



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

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

*Mine file
ACT/007/001
Folder #2*

September 13, 1991

TO: Daron Haddock, Permit Supervisor

FROM: Rick P. Summers, Senior Hydrologist *RS*

RE: Review: Demonstration of Design Event Exceedance (received September 6, 1991), Belina Mine Complex, Valley Camp Coal, Inc., ACT/007/001, Carbon County, Utah

Summary

This information was submitted in response to Notice of Violation N91-38-2-2 issued to Valley Camp Coal for failure to maintain diversion structures at the Belina Mine. The information summarizes the events that occurred prior to the inspection date and presents supportive information that a storm event occurred that produced a runoff peak in exceedance of the predicted design storm peak for the 10 yr. - 6 hr. precipitation event (regulatory criteria for design).

Study Method:

On August 2, 1991, a significant precipitation event passed over the Eccles Creek Drainage. The short duration, high intensity storm produced 0.76" of precipitation in a period of 20 minutes. This data is from a NOAA registered precipitation gage located at the Skyline Mine main facilities area to the west and up drainage from the Valley Camp Mine. Records from the Clear Creek gauging station located south of Eccles Creek indicate that this storm is equivalent to the 100 yr. - 30 minute precipitation event.

The operator also indicated that several small storms had occurred in the area in the previous week. Although the rain gage data does not confirm this statement, it is possible that the small cell nature of thunderstorms resulted in no precipitation at the gage. This would predispose the watershed to runoff due to high moisture content in the watershed soils. In design terms, the storms could result in an antecedent moisture condition approaching a level III which results in a higher curve number and predicted peak flow.

problems associated with correlating a short duration storm (20 minute) with the regulatory design value (6 hour duration). This is also consistent with Rule R614-301-742.323 which states: "...adequate to pass safely the peak runoff of a 10 yr. - 6 hr. precipitation event for a temporary diversion.....". The information from the precipitation gage at Skyline Mine is supportive that a significant event occurred in Eccles Canyon, however, the data alone is not conclusive that a precipitation event in excess of the 10 yr. - 6 hr. event occurred at the Valley Camp site.

The results of the field survey and the back calculation of the flows using Manning's equation and the culvert nomographs indicate that flows in excess of the estimated peak flows occurred on the order between two and ten times. For example, at culvert C-25-36, field measurements indicate the flow was approximately 32 cfs. The 10 yr. - 6 hr. design flow for this structure is 7.0 cfs (exceeded by 4.5 times). The reader might expect that if the event was exceeded, the order of exceedance would be reasonably the same for all structures. This large variance in the exceedance percentages between structures located reasonably close geographically is of some concern. The large differences are probably attributable to three sources of error:

1. The inherent error in the empirical based Manning's equation and the culvert nomographs coupled with flow characteristics during the event occurrence that can only be assumed.
2. Model errors in the methodology used to predict the design flows (i.e. SCS methodology variability).
3. Variability potentially associated with the nature of thunderstorm cell phenomena. The variability of the storm intensity from cell center to cell edge coupled with the effects of cell movement are exceedingly difficult to model or predict.

However, these sources of error are generally accepted by the hydrologic community which must rely on models to describe events for wildland watersheds. These watersheds are typically ungauged and lack a sizeable database for a more rigorous statistical analysis. With these factors in mind, the evidence collected at the site indicates and supports the conclusion that a precipitation event occurred at the Belina Mine site that produced a flow in excess of that estimated for the 10 yr. - 6 hr. precipitation event.

Determination:

In summary, the information presented and verified by the Division indicates that a storm occurred at the Valley Camp Belina site that produced a peak flow in excess of the 10 yr. - 6 hr. estimated design flow. This conclusion is based upon the following supportive information:

1. Presentation of calculations of the actual flow event based upon site evidence (high water marks).
2. Presentation of precipitation data from a recording raingage indicating a storm of approximately a 100 yr. - 30 min. magnitude occurred in the area (Skyline Mine).
3. Observations of the stormflow by mining personnel during the event and observations of evidence of the event by Division personnel following the event. This information is supportive of a significant event, but does not quantify the event in terms of regulatory criteria.

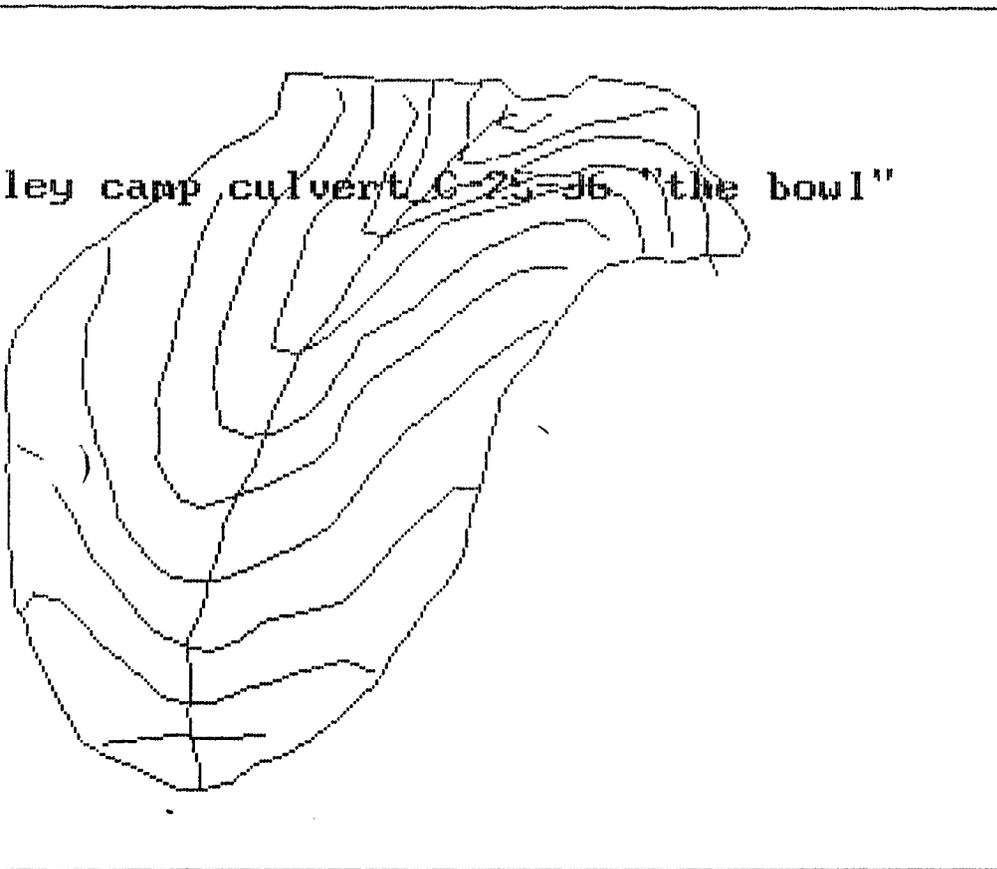
The success of this demonstration study can be attributed to close consultation with the Division, conducting the study within a short time frame of the event, and appropriate selection of study reaches with careful, meticulous data collection in the field.

Discussion on Estimating Peak Flows:

As a side note, the reader may be curious as to why the design flow storm was exceeded by such a significant degree. Also, it became interesting to note the comparison between an actual event and the predicted event. It is apparent that the selection of the curve number is of paramount importance for these small duration, high intensity storms and watersheds with a high moisture content. Using a CN of 73 as the design value for one watershed (C-25-36) and a 0.76"/20 minute storm, the SCS hydrograph model predicts a flow of 0.05 cfs. The actual measured flow at this site was on the order of 30 cfs. Examination of this problem (in addition to the potential sources of error noted previously) indicates that by using a curve number with a high soil moisture adjustment (AMC III, CN=83), the model predicts the peak flows a bit more accurately. Using a CN of 83 and identical watershed/storm assumptions the predicted flow value for this short duration storm is on the order of 23 - 28 cfs (depending on the storm distribution used). Additional occurrences of this type of storm and related failures may warrant Division modification of the design storm criteria and procedure for peak flow determination.

cc: L. Braxton
S. Falvey
T. Munson
H. Klein
P. Burton
J. Zingo, AFO

VCMSTREX.RS



MAP SCALE: 2000
 CONTOUR INTERVAL: 40

Name:

AREA: 156.26 acres

HYDRAULIC LENGTH: 4044.61 ft.

$T_c = 0.4940$, slope = 16.24%

CONTOUR # 1120 : 643.57 ft.

SUM OF CONTOURS: 27637.83 ft.

$T_{PC, 10-6} = 1.55''$

$Q_{10-6} = 7.31 \text{ cfs}$ \therefore applicable value

MINIMIZE CONTOUR #: 1160
 PRESS 'C' to continue 'R' to redo contours?



State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

John

Norman H. Bangerter
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355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
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INSPECTION REPORT

INSPECTION DATE & TIME: 08/08/91
02:50 pm 05:20 pm

Permittee and/or Operator's Name: Valley Camp
Business Address: Scofield Route Helper Ut. 84526
Mine Name: Belina Complex Permit Number: Act 007/001
Type of Mining Activity: Underground Surface Other
County: Carbon Company Official(s): Grant Howell
State Officials(s): Sharon Falvey
Federal Official(s): none
Partial: Complete Date of last Inspection: 07/08/91
Weather Conditions Warm, Clear
Acreage: Permitted 3136 Disturbed 79 Regraded Seeded
Bonded 79 Enforcement Action: yes

COMPLIANCE WITH PERMITS AND PERFORMANCE STANDARDS

	YES	NO	N/A	COMMENTS
1. PERMITS	()	()	()	()
2. SIGNS AND MARKERS	()	()	()	()
3. TOPSOIL	()	()	()	()
4. HYDROLOGIC BALANCE:				
a. STREAM CHANNEL DIVERSIONS	()	()	()	()
b. DIVERSIONS	()	(x)	()	(x)
c. SEDIMENT PONDS AND IMPOUNDMENTS	(x)	()	()	(x)
d. OTHER SEDIMENT CONTROL MEASURES	()	(x)	()	(x)
e. SURFACE AND GROUNDWATER MONITORING	()	()	()	()
f. EFFLUENT LIMITATIONS	()	()	()	()
5. EXPLOSIVES	()	()	(x)	()
6. DISPOSAL OF DEVELOPMENT WASTE & SPOIL	()	()	()	()
7. COAL PROCESSING WASTE	()	()	()	()
8. NONCOAL WASTE	()	()	()	()
9. PROTECTION OF FISH, WILDLIFE AND RELATED ENVIRONMENTAL VALUES	()	()	()	()
10. SLIDES AND OTHER DAMAGE	()	()	()	()
11. CONTEMPORANEOUS RECLAMATION	()	()	()	()
12. BACKFILLING AND GRADING	()	()	()	()
13. REVEGETATION	()	()	()	()
14. SUBSIDENCE CONTROL	()	()	(x)	()
15. CESSATION OF OPERATIONS	()	()	()	()
16. ROADS				
a. CONSTRUCTION	()	()	()	()
b. DRAINAGE CONTROLS	(x)	()	()	(x)
c. SURFACING	()	()	()	()
d. MAINTENANCE	()	()	()	()
17. OTHER TRANSPORTATION FACILITIES	()	()	()	()
18. SUPPORT FACILITIES				
UTILITY INSTALLATIONS	()	()	()	()

INSPECTION REPORT

(Continuation sheet)

Page 2 of 4

PERMIT NUMBER: ACT/007/011

DATE OF INSPECTION: 08/08/91

(Comments are Numbered to Correspond with Topics Listed Above)

On arrival at the Valley Camp office the only mine representative available was the receptionist Valerie^{Gloria} Smith. I inspected the lower Valcam load out then proceeded to the Mine area where I met Grant Howell, a mine employee. I informed Mr. Howell of my concerns at the site. No other representatives were available. At the end of my inspection I returned to the main office, the secretary had left and only grounds and building maintenance persons were present.

A few days prior to my inspection, two storm events occurred. During a follow-up phone conversation with Steve Tanner, Valley Camp Representative, on Monday August 12, 1991, I learned that the previous Friday evening storm was estimated to be a 3/4 inch storm over a 20 minute time period. The following storm apparently occurred on Tuesday, August 6th. Both events occurred within a relatively short time period.

4. Hydrologic Balance

b) Diversions

Culvert C-33-24, the inlet to sediment pond 004, was in need of repair at the time of my inspection. According to my observations water was flowing underneath the culvert and a good portion of the upstream bank had sloughed into the pond forming a delta below the culvert. The base of the culvert was plugged and dented.

On Friday August 9, 1991 I called the Mine again. The only available representative was Ron Polletta, Mine Foreman. I described the location and culvert identification (C-33-24) to Mr. Polletta. He said he would relay the information to the O'Tannys, the mine surface maintenance contractor.

On Monday August 12, 1991 Steve Tanner called me at around 11:00 am. He indicated that the moisture at the culvert of concern was probably part of snow melt from piles placed at the top of the bank for road maintenance. He had not yet been to the site. I informed him that I did not see any snow during my inspection and that he should go look at the culvert. Steve Tanner, after seeing the site, called me for the second time that day. Mr. Tanner then indicated that the riveted segments were

INSPECTION REPORT

(Continuation sheet)

Page 3 of 4

PERMIT NUMBER: ACT/007/011

DATE OF INSPECTION: 08/08/91

(Comments are Numbered to Correspond with Topics Listed Above)

4. Hydrologic Balance

b) Diversions (continued)

detached at a bend in the culvert located at the upper edge of the bank above the pond: he also indicated that the lower portion of the pipe was deformed and plugged. Mr. Tanner said that he would order new pipe segments to replace the damaged pipe, and that culvert would be fixed to allow passage of flow on the following morning, Tuesday, August 13, 1991. NOV N91-38-2-1 was issued on August 13, 1991.

The southeast inlet to the pond also showed signs of destabilization. The riprap placed to protect the inlet was washed out but, the function of the channel was maintained.

c) Sediment Ponds And Impoundments

No flow was discharging from any of the ponds at the time of the inspection. Pond 004 was full to approximately 3.5 inches from the principle spillway outlet. Water was flowing over the upstream embankment and had apparently destabilized it so that it formed a delta at the base of the damaged culvert. This did not appear to significantly decrease the pond design capabilities, but the sediment level should be checked for capacity requirements.

Other observations at the pond include a small area of orange discoloration of the coal waste in a portion of the moistened bank. The majority of the flow did not have the discoloration. This indicates a need to sample the material that is being placed at the top of the pond as well as other material at the site for potential Acid and Toxic forming materials.

d) Other Sediment Control Measures

The straw bales placed along drainage D-21, between the road and Eccles Creek, was filled with sediment. Some of the sediment was reaching the stream channel and was probably transported during the event. NOV N91-38-2-2 was issued on August 13, 1991.

INSPECTION REPORT

(Continuation sheet)

Page 4 of 4

PERMIT NUMBER: ACT/007/011

DATE OF INSPECTION: 08/08/91

(Comments are Numbered to Correspond with Topics Listed Above)

16. Roads

b) Drainage Controls

The successive storm events were great enough to loosen some areas of the cement drainage along the haul road. From the appearance of other sections of the ditch the affected area was portions of cement that were previously reconstructed due to cracking, probably from freeze/thaw action. In a couple of places the water was beginning to work on the fill below the culvert. The potential for piping exists if these areas are not plugged before the next significant event. At the time of this inspection no actual piping was observed.

Copy of this Report:

Mailed to: Brian Smith, OSM; Steve Tanner, Valley Camp
Given to: Joe Helfrich and Daron Haddock, DOGM

Inspector's Signature & Number: Sharon K Falvey #38 Date: 08/14/91

EVENT VIOLATIONS INSPECTORS STATEMENT

A. SERIOUSNESS

1. What harmful event was this regulation designed to prevent? Refer to the DOGM reference list of events below and remember that the event is not the same as the violation. Circle and explain each event.

- a. Activity outside the approved permit area.
 - b. Injury to the public (public safety).
 - c. Damage to property.
 - d. Conducting activities without appropriate approvals.
 - e. Environmental harm.
 - f. Water pollution.
 - g. Loss of reclamation/revegetation potential.
 - h. Reduced establishment, diverse and effective vegetative cover.
 - i. Other.
- e. Additional contributions of sediment would/could impair fish populations.**
- f. Additional contributions of sediment to stream.**

2. Has the event occurred? Yes No

If yes, describe it. If no, what would cause it to occur and what is the probability of occurrence of the event? (None, Unlikely, Likely, Occurred).

Another reasonably large rainfall event.

3. Would and/or does damage extend off the disturbed and/or permit area?

DISTURBED AREA

PERMIT AREA

Would: Yes No

Would: Yes No

Does: Yes No

Does: Yes No

4. Describe the duration and extent of the damage or impact. How much damage may have occurred if the violation had not been discovered by a DOGM inspector? Describe this potential damage and whether or not damage would extend off the disturbed and/or permit area.

Potential damage off the disturbed area. Yes No

Potential damage off the permit area. Yes X No

Potential for greater destabilization of the material stacked at the upstream end of the pond. This material then would fill the pond (potentially) decreasing design runoff retention, thus detention time. Sediment laden water would then exit the site through the spillway.

B. DEGREE OF FAULT (Check the statements which apply to the violation and discuss.)

1. (X) Was the violation not the fault of the operator (due to vandalism or an act of God), explain. Remember that the permittee is considered responsible for the actions of all persons working on the mine site.
2. (X) Was the violation the result of not knowing about DOGM regulations, indifference to DOGM regulations or the result of lack of reasonable care, explain.

() If the actual or potential environmental harm or harm to the public should have been evident to a careful operator, describe the situation and what, if anything, the operator did to correct it prior to being cited.

() Was the operator in violation of a specific permit condition?
3. (X) Did the operator receive prior warning of noncompliance by State or Federal inspectors concerning this violation?

() Has DOGM or OSM cited the violation in the past? If so, give the dates and the type of warning or enforcement action taken.

Explanation

1. **The violation is a result of 2 consecutive (separated by a couple of days) rainfall events.**
2. **Appears as the result of lack of reasonable care. From my information gathered, no operator representative cognizant of the potential environmental damage was available at the mine following the first significant rainfall event.**

3. **Attempts were made to inform mine representatives of the problem. It was identified as a "concern", not a potential violation, to those I spoke with.**

C. GOOD FAITH

1. In order to receive good faith for compliance with an NOV or CO, the violation must have been abated before the abatement deadline. If you think this applies, describe how rapid compliance was achieved (give dates) and describe the measures the operator took to comply as rapidly as possible.

A. **Inspection occurred on August 8, 1991.**

B. **Precipitation events occurred late in the day on Friday, August 2, 1991, and on Tuesday, August 6, 1991.**

C. **Attempts to fix the problem occurred on Tuesday morning, August 13, 1991. I believe culverts were ordered on Monday, August 12, 1991.**

D. **Violation was delivered on August 13, 1991.**

2. Explain whether or not the operator had the necessary resources onsite to achieve compliance.

Operator had to order replacement parts for the culvert.

3. Was the submission of plans prior to physical activity required by this NOV/CO? Yes ___ No X If yes, explain.

August 27, 1991
DATE

Sharon K. Fabray Rec. Hyder
AUTHORIZED REPRESENTATIVE

EVENT VIOLATIONS INSPECTORS STATEMENT

A. SERIOUSNESS

1. What harmful event was this regulation designed to prevent? Refer to the DOGM reference list of events below and remember that the event is not the same as the violation. Circle and explain each event.

- a. Activity outside the approved permit area.
- b. Injury to the public (public safety).
- c. Damage to property.
- d. Conducting activities without appropriate approvals.
- e. Environmental harm.
- f. Water pollution.
- g. Loss of reclamation/revegetation potential.
- h. Reduced establishment, diverse and effective vegetative cover.
- i. Other.

e. Additional contributions of sediment could impair fish populations.

f. Additional contributions of sediment to the system.

2. Has the event occurred? Yes X No ___

If yes, describe it. If no, what would cause it to occur and what is the probability of occurrence of the event? (None, Unlikely, Likely, Occurred).

Yes, the straw bales were filled and sediment had moved into the area of the stream channel.

3. Would and/or does damage extend off the disturbed and/or permit area?

DISTURBED AREA

PERMIT AREA

Would: Yes X No ___

Would: Yes ___ No ___

Does: Yes X No ___

Does: Yes ___ No ___

4. Describe the duration and extent of the damage or impact. How much damage may have occurred if the violation had not been discovered by a DOGM inspector? Describe this potential damage and whether or not damage would extend off the disturbed and/or permit area.

Potential damage off the disturbed area. Yes X No

Potential damage off the permit area. Yes X No

The damage appeared to have occurred during the larger event. A greater portion of sediment was probably retained on-site than moved off-site. Another large event would have moved more sediment to the steam channel.

B. DEGREE OF FAULT (Check the statements which apply to the violation and discuss.)

1. (X) Was the violation not the fault of the operator (due to vandalism or an act of God), explain. Remember that the permittee is considered responsible for the actions of all persons working on the mine site.
2. (X) Was the violation the result of not knowing about DOGM regulations, indifference to DOGM regulations or the result of lack of reasonable care, explain.
 - () If the actual or potential environmental harm or harm to the public should have been evident to a careful operator, describe the situation and what, if anything, the operator did to correct it prior to being cited.
 - () Was the operator in violation of a specific permit condition?
 - () Did the operator receive prior warning of noncompliance by State or Federal inspectors concerning this violation?
 - () Has DOGM or OSM cited the violation in the past? If so, give the dates and the type of warning or enforcement action taken.

Explanation

1. **The violation is a result of 2 consecutive rainfall events.**
2. **Appears to be the result of lack of reasonable care as I have received no information demonstrating otherwise. No operator/representative cognizant of the potential environmental damage was available at the mine following the 1st significant rainfall event.**

NOV/CO #N-91-38-2-2
VIOLATION # 2 of 2

C. GOOD FAITH

1. In order to receive good faith for compliance with an NOV or CO, the violation must have been abated before the abatement deadline. If you think this applies, describe how rapid compliance was achieved (give dates) and describe the measures the operator took to comply as rapidly as possible.
 - A. Inspection occurred on August 8, 1991.
 - B. Precipitation events occurred on Friday, August 2, 1991 and Tuesday, August 6, 1991.
 - C. Straw bales were placed in ditch on August 13, 1991. (Not Staked)
 - D. Violation was delivered on August 13, 1991.
2. Explain whether or not the operator had the necessary resources onsite to achieve compliance.

I believe so.
3. Was the submission of plans prior to physical activity required by this NOV/CO? Yes ___ No X If yes, explain.

August 27, 1991
DATE

Shawn K. Fulmer, Rec Hydro.
AUTHORIZED REPRESENTATIVE