

STATE OF CALIFORNIA  
CALIFORNIA NATURAL RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
DIVISION OF SAFETY OF DAMS

**INSPECTION OF DAM AND RESERVOIR IN CERTIFIED STATUS**

Name of Dam Santiago Creek Dam No. 75-0 County Orange  
Type of Dam Earth Type of Spillway Concrete weir and channel  
Water is 39.6 feet below spillway crest and 59.6 feet below dam crest.

Weather Conditions Clear, mild

Contacts Made Steve Sweeney, Dean Esconbido, Jerry Vilander

Reason for Inspection Annual Maintenance Inspection

**Important Observations, Recommendations or Actions Taken**

1. Clear the woody vegetation beyond both groins a distance of 10-feet by November 1, 2018.
2. Remove the large sycamore tree near the downstream toe of the dam by November 1, 2018.
3. Repair the damaged left spillway training wall at the ski jump by November 1, 2019.
4. Stabilize the eroding foundation under the spillway ski jump by November 1, 2019.
5. Stabilize the left spillway abutment near the approach by November 1, 2023 (pending conclusions from the Spillway Assessment Review and Evaluation).
6. Replace the ladder on the tower when the reservoir level permits access.

**Conclusions**

From the known information and visual inspection, the dam, reservoir, and the appurtenances are judged safe for continued use.

**Observations and Comments**

Dam

This is a dual zoned embankment with the impervious zone positioned in the upstream fourth of the dam, with no drains. The graveled crest was level, well aligned, and in satisfactory condition. The upstream slope was lined with panels of concrete, moderately weathered, but revealed no signs of instability. My review of the Files found no historical upstream slope stability issues. Minor spalls and deterioration expected of concrete this age were observed in the lower panels close to the waterline. The downstream slope was covered with low grasses and scattered clumps of anise and sumac brush. The owner's vegetation control contractor comes out once a year to clear the brush. What was visible of the downstream slope, appeared uniform and stable. A large sycamore tree at the downstream toe needs to be removed, as well as the woody vegetation along both abutments for a distance of 10-feet beyond the groins. Light rodent activity observed along the lower sections of the downstream slope calls for continued rodent control measures.

Spillway

The spillway approach was clear and unobstructed, except for the approach at the left-most bay, which was partially blocked with colluvial deposits from chronic erosion of the steep left abutment. The abutment is eroding away from the left training wall and bridge structure. The concrete lining the spillway floor is aged, with alligator cracking, exposed rebars, spalls, cracks, and numerous patching efforts evident. Except for the joint separating the original and rebuilt sections, there are no joints in the slab or training walls. Both training walls contain numerous long diagonal shear cracks, superficially patched. The right training wall abuts a narrow ridge of native sandstone separating the spillway and dam. At the location of the ski jump, the left training wall was damaged by what might have been falling boulders. This section of wall should be repaired to halt continued undermining of the ski jump structure during spillway flows. The underside of the ski jump and waste channel were not inspected due to safety concerns. If the piers supporting the ski jump section become exposed due to continuing erosion, measures should be taken to halt the erosion. The bull noses of the bridge piers contain alligator cracks up to about 4-feet above the base. This

Photos taken? Yes X No         
cc for Owner/Book

Electronic Signature:  
Philip Lee, P.E.  
7/24/2018

Inspected by PW Lee  
Date of Inspection 5/3/2018  
Date of Report 6/8/2018

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Dam No. 75-0

Date of Inspection 5/3/2018

## Observations and Comments

	<p>corresponds to the height of water held back by the flashboards, since removed. The exposed lateral rebars under the bridge deck indicate a structural deficiency. I advised that no vehicles or weighted equipment be allowed on this bridge. A Draft Spillway Condition Assessment report dated 2/28/18 describes the spillway in more detail. This aging spillway remains operational, but it may be a candidate for structural updating, pending conclusions from the condition assessment review.</p>
<u>Outlet</u>	<p>The outlet consists of 8 upstream valves located in the tower, 2 downstream diversion valves and a 30" blowoff valve. Access to the upstream outlet controls requires a boat ride and ladder climb to the top of the tower. The four lower valves in the tower have silted up and become dysfunctional for many years. They include the valves identified as Elevations 710, 700, 690, and the drain valve. The four functioning valves, positioned at Elevations 720, 730, 740, and 750, were fully cycled satisfactorily on this inspection. The valves at Elevations 730 and 750 were controlled by pneumatic actuators and operated easily. The valves at Elevations 720 and 740 required a hand operated power-drive tool that took approximately 40 minutes to fully operate one direction. It took a total of 2 hours and 40 minutes to fully cycle these last two. This may be a concern in an emergency situation. Mr. Vilander indicated there are plans to replace the upstream outlet system due to a seismic stability issue with the tower. The two downstream diversion butterfly valves and the 30-inch cone diffusion blowoff valve were fully cycled satisfactorily.</p>
<u>Seepage</u>	<p>There were no signs of seepage observed on the downstream slope, groins, or toe of the dam.</p>
<u>Instr.</u>	<p>Instrumentation at this dam consists of 7 open well multistage piezometers, 5 single stage piezometers, and 5 survey monuments. The latest instrumentation surveillance report submittal was dated 8/25/2017 and included data for all of 2016. My review of the data for this period found no alarming trends beyond the anomalies associated with contamination of the open tube piezometers, which have been addressed. The survey data showed negligible movements. The instrumentation data indicates the dam is performing satisfactorily and no new instrumentation is judged necessary at this time.</p>
<u>Other</u>	<p>The only way to access the upstream outlet valves is from the top of the tower. The highly corroded ladder to access this platform poses a potential impediment to the controls (say in an emergency) if someone gets injured from the rungs or mounting devices breaking off while climbing the ladder. Recommend replacing this ladder as soon as practical, while the reservoir level is still low. No application is required.</p>

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Crest



Upstream Slope and Spillway Approach



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Concrete Panels lining the Upstream Slope



Downstream Slope



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Remove this Tree at Downstream Toe



Rodent Activity on lower portion of Downstream Slope



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Remove Woody Vegetation 10-feet beyond the groins



Spillway Approach



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Chronic Erosion of Left Abutment at Spillway Approach



Spillway Channel



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Damaged Left Training Wall at Ski Jump



Alligator Cracking on Bull Noses of Spillway Bridge Piers



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Valve Control Stems inside Tower



Typical Ladder Rung Accessing Tower – Note Holidays and Cracked weld



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Structural Framing for Tower Ladder



One of Two Downstream Diversion Valve /Actuators



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Blowoff Cone Valve



Blowoff Energy Dissipater Structure