



- Board of Directors
Engineering and Operations Committee

3/12/2013 Board Meeting

7-8

Subject

Authorize amendment to agreement with Power-Tech Engineers, Inc. for the Wadsworth Control and Protection Upgrade Project

Executive Summary

This action authorizes an amendment to the existing agreement with Power-Tech Engineers, Inc. to develop and execute prototype test procedures for control of a full-scale pump/generator unit at the Hiram Wadsworth Pumping Plant (shown on the map in [Attachment 1](#)). The prototype will be used to test and confirm key technical concepts prior to initiating final design of upgrades for the entire pumping plant. No additional funds are required for this work, as sufficient funds were previously appropriated.

Timing and Urgency

This amendment authorizes the development of a prototype for testing a hydro pump/generation system in the preliminary design phase of the project. The prototype will provide early validation of technically complex control logic and control migration procedures, and will reduce technical and budgetary risks for the upcoming final design and full-scale upgrades at Wadsworth pumping plant. The testing will also reduce uncertainty of technical feasibility, and thereby enhance Metropolitan's future negotiations for the scope and cost of final design and construction. Staff recommends moving forward with the prototype testing in preliminary design to enable the full-scale upgrades to proceed as efficiently and cost-effectively as possible.

This project has been reviewed with Metropolitan's updated Capital Investment Plan (CIP) prioritization criteria, and staff recommends moving forward with the upgrades to maintain system reliability and maximize power generation. Funds for this action are available within Metropolitan's capital expenditure plan for fiscal year 2012/13.

Background

In February 2012, Metropolitan's Board authorized preliminary design to upgrade the Wadsworth pump/generator control and electrical protection systems. Several critical plant control and protection components are reaching their end-of-supportable life. The systems and components to be upgraded include programmable logic controllers, protection relays, vibration monitoring systems, communication network components, and pump/generator drive control modules. Failure of these components could cause the shutdown of a single pump/generator unit or an entire section of the pumping plant, resulting in reduced pumping capacity and power generation.

Preliminary design phase activities include gathering necessary information to make design decisions about the control system, software, and methods needed to replace system components with minimal impact to plant operations. Following the completion of preliminary design and stakeholder agreement with the recommendations, the final design phase will proceed in a more detailed and comprehensive manner. Prototype development is a component of overall system functional testing, and is typically included within the scope of final design. During preliminary design phase of the Wadsworth Control and Protection Upgrade project, staff identified that the challenge of migrating to a new control system while maintaining an operational facility would

pose substantial price and schedule risks for the project. To minimize these risks, developing and functionally testing prototype control logic and migration procedures during the preliminary design phase would allow confirmation of these key project elements prior to further investment. Power-Tech Engineers has developed extensive technical knowledge, regarding Metropolitan's Hiram Wadsworth Pumping Plant during the preliminary design. An amendment to Power-Tech Engineers' existing agreement is needed because prototype testing was included in the final design phase and was, therefore, not included as part of Power-Tech Engineers' scope of work for preliminary design.

In February 2012, the Board authorized an agreement with Power-Tech Engineers, Inc. to provide the preliminary design phase of the Wadsworth Control and Protection Upgrade project. Power-Tech Engineers was selected through a competitive process via Request for Proposals No. 989. Power-Tech Engineers specializes in the design and commissioning of large pump/generator facilities and its scope of work includes technical assistance in these areas.

Pump/Generator Prototype Testing (No Funds Required)

The prototype testing will be used to assess various control hardware, software, and control system transition processes developed during preliminary design. The scope of the prototype test includes:

1. Installing a modern programmable logic controller (PLC) recommended during preliminary design on a single pump/generator.
2. Migrating pump/generator PLC programming from the existing to the new PLC, and developing any additional software necessary for prototype testing.
3. Connecting the new PLC to the existing equipment and communication networks.
4. Testing the migrated PLC software, and the ability of the new PLC to seamlessly communicate with the existing networks.

The benefits of conducting early prototype testing include:

1. Confirming fundamental critical design and migration procedures related to the Wadsworth Pumping Plant control and electrical protection upgrades, prior to further investment.
2. Minimizing operational and project cost and schedule risks associated with the control upgrades.
3. Enhancing Metropolitan's leverage and position during future final design negotiations, by confirming the design criteria and operability, and eliminating unknowns.

In addition to these technical advantages, the development of a strong internal understanding of key technical details and risks would improve staff's understanding of detailed plant and project needs, and may provide additional savings to overall project costs and timing.

Early prototype testing does not increase the overall project budget, since a comprehensive testing plan for the facility was originally planned to take place during the final design phase. No additional funds are required for this work, as sufficient funds remain within the preliminary design budget.

This action authorizes an increase of \$206,000 to the existing agreement with Power-Tech Engineers, Inc. for a new not-to-exceed total of \$504,000, to perform prototype testing for control of a full scale pump/generator unit at the Hiram Wadsworth Pumping Plant.

Policy

Metropolitan Water District Administrative Code Section 5108: Appropriations

Metropolitan Water District Administrative Code Section 8121: General Authority of the General Manager to Enter Contracts

California Environmental Quality Act (CEQA)

CEQA determination for Option #1:

The proposed action to amend the existing contract for preliminary design to rehabilitate and upgrade the control and electrical protection systems of an existing facility is not subject to CEQA because it involves government fiscal activities, which do not involve any commitment to any specific project which may result in a potentially significant physical impact on the environment (Section 15378(b)(4) of the State CEQA Guidelines). The proposed action to perform functional testing is categorically exempt under the provisions of CEQA and the State CEQA Guidelines because it consists of modifying existing public facilities with negligible or no expansion of use beyond that existing at the time of the lead agency's determination. In addition, the proposed action will not have a significant effect on the physical environment. Accordingly, this proposed action qualifies as a Class 1 Categorical Exemption (Section 15301 of the State CEQA Guidelines).

The CEQA determination is: Determine that the proposed action is exempt from CEQA pursuant to Sections 15301 and 15378(b)(4) of the State CEQA Guidelines.

CEQA determination for Option #2:

None required

Board Options

Option #1

Adopt the CEQA determination and authorize an increase of \$206,000 to the existing agreement with Power-Tech Engineers, Inc., for a new not-to-exceed total of \$504,000.

Fiscal Impact: None. Funds for this work were previously appropriated.

Business Analysis: Prototype testing in the preliminary design phase will provide early validation of control logic and control migration procedures, reduce technical and budgetary risks, and reduce uncertainty of technical feasibility in the upgrades to the Wadsworth Pumping Plant's control and electrical protection systems to maintain pumping and generating capacity.

Option #2

Do not amend the agreement with Power-Tech Engineers Inc., and do not proceed with the prototype testing.

Fiscal Impact: None

Business Analysis: Deferral of the functional testing until the final design phase of the upgrades would forego an opportunity to confirm the functionality of critical control logic and control migration strategies at an early stage of the project. This approach would not reduce the budget of the project.

Staff Recommendation

Option #1

	2/20/2013
Roy L. Wolfe Manager, Business Technology	Date

	2/28/2013
Jeffrey Kightlinger General Manager	Date

Attachment 1 – Location Map

Diamond Valley Lake

