



COLORADO
Division of Water Resources
Department of Natural Resources
Dam Safety Branch

August 31, 2021

Mr. Scott Southworth
Falls Creek Ranch Association
6530 Falls Creek Main
Durango, CO 81301
via email: scottrubin410@gmail.com

When replying, please refer to:
TURNER DAM, DAMID 300113
Water Division 7, Water District 30

SUBJECT: 2021 Engineers Inspection Report

Dear Scott,

On August 16, 2021, I performed a dam safety inspection for the above referenced structure in accordance with Section 37-87-107, C.R.S. (1991 Repl. Vol.), which assigns the responsibility for the determination of the safe storage level for the reservoirs within Colorado to the State Engineer. The enclosed inspection report summarizes my findings during the inspection.

The condition of the Dam is rated as Satisfactory, and the recommended safe storage level is Full Storage. Please read the report and implement the recommendations on page 3.

If you have any questions, please contact me at 970-317-4147.

Sincerely,

Matthew J Gavin, P.E.
Colorado Dam Safety Branch

ec: Rob Genualdi, Division Engineer, Water Division 7
Bill McCormick, Chief, Dam Safety Branch
Jeff Titus, Water Commissioner, WD30



ENGINEER'S INSPECTION REPORT

INSPECTOR: MJG

OFFICE OF THE STATE ENGINEER - DIVISION OF WATER RESOURCES - DAM SAFETY BRANCH

1313 SHERMAN STREET, ROOM 818, DENVER, CO 80203, (303) 866-3581

DAM NAME: TURNER T: 360N R: 0090W S: 21 COUNTY: LA PLATA DATE OF INSPECTION: 8/16/2021
DAM ID: 300113 YRComp: 1969 DAM HEIGHT(FT): 35.0 SPILLWAY WIDTH(FT): 125.0 PREVIOUS INSPECTION: 8/17/2020
CLASS: High hazard DAM LENGTH(FT): 510.0 SPILLWAY CAPACITY(CFS): 5000.0 NORMAL STORAGE (AF): 472.0
DIV: 7 WD: 30 CRESTWIDTH(FT): 22.0 FREEBOARD (FT): 6.0 SURFACE AREA(AC): 42.0
EAP: 7/29/2019 CRESTELEV(FT): 7150.0 DRAINAGE AREA (AC.): 4057.0 OUTLET INSPECTED: 8/23/2013

CURRENT RESTRICTION: -- NONE --

OWNER: FALLS CREEK RANCH ASSOCIATION, INC. OWNER REP.: SCOTT SOUTHWORTH
ADDRESS: 6350 FALLS CREEK MAIN CONTACT NAME: SCOTT SOUTHWORTH
DURANGO CO 81301-0000 CONTACT PHONE: (970) 247-9506X

INSPECTION PARTY : Scott Southworth Michael Morton James Glover
REPRESENTING : FCRA FCRA FCRA

FIELD CONDITIONS OBSERVED WATER LEVEL: BELOW DAM CREST 7.6 FT. Below Spillway 1.6 FT. GAGE ROD READING N/A
GROUND MOISTURE CONDITION: DRY WET SNOWCOVER OTHER

DIRECTIONS: MARK AN X FOR CONDITIONS FOUND AND UNDERLINE WORDS THAT APPLY

UPSTREAM SLOPE

PROBLEMS NOTED: (0) NONE (1) RIPRAP - MISSING, SPARSE, DISPLACED, WEATHERED (2) WAVE EROSION - WITH SCARPS
 (3) CRACKS WITH DISPLACEMENT (4) SINKHOLE (5) APPEARS TOO STEEP (6) DEPRESSIONS OR BULGES (7) SLIDES
 (8) CONCRETE FACING - HOLES, CRACKS, DISPLACED, UNDERMINED (9) OTHER

The upstream slope appears in good condition. Undesirable vegetation has been removed and the slope has a good short grass cover. There are some rushes along the normal water surface. They do not obscure the slope or cause any other issues. Riprap is performing well; no signs of erosion.

CONDITIONS OBSERVED: Good Acceptable Poor

CREST

PROBLEMS NOTED: (10) NONE (11) RUTS OR PUDDLES (12) EROSION (13) CRACKS - WITH DISPLACEMENT (14) SINKHOLES
 (15) NOT WIDE ENOUGH (16) LOW AREA (17) MISALIGNMENT (18) IMPROPER SURFACE DRAINAGE (19) OTHER

The crest has a good short grass cover and no vehicular access. No concerns noted.

CONDITIONS OBSERVED: Good Acceptable Poor

DOWNSTREAM SLOPE

PROBLEMS NOTED: (20) NONE (21) LIVESTOCK DAMAGE (22) EROSION OR GULLIES (23) CRACKS - WITH DISPLACEMENT (24) SINKHOLE
 (25) APPEARS TOO STEEP (26) DEPRESSIONS OR BULGES (27) SLIDE (28) SOFT AREAS (29) OTHER Grass Cover

(29) The slope appears unchanged in recent years with the exception of a slightly improved grass cover. There are no signs of instability or other concerns.

CONDITIONS OBSERVED: Good Acceptable Poor

SEEPAGE

PROBLEMS NOTED: (30) NONE (31) SATURATED EMBANKMENT AREA (32) SEEPAGE EXITS ON EMBANKMENT
 (33) SEEPAGE EXITS AT POINT SOURCE (34) SEEPAGE AREA AT TOE (35) FLOW ADJACENT TO OUTLET (36) SEEPAGE INCREASED / MUDDY
DRAIN OUTFALLS SEEN No Yes Show location of drains on sketch and indicate amount and quality of discharge. (37) FLOW INCREASED / MUDDY (38) DRAIN DRY / OBSTRUCTED
 (39) OTHER

The embankment exhibits good seepage control. The toe area and valley floor below the dam area firm and dry as are both groins. The dam has no internal drains.

CONDITIONS OBSERVED: Good Acceptable Poor

OUTLET

PROBLEMS NOTED: (40) NONE (41) NO OUTLET FOUND (42) POOR OPERATING ACCESS (43) INOPERABLE
 (44) UPSTREAM OR DOWNSTREAM STRUCTURE DETERIORATED (45) OUTLET OPERATED DURING INSPECTION YES NO
INTERIOR INSPECTED (120) NO (121) YES (46) CONDUIT DETERIORATED OR COLLAPSED (47) JOINTS DISPLACED (48) VALVE LEAKAGE
 (49) OTHER

(45) The outlet was operated to near full stroke during the inspection in an attempt to dislodge any potential obstructions in the intake. (48) Gate leakage had increased notably over historic performance since the conduit was lined in 2013. Historic leakage has been in the four gallons per minute range. At the time of the inspection, leakage was estimated at 15 gpm. After exercising the gate, leakage remained well above historic values. (120) The outlet has not been video inspected since just after the CIPP liner was installed in 2013. It would be advisable to perform a video inspection of the conduit, particularly at the gate to determine the cause of the increased leakage. A wet inspection/gate adjustment may be warranted as well.

CONDITIONS OBSERVED: Good Acceptable Poor

SPILLWAY

PROBLEMS NOTED: (50) NONE (51) NO EMERGENCY SPILLWAY FOUND (52) EROSION WITH BACKCUTTING (53) CRACK - WITH DISPLACEMENT
 (54) APPEARS TO BE STRUCTURALLY INADEQUATE (55) APPEARS TOO SMALL (56) INADEQUATE FREEBOARD (57) FLOW OBSTRUCTED
 (58) CONCRETE DETERIORATED / UNDERMINED (59) OTHER

The spillway is in serviceable condition with the willow thicket near the approach well under control. There are a few trees establishing along the right side-slope. The slope should be maintained free of trees up to the elevation of the dam crest at a minimum. The low-flow delivery system installed in the channel has continued to function as designed.

CONDITIONS OBSERVED: Good Acceptable Poor

MONITORING

EXISTING INSTRUMENTATION FOUND (110) NONE (111) GAGE ROD (112) PIEZOMETERS (113) SEEPAGE WEIRS / FLUMES
 (114) SURVEY MONUMENTS (115) OTHER

MONITORING OF INSTRUMENTATION (116) NO (117) YES PERIODIC INSPECTIONS BY: (118) OWNER (119) ENGINEER

(114) Monument survey is overdue. (117) Dam is routinely observed by dam committee and residents.

CONDITIONS OBSERVED: Good Acceptable Poor

MAINTENANCE AND REPAIRS

PROBLEMS NOTED: (60) NONE (61) ACCESS ROAD NEEDS MAINTENANCE (62) LIVESTOCK DAMAGE
 (63) BRUSH ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE (64) TREES ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE
 (65) RODENT ACTIVITY ON UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, TOE (66) DETERIORATED CONCRETE - FACING, OUTLET, SPILLWAY
 (67) GATE AND OPERATING MECHANISM NEED MAINTENANCE (68) OTHER

Dam appears very well-maintained. Continue with annual protocol.

CONDITIONS OBSERVED: Good Acceptable Poor

Go to next page for Overall Conditions and Items Requiring Actions

OVERALL CONDITIONS

Dam is well-maintained and performing as expected. Detailed inundation mapping was completed this year and added to the State's database.

Based on this Safety Inspection and recent file review, the overall condition is determined to be:

(71) SATISFACTORY

(72) CONDITIONALLY SATISFACTORY

(73) UNSATISFACTORY

ITEMS REQUIRING ACTION BY OWNER TO IMPROVE THE SAFETY OF THE DAM

MAINTENANCE - ORDINARY REPAIR - MONITORING

CLEAR TREES AND/OR BRUSH FROM

7/25/2019 - Continue to control brush on dam surfaces annually.

ENGINEERING - EMPLOY AN ENGINEER EXPERIENCED IN DESIGN AND CONSTRUCTION OF DAMS TO

PERFORM AN INTERNAL INSPECTION OF THE OUTLET

8/16/2021 - Perform Internal Inspection to Investigate Cause of Increased Leakage

The State Engineer, by providing this dam safety inspection report, does not assume responsibility for any unsafe condition of the subject dam. The sole responsibility for the safety of this dam rests with the reservoir owner or operator, who should take every step necessary to prevent damages caused by leakage or overflow of waters from the reservoir or floods resulting from a failure of the dam.

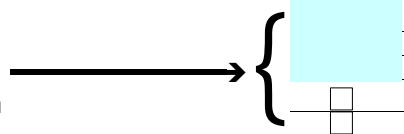
SAFE STORAGE LEVEL: RECOMMENDED AS A RESULT OF THIS INSPECTION

(101) FULL STORAGE

(102) CONDITIONAL FULL STORAGE

(103) RECOMMENDED RESTRICTION

(104) CONTINUE EXISTING RESTRICTION



FT. BELOW DAM CREST

FT. BELOW SPILLWAY CREST

FT. GAGE HEIGHT

NO STORAGE-MAINTAIN OUTLET FULLY OPEN

REASON FOR RESTRICTION

ACTIONS REQUIRED FOR CONDITIONAL FULL STORAGE OR CONTINUED STORAGE AT THE RESTRICTED LEVEL:

Engineer's
Signature

Matthew J. Lomi
INSPECTED BY

Owner's
Signature

OWNER/OWNER'S REPRESENTATIVE

DATE: / /

GUIDELINES FOR DETERMINING CONDITIONS

CONDITIONS OBSERVED - APPLIES TO UPSTREAM SLOPE, CREST, DOWNSTREAM SLOPE, OUTLET, SPILLWAY

GOOD In general, this part of the structure has a near new appearance, and conditions observed in this area do not appear to threaten the safety of the dam.	ACCEPTABLE Although general cross-section is maintained, surfaces may be irregular, eroded, rutted, spalled, or otherwise not in new condition. Conditions in this area do not currently appear to threaten the safety of the dam.	POOR Conditions observed in this area appear to threaten the safety of the dam.
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CONDITIONS OBSERVED - APPLIES TO SEEPAGE

GOOD No evidence of uncontrolled seepage. No unexplained increase in flows from designed drains. All seepage is clear. Seepage conditions do not appear to threaten the safety of the dam.	ACCEPTABLE Some seepage exists at areas other than the drain outfalls, or other designed drains. No unexplained increase in seepage. All seepage is clear. Seepage conditions observed do not currently appear to threaten the safety of the dam.	POOR Seepage conditions observed appear to threaten the safety of the dam. Examples: 1) Designed drain or seepage flows have increased without increase in reservoir level. 2) Drain or seepage flows contain sediment, i.e., muddy water or particles in jar samples. 3) Widespread seepage, concentrated seepage, or ponding appears to threaten the safety of the dam.
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CONDITIONS OBSERVED - APPLIES TO MONITORING

GOOD Monitoring includes movement surveys and leakage measurements for all dams, and piezometer readings for High hazard dams. Instrumentation is in reliable, working condition. A plan for monitoring the instrumentation and analyzing results by the owner's engineer is in effect. Periodic inspections by owner's engineer.	ACCEPTABLE Monitoring includes movement surveys and leakage measurements for High and Significant hazard dams; leakage measurements for Low hazard dams. Instrumentation is in serviceable condition. A plan for monitoring instrumentation is in effect by owner. Periodic inspections by owner or representative. OR, NO MONITORING REQUIRED.	POOR All instrumentation and monitoring described under "ACCEPTABLE" here for each class of dam, are not provided, or required periodic readings are not being made, or unexplained changes in readings are not reacted to by the owner.
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CONDITIONS OBSERVED - APPLIES TO MAINTENANCE AND REPAIR

GOOD Dam appears to receive effective on-going maintenance and repair, and only a few minor items may need to be addressed.	ACCEPTABLE Dam appears to receive maintenance, but some maintenance items need to be addressed. No major repairs are required.	POOR Dam does not appear to receive adequate maintenance. One or more items needing maintenance or repair has begun to threaten the safety of the dam.
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OVERALL CONDITIONS

SATISFACTORY The safety inspection indicates no conditions that appear to threaten the safety of the dam, and the dam is expected to perform satisfactorily under all design loading conditions. Most of the required monitoring is being performed.	CONDITIONALLY SATISFACTORY The safety inspection indicates symptoms of structural distress (seepage, evidence of minor displacements, etc.), which, if conditions worsen, could lead to the failure of the dam. Essential monitoring, inspection, and maintenance must be performed as a requirement for continued full storage in the reservoir.	UNSATISFACTORY The safety inspection indicates definite signs of structural distress (excessive seepage, cracks, slides, sinkholes, severe deterioration, etc.), which could lead to the failure of the dam if the reservoir is used to full capacity. The dam is judged unsafe for full storage of water.
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SAFE STORAGE LEVEL

FULL STORAGE Dam may be used to full capacity with no conditions attached.	CONDITIONAL FULL STORAGE Dam may be used to full storage if certain monitoring, maintenance, or operational conditions are met.	RESTRICTION Dam may not be used to full capacity, but must be operated at some reduced level in the interest of public safety.
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HAZARD CLASSIFICATION OF DAMS

High hazard Loss of human life is expected in the event of failure of the dam, while the reservoir is at the high water line.	Significant hazard Significant damage to improved property is expected in the event of failure of the dam while the reservoir is at the high water line, but no loss of human life is expected.	Low hazard Loss of human life is not expected, and damage to improved property is expected to be small, in the event of failure of the dam while the reservoir is at high water fine.
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NPH hazard - No loss of life or damage to improved property, or loss of downstream resource is expected in the event of failure of the dam while the reservoir is at the high water line.

Turner Dam

by Gavin, Matthew

August 16, 2021



Flume Vault in Spillway Channel



Parshall Flume in Vault



Stage on Flume = 0.24'



Crest from Right End of Dam



Upstream Slope from Right End of Dam



Outlet Operator



CIPP Lined WSP Outlet Conduit – Note Increased Gate Leakage



Exercising the Outlet



Exercising the Outlet



Toe Area from Near Left End of Embankment



The Loneliest Flume in La Plata County