

2020 SWP Construction Project Updates

California Water Commission Briefing, November 20, 2020



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CALIFORNIA DEPARTMENT OF
WATER RESOURCES

Projects to be Discussed

- SWP Fire and Life Safety Modernization
- California Aqueduct Liner and Embankment Repair Projects
- SWP Pipeline Condition Assessment
- Southern Field Division East Branch Maintenance Outage
- South Bay Aqueduct Reliability Improvement
- California Aqueduct Radial Gate Maintenance and Repairs
- Continued investigations and improvements made to the SWP Spillways
- Bethany Dams Restoration and Rodent Burrow Prevention Project
- Castaic Dam Outlet Tower Seismic Retrofit Project
- Thermalito Restoration
- Edmonston East MG Failure and Reliability Improvements
- Switchyard Instrument Transformer Modernization
- Controls, Protection, & Regulatory Compliance Asset Replacement



SWP FIRE & LIFE SAFETY MODERNIZATION

Program implemented in response to the Thanksgiving Day fire at Thermalito Pump-Generating Plant

Project Scope:

- Fire detection and alarms
- Fire suppression systems
- Protected egress routes
- HVAC modifications
- New domestic and water lines
- Emergency responder comms



SWP FIRE & LIFE SAFETY MODERNIZATION

Project Status:

Oroville Field Division

- Final commissioning & punch list items
- Completion planned January 2021

San Luis Field Division

- Currently under final review by Office of the State Fire Marshal
- Fire code updates required significant design changes
- Construction start estimated May 2021

San Joaquin Field Division

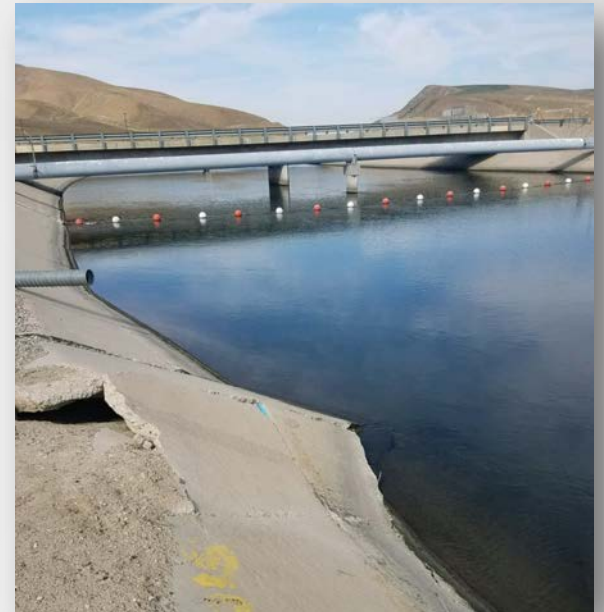
- 10% Design completed
- Construction start January 2023



California Aqueduct Canal Liner and Embankment Repairs

Governor Edmund G. Brown
California Aqueduct is approximately
700 miles in length and conveys and
stores water for 27 Million in
California

Repair sites were identified through
O&M's Condition Assessment
Program



California Aqueduct Canal Liner and Embankment Repairs

Project Scope:

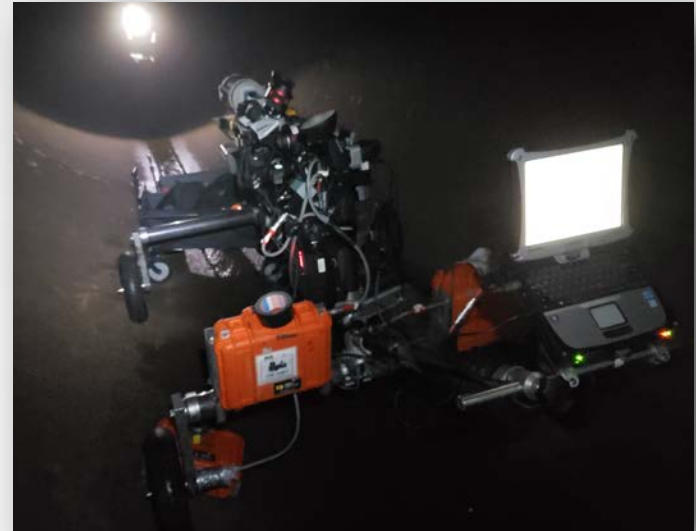
- 35 to 45 Sites planned 2021
- Multiple panel replacement and repair methodologies
- Repairs scheduled based on operational constraints
- Project planned completion 2023



SWP Pipeline Condition Assessment

O&M investing in new technologies for performing Pipeline Condition Assessments that do not require dewatering

- SmartBall Technologies for Leak Detection
- PipeDiver and PipeWalker Technologies for detecting broken prestressed wires in a Prestressed Concrete Cylinder Pipe

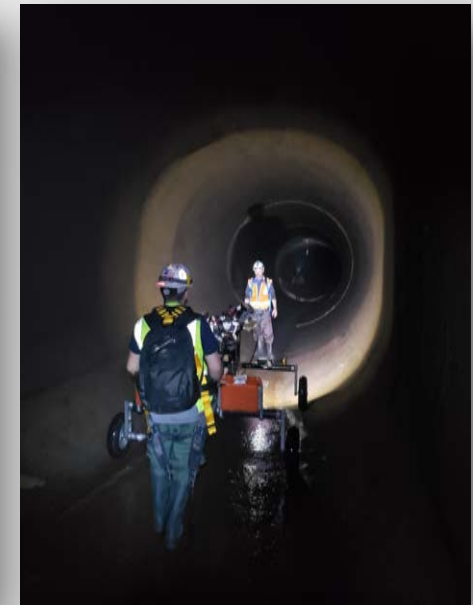
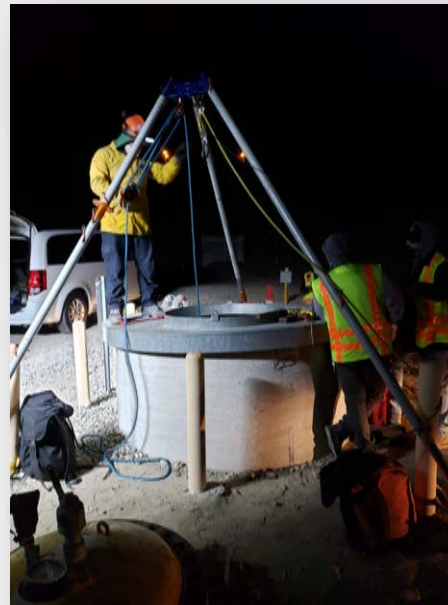


SWP Pipeline Condition Assessment

Peace Valley Pipeline

Located west of I-5 and south of I-138 near Gorman Creek in Los Angeles County

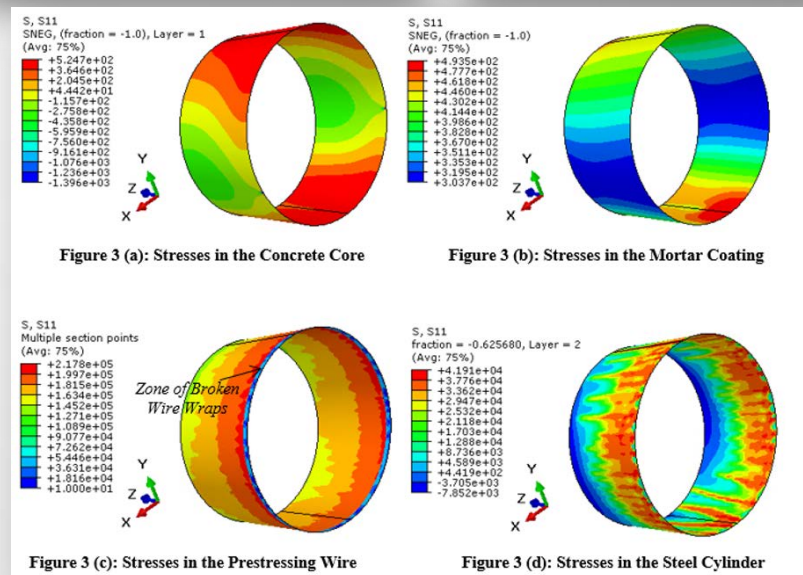
- October 2020 performed Inspection, Condition Assessment and Repairs
- Next Step Structural Analysis and Risk Assessment



Santa Ana Pipeline

Used 2018 PipeDiver wire break data to:

- Perform a Structural Analysis
- Inform Risk Assessment



Southern Field Division East Branch Maintenance Outage

In early 2020 Planned Outage at the Devil Canyon Powerplant to perform maintenance and repairs at four SWP Facilities:

- San Bernardino Tunnel and Intake Tower
- Devil Canyon Powerplant Penstock
- Devil Canyon 2nd Afterbay
- Santa Ana Valley Pipeline



Southern Field Division East Branch Maintenance Outage

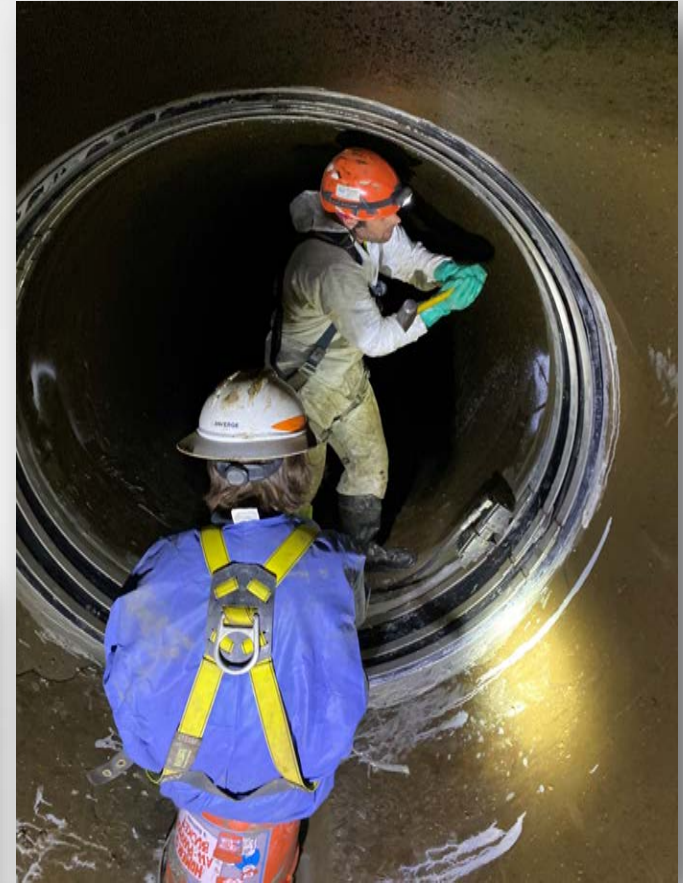
Condition Assessment, Maintenance, and/or
Repairs on SWP Intake Tower, Tunnel,
Penstock, Afterbay, Gate and Pipeline



South Bay Aqueduct Reliability Improvement Project

Improvement projects to maintain and improve the reliability of water delivery via the South Bay Aqueduct.

Late December and early January, DWR to perform inspection and preventative maintenance and repairs along the pipelines to improve reliability.



California Aqueduct Radial Gate Maintenance and Repairs

Ongoing improvements to condition assessment, maintenance, and refurbishment to the radial gates along the CAAQ.



Cedar Springs Dam Spillway Under Drain Repairs and Access Road Improvements

Cedar Springs Dam on Silverwood Lake, has an uncontrolled (ungated) spillway. The dam stores 75,000 AF of water on the SWP's East Branch, overlooking San Bernardino. This project is an outcome of the Phase I Spillway Inspection and Condition Assessment effort.



Cedar Springs Dam Spillway Under Drain Repairs and Access Road Improvements

Project Objectives:

- Replacement of Spillway Wall Backfill and Collector Drains
- Inspection and Cleaning of Underdrains
- New Construction of access roads and access to the spillway for long term monitoring and accessibility



Project Status

- Inspections completed
- Collector pipe and Backfill Restored
- Concrete drainage swale to protect backfill remains to be constructed.



Pyramid Dam

Gated and Emergency Spillway Investigations

Pyramid Dam and Lake are located in Los Angeles County near Castaic, California and provide water storage for the greater LA area

This project is Phase II of the Spillway Inspection and Condition Assessment effort, and follows 2018 Phase I investigation.



Pyramid Dam Emergency Spillway Investigation

Project Objective:

- Collect subsurface data for evaluation of the spillway's stability and erodibility.

Project Status

- Data reports are in preparation and will be utilized to inform stability and erosion analyses.
- The depth of bedrock weathering was found to be relatively shallow.



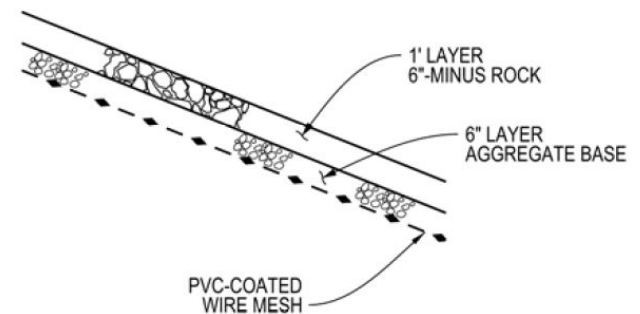
Bethany Dams Restoration and Rodent Burrow Prevention Project

Project Objective:

- Repair damage to the dams caused by extensive rodent burrowing.
- Provide permanent armoring to prevent future burrowing.
- Highlighted as urgent by latest Director's Safety Review Board.

Project Status:

- Lengthy environmental process to address Endangered and threatened Species finally led to Biological Opinion and Incidental Take Permit in July 2020.
- DSOD Approval – Oct. 2020
- Construction – Spring 2021



C ROCK PLACEMENT DETAIL
SCALE: NTS
C-XXX, C-XXX, C-XXX



Castaic Dam Outlet Tower Bridge Seismic Retrofit

Project Objective:

- Retrofit the bridge to prevent collapse for the 50th percentile maximum credible earthquake.
- The bridge survived the 1994 Northridge Earthquake.

Project Status:

- DSOD Approval – Expected in November
- Construction – Spring 2021; Complete in 2022
- Includes a reservoir drawdown in order to retrofit the tall piers



THERMALITO RESTORATION PROJECT

Thermalito Pumping-Generating Plant is a 115 MW hydro plant located in Oroville, CA. On Thanksgiving Day 2012, a fire occurred in the plant rendering it inoperable. Clean-up occurred during the span of 2013-2014, with Restoration beginning in 2015.

Project Scope:

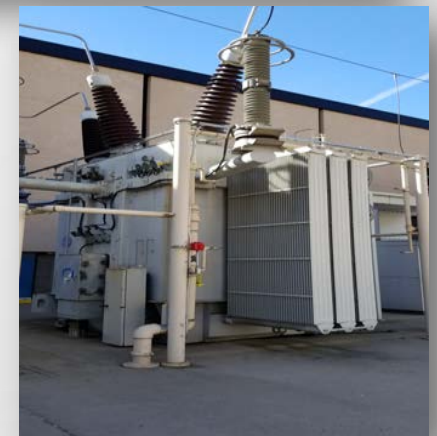
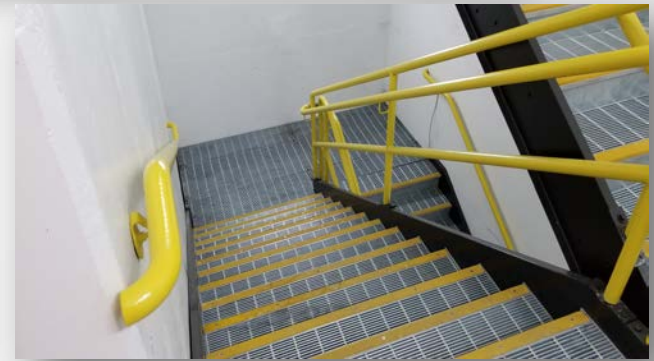
- Replace Plant Electrical Systems
- Mechanical Refurbishment – All units
- Power Transformer Refurbishment
- Roof Replacement
- Fire and Life Safety Modernization



THERMALITO RESTORATION PROJECT

Current Status:

- Roof Replacement – Complete
- Power Transformer Refurbishment – Complete
- Unit Mechanical Refurbishment – Complete
- All equipment has been installed and commissioned and units have returned to service. Plant was officially transferred back to the field division for normal operations and maintenance on September 1.
- Fire modernization is complete with final approval by the State Fire Marshall on September 29.



EDMONSTON EAST MOTOR-GENERATOR FAILURE

Background:

- Edmonston has two of these uniquely built machines to soft start main units
- Equipment is approximately 50 years old and has been in service without a major overhaul
- Generator failure occurred May 23, 2020 – isolated to a shorted rotor pole

Repair and Return to Service:

- Removal required unique tooling and procedures
- Pole shipped to repair facility, then shipped back to site and re-installed
- MG returned to service July 27, 2020

Reliability Enhancements:

- Protective relay upgrade planned for 2020
- Identification and procurement of long-lead items to store as spare parts
- Increased testing and inspection frequency to identify problems before failure



SWP SWITCHYARD INSTRUMENT TRANSFORMER MODERNIZATION

Background:

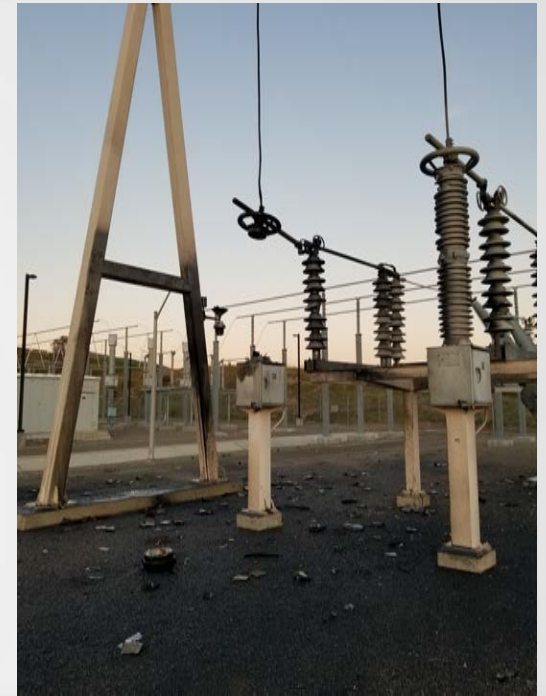
- SWP switchyards contain instrument transformers to monitor voltage and current for protection and revenue metering
- Equipment is approximately 50 years old and is beyond the design life
- Explosive failure occurred at Banks switchyard during early morning hours of February 26, 2020

Repair and Return to Service:

- Equipment replacements installed and yard re-energized May 23, 2020
- Further upgrades to switchyard equipment planned

Reliability Enhancements:

- Study of SWP switchyard instrument transformer equipment revealed an extensive list of end-of-life equipment
- Historical testing and monitoring frequency insufficient to identify failure issues
- Increased testing and inspection frequency to identify problems before failure
- Planned replacement of all devices over 25 years old
- Procurement of spares to mitigate long lead times that could extend outages



SWP CONTROL, PROTECTION, AND REGULATORY COMPLIANCE ASSET REPLACEMENT

Project Scopes:

- Replacing end of life electrical protection and control equipment to keep compliant with increasing regulatory requirements
- Equipment has a life cycle of 15-20 years

Equipment:

- Automatic Voltage Regulators (AVRs) – maintains unit voltage within specified limits
- Protective Relays – Protects electrical equipment from faults or system disturbances that could severely damage equipment
- Programmable Logic Controllers (PLCs) – interfaces equipment and instrumentation for local and remote monitoring & control for facilities

Timeline:

- Projects are independent of one another but are multi-year efforts to complete the entirety of SWP facilities

