



MEMORANDUM

FC 14 (01-02-07)

TO: Beau Goldie

FROM: Frank Maitski

SUBJECT: Dam Safety Program Update

DATE: 12/12/2011

This is the 4th Dam Safety Program Update for 2011. This update provides information on all 3 seismic stability evaluation projects, the Anderson Dam Seismic Stability Retrofit Project, the Dam Maintenance Program EIR, the FERC Five Year Safety Inspection and Report for Anderson Dam, and Dam Maintenance.

See the attached table summarizing the contractual status of the 3 seismic stability evaluation consultant agreements.

Anderson Dam Seismic Stability Evaluation

The major tasks in this project included field and laboratory investigations, seismic stability evaluations, and preparing the final report.

The consultant submitted all required deliverables. The agreement with AMEC Geomatrix has been closed out. The remaining agreement funds (\$364,929, or 14% of the agreement encumbrance) have been returned to District reserves. This is the final Dam Safety Program Update that will include the Anderson Dam Seismic Stability Evaluation. The consultant deliverables (Seismic Stability Evaluation Report and technical memoranda) are available on the District's website.

Anderson Dam Seismic Retrofit Project

Staff initiated work to scope and execute a seismic stability retrofit project and staff has developed the overall project delivery strategy. It has been incorporated in the Fiscal Year 2012-2016 Capital Improvement Plan and the Fiscal Year 2012 budget. The strategy involves retaining 4 separate consulting firms to perform project management, planning, design, and construction management work. The use of consultants to undertake and prepare the key project deliverables is being proposed due to the extensive resource commitment necessary to ensure timely completion of this retrofit.

The scope of this project will include modifying or replacing the outlet works to address the potential fault rupture risk. Funding for the replacement of the outlet works is planned to be included in the Fiscal Year 13-17 CIP. We anticipate performing additional field investigation to either establish fault inactivity and/or to estimate the potential fault offset to determine whether it is feasible to modify the outlet works versus a full replacement.

The other major outstanding scope issues involve assessing the adequacy of the existing spillway and the flow capacity requirements of the new or rehabilitated outlet. Staff requested input from both DSOD and FERC on these issues. The 2011 FERC Five Year Safety Inspection and Report (discussed below) recommended reevaluation of the Anderson Dam Probable Maximum Flood, which will be addressed in this project.

Staff solicited proposals from consulting firms for the overall Project Management scope of work on July 25, 2011. The selection process continues, with the planned contract award by January, 2012. Proposals for the Planning Phase scope of work were solicited on August 25, 2011, with the planned contract award by February 2012.

Dam Maintenance EIR

The draft Dam Maintenance EIR was released for public review on August 1, 2011, with the public comment period closing on September 16, 2011. The Dam Maintenance EIR is currently scheduled for

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Board certification in January, 2012. This schedule includes an extended internal review to ensure effective coordination with habitat conservation plans and to optimize maintenance work practices. Since the Draft Stream Maintenance Program EIR was out for public review at this time, several resource agencies requested extensions for their review of these two EIRs. These were granted and additional time has been required to coordinate agency comments between the two EIRs.

Almaden, Calero and Guadalupe Dam Seismic Stability Evaluations

The major tasks in these evaluations include field and laboratory investigations, seismic stability analyses, and completion of the final report. The field and laboratory investigations are complete and analyzed. Engineering material properties for the dams were developed by the consultant and presented to DSOD in December 2010. DSOD agreed with the adequacy of the field investigation and the proposed engineering material properties. Resolving DSOD comments on the appropriate ground motions (earthquake energy and wave shape) for analysis was completed on April 11, 2011, and allowed the seismic stability evaluation analysis to move forward.

The field investigation identified the presence of alluvial materials in portions of the foundations at all three dams, with potential liquefaction under Calero Main Dam in a maximum credible earthquake. Preliminary results on the seismic stability of the dam embankments were reviewed by our Technical Review Board and DSOD, and then presented to the Board at the October 25, 2011 Board meeting. These preliminary results stated that both Calero Main Dam and Guadalupe Dam have inadequate seismic stability, whereas the Almaden Dam and the Calero Auxiliary Dam have adequate seismic stability.

The consultant submitted a draft technical memo with recommendations for the operating restriction on these 3 reservoirs on October 7, 2011. These recommendations included increasing the operating restrictions at Calero and Guadalupe Dams to 25 feet below the dam crest, and to remove the Almaden Dam operating restriction. After review and consideration, staff implemented revised restrictions, changing from 20 feet to 25 feet at Calero and 14.7 feet to 25 feet at Guadalupe. Staff has provided draft letters to DSOD with those 2 changes proposed, as well as a proposal to remove the restriction at Almaden Dam. Staff will continue to work with DSOD to obtain agreement with DSOD on the restrictions at these 3 dams.

The current schedule shows that a draft seismic stability evaluation report will be provided to DSOD for comment in January, 2012, with the final report completed in March, 2012. Based upon our review of the consultant submittals and new information developed during the seismic stability review of Stevens Creek Dam, staff believes that performing additional field investigation at Calero Dam may be worthwhile at this time rather than deferring it to the planning stage as previously planned. It appears that performing additional Becker Penetration Testing under Calero Dam would be helpful in refining the impact of liquefaction on Calero Dam seismic stability. The consultant is preparing a proposal for staff review and approval. There are funds for this work in the existing agreement. If the additional field investigation is executed, there would probably be a schedule impact on the completion of the Calero Dam study that would need DSOD approval.

Lenihan, Stevens Creek, Chesbro, and Uvas Dam Seismic Stability Evaluations

The project scope for the current evaluations includes the seismic stability evaluation for Lenihan and Stevens Creek Dams (SSE2A). Chesbro and Uvas Dams (SSE2B) will be evaluated after the agreement is amended, as originally planned. The major tasks in the SSE2A project are similar to those in the other seismic stability evaluations.

The seismic stability analyses will begin after DSOD accepts the results of the field and laboratory investigations and accepts the consultant's recommendations on the site properties and earthquake ground motions for use in the analyses. The planned field investigation and laboratory testing at Lenihan Dam was completed in September 2011 and the results submitted to DSOD as a data report in

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system repairs at Guadalupe Dam, repairs to the Anderson Dam hydraulic system in the control building, replacement of the fixed cone valve hydraulic cylinders at Coyote Dam, and the installation of safety stairs for access to the Anderson Dam seepage monitoring weirs. A budget adjustment for \$200,000 for these items will be brought to the Board of Directors on December 13, 2011.

A hydraulic system leak and reduced functionality was identified on the Lenihan Dam hydraulic system during routine cycling of the upstream sluice gates on Tuesday, November 29, 2011. Although some of the sluice gates cannot be fully operated, the outlet appears to have adequate functionality to ensure the safety of the dam. This portion of the Lenihan Dam Outlet Works Modification project is under warranty. Staff met with FCI (the contractor) and Jacobs Associates (the engineer) on Monday, December 5, to initiate repairs to the system under the warranty. Initial work is focused on a) confirming the extent of the reduced functionality and b) determining if the problems are covered under the warranty or if the problems are the result of some unknown external factor that is beyond the extent of the warranty. DSOD has been notified.

Finally, work has begun this year on the design of staff safety improvements at our dams. This includes stairs, anchoring points for the cleaning of spillway weep holes and expansion joints, and improved railings and platforms over the Vasona Dam spillway. The FY 2012 budget included much of the labor for this work. Funds for contract services and materials were deferred until the design was completed and the costs estimated. The request to budget staff safety stairs at Anderson Dam noted above is the first staff safety improvement that is ready to be implemented. Staff will be balancing the criticality of making these staff safety improvements in FY 2012, versus budgeting for them in FY 2013, in making a decision on any additional budget adjustment in FY 2012.



Frank Maitski
Deputy Operating Officer
Water Utility Technical Support Division Deputy's Office

Attachment

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October 2011. The consultant is currently preparing the "Site Characterization, Material Properties, and Ground Motions" report. The consultant met with our Technical Review Board on December 6, 2011 and obtained concurrence on the interpretation of the site properties at Lenihan Dam, prior to submitting the site characterization report to DSOD. We have also tentatively scheduled a meeting with DSOD to discuss the site properties at Lenihan Dam on January 25, 2012.

As discussed in the previous Dam Safety Program report for 2011, the field and lab investigation at Stevens Creek Dam shows foundation alluvial materials that may be potentially liquefiable in a maximum credible earthquake. Even with the potentially liquefiable alluvial material in the dam foundations, our consultant and our Technical Review Board believes there is a chance of establishing the seismic adequacy of Stevens Creek Dam, and that additional field investigation is critical to making a convincing case. Our consultant met with DSOD on August 15, 2011 to discuss the results of the field investigations completed to date and their interpretation of the site properties at Stevens Creek Dam. DSOD and the District agreed to conduct additional field investigation at Stevens Creek Dam to better characterize the properties of the alluvium beneath the dam and the anticipated ground motions. The first part of this additional phase of investigation was completed in October 2011. Our consultant briefed our Technical Review Board on the results on December 6, 2011, who endorsed the work to date and the recommendation to continue the field investigation. If DSOD agrees with our consultant's recommendation, the second part of this additional phase of investigation will be performed in spring 2012. The additional field investigation cost is planned to be within the contract budget.

This additional field investigation will impact the schedule for completion of the seismic stability evaluation of Stevens Creek Dam. Once a new schedule has been negotiated with DSOD, the Board will be updated. DSOD has been briefed on this and believes that obtaining the information from the additional field investigation is worth the wait.

Staff has not yet initiated the contracting for the Seismic Stability Evaluation of Chesbro and Uvas Dams. Staff has been coordinating the likely schedule changes with DSOD.

Dam Safety Review of Almaden, Calero and Guadalupe Dams

As previously discussed in the 2nd Dam Safety Program Update for 2011, the District included an independent dam safety review and potential failure mode analysis evaluation for Almaden, Calero, and Guadalupe Dams as an element of our dam safety program. This will provide critical information for planning and executing the dam safety program at these three dams. This analysis will determine if the Dam Safety Program is studying and monitoring conditions relevant to public safety, and to gather data that may be useful should seismic retrofits be required at any of these dams.

The consultant plans to submit for District review the draft Potential Failure Mode Analysis and Supplemental Technical Information Document reports for each of the three dams in November and December 2011. Upon receipt of District review comments, the consultant intends to finalize the reports for all three dams by the end of December 2011.

Dam Maintenance

District staff inspected Stevens Creek, Chesbro, Uvas, Coyote, Coyote Percolation and Anderson Dams with DSOD on November 14 and 15, 2011. The inspection showed the dams to be in generally good shape and that our Dam Maintenance Program is adequately addressing maintenance needs, while at the same time identifying specific issues that must be addressed. Some of these issues can be addressed under the FY 2012 budget, with the more substantial issues probably addressed in FY 2013.

Dam maintenance is being executed as planned in our Annual Maintenance Work Plan and as covered by our current environmental clearances. A number of additional dam maintenance tasks have emerged since the FY 2012 budget was prepared. Currently identified needs include the hydraulic

<p>SCVWD Dams - Seismic Stability Evaluation – Consultant Agreement Status</p> <p><u>Anderson</u> Consultant: AMEC Geomatrix Consultant Budget: \$3.126 million, 86%% expended (remainder returned to reserves) Conditional Task Budget Authorized: \$362,327 authorized (79%) of \$457,000 budgeted, for downstream shell Becker Hammer testing, support for fault rupture field investigation Mitigated Negative Declaration, fault rupture investigation, sensitivity analysis, reservoir restrictions, and conceptual remedial alternatives. Completion: 100% complete Completion Date: Project deliverables including reports and technical memoranda were completed in June 2011. Based upon project conclusions, staff will incorporate consideration of further field investigation for fault rupture and fault offset into the planning consultants work for the Anderson Dam Seismic Stability Retrofit Project. Issues: seismic stability of embankment confirmed to be deficient, outlet pipe may need rehabilitation or replacement.</p>
<p><u>SSE1B (Almaden, Calero, Guadalupe)</u> Consultant: URS Consultant Budget: \$3.3 million, 78% expended Conditional Task Budget Authorized: \$413,301 authorized (51%), of \$810,000 budgeted, for Calero Dam Becker Hammer Testing, Calero Fault investigations, more refined deformation analysis, reservoir restriction evaluation, and conceptual remedial alternatives. Completion: 78% complete Completion Date: Preliminary results on the seismic stability of the dam embankments were presented to DSOD in August 2011. Calero and Guadalupe Dams have inadequate seismic stability. URS recommended revising the Calero and Guadalupe operating restrictions. Completion of the report by April 2012 was anticipated; if additional Calero Dam field investigation is executed, the schedule will be revised for Calero. Issues: seismic stability of embankments are deficient at Calero Main and Guadalupe Dams.</p>
<p><u>SSE2 (Lenihan, Stevens Creek, Chesbro & Uvas)</u> Consultant: Terra/GeoPentech, A Joint Venture Consultant Budget: \$1.89 million FY 2010, 82.6% expended (\$2 million planned for FY 2012 budget for Chesbro and Uvas Dams) Conditional Task Budget Authorized: \$115,276 authorized (26%) of \$442,200 budgeted, for characterization of Lenihan Fault traces and completion of Becker Penetration Tests at Stevens Creek Dam. Completion: 80% complete Completion Date: Current schedule calls for completion of Lenihan & Stevens Creek Dams by March 2012 and Chesbro & Uvas Dams by December 2013. Additional Stevens Creek Dam field investigation will require a schedule extension, subject to discussion with DSOD. Issues: Seismic stability of embankments – potentially liquefiable alluvium found at Stevens Creek Dam. Additional field investigation and analyses to determine whether the dam is seismically deficient is in progress.</p>