



Oregon

Kate Brown, Governor

Water Resources Department

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Salem, OR 97301

(503) 986-0900

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January 13th, 2017

Paul Eckley
Public Works Director
City of Silverton
306 S. Water Street
Silverton, OR 97381

Re: Silver Creek Dam (S-66) – Inspection Summary

This dam was inspected on September 28th, 2016. I performed the inspection with State Engineer Keith Mills. You and Travis Sperle were also there for the inspection. The Water Resources Department conducts routine inspections of the dam's exterior surfaces to identify conditions that might affect the safety of the dam. Dams are assigned a hazard rating based on downstream hazard to people and property, not on the condition of the dam. Silver Creek Dam is classified as a high hazard dam. High hazard dams are inspected annually.

Summary: The dam is well maintained and operated and in satisfactory condition. No major issues of concern were identified at the dam during this inspection. The results of this inspection are illustrated and described in the following photos and text. This inspection includes recommendations to keep the dam safe and functional.

Results of Inspection:



The reservoir level was at an elevation of 423 feet, which corresponds to a freeboard of approximately 17 feet. The reservoir was clean and did not contain any logs or floating debris. The crest of this dam is wide and has a road that allows access to the entire crest. No signs of settlement, cracks, or depressions were observed during the inspection. Most of the dam has a well maintained grass cover, which is ideal. A well maintained grass cover on the dam effectively reduces surface erosion and provides very little cover for burrowing animals.



Toe drains and monitoring weirs



Low level outlet, toe drains, weirs



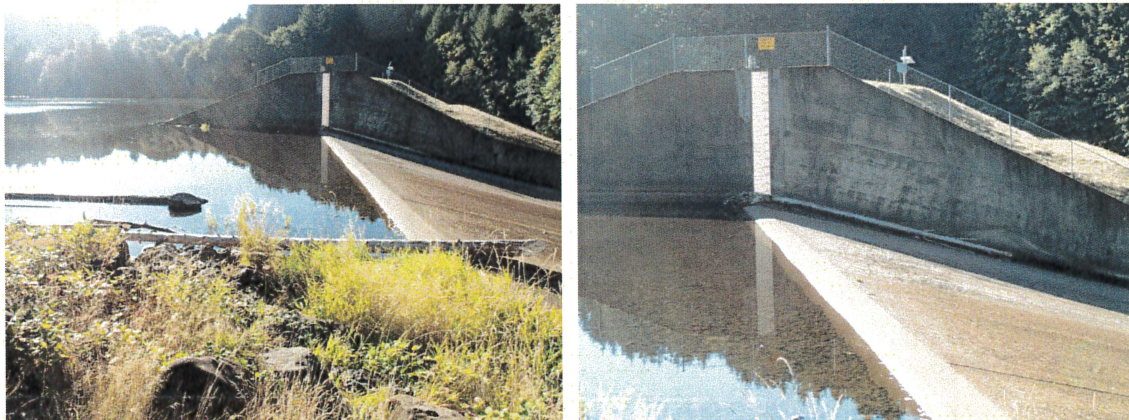
Wet spot below toe

At the time of the inspection, there was a minor amount of seepage flow through the embankment and into the toe drains. The seepage was clear of sediment which suggests that it is normal seepage. Most earth fill dams have seepage so a certain amount of

seepage through the embankment from the reservoir is normal. In addition, there was an area below the toe of the dam near the left abutment that was wet. There was no flowing or standing water but the soil was moist. This area was located off of the dam and likely is seepage from the reservoir that is moving underneath the dam. This type of seepage infrequently occurs on embankment dams and is less important from a dam safety perspective than the seepage through the embankment mentioned above.

Seepage is characterized in terms of the amount of flow (quantity) and whether or not the seeping water is clear or contains sediment. Increase in the quantity of seepage and/or the presence of sediment in the seeping water indicates that internal erosion and piping has developed through the embankment. Internal erosion and piping are serious dam safety issues that can lead to a dam failure if left unchecked. As a result, it is important that the seepage characteristics be monitored for changes over time. Remote monitoring was added in 2014/2015, which included the seepage measurements. This monitoring has made it easy to track the data and detect any unusual changes in seepage, if changes should occur.

The low level conduit outlet was partially submerged and does not close completely. In review of past inspections since 2001, it appears that this situation has not changed much. At some point this leak should be addressed.



Logs in spillway approach, control, and discharge section

There are many sources of large wood (trees) in the watershed for this dam. This has resulted in logs and debris floating into the reservoir and moving through the spillway. The spillway for this dam is very large and typically has been able to pass the large logs that have floated through the reservoir. However, as can be seen in the photos above and below, occasionally logs become stuck at transition points in the spillway. When this occurs, it is important that they be removed as soon as possible, as it creates an opportunity for additional logs and debris to get hung up. Accumulation of debris at any point in the spillway reduces the capacity of the spillway to pass flood flows and prevents it from functioning as designed. Removing this debris regularly will prevent it from becoming an issue. An alternative would be to install a log boom to catch logs and other floating debris before it reaches the spillway.



Logs accumulating in stilling basin



Spillway repair work

During our last inspection, in September 2015, repair of the spalled and cracked concrete portions of the spillway channel were in progress. The repairs seem to be holding up well. However, the repaired area should be monitored in the future for any changes. If similar cracking returns, it may be an indication that slab uplifting has recurred and further investigation would be required.

Recommendation(s):

1. Continue regular vegetation management
2. Monitor the repaired spillway joint for changes
3. Continue to monitor seepage
4. Investigate leakage through the low level conduit

We use a standard inspection form, and a copy of the field inspection sheet for this dam is attached. Thanks again for meeting with us. I plan on another routine inspection next year. Please let me know if you have any questions about this inspection. I look forward to future inspections of this dam.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tony Janicek".

Tony Janicek, Ph.D., P.E.
Dam Safety Program Coordinator
(503) 986-0839

C: Keith Mills, State Engineer
Joel Plahn, Watermaster District 16
Dam Safety File S-66



Dam Safety Inspection Form

State of Oregon
Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900

Name of Dam: SILVER CREEK File #: S-66
 Height: 65 ft. Storage: 1,300 ac. ft. Permit: R-5948 NID #: OR-00622
 Hazard: Low Significant High Request Inundation Analysis for change
 Inspector(s): MILLS, JANECK Watermaster District: 16
 Others on site: PAUL SCULLEY, TRAVIS SPERLE, MIKE
 Date: 9/28/2016 Weather: SUNNY
 Prior Inspection Date: 9/1/2015 Issues from prior inspection: NONE

Expedited Re-inspection Needed: Next Inspection Date: 2017

Rating Criteria: 5-Very good; 4-Adequate 3-Maintenance or minor repair needed
 2-Serious repair needed; 1- Urgent dam safety issue – action now - Contact dam owner and dam safety engineer directly

I. Dam	<input type="checkbox"/> Earth <input type="checkbox"/> Rock <input type="checkbox"/> Concrete <input type="checkbox"/> Other	Rating
Up. Slope	Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent <i>CLEAR</i>	5
Crest	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching <i>CLEAR</i>	5
Down. Slope	Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide <i>CLEAR</i>	5
R. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy) <i>CLEAR</i>	5
L. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy) <i>CLEAR</i>	5
Toe	Vegetation, Erosion, Seepage, Leak (muddy), Boil <i>MUDDY SPOT BELONGS TOE NEAR LEFT ABUTMENT</i>	5
Seepage/leak flow	Right ___ gpm Center ___ gpm Left ___ gpm Other ___ gpm (use comment)	—
Auxiliary dike (s)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> over 5	—
Comments:		

II. Reservoir	Pool elevation: <u>423'</u>	Point of Reference: <u>EL.</u>	Rating
Minimum freeboard	Vertical distance debris from debris line to crest ___ ft.		—
Floating Debris/Trash	<input checked="" type="checkbox"/> Clean <input type="checkbox"/> Around reservoir <input type="checkbox"/> Near spillway		4
Log Boom	<input type="checkbox"/> Not needed <input type="checkbox"/> Present <input type="checkbox"/> Needed <input type="checkbox"/> Deterioration <input type="checkbox"/> Ineffective		?
Unusual Conditions	<input checked="" type="checkbox"/> None <input type="checkbox"/> Active Landslide <input type="checkbox"/> Wildfire in Watershed <input type="checkbox"/> Other (comments)		
Comments:			

III. Toe Drains #	LOWER	UPPER						
Flow (gpm)	15	5-6						
Damage								
Sediment								
Rating								

*TOO SPELL WAY
(SEE PHOTO)*

IV. Conduit		Control: <input type="checkbox"/> Manual <input checked="" type="checkbox"/> Power <input type="checkbox"/> Other <input type="checkbox"/> Conduit Control missing	Rating
Inlet gate	<input checked="" type="checkbox"/> Submerged		—
Trash Rack	<input checked="" type="checkbox"/> Submerged		—
Control/Stem	<input checked="" type="checkbox"/> Clean <input type="checkbox"/> Greased <input type="checkbox"/> Irregular <i>HYDRAULIC</i>		4
Valve(s) cycling	<input type="checkbox"/> Frozen <input type="checkbox"/> unknown <input type="checkbox"/> past year <input checked="" type="checkbox"/> frequent <i>1-2 x per yr</i>		4
Diameter:	Material	Condition	—
Outlet Structure	<input type="checkbox"/> Overgrown <input checked="" type="checkbox"/> Clean <input type="checkbox"/> Pressurized <input type="checkbox"/> Leaking _____ gpm		4
Secondary outlet	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Type _____ Diameter _____ in.		—
Comments:			

V. Spillway		<input type="checkbox"/> Earth <input type="checkbox"/> Rock <input checked="" type="checkbox"/> Concrete <input type="checkbox"/> Other	Rating
Modifications	<input checked="" type="checkbox"/> None <input type="checkbox"/> Reduction in capacity <input type="checkbox"/> Feature not on design		—
Approach Channel	<input type="checkbox"/> Clear <input checked="" type="checkbox"/> Trees/brush <input type="checkbox"/> debris <input type="checkbox"/> erosion <i>FEW TREES LEAK + IN CONTROL SECTION</i>		4
Control Section	Width _____ Depth _____ <input type="checkbox"/> Concrete <input type="checkbox"/> Rock <input type="checkbox"/> Soil <input type="checkbox"/> Culvert <input type="checkbox"/> Unstable		—
Flashboards/Gate	<input checked="" type="checkbox"/> None <input type="checkbox"/> In place <input type="checkbox"/> operational <input type="checkbox"/> deteriorated		—
Discharge Channel	<input checked="" type="checkbox"/> Clear <input type="checkbox"/> Trees/brush <input type="checkbox"/> leakage <input type="checkbox"/> headcutting (_____ feet approaching control section, depth _____ feet.)		4
Stilling basin	<input type="checkbox"/> N/A <input checked="" type="checkbox"/> Functional <input type="checkbox"/> Minor Erosion <input type="checkbox"/> Severe Erosion/Undercutting		4
Aux. Spillway	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (use comments below)		—
Comments:	<i>CONCRETE REPAIRS (TOP SURFACE), FEW SURFACE CRACKS</i>		

VI. Access and Security		Rating	
Vehicle access	<input checked="" type="checkbox"/> Public road <input type="checkbox"/> all weather road <input type="checkbox"/> dirt road <input type="checkbox"/> cross country		4
Fencing, signage	<input type="checkbox"/> Remote <input type="checkbox"/> Gate <input checked="" type="checkbox"/> Secure Fence <input checked="" type="checkbox"/> Camera <input type="checkbox"/> Uncontrolled		4
New Structure below dam	Dwelling _____ feet Paved public road _____ feet Other sig building _____ feet		—
Emergency Action Plan	<input type="checkbox"/> Not required <input checked="" type="checkbox"/> Completed _____ at dam (dated _____) <input type="checkbox"/> None		4
Comments:			

Instrumentation data reviewed: N/A Yes No

Other:

• SET UP TIME TO DO KAMUWIKIYU

• GET DATA / ACCESS TO DAM