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Oroville Dam Update and Dam Safety Efforts Background

Wednesday, January 10, 2018
9:30 a.m. State Capitol, Room 4202

Oroville Incident

On February 7, 2017, California Department of Water Resources (DWR) employees at Oroville Dam noticed unusual water flow patterns on the dam's main spillway. When they stopped the flow to inspect, they discovered missing concrete and foundation erosion.

The next day, operators ran short-duration water flows over the spillway to monitor erosion. Inspectors determined that the size of the damaged section had doubled within this short time and it became apparent that the spillway would have to shut down. DWR activated emergency interagency operations centers to monitor and respond to the incident.

On February 9, DWR in consultation with federal entities again began releasing water down the spillway in an attempt to avoid the need for the water to rise over the dam's emergency spillway, and to prevent flooding at the dam's power plant. By that evening, storm forecasts for what was already expected to be the largest storm of the year indicated a significantly wetter storm than earlier predicted. Outflows along the spillway were increased the next day.

Despite these efforts, Lake Oroville rose above 901 feet at about 8 a.m. on February 11, and water began flowing over the 1,700-foot long concrete emergency spillway. This was the first time in the dam's 49-year history that the emergency spillway was engaged.

By the middle of the afternoon on February 12, anticipated erosion near the emergency spillway began progressing quickly and experts determined that this could pose harm to the emergency spillway's structure.

In response to this possible hazard, the Butte County Sheriff's Office issued mandatory evacuations for the Oroville area. Additionally, flows were increased down the main spillway to reduce the time that the emergency spillway would be needed. By approximately 8 p.m. on February 12, water stopped flowing over the emergency spillway when the lake level dropped below 901 feet.

This incident occurred during runoff to the area from the largest storm in 20 years. From February 6 through the next several days, runoff totaled more than a million acre feet. One acre foot of water is about 326,000 gallons.

Initial Recovery and Costs

DWR contracted with Kiewit Infrastructure West (Kiewit) in April to repair and replace 2,270 feet of the main spillway by November 1, in order to be ready for the upcoming rain season. To meet this deadline, more than 600 Kiewit workers put in more than 720,000 hours.

The initial contract for \$275 million was based on early design plans, and the costs increased as additional excavation and other work was needed to reach stable bedrock and to ensure safety at the construction site. These factors resulted in an increase from \$275 million to more than \$500 million.

According to DWR, repairs to the spillway will be paid by State Water Project (SWP) contractors for any costs not recoverable from federal grants or other sources. DWR has been working with the Governor's Office of Emergency Services to secure funding under the Federal Emergency Management Agency's (FEMA) Disaster Assistance Program. FEMA can cover 75% of eligible emergency response and repair costs. As of the middle of December, FEMA had reimbursed DWR for \$76.6 million.

Spillway Evaluations

In response to the Oroville incident, the Governor ordered a statewide comprehensive review of dam-related structures like spillways.

DWR's Division of Safety of Dams (DSOD), which oversees all dams within the state's jurisdiction, began reviewing dam spillway information. DSOD determined that, based on factors such as age of the spillways, dam capacities, potential hazards downstream, design features, geological conditions, and maintenance records, spillways at 93 dams needed to undergo comprehensive assessments. DSOD directed dam owners to conduct reviews of such items - among others - as spillway concrete lining and drainage systems, and to evaluate potential geological hazards and susceptibility to erosion and instability near spillways.

Letters to dam owners specified that known damage to the spillways must be repaired prior to the next flood season.

About Jurisdictional Dams

More than 1,200 dams are under the jurisdiction of DSOD, which inspects dams to ensure they are performing properly and being maintained appropriately. DSOD works with dam owners to resolve potential issues, including those related to dam safety.

A review of DSOD's dam records, as of September 1, 2017, showed that of the 1,249 jurisdictional dams, DSOD assessed most as being in "satisfactory" conditions:

- About 92% of dams were rated satisfactory
- About 7% were rated fair
- Less than 1% were rated poor or unsatisfactory

To be considered poor, a dam safety deficiency is recognized for conditions that may realistically occur, like stress from seismic activity or major storm events. Seven dams were classified as poor and those with this classification require corrective actions.

To be considered unsatisfactory, a dam safety deficiency is identified as one that requires immediate or emergency remedial action. As of September, when the work at Oroville was underway, it was the only one in the state rated as unsatisfactory.

State Water Project Background and Financing

Oroville Dam, which is owned and operated by DWR, is part of the SWP. The SWP is the state-built water storage and delivery system that distributes water to two-thirds of California's population.

Lake Oroville is the SWP's largest storage facility with a capacity of approximately 3.5 million acre feet.

SWP facilities have been mostly financed by general obligation bonds and revenue bonds. Repayment of these funds as well as the operation, maintenance, power and replacement costs associated with water supply are paid by the 29 agencies and districts that have long-term contracts with DWR for SWP water delivery.

DWR releases and posts online an annual report titled "Management of the California State Water Project," which includes information about project costs and financing, water supply planning, power operations, and significant events that impact the SWP. The most recent report, released in June, 2017, includes information from the 2015 calendar year.

During that year, the SWP had about \$1 billion in revenues with nearly all of it from water contract payments. Its expenses were about \$1 billion, with approximately 64% directed toward project operation, maintenance, power, and replacement while 30% paid bond principal and interest, and 5% was deposited into reserves.