



Oregon

John A. Kitzhaber, MD, Governor

Water Resources Department

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December 24, 2014

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

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

This dam was inspected on August 14, 2014. I performed the inspection with Engineering Intern, Tim Bedford; Rich Barstad and Travis Sperle from the city of Silverton were also there for the inspection. The Water Resources Department conducts routine inspections 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, inspected annually.

Summary: The dam is well maintained, operated, and in satisfactory condition. No issues of concern were identified at the dam. The City is in the process of developing real time monitoring of this dam. The results of this inspection are illustrated and described in the following photos and text.

Results of Inspection:



Crest

Vegetation on the dam had just been maintained, and it had a manicured appearance. This allowed simple and thorough inspection of all exterior surfaces of the dam. No evidence

of surface erosion or movement of the embankments was observed. The crest is fairly uniform and wide.



Downstream face from left abutment

The dam has a well maintained cover of grass and other non woody vegetation. The grass cover on the dam now effectively reduces surface erosion and provides very little cover for burrowing animals.



Spillway control section

The reservoir level was just below the spillway control section elevation for this inspection. There is a new staff gage to determine freeboard at the spillway crest, installed a couple of years ago to aid visual monitoring of water level during any significant flood event. Since the spillway was dry, a thorough inspection of the spillway surface was possible.



There are a few spillway slab locations with apparent voids under the concrete. It is unclear if the voids are the result of slight separation of concrete at the joints or if there are larger voids under the slabs. To make this determination it will probably require small cores through the concrete. It may be necessary to grout or make other repairs depending on what is found to be the cause(s) of these voids.



Stilling basin

The stilling basin and the base of the concrete section have been undercut by erosion over the years. The stilling basin was completely restored two years ago by use of a dental concrete to fill all the eroded surfaces. No changes were observed in seepage through the spillway drains.



Outlet of low level conduit

The interior of the low level conduit has not been inspected in at least the last 8 years, at least not by an OWRD dam safety engineer. There appears to be continued minor leakage through the valve. It is a priority to inspect the conduit during the inspection this coming year, at a time where it is convenient for the City to close the valve.



Collecting seepage

Seepage on this dam has been collected since construction. In the past, individual measurements have been made, often by filling buckets. Remote monitoring was under development for this inspection, I look forward to future reports from this monitoring. This monitoring will add to the security of this dam, as it should be able to detect any unusual changes in seepage rates.



New monitoring of Instrumentation

Since our prior inspection in 2013 a small outbuilding has been built to house the electronic instrumentation equipment. Currently there are weir boxes and flow gages on all of the toe drains to monitor any changes in flow through the dam. Rich Barstad also informed us that a more comprehensive Early Warning System is going to be implemented sending notifications to appropriate personnel when the reservoir reached hazardous levels. Furthermore, Engineered Monitoring Systems is installing more piezometers to monitor flow depths and rates through the dam. Although this will not be complete for some time, having an electronic notification system such as this is very beneficial to the safety of downstream residents and dam safety when unusual conditions present themselves. Thank you for taking such an active role in maintaining the safety of Silver Creek Dam.

Recommendation(s):

1. Continue excellent maintenance of vegetation on the dam.
2. Complete the monitoring system.
3. Demonstrate monitoring, so that OWRD can link to water levels if possible.
4. At next year's inspection, have cores cut through the spillway, and temporarily close the conduit so the interior may be inspected.

We use a standard inspection form, a copy of the field inspection sheet for this dam is attached. Please let me know if you have any questions about this inspection. I look forward to future inspections of this dam.

Sincerely,

Keith Mills, P.E., Dam Safety Engineer
(503) 986-0840
Cell (541) 706-0849

C: 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: Silverton File #: S-66
 Height: 65 ft. Storage: 1300 ac. ft. Permit: R-5948 NID #: OR-00622
 Hazard: Low Significant High Request Inundation Analysis for change
 Inspector(s): Keith Mills, Tim Badland Watermaster District: 16
 Others on site: Rich Travis
 Date: 8/14/2014 Weather: Clear
 Prior Inspection Date: _____ Issues from prior inspection: _____

Expedited Re-inspection Needed: Next Inspection Date: _____

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 checked="" type="checkbox"/> Rock <input type="checkbox"/> Concrete <input type="checkbox"/> Other	Rating
Up. Slope	Vegetation, Animals, Erosion, Wave Action, Depression, Whirlpool adjacent <u>Clean</u>	4+
Crest	Width, Surfacing, Vegetation, Trampling, Depression, Cracks, Breaching <u>10'-12' Varies</u>	4
Down. Slope	Vegetation, Animals, Erosion, Seepage, Leak (muddy), Bulge, Depression, Slide <u>Grass</u>	4+
R. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy) <u>clean</u>	5
L. Abutment	Vegetation, Animals, Erosion, Seepage, Leak (muddy) <u>clean</u>	5
Toe	Vegetation, Erosion, Seepage, Leak (muddy), Boil <u>damp - no flow</u>	4
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>423.6'</u>	Point of Reference: <u>Staff gage</u>	Rating
Minimum freeboard	Vertical distance debris from debris line to crest _____ ft.		5
Floating Debris/Trash	<input checked="" type="checkbox"/> Clean <input type="checkbox"/> Around reservoir <input type="checkbox"/> Near spillway		5
Log Boom	<input checked="" type="checkbox"/> Not needed <input type="checkbox"/> Present <input type="checkbox"/> Needed <input type="checkbox"/> Deterioration <input type="checkbox"/> Ineffective		5
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 #	#3	#6	left	right	4	203	5,6,8,9	Rating
Flow (gpm)	10	5	2	12	5	20	trickle	
Damage								
Sediment								
Rating								

on left wall of spillway facing downstream
 unregistered seepage 4 gpm

IV. Conduit	Control: <input checked="" type="checkbox"/> Manual <input type="checkbox"/> Power <input type="checkbox"/> Other <input type="checkbox"/> Conduit Control missing	Rating
Inlet	<input checked="" type="checkbox"/> Submerged <input type="checkbox"/> Debris on Trash Rack <input type="checkbox"/> Deterioration	4
Trickle tube	<input checked="" type="checkbox"/> None <input type="checkbox"/> Screened <input type="checkbox"/> Blockage <input type="checkbox"/> Deterioration	4
Control/Stem	<input checked="" type="checkbox"/> Operable <input type="checkbox"/> Damaged <input type="checkbox"/> Missing	4
Valve(s) cycling	<input type="checkbox"/> Frozen <input type="checkbox"/> unknown <input checked="" type="checkbox"/> past year <input type="checkbox"/> frequent	4A
Size: 42"	Material _____ Condition _____	4
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 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 checked="" type="checkbox"/> Clear <input type="checkbox"/> Trees/brush <input type="checkbox"/> debris <input type="checkbox"/> erosion	5
Control Section	Width _____ Depth _____ <input checked="" type="checkbox"/> Concrete <input type="checkbox"/> Rock <input type="checkbox"/> Soil <input type="checkbox"/> Culvert <input type="checkbox"/> Unstable	5
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	5
Aux. Spillway	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (use comments below)	
Comments:	Pitting @ 1st Joint 23' from right edge	

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	5
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	5
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	
Comments:		

Instrumentation data reviewed: N/A Yes No

Other:

Paul Eckley - New Public Works Director