

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 Alpine Dam No. 33 County Marin
 Type of Dam GRAV Type of Spillway Eight siphons
 Water is 1 feet above the spillway crest and 7.0 feet below the dam crest.
 Weather Conditions Moderate to heavy rain
 Contacts Made Lucy Croy, Trinity Leonard, and Ronnie Chasteen during the inspection
 Reason for Inspection Periodic evaluation

Important Observations, Recommendations or Actions Taken

Woody and tall non-woody vegetation has been cleared from along both downstream groins as requested. The dam galleries were not entered during this inspection, and were last inspected in June of 2013. The owner should make arrangements to allow for inspection of the galleries during the next periodic inspection. The plunge pool below the outlet conduit Tee outfall is susceptible to erosion and should be armored with concrete stabilized large-boulder riprap.

Conclusions

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

Observations and Comments

<u>Dam</u>	The visible portions of the upstream face, crest, downstream face, and abutments are in satisfactory condition, with no indication of surficial distress or instability. Minor cracks and offsets appear unchanged from that reported in previous inspection reports. Vegetation control is satisfactory, and woody and tall non-woody vegetation have been cleared from both downstream groins.
<u>Galleries</u>	The galleries are considered a confined space requiring qualified and trained personnel for access and inspection, and were not entered during this inspection; the galleries were inspected by David Borger on July 28, 2009, and by Jim Lowe on June 26, 2013. The galleries should be inspected during the next periodic inspection.
<u>Spillway</u>	The spillway approach was open and clear. A polyethylene log boom was in place several dozen yards upstream of the dam. Approximately 1.0 of water was flowing through the two spillway gates; the spillway siphon was not flowing. The current design storm, prepared in 1982, is for a 170,000 year return period producing 9475 cfs (~929 cfs / sq mi) from the 10.2 square mile drainage area. The spillway capacity is ~9770 cfs which is slightly greater than the peak inflow. Total freeboard is 8 feet and the residual freeboard for the design storm is 2.3 feet. Freeboard is satisfactory.
<u>Outlet</u>	The 125-foot tall dry outlet tower has inlets at five different elevations. The upper most inlet at elevation 626' is controlled with a 24-inch slide gate mounted outside of the tower; the remaining four inlets at elevations 595', 567.5', 540', and 530.75' are controlled with externally mounted 18-inch slide gates. Each of the five slide gate valves outside of the tower has an equivalent sized gate valve within the dry portion of the tower.

Photos taken? Yes X No _____
 cc for Owner/Book

Inspected by J. Lowe
 Date of Inspection 8 February 2017
 Date of Report 21 February 2017

(Handwritten signature and date: J. Lowe 2/21/17)

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Observations and Comments

The upper four outlet tower inlets manifold into a single 30-inch concrete-encased steel pipe within the tower, from whence the outlet pipe passes beneath the dam for conveyance to facilities downstream; the outlet is normally pressurized. The lowest 18-inch tower inlet feeds a separate "scour pipe" which discharges at the downstream spillway apron of the dam.

Significant additional drawdown capacity is provided by a recently installed 24" Tee within the primary outlet conduit, just beyond the downstream toe of the dam. Flow through the outlet conduit outfall is controlled by three 24" butterfly valves. A detailed description of this supplementary outlet system is provided in the 26 February 2015 inspection report.

The three 24" butterfly controls at the outlet conduit Tee were fully cycled and found to be in good operating condition; none of the upstream controls were cycled during this inspection. Those upstream and downstream outlet controls accessible from outside of the outlet tower (exterior valves) were partially cycled during the 12 April 2016 inspection. All upstream and downstream controls that remain operable, including those within the outlet tower, were fully cycled during either the February 26, 2015, or April 30, 2015 inspections.

The plunge pool below the outlet conduit Tee outfall is susceptible to erosion and should be armored with concrete stabilized large-boulder riprap.

Seepage Rainfall prevented evaluation for minor seepage. No evidence of significant seepage was observed within the downstream face, groins, or abutments. Consistent with previous inspections, there was minor seepage from the right abutment, and from several of the internal gallery drains. The owner has reported that seepage rates decrease significantly when the reservoir level drops more than 22.5 feet below spillway elevation.

There is no designated collection point or weir for estimating and apportioning seepage from the left galleries and left abutment. In the past, the total seepage from the left side of the dam has been visually estimated as it flows over and around the left downstream toe. With the reservoir high flows from the left side of the dam have been in the 5 gpm range, as they were during this inspection.

Seepage from the right galleries and right abutment is collected and measured at two locations designated the "Upper" and "Lower" leaks, respectively. The total cumulative seepage from the right side of the dam was on the order of 30 gpm or so cumulative flow, with the majority of that coming from gallery No. 5.

Seepage from both sides of the dam was clear and remains within historic levels.

Instr. Instrumentation consists of four (4) piezometers, and two (2) seepage measurement locations.

The latest instrumentation data was received from the owner on December 16, 2015, and no new data has been received since that time. The last instrumentation review is presented in the 12 April 2016 inspection report, and is not repeated here; I direct the reader to the earlier report for a detailed explanation of the instrumentation monitoring the dam, and the performance of the dam as reflected in the 16 December 2015 submittal. The conclusion of the April 2016 review was that, "Based on the data submitted the dam appears to be performing satisfactorily, and no additional instrumentation is believed necessary at this time".

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Approximately 1.0 of water was flowing through the two spillway gates; the spillway siphon was not flowing.



The three 24" butterfly controls at the outlet conduit Tee outfall were fully cycled and found to be in good operating condition. The plunge pool below the Tee outfall is susceptible to erosion and should be armored with concrete stabilized large-boulder riprap.