June 21, 1999

To: Board of Directors (Executive Committee--Action)

From: General Manager

Submitted by: Mark D. Beuhler
Director of Water Quality

Subject: Appropriate $1,834,200 for Third Year Funding of the Desalination Research and Innovation Partnership (DRIP)

Reference: Appropriation No. 15301

RECOMMENDATION(S)

Approve an increase of $1,834,200 in Appropriation No. 15301 from $576,200 to $2,410,400 from the Pay-As-You-Go Fund to finance the third year of the Desalination Research and Innovation Partnership (DRIP).

EXECUTIVE SUMMARY

The Desalination Research and Innovation Partnership (DRIP) is in its third year of applied research to develop and demonstrate new and innovative technologies to substantially reduce the cost of desalinating Colorado River water and other brackish water sources. Approval of this recommendation will authorize an increase of $1,834,200 in the appropriation to a total of $2,410,400 to cover the third year of the project.

The DRIP partners include Metropolitan, Orange County Water District, West Basin Municipal Water District, San Diego County Water Authority, University of California, Northern California water utilities, and representation from the electric utilities (see **Table 1**). The total amount of outside grant funding received to date by the DRIP partners is $2,400,000 (See **Figure 1**). It is expected that the increased appropriation will be significantly leveraged by new outside funding which is anticipated during FY 1999/00.

JUSTIFICATION

The DRIP consortium aims to achieve technological advances in desalination of various brackish waters, including Colorado River water (CRW), brackish groundwater, municipal wastewater, and agricultural drainage water. A technological breakthrough to achieve cost-effective desalination would have numerous economic, environmental, water quality, and customer satisfaction benefits.

High total dissolved solids (TDS) levels cause problems for homeowners by corrosion and scaling of plumbing fixtures and appliances, as well as for agricultural, commercial and industrial processes. Elevated TDS levels also limit the use of municipal wastewater for irrigation and groundwater recharge. Development and implementation of cost-effective desalination technologies would significantly mitigate these concerns with the use of CRW.

The successful deployment of new technologies resulting from DRIP could also be used to develop new water supplies within Southern California, such as brackish groundwater, municipal wastewater, and agricultural drainage water. The potential reduced need for State Project Water resulting from the development of these non-traditional water supplies could minimize the environmental impacts associated with water imports from the Sacramento-San Joaquin Delta.

ALTERNATIVE(S) TO PROPOSED ACTION

Alternatives to the proposed action include discontinuing participation in the DRIP consortium, in which case, applied desalination research and development would not occur, and deployment of less cost-effective desalination technologies would be needed within Metropolitan's service area. This would limit Southern California's ability to manage salinity regionally and limit Metropolitan's ability to determine to what extent emerging treatment technologies may play a role in Metropolitan's future.

FUNDING REQUEST

Program Name:	Desalination Research and Innovation Partnership (DRIP)				
Source of Funds:	Pay-As-You-Go Fund				
Appropriation No.:	15301	**Board Action No.:**	3	**FY 98/99 Budget:**	$330,000
Requested Amount:	$1,834,200	**Capital Program No.:**	15301-W		
Total Appropriated Amount:	$2,410,400	**Capital Program Page No.:**	E-73		
Total Program Estimate:	$7,342,800	**Program Category:**	W-Water Quality		

ACTIONS AND MILESTONES

The scope of work for the third year of the project is to (1) demonstrate large-scale reverse osmosis (RO) elements on targeted source waters; (2) evaluate next-generation carbon aerogel capacitive deionization technologies on targeted source waters; (3) design and construct demonstration-scale pretreatment facilities; and (4) evaluate innovative brine concentration and disposal technologies. The proposed schedule would be completed by the year 2005 (see **Figure 2**), with goals and accomplishments as shown in **Table 2**. Staff will provide semi-annual updates to the Board and to the Member Agency Advisory Group. Continued efforts on this program will be based on promising test results, the amount of outside funding received, and input from the Board and Member Agencies. The total program estimate for Metropolitan's portion of the DRIP activities is $14.7 million, with an assumption that at least half of this cost

will be met from outside grants. The Partnership will vigorously pursue additional potential funding sources for DRIP (see **Table 3**) to minimize the net cost to Metropolitan and its partners.

CEQA COMPLIANCE / ENVIRONMENTAL DOCUMENTATION

Approval of the recommendation will not, in and of itself, have any environmental effects. When and as specified steps are proposed for implementation, the Board will be requested to comply, as appropriate, with the California Environmental Quality Act. This program is exempt because it consists of basic data collection, applied research, experimental management, and resource evaluation activities not resulting in a serious or major disturbance to an environmental resource (Title 14 CCR Sec. 15306).

DETAILED REPORT

Background

The Desalination Research and Innovation Partnership (DRIP), a historic partnership between the water industry, electric industry, and state and federal agencies, was formed to address critical water quality and supply issues. As listed in **Table 1**, DRIP currently consists of fourteen agencies including West Basin Municipal Water District, Orange County Water District, and San Diego County Water Authority. In the past year, Alameda County Water District, Sonoma County Water Agency, and Santa Clara Valley Water District have been added to the DRIP consortium. This gives DRIP California-wide representation and focus, and significantly broadens the appeal of the Partnership to organizations with a statewide purview. Within DRIP, Metropolitan is primarily addressing desalination issues related to CRW, while the other DRIP partners are addressing the issues associated with brackish groundwater, municipal wastewater, and agricultural drainage water.

The overall objective of DRIP is to develop new and innovative technologies to substantially reduce the cost of desalinating water from the Colorado River and other brackish water sources. The specific objectives of the program are to: (1) demonstrate new, large-scale technologies to reduce the cost of producing potable water; (2) partner with industry to ensure commercial viability of newly developed treatment technologies; (3) reduce the need for energy-intensive water imports; (4) improve water quality to meet future U.S. EPA standards; and (5) cost-effectively develop new, local, non-traditional water supplies.

To achieve these objectives, DRIP is investigating new technologies for desalination, including new, experimental membranes, capacitive deionization with carbon aerogel electrodes, non-traditional pretreatment options, new techniques for brine minimization and disposal, use of ultraviolet (UV) technology for disinfection and biofouling control, and methods that take advantage of economies of scale.

The DRIP is in the third year of a proposed eight-year program. The accomplishments achieved during the first two years of the program, and the goals for the third year are summarized in **Table 2**. The third year of applied research builds on the first two years' efforts. For example, results from RO studies currently being conducted at the pilot scale will be used to develop design criteria for construction of demonstration-scale facilities during the third year. The new

technologies being developed as part of DRIP may also provide additional treatment options. These technologies include membranes for salt and contaminant removal, and ultraviolet disinfection to kill microbes while avoiding the creation of disinfection byproducts.

Outside Funding

Significant outside funding has been secured by DRIP to help offset the cost of the program. As shown in **Figure 1**, Metropolitan has received $815,000 to support applied research being conducted under DRIP. Collectively, the Partnership has been awarded $2,400,000 in grant funding. Metropolitan's Member Agency partners are receiving a significant portion of this grant funding.

In addition, several very promising funding opportunities are being pursued by the DRIP consortium, as indicated in **Table 3**. At the invitation of Commissioner David A. Rohy of the California Energy Commission (CEC), the DRIP consortium presented a preproposal to the CEC for funding under the Public Interest Energy Research (PIER) Stage 2 program on June 9, 1999. The preproposal is for a 5-year, $20 million continuation of the work currently underway in DRIP. Although no commitment has been made by the CEC, they were very favorably impressed by the DRIP preproposal, and are currently discussing what funding mechanism may be appropriate for DRIP.

Also, AB 1605 (Margett) was developed to provide additional funding of $1,000,000 for DRIP. The bill has passed the Assembly on a 78-1 vote, and will be acted on by the Senate in the near future. Metropolitan's Sacramento Legislative Office has been instrumental in moving the bill thus far. Other possible opportunities include having funding earmarked for DRIP in the budget of both the U.S. Bureau of Reclamation and the U.S. EPA. A funding amount of $2,000,000 for each agency has been proposed. These actions are being supported by Metropolitan's Washington, D.C. Legislative Office.

The DRIP program also received the 1999 Water Efficiency Award in the Government/Public Works category from the California Water Awareness Campaign.

JTD/mi

Attachment 8-8A

Attachment 8-8B

Attachment 8-8A

TABLE 1

DESALINATION RESEARCH AND INNOVATION PARTNERSHIP

PARTICIPANTS TO DATE (June, 1999)

* Metropolitan Water District of Southern California
* Orange County Water District
* San Diego County Water Authority
* West Basin Municipal Water District
* Southern California Edison
* Electric Power Research Institute
* American Water Works Association Research Foundation
* University of California, Riverside
* California Department of Water Resources
* Lawrence Livermore National Laboratory
* Alameda County Water District
* Sonoma County Water Agency
* Santa Clara Valley Water District
* California Energy Commission

TABLE 2

DESALINATION RESEARCH AND INNOVATION PARTNERSHIP ACCOMPLISHMENTS AND GOALS

Project Tasks	Second Year Accomplishments	Third Year Goals
Raise Money/Obtain Partners	• Obtained $65,000 in Prop 204 funds from the Department of Water Resources (DWR) to support DRIP research being conducted by the San Diego County Water Authority and City of San Diego • Brought Alameda County Water District, Sonoma County Water Agency, and the Santa Clara Valley Water District into DRIP • Coordinated closely with the California Energy Commission (CEC) to optimize chances of obtaining Public Interest Energy Research (PIER) Stage 2 funding • Submitted proposals for funding to the CEC and U.S. Bureau of Reclamation • Provided language and generated institutional support for AB 1605 (Margett), which passed the Assembly on a 78-1 vote and is in the Senate • Supported "earmarking" funds for DRIP in the budgets of the USBR and the U.S. EPA	• Obtain additional research partners, as appropriate, and raise funds from state and federal sources • Continue efforts to secure significant funding from the CEC's PIER Stage 2 program • Continue efforts to secure funding through federal appropriations
Treatment Evaluations	• Procured and installed R&D facilities • Completed preliminary evaluation of ultra-low pressure RO membranes for Colorado River water • Completed preliminary evaluation of the performance of carbon aerogel electrodes • Evaluated pretreatment options including conventional treatment, conventional treatment with ozone/biofiltration, and microfiltration • Conducted preliminary studies on membrane scale-up issues • Completed preliminary evaluation of pulsed-UV for disinfection	• Demonstrate large-scale reverse osmosis prototype on targeted source waters • Evaluate next-generation capacitive deionization technologies on targeted source waters • Design and construct demonstration-scale pretreatment facilities • Evaluate innovative brine concentration and disposal technologies • Compare pulsed-UV to more traditional UV systems and construct scaled-up pulsed-UV system

Table 3

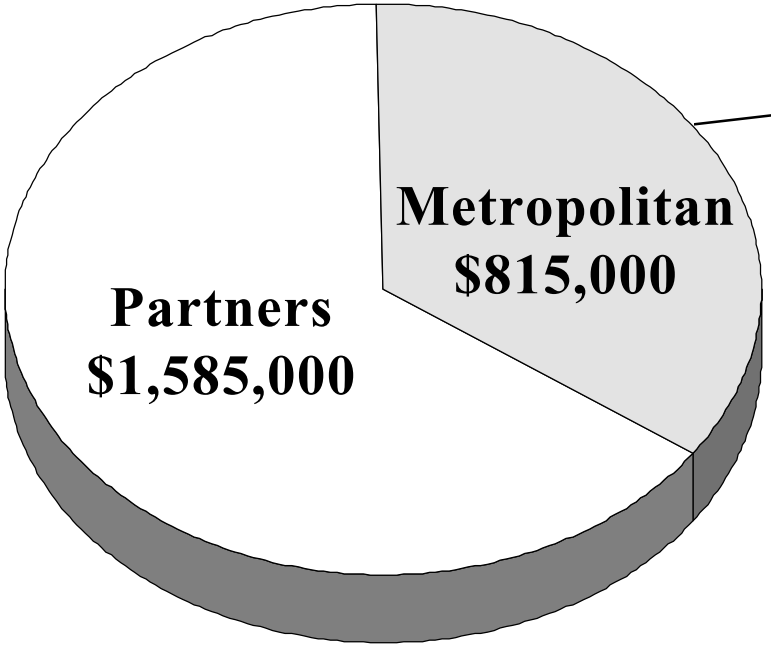
POTENTIAL FUNDING SOURCES FOR DRIP

Funding Source	Description	Amount Proposed	Expected Timing
California Energy Commission	DRIP partners presented a preproposal for a 5-year continuation of DRIP under the Public Interest Energy Research (PIER) Stage 2 program in June, 1999.	$20,000,000	CEC decision on funding expected by September, 1999
AB 1605 (Margett)	AB 1605 (Margett) requests funding for DRIP applied research activities. Bill passed Assembly on a 78-1 vote; bill has been read in the Senate and assigned to committee.	$1,000,000	Action on bill expected in Senate by September, 1999
U.S. Environmental Protection Agency	Washington D.C. Legislative Office pursuing "earmarked" funding for DRIP in U.S. EPA budget.	$2,000,000	Action expected by September, 1999
U.S. Bureau of Reclamation (USBR)	Metropolitan requested that the FY 2000 budget of USBR include funding for DRIP.	$2,000,000	Action expected by September, 1999
U.S. Bureau of Reclamation	Metropolitan submitted a proposal under the USBR Desal R&D program for a study of precipitative fouling for Colorado River water desalination.	$100,000	Winning proposals selected in September, 1999
Others	To be pursued as identified	----	----

FIGURE 1

Grant Money to Partnership

(As of June 1999)

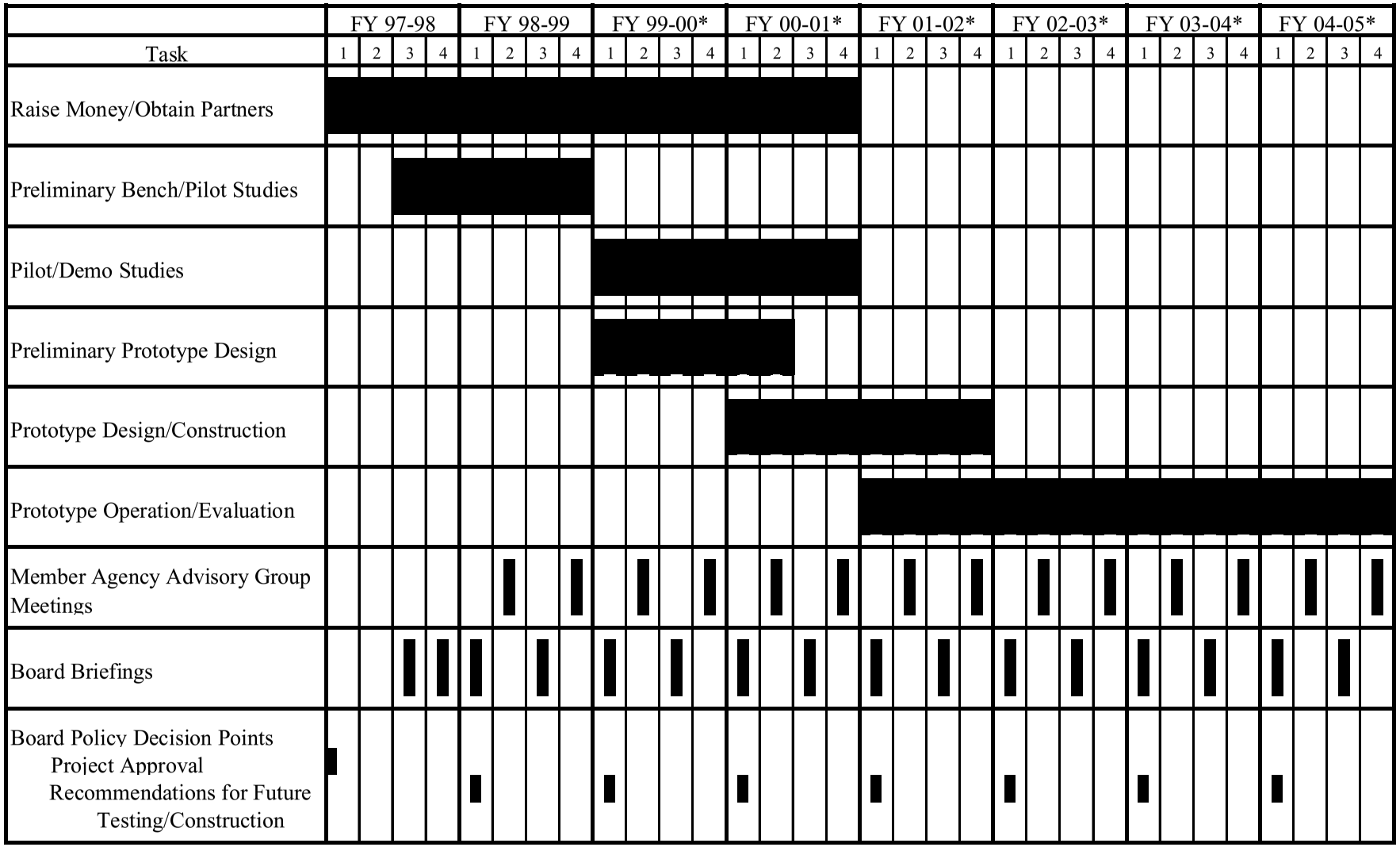


California Energy Commission	$ 525,000
Edison Technology Solutions	$ 215,000
American Water Works Association Research Foundation	$ 75,000
Total	$ 815,000

Total Grant Funding = $2,400,000

Figure 2

Proposed Desalination Research and Innovation Partnership Schedule



* Efforts in these years are subject to modifications based on results from the first two years of work, the amount of outside funding received, and input from the Board and Member Agency Advisory Council.

Attachment 8-8B

FINANCIAL STATEMENT

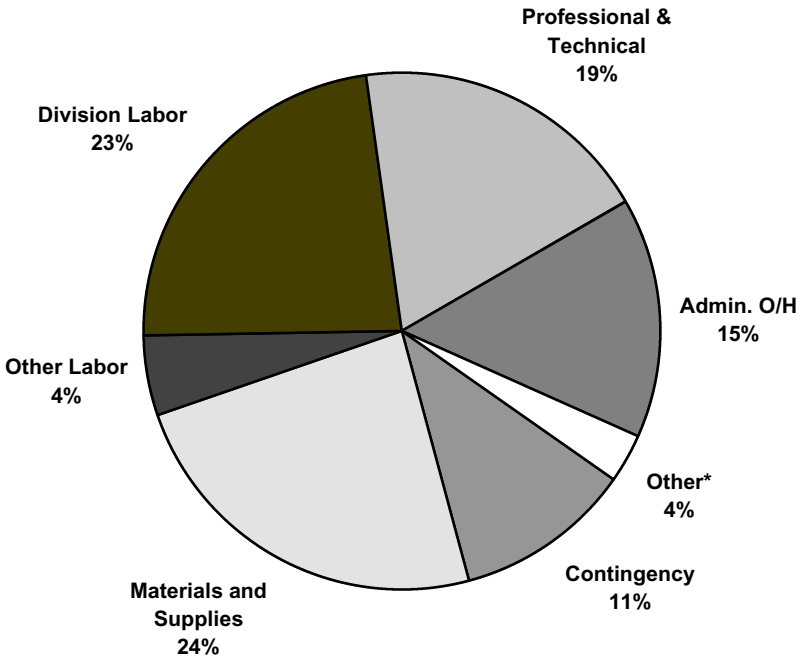
(Capital Program No. 15301-W)

The breakdown of the total estimated cost for Desalination Research and Innovation Partnership is as follows:

	BOARD ACTION NO. 3
Labor:	
Water Quality Division	501,275
Operations Division	100,800
Subtotal Labor	**602,075**
Material and Supplies	525,000
Professional/Technical	420,000
Incidental Expenses	21,000
Operating Equipment	10,500
Administrative Overhead	332,179
Contracts	
Construction	56,700
Grants	(368,326)
Contingencies	235,072
Total	**1,834,200**
Source of Funds: Pay-As-You-Go	
Projected Expenditures of Funds :	
Through Fiscal Year 1999/00	2,162,100
Fiscal Year 2000/01	2,641,400
Outlying Fiscal Years	1,624,500
Contingencies	914,800
Total	7,342,800
Capital Program for Fiscal Year 1999/00	
Total Program Estimate	7,342,800
Program Estimate for FY 1999/00	1,834,200

Desalination Research and Innovation Partnership (DRIP)

Breakdown of Estimated Costs for Third Year of DRIP



*Other (incidental expenses, operating equipment, construction contract)