



# Oregon

John A. Kitzhaber, MD, Governor

## Water Resources Department

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DEC 31 2012

CITY OF SILVERTON  
PUBLIC WORKS

December 27, 2012

Gerald Fisher, 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 9, 2012. I performed the inspection with engineering intern Tony Janicek. You were also there for the inspection. The Water Resources Department conducts these routine inspections to identify safety, maintenance or operational issues that may affect dam integrity. 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.

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 properly working.

### Results of Inspection:

The spillway is the most important safety feature of the dam. At the time of the inspection the spillway was undergoing repairs to fix damage caused in part by scour associated with loose boulders at the outlet of the spillway.



Spillway with fresh concrete filling scour in stilling basin





New staff gage at spillway crest

After the winter storm of January 2012, it was apparent that an easy to read gage at the crest of the spillway would be very useful, as the existing gage is much harder to see. And it will be interesting to see how the static level in the reservoir compares to the depth at the crest of the spillway during large peak flows.



Inspecting spillway discharge channel slabs

The lowest slabs were visually inspected last year, and at least at the base of the spillway are poured directly onto competent basalt rock. The materials under the upper part of the

spillway include more of a colluvial material, so the concrete slabs and walls serve a critical dam safety function at this location.



Spall and cracking of concrete slabs of the emergency spillway

There was a hollow sound when hitting concrete with the hammer at very limited locations. This may indicate small voids under the slabs at these locations. There is no associated distress observed in the slabs at this time. There was no sign of water flowing out of or into the joints either.



Downstream face, toe and spillway work

This photo provides the best view of the maintenance and repair work done on Silver Creek Dam in 2012. This addressed many of the priority issues from the 2011 inspection. The one issue here is that the embankment is currently accessible to heavy equipment during low flow periods, as there is no road to the south side of the dam.



Repairs taking place at the outlet of the emergency spillway channel

This project filled the scour hole at the approach to the stilling basin. The concrete was nearly all placed during our inspection. This looks to have addressed a recommendation made by CH2MHill and by me from the 2011 inspections.



Rip rap located near the spillway approach

The gravel in the in foreground has just been re-graded, and I will be interested in evaluating this next year after winter flows. Most of the rip-rap appears sufficiently grouted, but there appear to be a few loose boulders. I believe these have been responsible in part for the past erosion in the approach to the stilling basin.



Instructions for hydraulic controls of two gate valves

These controls shown above are secure in a lock control box. The instructions are relatively simple, and the interior of the box was clean and operational. Operational contingencies in the case of a leak in the hydraulics will be important.



Low level conduit

The low level conduit of this dam was partly submerged. The upper portion of the conduit could be observed and showed no distress. The concrete is in good condition, and there is no erosion around the outlet structure.



Downstream face of the dam showing excellent vegetation control

Thorough maintenance from 2012 is very apparent in this photo. All drains are carefully marked, and this low grass cover is the best possible cover on a dam. The low grass cover effectively prevents erosion, yet allows evaluation of the embankment and drains.

**Recommendations in order of priority:**

- 1) Secure access by road to the main dam embankment (probably from the south)
- 2) Investigate possible small voids under discharge spillway slabs
- 3) Secure any loose rip-rap on spillway approach
- 4) Continue to work towards remote monitoring of the dam. The simplest monitoring will be to have cameras installed in key locations. In my opinion, the next priority will be to reservoir level and accurate discharge flow measurements

We use a standard inspection form, and a copy of the field inspection sheet for this dam is attached. Thanks again for meeting with Tony and me. Please let me know if you have any questions about this inspection. I look forward to the 2013 inspection of this dam.

Sincerely,

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

C: Barry Norris, State Engineer  
Mike McCord, Watermaster District 16  
Dam Safety File S-66



III.A. Other Instrumentation	<input type="checkbox"/> Piezometers	<input type="checkbox"/> Inclinator(s)	<input type="checkbox"/> Ground Motion
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Reviewed by dam safety engineer NA Yes No

<b>IV. Conduit</b>	Control: <input type="checkbox"/> Trickle tube <input type="checkbox"/> Manual Valve <input checked="" type="checkbox"/> Power Valve <input type="checkbox"/> other		<b>Rating</b>
Inlet gate	<u>Submerged</u>	<u>hydraulic</u>	—
Trash Rack	<u>Submerged</u>	replaced ~ 14 years ago - 18"	—
Control/Stem	Clean Greased Irregular	<u>Secure +</u>	4+
Valve(s) cycling	<input type="checkbox"/> Frozen <input type="checkbox"/> unknown <input type="checkbox"/> past year <input checked="" type="checkbox"/> frequent		4
Diameter: _____	Material _____	Condition <u>Submerged</u>	—
Outlet Structure	Overgrown <u>Clean</u> Pressurized Leaking _____ gpm	*	4
Secondary outlet	Yes <input type="checkbox"/> No <input type="checkbox"/> Type _____	Diameter _____ in.	Consider flow min 1/2

<b>V. Spillway</b>	<input type="checkbox"/> Earth <input type="checkbox"/> Rock <input checked="" type="checkbox"/> Concrete <input type="checkbox"/> Other	
<b>Modifications</b>	<u>None</u> Reduction in capacity Feature not on design	—
Approach Channel	Clear Trees/brush debris sill	roll just in from
Flashboards/Gate	<u>None</u> In place operational deteriorated	→ boulders side of right
Discharge Channel	Clear Trees/brush leakage headcutting ( _____ feet approaching control section, depth _____ ft)	5
Stilling basin	Not applicable <u>functional</u> Minor Erosion Severe erosion/Undercutting	4+
Aux. Spillway	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No use comments below	

<b>VI. Access and Security</b>		
Vehicle access	<u>Public road</u> all weather road dirt road cross country	one side only
Fencing, signage	Remote <u>Clear signage</u> Secure Fence Camera Unsecure	4
On Site Dam Tender/Contact	Yes No Name: _____ Phone: _____	
Emergency Action Plan	<input type="checkbox"/> Not required <input checked="" type="checkbox"/> Completed _____ at dam (dated _____) <input type="checkbox"/> None	

Comments:

① concrete being filled ② ④ - some hollow areas under spillway joints - consider

Access to other side, high warning system - good - slightly lower priority  
 - highest camera  
 great maintenance by Division staff

Reqs

- ① Access road
- ② Spalling spillway slab
- ③ loose rocks spillway approach
- ④ Camera at discharge  
 Camera at bench by access  
 gate at discharge