

- **Board of Directors**  
**Engineering, Operations and Real Property Committee**

March 13, 2001 Board Meeting

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8-2

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**Subject**

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Authorize \$1.15 million for the conversion of four pump-motor units to turbine-generators at the Hiram W. Wadsworth Pumping Plant, and delegate authority to the General Manager to award an agreement to complete the work and to execute all agreements necessary to obtain financial incentives and to enable Metropolitan to sell the hydroelectric energy thereby produced (Appn. 15360)

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**Description**

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The hydraulic facilities at Diamond Valley Lake (DVL) were designed to direct normal water deliveries from the reservoir into the San Diego Canal via the pumping plant forebay. Metropolitan has the opportunity to generate electrical power from the potential hydraulic energy available during withdrawals from the reservoir by converting pump-motor units to turbine-generator units. The converted units would be capable of operation in either a pumping mode or a power-generation mode. This Board action would convert four units to fully utilize the expected near-term flow demand at DVL. Conversion of the units to provide this capability is expected to require relatively minor physical changes to the operating system software, motor speed control equipment, power metering equipment, and the electrical protection systems.

In November 2000, the Board approved an initial appropriation to fund preliminary engineering, environmental documentation, and processing of the required application to the Federal Energy Regulatory Commission (FERC). FERC granted approval of Metropolitan's project application for licensing exemption as a small conduit hydroelectric facility in February 2001.

In December 2000, Metropolitan became eligible to receive incentives from the California Energy Commission (CEC) for electrical energy produced and sold during the first five years of operation of new projects. The total potential award is approximately \$1.1 million. Metropolitan must bring this project on-line by July 1, 2001 in order to remain eligible for the total amount of this award. To attain this milestone, Metropolitan intends to accelerate a portion of the project and complete conversion of the first four units by the July 1 deadline. The conversion of four units would provide a generating capacity of approximately 13 megawatts (MW) of electrical power. Because of the accelerated schedule and the need to resolve certain technical issues in the conversion process, the initially converted units will operate manually. To achieve this conversion, Metropolitan intends to award a noncompetitive consultant agreement to Alstom Power Conversion, Inc. (Alstom). Alstom is the original designer and supplier of the motor variable speed drive units, control systems, and associated software. A sole source award to Alstom is necessary because of their familiarity with the control systems and the proprietary nature of their software. It is not feasible to accomplish this project without Alstom's involvement.

An initial feasibility study indicates that the anticipated ultimate build-out project cost will range from \$4 to \$5 million. The study also suggests the project build-out will demonstrate a capital cost payback within 5 to 8 years of operation. Approval of the following recommendation will authorize the appropriation of \$1.15 million to finance the conversion of four units for turbine-generator operation in a manual mode by July 1, 2001, and to fund any additional studies necessary for power sales to energy markets. Implementation of this accelerated schedule for the conversion of four units is not anticipated to result in an increase of the ultimate build-out project cost estimate.

At the completion of the accelerated work, staff intends to complete the feasibility study, all preliminary engineering and testing activities, and to formulate a recommendation on the appropriate total number of units to

convert. At that time, staff will request appropriation of funding to complete the conversion of the remaining pump-motor units and to automate the four units converted during this phase of the project.

If the Board approves this recommendation, the FY 2000/2001 Capital Investment Plan (CIP) expenditure plan will be adjusted to include funds for this project.

See [Attachment 1](#) for the Detailed Report, [Attachment 2](#) for the Financial Statement and [Attachment 3](#) for the Location Map.

**Policy**

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Metropolitan Water District Administrative Code Section 5108: Capital Project Appropriation

**Board Options/Fiscal Impacts**

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**Option #1**

Appropriate \$1.15 million to finance the conversion of four pump-motor units to turbine-generator units for operation in a manual mode. Authorize the General Manager to award an agreement to Alstom in an amount up to \$650,000 for this purpose.

**Fiscal Impact:** \$1.15 million of non-budgeted funds under existing Appropriation 15360. The FY 2000/2001 CIP expenditure plan will be adjusted to include funds for this project. Future reduction or offset of energy costs to Metropolitan and future potential incentive award from the CEC of approximately \$1.1 million.

**Option #2**

Defer action.

**Fiscal Impact:** No future expenditures; however, up to \$325,000 of actual costs for preliminary development of the project expended to date.

**Staff Recommendation**

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Option # 1

  
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Roy L. Wolfe  
Manager, Corporate Resources

2/23/2001  
Date

  
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Ronald R. Jester  
General Manager

2/27/2001  
Date

[Attachment 1—Detailed Report](#)

[Attachment 2—Financial Statement](#)

[Attachment 3—Location Map](#)

## Detailed Report

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*Purpose/Background.* The Hiram W. Wadsworth Pumping Plant at Diamond Valley Lake (DVL) was designed as a normally unattended, off-stream facility for pumping water from the forebay into DVL through the reservoir's Inlet/Outlet Tower. Also installed at this pumping plant are seven pressure control vertical sleeve valves. These valves control flow and dissipate energy when delivering water from DVL to the forebay for transfer into the San Diego Canal.

In its normal operating mode, water deliveries from DVL are directed through the pressure control valves. Metropolitan has the opportunity to generate electrical power by converting the hydraulic energy available during water deliveries. Electrical energy will be produced by directing the normal reservoir withdrawal through the pump-motor units operating in a reverse mode. In reverse mode, the pump-motor units act as turbine-generators and produce electrical energy. The ultimate build-out capacity of this facility, converting all 12 units, is approximately 40 megawatts (MW) of electrical power.

*Project Description.* Although not originally designed as reversible pump-turbine units, the conversion of the units to provide this capability is expected to require relatively minor physical changes to the existing equipment. A brief study was conducted in August 2000 to determine the feasibility of such a project. The principal modifications required involve reconfiguration of the motor speed control equipment, the power metering equipment, and the electrical protection systems. A significant portion of the work is anticipated in the required software changes in the operating program to allow remote, automatic, unattended operation in the turbine mode as is available in the pump mode.

Metropolitan may sell the electrical power generated in this manner in available energy markets or to third parties under new power contracts. Metropolitan currently maintains a number of similar power contracts for delivery of electrical power generated at 15 small conduit hydroelectric plants throughout the distribution system. The 15 plants, with the exception of the Etiwanda facility, were all retrofitted at the then-existing pressure control facilities. The addition of this 40 MW capacity facility at DVL will increase Metropolitan's aggregate generating capacity to 141 MW. Continuous operation of Metropolitan's hydroelectric plants at this total capacity would generate enough energy to meet the annual electrical needs of 141,000 southern California homes. Metropolitan's production of hydroelectric power helps offset purchased energy costs and contributes to the conservation of fossil fuels.

In early December 2000, Metropolitan became eligible to receive incentives from the California Energy Commission (CEC) for electrical energy produced and sold during the first five years of operation of new projects. For this small hydroelectric project, the estimated total potential award is approximately \$1.1 million. To remain eligible for 100 percent of this award, Metropolitan must satisfy several CEC requirements. First, the project must be on-line by July 1, 2001. Second, Metropolitan must sell the electricity generated in the power marketplace and provide monthly records to the CEC documenting generation and sales for each month. To ensure that Metropolitan retains its eligibility, staff intends to accelerate work on a portion of the project and complete the conversion of the first four pump-motor units to turbine-generation capability by the required on-line date. The conversion of four units would provide a generating capacity of approximately 13 MW of electrical power. Due to the accelerated schedule and the acknowledgement of certain unknowns in the conversion process, the four units will be operated manually. This Board action will provide funding to complete the conversion of the initial four units to turbine-generation capability in a manual mode by July 1, 2001. To achieve this conversion, Metropolitan intends to award a consultant agreement to Alstom Power Conversion, Inc. (Alstom), the original designer and supplier of the motor variable speed drive units, control systems, and associated software. The contract award to Alstom will be on a noncompetitive basis. This sole source is justified due to the unique nature of the equipment and software supplied by Alstom. Alstom's familiarity with the variable speed drive units, control systems and software, and the proprietary nature of their software, preclude the possibility of successfully accomplishing this project without their involvement.

The total cost estimate for this project will be refined in the preliminary engineering effort. However, it is anticipated that the ultimate capital project cost will range from \$4 to \$5 million. The initial feasibility review indicates the capital investment payback period for the initial build-out could range from 5 to 8 years of operation. This payback projection was developed by estimating the conversion cost of a varying number of units, and considering their operation over a range of flow projections and available head.

It is anticipated that acceleration of the project schedule to bring four units on-line by July 1, 2001 will not result in an increase to the estimated capital cost for the ultimate build-out project. Staff plans to request approval from the Board for the final phase of this project in July 2001. At that time, staff intends to complete the feasibility study, all preliminary engineering and equipment testing activities, formulate a recommendation on the appropriate number of units to convert, request appropriation of funding to convert the remaining units, and automate the four units converted in this phase of the project.

*Licenses/Permits.* Conversion of the existing system to hydroelectric power generation requires review and approval from the Federal Energy Regulatory Commission (FERC) and prior consultation with federal and state resource agencies. Metropolitan filed the application for approval to FERC in December 2000. On February 21, 2001, Metropolitan received notification that FERC granted approval of licensing exemption for the project as a small conduit hydroelectric facility.

*Recommendation.* Metropolitan's eligibility for incentive award from the CEC warrants an accelerated approach to comply with the CEC-mandated on-line date of July 1, 2001. Approval of this recommendation will authorize the appropriation of \$1.15 million to finance the conversion of four units to turbine-generation capability in a manual mode by July 1, 2001, and to fund any additional studies necessary for power sales to energy markets. Additionally, it is recommended that the General Manager be delegated the authority to award an agreement in an amount up to \$650,000 for turbine-generator conversion, and to execute all agreements necessary to obtain financial incentives and to enable Metropolitan to sell the hydroelectric energy thereby produced.

### **CEQA Compliance/Environmental Documentation**

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In October 1991, Metropolitan's Board of Directors certified the Final Environmental Impact Report (FEIR) for the Diamond Valley Lake Project. The FEIR identified hydroelectric power generation as a project component. No further CEQA documentation is required for the Board to approve the requested action.

### **Actions and Milestones**

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- July 2001 – Complete the conversion of four units and achieve on-line capability in a manual control mode, and request Board authority to complete the remaining conversion work.
- Mid 2002 – Achieve on-line capability in automatic mode for all converted units.

**FINANCIAL STATEMENT**

Board Action No. 2 for Appropriation No. 15360 to finance the conversion of four pump-motor units to turbine-generator units for operation in a manual mode, and delegate to the General Manager the authority to award an agreement in an amount up to \$650,000 for this purpose for the Hiram W. Wadsworth Pumping Plant Hydroelectric Pump-Motor Unit Conversion.

	<b>BOARD ACTION NO. 1 (Nov. 2000)</b>	<b>BOARD ACTION NO. 2 (Mar. 2001)</b>
Labor:		
Engineering and Water System Operations Staff	\$ 265,000	\$ 500,000
<b>Subtotal Labor</b>	<b>\$ 265,000</b>	<b>\$ 500,000</b>
Incidental Expenses	10,000	20,000
Contracts	50,000	775,000
Remaining Budget		180,000
<b>Total</b>	<b>\$ 325,000</b>	<b>\$ 1,475,000</b>

**FUNDING REQUEST**

<b>Program Name:</b>	Diamond Valley Lake Hiram W. Wadsworth Pumping Plant Hydroelectric Pump-Motor Unit Conversion		
<b>Source of Funds:</b>	Construction Funds (possibly General Obligation, Revenue Bonds, Pay-As-You-Go)		
<b>Appropriation No.:</b>	15360	<b>Board Action No.:</b>	2
<b>Requested Amount:</b>	\$ 1,150,000	<b>Capital Program No.:</b>	N/A
<b>Total Appropriated Amount:</b>	\$ 1,475,000	<b>Capital Program Page No.:</b>	N/A
<b>Total Program Estimate:</b>	\$ N/A	<b>Program Goal:</b>	O-Other

