

Staff Report

for the Regular Meeting of the Board of Directors, April 25, 2018

TO: Honorable Board of Directors

FROM: Keane Sommers, P.E., Hydroelectric Manager *KS*
Dar Chen, P.E., G.E., Senior Engineer - Dam Safety *DC*

DATE: April 18, 2018

SUBJECT: Hydrologic and Hydraulic Studies

HYDROELECTRIC

RECOMMENDATION

Approve a contract in the amount of \$355,583 with AECOM to perform Hydrologic Reevaluation and Hydraulic Analyses, authorize the General Manager to execute the necessary documents, and approve the associated budget amendment.

BACKGROUND

In the 2016 FERC Part 12D 5-Year Dam Safety Inspection Reports, the Independent Consultants recommended that the District reevaluate several hydrological and hydraulic issues related to safety performance of District dams and spillways. In the past, the District has completed the required hydrological studies, however, some of these need to be updated to meet the current standards. The required studies consist of the following two phases and major tasks:

Phase 1 - Hydrologic Reevaluation

- a. Update Probable Maximum Precipitation (PMP) and Probable Maximum Flood (PMF) values
- b. Update flood routing and dam breach analysis
- c. Reassess and update the existing spillway rating curves
- d. Reevaluate domino effects associated with breaching failures of the dams on Canyon Creek
- e. Update the inundation maps

Phase 2 – Hydraulic Analyses

- a. Evaluate the hydro-dynamic (nappe) effects of the Bowman South Arch

- and Combie Dams under flood spill flows.
- b. Develop a tailwater curve for future use in the scour protection design for the Combie Dam abutments/groins under floods up to the PMF.
 - c. Evaluate backwater effects due to convergence of the Rollins spillway chute.
 - d. Assess the potential of a flood up to PMF overtopping the spillway chute walls at French Lake and the spillway chute walls and lower plunge pool basin slope walls at Scotts Flat.

A request for proposal (RFP) was sent to seven (7) consulting firms. Three proposals were received from three (3) separate teams formed of five (5) consulting firms. The proposals were reviewed by a panel of technical staff members from Hydroelectric, Engineering, and Water Operations Departments. All of the three (3) teams presented good quality proposals, with variation in the approaches to meet the needs of the District and FERC. The consulting teams and the proposed costs are summarized in the following table.

Consulting Teams	Cost of Required Studies (\$)	Cost of Optional Studies (\$)	Total Cost (\$)
AECOM	251,359	103,544	355,583
HDR and Schnabel	398,035	186,901	584,936
Stantec and NHC	583,426	580,542	1,163,968

The AECOM proposal demonstrated a good understanding of the technical demands, the District's needs, and the regulatory requirements. In addition, they proposed the most expedient solutions with the lowest cost to meet the project goals. Therefore, the review panel unanimously recommended that AECOM be selected to provide the hydrologic reevaluation and hydraulic analyses.

BUDGETARY IMPACT

The 2018 Hydroelectric Budget includes \$340,000 for dam safety related studies. The following table identifies the studies that are currently in progress and those studies that will be needed prior to the end of the year.

Studies	Cost
1. Seismic stability assessments for embankment dams	\$99,700
2. Seismic stability assessment for Combie (Van Giesen) Dam	\$192,558
3. Hydrologic Reevaluation and Hydraulic Analyses	\$355,583
4. Updates to Part 12D Supporting Technical Information Documents	\$200,000
5. Combie anchors lift off testing	\$50,000
6. Independent audit of Owner's Dam Safety Program	\$75,000
Total estimated cost	\$972,841
Current approved budget	\$340,000
Budget transfer needed	\$632,841

(1, 2 - in progress; 3 - approval requested; 4, 5, 6 - to be performed)

A total budget transfer of \$635,000 from Hydroelectric Department Operating Reserves is recommended to complete the dam safety studies currently expected in 2018. Changes in the regulatory environment following the Oroville Dam incident are a key driver in the cost increases. Regulatory agencies are requiring analyses at a faster pace than previously experienced. In turn, those requirements are placing a strain on the small pool of consultants specializing in dams, which results in increasing consulting costs. Additionally, FERC did not approve the required study plan until after the 2018 Hydroelectric Department Budget had been approved.

KSS
MDC

Attachments:

- Presentation Slides for Board Meeting
- Budget Amendment Form



Hydrologic Reevaluation and Hydraulic Analyses Study Presentation to the NID Board of Directors

Presented by:

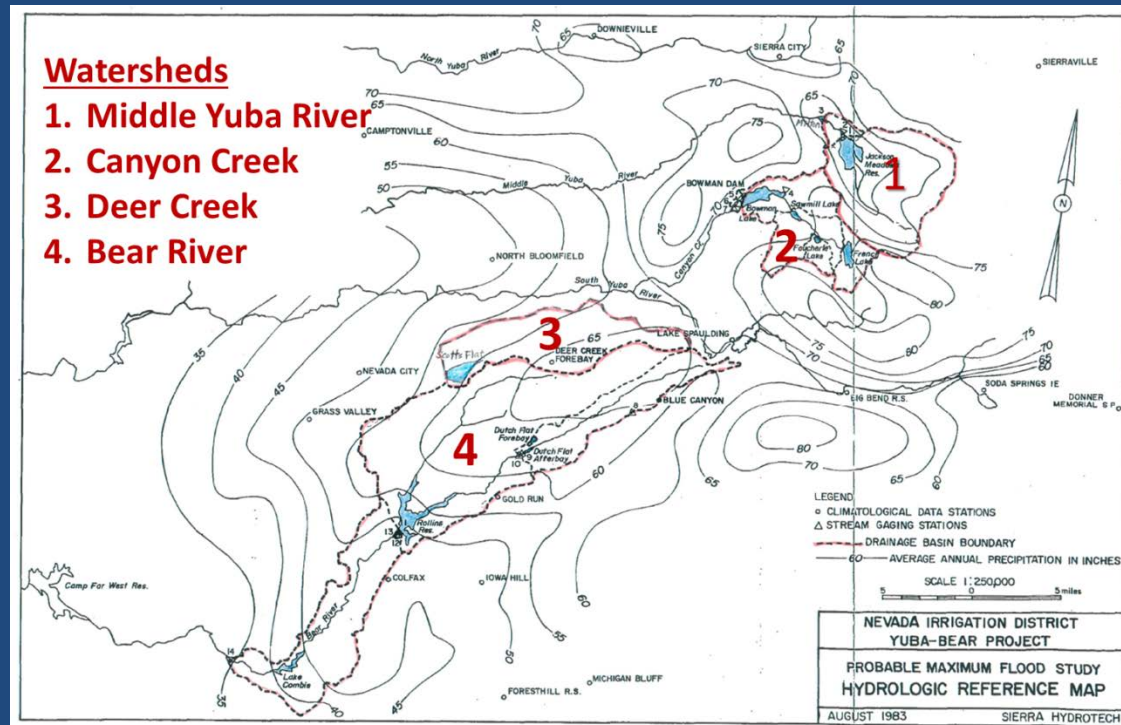
Keane Sommers, P.E., Hydroelectric Manager

Dar Chen, P.E., G.E., Dam Safety Engineer

April 25, 2018

Hydrologic Reevaluation and Hydraulic Analyses

- 11 Reservoirs and 11 Spillways
- 4 Watersheds (Middle Yuba River, Canyon Creek, Deer Creek, Bear River)

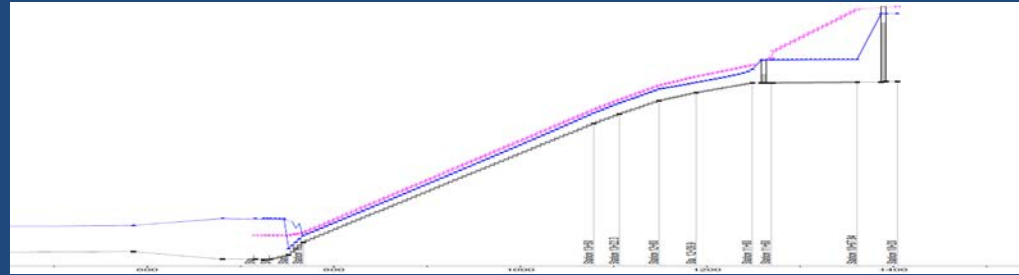


Hydrologic Reevaluation and Hydraulic Analyses

- District needs
- FERC requirements
- New DSOD inundation maps requirements for Emergency Action Plans (EAPs)

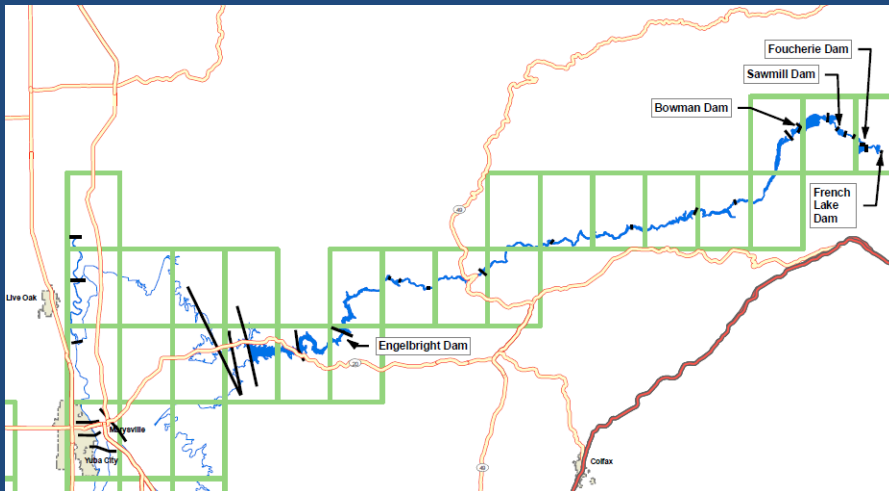
Study Elements

- Probable Maximum Precipitation and Flood (PMP, PMF) re-evaluation
- Spillway capacity rating updates



Study Elements (continued)

- Dam breach and inundation map updates
- Various hydraulic issues (spillway channel overtopping, flood spill hydro-dynamic effects of arch dams, etc.)



Consultant Selection Process

- RFP sent to 7 consulting firms
- 3 good quality proposals from 5 firms were received
- AECOM proposal demonstrates an efficient approach satisfying both regulatory requirements and District needs and bringing the most value to the District.

Funding

- Rapid, dramatic changes to regulatory requirements following Oroville incident
- Recently completed Independent Consultant report identified required studies
- \$340,000 budgeted in 2018
- Estimated \$973,000 in required studies in addition to focused studies at Scotts Flat budgeted separately.



Recommendation

Approve a contract in the amount of \$355,583 with AECOM to perform Hydrologic Reevaluation and Hydraulic Analyses, authorize the General Manager to execute the necessary documents, and approve the associated budget amendment.



**NEVADA IRRIGATION DISTRICT
BUDGET AMENDMENT REQUEST**

Request Number

Req. No BA 2018 - 80

Date: 4/18/2018
 To: Remleh Scherzinger, P.E., General Manager
 From: Keane Sommers, P.E., Hydroelectric Manager

Initial KS

Budget Transfer: Enter Operating/Capital Expenditure or Revenue line items.

Department	Object / Account	Increase/(Decrease)

Budget Increase: Enter Operating/Capital Expenditure or Revenue line items.

Department	Object / Account	Increase/(Decrease)
50112 Hydro Administration	52603 Consulting/Contractor Fees	\$ 635,000.00

Division Fund	Funding Account	Increase/(Decrease)
50 Electric Fund	34011 Operating Reserve	\$ (635,000.00)

Explanation: Enter narrative explaining reason for amendment.

Requested increase in Hydroelectric Department Budget for dam safety studies expected in 2018. Regulating Agencies approved the required study plan after the 2018 Budget was approved.

APPROVALS:

	<u>Date</u>	<u>Signature</u>	<u>AGM/FM Initials</u>	<u>Approved/Denied</u>
Level I:				
Level II:				
Level III:				