New Colgate Powerhouse Tailwater Depression

YCWA-12

I. Project Sponsor Contact Information

Lead Agency/Organization	Yuba County Water Agency
Name of Primary Contact(s)	Curt Aikens
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II. General Project Information

Project Title	New Colgate Powerhouse Tailwater Depression
Project Total Budget	TBD
Project Funding Match	TBD
Project Funding Request	$6,200,000
Can a detailed cost estimate be provided upon request?	No
Project Location:	Dobbins
Latitude	39° 22′ 04″ N,
Longitude	121° 12′ 25″ W
Could you provide a map of the project location including boundaries upon request?	Yes
County	Yuba
City/Community	Dobbins
Watershed/subwatershed	Yuba/North Yuba
Groundwater Basin	Fractured Hard Rock
Project Type	Facility Construction

III. Project Description

The primary purpose of this project is to improve the flood protection capability of New Bullards Bar Reservoir. This is accomplished by the Tailwater Depression limit allowing the Colgate Powerhouse to operate for a longer period of time through a major flood event. This allows more water to be evacuated from New Bullards Bar Reservoir in advance of the peak flow and allows for peak flow releases out of New Bullards Bar Reservoir.

The New Colgate Powerhouse, constructed between 1968 and 1970, is located on the Yuba River at the upper end of Englebright Reservoir. The two generators are driven by vertical-shaft impulse (Pelton) turbines. The powerhouse is owned and operated by Yuba County Water Agency (YCWA) and provides power to the PG&E system.

High tailrace water elevations, due to high flows in the river during flooding, reduce the space in the turbine runner pits. If the tailwater rises to the point where foam interferes with the rotation of the runner, a backsplash effect occurs in the buckets, resulting in irregular runner rotation, excessive turbine vibration, and instability of power output. To continue operation of the unit under rising tailwater level conditions, the water flow discharged through the unit must be reduced to reduce the amount of foam generation. If the tailwater level continues to rise, the units eventually have to be shut down because they are not operable when submerged.

Technical Benefits of the Project

Installation of a tailwater depression system at New Colgate Powerhouse is technically and operationally feasible and the best means of avoiding operation curtailments resulting from high flows in the Yuba River.

Economic Benefits of the Project

Curtailments reduced the power generation by an average of 14,552 megawatt hours (MWh) for the 14 historical curtailment events, with a range of 1,826 MWh to 60,533 MWh.

Average annual flood inundation benefits were estimated to be $228,000 without considering growth and $879,999 with growth.

An estimated $237,000 in power generation benefits would be realized.

Equivalent annual economic cost over a 50-year period of analysis, including imputed interest at 6 percent during the construction period and operation and maintenance costs, was estimated to be $344,700.

The average annual operation and maintenance cost is estimated to be about $27,200. This includes about $17,800 for energy consumption and lesser amounts for materials and supplies. It has been assumed that the operating and maintenance labor will be provided by the New Colgate Powerhouse operating personnel during their regular work hours. Therefore, no additional labor cost is anticipated.

The project has a benefit-cost ratio of 1.35:1 without growth and 3.24:1 with growth.

Construction tasks requiring the shutdown of the turbines will be scheduled to minimize impacts on energy production. This will be in coordination with the California ISO and PG&E to avoid power losses.

IV. Project Rationale/Issues Statement

During the 31 years since full operation of New Colgate Powerhouse, there have been 14 occasions, ranging from 3 to 12 days, when flows in the Yuba River caused high tailwater conditions and required total or partial curtailment of generation. Curtailments occurred during a total of 91 days. Curtailments reduced the capacity to release water by an average of about 12,900 acre-feet during the 14 curtailment events. The amounts ranged from about 1,600 acre-feet during 3 days in 1974 to 54,000 acre- feet during 11 days in 1996-1997. This project addresses the following identified regional issues:

Infrastructure

Develop new infrastructure as well as repair, replace and retrofit aging infrastructure to ensure adequate and reliable water supply;

Flood Management

Improve integrated flood management to ensure better emergency preparedness;

Climate Change

Respond to projected climate change impacts on water supply reliability, water quality, public safety and watershed health and develop regional and inter-regional adaptive management strategies.

V. Goals/Objectives/Performance Metrics

Goals Addressed by the Project	**Goal 5**: Protect public safety through emergency and drought preparedness and integrated flood management **Goal 6** Address climate vulnerabilities and reduce greenhouse gas emissions
Objectives Addressed by Project	5.1 Improve integrated flood management to ensure emergency preparedness, increase flood protection and enhance regional and inter-regional collaboration; 6.3 Increase system flexibility and resiliency to adapt to climate variability.
What performance metrics will be used to demonstrate that objectives are being met? Wherever possible, provide a quantitative measurement reflecting successful project outcomes.	

VI. Resource Management Strategies

Improve Operational Efficiency and Transfers

System Reoperation	Installation of a tailwater depression system at New Colgate Powerhouse reoperates the system to avoid against power generation curtailments.
Improve Flood Management	
Flood Risk Management	The project would avoid against interruptions in power generation as a result of high flows from extreme storm events.

VII. Statewide Priorities

Climate Change Response Actions

- Adaptation to Climate Change: Water management system modifications that address anticipated climate

Practice Integrated Flood Management

- Better emergency preparedness and response
- Improved flood protection
- More sustainable flood and water management systems

Climate Change Adaptation

The project is in response to the following regionally identified climate vulnerabilities:

- Increased storm intensity and severity puts communities, critical infrastructure, and protective levees at greater risk;

This project directly addresses this vulnerability by upgrading and reoperating this power generation infrastructural facility to adapt to extreme flood events.

GHG Emissions Reduction

The GHG considerations have yet to be determined since this project is in a conceptual stage.

VIII. Project Status and Schedule

For Conceptual Projects Only: The Project is currently in the Conceptual Stage: YES

IX. Project Technical Feasibility

a. List the water planning documents that specifically identify this project.	
b. List the adopted planning	

documents the proposed project is consistent with (e.g., General Plans, UWMPs, GWMPs, Water Master Plans, Habitat Conservation Plans, etc.)	
c. List technical reports and studies supporting the feasibility of this project.	Report on Feasibility of Tailwater Depression at New Colgate Powerhouse, and Element of Yuba-Feather Supplemental Flood Control Project, October 2002 Initial Study and Proposed Mitigated Negative Declaration, Feasibility of Tailwater Depression at New Colgate Powerhouse, an Element of Yuba-Feather Supplemental Flood Control Project, Appendix NCP-B of Feasibility of Tailwater at New Colgate Powerhouse, September 2002 Basis of Design for Tailwater Depression at New Colgate Powerhouse, Yuba-Feather Supplemental Flood Control Project, July 2003 Specifications and Drawings for Tailwater Depression at New Colgate Powerhouse, Yuba-Feather Supplemental Flood Control Project, December 2004 Design Report for Tailwater Depression atNew Colgate Powerhouse, Yuba-Feather Supplemental Flood Control Project, December 2004
If you are an Urban Water Supplier:	
1. Have you completed an Urban Water Management Plan and submitted to DWR?	Yuba County Water Agency (YCWA) does not supply water for direct urban use and is not subject to the Urban Water Management Plan Act (UWMPA).
2. Are you in compliance with AB1420?	See above.
3. Do you comply with the water meter requirements (CWC Section 525)?	See above.
If you are an Agricultural Water Supplier:	
1. Have you completed and submitted an AWMP?	Yes
If the project is related to groundwater:	
1. Has GWMP been completed and submitted for the subject basin?	Yes