REGULAR MEETING
OF THE BOARD OF DIRECTORS
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
18700 Ward Street, Board Room, Fountain Valley, California
March 18, 2015, 8:30 a.m.

AGENDA

PLEDGE OF ALLEGIANCE

ROLL CALL

PUBLIC COMMENTS/PARTICIPATION
At this time, members of the public will be given an opportunity to address the Board concerning items within the subject matter jurisdiction of the Board. Members of the public may also address the Board about a particular Agenda item at the time it is considered by the Board and before action is taken. If the item is on the Consent Calendar, please inform the Board Secretary before action is taken on the Consent Calendar and the item will be removed for separate consideration.

The Board requests, but does not require, that members of the public who want to address the Board complete a voluntary "Request to be Heard" form available from the Board Secretary prior to the meeting.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED
Determine need and take action to agendize items(s) which arose subsequent to the posting of the Agenda. (ROLL CALL VOTE: Adoption of this recommendation requires a two-thirds vote of the Board members present, or, if less than two-thirds of the Board members are present, a unanimous vote of those members present.)

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING
Pursuant to Government Code section 54957.5, non-exempt public records that relate to open session agenda items and are distributed to a majority of the Board less than seventy-two (72) hours prior to the meeting will be available for public inspection in the lobby of the District's business office located at 18700 Ward Street, Fountain Valley, California 92708, during regular business hours. When practical, these public records will also be made available on the District's Internet Web site, accessible at http://www.mwdoc.com.

NEXT RESOLUTION NO. 2010

CONSENT CALENDAR (Items 1 to 8)
(All matters under the Consent Calendar will be approved by one motion unless a Board member requests separate action on a specific item)

1. MINUTES
a. February 4 , 2015 Workshop Board Meeting
b. February 18, 2015 Regular Board Meeting

Recommendation: Approve as presented.

2. COMMITTEE MEETING REPORTS

a. Planning & Operations Committee: February 2, 2015
b. Administration & Finance Committee: January 14, 2015
c. Executive Committee Meeting: February 19, 2015

Recommendation: Receive and file as presented.

3. TREASURER'S REPORTS

a. MWDOC Revenue/Cash Receipt Register as of February 28, 2015
b. MWDOC Disbursement Registers (February/March)

Recommendation: Ratify and approve as presented.

c. Summary of Cash and Investment and Portfolio Master Summary Report (Cash and Investment report) as of January 31, 2015
d. PARS Monthly Statement (OPEB Trust)
e. Water Use Efficiency Projects Cash Flow

Recommendation: Receive and file as presented.

4. FINANCIAL REPORT

a. Combined Financial Statements and Budget Comparative for the period ending January 31, 2015

Recommendation: Receive and file as presented.

5. MEMBERSHIP IN THE ASSOCIATION OF METROPOLITAN WATER AGENCIES (AMWA)

Recommendation: Approve membership in AMWA for this fiscal year (2014-15).

6. TRAVEL EXPENSES FOR LEGISLATIVE STAFF ON METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA (MET) INSPECTION TRIPS

Recommendation: Authorize payment of $1401 in outstanding costs from the December 2014 trip.

7. TRAVEL TO WASHINGTON, DC TO COVER FEDERAL INITIATIVES

Recommendation: Receive and file.

8. TRAVEL TO SACRAMENTO TO COVER STATE INITIATIVES

Recommendation: Receive and file.

– **End Consent Calendar –**

ACTION CALENDAR

9-1 BUREAU OF RECLAMATION CALFED WATER USE EFFICIENCY GRANT RESOLUTION RES. NO. _____

Recommendation: Adopt the proposed Resolution in support of MWDOC's 2015 CALFED Water Use Efficiency grant application to be submitted to the Bureau of Reclamation by March 20, 2015.

9-2 TWO NEW OC WATER RELIABILITY STUDY AUTHORIZATIONS – (A) ANALYSIS AND MAPPING OF SEISMIC HAZARDS AND (B) FACILITY VULNERABILITY AND RECOVERY ASSESSMENT – AUTHORIZATION FOR PROFESSIONAL SERVICE AGREEMENTS

Recommendation: Authorize the General Manager to enter into two professional service agreements: (1) GeoPentech, Inc. in the approximate amount of $77,600 to perform Part A Analysis and Mapping of Seismic Hazards and (2) G&E Engineering in the approximate amount of $41,000 to perform Part B Facility Vulnerability and Recovery Planning (the dollar amounts are subject to final negotiation). Both of these efforts will be utilized in the OC Water Reliability Study work. The additional work was presented to the OC Water Reliability Study Workgroup subcommittee who concurred with the approach and the consultant selection.

9-3 CONSIDER FINANCIAL PARTICIPATION IN THE SCIENCE FAIR

Recommendation: The Public Affairs & Legislation Committee will discuss this item on March 16, 2015 and make a recommendation to the Board regarding whether or not to include financial participation in the OC Science and Engineering Fair during the fiscal year 2015-16 budget process.

9-4 SAN DIEGO GAS & ELECTRIC SOUTH ORANGE COUNTY RELIABILITY ENHANCEMENT (SOCRE) PROJECT AUTHORIZATION TO SUBMIT COMMENTS IN SUPPORT OF THE PROJECT

Recommendation: Authorize the General Manager to submit comments and present testimony before the California Public Utilities Commission at one of two project Public Hearings to be held on March 25, 2015 in San Juan Capistrano and San Clemente in support of the subject electrical reliability grid enhancement project for South Orange County.

INFORMATION CALENDAR (All matters under the Information Calendar will be Received/Filed as presented following any discussion that may occur)

10. GENERAL MANAGER'S REPORT, MARCH 2015 (ORAL AND WRITTEN)

Recommendation: Receive and file report(s) as presented.

11. MWDOC GENERAL INFORMATION ITEMS

a. Board of Directors - Reports re: Conferences and Meetings and Requests for Future Agenda Topics

Recommendation: Receive and file as presented.

CLOSED SESSION ITEMS

12. CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION, Consider Initiation of Litigation pursuant to Paragraph (4) of subdivision (d) of Section 54956.9: (Two Cases).

13. CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION Consideration of initiation of litigation pursuant to paragraph (4) of subdivision (d) of Section 54956.9 (One Case).

ADJOURNMENT

Note: Accommodations for the Disabled. Any person may make a request for a disability-related modification or accommodation needed for that person to be able to participate in the public meeting by contacting Maribeth Goldsby, District Secretary, at (714) 963-3058, or writing to Municipal Water District of Orange County at P.O. Box 20895, Fountain Valley, CA 92728. Requests must specify the nature of the disability and the type of accommodation requested. A telephone number or other contact information should be included so that District staff may discuss appropriate arrangements. Persons requesting a disability-related accommodation should make the request with adequate time before the meeting for the District to provide the requested accommodation.

MINUTES OF THE WORKSHOP BOARD MEETING
OF THE BOARD OF DIRECTORS OF
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY (MWDOC)
WITH THE MWDOC MET DIRECTORS
February 4, 2015

At 8:30 a.m. Vice President Osborne called to order the Workshop Board Meeting of the Board of Directors of Municipal Water District of Orange County (MWDOC) at the District facilities located in Fountain Valley. Director Tamaribuchi led the Pledge of Allegiance and Secretary Goldsby called the roll.

MWDOC DIRECTORS
Brett R. Barbre*
Larry Dick* (absent)
Joan Finnegan
Susan Hinman
Wayne Osborne
Sat Tamaribuchi
Jeffrey M. Thomas

MWDOC STAFF
Robert Hunter, General Manager
Karl Seckel, Assistant General Manager
Russ Behrens, Legal Counsel
Maribeth Goldsby, Secretary
Harvey De La Torre, Prin. Water Resources Planner
Darcy Burke, Director of Public Affairs
Kevin Hostert, Assoc. Water Resources Analyst
Joe Berg, Water Use Efficiency Prog. Mgr.
Richard Bell, Principal Engineer

*Also MWDOC MET Directors

OTHER MWDOC MET DIRECTORS
Linda Ackerman
Larry McKenney

OTHERS PRESENT

Joe Byrne	Best, Best & Krieger
Fred Adjarian	El Toro Water District
William Kahn	El Toro Water District
Ken Vecchiarelli	Golden State Water Company
Doug Reinhart	Irvine Ranch Water District
Peer Swan	Irvine Ranch Water District
Paul Shoenberger	Mesa Water District
John Kennedy	Orange County Water District
Ray Miller	City of San Juan Capistrano
Rick Erkeneff	South Coast Water District
Andy Brunhart	South Coast Water District
Gary Melton	Yorba Linda Water District
Randall Neudeck	MET Manager, Bay Delta Issues Program
Elizabeth Mendelson	San Diego County Water Authority
Laer Pearce	Laer Pearce & Associates
Ed Means	Means Consulting
Kelly Rowe	WR Consultant
Betsy Eglash	Brady & Associates

ITEMS RECEIVED TOO LATE TO BE AGENDIZED
Determine need and take action to agendize item(s), which arose subsequent to the posting of the Agenda. (ROLL CALL VOTE: Adoption of this recommendation requires a two-thirds vote of the Board members present or, if less than two-thirds of the Board members are present, a unanimous vote.)

No items were presented.

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING
Vice President Osborne inquired as to whether there were any items distributed to the Board less than 72 hours prior to the meeting.

It was noted that the January MET Agenda was distributed to the Board at the meeting and made available to the public.

PUBLIC PARTICIPATION/PUBLIC COMMENTS
Vice President Osborne inquired whether any members of the public wished to comment on agenda items.

Legal Counsel Behrens introduced and provided background information on Mr. Joe Byrne, attorney at Best, Best & Krieger,

PRESENTATION/DISCUSSION/INFORMATION ITEMS

BAY DELTA CONSERVATION PLAN (BDCP) UPDATE ON FISH AND WILDLIFE REGULATORY ACTIVITIES

Mr. Randy Neudeck (MET's Manager of Bay Delta Issues Program) presented information on the Bay Delta. Mr. Neudeck's presentation included information regarding Delta regulatory restrictions and drought year balancing, an update on the Delta Smelt lawsuit and court decision, an overview of the California Treasurer's Report and key findings, the status of the Bay Delta Conservation Plan (including revisions), and an update on Delta emergency planning (earthquake protection).

Considerable discussion ensued regarding the Bay Delta Conservation Plan conveyance facilities, refinements, and continued optimization, as well as the 2009 proposal to build two gates at the Delta pumps, in an effort to control the fish movement, with Mr. Neudeck advising that this proposal was deemed not feasible. Director Tamaribuchi asked whether the gates would work if they were built lower (or more southern) on the Delta; Mr. Neudeck advised he would research this question and report back.

The Board received and filed the report.

2015 WATER SUPPLY REPORT

Mr. De La Torre reported that although conditions are dry and the levels of key State reservoirs are significantly low, California's precipitation levels have slightly increased, thereby allowing DWR to increase the Table A State Water Project allocation to 15%. He reviewed

the snow pack conditions, the statewide reservoir conditions, Lake Mead elevation, and MET's dry-year storage amounts.

Mr. De La Torre advised that MET will evaluate conditions and storage levels in February, and if there are no significant changes in levels, the MET Board may consider implementing its Allocation Plan; it is anticipated the MET Board will discuss this item in March.

Discussion ensued regarding the dry-year outlook, its impact on both imported and groundwater supplies, MET's storage portfolio, and the potential for water allocations.

The Board received and filed Mr. De La Torre's report.

MWD ITEMS CRITICAL TO ORANGE COUNTY

a. MET's Water Supply Conditions
b. MET's Finance and Rate Issues
c. Colorado River Issues
d. Bay Delta/State Water Project Issues
e. MET's Ocean Desalination Policy and Potential Participation by MET in the Doheny Desalination Project
f. Orange County Reliability Projects

The Board received and filed the reports as presented.

OTHER INPUT OR QUESTIONS ON MET ISSUES FROM MEMBER AGENCIES

No new information was presented.

METROPOLITAN (MET) BOARD AND COMMITTEE AGENDA DISCUSSION ITEMS

a. Summary regarding January MET Board Meeting
b. Review Items of significance for the Upcoming MET Board and Committee Agendas

The Board received and filed the reports as presented.

ADJOURNMENT

There being no further business to come before the Board, the meeting adjourned at 10:00 a.m.

Respectfully Submitted,

_____
Maribeth Goldsby
Board Secretary

MINUTES OF THE REGULAR MEETING
OF THE BOARD OF DIRECTORS
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
February 18, 2015

At 8:30 a.m. President Dick called to order the Regular Meeting of the Municipal Water District of Orange County in the Board Room at the District facilities located in Fountain Valley. Director Tamaribuchi led the Pledge of Allegiance and Secretary Goldsby called the roll.

MWDOC DIRECTORS	**STAFF**
Brett R. Barbre	Robert Hunter, General Manager
Larry Dick	Karl Seckel, Assistant General Manager
Joan Finnegan	Russ Behrens, Legal Counsel
Susan Hinman	Maribeth Goldsby, Board Secretary
Wayne Osborne	Patrick Dinh, Network Administrator
Sat Tamaribuchi	Joe Berg, Water Use Efficiency Prog. Mgr.
Jeffery M. Thomas (absent)	Heather Baez, Governmental Affairs Manager
	Darcy Burke, Director of Public Affairs
	Kelly Hubbard, WEROC Programs Manager

ALSO PRESENT

Larry McKenney	MWDOC MET Director
Linda Ackerman	MWDOC MET Director
Ken Vecchiarelli	Golden State Water Company
Brian Ragland	City of Huntington Beach
Paul Weghorst	Irvine Ranch Water District
Charles Gibson	Santa Margarita Water District
Dennis Erdman	South Coast Water District
Bill Green	South Coast Water District
Andy Brunhart	South Coast Water District
Gary Melton	Yorba Linda Water District
Howard Johnson	Brady & Associates

PUBLIC PARTICIPATION/PUBLIC COMMENT
President Dick announced members of the public wishing to comment on agenda items could do so after the item has been discussed by the Board and requested members of the public identify themselves when called on. Mr. Dick asked whether there were any comments on other items which would be heard at this time.

Mr. Charles Gibson, Santa Margarita Water District, thanked the MWDOC and MET Board members and staff for the great experience and learning opportunity he had while attending a recent Colorado River Aqueduct inspection trip.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED

Determine need and take action to agendize items(s), which arose subsequent to the posting of the Agenda. (ROLL CALL VOTE: Adoption of this recommendation requires a two-thirds vote of the Board members present or, if less than two-thirds of the Board members are present, a unanimous vote.)

No items were presented.

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING
President Dick inquired as to whether there were any items distributed to the Board less than 72 hours prior to the meeting.

No items were presented.

CONSENT CALENDAR

President Dick stated all matters under the Consent Calendar would be approved by one MOTION unless a Director wished to consider an item separately.

Director Hinman pulled Item No. 6 (Approve Recommended Changes to MWDOC's Water Supply Allocation Plan).

Upon MOTION by Director Barbre, seconded by Director Finnegan, and carried (6-0), the Board approved the balance of Consent Calendar items as follows. Directors Barbre, Dick, Finnegan, Hinman, Osborne, and Tamaribuchi voted in favor. Director Thomas was absent.

MINUTES

The following minutes were approved.

January 7, 2015 Workshop Board Meeting
January 21, 2015 Regular Board Meeting

COMMITTEE MEETING REPORTS

The following Committee Meeting reports were received and filed as presented.

Planning & Operations Committee Meeting: December 1, 2014
Planning & Operations Committee Meeting: January 5, 2015
Executive Committee Meeting: January 22, 2015
MWDOC/OCWD Joint Planning Committee Meeting: January 28, 2015

TREASURER'S REPORTS

The following items were ratified and approved as presented.

MWDOC Revenue/Cash Receipt Register as of January 31, 2015
MWDOC Disbursement Registers (January/February)

The following items were received and filed as presented.

MWDOC Summary of Cash and Investment and Portfolio Master Summary Report

(Cash and Investment report) as of December 31, 2014

PARS Monthly Statement (OPEB Trust)

Water Use Efficiency Projects Cash Flow

FINANCIAL REPORT

The following items were received and filed as presented.

Combined Financial Statements and Budget Comparative for the period ending December 31, 2014

Quarterly Budget Review

DISTRICT CONFERENCES

American Water Works Association (AWWA) Sustainable Water Management Conference, March 15-17, 2015, Portland, Oregon

Partners in Emergency Preparedness Conference, April 14-16, 2015, Tacoma, Washington

The Board authorized attendance by Melissa Baum-Haley at the AWWA Sustainable Water Management Conference in Portland, Oregon, and authorized attendance by Kelly Hubbard at the 2015 Partners in Emergency Preparedness Conference in Tacoma, Washington.

STANDING COMMITTEE AND AD HOC COMMITTEE APPOINTMENTS FOR 2015; SCHEDULE OF COMMITTEE MEETING DATES FOR 2015

The Board ratified the list of Standing Committee and Ad Hoc Committee appointments as presented by the President of the Board and ratified the Committee meeting dates/times for 2015.

END CONSENT CALENDAR

ITEM PULLED FROM CONSENT CALENDAR FOR FURTHER DISCUSSION

APPROVE RECOMMENDED CHANGES TO MWDOC'S WATER SUPPLY ALLOCATION PLAN (WSAP)

Director Hinman requested an update on MWDOC's WSAP. Mr. Hunter advised that both Plans (MWDOC's and MET's) were shared with the member agencies, the possibility for allocations is strong (unless there is significant snow pack and rain), and that the MET Board will consider implementations at its March or April meeting. He also noted that staff informed the member agencies that staff is available for presentations, if desired.

Upon MOTION by Director Osborne, seconded by Director Hinman, and carried (6-0), the Board approved revisions to MWDOC's Water Supply Allocation Plan, which included the following major changes: (1) Update the Base Period from Calendar Years 2004 – 2006 to Fiscal Years 2012/13 and 2013/14; and (2) update the Growth Adjustment to including the average population increase for years 2013 and 2014; and (3) include a Baseline Adjustment for an agency's early enforcement of mandatory water use restrictions; and (4) change the Conservation Demand Hardening Credit calculation to a method based on an agency's per capita water use reductions; and (5) include a separate allocation for groundwater basins' imported water needs; and (6) replace the current allocation penalty rates with a cost-of-service based charge – Allocation Surcharge. Directors Barbre, Dick, Finnegan, Hinman, Osborne, and Tamaribuchi voted in favor. Director Thomas was absent.

ACTION CALENDAR

ASSOCIATION AND COMMISSION APPOINTMENTS FOR 2015

President Dick announced that the proposed appointments to the Associations and Commissions for 2015 were before the Board for consideration.

Upon MOTION by Director Finnegan, seconded by Director Osborne, and carried (6-0), the Board (1) ratified the appointment of Representatives and Alternates to Associations, as recommended by the President of the Board; and (2) adopted RESOLUTION NO. 2005 approving the appointment of Jeffery Thomas as Representative and Karl Seckel as Alternate to the Santiago Aqueduct Commission (SAC), for submission to SAC. Said RESOLUTION NO. 2005 was adopted by the following roll call vote:

AYES: Directors Barbre, Dick, Finnegan, Hinman, Osborne & Tamaribuchi
NOES:None
ABSENT: Director Thomas
ABSTAIN: None

CONSIDER ADOPTING RESOLUTIONS CONCURRING IN NOMINATIONS TO THE ACWA/JPIA EXECUTIVE COMMITTEE

Upon MOTION by Director Finnegan, seconded by Director Barbre, and carried (6-0), the Board adopted RESOLUTION NO. 2006, Concurring in the Nomination of Paul Dorey (Vista Irrigation District), RESOLUTION NO. 2007, Concurring in the Nomination of Fred Bockmiller (Mesa Water District), and RESOLUTION NO. 2008, Concurring in the Nomination of Dennis Erdman (South Coast Water District) to the ACWA/JPIA Executive Committee, by the following roll call vote:

AYES: Directors Barbre, Dick, Finnegan, Hinman, Osborne, and Tamaribuchi
NOES:None
ABSENT: Director Thomas
ABSTAIN: None

APPROVAL OF RESOLUTION DESIGNATING AUTHORIZED AGENTS AND 2014 GRANT TRANSFER AGREEMENT WITH THE CITY OF ANAHEIM AS THE LOCAL URBAN AREA SECURITY INITIATIVE (UASI) ADMINISTRATOR

Upon MOTION by Director Tamaribuchi, seconded by Director Barbre, and carried (6-0), the Board adopted RESOLUTION NO. 2009, approving the execution of the 2014 Grant Transfer Agreement with the City of Anaheim as the Local Urban Area Security Initiative (UASI) Administrator and approving the WEROC Program Manager and the General Manager as designated Authorized Agents for this grant to execute any subsequent agreements, by the following roll call vote:

AYES: Directors Barbre, Dick, Hinman, Osborne, Tamaribuchi and Thomas
NOES:None
ABSENT: Director Finnegan
ABSTAIN: None

ADOPT POSITION ON SB 143 (STONE) – DIAMOND VALLEY LAKE; RECREATIONAL USE

Upon MOTION by Director Barbre, seconded by Directors Hinman and Finnegan, and carried (6-0), the Board voted to oppose SB 143 (Stone) and send a letter to the author indicating MWDOC's opposition, and encourage MWDOC's member agencies to take similar action. Directors Barbre, Dick, Finnegan, Hinman, Osborne, and Tamaribuchi voted in favor. Director Thomas was absent.

ADOPT POSITION ON AB 1 (BROWN) – LOCAL GOVERNMENT DROUGHT FINES

Upon MOTION by Director Tamaribuchi, seconded by Director Osborne, and carried (6-0), the Board voted to support AB 1 (Brown) and send a letter to the author indicating MWDOC's support position. Directors Barbre, Dick, Finnegan, Hinman, Osborne, and Tamaribuchi voted in favor. Director Thomas was absent.

ADOPT POSITION ON AB 149 (CHAVEZ) – URBAN WATER MANAGEMENT PLANS ADOPTION DATES

Upon MOTION by Director Hinman, seconded by Director Tamaribuchi, and carried (6-0), the Board voted to support AB 149 (Chavez) and send a letter to the author indicating MWDOC's support position. Directors Barbre, Dick, Finnegan, Hinman, Osborne, and Tamaribuchi voted in favor. Director Thomas was absent.

INFORMATION CALENDAR

GENERAL MANAGER'S REPORT, FEBRUARY 2015

General Manager Hunter advised that the General Manager's report was included in the Board packet.

In response to a question by Director Osborne, Mr. Hunter advised that any further increases to the Table “A” Allocation by DWR is highly unlikely due to the dry-year conditions.

The Board received and filed the report as presented.

MWDOC GENERAL INFORMATION ITEMS

BOARD OF DIRECTORS

The Board members each reported on their attendance at the regular (and special) MWDOC Board and Committee meetings. In addition to these meetings, the following reports were made on conferences and meetings attended on behalf of the District.

Director Hinman advised that she attended the MWDOC Board and Committee meetings, as well as the Water Policy dinner, the San Juan Capistrano Utilities Commission meeting, the WACO Planning meeting, a tour of the Doheny Desalination Project facility, and the San Juan Basin Authority meeting.

Director Tamaribuchi reported that he attended the MWDOC Board and Committee meetings, a meeting with representatives from Santa Margarita Water District, and the Water Policy dinner.

Director Osborne noted his attendance at the MWDOC Board and Committee meetings, the Water Policy dinner, and the WACO meeting.

Director Barbre reported on attending the MWDOC and MET regular meetings, as well as a Colorado River inspection trip, an Ad Hoc Committee meeting re the Admin Code, the quarterly meeting with OCWD and Yorba Linda Water District (YLWD), the ISDOC luncheon, the WACO meeting, a meeting with Pat Scanlon (Golden State Water Company), the Water Policy dinner, a meeting with Marc Marcantonio (General Manager of Yorba Linda Water District), and a recent legislative trip to Washington, DC.

Director Dick reported on attending the MWDOC and MET regular meetings, a governance training by the California Special Districts Association, the UGMO meeting, the Ad Hoc Committee meeting re the Admin Code, the MET Executive Committee “pre-meeting,” the MET Executive Committee, the Garden Grove City Mayor’s State of the City meeting, a tour of the Coca-Cola facility, the Association of California Cities meeting, and the WACO Planning Committee meeting.

CLOSED SESSION

At 8:51 a.m., Legal Counsel Behrens announced that the Board would adjourn to closed session on the following matter:

CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION, Consider Initiation of Litigation pursuant to Paragraph (4) of subdivision (d) of Section 54956.9: (Two Cases).

RECONVENE

At 10:20 a.m., the Board reconvened and Legal Counsel Behrens announced that no reportable action was taken in closed session.

ADJOURNMENT

There being no further business to come before the Board, President Dick adjourned the meeting at 10:21 a.m.

Respectfully submitted,

_____
Maribeth Goldsby, Secretary

MINUTES OF THE MEETING OF THE
BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
PLANNING & OPERATIONS (P&O) COMMITTEE
February 2, 2015 - 8:30 a.m. to 8:46 a.m.
MWDOC Conference Room 101

P&O Committee:
Director Wayne Osborne, Chair
Director Brett Barbre
Director Susan Hinman - absent
Director Joan Finnegan

Staff:
Rob Hunter, Karl Seckel, Richard Bell,
Harvey De La Torre, Joe Berg
Kevin Hostert, Don Froelich, Pat Meszaros

Also Present:
President Larry Dick
Director Sat Tamaribuchi
MWDOC MET Director Linda Ackerman
MWDOC MET Director Larry McKenney
Don Froelich, Moulton Niguel Water District
Steve Lamar, Irvine Ranch Water District
William Kahn, El Toro Water District
Chuck Gibson, Santa Margarita Water District
Paul Weghorst, Irvine Ranch Water District
Liz Mendelson, San Diego County Water Auth
Ian Delzer, Townsend Public Affairs
Fiona Sanchez, Irvine Ranch Water District

Director Osborne called the meeting to order at 8:30 a.m.

PUBLIC PARTICIPATION

No comments were received.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED

No items were presented.

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING

No items were presented.

ACTION ITEMS

APPROVE RECOMMENDED CHANGES TO MWDOC'S WATER SUPPLY ALLOCATION PLAN

Director Barbre gave a brief description of the recommended changes to MWDOC's Water Supply Allocation Plan (WSAP), as a result of the changes to MET's Plan, which include

updated baseline; growth adjustment; demand hardening credit calculation; groundwater allocation; and penalty rates. Further, he commended Mr. Hunter and Mr. De La Torre for their good work at MET to get this accomplished. Director Osborne requested clarification of the change to the conservation demand hardening credit calculation to which Mr. De La Torre responded that we want to provide credit for agencies who have done conservation and water use efficiency efforts. The recommendation is to change the conservation demand hardening credit from a device-based calculation to one based on observed reductions in GPCD (gallons per capita per day). It is a better measure of determining an agency's actual conservation savings and properly credits water use efficiency activities.

Upon MOTION by Director Barbre, seconded by Director Osborne, and carried (3-0), the Committee recommended the Board approve the recommended changes to MWDOC's Water Supply Allocation Plan. Committee members Osborne, Barbre, and Finnegan voted in favor. Director Finnegan participated as a committee member due to Director Hinman's absence.

APPROVAL OF RESOLUTION DESIGNATING AUTHORIZED AGENTS AND 2014 GRANT TRANSFER AGREEMENT WITH THE CITY OF ANAHEIM AS THE LOCAL URBAN AREA SECURITY INITIATIVE (UASI) ADMINISTRATOR

Director Barbre inquired about Section 4, Political and Sectarian Activity Prohibited, and whether we'd be required to submit certification. Mr. Seckel responded that we would be required to file a Disclosure Form as would anyone with whom we dealt.

Upon MOTION by Director Barbre, seconded by Director Osborne, and carried (3-0), the Committee recommended the Board approve the resolution designating authorized agents and 2014 Grant Transfer Agreement with the City of Anaheim. Committee members Osborne, Barbre, and Finnegan voted in favor.

DISCUSSION ITEMS

STATUS UPDATE ON THE OC WATER RELIABILITY STUDY – JANUARY 2015

Mr. Seckel reported that the schedule is slipping somewhat due to several issues among which is the need to update prior work on seismic ground accelerations in Orange County. Additional structural/geotechnical work is needed to determine potential failure modes for wells and well-head facilities. Mr. Seckel stated further that it was requested that he provide a briefing on Drought Impacts to San Juan Basin which he's included in this update. He noted that the Basin is still struggling; they've shut down a couple of wells and continue to sample and monitor every 2 weeks.

Discussion ensued on MET's demand projections out to 2035 and the effect of the Bay Delta Conservation Plan (BDCP) on those projections. Mr. Seckel reported that MET had a completion date of 2023 for the BDCP but now it's 2026 and more likely 2030. MET never included in their schedule sufficient time to get through the lawsuits. In forecasting, we will do a scenario with and without the BDCP. Planning horizon for this study is 2035.

INFORMATION ITEMS

STATUS REPORTS

a. Ongoing MWDOC Reliability and Engineering/Planning project
b. WEROC
c. Water Use Efficiency Projects
d. Water Use Efficiency Programs Savings and Implementation Report

Reports were received and filed.

REVIEW OF ISSUES RELATED TO CONSTRUCTION PROGRAMS, FACILITY AND EQUIPMENT MAINTENANCE, WATER STORAGE, WATER QUALITY, CONJUNCTIVE USE PROGRAMS, EDUCATION, DISTRICT FACILITIES, and MEMBER-AGENCY RELATIONS

No items were presented.

ADJOURNMENT

There being no further business to be brought before the Committee, the meeting adjourned at 8:46 a.m.

MINUTES OF THE MEETING OF THE BOARD OF DIRECTORS OF THE MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
ADMINISTRATION & FINANCE (A&F) COMMITTEE
January 14, 2015 – 8:35 a.m. to 11:15 a.m.
MWDOC Conference Room 101

Committee Members:
Director Jeff Thomas, Chair
Director Joan Finnegan
Director Wayne Osborne

Staff:
Robert Hunter, Karl Seckel, Hilary Chumpitazi, Katie Davanaugh, Darcy Burke

Also Present:
Director Brett Barbre
Director Larry Dick
Director Susan Hinman
Director Sat Tamaribuchi
Met Director, Larry McKenney
Russ Behrens, legal counsel
John Wallin
Paul Weghorst, Irvine Ranch Water District

Director Osborne called the meeting to order at 8:35 a.m., noting Director Thomas had not yet arrived. Director Dick acted as Committee member.

PUBLIC COMMENTS

No comments were received.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED

No items were presented.

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING

No items were presented.

PROPOSED BOARD CONSENT CALENDAR ITEMS-ACTION

TREASURER'S REPORT

a. Revenue/Cash Receipt Report – December 2014
b. Disbursement Approval Report for the month of January 2015
c. Disbursement Ratification Report for the month of December 2014
d. GM Approved Disbursement Report for the month of December 2014
e. Water Use Efficiency Projects Cash Flow – December 31, 2014
f. Consolidated Summary of Cash and Investment – November 2014
g. OPEB Trust Fund monthly statement

Upon MOTION by Director Osborne, seconded by Director Finnegan, and carried (3-0), the Committee recommended the Treasurer's Report for approval at the January 21, 2015 Board meeting. Directors Osborne, Finnegan and Dick all voted in favor.

It was noted that the item on the disbursement register to Best Western was for a rebate for the turf program. The Committee held discussion on various projects within the MWDOC service area that are taking advantage of the turf program.

FINANCIAL REPORT - Combined Financial Statements and Budget comparative for the period ending November 30, 2014

Upon MOTION by Director Osborne, seconded by Director Finnegan, and carried (3-0), the Committee recommended the Financial Report for approval at the January 21, 2015 Board meeting. Directors Osborne, Finnegan and Dick all voted in favor.

2015 COLLABORATIVE SERVICES SUMMIT

Upon MOTION by Director Osborne, seconded by Director Finnegan, and carried (3-0), the Committee recommended the 2015 Collaborative Services Summit for approval at the January 21, 2015 Board meeting. Directors Osborne, Finnegan and Dick all voted in favor.

Director Thomas arrived at 8:45 a.m. and chaired the meeting.

ACTION ITEMS

RESTATEMENT OF DISTRICT MONEY PURCHASE PENSION PLAN (MPP) AND TRUST AGREEMENT

Mr. Hunter noted that this item includes the revisions from legal counsel. Mr. Wallen reviewed the changes that were summarized in the written staff report. Director Hinman inquired whether a red-line version was available with staff responding they would provide a copy.

Upon MOTION by Director Osborne, seconded by Director Finnegan, and carried (3-0), the Committee recommended the Restatement of the MPP and Trust Agreement for approval at the January 21, 2015 Board meeting. Directors Osborne, Finnegan and Thomas all voted in favor.

BUREAU OF RECLAMATION WATERSMART GRANT RESOLUTION

Upon MOTION by Director Thomas, seconded by Director Finnegan, and carried (3-0), the Committee recommended this item for approval at the January 21, 2015 Board meeting. Directors Osborne, Finnegan and Thomas all voted in favor.

AUTHORIZE THE GENERAL MANAGER TO DEVELOP A TEN-YEAR PURCHASE COMMITMENT WITH ORANGE COUNTY WATER DISTRICT' AND SIGN A PURCHASE ORDER WITH METROPOLITAN WATER DISTRICT

Upon MOTION by Director Osborne, seconded by Director Finnegan, and carried (3-0), the Committee recommended this item for approval at the January 21, 2015 Board meeting. Directors Thomas, Finnegan, and Osborne all voted in favor.

INFORMATION ITEMS

ACWA/JPIA EXECUTIVE COMMITTEE ELECTION

It was noted that MWDOC Directors are not eligible for nomination to the ACWA/JPIA Executive Committee due to withdrawal from the JPIA workers' compensation program.

The remainder of the informational reports were received and filed without comment.

FY 2015-16 BUDGET PREPARATION SCHEDULE

Director Barbre requested that funding the OPEB liability be discussed during the budget process.

CALPERS ANNUAL VALUATION REPORT AS OF JUNE 30, 2013

INTERNAL REVENUE SERVICE PAYROLL AUDIT (oral report)

MONTHLY WATER USAGE DATA, TIER 2 PROJECTION & WATER SUPPLY INFO

DEPARTMENT ACTIVITIES REPORTS

a. Administration
b. Finance and Information Technology

OTHER ITEMS

REVIEW ISSUES REGARDING DISTRICT ORGANIZATION, PERSONNEL MATTERS, EMPLOYEE BENEFITS FINANCE AND INSURANCE

It was noted that the IRS audit will be completed in the near future and a full report provided at a future meeting, likely in closed session as it likely pertains to litigation.

Director Dick noted the recruitment efforts currently underway; WEROC Coordinator, Water Use Efficiency and Public Affairs Interns.

CLOSED SESSION ITEMS

At 9:03 a.m., legal counsel Russ Behrens announced that the Board would adjourn to closed session for conferences with Legal Counsel regarding the following:

CONFERENCE WITH LEGAL COUNSEL – ANTICIPATED LITIGATION
Significant exposure to litigation pursuant to paragraph (2) of subdivision (d) of section 54956.9 (one case).

RECONVENE

The Committee reconvened at 11:15 a.m. No reportable action was taken in closed session.

ADJOURNMENT

There being no further business to be brought before the Committee, the meeting adjourned at 11:15 a.m.

MINUTES OF THE MEETING OF THE
BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
jointly with the
EXECUTIVE COMMITTEE
February 19, 2015, 8:30 a.m. to 9:50 a.m.
Conference Room 102

Committee:
Director Dick, President
Director Osborne, Vice President
Director Finnegan (absent)

Staff:
R. Hunter, M. Goldsby

Also Present:
Director Hinman
Director Barbre

At 8:30 a.m., President Dick called the meeting to order.

PUBLIC PARTICIPATION

No public comments were received.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED

No items were presented.

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING

At the beginning of the meeting, Staff distributed the draft agendas for the March Committee meetings.

DISCUSSION REGARDING UPCOMING ACTIVITIES OF SIGNIFICANCE

Director Hinman commented on the recent Water Policy dinner, highlighting the excellent presentation by Lucy Jones (U.S. Geological Survey). She suggested MWDOC develop a way to share the information with MWDOC's agencies (especially the cities). Director Dick concurred noting that the issues presented (earthquake scenarios) highlight the importance of a Delta fix. Mr. Hunter advised that this issue could tie into the Orange County Reliability Study currently underway.

MEMBER AGENCY RELATIONS

Discussion ensued regarding Orange County Water District, staff's participation in OCWD meetings, and the lawsuits involving OCWD, and the issues OCWD has with the Orange County Business Council.

EXECUTIVE COMMITTEE PROPOSALS FOR FUTURE AGENDAS

The Committee reviewed and discussed the draft agendas for each of the Committee meetings and made revisions/additions as noted below.

a. Planning & Operations Committee

No new items were added to the agenda.

b. Workshop Board Meeting

No new items were added to the agenda.

c. Administration & Finance Committee

No new items were added to the agenda.

d. Public Affairs & Legislation (PAL) Committee

Discussion ensued regarding District travel on legislative advocacy activities and Director Dick suggested staff develop a more detailed/formalized plan for District travel to Washington, DC for these efforts (both Washington and Sacramento).

Mr. Hunter highlighted the “Participation in Science Fair” item (as recently brought up at the February PAL meeting), noting that Mr. Hunter’s recommendation would be to discuss this issue during the budget process.

e. MWDOC/OCWD Joint Planning Committee

No new information was added.

GENERAL MANAGER’S REPORTS

No new information was presented.

REVIEW AND DISCUSS DISTRICT AND BOARD ACTIVITIES

No new information was presented.

ADJOURNMENT

There being no further business to be brought before the Committee, the meeting adjourned at 9:50 a.m.

Municipal Water District of Orange County
REVENUE / CASH RECEIPT REPORT
February 2015

WATER REVENUES

Date	From	Description	Amount
02/02/15	City of Buena Park	December 2014 Water deliveries	298,233.68
02/02/15	City of La Palma	December 2014 Water deliveries	5,732.00
02/02/15	Trabuco Canyon Water District	December 2014 Water deliveries	16,660.76
02/02/15	City of La Habra	December 2014 Water deliveries	13,597.88
02/06/15	City of Fountain Valley	December 2014 Water deliveries	23,374.22
02/06/15	City of San Clemente	December 2014 Water deliveries	453,951.42
02/09/15	El Toro Water District	December 2014 Water deliveries	428,641.78
02/10/15	City of Seal Beach	December 2014 Water deliveries	10,443.71
02/10/15	South Coast Water District	December 2014 Water deliveries	348,612.53
02/10/15	Serrano Water District	December 2014 Water deliveries	501,956.24
02/10/15	City of Newport Beach	December 2014 Water deliveries	705,923.47
02/10/15	City of Garden Grove	December 2014 Water deliveries	586,439.94
02/11/15	City of Westminster	December 2014 Water deliveries	546,987.04
02/12/15	Laguna Beach County Water District	December 2014 Water deliveries	231,507.61
02/12/15	East Orange County Water District	December 2014 Water deliveries	109,733.39
02/12/15	City of Orange	December 2014 Water deliveries	378,013.74
02/12/15	Santiago Aqueduct Commission	December 2014 Water deliveries	83,149.35
02/13/15	Orange County Water District	December 2014 Water deliveries	5,303,662.31
02/13/15	Irvine Ranch Water District	December 2014 Water deliveries	564,214.13
02/13/15	Moulton Niguel Water District	December 2014 Water deliveries	1,449,943.20
02/13/15	Yorba Linda Water District	December 2014 Water deliveries	467,469.35
02/13/15	Golden State Water Company	December 2014 Water deliveries	383,309.06
02/27/15	City of San Juan Capistrano	January 2015 Water deliveries	148,483.33
02/27/15	Trabuco Canyon Water District	January 2015 Water deliveries	17,386.29
02/27/15	City of Brea	January 2015 Water deliveries	84,659.30
		TOTAL REVENUES	**$ 13,162,085.73**

Municipal Water District of Orange County
REVENUE / CASH RECEIPT REPORT
February 2015

MISCELLANEOUS REVENUES

Date	From	Description	Amount
02/02/15	City of San Clemente	2/5/15 Water policy dinner	80.00
02/02/15	City of Santa Ana	2/5/15 Water policy dinner	240.00
02/02/15	Moulton Niguel Water District	2/5/15 Water policy dinner	800.00
02/06/15	5 Checks	2/5/15 Water policy dinner	410.00
02/25/15	Petty Cash	2/5/15 Water policy dinner	160.00
02/27/15	Serrano Water District	2/5/15 Water policy dinner	490.00
02/13/15	Susan Hunt	March 2015 COBRA medical premium	689.89
02/27/15	Stan Sprague	March 2015 Retiree medical premium	212.59
02/09/15	Grisel Rodriguez	Movie tickets	80.00
02/12/15	Cathy Harris	Movie tickets	192.00
02/25/15	Petty Cash	Movie tickets	160.00
02/02/15	Trabuco Canyon Water District	Late payment penalty for November 2014 water deliveries	166.61
02/02/15	South Coast Water District	Doheny Environmental Baseline Funding	159,346.00
02/20/15	OC Sheriff	CESA Annual Training & Conference reimbursement	2,959.81
02/17/15	Golden State Water Company	October 2014 Smart Timer rebate program	4,778.61
02/13/15	Yorba Linda Water District	October & December 2014 Smart Timer rebate program	894.00
02/10/15	City of Newport Beach	November 2014 Smart Timer rebate program	75.00
02/13/15	City of Fullerton	November 2014 Smart Timer rebate program	228.10
02/20/15	City of Huntington Beach	November 2014 Smart Timer rebate program	144.00
02/06/15	City of Fullerton	December 2014 Smart Timer rebate program	75.00
02/12/15	Santa Margarita Water District	December 2014 Smart Timer rebate program	284.78
02/17/15	City of Newport Beach	December 2014 Smart Timer rebate program	69.00
02/27/15	South Coast Water District	December 2014 Smart Timer rebate program	150.00
02/09/15	El Toro Water District	December 2014 Smart Timer rebate program	75.00
02/02/15	City of Buena Park	November 2014 Turf Removal rebate program	105.00
02/09/15	City of Garden Grove	December 2014 Turf Removal rebate program	2,205.00
02/10/15	4 Checks	December 2014 Turf Removal rebate program	10,700.01
02/13/15	City of Brea	December 2014 Turf Removal rebate program	3,698.69
02/13/15	City of San Clemente	December 2014 Turf Removal rebate program	3,150.00
02/17/15	Laguna Beach County Water District	December 2014 Turf Removal rebate program	642.00
02/20/15	City of La Habra	December 2014 Turf Removal rebate program	528.18
02/12/15	Santa Margarita Water District	November 2014 Smart Timer & Turf Removal rebate program	323.00
02/17/15	Golden State Water Company	November 2014 Smart Timer & Turf Removal rebate program	2,812.78
02/20/15	City of Brea	November 2014 Smart Timer & Turf Removal rebate program	7,044.00
02/10/15	Moulton Niguel Water District	November 2014 Smart Timer & Rotating Nozzle rebate program	16,990.55
02/02/15	Golden State Water Company	December 2014 So Cal Watersmart Residential rebate program	1,741.00
02/09/15	El Toro Water District	December 2014 So Cal Watersmart Residential rebate program	1,279.55
02/13/15	Trabuco Canyon Water District	December 2014 So Cal Watersmart Residential rebate program	400.00
02/17/15	Moulton Niguel Water District	December 2014 So Cal Watersmart Residential rebate program	32,224.50
02/25/15	Santa Margarita Water District	December 2014 So Cal Watersmart Residential rebate program	3,874.00
02/17/15	Irvine Ranch Water District	Nov-Dec 2014 Landscape Performance Certification Program	1,500.00
02/25/15	Santa Margarita Water District	Addition to the Choice School Program FY 14-15	537.60

TOTAL MISCELLANEOUS REVENUES $ **262,516.25**

TOTAL REVENUES $ 13,424,601.98

Robert J. Hunter, General Manager

Hilary Chumpitazi, Treasurer

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
Core Expenditures:		
	Richard Ackerman	
1061	February 2015 Legal consulting on water policy issues	1,825.00
	*** Total ***	1,825.00
	Aleshire & Wynder LLP	
31755	January 2015 Legal services	5,806.01
	*** Total ***	5,806.01
	ALTA FoodCraft	
515021222	2/12/15 Coffee & tea supplies	312.69
	*** Total ***	312.69
	Best Best and Krieger LLP	
55401-JAN15	January 2015 Legal services	31,869.06
	*** Total ***	31,869.06
	California Association of Public Information Officials	
BA475647CF	Employment advertising for Public Affairs Manager position	25.00
	*** Total ***	25.00
	CDM Smith	
80514294/1	January 2015 Engineering services for Water Reliability Investigation	8,924.90
	*** Total ***	8,924.90
	Creative Management Solutions, Inc.	
1	February 2015 Services to provide 2015 Compensation Plan update	1,800.00
	*** Total ***	1,800.00
	CSU Fullerton ASC	
AR164012	3rd Quarter FY 14/15 CDR Support	9,990.25
	*** Total ***	9,990.25
	Dissinger Associates	
AP-MWD-JAN15	January 2015 Pension plan consulting	450.00
	*** Total ***	450.00
	Fraser Communications	
15570	January 2015 Services for the Value of Water Communications plan	10,231.25
	*** Total ***	10,231.25

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
	Fry's Electronics	
20651387	1/22/15 Computer supplies	4.31
20670985	2/3/15 Computer supplies	53.99
	*** Total ***	58.30
	Ronald R. Gastelum	
FEB2015	February 2015 Strategic assistance on MET issues	7,500.00
	*** Total ***	7,500.00
	Government Finance Officers Assoc.	
0122001-2015	April 2015-March 2016 Annual membership renewal	160.00
	*** Total ***	160.00
	Immersiv Media, Inc.	
-014(MWDOC 2015)	April-June 2015 Website hosting and maintenance service	525.00
	*** Total ***	525.00
	Independent Special District of OC	
012915-JF	1/29/15 Meeting registration for Director Finnegan	17.00
012915-BB	1/29/15 Meeting registration for Director Barbre	17.00
	*** Total ***	34.00
	James C. Barker, P.C.	
105-0215	February 2015 Federal legislative advocacy services	8,000.00
	*** Total ***	8,000.00
	Jeff Cole	
JCP20615	Video production services for 2/5/15 Water Policy dinner	500.00
	*** Total ***	500.00
	Edward G. Means III	
MWDOC-1025	February 2015 Support on MET issues & strategic guidance to Engineering department	1,000.00
	*** Total ***	1,000.00
	Metropolitan Water District	
OC-58-020915	Additional deposit for Service Connection OC-58 modifications	4,000.00
	*** Total ***	4,000.00
	Norco Delivery Services	
678742	2/13/15 Delivery charges for Board & Committee packets	138.09
	*** Total ***	138.09

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
	Office Solutions	
I-00732911	2/9/15 Office supplies	184.58
I-00740962	2/26/15 Office supplies	756.32
I-00742074	3/2/15 Office supplies	46.43
I-00743108	3/4/15 Office supplies	155.50
	*** Total ***	1,142.83
	Orange County Water Association	
3/2/15	2/18/15 Meeting registration for Director Hinman	30.00
	*** Total ***	30.00
	Orange County Water District	
14812	January 2015 Postage, shared office & maintenance expense	12,616.71
	*** Total ***	12,616.71
	Patricia Kennedy Inc.	
20212	March 2015 Plant maintenance	214.00
	*** Total ***	214.00
	Petty Cash	
022815	December 2014-February 2015 Petty Cash reimbursement	236.39
	*** Total ***	236.39
	Quality Copy & Printing Center	
31311	Flyers printed for Poster/Slogan & Digital Arts Contest	750.60
	*** Total ***	750.60
	SimplyNAS	
11739-ACT	Network storage backup device	2,711.00
	*** Total ***	2,711.00
	Staples Advantage	
8033195188	2/7/15 Office supplies	67.55
	*** Total ***	67.55
	Top Hat Productions	
89021	6/19/14 Lunch for Managers' meeting	532.44
89979	2/19/15 Lunch for Managers' meeting	403.38
	*** Total ***	935.82
	Townsend Public Affairs, Inc.	
10632	February 2015 State legislative advocacy services	7,500.00
	*** Total ***	7,500.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	Vendor / Description	Amount to Pay
	U. S. HealthWorks Medical Group	
2644671-CA	1/26/15 Pre-employment exam	160.00
2654494-CA	2/13/15 Pre-employment exam	160.00
	*** Total ***	320.00
	USA Fact	
2402544-IN	2/10/15 New hire background check	10.82
2402545-IN	2/10/15 New hire background check	10.82
	*** Total ***	21.64
	The Westin South Coast Plaza	
18553-02/05/15	2/5/15 Water Policy dinner banquet facilities	15,411.85
	*** Total ***	15,411.85
	Total Core Expenditures	135,107.94

Choice Expenditures:

	Autumn Print Group	
1668	6 signs printed for WUE Public Spaces program	206.66
1670	260,000 Bill inserts printed WUE programs	7,022.81
	*** Total ***	7,229.47
	State of California	
L-1	February 2015-January 2016 Lease for Doheny Ocean Desal project	24,000.00
	*** Total ***	24,000.00
	Discovery Science Center	
013115MWDOC	January 2015 School program	46,833.98
	*** Total ***	46,833.98
	Top Hat Productions	
89971	2/5/15 Lunch for WUE Workgroup meeting	445.82
90052	2/25/15 Lunch for California Urban Water Conservation Council Board meeting	332.10
	*** Total ***	777.92
	Total Choice Expenditures	78,841.37

Other Funds Expenditures:

	AquaFicient Consulting	
02-069	January 2015 Landscape Performance Certification program funded by IRWD & MET	1,500.00
	*** Total ***	1,500.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
	Autumn Print Group	
1668	6 Signs printed for WUE Public Spaces program	104.38
	*** Total ***	104.38
	Catalina Island Conservancy	
11235	1/14/15 Transportation provided for service technician to access radio repeater site	340.00
	*** Total ***	340.00
	ConserVision Consulting, LLC	
LPCP-227	January 2015 Consulting services for Landscape Performance Certification program	7,571.25
	*** Total ***	7,571.25
	Eagle Communications	
712903	2/5/15 Service to repair Catalina repeater	3,663.00
	*** Total ***	3,663.00
	Mission RCD	
1740	January 2015 Field verifications for Water Use Efficiency rebate programs	22,540.27
	*** Total ***	22,540.27
	South Coast Water District	
1	18 Smart Timers installed for the Residential Targeted Water Conservation program	2,700.00
2	6 Smart Timers installed for the Residential Targeted Water Conservation program	900.00
	*** Total ***	3,600.00
	Spray to Drip Program	
S2DC1010	Sybron Dental Specialties, Inc. (Orange)	2,630.40
S2D-GGRV-1013	G. Gadd	220.59
S2D-SMWD-1033A	W. Howard	525.00
S2D-SMWD-1033B	R. Rutkowski	175.00
S2D-TSTN-1023	G. Pinson	525.00
	*** Total ***	4,075.99
	Turf Removal Program	
TR5-BP-003	J. Currie	2,428.00
TR5W-BP-1249	R. Jost	1,896.00
TR5W-BP-1328	S. MacDowell	3,532.00
TR5W-BP-2428	V. Barnes	4,084.00
TR5-BREA-029	D. Schmachtenberg	2,140.00
TR5-BREA-030	T. Carman	2,232.00
TR5-BREA-031	L. Haines	650.00
TR5W-BREA-1023D	G. Chen	4,844.00
TR5W-BREA-1051D	J. Wood	1,560.00
TR5W-BREA-1200	D.Segura	4,606.00
TR5W-BREA-1510	F. Talactac	2,600.00
TR5W-BREA-1616	E. Siggson	7,208.00
TR5W-BREA-1881	S. Buinicky	2,000.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5W-BREA-2108	Y. Teng	1,143.50
TR5W-BREA-2111	R. Marlin	3,500.00
TR5W-BREA-2112	Y. Teng	209.69
TR5W-BREA-2136	J. Palmero	2,258.00
TR5W-BREA-2537	G. Skotarczyk	500.00
TR5W-BREA-2551	R. Blumenkranz	1,600.00
TR5W-BREA-2646	S. Horowitz/SL Realty, LLC (Brea)	8,400.00
TR5W-EOCWD-1198Dif	M. Weiss	954.68
TR5-WEST-008	J. Bunck	1,396.00
TR5-WEST-009	R. Taber	2,486.00
TR5-ET-013A	Laguna Village OA (Laguna Hills)	71,494.00
TR5-ET-013B	Laguna Village OA (Laguna Hills)	100,150.00
TR5-ET-013C	Laguna Village OA (Laguna Hills)	110,642.00
TR5W-ETWD-1543	The Willows Foundation, Inc. (Laguna Hills)	7,278.00
TR5W-ETWD-2282	D. Volmer	1,624.00
TR5W-ETWD-2330	R. Rabkin	368.00
TR5-FV-016	M. Yokota	1,446.00
TR5-FV-019	J. Kaczmarek	1,656.00
TR5-FV-020	T. Lyons	974.00
TR5W-FV-1255	L. Schuman	4,618.00
TR5W-FV-1420	D. Tran	706.00
TR5W-FV-1669	H. Trinh	394.00
TR5W-FV-2089	B. Nogy	1,406.00
TR5W-FV-2370	D. Sneddon	560.00
TR5-GG-014	E. Hawkins	1,086.00
TR5-GG-021	S. Cruchley	1,808.00
TR5-GG-024	R. Daniels	2,734.00
TR5-GG-025	J. Regalado	2,350.00
TR5-GG-027	P. Dahl	5,370.00
TR5-GG-030	S. Polydoros	362.00
TR5-GG-034	H. Truong	1,787.79
TR5W-GG-1005	B. Taylor	1,190.00
TR5W-GG-1103D	R. Bratcher	2,900.00
TR5W-GG-1284	G. Gadd	9,192.00
TR5W-GG-1297	A. Nguyen	1,585.87
TR5W-GG-1297D	D. Libed	3,840.00
TR5W-GG-1452	J. Kim	3,246.00
TR5W-GG-1653	J. Burger	3,640.00
TR5W-GG-1687	D. Richardson	2,152.00
TR5W-GG-1719	G. Zwick	2,036.00
TR5W-GG-1721	J. Kothenbeutel	5,132.00
TR5W-GG-1761	J. Nicholas	2,352.00
TR5W-GG-2147	P. Saliture	1,954.00
TR5W-GG-2169	C. Delp	1,746.00
TR5W-GG-2982048	K. McComb	1,824.00
TR5-GSWC-067	A. Mayor	764.00
TR5-GSWC-071	Cypress Management Company (Cypress)	90,897.50

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5-GSWC-075	D. Cox	1,082.00
TR5-GSWC-080	A. Hernandez	690.00
TR5-GSWC-082	C. Wasson	2,534.00
TR5-GSWC-084	Granada Park Community Association (Placentia)	59,844.00
TR5-GSWC-086	K. Pearce	2,022.00
TR5-GSWC-087	S. Kaslow	9,092.00
TR5-GSWC-088	L. Belanger	2,510.00
TR5-GSWC-089	J. Randall	1,080.00
TR5-GSWC-098	K. Wong	1,406.00
TR5W-GSWC-1215	B. Stoner	748.00
TR5W-GSWC-1220	S. Nicholson	4,710.00
TR5W-GSWC-1227	J. Rangel	1,592.00
TR5W-GSWC-1248	D. Makiyama	880.00
TR5W-GSWC-1269	M. Nishi	698.00
TR5W-GSWC-1333	K. Maine	1,922.00
TR5W-GSWC-142	R. McColum	4,164.00
TR5W-GSWC-1598	F. Thompson	12,720.00
TR5W-GSWC-1603	E. Brisson	2,990.00
TR5W-GSWC-1630	M. Metcalfe	703.84
TR5W-GSWC-1766	R. Pederson	1,488.00
TR5W-GSWC-1783	G. Nakamoto	966.00
TR5W-GSWC-1789	L. Borovinsky	1,448.00
TR5W-GSWC-1919	S. Brushwyler	934.00
TR5W-GSWC-2091	L. Pritchett	3,020.00
TR5W-GSWC-2119	E. Duncan	8,706.00
TR5W-GSWC-2146	J. St. Clair	2,128.00
TR5W-GSWC-2151	K. Hathaway	818.00
TR5W-GSWC-2301	D. Prince	3,318.00
TR5W-GSWC-2358	D. Brown	1,736.00
TR5W-GSWC-2485	J. Yamasaki	380.00
TR5W-GSWC-2619	R. Tajima	2,340.00
TR5W-GSWC-2698	B. Ung	696.00
TR5W-GSWC-2922522	J. Morgan	628.00
TR5W-GSWC-2932539	K. Shaw	488.00
TR5W-GSWC-2942556	S. Flood	3,032.00
TR5W-GSWC-2962021	C. Lyman	558.00
TR5-HB-083	M. Koepp	1,258.00
TR5-HB-084	S. Castillo	1,354.00
TR5-HB-088	M. White	1,550.00
TR5-HB-090	G. Ferrell	2,658.00
TR5-HB-094	S. Becker	532.00
TR5-HB-097	M. Feterik	1,024.00
TR5-HB-098	C. Grossman	1,752.00
TR5-HB-099	S. Benson	736.00
TR5-HB-100	R. Faulkner	2,154.00
TR5-HB-101	D. Hamada	1,806.00
TR5-HB-106	M. Kwan	362.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5-HB-108	J. Radle	1,928.00
TR5-HB-109	E. Martin	1,450.00
TR5W-HB-1039	R. Veary	836.00
TR5W-HB-1206	R. Benwell	1,860.00
TR5W-HB-1234D	M. Sheldon	1,724.00
TR5W-HB-1300	D. Nelson	1,364.93
TR5W-HB-1357	M. Feemster	792.00
TR5W-HB-1683	M. Eich	798.00
TR5W-HB-1770	Total Property Management Company (Huntington Beach)	25,022.00
TR5W-HB-2071	F. Hebert	4,196.00
TR5W-HB-2107	S. Silverstein	1,168.00
TR5W-HB-2133	C. Wooten	742.00
TR5W-HB-2144	S. Spear	3,646.00
TR5W-HB-2150	R. Hart	602.00
TR5W-HB-2176	J. Welz	516.00
TR5W-HB-2199	S. Frei	1,356.00
TR5W-HB-2208	D. Sanders	1,604.00
TR5W-HB-2236	R. Hoffman	672.00
TR5W-HB-2240	D. Zitko	580.00
TR5W-HB-2298	T. Emmerson	1,556.00
TR5W-HB-2391	D. Moore	2,892.00
TR5W-HB-2409	L. Knutsen	1,768.00
TR5W-HB-2475	D. Dickey	2,094.00
TR5W-HB-2609	G. Parra	1,228.00
TR5W-HB-2660	W. Brooks	2,078.00
TR5W-HB-2922517	A. Plotkin	4,214.00
TR5W-HB-2922518	P. Tamayo	1,148.00
TR5W-HB-2932543	D. Kalmick	2,488.00
TR5W-HB-2932546	L. Havens	1,934.00
TR5W-HB-2942560	J. Kisiah	1,272.00
TR5W-HB-3128	S. Bui	1,174.00
TR4-IRWD-033	L. Rombaut	1,503.00
TR5-IRWD-197	W. Adams	710.00
TR5-IRWD-232	T. Ngo	540.00
TR5-IRWD-248	C. Doan	1,112.00
TR5-IRWD-263	D. Luebbe	590.51
TR5-IRWD-294	CNH, LLC (Irvine)	14,114.00
TR5-IRWD-302	D. Hoyt	2,786.00
TR5-IRWD-305	Winwood Knoll Apartments (Irvine)	32,075.10
TR5-IRWD-307	G. Daynes	962.00
TR5-IRWD-312	A. Lee	838.00
TR5-IRWD-313	J. Irish	1,192.00
TR5-IRWD-314	K. Tran	340.00
TR5-IRWD-315	R. Vanasse	838.00
TR5W-IRWD-1042D	H. Lan	561.29
TR5W-IRWD-1077D	K. Burton	1,204.00
TR5W-IRWD-1126D	K. Carvalho	3,534.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5W-IRWD-1145	M. Oliver	2,100.00
TR5W-IRWD-1159	Y. Ma	1,546.30
TR5W-IRWD-1208	M. Rupprecht	1,258.00
TR5W-IRWD-1242	E. Lai	922.00
TR5W-IRWD-1260	R. Fulton	3,464.00
TR5W-IRWD-1264D	Sevilla HOA (Tustin Ranch)	3,974.00
TR5W-IRWD-1275	H. Nguyen	802.00
TR5W-IRWD-1286	D. Imech	1,812.00
TR5W-IRWD-1309	Orangetree Terrace HOA (Irvine)	37,960.00
TR5W-IRWD-1643	L. Kaufman	882.00
TR5W-IRWD-1714	L. Lowder	868.00
TR5W-IRWD-1781	A. Johnson	140.00
TR5W-IRWD-1808	G. Brance	726.00
TR5W-IRWD-1827	Los Alisos Skyview HOA (Lake Forest)	10,528.00
TR5W-IRWD-1916D	J. Topalian	260.00
TR5W-IRWD-2070	H. Eisenman	850.00
TR5W-IRWD-2083	L. Pittman	834.00
TR5W-IRWD-2094	S. Cronin	726.00
TR5W-IRWD-2101	D. Hu	506.00
TR5W-IRWD-2130	W. Quesnel	1,540.00
TR5W-IRWD-2137	K. Scholl	1,044.00
TR5W-IRWD-2141	S. Jones	1,794.00
TR5W-IRWD-2145	S. Harriss	320.00
TR5W-IRWD-2157	T. Searles	1,088.00
TR5W-IRWD-2183	L. Salemme	982.00
TR5W-IRWD-2189	W. Hogrefe	1,014.00
TR5W-IRWD-2201	T. Kay	449.11
TR5W-IRWD-2204	C. Kang	542.00
TR5W-IRWD-2205	M. Longacre	1,040.00
TR5W-IRWD-2223	D. Senatore	934.00
TR5W-IRWD-2254	S. Nguyen	1,996.00
TR5W-IRWD-2268	C. Lewis	1,026.00
TR5W-IRWD-2286	S. Wen	1,688.00
TR5W-IRWD-2300	B. Newell	426.00
TR5W-IRWD-2302	M. Nazareno	402.00
TR5W-IRWD-2306	V. Chuang	1,242.00
TR5W-IRWD-2312	B. Ogilvie	1,916.00
TR5W-IRWD-2327	J. Short	748.00
TR5W-IRWD-2367	New Horizon School Irvine	4,682.00
TR5W-IRWD-2403	M. Venegas	1,106.00
TR5W-IRWD-2422	T. Chow	1,350.00
TR5W-IRWD-2430	D. Schapiro	1,598.00
TR5W-IRWD-2434	S. Amirsolaimany	2,184.00
TR5W-IRWD-2443	A. Deboskey	634.00
TR5W-IRWD-2448	E. McCollum	1,288.00
TR5W-IRWD-2540	J. Hahn	514.00
TR5W-IRWD-2575	R. Kingery	672.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5W-IRWD-2584	SRI9 Main Plaza (Irvine)	20,532.00
TR5W-IRWD-2593	Spectrum Montessori, Inc. (Irvine)	3,900.00
TR5W-IRWD-2741	R. Carey	2,280.00
TR5W-IRWD-2922526	P. Lo	442.00
TR5W-IRWD-2982043	J. Greenberg	2,342.00
TR5W-IRWD-3002509	T. Haldorsen	1,002.00
TR5-LB-023	R. Young	1,737.79
TR5W-LB-1169	F. Sharman	570.00
TR5W-LB-1586	M. Johnson	975.00
TR5W-LB-1801	A. Brown	882.00
TR5W-LH-1141	K. Meyer	3,654.00
TR5W-LH-1250	C. Losco	618.00
TR5W-LH-1708	H. Heninger	1,284.00
TR5W-LH-2617	D. Mariani	3,076.00
TR5W-LH-2952504	D. Skinner	1,865.46
TR5-LP-002	F. Chadwick	984.00
TR5-LP-003	M. Van Melle	1,300.00
TR5W-LP-1904	H. Patel	1,172.00
TR5W-LP-2411	B. Chinen	500.00
TR5W-LP-2480	R. Herbold	480.00
TR5-MESA-026	D. Gordon	1,276.00
TR5-MESA-038	J. Whitney	5,994.00
TR5-MESA-046	G. Brogan	3,580.00
TR5-MESA-049	D. Gamstetter	4,100.00
TR5-MESA-051	D. Butler	2,092.00
TR5-MESA-053	D. Berger	4,066.00
TR5-MESA-057	J. Garibotti	1,554.00
TR5-MESA-059	M. Engard	1,120.00
TR5-MESA-060	D. Marzullo	4,566.00
TR5-MESA-065	E. Reuscher	5,080.00
TR5-MESA-066	D. Walden	2,012.00
TR5W-MESA-1036D	S. Huang	4,318.00
TR5W-MESA-1252	B. Donald	1,604.00
TR5W-MESA-1253	C. Echmalian	576.00
TR5W-MESA-1261	D. Moon	3,490.00
TR5W-MESA-1391	N. Sogoian	2,516.00
TR5W-MESA-1667	T. Main	628.00
TR5W-MESA-1715	A. Shroff	1,722.00
TR5W-MESA-1728	SEBCO, Inc. (Costa Mesa)	24,580.00
TR5W-MESA-1769	J. DiPierto	3,044.00
TR5W-MESA-2233	J. Jason	1,270.00
TR5W-MESA-2340	J. Fisher	4,454.00
TR5W-MESA-2344	S. Bolton	2,236.00
TR5W-MESA-2532	C. Corley	2,736.00
TR5W-MESA-2642	E. Carrasco	1,272.00
TR5W-MESA-2719	R. McLaughlin	1,326.00
TR5W-MESA-2942552	S. Byrne	890.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5W-MESA-2942557	D. Lukins	2,464.00
TR5W-MESA-3182311	D. Riddell	1,012.00
TR5-MN-067	R. Austin	5,600.00
TR5-MN-085	D. Weinberg	986.00
TR5-MN-100	R. Kuo	401.91
TR5-MNT-109	E. Chock	1,995.00
TR5-MNT-119	G. Heaton	7,718.00
TR5-MNT-145	P. Parto	7,688.00
TR5-MNT-175	D. Schlesinger	1,925.00
TR5-MNT-178	J. Yetter	5,145.00
TR5-MNT-180	A. Berkowitz	15,870.00
TR5-MNT-182	J. Smith	3,832.00
TR5-MNT-185	R. Stahr	1,765.00
TR5-MNT-186	M. Lowther	7,926.00
TR5-MNT-187	J. Cunningham	7,590.00
TR5-MNT-189	S. Escamilla	1,565.00
TR5-MNT-191	W. Lane	6,144.00
TR5-MNT-192	City of Mission Viejo	79,807.00
TR5-MNT-194	W. Halagarda	2,360.00
TR5-MNT-196	T. Griffin	1,615.00
TR5-MNT-197	D. Laws	6,836.00
TR5W-MNT-1035D	J. Clarke	3,130.00
TR5W-MNT-1071D	F. Wendell	1,540.00
TR5W-MNT-1113D	T. Petrov	4,000.00
TR5W-MNT-1165	W. Knitz	1,354.50
TR5W-MNT-1171	T. Nguyen	2,275.00
TR5W-MNT-1172	T. Welch	4,343.50
TR5W-MNT-1209	J. Yanoschak	5,589.00
TR5W-MNT-1221	J. Stahl	3,430.00
TR5W-MNT-1226	I. Berg	1,109.50
TR5W-MNT-1259	K. Bowen	1,050.00
TR5W-MNT-1298	W. Baumann	1,985.00
TR5W-MNT-1302	R. Hagin	9,225.00
TR5W-MNT-1313	G. Landingham	7,730.09
TR5W-MNT-1435	M. Ryan	2,100.00
TR5W-MNT-1445	C. Campbell	2,605.00
TR5W-MNT-1676	E. Patterson	1,697.50
TR5W-MNT-1685	J. Simmons	8,486.95
TR5W-MNT-1701	J. Schuck	4,010.00
TR5W-MNT-1706	J. Lee	3,725.00
TR5W-MNT-1767	T. Thacker	4,260.00
TR5W-MNT-1782	E. Segel	4,888.00
TR5W-MNT-1784	V. Palakian	5,700.00
TR5W-MNT-1786	R. Gulland	3,568.00
TR5W-MNT-1826	D. Mudry	5,628.00
TR5W-MNT-1841	I. Escutia	6,608.00
TR5W-MNT-1847	R. DeMent	1,480.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5W-MNT-1851	D. Hernandez	910.00
TR5W-MNT-1863	B. Woodward	3,164.00
TR5W-MNT-2059	J. Tehrani-kia	740.00
TR5W-MNT-2076	R. Selstad	2,912.00
TR5W-MNT-2100	R. & A. Niles	3,706.50
TR5W-MNT-2105	M. Savoie	1,750.00
TR5W-MNT-2164	C. Rinaldini	2,400.00
TR5W-MNT-2180	N. Stewart	5,620.00
TR5W-MNT-2182	M. Ibarra	2,282.00
TR5W-MNT-2196	P. Danison	1,440.00
TR5W-MNT-2222	T. Sayre	5,467.00
TR5W-MNT-2232	M. Malik	4,834.00
TR5W-MNT-2243	L. French	3,180.00
TR5W-MNT-2250	T. Wannberg	3,413.49
TR5W-MNT-2261	D. Hogan	1,662.50
TR5W-MNT-2267	A. Manko	4,790.00
TR5W-MNT-2272	D. Czernier	1,483.50
TR5W-MNT-2276	M. Lawrence	3,250.00
TR5W-MNT-2279	S. Rokni	2,649.50
TR5W-MNT-2304	A. McCanta	5,824.00
TR5W-MNT-2334	K. Liedlich	4,180.00
TR5W-MNT-2338	G. Hines	3,409.00
TR5W-MNT-2377	K. Marsoobian	9,376.50
TR5W-MNT-2388	R. Meehan	1,955.00
TR5W-MNT-2390	L. Miller	1,405.00
TR5W-MNT-2398	D. Darling	5,072.00
TR5W-MNT-2437	B. Arnet	965.50
TR5W-MNT-2438	D. Corbo	896.00
TR5W-MNT-2459	A. Veigas	5,920.00
TR5W-MNT-2469	T. Champieux	1,736.00
TR5W-MNT-2489	J. Bayless	1,630.00
TR5W-MNT-2525	T. Sanchez	4,645.00
TR5W-MNT-2625	M. Spearman	2,460.00
TR5W-MNT-2635	M. Reid	2,930.00
TR5W-MNT-2647	N. Vaughan	4,312.00
TR5W-MNT-2902505	J. Wilson	4,197.00
TR5W-MNT-2922525	A. Noronha	4,880.00
TR5W-MNT-2932536	J. Delisle	462.00
tr5w-mnt-2932545	R. Taylor	1,596.00
TR5W-MNT-2942551	T. Omran	7,428.50
TR5W-MNT-2942559	K. Jacobs	7,222.00
TR5W-MNT-2982046	J. Santley	1,029.00
TR5W-MNT-2992051	P. Evans	3,304.00
TR5W-MNT-3002	B. Robinson	5,924.00
TR5W-MNT-3012081	C. Shimmons	3,360.00
TR5-NWPT-011	J. Lorenz	2,274.00
TR5-NWPT-013	M. Skarin	1,946.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5W-NWPT-1257	T. Stephens	1,272.00
TR5W-NWPT-1274D	N. Sutherlin	1,802.00
TR5W-NWPT-1299	D. Hanson	2,956.00
TR5W-NWPT-2498	L. Hayes	3,082.00
TR5W-NWPT-2523	N. Rahe	2,938.00
TR5W-NWPT-3067	J. Grainger	1,356.00
TR5-O-048	J. Pierpont	1,178.00
TR5-O-049	W. Bannister	7,626.00
TR5-O-051	J. Carson	3,182.00
TR5-O-055	R. Thues	3,778.00
TR5-O-058	T. Burnett	1,194.71
TR5-O-059	A. Munoz	922.00
TR5-O-061	J. Britigan	2,632.00
TR5-O-062	L. Herrador	3,142.00
TR5-O-064	J. Coontz	1,532.00
TR5-O-065	P. Gartner	298.03
TR5W-O-1061	B. Hecht	1,706.00
TR5W-O-1123D	J. Berber	1,336.00
TR5W-O-1210D	KaVo Kerr Group (Orange)	26,304.00
TR5W-O-1360	N. Ellis	2,272.51
TR5W-O-1575	C. Nguyen	869.66
TR5W-O-1659	B. Ma	3,248.00
TR5W-O-1666	M. Nava	2,098.00
TR5W-O-1731	M. Fairbanks	2,356.00
TR5W-O-1890	J. Rodriguez	930.00
TR5W-O-2077	M. Yetter	2,004.00
TR5W-O-2163	R. Brace	936.00
TR5W-O-2293	D. Shelton	4,686.00
TR5W-O-2345	D. Vega	5,208.00
TR5W-O-2361	V. Cardona	2,266.00
TR5W-O-2942548	D. Simpson	258.00
TR5W-O-2952566	W. Koga	3,012.00
TR5W-O-2952569	R. Kilman	706.00
TR5-SB-007	D. Marsh	1,740.00
TR5-SB-009	R. Millar	740.00
TR5W-SB-1105D	J. Agee	1,150.00
TR5W-SB-1288	N. Khalil	1,210.00
TR5W-SB-1800	T. Swank	1,840.00
TR5W-SB-2126	R. Lee	2,400.00
TR5W-SB-2360	P. Barreto	500.00
TR5W-SB-2585	D. Knauss	630.00
TR5W-SB-3009	R. Bromen	340.00
TR5-SC-038	D. Lund	828.00
TR5-SC-072	D. Stowe	1,100.00
TR5-SC-083	R. Nolan	1,122.00
TR5-SC-086	D. Bassett	664.00
TR5-SC-087	J. Taylor	508.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5-SC-088	C. Black	3,216.00
TR5W-SC-1001D	G. Osendorf	2,106.00
TR5W-SC-1022D	D. Cagle	660.00
TR5W-SC-1143	C. McGovern	2,172.00
TR5W-SC-1164	C. Noyes	296.00
TR5W-SC-1184	L. Perea	3,496.00
TR5W-SC-1187	B. Sewell	956.00
TR5W-SC-1225	J. Martin	748.00
TR5W-SC-1308	S. Schultz	3,622.00
TR5W-SC-1353	C. Ranson	1,277.70
TR5W-SC-1356	R. Barnes	1,512.00
TR5W-SC-1379	R. Spear	1,674.00
TR5W-SC-1383	R. Somers	7,562.00
TR5W-SC-1418	K. Britton	3,246.00
TR5W-SC-1517	J. Pert	682.00
TR5W-SC-1526	Y. DeFabrique	650.00
TR5W-SC-1530	V. Brinkmann	1,316.00
TR5W-SC-1610	R. Hillerts	2,522.00
TR5W-SC-1732	M. Thelander	1,320.00
TR5W-SC-1891	K. Arrias	586.00
TR5W-SC-2248	R. Schmiedeke	224.00
TR5W-SC-2256	C. Wozney	1,058.00
TR5W-SC-2337	S. Egbert	752.00
TR5W-SC-2454	N. Beninga	368.00
TR5-SJC-038	R. Damore	6,308.00
TR5-SJC-044	A. Bartha	1,494.00
TR5-SJC-046	C. Thompson	1,728.00
TR5-SJC-048	D. McDonnell	7,634.00
TR5W-SJC-1049D	R. Wordes	1,316.00
TR5W-SJC-1228	J. Mankawich	1,292.00
TR5W-SJC-1233	S. Clairemont	1,675.00
TR5W-SJC-1273	M. Riekse	1,368.00
TR5W-SJC-1623	Ammcor Property Management (San Juan Capistrano)	18,052.00
TR5W-SJC-1672	K Clement	2,292.00
TR5W-SJC-1824	J. Altieri	8,174.00
TR5W-SJC-2128	C. Hughes	1,100.00
TR5W-SJC-2184	D. Taylor	2,628.00
TR5W-SJC-2228	S. Artinger	2,400.00
TR5W-SJC-2418	K. & S. Reiter	1,020.00
TR5W-SJC-2514	L. Orcutt	1,238.00
TR5W-SJC-2932541	A. Dickinson	1,080.00
TR5W-SJC-2942565	J. Brady	2,716.00
TR5-SM-062	Alicante Maintenance Corp. (Rancho Santa Margarita)	4,102.00
TR5-SM-145	CZ Master Association (Trabuco Canyon)	30,310.00
TR5-SM-149-150-151	SamLarc (Rancho Santa Margarita)	57,179.75
TR5-SM-156	R. Alberts	7,544.00
TR5-SM-161	D. De Mars	1,480.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5-SM-171	R. Otto	1,562.00
TR5W-SM-1063	Coto de Caza Golf and Racquet Club	150,150.00
TR5W-SM-1161	M. Troyer	1,390.65
TR5W-SM-1170D	L. Monaghan	2,700.00
TR5W-SM-1245	S. Markarbabrud	510.00
TR5W-SM-1251	P. Schlesinger	1,600.00
TR5W-SM-1289	C. Harris	1,561.18
TR5W-SM-1289D	W. Howard	2,520.00
TR5W-SM-1318	J. Patton	720.00
TR5W-SM-1326	D. McEwen	2,664.00
TR5W-SM-1462	M. Safari	1,012.00
TR5W-SM-1557	J. & A. Johnson	824.00
TR5W-SM-1702	J. Torok	534.00
TR5W-SM-1704	C. Chandler	1,338.00
TR5W-SM-1739	Arroyo Vista Apartments (Mission Viejo)	78,868.00
TR5W-SM-1838	B. Nardulli	1,500.00
TR5W-SM-1848	J. Boihem	994.00
TR5W-SM-1860	V. Shariat	1,394.00
TR5W-SM-1868	P. Smith	1,540.00
TR5W-SM-1899	C. Hammel	1,346.00
TR5W-SM-2115	L. Donahue	556.61
TR5W-SM-2125	A. Shah	2,010.00
TR5W-SM-2155	B. Edwards	710.00
TR5W-SM-2213	C. Repp	2,162.00
TR5W-SM-2224	F. Momayez-Tafreshi	2,800.00
TR5W-SM-2259	B. Moorhead	1,342.00
TR5W-SM-2260	R. Swain	866.00
TR5W-SM-2297	M. Jew	3,494.00
TR5W-SM-2318	S. Johnson II	720.00
TR5W-SM-2467	K. Sepp	878.00
TR5W-SM-2515	D. Henmi	1,006.00
TR5W-SM-2522	M. Austin	534.00
TR5W-SM-2598	J. Hollingsworth	552.00
TR5W-SM-2603	M. Matlaf	1,450.00
TR5W-SM-2639	R. Schierberl	1,172.00
TR5W-SM-2662	J. Grande	1,906.00
TR5W-SM-2669	K. Fawley	720.00
TR5W-SM-2952006	A. Bourne	1,930.00
TR5W-SM-3019	S. Fooladian	560.00
TR5W-SM-3036	R. Reese	1,230.00
TR5W-SM-3069	M. Roy	970.00
TR5W-SM-3082	R. Adams	1,090.00
TR5W-SM-3092513	H. Nathan	3,066.00
TR5W-SM-3161	C. French	1,086.00
TR5-SOCO-050	F. Perez	1,872.00
TR5-SOCO-062	R. Arnold	542.00
TR5-SOCO-065	A. Staudenbaur	1,404.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5-SOCO-068	M. McCusker	1,582.00
TR5W-SOCO-1472	Bar Harbour Comm. Assoc. (Dana Point)	49,618.00
TR5W-SOCO-1772	B. Sullins	2,714.00
TR5W-SOCO-2693	J. Casimiro	278.00
TR5W-SOCO-3026	S. Rimel	1,542.00
TR5-SWD-005	C. Kemp	11,563.08
TR5W-SWD-1196	S. Murg	3,126.00
TR5-TC-003	C. Hoiberg	4,100.00
TR5-TC-004	N. Dols	1,570.00
TR5W-TC-1421	L. Rivera	925.00
TR5W-TC-1427	E. Clarke	494.66
TR5W-TC-1499	R. Ervine	783.00
TR5W-TC-2309	D. Shannon	1,687.50
TR5-TUST-009	B. Stephenson	7,016.00
TR5-TUST-012	J. Lecce	864.00
TR5-TUST-013	Medallion Court Inc. (Tustin)	4,570.00
TR5-TUST-014	T. Hunt	8,434.00
TR5W-TUST-1037	Accell Property Management (Tustin)	3,060.00
TR5W-TUST-1269	J. Christopherson	7,030.00
TR5W-TUST-1572	E. Strich	4,188.00
TR5W-TUST-1682	B. Hanley	760.00
TR5W-TUST-1707	D. Shen	1,342.00
TR5W-TUST-2093	D. Mazurie	976.00
TR5W-TUST-2308	G. Anderson	900.00
TR5W-TUST-3052510	J. Ramstack	2,772.00
TR5W-WEST-1201	B. Diep	782.00
TR5W-WEST-2206	S. Knutsen	308.00
TR5-YLWD-004	A. Denney	2,296.00
TR5-YLWD-041	R. Cheung	2,220.00
TR5-YLWD-047	M. Mangold	7,080.00
TR5-YLWD-050	S. Joseph	2,248.00
TR5W-YLWD-1160	J. Halbur	4,122.00
TR5W-YLWD-1279	R. Ford	2,382.00
TR5W-YLWD-1541	A. Karp	1,024.00
TR5W-YLWD-1759	R. Kiley	1,427.52
TR5W-YLWD-2140	P. Yoo	1,086.00
TR5W-YLWD-2188	N. Manaytay	5,578.00
TR5W-YLWD-2262	B. Deyoung	2,884.00
TR5W-YLWD-2323	D. Vanderlaan	2,692.00
TR5W-YLWD-2366	J. Grippi	1,612.00
TR5W-YLWD-2446	W. Curl	2,105.82
TR5W-YLWD-2458	M. Miller	4,514.00
TR5W-YLWD-2606	M. Lou	610.00
TR5W-YLWD-2626	K. Lawrence	3,916.00
TR5W-YLWD-2675	G. Maxwell	502.00
TR5W-YLWD-2722	J. Falster	5,516.00
TR5W-YLWD-2932537	E. Kim	510.00

Municipal Water District of Orange County
Disbursement Approval Report
For the month of March 2015

Invoice#	*Vendor / Description*	*Amount to Pay*
TR5W-YLWD-2962020	Y. Ma	300.00
	*** Total ***	2,275,163.68
	URS	
6144985	November 2014 Professional services for Industrial Process Water Use Reduction program	1,415.00
	*** Total ***	1,415.00
	WaterWise Consulting, Inc.	
3422	February 2015 Professional services for Hotel program	2,510.00
	*** Total ***	2,510.00
	Total Other Funds Expenditures	2,322,483.57
	Total Expenditures	2,536,432.88

Municipal Water District of Orange County
Disbursement Ratification Report
For the month of February 2015

Check #	Date	Vendor # Invoice/CM #	Name / Description	Net Amount
Core Disbursements:				
127312	2/2/15	TIMEWA	Time Warner Cable	
		5210-FEB15	February 2015 Telephone and internet expense	940.05
			***Total ***	940.05
	2/13/15	ACKEEX/ACKECO	Linda Ackerman	
127314		013115	January 2015 Business expense	63.25
127315		JAN2015	January 2015 MET Director's compensation	2,565.50
			***Total ***	2,628.75
127318	2/13/15	C3OFFI	C3 Office Solutions LLC	
		INV33897	January 2015 Canon copier maintenance	238.39
		INV34771	February 2015 Canon copier maintenance	238.39
			***Total ***	476.78
127320	2/13/15	DELAGE	De Lage Landen Public Finance	
		44098642	February 2015 Canon copier lease	509.00
			***Total ***	509.00
127324	2/13/15	IRONMO	Iron Mountain	
		LDG8543	February 2015 Storage/retrieval of archived documents	446.18
			***Total ***	446.18
127344	2/13/15	TIMEWA	Time Warner Cable	
		3564-FEB15	February 2015 Telephone expense for 4 analog fax lines	140.06
			***Total ***	140.06
127348	2/13/15	VERIZO	Verizon Wireless	
		9739442894	January 2015 4G Mobile broadband unlimited service	38.01
			***Total ***	38.01
ACH001304	2/13/15	BARBCO	Brett Barbre	
		JAN2015	January 2015 MET Director's compensation	2,565.50
			***Total ***	2,565.50
ACH001305	2/13/15	BERGJO	Joseph Berg	
		012815	January 2015 Business expense	185.00
			***Total ***	185.00
	2/13/15	DICKCO/DICKEX	Larry Dick	
ACH001308		JAN2015	January 2015 MET Director's compensation	2,565.50
ACH001309		013115	January 2015 Business expense	216.25
			***Total ***	2,781.75

Municipal Water District of Orange County
Disbursement Ratification Report
For the month of February 2015

Check #	Date	Vendor # Invoice/CM #	Name / Description	Net Amount
ACH001311	2/13/15	FINNEG	Joan Finnegan	
		013115	January 2015 Business expense	89.83
			***Total ***	89.83
ACH001314	2/13/15	HINMAN	Susan Hinman	
		013115	January 2015 Business expense	354.80
			***Total ***	354.80
ACH001317	2/13/15	MCKECO	Larry B. McKenney	
		JAN2015	January 2015 MET Director's compensation	2,565.50
			***Total ***	2,565.50
ACH001326	2/13/15	HUNTER	Robert J. Hunter	
		010515	December 2014-January 2015 Business expense	33.51
			***Total ***	33.51
ACH001328	2/13/15	THOMAS	Jeffery Thomas	
		013115	January 2015 Business expense	149.50
			***Total ***	149.50
127667	2/27/15	BELLRI	Richard Bell	
		013115	January 2015 Business expense	61.35
			***Total ***	61.35
127670	2/27/15	DELAGE	De Lage Landen Public Finance	
		44607206	March 2015 Cannon copier lease	509.00
			***Total ***	509.00
127672	2/27/15	BAEZHE	Heather Baez	
		013115	January 2015 Business expense	96.67
			***Total ***	96.67
127677	2/27/15	STAPLC	Staples Credit Plan	
		4362-FEB15	1/22/15 Office supplies	38.85
			***Total ***	38.85
127680	2/27/15	USBANK	U.S. Bank	
		6533/5783-JAN15	12/22/14-1/22/15 Cal Card charges	16,373.29
			***Total ***	16,373.29
			(See attached sheet for details)	
ACH001330	2/27/15	BACATI	Tiffany Baca	
		020515	January-February 2015 Business expense	109.26
			***Total ***	109.26

Municipal Water District of Orange County
Disbursement Ratification Report
For the month of February 2015

Check #	Date	Vendor # Invoice/CM #	Name / Description	Net Amount
ACH001332	***2/27/15***	***CHUMPI***	***Hilary Chumpitazi***	
		013115	January 2015 Business expense	410.59
			***Total ***	410.59
			Total Core Disbursements	31,503.23

Choice Disbursements:

127676	***2/27/15***	***SDGE***	***San Diego Gas and Electric***	
		7768-FEB15	1/20/15-2/19/15 Electrical service for Doheny Ocean Desal project	212.19
			***Total ***	212.19
			Total Choice Disbursements	212.19

Other Funds Disbursements:

127308	***2/2/15***	***ATTEOC***	***AT&T***	
		4492-JAN15	January 2015 S. EOC telephone expense	226.40
		8200-JAN15	January 2015 N. EOC telephone expense	165.86
		0532-JAN15	January 2015 N. EOC Dedicated phone line	56.44
			***Total ***	448.70
127311	***2/2/15***	***SPRINT***	***Sprint***	
		320982721-125	January 2015 WEROC cell phone expense	42.16
			***Total ***	42.16
127317	***2/13/15***	***ATTUVEOC***	***AT&T***	
		8599-FEB15	February 2015 U-verse internet service for N. EOC	45.00
			***Total ***	45.00
127668	***2/27/15***	***CATALI***	***Catalina Island Conservancy***	
		11151	February 2015 WEROC radio repeater site lease	1,558.54
			***Total ***	1,558.54
ACH001340	***2/27/15***	***SANTAM***	***Santa Margarita Water District***	
		DEC2014	December 2014 SCP Operation surcharge	15,020.74
			***Total ***	15,020.74
ACH001341	***2/27/15***	***SPRINT***	***Sprint***	
		320982721-126	February 2015 WEROC cell phone expense	42.20
			***Total ***	42.20

Municipal Water District of Orange County
Disbursement Ratification Report
For the month of February 2015

Check #	Date	Vendor # Invoice/CM #	Name / Description	Net Amount
WIRE-150227	*2/27/15*	*METWAT*	***Metropolitan Water District***	
		8232	December 2014 Water deliveries	15,152,509.78
			***Total ***	15,152,509.78
			Total Other Funds Disbursements	15,169,667.12
			Total Disbursements	15,201,382.54

Robert J. Hunter, General Manager

Hilary Chumpitazi, Treasurer

Cal Card Statement Detail
Statement Date: January 22, 2015
Payment Date: February 27, 2015

Karl's Card

Date	Description	Amount	
12/22/14	American Water Works Association - Crafting Water Rates seminar in Los Angeles, CA on Jan. 28, 2015 - Registration for J. Berg	$ 25.00	
12/22/14	Brown and Caldwell employment advertising for WEROC coordinator	200.00	
12/23/14	UPS delivery charges for Board & Committee packets on Dec. 12, 2014	7.28	
12/23/14	Legislative activities in Washington, DC from Jan. 14-16, 2015 - Airfare change for Director Barbre	482.01	
12/24/14	GovernmentJobs.com employment advertising for WEROC coordinator	175.00	
12/26/14	California Special Districts Association - Introduction to Good Governance Principles seminar in Fountain Valley, CA on Jan. 22, 2015 - Registration for K. Seckel	225.00	
12/30/14	Association of California Cities,OC-Newly Elected Officials' dinner in Costa Mesa, CA on Jan. 29, 2015 - Registration for H. Baez	60.00	
12/31/14	ACWA Fall conference in San Diego, CA from Dec. 2-5, 2014 - Credit for overcharged accommodations	(750.00)	
01/05/15	California Emergency Services Association 2015 membership for L. Parson - Refund for canceled membership	(75.00)	
01/07/15	FedEx delivery charges for Board of Supervisors on Jan. 5, 2015	15.38	
01/07/15	Legislative activities in Washington, DC from Feb. 24-26, 2015 - Airfare for Director Barbre	623.19	1
01/07/15	Legislative activities in Washington, DC from Apr. 15-17, 2015 - Airfare for Director Barbre	1,088.47	2
01/07/15	Legislative activities in Washington, DC from Feb. 11-13, 2015 - Airfare for Director Barbre	613.19	3
01/07/15	Legislative activities in Washington, DC from Mar. 11-13, 2015 - Airfare for Director Barbre	623.19	4
01/07/15	Legislative activities in Washington, DC from May 13-15, 2015 - Airfare for Director Barbre	1,220.73	5
01/08/15	ACWA Legislative meeting in Sacramento, CA on Jan. 16, 2015 - Airfare for H. Baez	498.20	
01/09/15	Monthly license fee for Adobe Creative Cloud software	119.97	
01/12/15	Commercial microwave	268.92	
01/12/15	3 Year e-mail SSL certificate for secure browser connections	167.97	
01/13/15	UPS delivery charges for Board & Committee packets on Jan. 8, 2015	6.02	
01/14/15	Office supplies from Costco	488.06	
01/14/15	5 Toner cartridges	237.60	
01/15/15	2/8/15 - 2/7/16 Annual maintenance & support for Sage software	490.70	
01/15/15	2 California Legislature and 1 U.S. Congress directories	63.92	
01/16/15	Legislative activities in Washington, DC from Jan. 14-16, 2015 - Accommodations for Director Barbre	841.28	6

Cal Card Statement Detail
Statement Date: January 22, 2015
Payment Date: February 27, 2015

Date	Description	Amount
Karl's Card		
01/19/15	ACWA DC conference in Washington, DC from Feb. 25-26, 2015 - Registration for R. Hunter	625.00
01/19/15	ACWA DC conference in Washington, DC from Feb. 25-26, 2015 - Registration for H. Baez	625.00
01/19/15	ACWA DC conference in Washington, DC from Feb. 25-26, 2015 - Registration for Director Tamaribuchi	625.00
01/19/15	Legislative activities in Sacramento, CA from Feb. 23-24 & Feb. 27, 2015 - Airfare for H. Baez	498.20
01/19/15	ACWA DC conference in Washington, DC from Feb. 25-26, 2015 - Airfare for H. Baez	672.16
01/20/15	ACWA DC conference in Washington, DC from Feb. 25-26, 2015 - Accommodations for Director Tamaribuchi, R. Hunter & H. Baez	2,487.93 [7]
01/20/15	UPS delivery charges for Board & Committee packets on Dec. 9, 2014 & Jan. 15, 2015 and Laguna Beach County Water District on Jan. 13, 2015	124.36
	Total	**$ 14,267.01**

[1] Director Barbre to reimburse MWDOC $170.00
[2] Director Barbre to reimburse MWDOC $220.00
[3] Director Barbre to reimburse MWDOC $309.00
[4] Director Barbre to reimburse MWDOC $221.00
[5] Director Barbre to reimburse MWDOC $227.73
[6] Director Barbre reimbursed MWDOC $435.94
[7] Reservations were canceled and full refund was received on 2/5/15

Cal Card Statement Detail
Statement Date: January 22, 2015
Payment Date: February 27, 2015

Date	Description	Amount
Rob's Card		
12/23/14-01/22/15	Meals for R. Hunter's meetings on various dates	$ 113.32 [1]
01/09/15	Special Board meeting in Costa Mesa, CA on Jan. 3, 2015 - Meeting room and meals	1,978.96
01/19/15	Meeting at Metropolitan Water District in Los Angeles, CA - Parking	14.00
	Total	**$ 2,106.28**

[1] R. Hunter to reimburse MWDOC for $15.55

Municipal Water District of Orange County
GM Approved Disbursement Report [1]
For the month of February 2015

Check #	Date	Vendor # Invoice/CM #	Name / Description	Net Amount
Core Disbursements:				
127669	2/27/15	COOKHU	*Hunter T. Cook*	
		010615	November 2014-January 2015 Coastal retiree health benefit	1,364.76
			***Total ***	1,364.76
			Total Core Disbursements	1,364.76
Choice Disbursements:				
			Total Choice Disbursements	0.00
Other Funds Disbursements:				
127313	2/3/15	CATAYA	*Catalina Yamaha*	
		020315	Battery to repair WEROC radio repeater on Catalina Island	161.26
			***Total ***	161.26
			Total Other Funds Disbursements	161.26
			Total Disbursements	1,526.02

Robert J. Hunter, General Manager

Hilary Chumpitazi, Treasurer

(1) For disbursements that did not make the cut-off of previous month's Disbursement Approval report. Disbursements are approved by GM for payment and need A & F Committee ratification.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Street Address:
18700 Ward Street
Fountain Valley, California 92708

Mailing Address:
P.O. Box 20895
Fountain Valley, CA 92728-0895

(714) 963-3058
Fax: (714) 964-9389
www.mwdoc.com

Municipal Water District of Orange County
Consolidated Summary of Cash and Investment
January 31, 2015

District investments and cash balances are held in various funds designated for certain purposes as follows:

Fund	Book Value	% of Portfolio
Designated Reserves		
General Operations	$2,243,422	17.96%
Grant & Project Cash Flow	1,000,000	8.01%
Building Repair	239,491	1.92%
Total Designated Reserves	3,482,913	27.89%
General Fund	5,171,903	41.41%
Water Fund	5,705,125	45.68%
Conservation Fund	(2,229,156)	-17.85%
Desalination Feasibility Study Fund	222,385	1.78%
WEROC Fund	135,986	1.09%
Trustee Activities	562	0.00%
Total	**$12,489,718**	**100.00%**

The funds are invested as follows:

Term of Investment	% of Portfolio	Book Value	Market Value
Cash	0.09%	$11,155	$11,155
Short-term investment			
• LAIF	32.06%	$4,004,713	$4,004,713
• OCIP	43.01%	5,371,952	5,371,952
Long-term investment			
• Misc. Securities	12.03%	1,501,898	1,528,915
• Certificates of Deposit	8.81%	1,100,000	1,094,545
• Federal Agency Issues	4.00%	500,000	500,035
Total	**100.00%**	**$12,489,718**	**$12,511,315**

The average number of days to maturity/call as of January 31, 2015 equaled 137 and the average yield to maturity is 0.797%. During the month, the District's average daily balance was $20,579,407.71. Funds were invested in Federal Agency Issues, Certificates of Deposit, Negotiable CD's, Miscellaneous Securities, the Local Agency Investment Funds (LAIF) and the Orange County Investment Pool (OCIP) during the month of January 2015.

The $21,597 difference between the book value and the market value on January 31, 2015 represents the exchange difference if all investments had been liquidated on that date. Since it is the District's practice to "buy and hold" investments until maturity, the market values are a point of reference, not an indication of actual loss or gain. There are no current plans or cash flow requirements identified in the near future that would require the sale of these securities prior to maturity.

Robert J. Hunter
General Manager

Hilary Chumpitazi
Treasurer

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

WATER: DO MORE WITH LESS

Portfolio Management - Portfolio Summary

January 31, 2015

1/31/2015	Par Value	Market Value	Book Value	% of Portfolio	Days to Mat/Call	YTM @ Cost
Certificates of Deposit - Bank	1,100,000.00	1,094,545.00	1,100,000.00	8.82	1139	1.459
Federal Agency Issues - Step Up	500,000.00	500,035.00	500,000.00	4.01	89	1.737
Local Agency Investment Funds	4,004,713.72	4,004,713.72	4,004,713.72	32.10	1	0.262
Miscellaneous Securities - Coupon	1,500,000.00	1,528,915.00	1,501,897.54	12.02	266	3.122
Orange County Investment Pool	5,371,951.85	5,371,951.85	5,371,951.85	43.06	1	0.323
Total Investments	**12,476,665.57**	**12,500,160.57**	**12,478,563.11**	**100.00%**	**137**	**0.797**
Cash						
Passbook Checking	11,154.85	11,154.85	11,154.85		1	0.00
Total Cash and Investments	**12,487,820.42**	**12,511,315.42**	**12,489,717.96**		**137**	**0.797**

Total Earnings	Month Ending January	Fiscal Year to Date
Current Year	**10,024.50**	**75,843.41**
Average Daily Balance	**20,579,407.71**	
Effective Rate of Return	**0.797%**	

We certify that this report reflects the cash and investments of the Municipal Water District of Orange County and is in conformity with the Government Code requirements and the District Investment Policy and Guidelines in effect at the time of investment. The Investment Program herein shown provides sufficient cash flow liquidity to meet the next six month's estimated expenditure. The source for the market values are from Union Bank.

Robert J. Hunter, General Manager — Date: 3-3-15

Hilary Chumpitazi, Treasurer — Date: 3/3/2015

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Portfolio Management
Long-Term Portfolio Details - Investments
January 31, 2015

Issuer	CUSIP/Ticker	Settlement Date	Par Value	Market Value	Book Value	Coupon Rate	YTM @ Cost	Days To Call/Maturity	Maturity Date
Certificate of Deposit - Bank									
Ally Bank	02006LFV0	7/23/2014	250,000.00	248,610.00	250,000.00	1.150	1.150	905	7/24/2017
Discover Bank	2546712Y5	7/23/2014	250,000.00	248,072.50	250,000.00	1.600	1.600	1269	7/23/2018
GE Capital Bank	36163FJC8	7/25/2014	250,000.00	248,600.00	250,000.00	1.200	1.200	906	7/25/2017
Goldman Sachs Bank	38143A4T9	1/23/2013	100,000.00	100,010.00	100,000.00	1.050	1.050	723	1/23/2017
Synchrony Bank	87164XBY1	7/25/2014	250,000.00	249,252.50	250,000.00	2.050	2.050	1641	7/30/2019
Sub Total			**1,100,000.00**	**1,094,545.00**	**1,100,000.00**	**1.459**	**1.459**	**1139**	
Miscellaneous Securities - Coupon									
Bank of America	06051GED7	10/14/2010	250,000.00	254,332.50	250,941.36	3.700	3.000	213	9/1/2015
JPMorgan Chase	46625HHR4	11/23/2010	250,000.00	252,807.50	250,645.16	3.400	2.700	144	6/24/2015
MetLife Global	59217GAD1	2/25/2011	500,000.00	512,005.00	500,513.34	3.125	3.007	345	1/11/2016
Morgan Stanley	61747YCT0	3/9/2011	500,000.00	509,770.00	499,797.68	3.450	3.508	275	11/2/2015
Sub Total			**1,500,000.00**	**1,528,915.00**	**1,501,897.54**	**3.375**	**3.122**	**266**	
Federal Agency Issues - Step Up									
Federal Home Ln Mtg Corp	3134G5XZ3	1/30/2015	500,000.00	500,035.00	500,000.00	0.500	1.737	89	1/30/2018
Sub Total			**500,000.00**	**500,035.00**	**500,000.00**	**0.50**	**1.737**	**89**	
Total Investments			**3,100,000.00**	**3,123,495.00**	**3,101,897.54**	**2.231**	**2.308**	**547**	

Total Earnings	Month Ending January	Fiscal Year To Date
Current Year	6,063.24	46,914.80

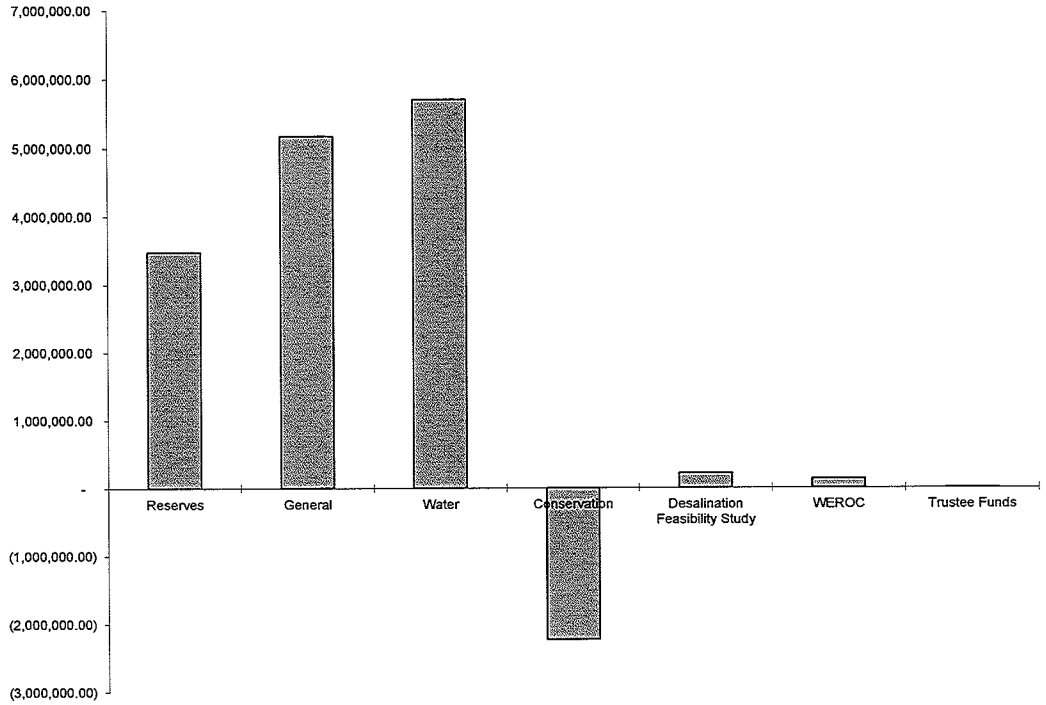
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Portfolio Management
Short-Term Portfolio Details - Cash and Investments
January 31, 2015

Investments	CUSIP/Ticker	Settlement Date	Par Value	Market Value	Book Value	Coupon Rate	YTM @ Cost	Days To Call/Maturity	Maturity Date
Local Agency Investment Funds									
LAIF LGIP	LAIF	6/30/2010	4,004,713.72	4,004,713.72	4,004,713.72	0.262	0.262	1	N/A
Sub Total			**4,004,713.72**	**4,004,713.72**	**4,004,713.72**	**0.262**	**0.262**	**1**	
Orange County Investment Pool									
County of Orange LGIP	OCIP	6/29/2005	5,371,951.85	5,371,951.85	5,371,951.85	0.323	0.323	1	N/A
Sub Total			**5,371,951.85**	**5,371,951.85**	**5,371,951.85**	**0.323**	**0.323**	**1**	
Total Investments			**9,376,665.57**	**9,376,665.57**	**9,376,665.57**	**0.297**	**0.297**		
Passbook Checking									
Bank of America Cash	CASH0547	7/1/2011	10,654.85	10,654.85	10,654.85	0.000	0.000	1	N/A
Petty Cash Cash	CASH	7/1/2011	500.00	500.00	500.00	0.000	0.000	1	N/A
Total Cash			**11,154.85**	**11,154.85**	**11,154.85**	**0.000**	**0.000**	**1**	
Total Cash and Investments			**9,387,820.42**	**9,387,820.42**	**9,387,820.42**	**0.297**	**0.297**	**1**	

Total Earnings	Month Ending January	Fiscal Year To Date
Current Year	3,961.26	28,928.61

Municipal Water District of Orange County
Cash and Investments at January 31, 2015

ALLOCATION	AMOUNT	%
MWDOC		
Designated Reserves		
General	$ 2,243,422	17.96%
Grant & Project Cash Flow	1,000,000	8.01%
Building Repair	239,491	1.92%
Total Designated Reserves	3,482,913	27.89%
General	5,171,903	41.41%
Water	5,705,125	45.68%
Conservation	(2,229,156)	-17.85%
Desalination Feasibility Study	222,385	1.78%
WEROC	135,986	1.09%
TOTAL MWDOC	$ 12,489,156	100.00%
TRUSTEE ACTIVITIES		
AMP Sales Admin	$ 562	0.00%
TOTAL TRUSTEE ACTIVITIES	$ 562	0.00%
TOTAL CASH & INVESTMENTS	**$ 12,489,718**	**100.00%**



MUNICIPAL WATER DIST OF ORANGE COUNTY
PARS OPEB Trust Program

Monthly Account Report for the Period
1/1/2015 to 1/31/2015

Rob Hunter
General Manager
Municipal Water Dist of Orange County
18700 Ward Street
Fountain Valley, CA 92708

Account Summary

Source	Beginning Balance as of 1/1/2015	Contributions	Earnings	Expenses	Distributions	Transfers	Ending Balance as of 1/31/2015
Employer Contribution	$1,121,471.00	$0.00	$415.77	$868.07	$0.00	$0.00	$1,121,018.70
Totals	**$1,121,471.00**	**$0.00**	**$415.77**	**$868.07**	**$0.00**	**$0.00**	**$1,121,018.70**

Investment Selection

Moderate HighMark PLUS

Investment Objective

The dual goals of the Moderate Strategy are growth of principal and income. It is expected that dividend and interest income will comprise a significant portion of total return, although growth through capital appreciation is equally important. The portfolio will be allocated between equity and fixed income investments.

Investment Return

			Annualized Return			
1-Month	3-Months	1-Year	3-Years	5-Years	10-Years	Plan's Inception Date
0.04%	0.54%	5.80%	8.88%	N/A	N/A	10/26/2011

Information as provided by US Bank, Trustee for PARS; Not FDIC Insured; No Bank Guarantee; May Lose Value

Past performance does not guarantee future results. Performance returns may not reflect the deduction of applicable fees, which could reduce returns. Information is deemed reliable but may be subject to change.

Investment Return: Annualized rate of return is the return on an investment over a period other than one year multiplied or divided to give a comparable one-year return.

Municipal Water District of Orange County
WATER USE EFFICIENCY PROJECTS
Cash Flow as of 2/28/15

	Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	TOTALS
Cash - Beginning Balance	$ 219,916.10	$ 150,103.91	$ 117,766.90	$ (72,152.50)	$ (515,391.87)	$ (1,608,304.88)	$ (1,748,879.69)	$ (2,229,156.18)	$ (4,263,447.70)	$ (4,263,447.70)	$ (4,263,447.70)	$ (4,263,447.70)	
REVENUES:													
BUREC					160,398.14								$ 160,398.14
City of Brea	3,448.00	328.00	69.00	2,812.00	1,164.00	663.00		10,742.69					$ 19,226.69
City of Buena Park						810.00		105.00					$ 915.00
City of Fountain Valley				75.00			399.00						$ 474.00
City of Fullerton	75.00	75.00	346.30	955.93	468.30	150.00		303.10					$ 2,373.63
City of Garden Grove		255.00	810.00	292.68	1,755.00	2,715.26	630.00	2,205.00					$ 8,662.94
City of Huntington Beach				433.85	75.00	279.09		144.00					$ 931.94
City of La Habra		105.00		105.00		840.00	744.00	528.18					$ 2,322.18
City of San Clemente	600.00	1,965.00	2,145.00	1,449.98	3,575.29	4,695.00	1,845.00	3,150.00					$ 19,425.27
City of San Juan Capistrano	105.00	735.00		1,470.00		4,140.00	1,785.00	2,636.35					$ 10,871.35
City of Santa Ana		157.68			369.00								$ 526.68
City of Tustin				225.00			300.00						$ 525.00
City of Newport Beach					300.00	189.00		144.00					$ 633.00
City of Orange	630.00	1,050.00	1,020.00	1,655.49	3,228.00	2,615.48	2,254.34	2,843.66					$ 15,296.97
City of Westminster		19.97		34.44									$ 54.41
El Toro Water District	2,703.99	2,717.00	1,576.00	6,802.99	2,996.79	3,048.00	2,646.52	1,354.55					$ 23,845.84
East Orange County Water District						91.61							$ 91.61
Golden State Water Company	2,671.00	3,493.93	3,350.00	2,589.58	6,447.10	4,170.10		14,477.39					$ 37,199.10
Irvine Ranch Water District	65,383.05	28,904.47	41,340.19	47,252.20	47,503.28	87,209.17	6,462.00	1,500.00					$ 325,554.36
Laguna Beach County Water District	328.00	1,130.00		885.00		3,237.00	210.00	642.00					$ 6,432.00
Mesa Water District		225.00	75.00	225.00	225.00	84.98	75.00	75.00					$ 984.98
Metropolitan Water District		142,191.56	1,183.00	11,158.91		241,505.68		54,391.59					$ 450,430.74
Moulton Niguel Water District			789.98	144.00		19,737.78	88,537.25	49,215.05					$ 158,424.06
Santa Margarita Water District	1,092.20	4,782.20			5,299.96	37,784.70		4,481.78					$ 53,440.84
South Coast Water District	75.00	225.00		150.00	75.00	75.00	75.00	150.00					$ 825.00
Trabuco Canyon Water District					100.00	525.00	1,242.50	400.00					$ 2,267.50
Yorba Linda Water District			213.00	351.00	645.00		516.10	894.00					$ 2,619.10
Miscellaneous Revenues													
Miscellaneous	5,950.50			1,861.01									7,811.51
Interest Revenue	171.77			81.72									253.49
Total Revenues	83,233.51	188,359.81	52,917.47	81,010.78	234,624.86	414,565.85	107,721.71	150,383.34	-	-	-	-	$1,312,817.33
EXPENDITURES:													
Aquaficient	1,500.00	1,500.00		3,000.00	1,500.00	1,500.00	1,500.00	1,500.00					12,000.00
Conservision Consulting, LLC	7,544.25	7,411.50		13,663.25	7,089.75		12,756.25	7,058.25					55,523.25
City of Newport Beach	2,968.00												2,968.00
Executive Information Systems		584.00											584.00
Hotel Program			5,151.92	27,674.40			12,050.00	27,870.00					72,746.32
Immersive Media					839.99								839.99
Industrial Program						94,197.34							94,197.34
Irvine Ranch Water District	16,250.00												16,250.00
Metropolitan Water District	7,988.20				56,442.29		61,593.48						126,023.97
MESA	2,119.50												2,119.50
Mission RCD	6,485.80	12,988.02	14,006.16	30,794.12	37,228.41	30,993.55	19,203.82	26,098.08					177,797.96
Quick Signs				1,973.27	1,517.65	63.50							3,554.42
Spray to Drip program		975.00	10,100.26	2,852.56	3,471.96	8,243.91	3,153.68	55,257.47					84,054.84
Survey Gizmo				675.00									675.00
Turf Removal	108,189.95	183,408.30	197,345.22	442,202.55	1,218,032.82	416,787.48	477,044.53	2,066,891.06					5,109,901.91
URS		12,580.00		1,415.00	1,415.00	2,765.00							18,175.00
Waterwise Consulting		1,250.00	1,250.00										2,500.00
Miscellaneous Expenses													
Interest Expense							696.44						696.44
Salary & Benefit			14,983.31			589.88							15,573.19
Total Expenditures	153,045.70	220,696.82	242,836.87	524,250.15	1,327,537.87	555,140.66	587,998.20	2,184,674.86	-	-	-	-	$5,796,181.13
Cash - Ending Balance	$ 150,103.91	$ 117,766.90	$ (72,152.50)	$ (515,391.87)	$(1,608,304.88)	$ (1,748,879.69)	$ (2,229,156.18)	$ (4,263,447.70)	$ (4,263,447.70)	$ (4,263,447.70)	$ (4,263,447.70)	$ (4,263,447.70)	

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

COMBINED FINANCIAL STATEMENTS

AND

BUDGET COMPARATIVE

JULY 1, 2014 THRU JANUARY 31, 2015

Municipal Water District of Orange County
Combined Balance Sheet
As of January 31, 2015

ASSETS	**Amount**
Cash in Bank	11,154.85
Investments	12,478,563.11
Accounts Receivable	23,776,112.21
Accounts Receivable - Other	1,511,081.63
Accrued Interest Receivable	14,518.42
Prepaids/Deposits	605,394.66
Leasehold Improvements	3,015,137.08
Furniture, Fixtures & Equipment	535,372.82
Less: Accum Depreciation	(2,504,037.27)
Net OPEB Asset	37,041.00
TOTAL ASSETS	$39,480,338.51
LIABILITIES AND FUND BALANCES	
Liabilities	
Accounts Payable	24,992,145.85
Accounts Payable - Other	(72,809.33)
Accrued Salaries and Benefits Payable	315,254.16
Other Liabilities	2,783,019.21
Unearned Revenue	1,095,020.32
Total Liabilities	29,112,630.21
Fund Balances	
Restricted Fund Balances	
Water Fund - T2C	955,733.05
Total Restricted Fund Balances	955,733.05
Unrestricted Fund Balances	
Designated Reserves	
General Operations	2,280,462.66
Grant & Project Cash Flow	1,000,000.00
Building Repair	239,491.00
Total Designated Reserves	3,519,953.66
GENERAL FUND	1,441,435.43
WEROC	55,774.88
Total Unrestricted Fund Balances	5,017,163.97
Excess Revenue over Expenditures	
Operating Fund	4,259,195.69
Other Funds	135,615.59
Total Fund Balance	10,367,708.30
TOTAL LIABILITIES AND FUND BALANCES	$39,480,338.51

Municipal Water District of Orange County
Revenues and Expenditures Budget Comparative Report
General Fund
From July 2014 thru January 2015

	Month to Date	Year to Date	Annual Budget	% Used	Encumbrance	Budget Remaining
REVENUES						
Retail Connection Charge	0.00	6,440,532.00	6,440,532.00	100.00%	0.00	0.00
Water Increment	5,128.75	75,606.48	103,564.00	73.00%	0.00	27,957.52
Water rate revenues	5,128.75	6,516,138.48	6,544,096.00	99.57%	0.00	27,957.52
Interest Revenue	10,257.05	75,305.52	138,000.00	54.57%	0.00	62,694.48
Subtotal	15,385.80	6,591,444.00	6,682,096.00	98.64%	0.00	90,652.00
Choice Programs	(6,500.80)	1,290,579.98	1,261,086.00	102.34%	0.00	(29,493.98)
Choice Prior Year Carry Over	0.00	94,000.00	94,000.00	100.00%	0.00	0.00
Miscellaneous Income	13.53	18,262.41	3,000.00	608.75%	0.00	(15,262.41)
School Contracts	17,231.45	48,726.87	70,000.00	69.61%	0.00	21,273.13
Delinquent Payment Penalty	166.61	166.61	0.00		0.00	(166.61)
Transfer-Out To Reserve	0.00	0.00	(84,374.00)	0.00%	0.00	(84,374.00)
Subtotal	10,910.79	1,451,735.87	1,343,712.00	108.04%	0.00	(108,023.87)
TOTAL REVENUES	26,296.59	8,043,179.87	8,025,808.00	100.22%	0.00	(17,371.87)

Municipal Water District of Orange County
Revenues and Expenditures Budget Comparative Report
General Fund
From July 2014 thru January 2015

	Month to Date	Year to Date	Annual Budget	% Used	Encumbrance	Budget Remaining
EXPENSES						
Salaries & Wages	235,628.87	1,713,860.64	2,995,855.00	57.21%	0.00	1,281,994.36
Salaries & Wages - Grant Recovery	0.00	(11,733.89)	(16,437.00)	71.39%	0.00	(4,703.11)
Directors' Compensation	15,906.10	99,222.63	210,342.00	47.17%	0.00	111,119.37
MWD Representation	10,262.00	56,929.03	120,197.00	47.36%	0.00	63,267.97
Employee Benefits	76,351.70	502,375.21	961,916.00	52.23%	0.00	459,540.79
OPEB Annual Contribution	0.00	0.00	133,331.00	0.00%	0.00	133,331.00
Employee Benefits - Grant Recovery	0.00	(3,009.86)	0.00	0.00%	0.00	3,009.86
Director's Benefits	4,865.19	45,412.40	119,356.00	38.05%	0.00	73,943.60
Health Ins $'s for Retirees	5,525.95	24,317.73	50,244.00	48.40%	0.00	25,926.27
Training Expense	397.52	2,699.52	18,000.00	15.00%	0.00	15,300.48
Tuition Reimbursement	0.00	0.00	6,000.00	0.00%	0.00	6,000.00
Personnel Expenses	348,937.33	2,430,073.41	4,598,804.00	52.84%	0.00	2,158,711.39
Engineering Expense	9,924.90	34,189.45	355,000.00	9.63%	254,703.32	66,107.23
Legal Expense	37,675.07	137,820.33	329,000.00	41.89%	199,679.67	(8,500.00)
Audit Expense	0.00	21,125.00	23,000.00	91.85%	0.00	1,875.00
Professional Services	71,392.83	400,284.83	1,133,200.00	35.32%	251,733.66	481,181.51
Professional Fees	118,992.80	593,419.61	1,840,200.00	32.25%	706,116.65	540,663.74
Conference-Staff	1,590.00	7,848.00	13,925.00	56.36%	0.00	6,077.00
Conference-Directors	659.00	6,017.00	8,650.00	69.56%	0.00	2,633.00
Travel & Accom.-Staff	2,803.25	18,968.23	38,300.00	49.53%	0.00	19,331.77
Travel & Accom.-Directors	3,581.39	11,855.36	29,600.00	40.05%	0.00	17,744.64
Travel & Conference	8,633.64	44,688.59	90,475.00	49.39%	0.00	45,786.41
Membership/Sponsorship	2,000.00	69,883.26	90,437.00	77.27%	0.00	20,553.74
CDR Support	0.00	19,980.50	39,961.00	50.00%	19,980.50	0.00
Dues & Memberships	2,000.00	89,863.76	130,398.00	68.91%	19,980.50	20,553.74
Business Expense	249.09	3,349.83	7,000.00	47.85%	0.00	3,650.17
Maintenance Office	7,787.25	57,943.89	120,768.00	47.98%	56,486.82	6,337.29
Building Repair & Maintenance	740.84	6,279.65	10,800.00	58.14%	4,520.35	0.00
Storage Rental & Equipment Lease	1,955.18	8,065.42	40,708.00	19.81%	8,642.58	24,000.00
Office Supplies	3,556.16	16,656.07	24,288.00	68.58%	1,495.33	6,136.60
Postage/Mail Delivery	693.98	6,323.01	11,100.00	56.96%	1,888.90	2,888.09
Subscriptions & Books	63.92	319.94	1,600.00	20.00%	0.00	1,280.06
Reproduction Expense	35.00	4,479.45	90,625.00	4.94%	7,745.30	78,400.25
Maintenance-Computers	4.31	2,415.90	6,000.00	40.27%	701.82	2,882.28
Software Purchase	287.94	14,807.82	25,515.00	58.04%	600.12	10,107.06
Software Support	1,481.77	16,443.33	28,869.00	56.96%	0.00	12,425.67
Computers and Equipment	0.00	8,183.14	9,300.00	87.99%	0.00	1,116.86
Automotive Expense	1,125.40	7,397.96	13,300.00	55.62%	0.00	5,902.04
Toll Road Charges	49.25	541.65	1,250.00	43.33%	0.00	708.35
Insurance Expense	6,721.16	60,498.36	97,000.00	62.37%	3,823.07	32,678.57
Utilities - Telephone	1,226.10	8,601.50	16,900.00	50.90%	0.00	8,298.50
Bank Fees	918.37	6,235.34	10,700.00	58.27%	0.00	4,464.66
Miscellaneous Expense	4,096.13	28,489.16	109,700.00	25.97%	0.00	81,210.84
MWDOC's Contrb. To WEROC	10,709.00	74,963.00	128,508.00	58.33%	0.00	53,545.00
Depreciation Expense	1,167.00	16,651.87	0.00	0.00%	0.00	(16,651.87)
Other Expenses	42,867.85	348,646.29	753,931.00	46.24%	85,904.29	319,380.42
Election Expense	0.00	272,536.97	444,000.00	61.38%	0.00	171,463.03
MWDOC's Building Expense	4,755.55	4,755.55	168,000.00	2.83%	0.00	163,244.45
TOTAL EXPENSES	526,187.17	3,783,984.18	8,025,808.00	47.15%	812,001.44	3,429,822.38
NET INCOME (LOSS)	(499,890.58)	4,259,195.69	0.00			

Municipal Water District of Orange County
Revenues and Expenditures Budget Comparative Report
Water Fund
From July 2014 thru January 2015

	Month to Date	Year to Date	Annual Budget	% Used	Budget Remaining
WATER REVENUES					
Water Sales	8,724,988.70	111,132,449.20	163,874,103.00	67.82%	52,741,653.80
Readiness to Serve Charge	1,100,100.87	8,069,223.87	13,946,682.00	57.86%	5,877,458.13
Capacity Charge CCF	368,705.00	2,198,355.02	3,659,300.00	60.08%	1,460,944.98
SCP Surcharge	17,786.70	191,231.36	361,200.00	52.94%	169,968.64
Interest	235.58	1,622.34	4,275.00	37.95%	2,652.66
TOTAL WATER REVENUES	10,211,816.85	121,592,881.79	181,845,560.00	66.87%	60,252,678.21
WATER PURCHASES					
Water Sales	8,724,988.70	111,132,449.20	163,874,103.00	67.82%	52,741,653.80
Readiness to Serve Charge	1,100,100.87	8,069,223.87	13,946,682.00	57.86%	5,877,458.13
Capacity Charge CCF	368,705.00	2,198,355.02	3,659,300.00	60.08%	1,460,944.98
SCP Surcharge	17,786.70	191,231.36	361,200.00	52.94%	169,968.64
TOTAL WATER PURCHASES	10,211,581.27	121,591,259.45	181,841,285.00	66.87%	60,250,025.55
EXCESS OF REVENUE OVER EXPENDITURES	235.58	1,622.34	4,275.00		

Municipal Water District of Orange County
WUE Revenues and Expenditures (Actuals vs Budget)
From July 2014 thru January 2015

	Year to Date Actual	Annual Budget	% Used
Landscape Performance Certification			
Revenues	32,470.61	116,000.00	27.99%
Expenses	54,252.75	116,000.00	46.77%
Excess of Revenues over Expenditures	(21,782.14)	0.00	
SmarTimer Program			
Revenues	92,884.61	50,467.00	184.05%
Expenses	69,962.20	50,467.00	138.63%
Excess of Revenues over Expenditures	22,922.41	0.00	
Industrial Water Use Reduction			
Revenues	71,730.17	113,980.00	62.93%
Expenses	99,808.24	113,980.00	87.57%
Excess of Revenues over Expenditures	(28,078.07)	0.00	
Spray To Drip Conversion			
Revenues	71,463.88	65,342.47	109.37%
Expenses	30,885.32	65,342.47	47.27%
Excess of Revenues over Expenditures	40,578.56	0.00	
Water Smart Landscape for Public Property			
Revenues	3,756.29	1,248,000.00	0.30%
Expenses	6,118.43	1,248,000.00	0.49%
Excess of Revenues over Expenditures	(2,362.14)	0.00	
Member Agency Administered Passthru			
Revenues	13,668.00	27,143.00	50.36%
Expenses	0.00	27,143.00	0.00%
Excess of Revenues over Expenditures	13,668.00	0.00	
ULFT Rebate Program			
Revenues	153,791.14	132,250.00	116.29%
Expenses	139,706.44	132,250.00	105.64%
Excess of Revenues over Expenditures	14,084.70	0.00	
HECW Rebate Program			
Revenues	278,665.00	403,000.00	69.15%
Expenses	255,010.40	403,000.00	63.28%
Excess of Revenues over Expenditures	23,654.60	0.00	
CII Rebate Program			
Revenues	11,778.00	159,250.00	7.40%
Expenses	10,878.00	159,250.00	6.83%
Excess of Revenues over Expenditures	900.00	0.00	
Large Landscape Survey			
Revenues	51,714.13	32,000.00	161.61%
Expenses	44,645.62	32,000.00	139.52%
Excess of Revenues over Expenditures	7,068.51	0.00	
Indoor-Outdoor Survey			
Revenues	3,516.87	5,200.00	67.63%
Expenses	0.00	5,200.00	0.00%
Excess of Revenues over Expenditures	3,516.87	0.00	
Turf Removal Program			
Revenues	3,358,447.56	725,000.00	463.23%
Expenses	3,359,159.86	725,000.00	463.33%
Excess of Revenues over Expenditures	(712.30)	0.00	

Municipal Water District of Orange County
WUE & Other Funds Revenues and Expenditures (Actuals vs Budget)
From July 2014 thru January 2015

	Year to Date Actual	Annual Budget	% Used
Comprehensive Landscape (CLWUE)			
Revenues	7,387.84	258,690.00	2.86%
Expenses	36,068.84	258,690.00	13.94%
Excess of Revenues over Expenditures	(28,681.00)	0.00	
Home Certification and Rebate			
Revenues	8,820.58	248,050.00	3.56%
Expenses	31,239.45	248,050.00	12.59%
Excess of Revenues over Expenditures	(22,418.87)	0.00	
CII, Large Landscape, Performance (OWOW)			
Revenues	0.00	145,960.00	0.00%
Expenses	8,280.85	145,960.00	5.67%
Excess of Revenues over Expenditures	(8,280.85)	0.00	
WEROC			
Revenues	206,869.38	248,622.00	83.21%
Expenses	127,659.08	248,622.00	51.35%
Excess of Revenues over Expenditures	79,210.30	0.00	
WUE Projects			
Revenues	4,160,094.68	3,730,332.47	111.52%
Expenses	4,146,016.40	3,730,332.47	111.14%
Excess of Revenues over Expenditures	14,078.28	0.00	
RPOI Distributions			
Revenues	0.00	4,921.00	0.00%
Expenses	0.00	4,921.00	0.00%
Excess of Revenues over Expenditures	0.00	0.00	
Ocean Desalination			
Revenues	0.00	0.00	0.00%
Expenses	(2,045.46)	0.00	0.00%
Excess of Revenues over Expenditures	2,045.46	0.00	

Item No. 5

CONSENT CALENDAR ITEM
March 18, 2015

TO: Board of Directors

FROM: **Administration & Finance Committee**
(Directors Thomas, Osborne, Finnegan)

Robert J. Hunter
General Manager

SUBJECT: **MEMBERSHIP IN THE ASSOCIATION OF METROPOLITAN WATER AGENCIES (AMWA)**

STAFF RECOMMENDATION

It is recommended that the Board of Directors approve membership in AMWA for this fiscal year.

COMMITTEE RECOMMENDATION

Committee concurred with staff recommendation.

DETAILED REPORT

Membership in AMWA is proposed as a cost-efficient method to increase the effectiveness and coverage of our legislative and regulatory issues in Washington, D.C.. AMWA activities would be combined with our existing Washington advocacy program and used in conjunction with an intensified involvement with ACWA. Utilization of AMWA staff and committees will extend our reach and effectiveness on the creation, development and modification of both legislation and regulation through the well respected and trusted leadership role AMWA has developed with Congress, bureaus and agencies over the past three and a half decades.

The Association of Metropolitan Water Agencies (AMWA) is an organization of the largest publicly owned drinking water systems in the United States. AMWA is the nation's only policy-making organization solely for metropolitan drinking water suppliers. The association

Budgeted (Y/N): N	Budgeted amount: None	Core __	Choice __
Action item amount: $16,004.39	Line item:		
Fiscal Impact (explain if unbudgeted): Funding available from budget/spending variances in FY2014-2015 budget.			

was formed in 1981 by a group of general managers of metropolitan water systems who wanted to ensure that the issues of large publicly owned water suppliers would be represented in Washington, D.C. Their focus remains on Washington and the interests of AMWA's member utilities. The association represents the interests of these water systems by working with Congress and federal agencies to ensure federal laws and regulations protect public health, cost-effective and a based on sound science. They have a staff of nine; including one staffer dedicated to Legislative Affairs and one for Regulatory Affairs.

Attached are a few AMWA documents including their 2015 Federal Drinking Water Agenda and two monthly editions of their Congressional Report. Other documents and their annual report are available upon request. Their five point drinking water agenda includes:

- Invest in Water Infrastructure through WIFIA and the SRFs
- Preserve Tax-Exempt Municipal Bonds
- Protect Drinking Water Sources from Pollution
- Help Water Systems Build Resilience to Extreme Events
- Maintain Science-Based Drinking Water Regulation.

AMWA is governed by a 20-member Board of Directors, which represents all regions of the country. Committees on regulation, legislation, utility management sustainability and security provide the expertise to achieve water suppliers' goals, including sustainable operations, regulations based on sound science and cost-effective laws that support the safety and security of drinking water.

Member representatives to AMWA are the general managers and CEOs of these large water systems. Current California members include Anaheim, Burbank, Coachella Valley, Contra Costa, East Bay MUD, Glendale, Long Beach, LADWP, MET, Riverside, Sacramento, San Diego, San Francisco PUC, and Western. Other western state members include Las Vegas, Central Arizona Project, Phoenix, Denver, and Salt Lake City.

ASSOCIATION OF METROPOLITAN WATER AGENCIES

FEDERAL DRINKING WATER AGENDA: 2015

The Association of Metropolitan Water Agencies represents the nation's largest publicly owned drinking water utilities, with a membership that serves 130 million people from Alaska to Puerto Rico.

This packet summarizes our top federal legislative priorities for 2015. If you have any questions, or would like additional information on these or any topics affecting drinking water utilities, please contact Dan Hartnett, AMWA's Director of Legislative Affairs, at 202-331-2820 or hartnett@amwa.net.

Association of Metropolitan Water Agencies
1620 I Street, NW, Suite 500, Washington, DC 20006
p 202.331.2820 f 202.785.1845
www.amwa.net

Invest in Water Infrastructure through WIFIA and the SRFs

Congress should fully fund the new Water Infrastructure Finance and Innovation Act (WIFIA) and the well-established Drinking Water and Clean Water State Revolving Funds (SRFs).

Preserve Tax-Exempt Municipal Bonds

Cities and towns rely on tax-exempt municipal bonds for affordable infrastructure financing. Tax reform proposals must maintain these critical incentives that encourage investment in the muni bond market while keeping interest rates low.

Protect Drinking Water Sources from Pollution

Chemical spills and nutrient runoff are threatening our drinking water sources. Prompt information sharing and adoption of sustainable agricultural practices are part of the solution.

Help Water Systems Build Resilience to Extreme Events

Extreme weather and changing hydrological conditions pose new challenges for water utility managers. Legislation in Congress would help water utilities plan for these risks, while ensuring uninterrupted water service.

Maintain Science-Based Drinking Water Regulation

Congress should maintain the Safe Drinking Water Act's science-based process for setting drinking water regulations for new contaminants.

ASSOCIATION OF METROPOLITAN WATER AGENCIES

INVEST IN WATER INFRASTRUCTURE

Since 1997, the **Drinking Water State Revolving Fund (DWSRF)** has helped thousands of communities nationwide protect public health through drinking water system improvements. And last year, Congress approved a new **Water Infrastructure Finance and Innovation Act (WIFIA)** to help cities and towns pay for large-scale water infrastructure projects.

WIFIA is designed to target major water infrastructure projects costing more than $20 million, while the average DWSRF loan delivers $2.4 million.

Research shows that every million dollars invested in water infrastructure supports 16 jobs,[1] making WIFIA and the DWSRF strong engines in the economy. **AMWA urges Congress to robustly fund both WIFIA and the DWSRF in the 2016 fiscal year.**

Association of Metropolitan Water Agencies
1620 I Street, NW, Suite 500, Washington, DC 20006
p 202.331.2820 f 202.785.1845
www.amwa.net

[1] Water Environment Research Foundation and the Water Research Foundation, *National Economic & Labor Impacts of the Water Utility Sector,* September 2014. http://www.waterrf.org/PublicReportLibrary/4566a.pdf.

America's Water Infrastructure Needs are Well-Documented

Communities across the U.S. face staggering costs to upgrade aging water infrastructure. EPA has estimated the nation's drinking water systems need more than $384 billion over the next 20 years just to maintain current levels of service. Of this amount, $145 billion is attributed to metropolitan water systems that serve more than 100,000 people.

The DWSRF Helps Keep Our Water Safe to Drink

Through the DWSRF, states issue loans for water projects that will address serious public health risks by improving drinking water quality. President Obama requested $1.186 billion for the DWSRF in FY16, which would mark the program's highest appropriation since 2010.

WIFIA Will Leverage Federal Dollars to Address Our Biggest Project Needs

Like the TIFIA program, WIFIA will leverage federal investments while delivering low-cost financing to major water projects. A conservative projection estimates that fully funding WIFIA at $25 million in FY16 could translate into at least $250 million worth of water infrastructure loans nationwide.

One Simple Change Will Make WIFIA Even More Effective

To secure a clean budget score, Congress added a provision to WIFIA that bars recipients from using tax-exempt financing to supplement a project's WIFIA loan amount. This has no basis in sound policy, and makes it hard for communities to contribute their own dollars to WIFIA-funded projects. Congress should reverse this ban and allow WIFIA to fulfill its potential.

ASSOCIATION OF METROPOLITAN WATER AGENCIES

PRESERVE TAX-EXEMPT MUNICPAL BONDS

Communities issue municipal bonds to finance capital improvements at low borrowing rates – stretching their dollars while creating jobs and keeping water and sewer rates in check. But some proposals on Capitol Hill would apply federal income tax to municipal bond interest for the first time – leading to higher costs for cities, towns, and local ratepayers.

AMWA asks you to reject these changes and preserve tax-exempt municipal bonds.

More information on the importance of tax-exempt municipal bonds to local water utilities is available at www.amwa.net/MuniBondReport.

Tax-Exempt Municipal Bonds Have a Long History in the Federal Tax Code

Since 1913, interest earned on municipal bonds has been exempt from federal income taxes. This leads investors to accept lower interest rates from cities and towns borrowing to fund infrastructure. As a result, communities can keep water rates affordable for local residents while reducing pressure on federal infrastructure assistance programs.

Water Systems Rely on Tax-Exempt Municipal Bonds to Finance Infrastructure Upgrades

Between 2003 and 2012, cities and towns across the U.S. financed nearly $258 billion worth of water and sewer infrastructure improvements through tax-exempt municipal bonds. In 2012 alone, communities in 48 of the 50 states utilized tax-exempt bonds to fund water and wastewater infrastructure.

Taxing Municipal Bond Interest Would Burden Local Communities

Fully taxing municipal bond interest would have increased water infrastructure financing costs by $9 billion nationwide in 2012 alone – essentially imposing a new tax on municipalities and utility ratepayers.

Local Ratepayers – Not Wealthy Investors – Would Pay the Cost of New Municipal Bond Taxes

Investors would offset new taxes on municipal bond interest earnings by seeking higher interest rates – thereby raising local borrowing costs, stressing community resources, and costing jobs by slowing critical water infrastructure improvements.

Association of Metropolitan Water Agencies
1620 I Street, NW, Suite 500, Washington, DC 20006
p 202.331.2820 f 202.785.1845
www.amwa.net

ASSOCIATION OF METROPOLITAN WATER AGENCIES

PROTECT DRINKING WATER SOURCES FROM POLLUTION

Across the country, communities' drinking water sources are under assault. Last year, a chemical leak in Charleston, West Virginia contaminated water supplies for days, preventing residents from using water in their homes. And last summer, a massive algal bloom in Lake Erie deposited toxins in Toledo's drinking water.

AMWA supports policies to prevent pollution in the first place, while also establishing a strong response structure to ensure rapid cleanup when it occurs.

Without action, chemical pollution events will continue to disrupt lives and commerce – while undermining Americans' confidence in their drinking water.

Association of Metropolitan Water Agencies
1620 I Street, NW, Suite 500, Washington, DC 20006
p 202.331.2820 f 202.785.1845
www.amwa.net

Utilities Need Immediate Notification if a Chemical Spill Threatens Their Water Supplies

If a chemical spill reaches drinking water sources, public water utility managers must be notified as soon as possible. This will allow utility staff to quickly implement a response tailored to the chemical in question – such as closing intakes, adjusting water treatment, employing targeted water quality monitoring, and rapidly sending appropriate water use advisories to customers.

Chemical Storage Facilities Must Share Information About Chemical Risks – Before Spills Occur

Chemical storage facilities should make information available about potential threats to nearby drinking water supplies, including details about how each chemical behaves in water, effective treatment and removal methods, and known human health risks at given concentrations. Having this information available will help utilities shape an effective spill response.

Agricultural Runoff that Contributes to Source Water Contamination Must be Contained

Runoff from agricultural operations often leads to high nitrate and phosphorus levels in drinking water sources. This can trigger algal blooms, the spread of algal toxins, and increases to organic carbon levels in treated water – which may react with chlorine disinfectants to produce new compounds with negative human health effects. Congress should fund initiatives – like the Regional Conservation Partnership Program – that encourage farmers to prevent fertilizer residue from escaping into nearby water supplies.

ASSOCIATION OF METROPOLITAN WATER AGENCIES

HELP WATER SYSTEMS BUILD RESILIENCE TO EXTREME EVENTS

Melting snowpack in the Northwest, widespread drought in the West, more intense storms in the Northeast, and rising sea levels along the coasts are projected to affect the nation in the coming decades. In light of these risks, the nation's water utilities are already taking steps to ensure uninterrupted, high-quality water service.

The "Water Infrastructure Resiliency and Sustainability Act" (WIRSA) will aid these efforts by establishing a competitive funding assistance program to help the nation's drinking water, wastewater, and stormwater systems plan and implement projects to adapt their infrastructure to changing hydrological conditions.

Association of Metropolitan Water Agencies
1620 I Street, NW, Suite 500, Washington, DC 20006
p 202.331.2820 f 202.785.1845
www.amwa.net

Extreme Weather and Changing Hydrological Conditions could Jeopardize Reliable Water Service

Regardless of their cause, extreme weather and changing hydrological conditions are putting water and wastewater systems at risk. Many utilities are already at work to build resiliency to threats as varied as prolonged drought and more frequent intense storms.

Local Water System Adaptation Costs are Projected to Approach $1 Trillion by 2050

These costs, which involve developing new water sources, relocating threatened infrastructure, and implementing new sustainable practices, will come in addition to traditional infrastructure upgrades utilities already face.[1]

WIRSA Targets Funding Assistance at the Most Vital Adaptation Projects

The legislation will establish a competitive program to help the nation's drinking water, wastewater, and stormwater systems implement critical adaptation projects, including those that conserve water and increase efficiency, rebuild or relocate threatened treatment facilities, accelerate the adoption of advanced water treatment technologies like water reuse and recycling, or incorporate green infrastructure.

WIRSA Will Soon be Reintroduced in the 114th Congress

Rep. Lois Capps and Sen. Ben Cardin plan to reintroduce WIRSA early this year. AMWA urges you to support this important legislation.

[1] AMWA and the National Association of Clean Water Agencies, *Confronting Climate Change*, October 2009. http://www.amwa.net/ConfrontingClimateChange.

ASSOCIATION OF METROPOLITAN WATER AGENCIES

MAINTAIN SCIENCE-BASED DRINKING WATER REGULATION

Congress designed the Safe Drinking Water Act (SDWA) to ensure drinking water contaminant regulations are well vetted, based on sound science, and constructed to deliver meaningful public health benefits. **Lawmakers should not circumvent this effective process on a contaminant-by-contaminant basis in reaction to media reports of new or perceived public health threats.**

Association of Metropolitan Water Agencies
1620 I Street, NW, Suite 500, Washington, DC 20006
p 202.331.2820 f 202.785.1845
www.amwa.net

Contaminant Detection Does Not Equal Public Health Threat

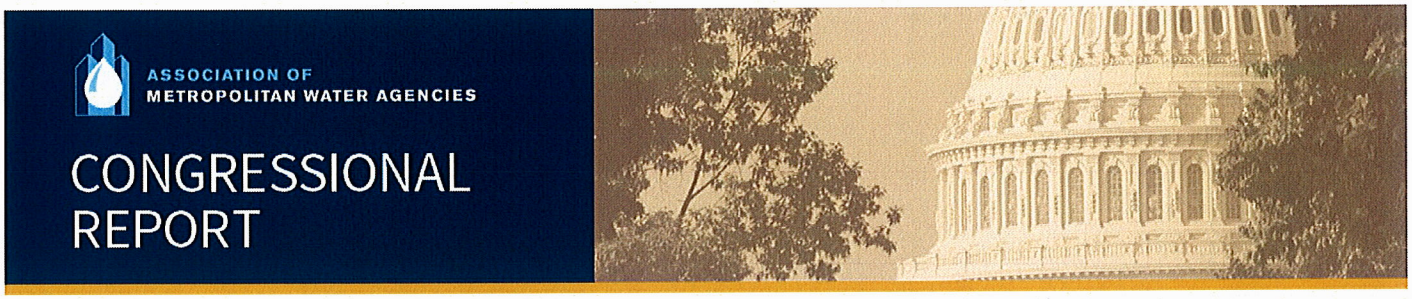
Modern testing capabilities allow researchers to identify compounds in water at concentrations of just a few parts per trillion – far beyond the measuring limits of only a few years ago. But as screening technologies continue to improve, more precise data should not be misinterpreted as a greater public health threat.

SDWA Outlines an Effective, Science-Based Evaluation and Regulatory Process

The Safe Drinking Water Act Amendments of 1996 direct EPA to follow a consistent process when considering new drinking water contaminant regulations. This process requires EPA to evaluate the public health ramifications of proposed new rules, consider the capabilities of water treatment technologies, and collect feedback from a wide range of stakeholders. These steps ensure that proposed drinking water regulations are well vetted, based on sound science, and will, if implemented, deliver meaningful public health benefits.

Congress Should Not Mandate Special Regulatory Rules for Certain High-Profile Contaminants

AMWA would have strong concerns about any proposal directing EPA to circumvent this process on a contaminant-by-contaminant basis. Bypassing SDWA's established regulatory process could undermine the public's confidence in the water supply and impose significant treatment costs on local communities without delivering public health benefits.



Congressional Report: January 2015

Republican Leaders Announce Priorities as 114th Congress Convenes

The 114th Congress formally convened in Washington on January 6, with Republicans taking control of both the House and Senate for the first time in eight years and potentially setting the stage for a series of protracted policy battles with the Obama Administration.

As the session began the chairmen of congressional panels with oversight of drinking water policy articulated their goals for the year ahead, which included a strong focus on government oversight and pushback against burdensome regulations. New Senate Environment and Public Works (EPW) Committee Chairman James Inhofe (R-Okla.) highlighted these topics in a discussion with the media this month, where he pledged to block EPA proposals Republicans believe could harm the economy – starting with the agency's controversial "Waters of the U.S." rule on the scope of federal authority under the Clean Water Act. The proposal will go under the microscope at a joint EPW hearing with the House Transportation and Infrastructure Committee that Inhofe said is planned for early February, and that event will likely be followed early this year with congressional votes to block the rule's implementation. President Obama, however, would be expected to veto any such bill, and at this point Congress appears short of the two-thirds majority to carry an override.

Keeping close tabs on EPA was also a common theme throughout a 2015 oversight plan released this month by the House Energy and Commerce Committee's Republican majority. The plan's "energy and environment" priorities include reviews of EPA's proposal to regulate greenhouse gas emissions under the Clean Air Act as well as other climate change initiatives. The committee also plans to "review [EPA's] funding decisions, resource allocation, grants, research activities, enforcement actions, relations with State and local governments, public transparency, and respect for economic, procedural, public health, and environmental standards in regulatory actions." New legislative efforts related to the Safe Drinking Water Act, over which the panel holds jurisdiction, are not cited in the plan.

Energy and Commerce will take a new look at cybersecurity issues this year, with the goal of ensuring protection while "avoiding one-size-fits all approaches." The panel also plans to review the Department of Homeland Security's newly reauthorized CFATS chemical facility security program. Meanwhile, additional priorities of Senate EPW include passage of a multi-year highway funding bill, a review of the Endangered Species Act and a reauthorization of the Toxic Substances Control Act.

From AMWA's perspective, securing FY16 appropriations for the new "Water Infrastructure Finance and Innovation Act" (WIFIA), as well as removing a provision that bars the use of tax-exempt financing on projects that receive WIFIA loans, will be a top 2015 priority. The association also plans to defend tax-exempt municipal bonds against proposals that would impose new taxes on muni bond interest (thus raising borrowing costs for communities), and will be active in helping shape legislation intended to prevent chemical spills into drinking water sources.

Sourcewater Protection, Chemical Security Bills Reintroduced in Congress

Members of the House and Senate opened the New Year by reintroducing dozens of bills that failed to attain passage during the last session of Congress. Several of these proposals that affect the water sector are detailed below, along with a prediction of each bill's

likelihood of passage during the 114th Congress:

- **H.R. 54, the "Frank Lautenberg Memorial Secure Chemical Facilities Act."** Sponsored by Rep. Shelia Jackson-Lee (D-Tex.), the bill would overhaul chemical security regulations by allowing DHS officials to require the use of "inherently safer technologies" (IST) at covered facilities. The bill would continue the exemption of drinking water and wastewater facilities from the CFATS program, but would direct DHS to "consult" with EPA in the course of new chemical security rulemaking on "security at drinking water facilities and wastewater treatment works." The bill is named in memory of former New Jersey Democratic Senator Frank Lautenberg, an "IST" proponent who died in 2013.
  Chance of passage: Low. *President Obama signed a four-year CFATS reauthorization into law in December, which should settle the issue for the foreseeable future. Republican leaders remain firmly opposed to any sort of "IST" mandate, so H.R. 54 has no path forward as long as the GOP controls Congress.*

- **S. 88, the "General Duty Clarification Act."** Sponsored by Sen. David Vitter (R-La.), the measure would prohibit EPA from using the General Duty Clause of the Clean Air Act to require implementation of "particular designs, approaches, or technologies" related to chemical handing or storage. Lawmakers previously introduced versions of the bill in response to calls by some environmental groups for EPA to use the General Duty Clause to impose "IST" mandates on facilities subject to the Clean Air Act's Risk Management Program (RMP), including some water treatment plants.
  Chance of passage: Moderate. *The Obama Administration recently directed federal agencies to explore options to increase chemical security using their existing regulatory authority, which led EPA to solicit comments from stakeholders about whether, and how, the agency could use the General Duty Clause to require "IST" reviews and substitutions at covered facilities. A subsequent decision by EPA to apply new "IST" rules through the RMP could prompt Congress to pass this legislation (a version of which also saw introduction in the House of Representatives last year) in response, though President Obama would likely veto the measure if it reached his desk.*

- **H.R. 212, the "Drinking Water Protection Act."** Introduced by Rep. Bob Latta (R-Ohio), H.R. 212 is the first of two bills introduced this year aiming to address cyanotoxins and microcystins in water supplies following last year's Lake Erie algal bloom that disrupted water service in Toledo, Ohio. The bill mirrors legislation Rep. Latta offered last year that would require EPA to develop a strategic plan to address the threat of cyanotoxins in drinking water sources. EPA would evaluate human health risks posed by drinking water contaminated with cyanotoxins, publish data about those cyanotoxins, recommend feasible water treatment options, and decide whether to publish health advisories for cyanotoxins found to represent a human health risk when present in drinking water.
  Chance of passage: Moderate. *Last year's version of the bill won backing from House Energy and Commerce Committee Chairman Fred Upton (R-Mich.), though it did not advance out of committee. This could be the bill House GOP leaders turn to if they feel pressure to pass cyanotoxins legislation in 2015.*

- **H.R. 243, the "Safe and Secure Drinking Water Act."** Sponsored by Rep. Marcy Kaptur (D-Ohio), this year's other Toledo-inspired bill would set a 90-day deadline for EPA to publish a health advisory on microcystins that includes recommendations on safe levels in drinking water supplies, feasible treatment techniques to achieve safe levels, and standardized testing procedures. EPA would have to make periodic reports to Congress on the status of its efforts determining whether to regulate microcystins in drinking water.
  Chance of passage: Moderate. *The U.S. Senate unanimously passed a similar bill in the closing days of the 113th Congress, so it has a built in base of support in the upper chamber. But House Republican leaders may prefer the other microcystins bill offered by a member of their own party.*

- **H.R. 291, the "Water in the 21st Century Act."** Sponsored by Rep. Grace Napolitano (D-Calif.), the bill would create a host of new programs to increase the sustainability of water supplies. Features of the bill include permanently authorizing EPA's WaterSense program to promote the use of water-efficient products; offering "water system mitigation and adaptation grants" to help water systems adapt to climate change (based on separate legislation supported by AMWA); establishing an innovative financing program (based on EPA's newly enacted WIFIA program) aimed at funding projects in Bureau of Reclamation states that address water recycling, reuse, desalination, and infrastructure renewal needs; investing in research into water-saving technologies and desalination; creating an open water data system; and helping local communities take steps to become better prepared for drought.
  Chance of passage: Low. While the bill would address a wide range of water sector needs, the bill carries a large price tag and Republican congressional leaders have little interest in creating a series of new government programs framed as a response to climate change.

- **Forthcoming version of the "Chemical Safety and Drinking Water Protection Act."** Reports from Capitol Hill say Sens. Joe Manchin (D-W. Va.) and Shelley Moore Capito (R-W. Va.) are working together to draft a new version of legislation they each introduced last year in response to the chemical spill that contaminated the drinking water supplies of Charleston, West Virginia. Few details on the upcoming draft have emerged, but last year's legislation would have created new state-based oversight programs targeting chemical storage facilities that could pollute nearby drinking water supplies. Last year's version also would have avoided new regulations or mandates specifically targeting drinking water systems.
  Chance of passage: Moderate. Though difficult to predict in advance of the release of a new draft bill, last year's bill from Sen. Manchin won approval of the Senate Environment and Public Works Committee. GOP concerns about creating new layers of bureaucracy prevented the measure from getting a vote on the Senate floor, but advancement is possible this year if Manchin and Capito can refine the proposal to address these objections.

President Obama Sends Cybersecurity Priorities to Capitol Hill

The White House this month released a legislative package that Obama Administration officials said focuses on their "three remaining [cybersecurity] priorities" that can only move forward with congressional approval. The package was sent to Capitol Hill with the recent cyber attack against Sony Entertainment still on the minds of many lawmakers – which could give cybersecurity legislation a new sense of urgency in Congress.

Obama's three-part proposal would encourage the private sector to share cyber-threat information with government offices and other stakeholders, set national standards requiring companies to notify consumers when their personal information is compromised, and strengthen law enforcement's ability to investigate and prosecute cyber crimes. Details of the three bills are available in these letters the administration transmitted to congressional leaders on January 13.

While members of Congress will now decide whether, and to what extent, to follow President Obama's cyber policy recommendations, Sen. Bill Nelson (D-Fla.) has already announced plans to introduce a bill based on the White House's data protection proposal. The draft bill and the White House plan would each require businesses to promptly notify consumers in the event of data breaches that expose sensitive information (such as home addresses, telephone numbers, birthdates, and electronic user names or account numbers) to hackers. The current drafts do not appear to apply to public or governmental entities (such as public water systems) that may hold such consumer data, but that could change if Congress takes up the proposal.

The President's most far-reaching proposal would reshape how the government engages with the private sector on cyber-threat information sharing. The plan would encourage private sector and non-federal governmental entities to voluntarily share certain computer data across sectors and with the National Cybersecurity and Communications Integration Center (NCCIC) at DHS. Participating stakeholders would receive liability protection against state and federal lawsuits related to cyber threat information they share with the government or other stakeholders pursuant to the act.

One component of the plan would establish "Information Sharing and Analysis Organizations" – separate from existing Information Sharing and Analysis Centers that serve critical infrastructure sectors – to facilitate the trading of cyber threat information among the

government and private sector. Federal officials have said the new ISAOs could organize in a multitude of ways (such as along regional lines or through common business interests) and not be tied to a particular sector like the ISACs.

The chairman and ranking members of the respective House and Senate homeland security committees reacted to the White House proposal somewhat cautiously, pledging to continue work on boosting cyber protections but stopping short of endorsing any particular administration proposal.

Two New Members Join Interior-EPA Spending Subpanel

The House subcommittee with jurisdiction over EPA spending will have two new Republican members this year, party leaders announced this month. The news came as House GOP leadership announced the full rosters of Appropriations subcommittees for the 114th Congress.

Rep. Ken Calvert (R-Calif.) will return as chair of the Interior, Environment, and Related Agencies Subcommittee. The panel is charged with producing a draft spending bill that includes EPA appropriations levels, and therefore plays a major role in determining spending levels for the Drinking Water and Clean Water State Revolving Fund (SRF) programs. This year the panel will also decide whether to include funding for the new Water Infrastructure Finance and Innovation Act (WIFIA) within the EPA spending bill.

In addition to Calvert, Republicans returning to the subcommittee are Reps. Tom Cole of Oklahoma, David Joyce of Ohio, and Chris Stewart of Utah. New to the panel this year are Mark Amodei of Nevada, and freshman Evan Jenkins of West Virginia. They effectively replace Reps. Jaime Herrera Beutler (R-Wash.) and David Valadao (R-Calif.), who were reassigned to the Energy and Water Development Appropriations Subcommittee.

The complete GOP rosters for all Appropriations subcommittees are posted on the committee's website. House Democrats have yet to announce their own Appropriations subcommittee member lists.

Sen. Boxer's Retirement to Reshape EPW Committee

California Senator Barbara Boxer, the top Democrat on the Environment and Public Works (EPW) Committee and one of Congress' most influential voices on environmental policy, will not run for reelection when her term concludes in 2016, she announced this month.

Boxer was elected to the Senate in 1992 and prior to that served in the House of Representatives. Before Republicans took the Senate majority this month following the November elections, she had served as chairman of EPW since 2007.

Sen. Boxer earned a reputation as a strong pro-environment liberal, and left her mark on a series of drinking water and infrastructure proposals. Most recently she championed last year's passage of the "Water Infrastructure Finance and Innovation Act" (WIFIA), and has cosponsored AMWA-backed legislation to help water and wastewater utilities adapt to climate change.

At other times Boxer has found herself at odds with some members of the water utility community. She has strongly backed imposing federal "inherently safer technology" mandates on water treatment plants, has pushed for new legislation to direct EPA to regulate levels of contaminants such as chromium-6 in water supplies, and opposed efforts to allow water systems to distribute annual consumer confidence reports electronically rather than through paper-copy mailings.

Boxer's seat is likely to remain in Democratic hands in left-leaning California, though the primary is expected to be fierce. Kamala Harris, the state's attorney general, has already announced her candidacy for the seat, and billionaire climate activist Tom Steyer is also mulling a run. More than a half-dozen current House members from California are also rumored to have interest in moving up to the Senate.

Sen. Tom Carper of Delaware is in line to become ranking Democrat on the EPW Committee after Boxer's departure. Carper is currently the top Democrat on the Homeland Security and Governmental Affairs Committee (a position he will have to give up if he takes over at

Congressional Report: February 2015

Congressional Report Stories Now Published on AMWA.net as News Happens

Beginning this month, AMWA will publish select *Congressional Report*, *Regulatory Report*, and *Sustainability and Security Report* stories online as the news breaks, and before the complete monthly editions of each newsletter are finalized. This new benefit – available to AMWA members who log into amwa.net – will deliver detailed policy news updates from Washington while the developments are still fresh.

AMWA members will continue to receive the full monthly edition of each newsletter via email.

To access the latest *Congressional Report* news updates, as well as full recent issues of the newsletter, log into amwa.net and visit http://www.amwa.net/periodical/congressional-report.

FY16 Budget Plan Includes WIFIA Dollars, DWSRF Increase

The fiscal year 2016 budget request sent to Capitol Hill by President Obama on February 2 includes both good news and bad news from a water infrastructure funding perspective. The good news is that the document would boost appropriations for EPA's Drinking Water State Revolving Fund (DWSRF) while also allotting funds for the agency to continue development of the new Water Infrastructure Finance and Innovation Act (WIFIA) loan program. The bad news is that the budget would impose new taxes on some interest earned on municipal bonds – likely causing muni bond rates to rise.

These were among the hundreds of funding and policy requests included in the President's $4 trillion plan to fund the federal government for the 2016 fiscal year. There is no chance of Congress approving the proposal in its entirety – in fact, much of the document will likely be ignored by Republican lawmakers – but the budget sheds light on the administration's spending priorities, and represents the starting point of the year's appropriations process.

The President's $8.6 billion plan for EPA would provide the DWSRF with $1.186 billion next year, $279 million above the program's enacted FY15 level and an amount that would represent its highest annual appropriation since the 2010 fiscal year. The White House proposal would even fund the DWSRF at a higher level than the Clean Water SRF, which would see its funding cut by $333 million to $1.116 billion. Funding for the two SRF programs combined would see a net reduction of $54 million under Obama's plan.

The budget would continue a requirement that states reserve between 20 and 30 percent of their DWSRF funding to support loan forgiveness in disadvantaged communities. States would not be required to set aside a specific portion of DWSRF funding for "green infrastructure" projects, while at least 20 percent of CWSRF dollars would have to be spent this way.

For WIFIA, the budget seeks $5 million for EPA "to begin developing the information necessary to lay the groundwork" for the new program. While the budget does not specify if any portion of the WIFIA funds would be available for EPA to offer as loans, at minimum the $5 million request is a vote of confidence in WIFIA that signals to Congress that the administration is behind the program. Combined with the nearly level funding requested for the SRFs overall (especially compared to the $541 million SRF cut the White

House requested last year), the budget should assuage fears that WIFIA could only receive funding at the expense of the SRFs.

Beyond the EPA budget, the President's plan includes a proposal that could lead to higher interest rates for communities that pay for infrastructure upgrades through municipal bonds. New tax policies proposed in the budget would "limit the value of itemized deductions and other tax preferences to 28 percent." In effect, this would result in new taxes on municipal bond interest for some wealthy investors.

To demonstrate, under current law an individual in the top 39.6 percent tax bracket effectively enjoys a tax reduction of 39.6 cents for every dollar of municipal bond interest earned in that bracket. But under the White House proposal the marginal tax reduction would be capped at 28 cents per dollar – making municipal bonds a less attractive investment for wealthy individuals and families. To make up for the reduced gains, investors would likely demand higher interest rates on municipal bonds – pushing borrowing costs higher for communities.

This is not the first time President Obama has sought to tax municipal bond interest, but his ongoing focus on the issue could put it on the table for negotiation if lawmakers attempt to hammer out a comprehensive tax reform plan this year. As this process plays out, AMWA and other municipal organizations will argue against any plan that would force communities to pay higher financing costs when undertaking water infrastructure improvements.

New Bond Programs, Army Corps Cuts Part of Budget Plan

Among the host of funding recommendations and new initiatives put forward in President Obama's FY16 budget plan were several new bond programs to finance infrastructure upgrades, alongside cuts to the U.S. Army Corps of Engineers. Some notable proposals include:

- A new category of private activity bonds (PABs), known as "qualified public infrastructure bonds." QPIBs could be used by private entities to finance infrastructure construction (including water and sewer systems), as long as the resulting project is owned by a state or local government and is regularly available for public use. State volume caps on PABs would not apply to QPIBs, which could allow them to attract higher levels of private investment. Interest earned on QPIBs would be exempt from federal income tax.
- A new America Fast Forward (AFF) bond program based on the expired Build America Bond program. Interest on AFF bonds would be taxable, but the government would offer issuers a subsidy equal to 28% of their interest costs. The bonds could be used to finance a wide range of infrastructure projects, including water and sewer improvements.
- $4.7 billion for the U.S. Army Corps of Engineers, $800 million below its FY15 funding level.
- $1.1 billion for the Bureau of Reclamation, a slight decrease from its FY15 appropriation of $1.13 billion.

The extent to which Congress may embrace these ideas is unclear, but in previous years lawmakers have rejected plans to cut Army Corps funding. The AFF proposal was also part of President Obama's FY15 budget plan, but it did not advance on Capitol Hill.

Congresswoman Plans Legislation Offering Utility Adaptation Aid

Rep. Lois Capps (D-Calif.) plans to "soon" reintroduce legislation that would offer funding to help water and wastewater utilities adapt their infrastructure to climate change, she announced during a House hearing on February 5.

Speaking at an Environment and the Economy Subcommittee hearing on toxic algal pollution, Rep. Capps pointed to warming temperatures as a contributing factor to the growth of algal blooms, which feed on nutrients washed into water supplies – particularly warm and shallow waters. Capps said the problem is only likely to get worse given warming temperatures associated with climate change.

Rep. Capps said the federal government must do more to help local utilities respond to these threats, and said her "Water Infrastructure Resiliency and Sustainability Act" could be part of the solution. An version of the bill introduced in the 113th Congress would offer competitive matching funds to water and wastewater utilities undertaking capital projects to adapt or build resiliency to

the consequences of climate change.

Staff to Rep. Capps have said she is aiming to reintroduce the legislation by late February or early March. Rep. Capps is scheduled to speak at AMWA's 2015 Water Policy Conference, and will likely explain the bill in more detail at that point.

Sen. Whitehouse Becomes Top Democrat on Water Subcommittee

Senator Sheldon Whitehouse of Rhode Island will serve as the top Democrat on the Environment and Public Works Committee's Fisheries, Wildlife, and Water Subcommittee, party leaders announced on February 10. The move bumps Maryland Senator Ben Cardin from his role as the top Democrat on the subpanel charged with oversight of the Safe Drinking Water Act and the Clean Water Act, though Sen. Cardin will remain a member of the subcommittee.

A member of the Senate since 2007, Whitehouse has a reputation as a staunch environmentalist and one of the chamber's leading advocates for taking action to combat global climate change. Water quality issues are frequently mentioned in Whitehouse's Senate remarks, though his focus is often on protecting oceans and coastlines from pollution and acidification tied to climate change.

Whitehouse's ascent to the ranking member position on the Fisheries, Wildlife, and Water Subcommittee is a result of the decision of EPW ranking Democrat Barbara Boxer (D-Calif.) to also claim the position of top Democrat on EPW's Transportation and Infrastructure Subcommittee, which will be tasked with producing a major transportation reauthorization bill this year. Boxer's move bumped Delaware Senator Top Carper from his place as the subpanel's top Democrat, which led Carper to take Whitehouse's place leading Democrats on the Clean Air and Nuclear Safety Subcommittee. Whitehouse then claimed Cardin's top spot on the water subcommittee.

The reshuffling, combined with Republicans taking over the Senate's majority, leaves Sen. Cardin with significantly less power than last year, when he served as chairman of what was then known as the Water and Wildlife Subcommittee. But Cardin is expected to remain active on water and wastewater issues; for example, he is soon expected to reintroduce legislation that would help water utilities adapt their infrastructure to climate change.

Democrats' complete EPW subcommittee membership lineup is available here. Committee Republicans have yet to announce their full rosters for each subcommittee, but freshman Alaska Senator Dan Sullivan will chair the Fisheries, Wildlife, and Water Subcommittee.

Lawmakers in Both Chambers Target Toxic Algal Blooms

Legislation designed to increase the understanding of toxic algal blooms saw activity in both chambers of Congress this month, as the House Energy and Commerce Committee unanimously approved legislation directing EPA to develop a strategic plan on the topic and similar legislation was introduced in the Senate. The bills are part of ongoing efforts in Congress to respond to last year's bloom in Lake Erie that contaminated the drinking water supplies of Toledo, Ohio.

As approved by the House Energy and Commerce Committee, the "Drinking Water Protection Act" (H.R. 212), would give EPA 90 days to develop and submit to Congress a strategic plan to assess and manage risks associated with algal toxins in drinking water supplies. The strategic plan would include a comprehensive list of algal toxins found to be harmful to human health when present in drinking water, summaries of these health affects, and a determination on whether EPA will publish health advisories or monitoring guidance for these algal toxins. Other parts of the strategic plan would include recommendations from EPA on feasible water treatment options to remove algal toxins. Rep. Bob Latta (R-Ohio) sponsored the bill.

While H.R. 212 won unanimous approval during the markup, Democratic members of the committee offered several amendments calling for EPA to develop additional strategic plans for drinking water risks related to drought, climate change, and hydraulic fracturing. Committee Republicans blocked these amendments from advancing, but pledged to work with Democrats on these issues in the future – potentially through legislation to reauthorize the Drinking Water State Revolving Fund.

Sen. Rob Portman (R-Ohio) introduced nearly identical legislation in the upper chamber this month. His bill, S. 460, carries the same

title as the House measure and would similarly direct EPA to develop, within 90 days, a strategic plan to address toxic algal blooms in drinking water sources.

Ohio's other Senator, Democrat Sherrod Brown, subsequently offered a second bill, the "Safe and Secure Drinking Water Act" (S. 462). Based on legislation the Senate approved last year, it would direct EPA to publish a health advisory for microcystin in drinking water and report on the level of microcystin in drinking water that is expected to be safe for human consumption. The bill would give EPA 180 days to complete the health advisory, and would also direct the agency to periodically report to Congress on whether the agency will promulgate a drinking water regulation for microcystin.

Due to the turnover in Senate leadership, Sen. Portman's proposal might stand a better chance of passage this year – especially if the House version wins approval in that chamber.

Senators Reject Water-Related Keystone Amendments

The U.S. Senate approved legislation (S. 1) late in January to approve the controversial Keystone XL pipeline, but not before voting on dozens of amendments proposed from both sides of the aisle. Several amendments that received votes would have affected the water sector, though none reached the 60-vote threshold required for adoption:

- Amendment 75, proposed by Sen. Ben Cardin (D-Md.), would have required Keystone's owners to notify governors and local officials about risks to drinking water sources that could arise in the event of a leak from the pipeline. Governors and local officials would then have an opportunity to request relocation of the pipeline away from water sources. The amendment failed by a vote of 37 – 61.
- Amendment 48, proposed by Sen. Kirsten Gillibrand (D-N.Y.), would have repealed a provision added to the Safe Drinking Water Act in 2005 that exempts hydraulic fracturing from EPA's underground injection control regulations. The amendment failed by a vote of 35 – 63.
- Amendment 115, proposed by Sen. Chris Coons (D-Del.) would have expressed the sense of Congress that "climate change is already impacting the safety and reliability" of the nation's critical infrastructure, and that the federal government should prioritize federal funding for climate resilient projects. It failed by a 47 – 51 vote.

Additionally, Sen. Jeff Merkley (D-Ore.) had filed an amendment to increase taxes on oil and gas producers and use the revenue to fund several infrastructure programs, including WIFIA and the Clean Water and Drinking Water SRFs. However, Sen. Merkley withdrew the amendment from consideration before it received a vote.

Most Senate Republican leaders criticized these and other amendments as distractions simply designed to slow down passage of the Keystone bill, but the votes put senators on record and may preview how they will approach similar water-related proposals in the future.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

CONSENT CALENDAR ITEM
March 18, 2015

TO: Board of Directors

FROM: **Administration & Finance Committee**
(Directors Thomas, Finnegan, Osborne)

Robert Hunter
General Manager

Staff Contact: Heather Baez

SUBJECT: **TRAVEL EXPENSES FOR LEGISLATIVE STAFF ON METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA (MET) INSPECTION TRIPS**

STAFF RECOMMENDATION

Staff recommends that the Board of Directors establish a policy regarding the hosting out-of-region legislative staff on MET Inspection Trips and the associated payment of travel costs which may include airfare, hotels, vehicles and meals.

COMMITTEE RECOMMENDATION

Committee recommended the Board authorize payment of $1404 in outstanding costs from the December 2014 inspection trip. Committee recommended additional discussion on future trips be held during the FY 2015-16 budget process.

DETAILED REPORT

Each year, MWDOC's four MET directors host inspection trips that provide elected and appointed officials, business and environmental community leaders, civic leaders, media representatives, educators, and interested stakeholders with the opportunity to learn about current and historical water issues affecting the region from both statewide and local

Budgeted (Y/N): No	Budgeted amount:	Core X__	Choice __
Action item amount: $1,401	Line item:		
Fiscal Impact (explain if unbudgeted): $1,401 in outstanding costs from the December 2014 trip have already been accrued and are not budgeted. MWDOC will not incur expenses from the March 2015 trip of up to ten DC staff. Pending the Board policy decision $10,000 may be included in next year's budget for this activity.			

perspectives. The tours also provide a first-hand look at the magnitude, complexity and needs of the water delivery systems by visiting numerous sites and facilities across the state.

For many years, MWDOC's MET Directors have hosted local legislative staff on various trips, however, no Capitol (Sacramento or Washington D.C.) staff have been included as MET covers transportation (from MWDOC or other MET member agency service area only), lodging (while on the trip), and food. Their current policy does not cover transportation to the service area, or lodging & meals before or after the trip.

COST BREAKDOWN

In December, Director Barbre invited two D.C. Capitol staff members on his Colorado River Aqueduct (CRA) trip. Alexandra Berenter of Congressman Calvert's office and Jacquelyn Gonzalez of Congresswoman Loretta Sanchez's office. Both staff members work on water related issues for their office and attending the CRA trip would be (and was) extremely beneficial to their work on and understanding California water supply issues. Ms. Berenter was in California already and only required a hotel the night before the trip started and the night it returned. Congresswoman Sanchez's office could not cover the travel expenses for Ms. Gonzalez, so she required airfare to California for the trip. She was able to stay with a family member who lives in Orange County, so she only required airfare to/from California. The incurred but unbudgeted costs for the December 2014 trip are:

Airfare - $1,121.20
Hotel - $279.80

Based on the success of the December trip, there was discussion with Director Barbre and staff to include more Capitol legislative staff in the future. These staff members are the individuals who work on water policy and related issues. Legislative staff in the district typically work on casework and community outreach – not policy. Having congressional staff that works directly on water policy on a daily basis attend an inspection trip to personally see what it is they are advocating for is a tremendous benefit for MWDOC. However, there can be a significant cost associated with this.

Currently, ten DC staff invitees have confirmed for the March 2015 State Water Project trip. They are providing their own air transportation and Metropolitan has agreed to pay for their hotel room in Sacramento as MET will not be incurring the normal airfare from John Wayne Airport to Sacramento. Director Barbre will personally shuttle the DC staff to LAX at the end of the trip, at his own cost.

POLICY TO CONSIDER

Staff recommends the Board discuss and establish a policy for accommodating legislative staff on future MET Inspection Trips. Possible questions and scenarios include:

- Should MWDOC invite non-OC based legislative staff?
    - With payment of associated costs by MWDOC
    - Only with no costs to MWDOC
- If so, then what expenses will be covered?
    - Hotel

  - Airfare
  - Rental car or ground transportation
  - Meals
  - Airport – There are no direct flights between Washington D.C. (Regan-National) and Orange County. Some invited staff members have requested to fly in/out of LAX. Should MWDOC establish a designated airport or not?
- Annual Budget and implied limit on number of invitees
- Staff time – The DC staff component takes a disproportionate amount of MWDOC staff time because of the non-standard nature of the logistics. If the Board of Directors endorses this activity then standard operating procedures dealing with lead time, invitations, approvals and confirmations are essential.

OTHER INFORMATION TO CONSIDER

Below is information provided by Director Barbre for your consideration:

"The Metropolitan Water District of Southern California (MET) provides numerous inspection trips as part of its public outreach. It is also a requirement of the MET Act. The Municipal Water District of Orange County (MWDOC) coordinates the trips for the four MWDOC MET Directors and guests are invited from the Orange County community with a preference given to various classifications of individuals, including elected officials, public policy makers, appointed officials and community leaders. Included as another classification are legislative assistants and field representatives to local, state and federal elected officials.

While it is easier to coordinate with local (Orange County based) field representatives for these inspection trips, the legislative staffs in Sacramento and Washington, DC are the individuals who generally work with the elected officials in the development of legislation and the coordination of responses to pending rules and regulations that are promulgated by various agencies. As such, there are significant benefits to be gained through providing the legislative staff with the opportunity to attend inspections trips.

Like the elected officials for whom they work, staff is covered by various rules which define gifts and permissible travel expenditures as it pertains to inspection trips. Because both MET and MWDOC are public agencies, these trips are considered educational and permissible trips.

On the state & local level, in some instances, the trips are reportable on Form 700's but are not considered gifts. As such, a dollar figure is included with the itinerary which denotes the value of the trip should it be deemed reportable. In addition, the contact information for the MWD legal department is included to ensure full transparency is provided.

On the federal level, the House of Representatives has ruled that "Participation on this (MET) inspection trip will not constitute a reportable gift and is not subject to gift limits under House Rule 25, clause 5(a)(3)(O)."

While MET has been very aggressive in providing State Water Project Trips for SACTO legislative and committee staff but has yet to provide the same opportunities for DC based legislative and committee staff.

The budgets of most Congressional offices allow for limited travel for legislative staff to the home District. In some instances, certain offices have augmented travel budgets for trips related to the committee on which the Member serves. As a result, in order to achieve full participation by members of DC legislative staff, it may be necessary to provide minimal travel expenses for legislative staff who would benefit from the inspection trips.

In December, **Alexandra Berenter** from the office of **Congressman Ken Calvert (R-CA – 42nd District)**, who chairs the House Appropriations subcommittee on Energy and Water and was the lead REP negotiator with Sen. Feinstein on a California Drought bill, participated in a Colorado River Aqueduct Inspection Trip. Her office was able to provide airfare to/from California but MWDOC was requested to provide lodging the night before and the night after the inspection trip. The cost was approximately $279.80. Also on the same trip was **Jacquelyn Gonzalez** from the office of **Congresswoman Loretta Sanchez (D-CA – 46th District)**, who has been a champion of Orange County water and infrastructure issues. Her office was unable to provide airfare and MWDOC was requested to provide the cost of the airfare, which was $1,121.20. Jacquelyn was from the District so there was no need to cover lodging as she was able to stay with family before and after the trip.

In both cases, because MWDOC is a public agency, the expenditures were proper and permissible and are not deemed to be improper gifts.

In order to increase the exposure of MET within our CA delegation and to allow more legislative staff to attend MET inspection trips, it seems proper to augment the public affairs budget to include a line item to cover limited travel expenses associated with MWDOC MET inspection trips. For the three day March 20-22 State Water Inspection Trip, Director Barbre will be tentatively joined by the following individuals:

Kyle Lombardi – Office of Congressman Kevin McCarthy (House Majority Leader)
Alexandra Berenter – Office of Congressman Ken Calvert (Appropriations Committee)
Jessica Butler – Office of Congressman David Valadao (Appropriations Committee)
Kevin Eastman – Office of Congressman La Malfa (Natural Resources Committee)
Chris Tudor – Office of Congressman McClintock (Natural Resources Committee)
Chris DelBeccaro - Office of Congressman Denham (Natural Resources Committee)
Jilian Plank & Caitlin Shannon - Office of Congressman Devin Nunes (Chair – Intelligence Committee; Ways & Means Committee)
Bryson Wong - Committee on Natural Resources subcommittee on Water, Power & Fisheries
Robert Rische – Office of Congressman Issa (Orange County representative; Judiciary subcommittee chair)

A recommended augmentation of $10,000 to the public affairs budget to cover miscellaneous travel expenditures for MWDOC MET inspections trips, and to limit it to legislative staff of the CA Congressional Delegation, the CA Senatorial Delegation, and relevant Senate and House Committee staff. All requests shall be directed to and approved by the General Manager in consultation with the MET Director hosting the trip."

From the U.S. Senate Website:

Travel Paid for by a Federal, State, or Local Government

Members, officers, and employees may accept travel that is paid for by the federal government, by a state or local government (including public universities), secured by the government under a government contract, or Native American groups with whom the federal government has entered into formal recognition of sovereignty. *See* Senate Rule 35.1(c)(16). Such travel is not subject to Committee pre-approval, nor does the travel need to be disclosed on the official's annual Financial Disclosure Report.

General Manager's Notes:

1. The "recommended augmentation of $10,000" is intended for next year's budget not for the current fiscal year.
2. MET has stated that they will be reestablishing trips specifically for DC legislators and staff and have obtained legal advice that the provision of this travel is appropriate, legal and does not trigger reporting requirements for House staff.
3. I personally support these trips as part of a well-defined national legislative program with an established budget and clear goals.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

CONSENT CALENDAR ITEM
March 18, 2015

TO: Board of Directors

FROM: **Public Affairs & Legislation Committee**
(Directors Barbre, Hinman, and Tamaribuchi)

Robert Hunter
General Manager

Staff Contact: Heather Baez

SUBJECT: **TRAVEL TO WASHINGTON D.C. TO COVER FEDERAL INITIATIVES**

STAFF RECOMMENDATION

Staff recommends the Board of Directors receives and files the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

DETAILED REPORT

For the third quarter of fiscal year 2014-2015, four trips have been appropriated:

- January (Director Barbre)
- February – 2 trips (Director Barbre)
- March (Director Barbre canceled trip for now)

The meetings and discussions have revolved around what Congress and the various Committees will do with respect to earmarking of projects and/or how to deal with the prohibition on earmarking as well as implementation of WIFIA, and drought and other water related legislation.

Budgeted (Y/N): Yes	Budgeted amount: $7,500 – 5 trips; 2014-2015 Fiscal year expenditure	Core X	Choice __
Action item amount:	Line item:		
Fiscal Impact (explain if unbudgeted):			

In working with MWDOC's Washington D.C. advocate, we have outlined the following goals for 2015:

1. Continue to meet with and educate the US House Members from Orange County and the two US Senate Offices on Water Issues affecting the District.
2. Monitor the EPA's implementation of the WIFIA rules and regulations regarding this loan program and where possible, offer assistance to the EPA so that the program is workable.
3. Submission of an Appropriations Request centered on asking the EPA to prepare a Report on what the costs of allowing tax free municipal bonds to be included in a WIFIA loan package—like the TIFIA Transportation Program currently allows. (*** Note – this letter was submitted to Senator Feinstein on February 18, 2015 ***)
4. Track and assist with California drought related legislation.
5. Allow California, and other states, to receive funds through the Army Corps water environmental infrastructure accounts.

Meetings with House and Senate staff will focus on these goals.

SUMMARY OF JANUARY AND FEBRUARY TRIPS

In January, Director Barbre traveled to Washington D.C. January 14-16, February 11-13 and February 24-27.

FISCAL IMPACT

The following is budgeted for fiscal year 2014/2015:

Washington Legislative Advocacy (5 trips) - $7,500 for directors.

- 4 trips have been taken so far this fiscal year (September, November, January & February)
- Total cost estimate so far for fiscal year 14/15: $7,704.79 (over budget)
- Total cost estimate for this quarter:
  January - $1,342.88
  February (2 trips) - $1876.38
  March – $402.19 (credit for canceled trip can be used for a different trip, but money has been spent)

Projecting out for 4th Quarter of fiscal year 2014/2015

- Two trips have been booked/scheduled by Director Barbre for April & May
  April - $868.47
  May - $993.00
  June – No trip scheduled at this time

Due to MWDOC's increased advocacy and outreach efforts, we are approximately $2,100 over budget in Washington Legislative Advocacy. Staff has recommended a larger travel budget to accommodate these efforts in fiscal year 2015/2016.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

CONSENT CALENDAR ITEM
March 18, 2015

TO: Board of Directors

FROM: **Public Affairs & Legislation Committee**
(Directors Barbre, Hinman, and Tamaribuchi)

Robert Hunter
General Manager

Staff Contact: Heather Baez

SUBJECT: **TRAVEL TO SACRAMENTO TO COVER STATE INITIATIVES**

STAFF RECOMMENDATION

Staff recommends the Board of Directors receives and files the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

DETAILED REPORT

For the third quarter of fiscal year 2014-2015, four trips have been taken, one more is scheduled:

- January (Heather Baez)
- February – 2 trips (Heather Baez)
- March – 2 trips (Heather Baez)

The majority of the Sacramento travel revolves around ACWA's State Legislative Committee (SLC) which is comprised of 40 members (four members from each of our 10

Budgeted (Y/N): Yes	Budgeted amount: Sacramento Legislative Advocacy - $1,600 – 4 trips; ACWA Legislative Symposium $1500 2014-2015 Fiscal year expenditure	Core X	Choice __
Action item amount:	Line item:		
Fiscal Impact (explain if unbudgeted):			

geographic regions) and recommends official state legislative policy positions on behalf of the Association. Committee members review relevant introduced and amended legislation, develop positions and provide recommendations to the Board of Directors regarding ballot measures and other major statewide policy issues. This allows MWDOC to be more engaged at the state level as well as within our own region.

The State Legislative Committee meeting typically runs two hours, and staff uses the remainder of the day to meet with legislative and committee staff.

In working with MWDOC's Sacramento advocates, we have outlined the following goals for 2015:

1. Continue to meet with and educate the Orange County delegation on Water Issues affecting the District and region as a whole.
2. Secure support and potential funding for the Doheny Desalination Project and other reliability efforts in Orange County.
3. Monitor, track, and assist with Prop 1 implementation guidelines
4. Monitor, track and respond to related legislation outlined in MWDOC's Legislative Policy Principles approved by the Board in January 2015.
5. Other issues as directed by the Board.

Meetings with members of the Orange County delegation, committee staff and other involved parties focus on these goals.

SUMMARY OF JANUARY AND FEBRUARY TRIPS

In January, Heather attended the ACWA State Legislative Committee (SLC) meeting, met with Senate Republican Caucus Natural Resources and Water Consultant, Todd Moffitt, Christina Hulick, Legislative Aide for Assemblyman Bill Brough, and Mark Reeder, Chief of Staff for Senator Janet Nguyen.

February's trips included:

Water 2015 sponsored by Capitol Weekly, ACC-OC/OCBC Sacramento Advocacy Trip, and the ACWA SLC Meeting (same week/plane ticket as ACC-OC/OCBC Trip), plus meetings with members of the Orange County delegation & staff.

March trips included the ACWA Legislative Symposium and the ACWA SLC meeting, CSDA's Public Works Coalition (re: CEQA legislation) so far.

FISCAL IMPACT

The following is budgeted for fiscal year 2014/2015:

Sacramento Legislative Advocacy (4 trips) - $1,600 for staff.

- 5 trips have been taken so far this fiscal year (October, January, February & March)

- Total cost estimate so far for fiscal year 14/15: $2,200 (over budget)
- Total cost estimate for this quarter:
  - January - $550
  - February (2 trips) - $800
  - March – (2 trips) - $800

Projecting out for 4th Quarter of fiscal year 2014/2015

- Upcoming trips:
  - April 10
  - May 1
  - June 5
  - June 26

We are projected to be approximately $2,800 over budget for this fiscal year. Due to our increased advocacy and outreach efforts in both Sacramento and Washington D.C., staff has recommended a larger travel budget for fiscal year 15/16.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 9-1

ACTION ITEM
March 18, 2015

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Osborne, Barbre & Hinman)

Robert Hunter
General Manager

Staff Contact: J. Berg
WUE Programs Manager

SUBJECT: **Bureau of Reclamation CALFED Water Use Efficiency Grant Resolution**

STAFF RECOMMENDATION

Staff recommends the Board of Directors adopt the proposed resolution in support of MWDOC's 2015 CALFED Water Use Efficiency grant application to be submitted to the Bureau of Reclamation by March 20, 2015.

COMMITTEE RECOMMENDATION

Committee concurred with staff recommendation.

DETAILED REPORT

In January 2015, the Bureau of Reclamation released its "Bay-Delta Restoration Program: CALFED Water Use Efficiency Grants for FY2015" Funding Opportunity Announcement (FOA). The objective of this announcement is to invite proposals to leverage investments and resources by cost sharing with Reclamation on projects that save water, improve energy efficiency, address endangered species and other environmental issues, and facilitate water transfers to new uses. A total of $8 million is available for project awards within the state of California which is within the Mid-Pacific Region of the Department of the Interior, Bureau of Reclamation. The Bureau may award up to $750,000 per agreement and estimates approximately 4 to 12 agreements will be awarded.

Staff will be submitting an application proposing a Comprehensive Landscape Water Use Efficiency Program which will provide incentive funding to promote landscape transformation for highly visible sites focusing on schools, public spaces, and roadways. The FOA requires all applications to include an official Board Resolution supporting the grant application. The proposed Resolution containing the required content is attached for your consideration.

Budgeted (Y/N): N/A	Budgeted amount: **N/A**	Core __	Choice _X_
Action item amount: N/A	Line item: **N/A**		
Fiscal Impact (explain if unbudgeted): N/A			

RESOLUTION NO _____
RESOLUTION OF THE BOARD OF DIRECTORS OF MUNICIPAL WATER DISTRICT OF ORANGE COUNTY SUPPORTING A BUREAU OF RECLAMATION 2015 BAY-DELTA RESTORATION PROGRAM:
CALFED WATER USE EFFICIENCY GRANT APPLICATION

WHEREAS, the Municipal Water District of Orange County submitted an application to the Bureau of Reclamation for funding for an Comprehensive Landscape Water Use Efficiency Program: Highly Visible Sites to improve urban landscape water use efficiency in the Municipal Water District of Orange County service area,

WHEREAS, the Municipal Water District of Orange County is committed to developing and implementing a comprehensive water use efficiency program designed to meet our local water supply reliability goals, comply with the Best Management Practices for urban water conservation in California, and exceed the Governor's call for a 20% reduction in urban per capita water use by 2020,

NOW, THEREFORE, BE IT RESOLVED, that the Municipal Water District of Orange County Board of Directors designates Robert J. Hunter, General Manager, as the official who has reviewed and supports the application submittal and the legal authority to enter into an agreement on behalf of the District, and designates Joseph M. Berg, Water Use Efficiency Programs Manager, as the District's representative to sign the progress reports and approve reimbursement claims.

NOW, THEREFORE, BE IT FURTHER RESOLVED, that the Municipal Water District of Orange County Board of Directors assures its capability to provide the amount of funding and in-kind contributions specified in the funding plan.

NOW, THEREFORE, BE IT FURTHER RESOLVED, that the Municipal Water District of Orange County will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

Said Resolution was adopted on March 18, 2015, by the following roll call vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

I HEREBY CERTIFY the foregoing is a full, true, and correct copy of Resolution No. ____ adopted by the Board of Directors of Municipal Water District of Orange County at its meeting held on March 18, 2015.

Maribeth Goldsby, Secretary
Municipal Water District of Orange County

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 9-2

ACTION ITEM
March 18, 2015

TO: **Board of Directors**

FROM: **Planning and Operations Committee**
(Directors Osborne, Barbre, Hinman)

Robert Hunter, General Manager

Staff Contact: K. Seckel/R.Bell

SUBJECT: **Two NEW OC Water Reliability Study Authorizations – (A) Analysis and Mapping of Seismic Hazards and (B) Facility Vulnerability and Recovery Assessment – Authorization for Professional Service Agreements**

STAFF RECOMMENDATION

Staff recommends that the Board of Directors authorize the General Manager to enter into two professional service agreements: (1) GeoPentech, Inc in the approximate amount of $77,600 to perform Part A Analysis and Mapping of Seismic Hazards and (2) G&E Engineering in the approximate amount of $41,000 to perform Part B Facility Vulnerability and Recovery Planning (the dollar amounts are subject to final negotiation). Both of these efforts will be utilized in the OC Water Reliability Study work. The additional work was presented to the OC Water Reliability Study Workgroup subcommittee who concurred with the approach and the consultant selection.

COMMITTEE RECOMMENDATION

The Committee raised a number of questions regarding the Seismic Study efforts, including:

- Are these efforts NEW and are they needed NOW?
- Will the consultants evaluate potential impacts on the seawater intrusion barriers?

Budgeted (Y/N): Y	Budgeted amount: $340,000	Core **X**	Choice
Action item amount: $120,000	Line item: Engineering + Carryover from the last fiscal year		
Fiscal Impact (explain if unbudgeted): The budgeted amount is comprised of this year's budget in Programs 21 and 23 including the carryover from the prior fiscal year. So far, approximately $220,000 has been encumbered for the CDM Smith towards the OC Water Reliability Study work. While this specific seismic work was not anticipated, the budget for the OC Water Reliability Study had other components that will not be done or that will carryover into the next fiscal year and can be included in the budget for 2015-16.			

- A question from OCWD noted that detailed analyses for each major well would be needed, otherwise the information coming from the consultants would be inadequate.

Staff responded that both SYSTEM (emergency, such as earthquakes) and SUPPLY reliability evaluations were always included in the Scope of Work for the OC Water Reliability Study. The SYSTEM analysis was to be conducted primarily by MWDOC staff. In 2005 MWDOC utilized an outside firm to conduct seismic mapping and staff developed a conceptual model of the potential impact to local wells. Recently, MWDOC was advised that the 2005 mapping was outdated and, via other discussions, staff learned of more refined methods of estimating the impacts to wells and other facilities based on work from the two specialized consultants that would improve the credibility of the work being performed. The two authorizations being requested will provide an updated analysis and mapping of seismic hazards and will provide earthquake engineering expertise for assessment of vulnerability to local wells, pipelines and regional pipelines from seismic forces. The information will be used to plan for mitigation and recovery to improve the overall resiliency of Orange County's water supply systems. Staff's belief is that the information to be developed by the consultants is important for us to consider in Orange County and will provide an indication of the level of risk to wells and seawater barrier facilities and other local facilities.

Because of the potential to go after grant funds and to maintain the overall schedule for the OC Water Reliability Study, it was emphasized it is important to complete this work now rather than postponing it to a later time. On a vote of 2-1, the Committee recommends that the Board of Directors approve the subject new authorizations for the Orange County Water Supply Reliability Study.

SUMMARY

In the process of starting the SYSTEM portion of the OC Reliability Study by MWDOC staff, staff confirmed that the 2005 seismic mapping was **NOT** sufficient to prepare the SYSTEM reliability analysis at the technical level desired. Staff conducted research into NEW approaches that would provide the ability to analyze seismic impacts to facilities, particularly wells in OC, to determine the level of GAPS between emergency supplies and emergency demands that might occur. Staff prepared a Scope of Work, received four proposals, and now is recommending that approximately $120,000 of technical work be completed to assist in the reliability analysis. Staff believes the work is well founded in planning for our water future in OC and should be pursued. The OC Water Reliability Workgroup and the consultant selection subcommittee concurred with the recommended work. We believe this is the first time that technical work on analyzing potential impacts to wells has been approached. OCWD and SJBA staff have been supportive of the approach.

DETAILED REPORT

As part of the OC Water Reliability Study, MWDOC staff took on the responsible for completing the SYSTEM reliability assessment and planning for the OC Water Reliability Study Scope of Work. Staff planned on using the existing seismic mapping/shaking data

from 2005 for the analysis. The Scope of Work for the OC Water Reliability Study included only limited involvement from CDM-Smith, our main consultant, to provide assistance to MWDOC on the approach for estimating well and pipeline impacts to local agency systems based on ground accelerations generated by five potential faults in the County and three major faults outside of the County. Staff met with CDM-Smith and their geotechnical engineer and seismic expert and OCWD staff to discuss the best manner to approach this work. At the meeting, we learned that the 2005 mapping information on seismic ground accelerations in OC had been significantly revised in recent years as much progress has been made in the field of seismology and analysis of shaking intensities based on analytical improvements. In general, the anticipated peak ground accelerations and peak ground deformations now being estimated are much higher than the prior estimates prepared in 2005 with new seismic design criteria and codes being developed.

The second item discussed was how to estimate potential damage to wells without having to complete a specific assessment on each well. There are approximately 185 major production wells in the County; damage from various shaking intensities could range from breaks in the wellhead piping that might require only simple repairs, loss of power, loss of disinfection facilities, and actual casing failures or misalignments that could render susceptible wells to outages for 6 to 9 months or more. In conjunction with these discussions between OCWD, MWDOC and CDM-Smith, we were advised that technical (structural, mechanical and geotechnical) earthquake engineering expertise should be sought to help evaluate how many wells in the groundwater basin may be at risk and what possible failure modes might occur from major earthquakes. We were advised that wells located in areas susceptible to earthquake induced liquefaction might be severely damaged and knocked out of service. These are areas where depths to first water are shallow, extending to depths to 50 feet below ground surface, and the soil structure is not well consolidated.

Based on the NEW information, staff began further research into an updated assessment for the entire county with particular emphasis on potential impacts to water supply wells and regional transmission pipelines using new and informed seismic vulnerability, mitigation and recovery planning information. Not only knowing what facilities might be vulnerable, but also knowing what improvements can be made to mitigate shaking or what steps might be taken to expedite recovery efforts would also be important to the resiliency of the local water supplies in OC. The technical work may also form the basis of grants for improvements to SYSTEM reliability in OC.

Staff met with engineering staff from MWDSC, spoke with engineering staff from LADWP and the California Department of Water Resources to discuss seismic vulnerability to the imported water system and planning efforts to better understand seismic risks, areas of needed improvements, and outage potential and recovery assessments. Staff has also spoken with Dr. Lisa Grant, seismologist at UCI and Dr. Lucy Jones, seismologist with the USGS concerning earthquake risks to the imported water system and to OC.

Staff identified several consultants with differing specialties that could help us with this type of work and discussed various approaches to conduct this work. Based on these discussions and review of available information, staff developed a scope of work for the “Seismic Vulnerability, Mitigation and Recovery Planning” work and identified consultants

who have the most up to date information, core expertise, qualifications and capabilities to perform this work. The work was divided into (A) Analysis and Mapping of Seismic Hazards and (B) Facility Vulnerability and Recovery Assessment. Parts A & B require different qualifications and capabilities from the consultants. The answers we are trying to ascertain through this work has never been undertaken to this level before in OC, but based on the recent discussions, the work will help to address several questions related to potential earthquake risks to the major water supply facilities in OC and in particular, the risk to wells. The information developed will be directly applicable to help guide the water supply reliability planning and earthquake preparedness activities in OC. In addition, the new work will provide information for the 2017 update to the Multi-Hazard Mitigation Plan.

To solicit consultant proposals for this work, staff prepared and issued a Request for Proposal (RFP) to firms identified as having core expertise in two facets of needed work: (A) Analysis and Mapping of Seismic Hazards and (B) Facility Vulnerability and Recovery Assessment. As noted, staff coordinated and received comments from several agencies and experts in preparation of the scope of work.

MWDOC received four excellent written proposals on February 16, 2015 from:

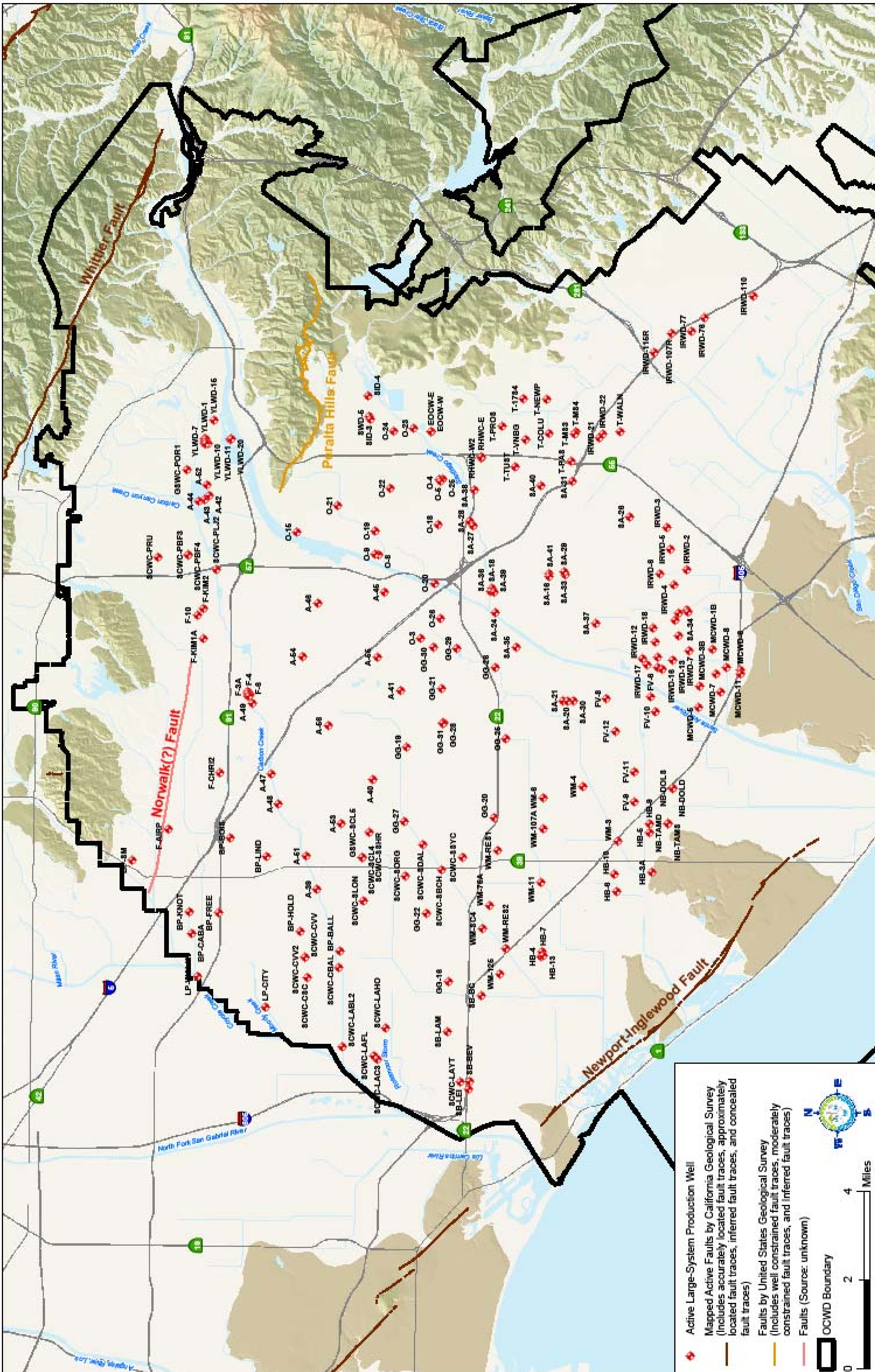
- Earth Consultants International (Part A)
- GeoPentech (Part A)
- G&E Engineering (Part B)
- Ballantyne Consulting (Part B)

The first two consultants are known to us and have done quite a bit of work in OC. The two latter consultants are both specialty consultants who spend essentially 100% of their time in analyzing potential impacts from seismic shaking and designing mitigation for key facilities. Mitigation can include redundancy in facilities, strengthening of facilities or designing flexibility into the performance of facilities, but it can also involve efforts to speed up recovery and restoration of facilities. Both consultants have a methodology for analyzing key facilities based on ground shaking, the local geology and the design of the facilities. Both consultants have analyzed the impacts from prior earthquakes and should be able to help us to better understand our risk profile. The purpose of this work is not to individually analyze the approximate 185 large water supply production wells in the county, but to conduct a regional approach to determine what level of risks might be present and to provide information to help improve the resiliency of OC's water supply system. The results could say that we only have limited exposure to well failures or that the failures might be located in certain areas where the geology poses additional concerns or it might say that this is a really big issue and it might require follow-up work. This type of work has never been undertaken in OC and until just recently, we were not familiar with the experts that conduct this type or work.

After receiving and reviewing the proposals, additional supplementary information was requested on Part B to more fully detail the proposed approach and methodology to assess potential damages to water supply wells, especially in areas of potential liquefaction. Those revised proposals were received on February 23. The OC Water Reliability Study Work Group Selection Committee consisted of representatives from OCWD, SMWD, Anaheim and CDM Smith as well as MWDOC staff. The selection committee concurred with the

evaluation and recommended selection of GeoPentech for PART A and G&E Engineering for Part B. It is estimated that this work will require about four months to complete. The estimated cost for this work is in the range of $120,000 plus/minus $20,000 as final negotiation of the scope will be necessary. This work is a core function and is included as part of the OC Water Reliability Study work.

The GeoPentech and G&E Engineering proposals are attached. Also attached is a graphic showing the locations of the major production wells in the groundwater basin.


Whittier Fault
Peralta Hills Fault
Norwalk(?) Fault
Newport-Inglewood Fault
North Fork San Gabriel River
Active Large-System Production Well
Mapped Active Faults by California Geological Survey (Includes accurately located fault traces, approximately located fault traces, inferred fault traces, and concealed fault traces)
Faults by United States Geological Survey (Includes well constrained fault traces, moderately constrained fault traces, and Inferred fault traces)
Faults (Source: unknown)
OCWD Boundary
0
2
4
Miles
N
E
S
W

Proposal for
North Orange County Water Supply System Reliability Plan
Seismic Vulnerability and Recovery Assessment

Prepared for:
MWDOC

Prepared by:

G&E Engineering Systems Inc.
6315 Swainland Rd
Oakland, CA 94611
(510) 595-9453
eidinger@geengineeringsystems.com

February 23, 2015

1.0 Task Outline

This proposal describes engineering services to be provided by G&E Engineering Systems Inc. for the Seismic Vulnerability and Recovery Assessment of MWDOC's North Orange County Water Supply System. This proposal is submitted in response to the RFP for the Project dated February, 2015 (Final Draft dated February 11 2015); and updated to reflect your request for more information dated February 23, 2015.

This scope of work is in response to the "Part B" element of the RFP. We assume that MWDOC will retain a third part to perform the "Part A" element of the RFP.

The intent of the work is to provide MWDOC with three main deliverables:

- Task B.1. What will happen to the water supply system, given a series of possible scenario earthquakes, for the water system in its current configuration? How much damage will there be? Which pipelines / wells will be damaged? What will be the impact on water delivery to customers (for potable water, for fighting post-earthquake fires)? How long will the outages last? Who will be best able to make the needed repairs? What will be the direct and indirect economic impacts?

- Task B.2. What strategies can MWDOC adopt now to reduce the impact of earthquakes? This might include pipeline upgrades, well improvements; additional storage; changes in emergency response strategies; addition of spare parts; etc. How much will these cost? Will these be cost effective?

- Task B.3. Reports, Meetings and Communication of Findings

UPDATE. On February 23 2015, MWDOC requested additional information with regards to the potential of liquefaction in Orange County, and how that might impact wells. This information is provided in this revised proposal, indicated by text in bold italic format.

Part A: Seismic Hazard Assessment

Part A is intended to be performed by others. Herein, we only highlight the key work to be done, and include the effort needed by G&E to interface with the Part A contractor.

Task A1. Characterize NOC and Nearby Active Faults.

Prepare maps of the Whittier, Puente Hills, Peralta Hills, San Joaquin Hills and Newport Inglewood faults (local faults) and San Andreas, San Jacinto and Elsinore (regional faults) in GIS format (presumed to be .shp file, ArcGIS 10.2). Include shape files showing locations of major water supply facilities (wells, treatment plants, regional water distribution pipelines).

Deliverable to G&E: Shape Files with GIS information, including all attributes. Report with description of the faults, seismicity, etc. G&E cost: $0.

Task A.2. Characterize Southern California Active Faults.

Describe ruptures along the San Andreas, San Jacinto and Elsinore faults that might damage MWDSC and DWR main facilities (Colorado River Aqueduct, Edmunston Pumping Plant, C.V. Porter Tunnel and East Branch Facilities, as well as MWDSC main feeders to Orange County.

Note: G&E is very familiar with many facilities of the State Water Project and the MWDSC. G&E has performed seismic inspections and evaluations of SWP facilities (canals, pipelines, pump stations, substations) and MWDSC facilities (water treatment plants, tunnels, pipelines). G&E has reports on the damage potential to power supply for Edmunston pumping plant.

Deliverable to G&E: Report with description of the faults, seismicity, and upstream MWDSC and DWR facilities. G&E cost: $0.

Task A.3. Provide Currently Available MCE Earthquake Scenarios for NOC.

Provide maps with PGA, PGV motions for selected scenario earthquakes. Characterize surface faulting (location, width of zone, amount of offset, distribution of offset motions) based on site specific information.

Provide maps with liquefaction susceptibility near regional water treatment plants, wells and transmission pipelines.

UPDATE. On February 23 2015, MWDOC requested additional information with regards to the potential of liquefaction in Orange County, and how that might impact wells. Under Task A.3, G&E requests that the Part A contractor provide the following:

- ***Well logs, historical, throughout Orange County, showing depth to ground water.***
- ***Interpretation of how the depth to water affects the potential for liquefaction (with PGA triggers)***
- ***Interpretation of Liquefaction Hazard maps develop by the CGS (or others, including URS) with regards to quantified interpretation as to qualitative terms like "High, Moderate, Low" with regards to percentage of areas within a uniformly graded area that can liquefy.***
- ***G&E has developed this type of information in the past, and to the extent that the Part A contractor needs to work collaboratively with G&E, G&E will provide the interface, meetings and technical reviews as part of an optional PART B work effort.***

In addition, the issue of liquefaction along shallow creeks should be generally refined as compared to what is available in available regional liquefaction maps. We will request the Part A contractor to refine these maps and models to establish permanent ground deformation (PGD) estimates at the depth or below of the regional transmission pipelines next to regional creeks; PGDs at elevations higher than the transmission pipelines are generally not damaging to the pipes.

Deliverable to G&E. All maps will be provided in GIS format (.shp files). A report will be provided that describes the basis for the seismic ground shaking hazards (PGA, PGV, spectra). G&E will use liquefaction triggering models to convert the liquefaction susceptibility into permanent ground deformations that are relevant to projecting damage for transmission pipelines, wells and water treatment plants. G&E cost: included with Part B.

G&E cost: optional, up to 40 hours professional time to work collaboratively with the Part A contractor to establish suitable liquefaction models.

Task A.4. Interface with Part B Consultant (G&E).

Prepare GIS maps and corresponding reports showing hazards and risk and facilities.

G&E cost: $0.

Part B: Facility Vulnerability and Recovery Planning

The intent of the Part B work is to provide MWDOC with the following deliverables:

- Task B.1. What will happen to the water supply system, given a series of possible scenario earthquakes, for the water system in its current configuration? How much damage will there be? Which pipelines / wells / treatment plants will be damaged? What will be the impact on water delivery to customers (for potable water, for fighting post-earthquake fires)? How long will the outages last? Who will be best able to make the needed repairs? What will be the direct and indirect economic impacts?

- Task B.2. Recommend strategies can MWDOC adopt now to reduce the impact of earthquakes. This might include pipeline upgrades; well improvements; additional storage; changes in emergency response strategies; addition of spare parts; etc. How much will these cost? Will these be cost effective?

- Task B.3. Reports and Meetings and Communication of the Findings

Task B.1. Case Study and Recommendations for Seismic Resiliency.

Data collection. Mr. Eidinger will attend a meeting with MWDOC with at project outset, to conduct a project kickoff meeting. Prior to this meeting, Mr. Eidinger will provide a list of data to be collected. Generally, this sill include:

- MWDOC and member agency water supply planning reports.

- GIS of pipelines, wells and water treatment plants. If available, GIS of distribution systems (not essential for the current work, but helpful for providing maps and considering concurrent damage issues).

- Plans and profiles (original design drawings) for major transmission pipelines. Leak history on these pipelines.

- Workforce capability to make post-earthquake repairs (in-house, and using contractors)

Field inspection. Mr. Eidinger will visit well fields to inspect a sample of installation practices. This will include the well head; power supply; use of rigid and flexible couplings and pipelines; issues related to liquefaction. Including the project kickoff meeting, this is planned for two days in the field to perform facility inspections.

Seismic Evaluation. Mr. Eidinger will evaluate the likely performance of the following transmission facilities for each scenario earthquake:

- Transmission pipelines. Damage due to ground shaking; liquefaction; fault offset. Describe style of damage (leaks to appurtenances like air release and blow offs, branch connections); breaks on the main barrel of the pipe (joint pull parts; failure of wires in prestressed concrete cylinder pipes; wrinkling of steel pipes; etc). Describe damage locations. For each major reach of pipe, describe likelihood that pipe will retain its function after the earthquake (still provides some flow) or require shutdown and repair. Describe repair strategies (manpower, work required, equipment required). Describe repair times, based on total system-wide damage and best strategy to restore the system to as many customers as possible.

- Wells. Describe potential for changes to the aquifer (rises / drops, change in water quality). Describe damage potential to well casings at depth and in the top 30 feet. Describe well head damage potential, including differential settlements. Describe potential for loss of offsite power, and bus connections / quick connect couplings available needed to restore power using permanent or portable emergency generators. Describe damage potential for pipelines from the wellhead to treatment (local tanks, etc.) and to transmission facilities. Describe availability of portable generators from third parties (mutual aid, contractors, etc.) versus need to have self-owned facilities.

- Water Treatment Plants. Describe damage potential for: operations buildings; filters; sedimentation basis; chemical systems (tanks, buried pipes); pumps; tanks; etc.

UPDATE. On February 23 2015, MWDOC requested additional information with regards to the potential of liquefaction and subsequent damage to wells in Orange County.

RESPONSE. G&E has worked with nearly every major water agency around the world over the past 25 years that have undergone earthquakes. Many of these agencies have wells. Many of these wells worked successfully after the earthquake (once power was restored); but some wells failed partially or entirely.

As part of the current effort, we understand that there may be as many as 500 wells in Orange County. We will request from MWDOC with data collection for as many wells as possible, including the following:

- ***Style of well: casing type (diameter, wall t, joinery), depth to ground water; screen / slots type; pump type (submersible or shaft driven); style of seals; style of casings in the top 30± feet; and to the extent available, original well logs, plans and profiles of well head facilities (including pipes, local settling tanks, water quality / treatment processes). With this information, field inspection will be done (as listed above) for selected wells that are more important and in***

more sensitive locations (mapped in high ground water table locations with moderate to high liquefaction potential).

- ***Historical well performance (in terms of initial yields and latest yield information, and ongoing maintenance actions). Wells that have already undergone more than 25% loss of yield, attributed other than to drawdown of the aquifer, may already have some amount of sanding / obstruction, and are more risky with regards to accelerated drop in yield after strong ground shaking.***
- ***The potential for damage in an earthquake to a well will depend on site-specific information. Two flavors of damage will be considered: changes to the aquifer and damage to the well itself.***
- ***As part of this effort, we will develop case histories of well success and well failures from past earthquakes. This will include shallow wells with thin walled casing pipes (considerable amount of damage in past earthquakes) as well as deep wells (often 500 feet or deeper). Case histories will include:***
    - ***Performance of Orange County wells in past earthquakes (1933 Long Beach, 1986 Offshore; 1987 Whittier; 1994 Northridge, etc.). While the damage to Orange County wells in these particular events may be limited / nil, this information will provide a firm benchmark as to the minimum levels of shaking at which no damage occurs.***
    - ***Performance of wells in the recent August 2014 Napa earthquake. In Carneros Valley, all water is supplied by wells. Levels of shaking in this area were high (PGA > 0.4g common), and the area is mapped as having high liquefaction potential (USGS). Damage / non-damage and water quality issues from these well owners is being collected by DWR, and we will tabulate the available performance.***
    - ***Performance of wells in the 2010 and 2011 Christchurch New Zealand earthquakes. The water supply in Christchurch is provided entirely by wells, with more than 180 wells in service at the time of the earthquakes. Portions of Christchurch liquefied. About 25% of all wells suffered damage, ranging from repairable (at the well head, often needed 100 to 200 manhours of effort) to non-repairable (at depth, requires a new well to be drilled). Sanding, damaged casings, well head damage all occurred. We will tabulate this damage for the style of wells in Christchurch, and use that to correlate to the type of wells in Orange County. G&E has worked extensively with the Christchurch City Council (Water Department) since this earthquake, and has visited with the water department 5 times.***
    - ***Performance of wells in the 1989 Loma Prieta earthquake. More than 100 wells were exposed to moderate to strong ground shaking, including those in the City of San Jose water department, the City of Santa Clara water department, the city of Sunnyvale water department, Cal Water (Los Altos water department), Palo Alto water department, East Palo Alto water department; Stanford University water department. Mr. Eidinger works with all these water agencies on seismic vulnerability assessments. For this effort, he will tabulate all***

the wells; their performance in 1989 (success / failure); their location with regards to liquefaction susceptibility maps (very high, high, moderate, low, etc.), and their actual motions (PGA). Note: several older shallow wells failed in liquefaction zones and required new wells to be drilled; but most wells subjected to moderate to high levels of shaking performed well.

- ***Based on the case histories, we will correlate the potential for damage at each of the MWDOC wells (about 500), based on known similarities in terms of well design (casings, well head configurations, etc.), versus the PGDs (permanent ground deformations in terms of settlements and lateral spreads) projected at the well locations. From this, will indicate the likely damage / non-damage situation by well, for each scenario earthquake; style of repair strategies (drill a new well; fix an above ground pipe; etc.); impacts of loss of power (form SCE or other local agency); need for emergency generators (permanent, portable, size) and quick connect couplings.***
- ***Note: to develop the most accurate liquefaction models, there may be some effort needed by the Part B contractor to work with and modify, as suitable, the liquefaction maps and models with the Part A contractor. We recommend up to 40 manhours for this interface effort (optional); lacking this, we will use the Part A liquefaction models directly.***

For each scenario earthquake, we will project water demand for the hours and days post earthquake, in three areas:

- Normal demand (winter time, summer time conditions) for potable, sanitary and economic uses.

- Water lost through leaking / broken pipes. This demand can exceed normal demand.

- Water demand for fire fighting. For each scenario earthquake, we will project the number of fire ignitions and the potential for fire spread. G&E has written the industry standard on this topic, "Fire Following Earthquake", a 300+ page book that addresses fire ignitions, fire spread models, and mitigation measures that can be adopted by water agencies, fire agencies, gas companies, etc.

Mr. Eidinger will describe the outages in terms of "water not delivered" by using of graphs / charts that show the recovery of the water supply (horizontal axis) versus the customers with water delivered (vertical axis). The area "above" the curve is the "customer-days" of non-served water. The larger this quantity, the larger the direct and indirect economic impacts.

Mr. Eidinger will use fragility models to establish these damage estimates. Mr. Eidinger "wrote the book" on water system fragility models (ALA 2001) and has conducted detailed investigations of essentially every water system, world-wide, for every major

earthquake since the mid-1980s. Further, G&E regularly puts these findings into practical practice: Mr. Eidinger has designed more than 300 water pipes crossing active faults and through liquefaction zones; Mr. Eidinger also regularly designs water tanks, water treatment plant and wells for seismic loads. Mr. Eidinger has written several books on design of water facilities, including the industry standard "Seismic Design of Water Pipelines" (ALA 2005) and "Seismic Evaluation of Water Transmission Systems" (ASCE 1999).

Mr. Eidinger has also written many reports on the practical impacts to water system in recent earthquakes. These include (name and magnitude of earthquake, publication date)

- Napa M 6.0, California (2014). TCLEE (in press)
- Lushan M 6.6 China (2013). ASCE TCLEE 2014.
- Tohoku M 9.0 Japan (2011). ASCE TCLEE 2014.
- Christchurch M 7.2, M 6.2, M 6.2 New Zealand (2010-2011). ASCE TCLEE 2013; EERI 2014.
- Chile M 8.8 (2010). ASCE TCLEE 2012.
- Sichuan M 8.0 China (2008). ASCE TCLEE 2010.
- Palo Robles M 6.5, California (2003). ASCE TCLEE 2004. EERI 2004.
- Napa M 5.6 California (2000). ASCE 2001.
- Denali M 7.7 Alaska (2002). ASCE TCLEE 2003.
- Arequipa M 8.5, Peru (2001). ASCE TCLEE 2002.
- Gujarat M 7.6 India (2001). ASCE TCLEE 2002.
- Kobe M 7.0 Japan (1995). ASCE TCLEE 1996.
- Northridge M 6.8, California (1994). ASCE 2001.
- Loma Prieta M 6.9, California (1989). USGS 1990.

As Chairman of ASCE's committee for Seismic Design of Water and Wastewater Facilities, Mr. Eidinger has worked extensively with many US and international experts on the seismic design of water facilities. Mr. Eidinger regularly works with water utilities and manufacturers outside of the US, dealing with seismic design and evaluation of their facilities, including:

- City of Kobe Water Department
- City of Tokyo Water Department
- City of Sendai Water Department
- Kubota Pipeline Company (Manufacturer of Seismic Resistant Pipelines)
- Miyagi Prefecture Water Department
- City of Auckland New Zealand Water Department
- Mekorot (Israel) Water Department
- Bio Bio (Concepcion, Chile) Water Department

Mr. Eidinger also works closely with many leading University researchers on the seismic testing and evaluation of water systems, including:

- Prof. Tom O'Rourke, Cornell University

- Prof. Mike O'Rourke, RPI
- Prof. M. Shinozuka, U.C. Irvine
- And others

Mitigation and Emergency Response. Depending upon the findings in Task B.1, Mr. Eidinger will develop a list of mitigation and emergency response strategies. Some of these are listed in Task B.2. Other strategies may include:

- Seismic upgrade of selected pipelines at fault crossings or liquefaction zones. We will describe the style of upgrade (type of pipe, length of pipe, details, etc.) , and upgrade costs.
- Replacement / upgrade of major pipelines due to age effects.
- Upgrade of water tanks (anchorage, sloshing, etc.)
- Upgrade of wells heads (change pipe outlet details, change style of casings, ground improvement, etc.)
- **Need to drill new wells or change maintenance efforts on existing wells**
- Stock spare parts (pipes, valves, butt straps, etc.)
- Improve emergency response capability (training, how to activate and manage large quantities of mutual aid)
- Equipment (excavators, welders, dump trucks, compactors, lighting, etc.)
- Install quick connect couplings
- Add storage (raw water or potable water as suitable)
- Construct new wells, as well as infrastructure (pipe, valve, etc.) to connect to transmission or distribution systems.

Task B.2. Local and Regional Supply Emergency Power, Interconnections and Isolation Valves

Given the impacts found from Task B.1, we will describe the portion of the loss of water supply (as a function of time) that is attributable to loss of offsite power (SCE or other agencies). We will factor in the current availability of portable or fixed emergency generators (or portable pumps).

EMERGNECY GENERATORS. Given the post-earthquake needs for water, especially for fire fighting purposes (which is highly time sensitive), and in conjunction with likely power restoration times by SCE (and other agencies), we will describe the benefits of having more portable / fixed emergency generators, including those for well fields; water treatment plants, as well as within the distribution systems. We will discuss the sizes (kilowatts), fuel supply, initial capital costs, ongoing maintenance costs for these emergency generators. We will discuss the cost effectiveness of having self-owned generators, or generators available via mutual aid / contractors.

VALVES. We will examine the state of damage to the pipeline / well / treatment plant network, including the locations of turnouts to major customers / retailers. Given the geographic location of the existing infrastructure and the seismic hazards (especially fault offset and liquefaction zones), we will recommend the installation of additional in-

line isolation valves (butterfly generally), and whether they should be manual (lower cost) or automatic (higher cost). For "automatic" valves, we will describe the best suited power sources (batteries, hydraulic, pneumatic); as well as in-line sensors (flow, pressure, acceleration) and computer logic suitable for automatic (or semi-automatic) operation. At well fields, we will make recommendations for additional valves. At water treatment plants, we will make recommendations for raw water bypass systems (including valves, pipe, air gaps, etc.)

INTECONNECTIONS. Depending on the findings, it might be possible to obtain emergency water supply to various agencies via interconnections to other agencies. These are often low flow (under 2,000 gpm or so), but major interconnections (10 to 50 MGD range) might also be warranted. We will consider concurrent damage to each agency, with the intent of providing supply as suitable from agencies that have seismic-reliable systems.

Examples. G&E has previously done many similar projects. A few are described below.

- EBMUD owns 175 pump stations. In 1991, EBMUD then had 1 fixed and 6 portable emergency generators. After conducting a seismic vulnerability assessment, based on G&E's recommendations, and in conjunction with PG&E power supply and concurrent fire risk, EBMUD procured 7 additional emergency generators and portable pumps; and installed 75 quick connect couplings and 82 sets of isolation valves with additional manifold connections.

- The goal of the EBMUD upgrade effort was to provide the maximum flexibility to respond to any range of likely earthquake outcomes, while keeping capital and ongoing maintenance costs within acceptable levels.

- City of Hayward. Assessed efficacy of through-system interconnections and development of local wells. In the last decade, Hayward has constructed emergency wells (enough to supply winter demand), as well as new interconnections (30 MGD) between EBMUD and SFPUC and Hayward.

- City of Palo Alto. Recommended new wells to supplement surface water supply from a regional wholesaler (SFPUC). The new wells have been built.

- City of Mercer Island. Recommended new wells to supplement surface water supply from a regional wholesaler (City of Seattle). The new wells have been built.

- Purissima Hills Water District. Recommended interconnection of nearby City of Los Altos water system for emergency water supply from wells. The interconnection pipeline has bee built.

Task B.3. Maps, Reports, Presentations

G&E will prepare all its findings in a report that will be submitted to MWDOC, OCWD and CDM Smith. The report will be prepare in a format that is suitable to the agencies (planned is "WORD" format, with graphics in .jpg). We will use GIS for map backgrounds, (the GIS data is developed by the Part A contractor).

For the current effort, we assume that G&E will prepare for and attend four meetings during the course of the work, in order to present findings.

G&E can provide hundreds of maps, detailed databases, but to keep costs down for the current effort, the development of new databases and use of SERA GIS software is an optional effort (not included in this proposal).

2.0 Project Management

The technical lead for this effort will be Mr. John Eidinger. His resume is attached. Along with his technical responsibilities for the project, he will also be responsible for organizing the project effort. To ensure good communications between MWDOC and G&E, Mr. Eidinger will attend telecom or in-person meetings with MWDOC's Project Manager. These meetings will be scheduled on a regular monthly basis, and take about 1 hour each; in conjunction with project technical or special meetings. For each meeting, Mr. Eidinger will prepare a status report, go over monthly progress, schedule, costs incurred to date, projected work for the following month, technical issues which may require input from MWDOC's Project Manager or from other MWDOC staff.

For each meeting, Mr. Eidinger will provide record meeting minutes, and submit the meeting minutes with monthly status reports. To the extent practical, agenda, meeting notes, technical memoranda etc. will be in electronic form.

3.0 Project Qualifications

3.1 Key Staff Experience

Mr. John Eidinger will be the Technical Lead for this work, and will be the primary point of contract between MWDOC and G&E. He will also be technically responsible for all aspects of the Part B work.

Mr. Eidinger has working knowledge of MWDSC's water system. He has visited several MWDSC sites and has knowledge of the structural issues related to MWDSC's pipelines and tunnels.

Mr. Eidinger has 37 years experience in earthquake engineering, with the most recent 25 years devoted to seismic assessment of water systems, including seismic design of water pipes across active faults and thorough liquefaction zones. Mr. John Eidinger is a internationally recognized expert in the seismic performance of water systems and design of water pipes through faults, liquefaction and landslide hazard zones. He has written and chaired committees for four books on the various aspects of seismic design for water systems, including:

Seismic Guidelines for Water Pipes, 256 pages, published by FEMA / ALA
Fire Following Earthquake, 325 pages, published by ASCE / NFPA
Fragilities for Water System Components, 250 pages, published by ALA / FEMA
Guidelines for the Evaluation of Water Transmission Facilities, 196 pages, ASCE

Mr. Eidinger has also published more than 70 technical papers on seismic issues for lifelines, more than 25 directly related to the performance of water systems in earthquakes. He has performed evaluations and designs of over 350 water pipelines that cross earthquake faults, including SFPUC's BDPL 1, 2, 3 and 4 pipelines (5 to 10 feet of offset, Hayward fault); EBMUD's 60" El Portal pipeline (5 feet offset, Hayward fault); EBMUD's 60", 72" and 87" Mokelumne Aqueducts (3 feet offset, Concord fault); EBMUD's 24" Crockett Aqueduct (5 feet offset, Hayward fault); EBMUD's 42" Southern Loop (7 feet offset, Calaveras fault); EBMUD's 36" Lake Temescal pipeline (5 feet offset, Hayward fault); and several dozen more EBMUD pipes ranging from 12-inch to 36-inch diameter; several of Hayward Water Department's 8" to 24" pipelines (all 5 feet offset, Hayward fault); the City of San Diego's 24" to 54" pipelines crossing the Rose Canyon and Silver Stand Faults (up to 5 feet offset); MWD's 120-inch Upper Feeder across the Sierra Madre fault (over 5 feet reverse thrust offset); MWD's 54" Palos Verdes feeder over the Eagle Rock fault (2 feet offset); SCVWD's twin bore 66-inch pipelines where they cross the Calaveras fault (one leaked in the 1989 Loma Prieta earthquake); Thames Water's 87" pipeline where it successfully took 10 feet of right lateral offset (with leaks) in the 1999 Izmit earthquake; Alyeska's 48" oil pipeline where it successfully withstood 14 feet of right lateral offset in the 2002 Denali (Alaska) earthquake; and many more. He has worked with leading researchers in Japan in

developing updated techniques to evaluate pipelines to withstand fault offset. Mr. Eidinger will be the Lead Pipeline Engineer.

Mr. Eidinger was in responsible charge (stamped drawings) of the 60-inch, 66-inch BDPL 1 and 2 pipelines crossing the Hayward fault (SFPUC); the 42-inch Southern Loop (EBMUD); and the 72" BDPL 5 crossing the Hayward fault. He write the upgrade alternatives report for BDPL 3 and 4 whey they cross the Hayward fault. He performed the engineering analyses and developed the details and the CER reports for the Alameda Siphon 4 and BDPL 3A pipelines.

Mr. Eidinger works closely with USGS and many leading geologic consultants in Southern California and in the San Francisco Bay Area to assess the seismicity of faults, including historic and predicted future patterns of fault offset. Mr. Eidinger has worked with firms including GeoPentech; AMEC / Geomatrix; WLA / LCI; URS, and others in southern California.

Mr. Eidinger has also performed detailed hydraulic modeling of many water systems, including all of SFPUC's large diameter pipelines, all of EBMUD's large diameter pipelines, to study their hydraulic response under normal operations and earthquake conditions. He has also developed state-of-the-practice hydraulic models to examine earthquake-induced hydrodynamic forces that are a factor in the earthquake design of pipelines.

Mr. Eidinger is a licensed Civil Engineer and Structural Engineer in California.

3.2 G&E Related Experience

G&E is a firm specializing in the seismic assessment of wastewater, water, power and related lifeline utilities. G&E staff have extensive experience in the seismic evaluation of underground pipelines, wells, tanks, reservoirs, the analysis of pipelines through liquefaction zones, evaluation of pipe aging / replacement due to effects of corrosion and ongoing leak history, field inspection of pumping plants, seismic evaluation of water and wastewater treatment plants, the evaluation of existing buildings under seismic motions for life safety and post-earthquake functionality requirements, and associated design efforts.

G&E was incorporated in 1991, and has been successfully working for wastewater, water and power utilities over the past 25 years. G&E has worked with over 100 water and electric utility clients during this time period. G&E's work mix is typically 25% to 75% wastewater and water and 25% to 75% electric utilities in any given year.

In Southern California, G&E has performed seismic vulnerability assessments for the following water systems within the past 15 years: San Diego County Water Agency, City of San Diego, Helix Water District, Burbank, Pasadena, Fountain Valley, Westlake, East Los Angeles, Redondo Beach, Dominguez, Big Bear Lake.

In Orange County, G&E is performed detailed seismic assessments and mitigation for the major power companies, including SCE and SDG&E. This includes ongoing seismic work at San Onofre, and regional assessment of major high voltage transmission systems (230 kV and 500 kV).

In the Pacific Northwest, G&E has performed seismic vulnerability assessments for the following water agencies: City of Everett, Clackamas River Water, Oregon City, City of Albany Oregon, Portland Water Bureau, Eugene, Mercer Island. G&E has done seismic evaluation of every BC Hydro and BPA substation in BC, Oregon and Washington, include all those in and near Vancouver, Burnaby, Coquitlam, North Vancouver, Richmond, Sea Island (Vancouver Airport), Annacis Island, Delta, Surrey.

In the past 25 years, G&E has performed seismic vulnerability evaluations for many water systems in Northern California, including: City of San Francisco (SFPUC), East Bay Municipal Utility District (EBMUD), Zone 7, Santa Clara Valley Water District (SCVWD), South Bay Aqueduct (DWR / State Water Project), Hayward, Milpitas, City of Santa Clara, Sunnyvale, Mountain View, Cal Water Los Altos, Palo Alto, Stanford University, Cal Water Livermore, Coastside County, Bear Gulch, Menlo Park, Redwood City, San Mateo, San Carlos, Belmont, Burlingame, Brisbane, Daly City, South San Francisco, Contra Costa Water District, the City of Berkeley (specialized fire fighting system).

Mr. Eidinger has prepared U.S. nation-wide procedures for FEMA, the American Lifelines Alliance, ASCE, and the U.S. National Institute of Building Sciences for water system seismic vulnerability assessments. These have undergone substantive peer review by numerous experts, and can be considered the “state-of-the-practice” in this area. G&E has authored 3 books (cumulatively over 700 pages long) include:

2001: Water System Fragility. This includes detailed pipeline fragility models for all major US and international earthquakes through 2000. Since then we have collected a lot of new data for water pipeline performance from Concepcion (2010 Chile M 8.8); Sendai (Japan M 9.0 2011); Christchurch (2010 and 2011 earthquake sequence); China (2008 and 2013) and other earthquakes.

2005: Guidelines for the Seismic Design of Water Pipelines. This is considered by many US water utilities as the "state of the practice" for design of new water pipelines through liquefaction, landslide and faulting zones. The guidelines cover every kind of water pipe, ranging from 96" diameter transmission pipelines, to 5/8" diameter service lateral connections, and all sizes in between. The guidelines cover use of Kubota ductile iron "chained" jointed pipe; HDPE pipe, and where it is reasonable and sound to use PVC, Tyton-jointed ductile iron, welded steel, and many other kinds of pipes.

Mr. Eidinger has developed many capital seismic improvement programs for water utilities, and have made many presentations to Boards of Directors, the Public and other stakeholders in the decision making process.

In the past 25 years, Mr. Eidinger has successfully obtained FEMA grant money for seismic upgrade for several water and wastewater utilities, with typical funding between $1.5 million and $3 million for each project. These upgrades cover items such as open cut reservoirs, concrete tanks, steel tanks, EBAA Flextend installations, building upgrades,

pump station upgrades, equipment upgrades, remediation / upgrade of pipes at fault crossings. While FEMA does not provide grants in Canada, the benefit cost models used to establish the cost effectiveness of these grants is directly applicable.

G&E has been actively involved with many transmission pipeline fault crossing and liquefaction seismic upgrade programs with many water utilities. These efforts include more than 300 water pipelines that cross active faults and go through liquefaction or landslide zones. G&E has performed these services in Northern California for pipelines crossing the San Andreas, Hayward, Calaveras and Serra faults; in Southern California, for pipelines crossing the Rose Canyon, Silver Strand, La Nacion, Elsinore, Raymond, Newport-Inglewood, Palos Verdes and Eagle Rock faults.

Client Contacts. G&E has performed similar seismic vulnerability assessment work for many water agencies, including: City of San Diego/ San Diego County Water Authority (Mike Conner, 858-522-6856); Cal Water (many water districts in the Los Angeles Basin, Mr. Bryan Kunic, 408-367-8312); and more than 50 others.

For this project, we expect that fault offset risk for water transmission pipelines will be one of the major elements of the overall vulnerability assessment. It is important to understand that not all pipes "break" due to fault offset, and this should be factored into making suitable upgrade plans for MWDOC. The following table provides a listing of some of the larger water pipelines that G&E has designed (or evaluated as acceptable) across faults. In addition to these large diameter pipes, G&E has done similar services for pipelines through liquefaction and landslide zones.

Pipe	Fault	Utility	Pipe	Fault	Utility
60" BDPL 1	Hayward	SFPUC	66" BDPL 2	Hayward	SFPUC
72" BDPL 5	Hayward	SFPUC	78" BDPL 3	Hayward	SFPUC
96" BDPL 4	Hayward	SFPUC	72" BDPL 3A (CER)	Hayward	SFPUC
36" Line A	Serra	SFPUC	78" Line N	Serra	SFPUC
96" Sunol (AAR)	Calaveras	SFPUC	72" Alameda Siphon 4 (CER)	Calaveras	SFPUC
60" El Portal	Hayward	EBMUD	42" South	Hayward	EBMUD
54" South	Hayward	EBMUD	87" Mokelumne 3	Concord	EBMUD
42" Southern Loop	Calaveras	EBMUD	72" Mokelumne 2	Concord	EBMUD
60" Mokelumne 1	Concord	EBMUD	48" PCCP	Hayward	ACWD
42" Steel	Hayward	ACWD	30" Brown	Hayward	ACWD
24" Zone A	Hayward	Hayward	16" Central	Hayward	Hayward
60" Lower Feeder	Palos Verdes	MWD	108" Upper Feeder	Sierra Madre	MWD
Aqueduct 1	Elsinore	SDCWA	Aqueduct 2	Elsinore	SDCWA
Aqueduct 3	Elsinore	SDCWA	Aqueduct 4	Elsinore	SDCWA
Aqueduct 5	Elsinore	SDCWA	36" Thorn Street	Rose Canyon	San Diego
24" Upas Street	Rose Canyon	San Diego			

A few example projects where G&E has been the lead engineer and designer of pipelines that cross faults include the following:

72" BDPL 5 pipeline across the Hayward fault. G&E developed the conceptual design, all alternatives, and the final design for this pipeline. It is constructed in 2011. This pipeline crosses the Hayward fault on sliding supports through a creek. G&E worked with all agencies (ACFCD, city of Fremont, etc.) to coordinate the design, select trench methods through busy streets (Grimmer and Paseo Padre) that were acceptable to the City. G&E developed all plans, profiles, detail drawings, technical specifications, cost estimates. G&E reviewed the fabricator's submittals (steel and welding) and contractors submittals.

60" and 66" diameter Bay Division Pipelines 1 and 2. These pipelines were built in 1923 and 1934, respectively. They are owned by the San Francisco Public Utilities Commission (SFPUC). G&E was retained by the SFPUC to evaluate the ability of these pipelines to absorb fault offset, and to develop alternative design methods to retrofit (replace) the pipelines to that they would reliably be able to withstand probable and maximum earthquakes on the Hayward fault. G&E developed more than ten retrofit design concepts. The ultimately chosen retrofit design was to use 60" x 11/16" and 66" x 3/4" steel pipes, using butt welds, changing to double lap welds and finally converting back to original riveted or thin-walled welded steel pipe. The pipelines are now constructed. G&E conducted material tests for the original pipes (including rivets); established acceptance criteria for the new and old pipes; conducted field soil-pipeline

skin friction tests; performed coating tests; performed global and local finite element models as part of design-by-analysis; developed cost estimates; assisted with corrosion protection for the new pipes; laid out designs for isolation valve vaults; developed rapid anchorage schemes (done to limit impact on busy roads that the City of Fremont wished to avoid); developed construction drawings and specifications. The figure below shows actual construction of the BDPL 1 and 2 pipes at the Hayward fault, showing the new soldier pile wall (far right), 60" BDPL 1 (ribbed pipe in foreground is in the pipe anchor zone, smooth pipe (with welder) is in the background); BDPL 2 (already constructed, far left). A special controlled density backfill trench was used to improve anchorage in the anchor zones, while a protected-pea gravel trench (trapezoidal shape) was used in the fault crossing zone. The ribbed pipes were used to rapidly anchor the pipes, thereby reducing the length of pipe that had to be replaced, and thus lowering project costs. Client

BDPL 1 and 2 Fault Crossing Design Details

Bypass system, SFPUC, Hayward fault. G&E laid out the design for a bypass system using flexible hose and double sets of 6-outlet manifolds. We also developed alternatives using 24" diameter high density polyethylene pipe.

78" and 96" diameter Bay Division Pipelines 3 and 4. These pipelines were built in 1952 and 1963, respectively. G&E was retained by the SFPUC to evaluate the ability of these pipelines to absorb fault offset, and to develop alternative design methods to retrofit (replace) the pipelines to that they would reliably be able to withstand probable and maximum earthquakes on the Hayward fault. These pipeline normally carry more than 170 MGD flows to serve Milpitas, San Jose, Santa Clara, Sunnyvale, Mountain View, Palo Alto and other cities. The existing pipelines are either segmented reinforced or prestressed concrete pipes. They cross the Hayward fault at an angle that forces them into compression and bending. Should the pipes fail, release of water may erode away potions of Interstate 680 and Mission Boulevard. G&E calculated flow and inundation zones due to break of the pipes. In conjunction with the SFPUC, G&E applied to FEMA for co-funding of the fault mitigation project. G&E laid out the requirements for isolation valve

vaults. G&E is developed design alternatives to replace the pipes, include heavy wall pipe within a new articulated culvert.

66" diameter Alameda Siphon 4. This is a new pipeline to be built in 2006/2007. G&E was retained by the SFPUC to develop the alignment and design the new pipe to accommodate up to 5 feet of fault offset (Calaveras fault) as well as intermittent settlements or lateral spreads due to liquefaction. G&E performed detailed structural analyses; cost estimates; developed plans and profiles.

96" diameter Sunol Valley Pipeline. This pipeline is a planned future upgrade for the SFPUC water system in Sunol Valley. G&E was retained by the SFPUC to develop the alignment and design the new pipe to accommodate up to 5 feet of fault offset (Calaveras fault) as well as landslides, liquefaction at a creek crossing, and sympathetic movement of the Sinbad fault. G&E performed detailed structural analyses; cost estimates; developed plans and profiles.

42" diameter Crow Canyon Pipeline. This pipeline is a new pipe that was designed and engineered by G&E through the Calaveras fault crossing zone. G&E worked with EBMUD (pipe owner) to develop an alignment that would optimize pipe performance, while minimizing impacts to the existing streets and nearby property owners. Ultimately, EBMUD selected an alignment that would not be optimal for pipe stress / strain, but which satisfied other important project criteria (like not upsetting the City of San Ramon too much). Given these practical issues, G&E designed the pipeline to provide as much capability of absorb fault offset as possible (about 3 to 5 feet, reliably), and included a bypass system (using standardized 12-inch diameter flex hose) that could be used in case the fault offset is larger. G&E worked with the steel pipe fabricator (Ameron) to develop suitable steel and fabrication requirements. The pipe was constructed in 2003 under budget and is now in service.

Pipeline: 36" diameter Dingee Main Pipeline. This pipeline was built in 1936. It is owned by EBMUD. It crosses the Hayward fault through the crest of the Lake Temescal dam, and also in a culvert under Highway 24. The retrofit design accommodates fault offset allows for rapid repair and bypass using 12-inch diameter flex hose should the fault move through the dam.

Other EBMUD water pipelines. G&E prepared contract documents to upgrade more than a dozen other water pipelines (12" to 36" diameter) that cross the Hayward fault or active landslides in the EBMUD system. G&E also did risk evaluation of the likelihood of survival for more than 200 pipelines in the EBMUD potable water system (4" to 66"); from that study, in conjunction with hydraulic modeling, G&E established the amount of flex hose to be purchased by EBMUD (5" to 12" diameter); EBMUD adopted these recommendations, and now has 17,000 feet of various diameter and length flex hose. G&E helped specify the design and storage requirements for the 12" hose. G&E performed design reviews of EBMUD-internal designs for upgrades of the 60" El Sobrante bypass pipeline and the 24" Crockett Aqueduct whey the cross the Hayward fault.

City of Hayward Water Department. G&E was retained by the City of Hayward to perform peer review of new pipelines (16" and 24" diameter) that cross the Hayward fault. G&E also laid out the conceptual design for three new pipelines (12") that cross the Hayward fault.

City of San Diego Water Department. G&E developed a pipe upgrade program for the San Diego Water Department, including installing new isolation valve and bypass systems for 16 major pipes (16" to 48" diameter) that cross the Rose Canyon and Silver Strand faults. G&E helped secure co-funding by FEMA for this project ($4,000,000).

G&E performed seismic risk evaluations of the **three EBMUD Mokelumne Aqueducts** where they cross the Concord fault in Concord. While the design of each of these large pipes differs, evaluations show that none of the pipes are capable of reliably surviving Concord fault offset. Should they break, they will take many weeks to repair. Given this situation, Mr. Eidinger developed a $700,000 seismic retrofit that would avoid major (and expensive) upgrade of the Mokelumne Aqueducts at the Concord fault, while still providing reliable service to all EBMUD customers after a Concord M 6.5+ earthquake. Other alternatives, costing up to $100,000,000, were considered. This upgrade has been implemented (final design by EBMUD internal staff).

Depending on the costs, importance and system characteristics, G&E has implemented seismic mitigation for these pipelines using a range of methods, including:

- Complete pipe replacement through the fault, with the new pipe being fault tolerant (capable of surviving several feet of offset without break).

- Installation of manual isolation valves either side of the fault zone. Should the pipe break, the valves are closed to isolate the damage, and allow pressure and flows to be maintained elsewhere in the water system.

- Installation of remotely-actuated automatic isolation valves. By "remotely actuated", it is meant that the valves have their own standby source of power (either hydraulic or electric), and with suitable instrumentation (motion, flow and pressure) so that a remote operator (via SCADA) can decide whether or not to close (or re-open) the valve. Completely automatic valves (using the instrument data alone to decide whether to close the valve) is rarely adopted by larger water utilities, unless there is a clear and present risk to immediately life safety or large inundation / erosion issues where minutes are critical to making the isolation decision.

- Installation of suitable manifolds (or, re-using existing fire hydrants with suitable outlets and adapter rings) to allow use of above ground large diameter (5" to 6") or ultra large diameter (8" to 12") flex hose, or aluminum pipe. The hose is manually installed within a few hours post-earthquake to re-establish water flows for customer use, while permanent repairs (taking days or weeks) are made to the

damaged pipeline.

- Procurement of suitable types of above ground hose that serves post-earthquake purposes throughout the water system, as well as day-to-day mini-emergency needs. Alternately, rely on the hose via mutual aid (a possible strategy for City of Hayward). Flex hose should to be designed and stored in consideration of available manpower, storage locations, shelf-life, deployment, attachment connections, maintenance, chlorination /disinfection considerations.

- Do nothing – accept the risk and consequences that some pipes might break or leak, but allow for such in the utility's emergency response and recovery plans. (Manage the Damage strategy). This strategy can be effectively used to lower capital construction costs used where available redundancy and system needs, and other constraints, make it appropriate.

4.0 Project Cost

The estimated cost for this project is provided below. The work will be performed on a time and materials basis in accordance with G&E rate schedule 2015.

Task B.1. $17,000.
Task B.2. $10,000.
Task B.3. $14,000.

Total. $41,000.

Part A. Optional. Up to 40 hours professional time to interface wit the Part A contractor to establish suitable liquefaction models.

5.0 Project Schedule

The schedule to perform the work is as follows:

Notice to Proceed	March 7 (target date).
Task 1. Evaluation	NTP + 10 weeks
Task 2. Recommendations	NTP + 12 weeks
Task 3. Reports Meetings	NTP + 16 weeks

A master project schedule showing all review cycles and subtasks will be provided one week after Notice to Proceed.

6.0 Resume for Mr. Eidinger

Attached.

Rate Schedule, Reimbursable Expenses and Payment

G&E ENGINEERING SYSTEMS INC.
RATE SCHEDULE 2015
Effective through December 31, 2015

Engineering Rate Schedule (Regular and Overtime Hours)

Principal	$215.00
Senior Technical Specialist	$205.00
Technical Specialist	$195.00
Senior Engineer	$156.00
Engineer	$135.00
Drafter	$125.00
Administrative	$62.00

Labor costs include salary, fringes, overhead, general and administrative, and profit. Labor costs are valid through December 31, 2015, and increase by 3% for the twelve months following. Rates for subsequent calendar years are subject to annual changes.

Reimbursable Expenses

a. Mileage standard IRS rate per mile

b. Expenses of travel, subsistence and communications outside of the San Francisco Bay Area, in connection with the Project. Air travel will be by coach rates.

c. Expense of the reproduction and messenger delivery of project work and other documents.

d. Expense of outside services including sub-consultants, mock-ups, models, special drafting, display renderings, graphic art work, and photographic work at cost plus 10%.

e. Expense of special supplies and materials. Color print media shall be charged at $0.75 per sheet (A size) or $1.50 per sheet (B size) or $1.50 per square foot for large format sizes (D or E size). Large format (D or E size) black and white drawings shall be charged at $1.00 per square foot.

f. Expense of computers. Computer costs include rates for computer-based engineering calculations and CAD drafting. No charge for computers used for word-processing or other overhead activities.

Payment

Invoices shall be submitted on a monthly basis. Payment is due net 30 days. Any portion of an invoice that is not in dispute is payable net 30 days. Late payments shall be charged a 1.5% per month late charge; such late charges are over and above any stated maximum ceiling amounts.

JOHN M. EIDINGER

EDUCATION

B.S., Civil Engineering, Massachusetts Institute of Technology, 1975
M.E., Structural Engineering and Structural Mechanics, U.C. Berkeley 1978
M.S., Structural Engineering and Structural Mechanics, U.C. Berkeley 1982
M.B.A., Business Administration, U.C. Berkeley, 1984

LICENSES

Professional Engineer, Civil, California, C-31637
Structural Engineer, California, SE-2631
Professional Engineer, Civil, Alaska, 11276

QUALIFICATION SUMMARY

Mr. Eidinger has 37 years experience in the water and electric utility industries. He has a detailed background with the analysis, design, risk quantification and economic analysis of large diameter water pipelines, water treatment plants, wells, tunnels, pump stations, canals, bridges, buildings, mechanical and electrical equipment, electric substations. Over the past 25 years, he has worked with nearly every major water utility around the world to address how they performed after major earthquakes.

PROFESSIONAL EXPERIENCE

Mr. Eidinger is an industry-recognized expert on the seismic performance of pipelines and reliability of water systems in earthquakes. He has conducted post-earthquake reconnaissance efforts for many water transmission systems around the world including California, Alaska, Japan, Turkey, Peru, India, China, Chile and New Zealand. He has designed many pipelines through fault, liquefaction and landslide zones. Mr. Eidinger has evaluated the seismic performance and developed upgrade recommendations for most of the water treatment plants in the San Francisco Bay Area. Mr. Eidinger has worked extensively with nation-wide agencies (FEMA, ALA, NIBS, ASCE, AWWA, JWWA) to develop four books on seismic guidelines for seismic design of water transmission systems. He has published extensively on this and related topics.

For the City of San Diego, Mr. Eidinger quantified fault crossing locations for about 100 pipelines where they cross the Silver Strand and / or the Rose Canyon fault zone. These evaluations consider the activity of the fault segments, and the design characteristics of each individual pipeline. About 60 pipelines may break in the next characteristic earthquake on the Rose Canyon fault. Design retrofit strategies were developed to mitigate this problem, through a combination of new "fault resistant" pipelines, re-routes, isolation valves, temporary 400 psi 12" pipes.

For Palo Verdes Water (Cal Water), he evaluated the 60" to 96" Metropolitan Water District of Southern California pipelines for performance due to fault offset of the Newport Inglewood and Palos Verdes faults.

For Pasadena Water and Power, he evaluated the performance of all 6" to 36" diameter pipelines where they cross the Eagle Rock, Raymond and Sierra Madre faults; as well as MWDSC's Upper Feeder and East Side Feeder. He has also designed seismic upgrades for several of their large open cut reservoirs.

For the City of Burbank, he assessed the seismic response of the wells and pipelines in the city's water system, as well as MWD's East Side feeder for surface water supply. He considered various possible earthquakes on the San Andreas, Verdugo, Sierra Madre, Puente Hills, Newport Inglewood, Elsinore, and more than 20 other faults in the region.

For the San Diego County Water Authority, Mr. Eidinger developed their seismic criteria, which includes fault offset of five larger diameter (60" and larger) treated and raw water pipelines that cross the active Elsinore fault. He developed post-earthquake repair times for each of these five pipelines, to help establish a suitable emergency response strategy for the City of San Diego.

For Redwood City, M. Eidinger developed a model to establish a short- and long-term water pipe replacement program that factors in both seismic, aging and corrosion-related pipeline issues.

For the City of Burbank, M. Eidinger developed a model to establish a short- and long-term water pipe replacement program that factors in both seismic, aging and corrosion-related pipeline issues.

For the SFPUC, Mr. Eidinger designed upgrades to three pipelines that cross the Serra fault, and two liquefaction zones. The existing pipelines include a 54" 1923-vintage riveted + lockbar steel pipe; a 61" welded steel pipe and a 66" lined prestressed concrete cylinder pipe. Modified pipes will use welded steel or DIP with seismic resistant joints (Kubota) in order to accommodate up to 2 feet of permanent ground deformations due to liquefaction or fault offset.

For EBMUD, he performed Monte Carlo seismic simulations of the raw water transmission system, including all tunnels and pipelines, to examine the reliability of the system to deliver water to each water treatment plant. He examined 8 different seismic retrofit strategies for the EBMUD system, ranging from $6 million to over $130 million, to examine the improvement in reliability for various levels of upgrade. Based on these studies, EBMUD adopted a $6 million upgrade program for its raw water system that meets its seismic reliability requirements.

For SCVWD, Mr. Eidinger evaluated all their tunnels and pipelines to establish their likely performance in various future earthquakes,

developed a suitable emergency response plan (with spare pipes). He evaluated the performance (and damage) of the twin 66" pipelines (using custom-made restrained-segmented joints) that cross the Calaveras fault, where one of the two pipes sustained damage in the 1989 Loma Prieta earthquake. He also developed the SCVWD seismic retrofit program that factors in the simultaneous seismic performance of SCVWD's wholesale customers. Due to the substantial reliability of some of SCVWD's wholesale customers (especially in the South Bay Area), the cost of SCVWD's seismic upgrade program was substantially reduced, while maintaining the overall seismic reliability goals for water usage in Santa Clara county. He performed economic analyses of the SCVWD system with and without various levels of possible seismic upgrades. He developed conceptual design upgrades for the Vasona pump station, and the operations buildings at Rinconada and Penitencia water treatment pants.

For Stanford University, Mr. Eidinger evaluation the water system for earthquakes, including all pipelines, pump stations and reservoirs. He developed a multi-stage seismic improvement plan for the University. He was also the engineer in charge of seismic upgrades for the Stanford high voltage electric system.

For the Purissima Hills Water District, Mr. Eidinger evaluation the water system for earthquakes, including all pipelines, pump stations and reservoirs.

For the City of Menlo Park, Mr. Eidinger evaluation the water system for earthquakes, including all pipelines, pump stations and reservoirs.

For the City of Mountain View, Mr. Eidinger evaluation the water system for earthquakes, including all pipelines, pump stations and reservoirs.

For the SFPUC, he has performed seismic reliability analyses for all water transmission pipelines and tunnels for ground shaking, liquefaction, landslide and fault offset. These analyses were performed to establish the reliability of SFPUC water to be delivered to the SCVWD system after earthquakes that jointly affect both water systems, as well as to the City of Palo Alto turnouts, as well as to establish a suitable emergency response and reliability program for the SFPUC.

For EBMUD, he quantified the need for medium diameter (6") and large diameter (12") flex hose for the entire water system, considering the need to rapidly restore water service throughout the EBMUD service area. The total length of hose considers hydraulic requirements to meet emergency flow rates; diameter and hook-up hardware; cost

effectiveness; availability of manpower to mobilize and install the hose; availability of hose from mutual aid agencies.

For the SFPUC, Mr. Eidinger designed the new BDPL 5 pipeline (72" diameter) where it crosses the Hayward fault in Fremont. The design uses state-of-the-practice design-by-analysis methods. This included analyses using ANSR and SAP (nonlinear models), design of below ground and above ground pipelines, supports for the pipeline for a self-supporting pipeline bridge, deep foundations, retaining walls, encasement through roads, trenches, and necessary sliding surfaces. Mr. Eidinger stamped all contract drawings and specifications for the pipeline through the Hayward fault crossing zone.

For the SFPUC, Mr. Eidinger designed the connections from a 108" diameter steel pipe to two vertical concrete shafts, located in a zone prone to liquefaction in Newark and Ravenswood.

For the SFPUC, Mr. Eidinger developed the design details for 60", 66" and 72" pipes and their service laterals (8" to 12"), blow off and air and vacuum valve assemblies, to ensure reliable service due to earthquake-induced liquefaction. He has done similar work for EBMUD.

For the SFPUC, Mr. Eidinger designed two new pipelines (60" BDPL 1, 66" BDPL 2) where they cross the Hayward fault in Fremont. These designs use state-of-the-practice design-by-analysis methods. Tests were performed to validate pipe-soil friction; a suitable epoxy coating system that will not flake off / crack at high pipe strain; and steel material properties for existing pipes, in order to minimize length of pipe to be replaced. Mr. Eidinger also conducted experimental tests to establish the true ductility and load capabilities of the original 1923 and 1933 pipelines, including welds and rivets; these tests form the basis of the capability of the existing pipelines to withstand fault offset.

For the SFPUC, Mr. Eidinger evaluated the seismic capability of the BDPL 1 and 2 pipelines where they cross San Francisco Bay near the Dumbarton bridge. This included research into the original construction of these pipes, inspection of every wooden trestle support, evaluation of linings and coatings and actual corrosion of the pipes, nonlinear structural analysis of the pipes, hydrodynamic analyses to consider earthquake-induced water hammer, thermal analyses for heat-up cool-down for the above ground pipes, and developing a low cost maintenance upgrade to keep the pipes reliable for a ten year operating period until the new BDPL 5 pipeline is constructed.

For the SFPUC, Mr. Eidinger developed the design of the new 72" BDPL 3A where it crosses the Hayward fault. This included nonlinear

structural analyses for the pipeline under a range of possible ground motions (inertial and offset), hydraulic analyses for a range of possible operating conditions (including simultaneous damage to all segments of the BDPL and Alameda Siphons); selection of location of isolation valve vaults, consistent with fault offset-induced forces, hydraulic analyses to consider leak rates should pipes be left unmitigated, and resulting inundation zones, considering available storm water culverts.

For the SFPUC, Mr. Eidinger developed the alternative analysis report for a possible new 96" diameter Sunol pipeline, able to withstand fault offset of the active Calaveras and potential active Sinbad faults. This work resulted in selection of a Alameda Siphon #4 pipeline. Mr. Eidinger designed the Alameda Siphon #4 through the 10% design stage, including route selection, and a range of nonlinear analyses.

For the SFPUC, Mr. Eidinger evaluated the performance and developed conceptual designs to upgrade two pipelines at the Harry Tracy Water Treatment Plant Line N (60" – 78") and Line A (36") to survive fault offset of the east and west strands of the Serra fault. As part of this work, he researched the original design basis of all pipelines at and near the water treatment plant, including all original design drawings and specifications, including multiple upgrades, re-routes and re-linings over the years from 1923 to 2008, of the SAPL 2, SAPL 3 and Sunset Supply pipelines.

For EBMUD, Mr. Eidinger designed the 42" Southern Loop pipeline where it crosses the Calaveras fault. The design ensures the pipe has a reasonably high reliability of surviving a fault offset, while maintaining its pressure boundary; a backup bypass system is included to accommodate very large offsets. He also examined the reliability of the pipeline to landslide movements along the Crow Canyon corridor. This pipeline is in current operation.

For EBMUD, Mr. Eidinger designed 16 pipelines where they cross faults or active landslide zones. Mitigation strategies included upgrade of the pipes so that they will not fail, including HDPE pipes, and the addition of failsafe isolation valves with bypass manifolds for use with ultra-large diameter flex hose.

For ACWD, he evaluated more than 100 water pipelines that cross the Hayward fault. He performed evaluation of ongoing performance due to fault creep for the two largest ACWD pipes that cross the Hayward fault (42", 48"). For ACWD's largest pipelines (16" and larger0, he developed conceptual designs and costs for upgrade; the ACWD Board recently adopted a five year capital budget that includes the costs to implement these fault crossing upgrades.

For Castro Valley Sanitary district, he evaluated the seismic capability of its 36" main sewer that crosses the Hayward fault. This pipe is a vitrified clay pipe in 6-foot segments, that has already sustained 8 inches of fault offset movement due to ongoing Hayward fault creep.

For the City of Hayward, Mr. Eidinger evaluated all of its major pipelines (12" to 24" diameter) that cross the Hayward fault. He has also designed replacement pipes that can sustain up to 5 feet of fault offset; these have already been installed for several of these pipelines.

For nearly all of the SFPUC wholesale customers, Mr. Eidinger has performed seismic reliability analyses of all their distribution pipes, wells, pump stations, reservoirs and tanks to establish how their system will perform post-earthquake. For these water systems, he considered the simultaneous "worst case" or "likely" or "possibly upgraded" performance of the SFPUC and SCVWD systems (for Hayward, also the EBMUD system), to establish a cost effective seismic upgrade program for each water agency. The wholesale customers include: Hayward, ACWD, Milpitas, Santa Clara, Sunnyvale, Mountain View, Purissima Hills, Palo Alto, Stanford University, Redwood City, Menlo Park, Bear Gulch, San Mateo, Belmont, San Carlos, Foster City, Brisbane, San Bruno, Burlingame, Daly City, South San Francisco.

For Humboldt Bay Municipal Water District, he evaluated all major portable and industrial water transmission pipelines (36" to 54" diameter), including fault crossings, a wooden trestle bridge system, and reliability of power supply. He developed seismic retrofits within a multi-tiered Capital Improvement Program budget.

Mr. Eidinger performed detailed structural evaluations of the 2.2 meter diameter steel butt welded Thames Water pipeline where it crossed the Anatolian fault. This pipe suffered minor leaks when it was subjected to 3 m of right lateral offset, forcing the pipeline into compression wrinkling. This pipe had not originally been designed for fault offset movements.

For the Alaska Natural Gas Transmission System, Mr. Eidinger developed the seismic and frost heave designs for the proposed 48" diameter buried natural gas pipeline.

Mr. Eidinger has evaluated the causes of damage to the 2 meter-diameter raw water pipeline that suffered compression bending and wrinkling failure due to the 1999 Chi Chi earthquake in Taiwan (Taiwan Water Company). This earthquake imposed more than 15 feet of reverse thrust motion on this low pressure pipeline, resulting in severe wrinkling and gross tearing of welds.

Mr. Eidinger was in responsible charge of design for a new salt water fire fighting system for the City of Berkeley, California. This included 16 miles of 30" steel pipe and 12" flex hose, and a 20,000 gpm pump station. The design includes allowance for liquefaction to ensure reliable performance following earthquakes.

For EBMUD, Mr. Eidinger developed their detailed Emergency Response and Repair plan. This included evaluation of total repair efforts by type of pipe damage (ranging from 4" AC pipe to 78" PCCP pipe), as well as damage to 13 tunnels, 6 water treatment plants, over 125 pump stations and over 175 reservoirs.

For the SFPUC, Mr. Eidinger developed their detailed Emergency Response and Repair Plan. This included evaluation of total repair efforts by type of pipe damage (ranging from 60" steel pipe to 96" PCCP pipe), as well as damage to 6 tunnels, and 2 water treatment plants.

For the East Bay Dischargers Authority, he has developed seismic retrofits for its large diameter (48" to 96") force mains that take effluent from four wastewater treatment plants into San Francisco Bay.

PUBLICATIONS

Performance of Electric Power Systems in the 2010-2011 Christchurch New Zealand Earthquake Sequence, with A. Kwasinski, A. Tang, C. Tudo-Bornarel, EERI SPECTRA, February, 2014.

Telecommunications Systems Performance Christchurch Earthquakes, with A. Tang, A. Kwasinski, C. Foster, P. Anderson, EERI SPECTRA, February, 2014.

Lushan China Earthquake Impact to Power and Water Systems, ASCE Monograph 40, 2014.

Performance of Buried Power Cables due to Liquefaction, with L. Kempner, Cigre, Auckland, New Zealand, 2013.

Liquefaction Analysis of Towers at the Columbia River, with L. Kempner, Cigre, Auckland, New Zealand, 2013.

Seismic Response of Buried Cables due to Liquefaction, 3rd US-China-Japan Workshop on Lifelines, Chengdu, China, 2013.

Performance of Water System in Lushan Earthquake, 8th US-Japan-Taiwan Workshop of Earthquake Countermeasures for Water Utilities, Oakland, CA, 2013.

Performance of Water Systems during the Maule Mw 8.8 Earthquake of 27 February 2010, EERI SPECTRA, 2013.

Seismic Mitigation for Lifelines – Different Approaches in China and Japan, APWA Meeting, Berkeley, California, Nov 15 2012.

Wind and Ice Loading on Transmission Towers, with L. Kempner, Cigre, Paris, France, 2012.

Reliability of Transmission Towers under Extreme Wind and Ice Loading, with L. Kempner, ASCE, Columbus, 2012.

High Voltage Transmission Line System Subject to Earthquake Scenarios, with L. Kempner, ASCE, Columbus, 2012.

Christchurch, Great Tohoku and Chile Earthquakes of 2010, 2011: Impact to Water Systems, EBMUD, 2012.

Christchurch Earthquake, Impact to Power Systems, ASCE Structures Congress, Las Vegas, April, 2011.

Wenchuan China Earthquake Impact to Power and Water Systems, ASCE Monograph 36, 2011.

September 4, 2010 M 7.1 Canterbury (Darfield), New Zealand Earthquake, Impact to Lifeline Systems, with A Tang, T. O'Rourke, Technical Council on Lifeline Earthquake Engineering, ASCE November, 2010.

Maule, Chile M 8.8 Earthquake of February 27, 2010, Impact to Water Systems, Technical Council on Lifeline Earthquake Engineering, ASCE September, 2010.

Replacing Seismically-Weak and Aging Water Pipes, EERI National Conference on Earthquake Engineering, Toronto, Canada, July, 2010.

Fragility of Non-Structural Components for FEMA Benefit Cost Analysis, BART and the BIG ONE, EERI National Conference on Earthquake Engineering, Toronto, Canada, July, 2010.

Wenchuan Earthquake – Impact to Lifelines, ASCE, Santa Rosa, California, December 9, 2009.

Magic R: Seismic Design of Steel Water Tanks, 6th AWWARF – JWWA Workshop on Seismic Design of Water Systems, Taipei, October, 2009.

Wenchuan Earthquake Impact to Power Systems, TCLEE Conference, ASCE, Oakland, California, June, 2009.

Seismic Upgrade of Pipes Across the Hayward Fault, 3rd Conference on Earthquake Hazards in the Eastern San Francisco Bay Area, Cal State Hayward, October 2008.

Seismic and Wind Design for Solar Panels, 14th World Conference on Earthquake Engineering, Beijing, China, October 2008.

Seismic Vulnerability Analyses for Lifelines, Presentation, Infrastructure Forum, Oregon Public Utilities Commission, http://www.asce.org/files/pdf/instfound/5-Eidinger-InfrastructureSeismicVulnerabilityAssessments.pdf, April, 2008.

Shakemap-Based Earthquake Emergency Response for Lifelines, With PG&E, Stu Nishenko, Marcia McLaren, AGU, December 2007.

Modeling the Landslide Risk for the BPA Transmission System, with Leon Kempner, Jared Perez, Donald Wells, DOGAMI Landslide Symposium, Portland Oregon, April, 2007.

The 1906 Earthquake Impacts on the San Francisco and Santa Clara Water Systems – What We Learned, and What We are Doing About It, with Lota de Castro, Dennis Ma, EERI Spectra, April, 2006.

The 1906 Earthquake – What Happened at the Dumbarton Strait, with Luke Cheng, Mark Ketchum, Stephanie Wong, EERI 8th National Conference on Earthquake Engineering, 2006.

Seismic Risk of a High Voltage Electric Transmission Network, with Leon Kempner, Jared Perez, Anshel Schiff, EERI 8th National Conference on Earthquake Engineering, 2006.

GIS and Database Tools for BART Seismic Upgrade, EERI 8th National Conference on Earthquake Engineering, 2006.

BART (Train), BPA (Power), Pasadena (Water): Observations on Performance Based Seismic Upgrade Programs, PEER Annual Meeting, Walnut Creek, CA April 2005.

Seismic Guidelines for Water Pipelines, Chairman, American Lifelines Alliance, sponsored by FEMA, http://homepage.mac.com/eidinger/ March, 2005.

The San Simeon, California, Earthquake of December 22, 2003, Water System Performance, Chapter Author, EERI Report, May, 2005.

Design Guideline for Seismic Resistant Water Pipeline Installations, 4th US-Japan Workshop for Seismic Performance for Water Utilities, Kobe, Japan, January 2005.

BART Seismic Upgrade – How Much? with Ed Matsuda, First International Conference of Urban Disaster Reduction, Kobe, Japan, January 18, 2005.

Design Guideline for Seismic Resistant Water Pipeline Installations, EERI Utility and Transportation Group Workshop for Water Utilities, October 28, 2004.

The 1906 San Francisco Earthquake and its Impact on the Water System, EERI Utility and Transportation Group Workshop for Water Utilities, October 28, 2004.

Fire Following Earthquake, Editor, http://homepage.mac.com/eidinger/ April 2004.

Water System Performance – San Simeon M 6.5 Earthquake of December 22, 2003, with Anshel Schiff, http://homepage.mac.com/eidinger/ January 14 2004.

"Southern Loop Pipeline – Seismic Installation in Today's Urban Environment", with T. Shastid, *in* Proceedings, sixth US Conference on Lifeline Earthquake Engineering, ASCE, TCLEE, Long Beach, http://homepage.mac.com/eidinger/ August 2003.

Denali (Alaska) M7.9 Earthquake of November 11, 2002, with M. Yashinsky, ASCE, TCLEE Monograph No. 25, October 2003.

"Seismic Risk Analysis of the Bay Area Rapid Transit System," with E. Matsuda, T. Horton and C. Wu, *in* Proceedings, sixth US Conference on Lifeline Earthquake Engineering, ASCE, TCLEE, Long Beach, http://homepage.mac.com/eidinger/ August 2003.

"The Benefits and Costs of Seismic Mitigation for Wholesale and Retail Water System Operators in the San Francisco Bay Area, 6th TCLEE, Long Beach, CA 2003.

"Performance of a Pipeline at a Fault Crossing", with M. O'Rourke and J. Bachhuber, *in* Proceedings, Seventh EERI, Boston, July 2002.

Gujarat (Kutch) India M7.7 Earthquake of January 26, 2001 and Napa M5.2 Earthquake of September 3, 2000, water chapter available at: http://homepage.mac.com/eidinger/, ASCE, TCLEE Monograph No. 19, June 2001.

"Seismic Retrofit of the Hetch Hetchy Aqueduct at the Hayward Fault,", *in* Advances in Pipeline Engineering & Construction, ASCE, San Diego, July 2001.

"Pipeline Performance in San Diego Due to Earthquakes," with F. Collins, M. Conner, J. Tomasulo, *in* Advances in Pipeline Engineering & Construction, ASCE, San Diego, July 2001.

"Seismic Assessment of the San Diego Water System," with F. Collins, M. Conner, 6th International Conference on Seismic Zonation, http://homepage.mac.com/eidinger/, Earthquake Engineering Research Institute, Palm Springs, CA, November, 2000.

"Napa M5.2 Earthquake of September 3, 2000, Evaluation of Lifeline Performance," with M. Yashinsky, A. Schiff, http://homepage.mac.com/eidinger/ *in* EERI Newsletter, November, 2000.

"Water and Wastewater System Performance in the August 17, 1999 Izmit (Kocaeli) Turkey Earthquake," *in* Monograph 17, A. Tang, Editor, Technical Council on Lifeline Earthquake Engineering, ASCE, March, 2000.

"Girth Joints in Steel Pipelines Subjected to Wrinkling and Ovalling," 5th U.S. Conference on Lifeline Earthquake Engineering, TCLEE, ASCE, Seattle,1999.

Guidelines for the Seismic Upgrade of Water Transmission Facilities, J. Eidinger, E. Avila, Editors, ASCE, TCLEE Monograph No. 15, January 1999.

"Seismic Reliability of Major Raw Water Aqueducts," with B. Maison, D. Lee, 6th U.S. National Earthquake Conference, Seattle, May 1998.

"Y2K Reliability of Lifelines, Worldwide," 5th U.S. Conference on Lifeline Earthquake Engineering, TCLEE, ASCE, Seattle, 1999.

"Seismic Assessment of Two Water Systems for the Cascadia Subduction Earthquake," 6th U.S. National Earthquake Conference, Seattle, May 1998.

"Water and Wastewater System Performance in the January 15, 1995 Kobe Japan Earthquake," *in* Monograph 14, A. Schiff, Editor, Technical Council on Lifeline Earthquake Engineering, ASCE, September 1998.

"Lifelines, Water Distribution System," in The Loma Prieta, California, Earthquake of October 17, 1989 - Lifelines, US Geological Survey Professional Paper 1552-A, pp A63-A78, A. Schiff Ed. 1998.

"The Benefits and Costs of Seismic Retrofits of Non Structural Components for Hospitals, Essential Facilities and Schools," with K. Goettel, Applied Technology Council, ATC 29-1, San Francisco, January 1998.

"Lifeline Earthquake Engineering," Seismic Safety Manual, Second Edition, Department of Energy, 1996.

“Fire and Economic Impacts of Earthquakes,” with K. Goettel, D. Lee, 4th U.S. Conference on Lifeline Earthquake Engineering, San Francisco, 1995.

“High Voltage Electric Substation Performance in Earthquakes,” with D. Ostrom, E. Matsuda, 4th U.S. Conference on Lifeline Earthquake Engineering, San Francisco, 1995.

“Water - Power Lifeline Interaction,” with B. Lau, 4th U.S. Conference on Lifeline Earthquake Engineering, San Francisco, 1995.

“EBMUD Water Distribution Damage in 1989 Loma Prieta Earthquake,” with B. Maison, D. Lee, B. Lau, 4th U.S. Conference on Lifeline Earthquake Engineering, San Francisco, 1995.

"Seismic Reliability of the San Francisco - Oakland Bay Bridge," with B. Maison, T. Desmond, Third Annual Research and Development Workshop, Caltrans, Sacramento, California, June, 1994.

"Fire Following Earthquake - Indirect Loss Estimation," Report to East Bay Municipal Utility District, R10.04.02, March , 1994.

"Fire Conflagration and Post-Earthquake Response of Power and Water Lifelines," 4th DOE Natural Phenomena Hazards Mitigation Conference, October 1993.

"Preparedness, Performance and Mitigation for Water Distribution System for Scenario Earthquakes," U. S. National Earthquake Conference, Memphis, May 1993.

"Lessons Learned and Implications for DOE Facilities - Oakland Firestorm of 1991," DOE Phenomenal Newsletter, DOE / LLNL, April 1993.

"Base Isolation Design for Industrial Facilities - Environmental and Analytical Issues," First Department of Energy Symposium on Base Isolation, Marina Del Rey, CA 1992

"Seismic Response of Long Span Bridges to Incoherent Ground Motions," with N. Abrahamson, First Annual Research and Development Workshop, Caltrans, Sacramento, California, 1991.

"Design of Rod-Hung and Unistrut-Type Supports for Equipment in Buildings and Industrial Facilities," Proceedings, Applied Technology Council, ATC-29, Irvine, California, 1990.

"ASCE Activities on Seismic Design of Electrical Raceways," with W. Djordjevic, S. Eder and F. Hettinger, Proceedings, Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping, Orlando, Florida, 1990.

"Overview of Seismic Isolation and Application to Nuclear Facilities,", with C. Kircher, Y.W. Chang, E. L. Glueckler, J. M. Kelly, E. Rodwell, R. Seidensticker, F. Tajirian, and N. Vaidya, Proceedings, Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping, Orlando, Florida, 1990.

“Base Isolation for Nuclear Power and Nuclear Material Facilities - Report on the State of the Practice,” with F. Tajirian, J. Kelly, R. Seidensticker, C. Kircher, Department of Energy Natural Phenomena Hazards Mitigation Conference, Knoxville, October, 1989.

"Post Earthquake Investigation of University of California, Berkeley Campus Cogeneration Facility due to 1989 Loma Prieta Earthquake,", Impell Internal Report, November 1989.

"Damping Values for Rigid Steel Conduit," with A. Cowell, PVP-Vol 99.3, 1988.

"Confirmation of Soil Radiation Damping From Test Versus Analysis," with G. Mukhim, Ninth SMIRT Conference, Proceedings, Lausanne, 1987.

"Post Earthquake Investigation of Devers Substation due to July 8, 1986 Palm Springs Earthquake," Impell Internal Report, July 1986.

"Floor Response Spectra Calculation by Direct Generation for a Turbine Building, " Eighth SMIRT Conference, Proceedings, No. K 12/5, Brussels, 1985.

"Snubber Reduction by Reduction of Unnecessary Seismic Margins," with G. Hau, Pressure Vessel and Piping Conference, PVP-Vol 98.3, New Orleans, 1985.

"Practical Application of Complete Quadratic Combination Modal Combination Technique for a Fuel Reprocessing Plant," Eighth SMIRT Conference, Proceedings, No. K 11/1, Brussels, 1985.

"Seismic Isolation for Nuclear Power Plants, Technical and Non-Technical Aspects in Decision Making," Nuclear Engineering and Design, NED 365D-6, Vol 198, 1984.

"Seismic Isolation for Nuclear Power Plants," Seventh SMIRT Conference, Proceedings, No. K 16/2, Chicago, 1983.

"Pipe Stress Allowables for Operating Reactors," with M. Strait, Seventh SMIRT Conference, Proceedings, No. K/16/2, Chicago, 1983.

"Ultimate Strength Analysis of Reinforced Concrete Cylindrical Containment Shield Walls," with M. Manrique, Sixth SMIRT Conference, Proceedings, No. J5/4, Paris, 1981.

"Experimental Results of an Earthquake Isolation System Using Natural Rubber Bearings, " with J. Kelly, Report No. EERC 78-03, UC Berkeley, 1978.

"Natural Rubber Bearings for Earthquake Isolation," with J. Kelly, D. Derham, Natural Rubber Technology, Vol. 8, Part 3, 1977

"Earthquake Isolation Systems -- Experimental Results," with J. Kelly, Canadian Conference of Applied Mechanics, May, 1977

"A Practical Soft-Story Earthquake Isolation System," with J. Kelly, D. Derham, Earthquake Engineering Research Center Report No. EERC 77-28, UC Berkeley, 1977.

Firm Name:
GeoPentech, Inc.

Entity: S-Corporation

State of Incorporation:
California

SBE/DBVE:
SBE, California

Vendor ID: 16114

Address:
525 N. Cabrillo Park Drive
Suite 280
Santa Ana, CA 92701

D&B Number: 03-4939178

Contact Information:
Tom Freeman, Principal Project Manager
Tel. 714 / 796-9100
Fax: 714 / 796-9191
Email:
tom_freeman@geopentech.com

Mr. Richard Bell, PE
Principal Engineer and Manager, Water Resources and Facility Planning
Municipal Water District of Orange County
18700 Ward Street
Fountain Valley, CA 92708

February 16, 2015

RE: Proposal for North Orange County System Reliability Study: Seismic Vulnerability and Recovery Assessment

Dear Mr. Bell:

GeoPentech is pleased to present this proposal in response to the Municipal Water District of Orange County's (MWDOC) Request for Proposal (RFP), dated February 11, 2015 for the North Orange County System Reliability Study: Seismic Vulnerability and Recovery Assessment (NOCSRS-SVRA). From within GeoPentech, and select outside individual consultants, we have assembled a team of seasoned seismic geologists, geotechnical earthquake engineers and lifeline earthquake engineers. The professionals on GeoPentech's team are experienced with seismic hazards in Southern California, and in particular in Orange County (OC), and have the experience and knowledge to provide MWDOC with high quality, focused services to meet the objectives of the NOCSRS-SVRA.

This proposal has five sections. Section 1 is this cover letter; Section 2 is a description of GeoPentech's proposed Scope of Work (SOW), which has been tailored in a format that is responsive to the SOW that was transmitted with MWDOC's RFP; Section 3 is a brief description of our company's relevant background; Section 4 identifies our proposed project manager (Tom Freeman), his expertise and qualifications, and a brief overview of GeoPentech's project management approach. The expertise and qualifications of the other members of GeoPentech's team (including our subject matter experts from academia and outside individual consultants) are also highlighted in Section 4. Section 5 identifies our team's expertise and experience with similar projects. More details regarding the expertise and relevant experience of each professional in the proposed GeoPentech team are provided through each individual's resume, which are provided in Attachment A. Attachment B presents a breakdown of our estimated budgets for the tasks identified in Section 2, the total estimated budget and hours, and our billing rates.

The professionals at GeoPentech, as well as our outside expert consultants, have provided decades of seismic hazard assessments, engineering, and hydrogeologic services for many public agencies and private firms in OC and Southern California. GeoPentech professionals are keenly aware of the challenges involved with conducting the type of regional-level studies being requested by MWDOC. We have worked with Metropolitan Water District of Southern California (MWD) and their member agencies, MWDOC and several of MWDOC's member Agencies, such as the Orange County Water District (OCWD), Los Angeles County Department of Public Works, Los Angeles Department of Water and Power, Southern California Edison Company, and Southern California Gas Company to provide state of the practice services while pushing the state-of-the-art in analysis and modeling. GeoPentech's team of professionals has a proven track record of providing our clients with strategic thinking on their seismic hazard issues and other geology and geotechnical matters.

We look forward to your review of our proposal and are prepared to respond to your questions. Should MWDOC select GeoPentech, we pledge our commitment to support MWDOC with your requests for professional consulting services.

Sincerely,

GeoPentech, Inc.

S. Thomas Freeman, PG, CHG, CEG
Principal/Vice President

2. Scope of Work

The proposed scope of work (SOW) presented here is based on our understanding of MWDOC's project goals. Some of the tasks identified by MWDOC have similar or overlapping scopes and thus herein these tasks have been combined into a single task for the purposes of scoping the work and costs. For example, the task of characterizing the physical and seismic properties of the active faults within Northern Orange County (NOC) has been grouped with the characterization of the San Andreas, San Jacinto, and Elsinore faults as the work is more efficiently completed under the same task. Part A, described below, entails the completion of the Seismic Hazard Assessments by GeoPentech, with assistance from seismic hazard experts in the academic community. We have also identified some Optional Part A Tasks, should MWDOC desire a more detailed study for specific facilities or different earthquake scenarios of interest. As requested in MWDC's RFP, Optional Part B tasks are also described, which entails gathering experienced earthquake lifeline engineers in formal workshop settings to identifying critical system vulnerabilities based on the results of the seismic hazard assessment completed in Part A.

Part A. Seismic Hazard Assessment

Study Objective: Provide an updated seismic hazard evaluation for NOC for critical water supply facilities. This will be accomplished by assembling information from the available literature bearing on the activity of faults in the area, estimated ground shaking hazard, and State zones for fault rupture hazard, liquefaction hazard, and earthquake-induced landsliding hazard. The results of this study will provide updated hazard information relative to the location of MWDOC facilities in NOC. We also outline optional tasks that could be undertaken if additional detail associated with specific facilities and/or scenario earthquakes is desired.

Task A.1. Identify and Characterize Faults of Interest

The aim of this task is to provide a map of the location of late Quaternary active faults thoughout OC and to characterize known faults (surface faults and blind faults) of interest to the project in NOC from the available literature. The following faults will be characterized in this task: (i) Whittier; (ii) Puente Hills; (iii) Peralta Hills; (iv) San Joaquin Hills; (v) Newport-Inglewood; (vi) San Andreas; (vii) San Jacinto; and (viii) Elsinore. The characterization will include: (i) preparing a map or maps of the faults relative to critical water supply facilities in NOC; (ii) identifying the recency of activity (i.e., Holocene-active, Early Pleistocene-active, etc.) of the faults, including the timing of past ruptures where information is available; (iii) reporting of fault slip rate estimates; and (iv) estimating the Maximum Credible Earthquake (MCE; i.e., the 2,475-year average return period earthquake) for the faults. For the faults outside OC (i.e., the San Andreas, San Jacinto, and Elsinore), characterizations relative to key water supply sources (like the Colorado River Aqueduct and the State Water Project California Aqueduct) will be provided.

Key data sources include the United States Geological Survey (USGS) database, the California Geological Survey (CGS) database, the Uniform California Earthquake Rupture Forecast version 3 (UCERF3), the Southern San Andreas ShakeOut Scenario, and other sources as appropriate, such as our recent work for Southern California Edison Company for the San Onofre Nuclear Generating Station (SONGS) and for Metropolitan Water District on the San Andreas Fault. Subject-matter experts from academia will also be consulted to provide expert opinions as appropriate.

The key deliverables of this task will be the following: (i) maps showing the location and geometry of the faults, relative to critical water supply facilities (e.g., water supply wells, treatment plants, regional distribution pipelines, groundwater replenishment basins; etc.), on a typical GIS base (e.g., topography, satellite imagery, major highways and roadways, etc.); (ii) ArcGIS shapefiles or layers containing the fault attributes and geometry; (iii) a map of historic earthquakes and instrumentally-recorded seismicity in Southern California; and (iv) tabulated fault characterization information.

Task A.2. Identify Broad-Scale Ground Shaking Hazard

The aim of this task is to assemble from the available literature a map or maps of calculated ground shaking at the spectral periods of interest (e.g., PGA and 1-second).

The primary data source for this task will be the 2014 National Seismic Hazard Maps (NSHM). This version of the

NSHM will be the basis for the seismic design criteria in the next building code update (ASCE 7-15, which will be adopted by CBC 2016). The NSHM provides regional-scale hazard corresponding to a 2% probability of exceedance in 50 years, which is the 2,475-year average return period. The basis for the NSHM hazard in California is the Uniform California Earthquake Rupture Forecast version 3 (UCERF3) fault model and the Next Generation Attenuation West 2 (NGA West 2) ground motion attenuation relationships.

For this task, the key deliverable will be a map of the 2014 NSHM ground motions corresponding to a 2% probability of exceedance in 50 years (2,475-year hazard level) for NOC, relative to critical NOC water supply facilities.

Task A.3. Identify Potential Primary Fault Rupture Hazard Areas

The aim of this task is to assemble from the available literature a map or maps of potential primary fault rupture hazard areas, relative to critical NOC water supply facilities.

Key data sources include the California Alquist-Priolo hazard zones (AP Zones) and other known fault crossings identified in Task A.1 (including blind thrusts) that may not yet be included in the State AP Zones. Primary fault offsets (e.g., 1 meter, 10 centimeters, etc.) will be estimated using common (empirical) magnitude-area-displacement regressions. Subject-matter experts from academia will also be consulted to provide fault offset estimates based on their professional judgment.

Map showing key NOC water supply facilities (courtesy of MWDOC)

Key deliverables of this task will include the following: (i) maps showing the location of the AP Zones, relative to critical water supply facilities (e.g., water supply wells, treatment plants, regional distribution pipelines, groundwater replenishment basins; etc.), on a typical GIS base (e.g., topography, satellite imagery, major highways and roadways, etc.); (ii) ArcGIS shapefiles or layers containing AP Zones; and (iii) tabulated primary fault rupture offset estimates.

Task A.4. Identify Potential Secondary Earthquake Hazard Areas

The aim of this task is to assemble from the available literature a map or maps of potential secondary earthquake hazard areas (i.e., liquefaction, earthquake-induced landslide hazards, and warping due to uplift and subsidence), relative to critical NOC water supply facilities.

The primary data source for this task will be the California Seismic Hazard Zones Maps, which identify required zones of investigation for liquefaction and earthquake-induced landslide hazards. Subject-matter experts from academia will be consulted to identify generalized areas of potential coseismic uplift and subsidence.

Key deliverables of this task will include the following: (i) maps showing the location of the Seismic Hazard Zones, relative to critical water supply facilities (e.g., water supply wells, treatment plants, regional distribution pipelines, groundwater replenishment basins; etc.), on a typical GIS base (e.g., topography, satellite imagery, major highways and roadways, etc.); (ii) ArcGIS shapefiles or layers containing the Seismic Hazard Zones; and (iii) maps identifying generalized areas of potential coseismic uplift or subsidence.

Task A.5. Reporting and Presentations

The aim of this task is to prepare one draft technical memorandum and one final technical memorandum documenting the results of Part A and to prepare for and carry out four (4) presentations to MWDOC, OCWD, CDM Smith, and the OC Water Reliability Study Working Group. Note that two of the four presentations are included in the optional task B1 (Workshops) described later and would be contingent on carrying out that optional task.

Optional Part A Tasks for Specific Facility and/or Scenario Earthquakes

The above tasks (i.e., A.1 through A.5) rely on published information to provide broad-scale (countywide scale) information; however, such broad-scale information may lack sufficient detail for scenario-specific concerns for critical NOC water supply facilities. These optional tasks focus on specific facilities and/or specific earthquake scenarios that can refine the hazard assessments to provide more detailed information. Some examples of the applicability of these optional tasks include: (i) selection of a scenario earthquake, mapping of the ground motions generated by the scenario earthquake along a MWDOC supply or distribution system, and estimated primary fault displacement where critical NOC water supply or distribution facility crosses the causative fault; and/or (ii) additional estimation of regional-scale deformation associated with a scenario earthquake, such as uplift and subsidence, along a feeder that might be sensitive to hydraulic grade changes. The results from these optional tasks would help hydraulic and facilities engineers more specifically identify areas of concern in the water supply and distribution system and inform subsequent planning, such as areas that could be readily retrofitted to withstand the deformation or to enhance post-event emergency response.

Optional Task A.O.1 for Scenario-Specific Ground Shaking Hazard

The aim of this task is to define one scenario earthquake for one fault and compute the ground shaking at the spectral periods of interest (e.g., PGA and 1-second) for specific critical NOC water supply facilities or along the MWDOC distribution system. This optional task would supplement the 2014 NSHM ground motions corresponding to a 2% probability of exceedance in 50 years (2,475-year hazard level) in Task A.2 by focusing on specific earthquake scenarios of interest to MWDOC. The results would be presented in the form of maps and tabulated spectra for each computed site. Ground shaking between computed sites would be interpolated. The costs shown in Attachment B represent one scenario earthquake for one fault, but this task can be repeated for different scenarios and different faults, as requested by the Client, and the cost would scale accordingly. The results of this optional task would be included in the Task A.5 Reporting and Presentations.

Optional Task A.O.2 for Scenario-Specific Ground Deformation

The aim of this task is to define one scenario earthquake for one fault and estimate the regional ground deformation that would be caused by the scenario event, along the MWDOC distribution system. This optional task would enhance the primary fault rupture hazards in Task A.3 by estimating a range of possible fault rupture offsets and also the regional warping (e.g., uplift and subsidence) that accompanies significant earthquakes. The results would be presented in the form of maps, profiles, and tabulated horizontal and vertical deformations would be provided at the regional grid points analyzed and/or critical NOC water supply locations of interest. The costs shown in Attachment B represent one scenario earthquake for one fault, but this task can be repeated for different scenarios and different faults, as requested by the Client, and the cost would scale accordingly. The results of this optional task would be included in the Task A.5 Reporting and Presentations.

Optional Part B: Facility Vulnerability and Recovery Planning

Study Objective: Conduct a workshop with a panel of key experts to assess the vulnerability of critical NOC water facilities, based on the results from the Part A Seismic Hazards Assessment. The goal of the workshop will be to evaluate and recommend approaches to seismically retrofit facilities, reduce the severity of facility outages, assess recovery times, and identify means to reduce recovery times, in context of the results from the Part A Seismic Hazards Assessment.

Study Approach: It is our understanding that the above objective is to be accomplished using pertinent past experiences and engineering judgment rather than quantitative analysis per se.

To this end, we propose to utilize combined experiences and engineering judgment of a group of experts who addressed similar tasks numerous times in the past. When experiences and engineering judgment are sought under the stated objective, appropriately synthesized consensus positions are considered to add more value.

Under Task B1 the currently envisioned names of experts are listed and their resumes are included in Attachment A. The proposed process would be to finalize the list after having specific discussions with MWDOC. For the final group of experts, the products would consist of consensus decisions and opinions and results of specific assignments to selected experts, helped by assistants, who would be doing some "homework" to facilitate the process. The overall process would focus on the stated objectives through a general facilitator, and a group leader for specific issues would facilitate an efficient progress toward the specific objectives.

Optional Task B1. Workshops

As an option to MWDOC, the aim of this task is to assemble a panel of five (5) key experts plus representatives from MWDOC, OCWD, and CDM Smith in two (2) workshops to assess the vulnerability of critical NOC water facilities, based on the results from the Part A Seismic Hazards Assessment. These two workshops will constitute two (2) of the four (4) presentations initially identified in Task A5. The panel of experts is expected to include the following individuals listed below. Note, Dr. Thomas O'Rourke, if available, will participate remotely through internet and will take part in the Task B1 workshops via webinar in order to save MWDOC travel costs, or if he is already present in Southern California, as he often is, at the time of the Workshops he may be able to participate directly. Tom is currently out of the country and we were unavailable to contact him at this time to discuss his possible involvement on this assignment. Tom is an internationally recognized expert geotechnical/lifeline engineer and we know him well, after having worked with him over the last several decades on several similar assignments, many here in Southern California. If he is available, we trust he will be interested in working on this assignment.

- Dr. Thomas O'Rourke, Geotechnical/Earthquake Engineer, with expertise in lifeline performance during earthquakes.
- Dr. Yoshi Moriwaki, Geotechnical/Earthquake Engineer, with expertise in earthquake engineering of Water Facilities.
- Eric Fordham, Hydrogeologist and Engineering Geologist, with expertise in large production water supply wells.
- Ronald Eguchi, Risk Analyst, with expertise in lifeline earthquake engineering risk analysis and management.
- Douglas Honegger, Lifelines Engineer, with expertise in geohazards and lifelines.

Resumes of these individuals are included in Attachment A.

It is anticipated that the workshop attendees will review the final report from the Part A Seismic Hazards Assessment in preparation for the workshops, and part of the first workshop will include a presentation and review of the results from Part A. The workshops are anticipated to cover the following topics:

- Select One Case Study and Identify Recommendations for Seismic Resiliency
    - Based on a large scenario earthquake, provide a planning-level review of the materials, design, construction, and retrofit approaches and methods that can be used to improve the resiliency of NOC water supply systems to significant earthquakes. Improvements include curtailing damage and reducing recovery times.
    - For a typical production well and wellhead, select a case study to identify methods to improve the capability of wells to resist damage from significant earthquakes.
- Identify Local and Regional Supply Emergency Power, Interconnections, and Isolation Valves
    - Provide recommendations on MWDOC's emergency power survey/study findings.

- Identify possibilities to enhance system redundancy and add isolation valves to reduce shortages during emergency outages (including well fields with regional pipeline connections).

- Identify the Types of at-risk Local Water Supply Facilities
- Approaches to Reduce Earthquake Damages to Water Supply Facilities, Recovery Times and Bolster Community Protection

Optional Task B2. Workshop Documentation

The aim of this optional task is to document the presentations and discussions that occur at the workshop to ensure the participants and entities have a written record of the recommendations and ideas discussed in the workshop. One draft document will be prepared for review and comment by key workshop personnel and one final draft document will be completed.

3. Company Background

GeoPentech is a registered Small Business Enterprise (SBE) specialty consulting firm, founded in 2000 by five partners who have over 140 combined years of specialized consulting experience in geologic, hydrogeologic, geotechnical, and earthquake engineering. GeoPentech currently has 14 professionals with consulting experience in hydrogeology, geophysics, engineering and seismic geology, and geotechnical and earthquake engineering. GeoPentech's organizational structure consists of our five Principal engineers and geologists who manage our projects, delegate work to the staff professionals in the office, and review and approve all reports that are produced. All of our professionals hold post-graduate degrees and professional registrations in the State of California.

Supporting our clients on seismic hazard-related issues is one of our key services. GeoPentech supports our clients on their seismic hazard-related projects by providing the full spectrum of seismic geology and earthquake engineering consulting services, including seismic source characterization, ground motion evaluations, fault rupture hazards, and secondary earthquake deformation hazards. GeoPentech also assists our clients on groundwater-related projects, including groundwater basin characterization, groundwater supply issues, water quality, groundwater modeling, well installation and development, groundwater monitoring, and assessing the potential for ground surface subsidence or heave.

The GeoPentech office is located in Southern California at: 525 North Cabrillo Park Drive, Suite 280, Santa Ana, CA 92701. We can be reached by phone at our office at (714) 796-9100 and by facsimile at (714) 796-9191. All contract implementation will be performed from this office location under the direction of GeoPentech's representative and Principal Geologist, Mr. Tom Freeman. His mobile phone number is (714) 325-2994 and his e-mail address is tom_freeman@geopentech.com.

4. Project Team

GeoPentech's approach to serving MWDOC is founded on the philosophy of thinking and working as an extension of your staff. Our experience has proven that fostering this type of partnership with our clients serves the best interest of both participants.

GeoPentech understands that effective organization and management of the Project Team is the key to successfully accomplishing the project objectives and achieving quality services in a cost-effective manner. We have assembled a team of experienced experts to support MWDOC with their consulting needs. Our team's Project Manager (Tom Freeman) is experienced with managing and coordinating large and complex seismic geology and seismic hazard projects, such as the Colorado River Aqueduct San Gorgonio Pass Seismic Event Vulnerability Study for the Metropolitan Water District of Southern California and the Seismic Source Characterization for Southern California Edison Company's San Onofre Nuclear Generating Station.

Tom Freeman was selected for this project based on his technical expertise, as well as his track record in completing comparable assignments. GeoPentech's approach emphasizes the Project Manager working directly with MWDOC's designated representative, as well as supervising the individual team members. The Project Manager has the full

responsibility for meeting the project's technical and contractual requirements, as well as managing day-to-day activities including direct communication with MWDOC on various task assignments and communicating these needs to the project team members. To minimize management costs and to maximize the technical emphasis we are placing on this project, the Project Manager will have a dual role as both managing the project and serving as the technical manager.

We have gathered a team of well qualified, experienced professionals to support MWDOC's needs and have Task Leaders available with special expertise in the needed scientific specialties to assist with the seismic hazard evaluation tasks that may arise. Task leaders will report directly to the Project Manager, who will provide MWDOC with a single point of contact. Working under the Task Leaders, supporting technical and administrative staff will ensure that the activities required for the successful completion of tasks are completed. Brief summary resumes for each of the key team members are provided in Attachment A. Full resumes, as well as resumes for supporting staff, are available upon request. Supporting staff will have the responsibility of providing as-needed services on tasks related to their expertise.

PROJECT MANAGER
Tom Freeman, PG, CHg, CEG

The key contact between MWDOC and GeoPentech will be Tom Freeman, located in GeoPentech's Santa Ana office. Administratively, Mr. Freeman will serve as the project manager and technically, he will serve as the team's lead seismic geologist responsible for the technical elements of studies completed for MWDOC. As a California Registered Geologist with specialty certifications in engineering geology and hydrogeology, Mr. Freeman has managed the assembly of data and the preparation of final reports for complex regional-scale projects. His experience has helped clients examine the feasibility of their projects and develop plans for their cost effective and timely completion, including examining alternative scenarios, and ranking and rating to identify the optimal program.

Mr. Freeman will be supported by the other GeoPentech geologists and engineers, including Steven Duke (Task Leader), Eric Fordham, Yoshi Moriwaki (Project Technical Advisor), Rambod Hadidi (Task Leader), Andrew Dinsick, Justin Zumbro, and Alexandra Sarmiento.

PROJECT TECHNICAL ADVISOR
Eric Fordham, PG, CEG, CHG

We have selected Eric Fordham PG, CEG, CHG as the Technical Advisor for the project. Mr. Fordham, Principal with GeoPentech, has managed or contributed to various types of small to large, multi-disciplinary water facility projects for over 30 years, spanning from field, laboratory, and instrumentation work through analysis and evaluation to project management.

Mr. Fordham has extensive experience evaluating his client's groundwater supply wells to address well capacity and water quality issues and provides recommendations to mitigate supply and water quality issues. Mr. Fordham has utilized various methods to investigate well issues including downhole video, downhole geophysics, spinner/flow testing, depth specific water quality testing, continuous pumping tests and step-tests for well performance. He has assessed the vulnerability of supply wells to shaking and vibrations from earthquakes, road noise and construction activities.

PROJECT TECHNICAL ADVISOR
Yoshi Moriwaki, PhD, PE, GE

We have selected Yoshi Moriwaki, PE, GE as the Technical Advisor for the project. Dr. Moriwaki, Principal with GeoPentech, has managed or contributed to various types of small to large, multi-disciplinary civil engineering projects for over 45 years, spanning from field, laboratory, and instrumentation work through analysis and evaluation to project management.

Dr. Moriwaki has extensive experience in comprehensive seismic hazard evaluations (earthquake ground motions, liquefaction, soil-structure interaction, mitigation measures, etc.) for numerous sites and facilities, including dams, underground structures, pipelines, and bridge sites in many parts of the United States (California, Alaska, Utah, Missouri, New York, etc.) and the world (Canada, Japan, Indonesia, Australia, Germany, etc.).

TASK LEADERS
Steven Duke, RGp, PG, CEG, CHg
Rambod Hadidi, PhD, PE, GE

Each task will be led by a California-registered geologist or engineer experienced with the implementation of similar studies, and knowledgeable with resources and methodologies required to successfully implement MWDOC's required seismic hazard assessments. Mr. Duke has over 20 years of experience in the fields of hydrogeology, engineering geology, seismic geology, and engineering geophysics. Dr. Hadidi has more than 14 years of experience in geotechnical and earthquake engineering on a wide range of infrastructure projects, for both private and public sectors, locally, nationally, and globally with a wide range of complexity and size. The staff assigned to duties under each task will report directly to the Task Leader. Each Task Leader will be responsible for coordinating the activities of their support staff with other task leaders. The following professionals from GeoPentech will support the task leaders:

Professionals	State of California Registration	Years of Experience
Doug Wahl	Civil Engineering (PE)	6
Andrew Dinsick	Civil Engineering (PE)	12
Justin Zumbro	Geology (PG)	15
Alexandra Sarmiento	Geology (PG)	5

In addition to our in-house personnel, GeoPentech will be assisted by respected geoscientists in the academic community. GeoPentech regularly consults respected subject-matter experts and has established working relationships with leading academic geoscientists, such as Dr. Thomas Rockwell (San Diego State University) and Dr. Lisa Grant-Ludwig (University of California, Irvine). Dr. Rockwell's and Dr. Grant-Ludwig's resumes are included in Attachment A, and we have budgeted time for Dr Rockwell's participation in this project, as shown in Attachment B. Because of university-related restrictions, Dr. Grant-Ludwig cannot charge consultancy fees at this time, so we have not included her in the budget in Attachment B. However, Dr. Grant-Ludwig has expressed interest in this project and has agreed to advise the project team when she is available at no fee, which is permitted by her university commitments. As discussed above under the optional SOW for Part B, the resumes of our other recommended subconsultants are also provided in Attachment A.

5. Experience

As shown in the Service Matrix (Table 1) presented below, GeoPentech has extensive experience in all aspects of the professional seismic geology and geotechnical engineering services needed by our clients including, but not limited to:

- Engineering and Seismic Geology
- Geotechnical Earthquake Engineering
- Seismic Hazard Analysis
- Ground Motion Evaluation
- Liquefaction Evaluation
- Landslide Evaluation
- A host of other geotechnical engineering, engineering geology, and earthquake engineering requirements that can come into play for water agency services, including short and long term planning.

The matrix shown in Table 1 lists selected groundwater and water supply projects completed by professionals of GeoPentech for several private and government entities such as the Los Angeles County Department of Public Works (LACDPW), the Los Angeles Department of Water and Power (LADWP), Metropolitan Water District of Southern California (MWD), the Water Replenishment District of Southern California and other clients with similar technical requirements. For each project, a checkmark "✓" is placed in the applicable spaces for various areas of the

services provided by the professionals of GeoPentech.

Table 1 clearly shows that ***through our project experience, GeoPentech professionals have excellent technical expertise and qualification*** to provide the seismic hazard evaluation services that MWDOC needs, including the ability to provide effective technical evaluation and strategic thinking to assist MWDOC with various seismic hazard assessment activities. The table also shows that many of these selected projects are similar in nature to this MWDOC assignment.

The successful completion of the example projects listed in the service matrix includes ***completing projects within budget and schedule*** and in a manner consistent with the client's vision of how the project should be completed. Paying attention to these important non-technical aspects of each project is one of the characteristics and attributes of GeoPentech and its professionals.

Table 1. Key Services Provided By GeoPentech

KEY SERVICES									
PROJECTS	Water Supply Regional/Planning Level Studies	Site Investigations	Laboratory Testing	Groundwater Wells, Groundwater & Ground Monitoring	Modeling & Analyses	Seismic Hazard Evaluation	Geotechnical Engineering and Design	Rpt/Presentation Prep., Workshops & Meetings	Construction Phase Services
LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS PROJECTS									
LA County Dominguez Gap Seawater Barrier Injection Wells Micro-Tunnel		✓				✓		✓	✓
Seawater Barrier Alternatives Evaluation	✓					✓	✓	✓	
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA									
Dominguez Gap Spreading Grounds	✓	✓	✓	✓	✓		✓	✓	
Alamitos Seawater Barrier Replacement/Augmentation Using a Passive Deep Soil Mix (DSM)	✓	✓	✓	✓	✓	✓	✓	✓	✓
LOS ANGELES DEPARTMENT OF WATER AND POWER PROJECTS									
LA Reservoir Backwash Ponds Evaluation		✓	✓	✓	✓			✓	
Hollywood Reservoir Water Quality Improvement Project		✓	✓	✓	✓	✓	✓	✓	✓
Elysian Reservoir Water Quality Improvement Project		✓	✓	✓	✓	✓	✓	✓	
LA Reservoir Water Quality Improvement Project	✓							✓	
Stone Canyon Reservoir & Pipeline		✓	✓				✓	✓	
LA Aqueduct/Pacific Oil Pipeline Crossing Fault Study		✓	✓		✓	✓	✓		✓
2nd LA Aqueduct/Terminal Hill Seismic Retrofit	✓		✓	✓	✓	✓	✓	✓	✓
Bouquet Canyon Reservoir Seismic Hazard Assessment		✓	✓	✓	✓	✓	✓	✓	
Griffith Park So Water Tank & Directionally Drilled		✓	✓	✓			✓	✓	
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA PROJECTS									
Tonner Tunnel-Yorba Linda Feeder									✓
Hayfield Lake Groundwater Storage Project	✓	✓	✓	✓	✓	✓	✓	✓	
Upper Chuckwalla Valley Groundwater Storage Project	✓	✓	✓	✓	✓	✓	✓	✓	
Cadiz Groundwater Storage Feasibility Studies	✓	✓			✓			✓	
Diamond Valley Reservoir Project	✓	✓	✓	✓	✓	✓	✓	✓	✓
Central Pool Augmentation Project	✓	✓	✓	✓	✓				
Lake Mathews Intake Structure		✓	✓		✓				✓
MWD Service Area Groundwater Assessment Study	✓		✓					✓	
Inland Feeder Pipelines, Tunnels and Fault Crossings	✓	✓	✓	✓	✓		✓	✓	✓
Foothill Feeder/San Fernando Tunnel	✓				✓			✓	
Orange County Reservoir		✓	✓	✓	✓				
Diemer Filtration Plant		✓	✓	✓	✓	✓	✓	✓	✓
Colorado River Aqueduct	✓	✓	✓		✓				
2nd Lower Feeder	✓	✓							
Upper Feeder San Gabriel Intake Structure		✓				✓	✓	✓	
MWDOC & MEMBER AGENCIES' PROJECTS									
Talbert Barrier									✓
Allen McCollouch Pipeline		✓	✓		✓	✓	✓		
Burris Pit		✓	✓		✓	✓	✓		
Santiago Dam - Irvine Lake				✓					
South Orange County Water Rehabilitation Study		✓				✓	✓	✓	
Walnut Canyon Reservoir				✓					
Upper Chiquita Reservoir	✓	✓	✓	✓	✓	✓	✓	✓	✓
South Orange Coastal Ocean Desalination Project	✓				✓				
OTHER RELEVANT PROJECTS									
San Onofre Nuclear Generating Station	✓	✓	✓	✓	✓	✓	✓	✓	✓
Newport/Inglewood Fault Study at Bolsa Chica		✓	✓		✓	✓		✓	
Newport/Inglewood Fault Study at Bixby Knoll		✓	✓		✓	✓		✓	
Irvine-Corona Expressway Tunnel	✓				✓			✓	
Arroyo Trabuco Golf Course Water Reliability Study	✓	✓	✓	✓	✓			✓	✓
Orchard Hills Groundwater Study		✓	✓	✓	✓		✓	✓	
City of Chino Hydrogeologic Support	✓	✓	✓	✓	✓		✓	✓	

Attachment A
Resumes of Project Team Members

GeoPentech, Inc. Professionals

Tom Freeman
Eric Fordham
Yoshi Moriwaki
Steven Duke
Rambod Hadidi

Professional Subconsultants

Ronald Eguchi, (ImageCat, Inc.)
Douglas Honegger, (D.G. Honegger Consulting)
Tom Rockwell, (California State University-San Diego)

Other Candidate Professional Subconsultants

Lisa Grant Ludwig, (University of California, Irvine[1])
Tom O'Rourke, (Connell University[2])

[1] Will have limited availability (with no fee) during current academic period. Potentially more availability as a subconsultant (with fee) during summer months non-academic period. Resume included

[2] May be remotely available for Part B workshop participation through website conference linkage or if workshop schedule is compatible with one of his regular west coast visits. Resume included and hourly billing rate is also included in Attachment B.

GeoPentech Resumes

S. Thomas Freeman, PG, CHg, CEG

Principal-Project Manager

EDUCATION

University of California, Berkeley: MS, Geological Engineering, 1974

University of California, Santa Barbara: BA, Geology, 1972

REGISTRATION

Professional Geologist: California, 1978, No. 3483 expiration 03/31/15

Certified Engineering Geologist: California, 1978, No. 1015 expiration 03/31/15

Certified Hydrogeologist: California, 2001, No. 712 expiration 03/31/15

PROFESSIONAL HISTORY

GeoPentech, 2000 – Present

URS/Woodward-Clyde, 1997-1999

Woodward-Clyde Consultants, 1972-1997

AFFILIATIONS

American Society of Civil Engineers

Geological Society of America

South Coast Geological Society

Association of Engineering Geologists

National Groundwater Association

AREAS OF EXPERTISE

- Engineering Geology
- Hydrogeology
- Seismic Geology
- Environmental Geology

EXPERIENCE SUMMARY

Mr. Freeman has over 42 years of consulting experience, specializes in evaluating the physical and performance characteristics of soil, rock, and groundwater and in assessing active faults, landslides, and other geologic hazards for input into planning, design, and construction of various types of projects in California, throughout the United States and overseas; ranging from individual short on-call assignments to managing multi- disciplinary teams on technically complex projects involving rigorous regulatory and public reviews.

He has worked with the full spectrum of geological, geotechnical, geophysical, and hydrogeology investigation techniques ranging from planning level reconnaissance, geology/geomorphology mapping, geophysical surveys, soil and rock borings, and in situ testing and laboratory testing. Work commonly involves evaluating subsurface geologic stratigraphy through an understanding of environments of deposition and geologic processes, faulting through an exhaustive background in seismic geology, groundwater flow and chemistry including groundwater monitoring, recharge, storage and utilization.

He has managed the assembly of the data and the preparation of the final reports. His experiences have be used helping clients examine the feasibility of their projects and developing plans for their cost effective and timely completion, including examining alternative scenarios and ranking and rating to identify the optimal program. He has also applied his knowledge toward focusing design phase investigations toward finalizing designs and preparation of specifications. He is also experienced in construction monitoring and evaluating operating facilities for maintenance, modifications and seismic safety compliance and assisting with conflict resolution.

SPECIFIC PROJECT EXPERIENCE INCLUDES:

Colorado River Aqueduct (CRA) Whitewater Tunnel #2 Seismic Vulnerability Assessment, Metropolitan Water District of Southern California (2014). Mr. Freeman assisted the Metropolitan Water District of Southern California (MWD) in organizing, conducting, and participating in a planning level workshop focused on the post-earthquake repair options to the Whitewater Tunnel #2 if it is severely damaged following a major earthquake along the San Andreas Fault beneath San Gorgonio Pass. The participants in the workshop included all relevant MWD department managers and engineers, and key internationally recognized tunnel contractors, and consulting engineers. Mr.

Freeman provided the engineering geology and geoseismic characteristics of the region around the Whitewater Tunnel #2 and coordinated the preparation and reviews of the proceedings that documented the information gained from the workshop. He also assisted MWD's staff in the preparation of long-range plans to address the potential seismic hazards to the tunnel.

Colorado River Aqueduct (CRA) San Gorgonio Pass Seismic Vulnerability Study, Metropolitan Water District of Southern California (2012-2014). Over the last several decades, Mr. Freeman has assisted engineers at the Metropolitan Water District of Southern California (MWD) address potential seismic hazard along the Colorado River Aqueduct and at its reservoirs and other facilities. This work has included applying his skills and experiences in seismic geology and site characterization to develop appropriate deterministic and probabilistic design parameters for measures to minimize active fault and ground motion hazards at the facilities. Recently, Mr. Freeman manage and lead a team of geoscientist, including several internationally recognized academic geoseismic researchers in the evaluation of the vulnerability of the CRA to forecasted major earthquakes along the San Andreas Fault where is trends beneath the CRA beneath San Gorgonio Pass. This vulnerability study included assessing the seismic geology, paleogeomorphology, paleoseismology, recorded seismology and geodetics and developing interpretation of the 3D configuration of the San Andreas Fault beneath the region of San Gorgonio Pass and to use this 3D configuration to model like surface fault displacements and ground deformations during the forecasted future earthquakes. These studies included preparation and conducting several workshops and meetings as well as preparation of large complex reports documenting the results of the seismic event vulnerability study.

Inland Feeder Arrowhead and Badlands Tunnels, Metropolitan Water District of Southern California, San Bernardino and Riverside Counties, California (1989-2013). Mr. Freeman has assisted MWD with the initial planning, environmental permitting, design, and construction of Inland Feeder including the Arrowhead Tunnels and the Badland Tunnels. On this assignment he provided direct assistance to MWD's Inland Feeder Program Management Team and the Arrowhead Tunnel's Project Engineer in the re-design of the Arrowhead Tunnels. His services included assisting with the coordination of MWD's Technical Board of Consultants and Legal Team, interactions with representatives of the San Manuel Indian Tribe, the U.S. Forest Service and the U.S. Geological Survey. His work included: reviews and technical guidance during surface geologic mapping and analysis of rock mass conditions, fault and other discontinuities, and analyses of groundwater conditions along the alignment including reviews and critiques of the U.S. Geological Survey's groundwater modeling efforts. He also assisted in the preparation of the U.S. Forest Service Special Use Permit and prepared the Draft Contingency Plan. Furthermore he assisted with reviews of the design team's contract documents including the GBR, and assisted MWD's staff in the contractor's pre-bid meeting and core reviews. During construction he has assisted MWD in evaluating contractor claims of differing site conditions and in developing models to help forecast future grouting requirements and closing the environmental permit. His staff recently assisted with the decommissioning of the groundwater monitoring wells that were used to document ground water conditions to achieve the final authorization permit for the Arrowhead Tunnels and decommissioning the wells on the Badlands Tunnels.

LADWP On-call Engineering Geology, Seismic Geology Hydrogeology, Geophysics, Geotechnical & Earthquake Engineering Services, Los Angeles, CA (2008 – Current). Mr. Freeman is GeoPentech's lead geoscientist with these on-call assignments, including: the planning and design level seismic hazard assessment of the 1st and 2nd LA Aqueducts in the region around Terminal Hill including a specially designed tunnel and shaft capable of accommodating fault ruptures during future seismic events so that flow through the 2nd LA Aqueduct to the reservoirs in the Department's Van Norman complex would not be cut off, and providing GeoPentech's on-site assignments during the construction of the tunnel and shaft at Terminal Hill; assisting in the evaluation of seismic hazards that could impact their reservoirs, pipelines, and canals in, and leading into, their Van Norman complex. This work included assessing the level of potential activity of faults within the San Fernando Fault System, including design and construction measures on a passing oil pipeline for it to accommodate future fault ruptures and not contaminate the feeder aqueducts to the complex; investigations to characterize the underlying and flanking bedrock, groundwater and seismic conditions and to assess the seismic stability, slope stability and seepage beneath, through and around the City of Los Angeles Department of Water & Power (LADWP) existing embankment dam and reservoir

Department's Elysian Reservoir Water Quality Improvement Project; evaluating the seismic stability of the Bouquet Canyon Reservoir's main dam and saddle dam, including assessing the character and stability of the embankments and their foundations and abutments and developing estimates of potential future ground motions and the level of activity of the Clearwater Fault Zone, which passes near the abutment of the saddle dam; and working through the planning, conceptual design of tunnel alternatives for the pipe line out of the Griffith Park Pump Station and preparing final designs for the Horizontal Direction Drill installation of the final pipeline.

South Orange Coastal Ocean Desalination Project's Open Intake Alternative, Municipal Water District of Orange County, California (2013). Mr. Freeman lead a team of geologist and engineers that assisted the Municipal Water District of Orange County (MWDOC) through Carollo Engineers by providing a conceptual level opinion regarding the feasibility of using either horizontal directional drilling (HDD), a micro-tunneling boring machine (MTBM), or an earth pressure balance tunnel boring machine (EPB TBM) as the construction method for the Open Intake Alternative (OIA) to the well extraction method for MWDOC's South Orange Coastal Ocean Desalination Project (SOCODP). The work included developing a summary of the different possible ground conditions along the OIA alignment based on the currently available subsurface geologic data and information available at that time and the likely affects these different possible ground conditions will have on the feasibility and associated costs of these three different construction methods. He also coordinated with subconsultant engineers in developing planning level opinions as to of the likely construction costs and schedule for the feasible one(s) of these three alternative construction methods.

Delta Habitat Conservation and Conveyance Program (2013). Metropolitan Water District of Southern California (Metropolitan) is evaluating the barge unloading and tunnel launch concept in their planning level feasibility assessment of Pipeline/Tunnel Option for the program. Mr. Freeman helped lead a GeoPentech team of geologist and engineers who were assisting Metropolitan in a preliminary planning level valuation of the geological and geotechnical aspects of designing and constructing the barge unloading facilities as an alternative for transporting the project's Tunnel Boring Machines to their launch shafts. And he lead a team of engineers and contractors who provided Metropolitan independent review of the region planning level studies of the 40-mile+ alternative alignment configurations for the project.

San Onofre Nuclear Generating Station, SCE, San Diego/Orange County (2009-2013). Tom Freeman was the lead geoscientist in SCE's re-evaluation of the seismic hazards at SONGS, particularly leading and coordinating up to 45 leading and internationally recognized academic, government and private sector researchers, including seismic geologist, petroleum geologist, seismologist and terrestrial and marine geophysics. Studies included analysis of old and newly acquired marine geophysics surveys of the faults in the region between Mexico and Palos Verde and offshore as far as San Clemente Island, coastal paleogeomorphology mapping of past seismic ground deformation of the coastal areas between Baja California and Palos Verde Peninsula, past fault activity trench investigation across the Newport-Inglewood Fault in San Diego, assessments of regional seismicity and geodetics data in Southern California, and the preparation and conducting several large workshops and meetings. The work also included the preparation of large complex reports documenting the results of the work.

Upper Chiquita Dam, Santa Margarita Water District, Orange County, California (2011). Principal Engineering Geologist for GeoPentech's involvement in the design and construction management team for the Santa Margarita Water District's new of the 155-ft high Upper Chiquita Dam and Reservoir. GeoPentech was responsible for the seismic and subsurface characterization for the design of the dam and reservoir, identifying onsite borrow areas for construction by reviewing previous studies; completing regional and local seismic source fault and potential ground motion assessments, onsite geologic mapping, CPT's, large diameter borings, surface and downhole geophysical surveys, test pit with in-place density measurements, recovered sample laboratory testing and corresponding seepage and stability analyses and reporting. Selective grading plans for on-site borrow material were developed and we have also coordinated and assisted in the reviews of these investigations and analysis, including observations during construction with the California DSOD. GeoPentech also provided consulting services related to geotechnical input to the EIR. This dam is now fully operational and GeoPentech is providing as-needed assistance with the District's monitoring system.

San Diego Pipeline #6 – South Reach Tunnel Feasibility Study, Metropolitan Water District of Southern California through Jacobs Associates, Riverside and San Diego Counties, California (2006-2009). Mr. Freeman has assisted MWD and Jacobs Associates by managing and conduction the site investigations, including existing information research and analysis, stereo aerial photograph assessments, geologic mapping, terrestrial geophysics. The work also included obtaining all the appropriate permits and completing several deep vertical and angle core holes into the granitic bedrock and across fault and discontinuities that could be sources of heavy volume, high pressure groundwater inflow during future tunnel excavations. Pumping test were complete on the core holes and piezometers were installed for longer term monitoring. The recovered core was laboratory tested for the rock properties utilized in tunnel design and construction. Using the resulting gathered data, groundwater models of the potential groundwater inflows were prepared and used to assess potential groundwater control measures during the construction of the tunnel and the possible impact to the groundwater regime overlying the tunnel alignment. The result study were then used in developing preliminary designs and environmental documentation. Following the completion of the study all the installed groundwater monitoring equipment was decommissioned.

Other MWD Tunnels (1989-2012)

Mr. Freeman has also correlated the characteristics of soil and rock ground conditions into planning, design and construction of other MWD tunnels, including his experience assisting with the planning and site characterization of the ground and groundwater conditions beneath the Santa Ana Mountains and the Cleveland National Forest for the MWD's Central Pool Augmentation Project's tunnel. He also assisted in the subsurface investigations for Lake Mathew's intake structure.

Orange County Reservoir Seismic Assessment (2008). Principal Engineering Geologist on the evaluation of static and seismic stability of the Metropolitan Water District of Southern California's (Metropolitan) Orange County Reservoir and dam, which was built in 1941 to store potable water. Worked included investigations of the ground conditions beneath the dam and reservoir and the surrounding area and analysis of the seismic stability of the facilities, their potential for future fault ruptures, the potential for excessive reservoir and embankment seepage, and an evaluation of the reservoirs existing gunite liner. The work included geologic mapping; mud-rotary borings with calibrated SPT testing, hollow-stem auger borings, CPT soundings; downhole seismic shear wave velocity measurements, groundwater level monitoring, laboratory testing. Analyses were completed of distress in the existing gunite lining and measures to mitigate the gunite liner distress. Analyses were also completed for reservoir leakage and embankment settlement, stability, and deformation and the adequacy of the facility in terms of the potential for fault ruptures, liquefaction, deformation and cracking of the embankment and slippage/movement of the surrounding ridge due to future earthquake events.

Hollywood Water Quality Improvement Project, Los Angeles, California (1997-1999). Mr. Freeman was project manager and lead engineering geologist of a team of consulting engineers, geologist, groundwater hydrologists and geophysicist providing technical support and supplementing when requested the staff of the LADWP in the geotechnical investigations, design, preparation of plans and specifications, and construction of two 30 million gallon underground concrete tanks extending 50 feet below grade and a utility tunnel and bypass tunnel. The project involved construction of a tied-back concrete slurry wall and a conventional tied-back shoring wall, design of subsurface drainage system and perimeter slope stabilization. Mr. Freeman and his staff pool logged boreholes and interpreted packer tests to assess geologic and hydrologic conditions; collected and interpreted dilatometer and pressuremeter data to assess in-situ engineering properties; conducted geophysical refraction and downhole seismic surveys to determine rock rippability and geologic structure; integrated geologic and geophysical results to create geologic maps and profiles. He also assisted LADWP staff in the preparation of the design and construction contract documents and provided geological consultation to the LADWP Construction Manager during the course of the projects construction.

Diamond Valley Reservoir, Metropolitan Water District of Southern California, Hemet, California (1990-1997). Project Engineering Geologist on a series of geotechnical dam site investigations for the MWD of Southern California, including site characterization studies to screen 14 alternative dam sites to one preferred site on which more detailed geotechnical investigations and final designs were completed and construction geological monitoring was done. As

part of the initial site screening studies, Mr. Freeman led the geological elements in the assessment of Perris Reservoir as an alternative to the DVR by increasing its height considering potential constructability and borrow sites as well as static stability, seepage evaluations, and seismic deformation of the dam.

LADWP Dams Seismic Assessment, California (1996). Assisted the LADWP's staff in completing an evaluation and ranking and rating of the 17 existing dams in their reservoir system in terms of potential seismic and other geologic hazard. The results of the study allowed the Department to prioritize their future retrofit efforts on the more critical facilities, such as Bouquet Reservoir.

Other Past Related Assignments (1972-2012). Mr. Freeman has also correlated the characteristics of soil and rock ground conditions into planning, design and construction of other underground structures, including a laketap and tunnel at Bradley Lake Alaska, at Thistle Utah and at the Camp Far West Reservoir in California. More recent experience includes assisting with the characterization of the ground and groundwater conditions beneath the Santa Ana Mountains and the Cleveland National Forest for the Riverside County Transportation Commission's Irvine-Corona Expressway Tunnels. Examples of other tunnels where he lead the effort in planning and executing the investigations, participated in design teams' preparation of the contract documents, was a leader in the construction management team to complete the tunnel construction, and assisted owners in solving seismic hazard , underground stability and excessive groundwater inflow problems include the Second Manapouri Tailrace Tunnel and gold mine tunnels in seismically active New Zealand, the Getty Museum's Drainage Tunnel, the Richmond Tunnel, the Goodwin Tunnel in seismically active California, and the Glenwood Canyon tunnels in Colorado. Mr. Freeman also provided senior geological and tunnel constructability reviews during feasibility studies for MWD's West Valley Conveyance tunnel. He also assisted in the evaluation, design and construction management to repair tunnels, such as the Azusa, Devil's Gate for the City of Pasadena, and the Kern River tunnels for Southern California Edison. Other tunnel projects where Mr. Freeman contributed his geologic engineering and tunneling expertise toward their design and/or construction include Yucca Mountain, South Bay and Point Loma out falls, Cowels Mountain, and Stone Canyon Water Quality Improvement. In the 1970's and early 80's he assisted a variety of tunnel contractors on over 16 projects with their pre-bid assessments and differing site condition claims during construction.

Assisted the Orange County Water District by providing on-site stratigraphic logging and monitoring of the drilling of their Talbert seawater barrier injection wells. Along with Dr. Paul Witherspoon, provided WRD a geological/groundwater hydrogeology analysis of the West Basin and its crossing Newport-Inglewood and other faults and their effectiveness as seawater barriers and to assist in identifying efficient measures to close gaps in the fault barriers. Provided WRD senior geological/hydrogeological review of the subsurface characterization and modeling of the stratigraphy, faulting and groundwater conditions in the Alamitos Gap in the Newport-Inglewood Fault leading to trial-runs of alternative measures permanently close the gap thus eliminative the need for injection wells. Completed complex investigations characterizing the geometry and level of activity of the Newport-Inglewood Fault through the Bolsa Chica and Bixby Knolls areas.

Managed planning-level regional reconnaissance hydrogeologic investigations for groundwater basin storage and resource development studies in eastern California's desert for MWD's Colorado River Aqueduct Groundwater Storage Project including Vidal, Rice, Ward, Cadiz, Fenner, Palen, Chuckwalla, Hayfield, and Shavers valleys. Managed a detailed site investigations for MWD in Hayfield Valley to assess the feasibility of using the valley's groundwater basin, overlying dry lake bed and their CRA Hinds Pumping Station discharge facilities in a groundwater storage and conjunctive use program, The investigations included surface geologic/geomorphic mapping, deep sounding geophysical surveys and borings, fault barrier analyses, ground water monitoring and water quality analysis large scale trial infiltration tests, and groundwater modeling/analysis and report preparation.

Managed a detailed site investigations for MWD in Chuckwalla Valley to assess the feasibility of using the valley's groundwater basin and the bordering CRA canal and syphon in a groundwater storage and conjunctive use program, The investigations included surface geologic/geomorphic mapping, deep sounding geophysical surveys and borings, fault barrier analyses, ground water monitoring and water quality analysis designing and constructing large scale trial infiltration test basins, and groundwater modeling/analysis and report preparation. Providing management of on-call engineering geology and hydrogeological services supporting MWD's portion of the Cadiz Valley Groundwater Conjunctive Use Project, including, geologic/geomorphic mapping along the route between the CRA and the Cadiz Valley, proposed for the water conveyance facility, alternative spreading basin concepts, groundwater modeling and water quality analysis of existing and alternative conjunctive use scenarios. Also assisted by critiquing, other ground water models, such as presented by interveners and regulating agencies and provided presentation in various internal meeting and meetings with regulators and interveners.

Assisted MWD by reviewing PG&E's remediation of Cr+6 contaminated groundwater near the Colorado River and by completing an independent reviews, analyses and models of the stratigraphic and groundwater conditions along and bordering the river leading the development of alternative measures to install a permanent barrier to protect the river from Cr+6 contamination.

Recently, have been assisting MWD by providing on-call geology/hydrogeology services to analysis and assess the impact of the Diamond Valley Reservoir operations on the neighboring groundwater utilizers

PUBLICATIONS

- Arrowhead Tunnels: Assessing Groundwater Control Measures in a Fractured Hard Rock Medium; with E. Fordham, D. Tempelis and S. Duke; Rapid Excavation and Tunneling Conference Proceedings, 2003
- Matahina Dam – Fault Surface Displacement Design Criteria (with Murray Gillon, Paul Somerville, Lelio Mejia, and Yoshiharu Moriwaki), 12th World Conference on Earthquake Engineering, Auckland, New Zealand, 2000
- Planning Southern California Tunnels (with F.W. Horne, and D.C. Mann). Proceedings Rapid Excavation and Tunneling Conference, Boston, MA. 1993.
- Numerical Simulation of Tunnel Ground-Water Inflows with (S.B. Lee and D. Jensen). Association of Engineering Geologist 36th Annual Meeting Pg. 60 Program and Abstracts 1 - 16 October, San Antonio, TX. 1993.
- Seismic Hazard Assessment, Newport-Inglewood Fault Zone in Engineering Geology Practice in southern California, (with E. Heath, P. Guptill, and J. Waggoner), Edition by B. Pipkin and R. Proctor AEG Special Publication No. 4, Pg. 211-231, 1992.
- Late Quaternary Activity Along the Onshore Portion of the Palos Verdes Fault Zone (with P.D. Guptill, T.A. Demere, D.L. Schug) Final Technical Report to U.S. Geological Survey, Contract no. 14-08-0001-21304, 1987.
- Lake Thistle, Evaluation of Lake Tap Alternatives (with J.A. Bischoff and R.J. Essex) Tunneling Technology. Published by the U.S. National Committee on Tunneling Technology. 1984.
- Underground Technology in the Peoples Republic of China (with D.J. Lachel and B.L. Smith) Tunneling Technology. Published by the U.S. National Committee on Tunneling Technology. 1981.

- Potassium argon ages of tertiary volcanic rocks from the eastern Mojave Desert (with S. Kuniyoshi). Geological Society of America Annual Meeting Abstracts with Programs. 1974.
- The Buckskin Mountain tunnel: rock mass properties and their effect on TMB design and performance (with L.L. Oriard). Southern California Section of the Association of Engineering Geologists. 1979.
- Th^{230} - U^{234} dating of pedogenic carbonates in gravelly desert soils of Vidal Valley, southeastern California (with T.K. Ku, W.B. Bull, and K.G. Knauss). Geological Society of American Bulletin 90 (11), 1063-1073. 1979.
- Late Quaternary Slip Rate of the North Branch of the San Andreas Fault at City Creek California (with K. Sieh and L. B. Grant) Geological Society of America 90th Annual Cordilleran Section Meeting Abstracts with Programs. Vol. 26 No. 2 pg. 91. 1994.

Eric Fordham, PG, CHg, CEG

Principal Hydrogeologist-Project Technical Advisor

EDUCATION

California State University, Long Beach, California, M.S., Geology, 1989

California State University, Long Beach, California, B.S., Geology, 1981

REGISTRATION

Professional Geologist, California, 1990, No. 4754 expiration 02/28/17

Certified Engineering Geologist, California, 1991, No. 1665 expiration 02/28/17

Certified Hydrogeologist, California, 1995, No. 283 expiration 02/28/17

AFFILIATIONS

American Geophysical Union

Association of Engineering Geologists

Association of Groundwater Scientists and Engineers

Society for Mining, Metallurgy and Exploration

AREAS OF EXPERTISE

- Hydrogeology
- Engineering Geology
- Environmental Geology

REPRESENTATIVE EXPERIENCE

Mr. Fordham is a consulting hydrogeologist with over 30 years' experience in the field of hydrogeology, engineering geology and environmental geology. Mr. Fordham's responsibilities have included designing and implementing surface and subsurface investigations to characterize geologic and hydrogeologic conditions for: groundwater control during the construction of subterranean structures; the siting and expansion of dams and waste disposal facilities; development of groundwater monitoring programs; geologic and hydrogeologic support for environmental permitting; management of groundwater basins, including groundwater development, aquifer recharge and groundwater storage; design and evaluation of water supply wells; and the assessment and remediation of soil and groundwater contaminants. Mr. Fordham has provided these services for both private- and public-sector clients.

Mr. Fordham's capabilities include conducting subsurface characterizations using a multitude of investigation methods including downhole and surface geophysics, drilled and direct-push soil borings, soil and rock coring, bucket-auger drilling, trenching, test pits and down-hole logging, Cone Penetration Testing, measurements of groundwater chemistry and sampling from monitoring well networks, discrete-interval groundwater sampling, single well and multiple well pumping tests, slug tests, vertical flowmeter tests, tracer tests and soil-gas testing. Mr. Fordham utilizes collected data to develop a conceptual understanding of the geologic and hydrogeologic conditions which he then tests using both analytical and numerical techniques.

His project experience has involved project management and staff supervision, data collection, compilation, and analysis of geologic and hydrogeologic information, technical review, expert witness testimony, report preparation, database management, geographical information system (GIS) management, statistical analysis, and vadose zone and groundwater flow and pollutant fate and transport modeling. He possesses a thorough knowledge of groundwater-related

regulatory requirements and regularly performs agency liaison on behalf of clients.

A selection of Mr. Fordham's representative experience is highlighted below:

Groundwater Supply Wells

- Mr. Fordham evaluates his client's groundwater supply wells to address well capacity and water quality issues and provides recommendations to mitigate supply and water quality issues. Mr. Fordham has utilized various methods to investigate well issues including downhole video, downhole geophysics, spinner/flow testing, depth specific water quality testing, continuous pumping tests and step-tests for well performance. He has assessed the vulnerability of supply wells to shaking and vibrations from earthquakes, road noise and construction activities. Mr. Fordham has also provided well design and construction services. Clients that Mr. Fordham has provided these services include, Newhall County Water District, City of Downey, City of Chino and the Niagara Water Bottling Company.

Subsidence

- Evaluates causes for subsidence due to groundwater extraction from aquifers and ground loss from subterranean construction. Examples include: excessive groundwater withdrawals from the Chino Basin of Southern California resulted in over 4 feet of permanent ground subsidence with differential subsidence across a previously unknown fault barrier resulting in the occurrence of ground fissures. Investigations included developing understanding of the underlying aquifers and aquitards, groundwater occurrence, groundwater extraction history, evaluating existing land survey data, installing and monitoring piezometric pressures in key zones along with a multi-depth extensometer, use of InSAR and land level surveys to assess ongoing permanent and elastic ground deformations, and installation of a horizontal extensometer to evaluate potential for ground fissures. Also evaluated for the Los Angeles County Metropolitan Transportation Authority, ground subsidence above the Red Line Northern Extension tunnels due to ground loss during construction.

Numerical Modeling

- Integrates geologic, hydrogeologic and geochemical data into groundwater flow models to evaluate groundwater supply and quality, identify potential benefits and disadvantages of proposed water-related projects, evaluate

effects of man-made subsurface barriers on seawater intrusion, and assess the fate and transport of chemical contaminants in soil and groundwater. Develops numerical and analytical models to estimate possible groundwater inflows to tunnels during construction and evaluates potential impact to overlying groundwater resources. Applies numerical and analytical techniques to evaluate optimum construction dewatering schemes. Groundwater flow codes applied include MODFLOW, FEMWATER, FRAC3DVS, WinFlow, UTCHEM, and SEEP2D/ SEEP3D. Develops and applies chemical fate and transport models to assess dissolved and free-phase chemical transport of petroleum hydrocarbon compounds, VOCs, metals, nitrate and chloride. Transport codes applied include MT3D, MT3DMS, MODPATH, ParsSim, UTCHEM, FRACTRAN, MOC3D, and SUTRA. Also uses mass balance modeling approach to evaluate perchlorate, manganese, iron, arsenic, nitrate, and chloride impacts to groundwater supply. Also uses the code PHREEQC to model water chemistry resulting from soil interaction and water mixing as a result of groundwater recharge. Key projects include, Metropolitan's Hayfield and Chuckwalla Groundwater Storage projects and Inland Feeder tunnel projects, the Tehachapi Blue Eagle Lode Mine, Kern County's Lake Isabella shallow groundwater issues, Newhall County Water District well fields, Water Replenishment District of Southern California's Alameda Seawater Barrier Project, Xerox VOC remediation, BF Goodrich Aerostructures Facility VOC remediation and Arroyo Trabuco Golf Course water supply.

Groundwater Resource Development

- Provides hydrogeologic services to municipal water agencies, private water bottling companies and land developers to develop groundwater resources for domestic water supply, bottled water production and irrigation. Key projects have included hydrogeologic characterization of groundwater basins for conjunctive use projects. Clients include Metropolitan Water District of Southern California; City of Chino; Water Replenishment District of Southern California; Newhall County Water District; Rancho Mission Viejo; Arrowhead Springs Water Company; and Niagara Water Bottling Company.

Spreading Grounds

- Lead hydrogeologist responsible for conducting hydrogeologic and geologic investigations for Metropolitan Water District of Southern California to

assess the feasibility of storing surplus Colorado River water in California's desert basins during wet years and recovering water from the basins during drought years. Projects included Hayfield, Chuckwalla, Cadiz, Rice, and Palen valleys. Conducted percolation tests, analyzed results and provided recommendations for the Water Replenishment District of Southern California on groundwater recharge enhancements at the Dominguez Gap Spreading Grounds. Evaluated options for conjunctive use of groundwater and surface water for golf course irrigation, including groundwater storage during wet years.

Seawater Barriers

- Lead hydrogeologist for the Seawater Barrier Alternatives Study for three existing seawater barrier systems in the West Coast Basin of Los Angeles County, California. This work was completed under contract with the U.S. Department of the Interior Bureau of Reclamation with technical support from the Water Replenishment District of So. California, L.A. County Department of Public Works and the Orange County Water District. Responsible for compiling, synthesizing and reporting to a technical advisory committee geologic and hydrogeologic characteristics of the three barriers and identifying potential technologies that could be applied to prevent the intrusion of seawater. Collected geologic, hydrogeologic and geotechnical data, and completed data analysis and groundwater flow and chloride transport modeling to evaluate the effects of a Deep Soil Mix subsurface barrier wall on preventing seawater intrusion at the Los Alamitos gap.

Environmental Geology

- Conducts Phase 2 site assessments to characterize the hydrogeology, the magnitude and extent of chemical and pathogenic contaminants in soil and groundwater, and also implements remediation to reduce the potential for public health and environmental effects. Mr. Fordham also provides legal assistance on issues associated with potential or actual impact of transgressing chemicals released into the environment. Chemical contaminants with which Mr. Fordham has specific experience include perchlorate, nitrate, chromium, arsenic, lead, mercury, thallium, volatile and semi-volatile organic compounds, fuel hydrocarbons and pathogenic microbes. Many of these projects were completed under the authority of either the California Regional Water Quality Control

Board or the Department of Toxic Substances Control. Clients included Fortune 500 companies such as Xerox, Eaton, Amgen, Unocal and BP Amoco; and local, State and Federal agencies such as the City of Malibu, California Department of Parks and Recreation, Metropolitan Water District of Southern California, Los Angeles County Metropolitan Transportation Authority, CalTrans, and the U.S. Bureau of Reclamation.

Technical Review

- Participates on review committees for various government and corporate entities providing hydrogeologic and geologic input, including: Impact Assessment for the New York City Department of Environmental Protection, Aqueduct Connection Environmental Support Project, Roseton, New York (2014 to present); Chino Basin Watermaster Land Subsidence Committee, representing the City of Chino (2003 to present); PG&E Topock Hexavalent Chromium Cleanup Site Technical Work Group, representing the Metropolitan Water District of Southern California (2003 to present); Nevada Environmental Response Trust Perchlorate Cleanup Stakeholder, representing the Metropolitan Water District of Southern California (2004 to present); ARCO Pipeline Environmental Remediation Working Group, (1996 to 1998).

Yoshi Moriwaki, GE, PE

Principal-Project Technical Advisor

Education

Ph.D., Geotechnical Engineering, UC Berkeley, 1975
M.S., Engineering Mechanics, NYU, 1968
B.S., Civil Engineering, MIT, 1966

Registration

Civil Engineering, CA, 1986 (C40972)
Geotechnical Engineering, CA, 2000 (GE2499)

Affiliations

American Society of Civil Engineers
Earthquake Engineering Research Institute

QUALIFICATIONS:

Dr. Moriwaki, Principal with GeoPentech, has managed or contributed to various types of small to large, multi-disciplinary civil engineering projects for over 45 years, spanning from field, laboratory, and instrumentation work through analysis and evaluation to project management.

Dr. Moriwaki has extensive experience in comprehensive geotechnical seismic evaluation of dams, reservoirs, pipelines, underground structures, and bridges. Further, he has extensive experience in seismic hazard (earthquake ground motions, liquefaction, soil-structure interaction, mitigation measures, etc.) evaluations for numerous sites and facilities, including dams, underground structures, pipelines, and bridge sites in many parts of the United States (California, Alaska, Utah, Missouri, New York, etc.) and the world (Canada, Japan, Indonesia, Australia, Germany, etc.).

Dr. Moriwaki's expertise also includes static and seismic numerical analysis of soil and soil-structure systems and the geotechnical application of probabilistic methods to various projects including those applied to dams, highway and bridge systems. Dr. Moriwaki has actively contributed to various professional societies and committees, such as having been an ASCE Geotechnical and Geoenvironmental Engineering Journal Editorial Board member, and has taught at the San Jose State University and Caltech. Furthermore, his professional contributions include being a member of the NCEER experts that compiled the state-of-the-art liquefaction assessment, a contributor to California Division of Mines and Geology (CDMG) Special Publication 117 Guidelines for Evaluating and Mitigating Seismic Hazards in California, and one of the instructors for Seismic Hazards Evaluations seminars sponsored by CDMG (led by Prof. Ray Seed) over several years. Dr. Moriwaki also was a member of the NSF-sponsored USA geotechnical team that visited the Kobe area following the 1995 Kobe earthquake.

His experience includes many ground improvement evaluations including those at Tablachaca, Peru; Costa Oriental Dikes, Venezuela; Jensen Filtration Plant; the Honda testing track in the Mojave Desert, and the CSU site in Long Beach. Methods addressed included many soil improvement methods including excavation and replacement, stone column methods, chemical grouting, dynamic compactions, and others.

SELECTED SPECIFIC PROJECT EXPERIENCE INCLUDES:

Stevens Creek and Lenihan Dams, Santa Clara Valley Water District, Santa Clara, CA (2013)

Principal engineer leading the seismic/earthquake engineering aspects of GeoPentech work on this project focusing on material and ground motion characterization and seismic analysis. The evaluations was required by the Division of Safety of Dams (DSOD) in June 2008 as part of their Phase III screening process of the State's dams located in highly seismic environments. The evaluations of 170-ft Lenihan Dam and 120-ft high Stevens Creek Dams are also a vital part of the Santa Clara Valley Water District's Dam Safety Program (DSP). The project included field investigation, material characterization and seismic deformation analysis to evaluate the potential deformation range in the event of a major earthquake.

San Pablo Dam, East Bay Municipal District, Contra Costa, CA (2010)

Lead seismic/earthquake engineer for the seismic upgrading design work of initially hydraulically built San Pablo Dam located in Contra Costa County, California, completed in 1921 but seismically upgraded twice in the past. In the

previous investigations, the shells of the dam and alluvial foundation soils beneath the embankment were considered to have high liquefaction potential. With the high design earthquake shaking conditions (0.91g peak ground acceleration) developed for the site, the seismic upgrading design focused on deep soil mix downstream of the embankment to be overlain by a significant downstream berm and other associated modifications. Field investigation starting with cone penetration tests and continuing with borings combined with laboratory testing, formed the basis for a revised site and material characterization where the shells of the dam have low liquefaction potential and even alluvial foundation soils have only some potential for liquefaction. Seismic deformation analysis using FLAC was performed to generate inputs to the design of deep soil mixing systems to address some potential for liquefaction in the alluvial foundation soils that cannot be discounted. The FLAC evaluation addressed the "soil-structure interaction" effects as well as spatially varying deformation patterns of the embankment. California Department of Safety of Dams, a review board for the client, and a number of technical consultants were involved.

Walnut Canyon Dam, Anaheim, California

Principal engineer leading the seismic/earthquake engineering aspects of GeoPentech work. The seismic performance evaluation of the Walnut Canyon Dam was performed using FLAC and material properties based on detailed analysis of the construction records, laboratory strength testing, field investigation including in situ testing, and our experience. The input ground motions at about 1 g peak ground acceleration were reviewed and accepted by DSOD. On the basis of the material characterization and FLAC analysis results combined with careful evaluations of seepage conditions, we were able to show to DSOD that initially contemplated significant seismic remediation will not be needed. The results of seismic FLAC analysis addressed not only the seismically induced deformations of the dam, but also potential changes in internal stress conditions as possibly affecting the potential for cracks and piping phenomena.

Bouquet Canyon Dams Seismic Evaluation, Los Angeles Department of Water and Power, Los Angeles, California (ongoing)

Principal engineer leading the seismic/earthquake engineering aspects of GeoPentech work. The two earth dams at the Bouquet Canyon Reservoir dams, located in the Angeles National Forest, north of Los Angeles, are being evaluated for earthquake shaking and faulting. The two dams were identified as those requiring further seismic evaluation based on a screening study performed by GeoPentech professionals while working at Woodward-Clyde Consultants. In particular, the downstream slope of the Bouquet Canyon Dam No. 1 is founded on existing alluvium with potential for liquefaction. Because the site is only 8 km from the San Andreas Fault, the shaking conditions including acceleration time histories had to be developed incorporating near-fault effects. The current phase of the project includes seismic hazard evaluation, field investigation, material characterization, and analysis using FLAC to evaluate the response of the dam in the event of a major earthquake. The work is reviewed by DSOD, as well as an external review board.

Second Narrows Water Supply Tunnel, MetroVancouver, Vancouver, British Columbia (2010 - 2014)

Lead seismic and earthquake engineer for GeoPentech. The project consisting of two new water mains within an approximately 6 meter diameter tunnel crossing below Burrard Inlet at Second Narrows and associated structures involved reviewing site characterization, ground motion evaluation, and seismic deformation analysis performed by another firm. Our work involved independent, but focused material characterization and dynamic analysis addressing significant liquefaction-induced deformations near ground surface extending to depths of about 60 m below the ground surface. Our review identified significant epistemic uncertainty of the seismic displacements computed at depth (up to 60 m), and recommended further evaluating and quantifying this uncertainty.

Cerro Corona Tailings Dams in Peru (2012)

Lead seismic and earthquake engineer for GeoPentech. As a subconsultant to MWH, working on static and seismic deformation and stability evaluations of various tailings dams at the site as the "modified" centerline design concept developed; the work involves evaluations of data, ground motion issues, and advanced static and seismic analyses using FLAC and various soil models over several years involving liquefaction issues.

Steven Duke, PG, CEG, RGp, CHG

Task Leader

Education

MS, Geophysics, 1990
BS, Geophysics, 1988

Registration

Registered Geologist: California, 2001 (7243)
Certified Engineering Geologist: California, 2002 (2264)
Registered Geophysicist: California, 1996 (1013)
Registered Hydrogeologist: California, 2003 (746)

Affiliations

Environmental and Engineering Geophysical Society
Society of Exploration Geophysicists
American Geophysical Union

QUALIFICATIONS:

Mr. Duke has over 23 years of experience in the fields of engineering geology, hydrogeology, and engineering geophysics. He has designed, performed, and interpreted geological and geophysical data for numerous small and large scale projects. His experience extends through all phases of project development including planning, design, construction, and post-construction work.

Mr. Duke has been responsible for field operations, data processing, and quality control during geological and geophysical site investigations for numerous projects related to groundwater storage, tunnels, subways, dams, borrows, foundation engineering, slope stability, hydrogeology, seismic geology, and landfills. For projects such as these, he has characterized the soil, rock, and groundwater conditions; and evaluated active faults, landslides, and other geologic structures. Mr. Duke is also extensively involved in soil and rock borehole and core logging, downhole bucket-hole logging, cone penetration testing, geologic and groundwater instrumentation, groundwater modeling, surface seismic, magnetic, and electrical geophysical surveys, marine geophysical surveys, and down-hole geophysical surveys. He has used these investigation techniques for site characterization and monitoring for numerous groundwater, geotechnical, and environmental projects.

SELECTED SPECIFIC PROJECT EXPERIENCE INCLUDES:

Bouquet Reservoir Seismic Evaluation, Los Angeles County, California (2002 – Present). Planned, conducted, and supervised a geologic and geophysical program for the evaluation of the seismic integrity and potential fault rupture hazard of two dam sites containing Bouquet Reservoir. Performed geologic mapping of natural exposures, road cuts, and exploration trenches. Conducted geophysical refraction and downhole seismic surveys to determine soil/rock velocities and geologic structure. Geologic and geophysical data were compiled to produce geologic maps and profiles. The compiled data were used to develop estimates of potential rupture displacements and to map potentially liquefiable layers that might underlie the two dams.

Diemer Filtration Plant, Yorba Linda, CA (1994 – Present). Performed numerous geophysical surveys (including seismic refraction, downhole seismic, electrical resistivity, magnetometer, and magnetic locator) and geotechnical investigations for various site development projects located throughout the MWD Diemer plant. These surveys were used in part to evaluate subsurface geology, faulting, slope stability, and groundwater conditions; corrosivity; location of utilities; material rippability; and the presence of a buried metallic well head.

LADWP On-call Geophysical Services (2011 – Present): Project Manager providing on-call geotechnical and geophysical services to the Geology and Soils Group of the LADWP's Power Engineering Services Division. He has recently completed a geotechnical investigation for the Owens Gorge Flow Restoration Project for improvements of LADWP's at Upper, Middle, and Control Gorge Power Plant Facilities. Additionally, he has recently completed work for the Haskell Canyon site development, Hollywood-Toluca Lake Road Repairs, and Cottonwood Power Plant development. Typical work for these projects included: seismic refraction geophysical surveys, bucket auger borings, rotary wash borings, test-

pits, surface geologic mapping, laboratory testing, and engineering analysis to provide recommendations for slope stability, foundation design.

Mid-and-High-Rise Buildings, Los Angeles, CA (2004 – Present). Provided the engineering geology and geophysical services for several of the mid-and-high-rise buildings in downtown Los Angeles. Typical geotechnical investigation work performed for these structures include deep borings, laboratory testing and extensive engineering analysis to provide recommendations for foundation design, ground motions, excavation and shoring, earthwork and drainage. Example buildings in downtown LA area include: 9th & Figueroa (addition currently being completed), 1027 Wilshire Blvd. (in design phase), LA Convention Hotels (two towers recently opened), 1015 Wilshire Blvd., 12th and Grand, Metropolis, Hollywood/Western, 8th and Grand, and the New San Bernardino Courthouse. Some of these buildings were designed considering performance-based design seismic input. In addition to the engineering and geophysical studies provided for these projects, he also performed the instrumentation and monitoring of the deep excavations such in the case of 9th and Figueroa. Also performed downhole and refraction microtremor (REMI) geophysical measurements to characterize shear-wave velocity structure (Vs30, Z1.0) for several mid-and-high rise building development sites in the Los Angeles area. In addition to the sites mentioned above, these sites include: California Science Center, Bicycle Casino, 755 S. Figueroa Blvd., 5825 Sunset Blvd., 6121 Sunset Blvd., 225 S. Grand, 848 S Grand Ave., UCLA Health Sciences, 820 Olive Street, 929 S. Broadway, 1212 S. Flower, Metropolis, 400 S. Broadway, and 850 S. Hope.

Santiago Dam, Irvine, California (2011 – 2012). Performed a geotechnical investigation to assess potentially liquefiable materials under the dam. Conducted rotary sonic boreholes, geophysical seismic refraction using a shear-wave source, downhole seismic and ReMi surveys to determine geologic structure and shear-wave velocity characterization. Results were used to assess liquefaction in gravelly soil condition using the results of the sonic boreholes and the measured shear-wave velocities. Analyses were presented to DSOD to show that the materials underlying the dam were not liquefiable.

Walnut Canyon Dam, City of Anaheim, CA (2010 – 2014). Performed a geotechnical investigation for a seismic evaluation of the City of Anaheim's Walnut Canyon Dam that was operating at a restricted low level due to DSOD concerns over its seismic stability and its drain system. Also, installed a groundwater instrumentation system to automatically monitor groundwater levels within boreholes located on the dam and trained City of Anaheim personnel to manage and download automated instrumentation readings.

San Onofre Nuclear Generating Station Seismic Hazard Analysis, San Onofre, California (2009 – 2014). Mr Duke is a Senior Project Geophysicist and Geologist for the seismic hazard analysis for the recently closed San Onofre Nuclear Generating Station. His work for this projected included a detailed geologic and seismic characterization using (1) marine seismic reflection data analysis, (2) geodetic data modeling, and (3) geologic and geophysical logging of deep boreholes. He is currently performing a re-analysis of offshore industry seismic reflection data, which have been reprocessed using modern methods to improve seismic image quality. The results are being used to evaluate the center, body, and range of possible fault tectonic models and ground motion parameters that may influence the seismic hazard at the plant, including the fuel handling building.

Elysian Reservoir Water Quality Improvement Project, LADWP, Los Angeles, California (2009 – 2013). Senior Project Geologist and Geophysicist - Performed a geologic and geophysical investigation program to characterize subsurface conditions for the design of a proposed water-conveyance tunnel and reservoir cover development. Conducted geophysical seismic refraction, seismic downhole, and SASW / ReMi surveys to determine geologic structure, shear-wave velocity characterization (Vs30 and Z1.0), and rock rippability. Also, supervised the logging of coreholes, rotary-wash boreholes, and a sonic borehole to

characterize rock conditions along the proposed tunnel alignment and beneath the dam, and soil conditions within the dam and under the reservoir.

Upper Chiquita Reservoir, Orange County, California (2009 – 2011). Planned, conducted, and supervised a geologic and geophysical program for the site characterization and design of a 155-ft high earth fill dam for the Santa Margareta Water District. The subsurface investigations conducted included CPT's, large diameter borings that were downhole logged, surface and downhole geophysical surveys, test pit with in-place density measurements, and geologic mapping. Also, developed Vs30, Z1.0, Z1.5, and Z2.5 for use in Next Generation Attenuation (NGA) models. Reviewed and presented results of field investigations to DSOD in their Sacramento offices. Currently, leading the site geologic mapping and coordination with DSOD during the construction of the dam and reservoir, which has included the evaluation of the activity of a fault that was located through the dam.

Escondido Canal, San Diego County, California (2009 – 2010). Performed a geotechnical feasibility-level evaluation of alternative cut and cover pipeline alignments considered for the undergrounding of the existing Escondido Canal. This evaluation identified possible ground conditions and its influence on pipeline design, construction and operation along the alternative alignments. Reviewed available geological/geotechnical data, including aerial photography and performed a field reconnaissance study, including seismic refraction surveys. Results were used to provide input on constructability, geotechnical issues, and geologic hazards for cataloging and rating of the proposed alternative alignments.

Camanche Reservoir, San Joaquin County, California (2008). Assisted with the characterization of the Camanche Reservoir Main Dam and associated Dikes. The characterization involved assessing main tailings foundation material beneath the main dam and alluvium beneath the dikes. The characterization was used in FLAC seismic analysis to be used for the basis for ground improvement recommendations. Performed downhole seismic measurements and calculated Vs30, Z1.0, Z1.5, and Z2.5 for use in Next Generation Attenuation (NGA) models.

San Pablo Dam, Contra Costa, California (2006 – 2008). Assisted with the characterization and design of the seismic upgrade of the 170-ft high hydraulic fill dam constructed in 1920. The design work involved the seismic nonlinear analysis of the dam to optimize the size, extent, and mix design of deep soil mixing stabilization of the downstream alluvium against seismic deformation. The characterization involved assessing alluvium beneath the dam for use in the nonlinear analysis. Performed geophysical seismic refraction and downhole seismic measurements.

San Diego Pipeline No. 6 Segment 2, Riverside and San Diego Counties, California (2007). Performed a geotechnical feasibility evaluation along the cut-and-cover pipeline portions of 5 alternative alignments for the second segment of San Diego Pipeline 6. Reviewed available geological/geotechnical data, including construction data of existing parallel pipeline alignments and performed a field reconnaissance study. Results were used to provide input on constructability, geotechnical issues, and geologic hazards related to the construction of the pipeline along the alternative alignments.

Arrowhead East and West Tunnels – Inland Feeder Pipeline Project, San Bernardino County, California (2001 – 2009). Performed geologic and hydrologic characterization of the tunnel alignments to assist with geologic and groundwater resource evaluation during tunnel construction. Installed and maintained automated groundwater instrumentation system to monitor pre- and post-construction groundwater levels along 10-mile tunnel alignment. Performed data reduction and interpretation of monitoring data from groundwater resources and developed mitigation criteria for groundwater resource sites. Also, created a probe drill pressure automated monitoring system, and analyzed response of system

during probe drilling ahead of tunnel face to predict ground conditions within the unmined rock ahead of the tunnel.

Riverside Badlands Tunnel – Inland Feeder Pipeline Project, Riverside and San Bernardino Counties (1998 – 2003). Installed and maintained automated groundwater instrumentation system to monitor pre- and post-construction groundwater levels along 8-mile tunnel alignment. Planned, implemented, and interpreted data from numerous hydrologic tests and geologic borings to assess aquifer properties, well production, and groundwater response to tunnel construction activities. Interpreted data were used to assess groundwater impacts to nearby private groundwater resources, the effectiveness of contractor's dewatering systems, design and construction of additional dewatering wells, and groundwater influence from an adjacent landfill.

Chuckwalla Groundwater Storage Basin Project, Riverside County, California (2002 – 2003). Performed and supervised geologic, hydrogeologic, and geophysical investigations for the design of an approximately 1,000,000 acre-ft aquifer storage and recovery project. Installed automated groundwater instrumentation system within the basins to monitor groundwater levels. Interpreted geologic and hydrogeologic conditions to assist with the design of spreading basin layouts, estimate storage volume for different pump field alternatives, and to estimate hydrocompaction.

Rambod Hadidi, GE, PE

Task Leader

Education

PhD, Civil Engineering, 2007
Rutgers University
MS, Civil Engineering, 2003
Rutgers University
BS, Civil Engineering, 1999

Registration

Civil Engineering, CA, 2009 (C74338)
Geotechnical Engineering, CA, 2013 (GE3051)

Affiliations

American Society of Civil Engineers
Earthquake Engineering Research Institute

QUALIFICATIONS:

Dr. Hadidi has more than 14 years of experience in geotechnical and earthquake engineering and numerical analysis on a wide range of infrastructure projects, for both private and public sectors, locally, nationally, and globally with a wide range of complexity and size. These projects cover a wide range of infrastructure facilities such as dams, reservoirs, bridges, buildings, pipelines, roadways, airports, tunnels, and power plants.

During his career, Dr. Hadidi has performed numerical modeling and analysis in support of evaluation, design, construction, and monitoring of infrastructure using many of the commercially available platforms (e.g. FLAC, PLAXIS, ANSYS, ABAQUS) as well as customized analysis routines developed in various development environments (MATLAB, Visual Basic, FISH, etc.). Specifically, within the past two years, Dr. Hadidi has been part of the team in numerical analysis and seismic evaluation of major dams and tunnels in north and south America.

Dr. Hadidi has several years of research and teaching experience at several universities in United States. He has published many articles on numerical analysis of seismically induced soil deformation and constitutive modeling.

SELECTED SPECIFIC PROJECT EXPERIENCE INCLUDES:

Stevens Creek Dam, Santa Clara Valley Water District, Santa Clara County, CA (2013)

Senior Engineer for seismic stability evaluation and deformation analysis of 120-ft high Stevens Creek Dam. The evaluations was required by the Division of Safety of Dams (DSOD) in June 2008 as part of their Phase III screening process of the State's dams located in highly seismic environments. The evaluations are also a vital part of the Santa Clara Valley Water District's Dam Safety Program (DSP). Presence of potentially liquefiable alluvial deposits under downstream of the dam and its potential to cause stability concerns were a major factor in evaluation of the dam. The project included field investigation, material characterization and seismic deformation analysis to evaluate the potential deformation range in the event of a major earthquake. The analysis was carried out with a FLAC and using custom developed FISH routines to account for triggering of liquefaction and reduction of the material strength as a results. The analysis has been reviewed by DSOD, and District's review board, and District is evaluating possible remediation measures to address DSOD's concerns.

Lenihan Dam, Santa Clara Valley Water District, Santa Clara County, CA (2013)

Senior Engineer for seismic stability evaluation and deformation analysis of 170-ft high Lenihan Dam. Similar to Stevens Creek Dam, the evaluations was required by the Division of Safety of Dams (DSOD) in June 2008 as part of their Phase III screening process of the State's dams located in highly seismic environments. The evaluations are also a vital part of the Santa Clara Valley Water District's Dam Safety Program (DSP). The dam is constructed of cohesive material with relatively similar properties. The project included field investigation, material characterization, and analysis using FLAC to evaluate the response of the dam in the event of a major earthquake. The analysis has been reviewed by DSOD, and District's review board, and indicates satisfactory performance of the dam in the event of a major earthquake.

Headworks Reservoir, Los Angeles Department of Water and Power, Los Angeles, California (2010)

Senior engineer responsible for performing numerical soil-structure interaction analysis using FLAC and assisting in geologic hazard evaluation. Project includes geotechnical investigation and design recommendations for the proposed buried reinforced concrete water storage reservoir with the capacity of 110 million gallons, hydroelectric generation station, and 3,600 linear feet of piping. The innovative approach to design included evaluation of the performance the reservoir through a soil-structure interaction analysis with simulated structure, allowed the design team to evaluate the response of the structure and attempt to achieve performance goals beyond the conventional code-based design.

Palos Verdes Reservoir, Metropolitan Water District of Southern California (ongoing)

Senior Engineer for seismic stability evaluation and deformation analysis of Palos Verdes reservoir in Southern California. The more than 70 year old reservoir stores drinking water for South Bay and Harbor areas of Southern California and is managed and operated by Metropolitan Water District of Southern California. The evaluations is a part of district's on-going commitment to seismic safety. The project included field investigation, material characterization, and analysis using FLAC to evaluate the response of the dam in the event of a major earthquake. The analysis will be reviewed by DSOD, and District's engineers.

Bouquet Canyon Dams, Los Angeles Department of Water and Power, Los Angeles, California (ongoing)

Senior engineer responsible for performing numerical analysis using FLAC and assisting in investigation and geologic hazard evaluation for Bouquet Canyon Dams. The 200 ft high dam No. 1 and shorter Dam No. 2 are earthfill dams built in 1934 as a replacement for the Failed St. Francis Dam, and they impound one of the a major reservoirs along the Los Angeles Aqueduct, which supplies drinking water to City of Los Angeles. The project inclues seismic hazard evaluation, field investigation, material characterization, and analysis using FLAC to evaluate the response of the dam in the event of a major earthquake. The analysis will be reviewed by DSOD, as well as an external review board.

Second Narrows Water Supply Tunnel, MetroVancouver, Vancouver, British Columbia (2012 – 2014)

Senior Project Engineer for the seismic deformation evaluation for the preliminary design of the Second Narrows Water Supply Tunnel Project. The project is to construct two new water mains within an approximately 6 m diameter tunnel crossing below Burrard Inlet at Second Narrows and associated structures. The new crossing is required to withstand and remain operational following the Maximum Credible Earthquake with a return period of 10,000 years. The subsurface materials consist of a stratigraphic column of deltaic deposits with variable susceptibly and resistance to liquefaction triggering. The work undertaken included review of the characterization by others followed by an independent effort to complete data reduction and interpretation, ground motion evaluation, and seismic deformation evaluation for preliminary design phase. This included specific emphasis on characterizing modeling uncertainty through use of different soil models in the analysis (i.e. Mohr Coulomb, UBCSAND, and PM4SAND).

Cerro Corona Tailings Dams, Cajamarca Hualgayoc, Peru (2012)

Senior Engineer for seismic stability evaluation and deformation analysis of three tailing dams on Las Aguilas, Gordas, and La Hiebra valleys (subconsultant to MWH). Increases in the height of the existing dams of various heights are being considered to accommodate the mining operations. The analysis included seismic stability evaluation and deformation analysis using FLAC to evaluate the response of the

dam in the event of a major earthquake. The results are reviewed by a panel of experts and they will guide the design team in implementing the proposed height increases.

Dumbarton Rail Line Corridor Project Geologic and Seismic Studies, San Mateo California (2009).

Senior Engineer for identification and assessment of geologic and seismic impacts for approximately 15 miles of rail line for proposed Dumbarton Rail Corridor project, an effort to transform former Southern Pacific rail line into commuter rail line serving South Bay area and as link in area multi-modal transit system. The project included numerous bridges including Dumbarton rail bridge, a 310 foot long steel truss bridge, and the Newark Slough bridge, A 188 feet long bridge. Responsible for directing and performing geologic, seismic and geotechnical engineering studies in support of project environmental document.

Professional Subconsultant Resumes

Ronald T. Eguchi

Chief Executive Officer and President
ImageCat, Inc.
400 Oceangate, Suite 1050
Long Beach, CA 90802
562 628-1675
rte@imagecatinc.com, http://imagecatinc.com

A. PROFESSIONAL PREPARATION

College/University	Major	Degree &Year
University of California, Los Angeles	Engineering	B.S., 1973
University of California, Los Angeles	Engineering	M.S., 1975

B. APPOINTMENTS

2000 - Present	President & CEO, ImageCat, Inc., Long Beach, California
2007 - 2009	Research Associate Professor, Department of Civil, Structural, & Environmental Engineering, University at Buffalo
1991 - 2000	Vice President, EQE International Inc., Irvine, California
1986 - 1991	Associate, Dames & Moore, Los Angeles, California
1984 - 1986	Senior Associate, Engineering Mechanics Associates
1983 - 1984	Principal Engineer, Agbabian Associates, El Segundo, California
1975 - 1983	Department Manager, J.H. Wiggins Company, Redondo Beach, California

C. PRODUCTS

(i) Products/Data Sets/Software/Patents/Copyrights Most Closely Related to Proposal

1. Corbane, C., Saito, K., Dell'Oro, L., Gill, S., Piard, B., Huyck, C., Kemper, T., Lemoine, G., Spence, R., Krishnan, R., Bjorgo, E., Senegas, O., Ghesquiere, F., Lallemant, D., Evans, G., Gartley, R., Toro, J., Ghosh, S., Svekla, W., Adams, B., and R. Eguchi, 2011. A Comprehensive Analysis of Building Damage in the January 12, 2010 M_W7 Haiti Earthquake using High-Resolution Satellite and Aerial Imagery, *Photogrammetric Engineering & Remote Sensing Journal*, American Society for Photogrammetry and Remote Sensing, Special Issue on the Haiti Earthquake, Vol. 77, Number 10, October.
2. Cutter, S.L., Emrich, C.T., Adams, B.J., Huyck, C.K., and R.T. Eguchi, 2007, "New Information Technologies in Emergency Management," *Emergency Management – Principles and Practice for Local Government,* Chapter 14, Second Edition, Editors W.L. Waugh Jr. and K. Tierney, ICMA Press, pp. 279-298.
3. Ghosh, Shubharoop, Huyck, Charles K., Greene, Marjorie, Gill, Stuart P., Bevington, John, Svekla, Walter, DesRoches, Reginald, and Ronald T. Eguchi, 2011. Crowd-sourcing for Rapid Damage Assessment: The Global Earth Observation Catastrophe Assessment Network (GEO-CAN), *Earthquake Spectra*, Special Issue on the Haiti Earthquake, Vol. 27, No. S1, October.
4. Hill, A., Bevington, J., Davidson, R., Chang, S., Eguchi, E., Adams, B., Brink, S., Panjwani, D., Mills, R., Pyatt, S., Honey, M., and Amyx, P., 2011. Community-Scale Damage, Disruption, and Early Recovery in the 2010 Haiti Earthquake, *Earthquake Spectra*. Vol. 27, No. S1, October.
5. Eguchi, R.T. and Mansouri, B., 2005, Use of Remote Sensing Technologies for Building Damage Assessment after the 2003 Bam, Iran, Earthquake – Preface to Remote Sensing Papers, *Earthquake Spectra,* Volume 21, No. S1, December.

(ii) Other Significant Products/Data Sets/Software/Patents/Copyrights (5 total)

1. Huyck, C.K., Adams, B.J., Cho, S, and Eguchi, R.T., 2005, "Towards Rapid City-wide Damage Mapping Using Neighborhood Edge Dissimilarities in Very High Resolution Optical Satellite Imagery – Application to the December 26, 2003 Bam, Iran Earthquake," *Earthquake Spectra Special Edition on the Bam Earthquake*, Volume 21, No. S1, December.
2. Eguchi, R.T., Huyck, C.K., and Adams, B.J., An Urban Damage Scale based on Satellite and Airborne Imagery, *Proceedings of the 1st International Conference on Urban Disaster Reduction,* Kobe, Japan, January 18-20, 2005.
3. Eguchi, R.T., Goltz, J.D., Seligson, H.A., Flores, P.J., Blais, N.C., Heaton, T.H., and E. Bortugno, "Real-Time Loss Estimation as an Emergency Response Decision Support System: The Early Post-Earthquake Damage Assessment Tool (EPEDAT)," *Earthquake Spectra,* Vol. 13, Number 4, November 1997.
4. Eguchi, R.T., Goltz, J.D., Taylor, C.E., Chang, S.E., Flores, P.J., Johnson, L.A., Seligson, H.A. and N.C. Blais (1998), "Direct Economic Losses in the Northridge Earthquake: A Three-Year Post-Event Perspective," *Earthquake Spectra,* Volume 14, No. 2, May 1998.
5. Eguchi, R.T., Goltz, J.D., Seligson, H.A., Heaton, T.H., "Real-Time Earthquake Hazard Assessment in California: The Early Post-Earthquake Damage Assessment Tool and the Caltech-USGS Broadcast of Earthquakes," *Proceedings, Fifth US National Conference on Earthquake Engineering,* Vol. 1, July 1994, p. 55-63.

D. SYNERGISTIC ACTIVITIES

(1) Transfer of research findings on Lifeline Earthquake Engineering into Practice; developed a series of seismic evaluation guidelines for electric power and natural gas and oil systems for the American Lifelines Alliance; (2) Teaching and training on Lifeline Earthquake Engineering – Developed Earthquake Hazard Mitigation Course on Lifelines for the Federal Emergency Management Agency (FEMA) – taught over 50 courses throughout the U.S.; (3) Conducted innovative research on the use of remote sensing technologies for natural disaster assessment; workshop organizer for ten international workshops on remote sensing and disaster response – sponsors include U.S. Geological Survey, MCEER, Earthquake Engineering Research Institute, the University of California at Irvine, and ImageCat; (4) Created a real-time loss estimation tool for the California Governor's Office of Emergency Services – a tool that is still being used by the State and the City of Los Angeles; (5) Created a series of user's guides to update and enhance input databases on building and lifeline inventories for HAZUS-MH; this work is helping local and state organizations in California respond to the requirements of FEMA's Hazard Mitigation program.

E. COLLABORATORS AND OTHER AFFILIATIONS

Collaborators over the Last 48 Months:

Stephanie Chang (University of British Columbia) – NSF Grant on Post-disaster Recovery
Robert Chen (Columbia University) – NASA Grant on Global Inventory Datasets
Rachel Davidson (University of Delaware) – NSF Grant on Post-disaster Recovery
Reginald DesRoches (Georgia Institute of Technology) – World Bank study on Haiti earthquake
Arleen Hill (Memphis University) – NSF Grant on Post-disaster Recovery
Albert Lin (University of California, San Diego) – NSF Rapid Grant, Tohoku, Japan earthquake
Sharad Mehrotra (University of California, Irvine) – NSF ITR: RESCUE project
Nalini Venkatasubramanian (University of California, Irvine) – DHS: Safire project

Graduate and Postdoctoral Advisors

C. Martin Duke (University of California, Los Angeles)

Brief Capabilities Statement for ImageCat, Inc. – Seismic Risk of Pipeline Systems

Capabilities:

- Seismic hazard map development for ground shaking and ground failure effects (surface fault rupture, liquefaction and landslide)
- Pipeline fragility analyses for seismic effects
- Network studies of post-earthquake system performance
- GIS (geographic information systems) studies to correlate pipeline risk to impacts on communities
- Examination of seismic risk reduction strategies or measures

Example Studies:

- Development of Seismic Risk Action Plan – Subconsultant to CH2MHill – GVS&DD
- GVS&DD Sewage System Seismic Risk Assessment Study – Subconsultant to Sandwell – GVS&DD
- Guideline for Assessing the Performance of Oil & Natural Gas Pipeline Systems in Natural Hazard and Human Threat Events: Part 1 – Guideline; Part 2 – Commentary, prepared for Federal Emergency Management Agency - American Lifelines Alliance.
- Guideline for Assessing the Performance of Electric Power Systems in Natural Hazard and Human Threat Events: Part 1 – Guideline; Part 2 – Commentary, prepared for Federal Emergency Management Agency - American Lifelines Alliance.
- Regional Risk Assessment of Environmental Contamination from Oil Pipelines, prepared for Multidisciplinary Center for Earthquake Engineering Research, University at Buffalo.
- Pipeline Replacement Feasibility Study: A Methodology for Minimizing Seismic and Corrosion Risks to Underground Natural Gas Pipelines, prepared for National Center for Earthquake Engineering Research.
- Seismic Risk Assessment of BC Gas Transmission and Intermediate Pressure Natural Gas Pipeline System in the Lower Mainland Region, prepared for BC Gas Inc.
- Study of Indirect Economic Consequences from a Catastrophic Earthquake: Impact on National Energy Distribution Network, prepared for the Federal Emergency Management Agency.
- Preliminary Seismic Risk Evaluation of Major ARKLA Incorporated Pipeline and Distribution Facilities, prepared for Arkansas Louisiana Gas Company.
- Preliminary Seismic Risk Evaluation of Texas Gas Transmission Pipeline and Distribution Facilities, prepared for Texas Gas Transmission Corporation.
- A Relative Seismic Risk Assessment of Proposed Inland Feeder Alignments, prepared for the Metropolitan Water District of Southern California.
- Seismic Risk Analysis of Southern California Gas Company Pipelines - The Effects of a Large and Moderate Earthquake on the Newport-Inglewood Fault, prepared for the Southern California Gas Company.
- Seismic Risk Analysis of Southern California Gas Company Pipelines - The Effects of a Large Earthquake on the San Andreas Fault in Southern California, prepared for the Southern California Gas Company.
- Earthquake Performance of Water and Natural Gas Supply Systems, prepared for the National Science Foundation.
- U-RAMP, a software package to estimate earthquake-induced damage to water, wastewater, and drainage networks as well as the costs and benefits associated with specific mitigation activities developed for the California Governor's Office of Emergency Services.
- A comprehensive seismic vulnerability and loss evaluation of the State of South Carolina, including lifelines and hazardous materials, prepared of the State of South Carolina.

Key Personnel:

Ronald T. Eguchi is President and CEO of ImageCat, Inc., a risk management company specializing in the development and use of advanced technologies for risk assessment and reduction. Mr. Eguchi has over 30 years of experience in risk analysis and risk management studies. He has directed major research and application studies in these areas for government agencies and private industry. He is a member of the National Research Council's Disaster Roundtable whose mission it is to identify urgent and important issues related to the understanding and mitigation of natural, technological, and other disasters. He is a past member of the Scientific Advisory Committee of the U.S. Geological Survey, a committee that reports to Congress on recommended research directions for the USGS in the area of earthquake hazard reduction. In 1997, he was awarded the ASCE C. Martin Duke Award for his contributions to the area of lifeline earthquake engineering. He still remains active in the ASCE Technical Council on Lifeline Earthquake Engineering serving on several committees and having chaired the Council's Executive Committee in 1991. In 1992, Mr. Eguchi was asked to chair a panel, established jointly by the Federal Emergency Management Agency and the National Institute of Standards and Technology to develop a plan for assembling and adopting seismic design standards for public and private lifelines in the U.S. This effort has led to the formation of the American Lifeline Alliance, currently managed by the National Institute of Building Sciences. In 2006, he accepted an ATC Award of Excellence on behalf of the ATC-61 project team for work on *An Independent Study to Assess Future Savings from Mitigation Activities* that showed that a dollar spent on hazard mitigation saves the nation about $4 in future benefits. He was recently recognized by EERI as the 2008 Distinguished Lecture where he discussed the topic of *"Earthquakes, Hurricanes, and other Disasters: A View from Space."* He was also invited as a keynote speaker to the 14th World Conference on Earthquake Engineering, held in Beijing, China in 2008. He has authored over 250 publications, many of them dealing with the seismic risk of utility lifeline systems and the use of remote sensing technologies for disaster response.

William P Graf, CE, manages ImageCat's earthquake risk software resources for lenders, building owners and property insurers. He has 30 years of experience in seismic and other natural hazard and risk analyses for individual buildings, building portfolios, and lifeline structures. Mr. Graf also performs analyses of structures subject to earthquake or other loads, and develops seismic strengthening schemes.

Charles K. Huyck is Executive Vice President of ImageCat, Inc. As a founding partner of ImageCat, Mr. Huyck has been instrumental in developing operational strategies for spatial technologies. He directs a team of engineers, scientists, and programmers developing software tools and data processing algorithms for loss estimation and risk assessment. He has 20 years of GIS analysis and application development experience integrating advanced geospatial technologies into disaster simulation tools and CAT modeling programs. He is known for results-oriented and novel solutions to complex spatial modeling problems, including extracting damage estimates and building inventories from satellite imagery, migration of CAT models to an online environment, integration of transportation and lifelines vulnerability into GIS network analysis, and integrating social networking platforms into real time online loss estimation programs.

ImageCat Certifications:

State Minority Business Enterprise, California Department of Transportation
Disadvantaged Business Enterprise, California Unified Certification Program
Small Business, California Department of General Services
Minority Business Enterprise, California Public Utilities Commission, Supplier Clearinghouse

Douglas G. Honegger

D.G. Honegger Consulting
2690 Shetland Place
Arroyo Grande, CA 93420
Phone/Fax: 805-473-0856
e-mail: dghconsult@aol.com

SUMMARY

Mr. Honegger has over 30 years of experience in a broad range of consulting activities related to understanding the response of structures, structural components and equipment to extreme loading resulting from earthquake hazards, blast and impact. Over his career, his clients have included pipeline and utility companies (natural gas, oil, water), the nuclear power industry, the Department of Energy (DOE), and the Department of Defense. Mr. Honegger's project activities have covered experimental investigations, detailed analytic evaluations and engineering assessments. He is experienced in providing defensible results under the high level of scrutiny often associated with critical facilities. He has been the principal author of over 30 professional papers and has been a contributing author to three books related to the subject of seismic design of pipeline systems.

Mr. Honegger is a recognized expert in the evaluation of the impacts of large permanent ground deformation on buried pipelines and conduits and continues to advance the state of practice through active laboratory and field research activities. His expertise also includes assessing the impact of earthquakes on aboveground non-structural components, and establishing rational design criteria for seismic hazards. He was in charge of developing new industry guidelines for the design of natural gas and liquid hydrocarbon transmission pipelines for hazards related to earthquakes, landslides, and subsidence and has been a co-instructor of a continuing education course on the seismic design of buried pipelines, most recently including a co-instructor for an 8-hour pre-conference workshop at the ASCE Pipelines 2013 conference in Fort Worth, TX.

Mr. Honegger was the principal investigator for the American Lifelines Alliance (ALA), a FEMA project focused on promulgating national guidelines and standards to improve utility and transportation system performance when subjected to natural and man-made hazards (www.americanlifelinesalliance.org). During course of the ALA project (1998 through 2009), ALA projects addressed topics related to recommended practice for assessing vulnerability and design of buried pipelines, revised seismic design requirements for aboveground steel storage tanks, and guidelines for determining the appropriate scope of work to support risk management decisions for water, natural gas, and oil pipeline systems. As the principal investigator for ALA, Mr. Honegger was instrumental in adding language to ASCE-7 to explicitly exclude electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances from seismic design requirements primarily intended for buildings and industrial structures.

Mr. Honegger is an active member of the American Society of Civil Engineers (ASCE) where he has chaired the Earthquake Actuated Automatic Gas Shutoff Devices (ASCE 25) standards committee. He is a member of the ASCE 7 seismic task committee, is a past chair of the ASCE Codes and Standards Council that oversees all ASCE standards, and has represented lifelines interests in the development of national standards in the U.S. and Canada. He also currently severs on the Canadian standard committee addressing requirements for field constructed LNG containers and facilities.

NATURAL GAS PIPELINE EXPERIENCE

- Currently responsible for updating industry guidelines for the seismic assessment of new and existing natural gas and liquid hydrocarbon transmission pipelines prepared by D.G. Honegger Consulting in 2004 for the Pipeline Research Council International (PRCI Catalog No. L51927)
- Currently providing (since 2011) assessment of several Pacific Gas & Electric Company gas pipeline fault crossings and identifying pipeline replacement and construction alternatives to improve pipeline response.
- One of three contractors to PRCI and the project technical coordinator for a 3-year project to develop guidelines for assessing the performance of pipelines located in areas subjected to ground movement from landslides and

subsidence that is partially funded by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (http://primis.phmsa.dot.gov/matrix/PrjHome.rdm?prj=202&btn=Go).

- Seismic consultant to Southern California Gas Company providing analysis and design recommendation for numerous pipelines fault crossings including the San Andreas, San Jacinto, Santa Susana, and Whittier faults.
- Since 1995, has served as a seismic consultant to BC Gas Utility Ltd. (now FortisBC Energy) to provided site-specific assessments of critical pipeline river crossings, developed recommendations for changes in pipeline alignments to minimize risk for pipeline rupture from large lateral spread displacements, conduct training courses, and provide guidance on when to perform detailed seismic hazard investigations on new pipeline projects. Recently (2010), he directed a project for FortisBC Energy was to provide a probabilistic assessment the seismic vulnerability of key gas pipelines in the Lower Mainland and on Vancouver Island.
- Seismic consultant to Sempra Energy on a project to build a natural gas transmission pipeline to the President Juarez Power Plant (Tijuana to Rosarito Beach) in northern Baja California, Mexico
- Provided review and recommendations to Pipeline Research Council International regarding proposed 2008 research that was intended to address gaps in the practice of assessing buried pipelines for blast loading. Review resulted in reformulation of research focus with recommendation that more effort be directed at alternate assessment approaches based upon expected zones of explosively-driven block motion.
- Provided an assessment of the proposed Rocky Mountain Pipeline for fault displacement on the Weber segment of the Wasatch fault. Various alignments are being evaluated to account for a large uncertainty in fault location and constraints on available pipeline right-of-way.
- Provided recommendations for Questar Feeder Line 26 crossing of the Wasatch fault near Provo, UT including alternate pipeline alignment configurations and locations for increased pipe wall thickness.
- Provided design recommendations for proposed Porcupine Ridge crude oil pipeline crossing the Weber segment of the Wasatch fault in the City of Centerville, UT. Key challenges in the project revolved around design measures that would accommodate the pipeline alignment within city streets.
- Analyzed standard large PG&E meter set assemblies for seismic ground motions expected in the PG&E service area, compared analysis findings with actual earthquake experience, and provided recommendations for improving PG&E standard specifications.
- Served as the technical lead and coordinator in the preparation of the California Seismic Safety Commission document, *Improving Natural Gas Safety in Earthquakes*, that identifies key risks and mitigation measures related to the use of natural gas in residential applications (www.seismic.ca.gov)
- Served as expert reviewer to Williams for the seismic design of a 16-inch high pressure gas pipeline crossing the Strait of Georgia between Washington and Vancouver Island, British Columbia
- Performed analyses to confirm the seismic adequacy of preliminary designs for key gas components of the BHP Billiton Cabrillo LNG facility. These analyses examined pipeline response to ground displacements resulting from fault movement, liquefaction, and wave propagation as well as the loads placed on portions of the pipelines, risers and mooring system as a result of turbidity currents generated by seismically triggered slope failure.
- Worked with D.J. Nyman & Associates on a variety of pipeline projects:
  - Fault crossing design for the Papua New Guinea LNG gas and liquids pipelines
  - Performed analyses to confirm gas pipeline design requirements for British Petroleum's Baku-Tiblisi-Ceyhan project through Azerbaijan, Georgia, and Turkey
  - Assess the response of the Rockies Express to potential subsidence induced by coal mining.
  - Assess the response of buried product and process pipelines within a common pipe corridor to subsidence induced by salt mining.

- Perform analyses to simulate the dislocation of offshore pipelines from hurricane surge for the purposes of estimating pipeline axial and bending strains.
- Analytically simulate construction of a pipeline installed by winching sections of pipeline up a steep slope to determine required winch capacity and residual pipeline stresses following construction and hydrotesting

LIQUID PRODUCT PIPELINE EXPERIENCE

- Provided analytical support to Trans Mountain Pipe Line Company (now Kinder-Morgan Canada) to confirm the ability of a proposed horizontal directionally drilled replacement of portion of a 24-inch liquid products line crossing the Fraser River to withstand lateral spread displacements
- Provided expert review for Sakhalin Energy Investment Company related to design approaches for fault crossings for the Sakhalin II project developed by their contractor Snamprogetti as a consultant to D.J. Nyman & Associates
- Provided guidance to UNOCAL for a proposed replacement alignment for a crude oil pipeline in Huntington Beach, California to minimize the risk of fires related to pipeline leakage as a result of earthquake-related ground deformations.
- Provided assistance to SPEC Services Inc. for several Kinder-Morgan projects including pipeline response analyses and design recommendations for ground displacement hazards associated with earthquake fault movement and ground settlement for the Concord-to-Sacramento pipeline, assessment of pipeline performance for a new alignment across the Hayward fault, and developing strategies to determine the influence of ground subsidence cracking in the vicinity of two products pipelines in Arizona.

WATER/WASTEWATER REALTED EXPERIENCE

- Consultant to URS Corporation to provide design recommendations for the seismic design of a proposed new low-level outlet pipeline for Anderson Dam.
- Consultant to URS Corporation providing pipeline analysis and design support for key Alameda County Water District pipelines at several Hayward fault crossings.
- Consultant to the San Francisco Public Utilities Commission providing seismic expertise related to acceptable construction alternatives to resolve issues related to non-compliant welded slip joints on Bay Division Pipeline 5.
- Consultant to URS Corporation providing analytical support for the seismic upgrade of the San Francisco Public Utilities Commission Bay Division Pipelines 3 and 4 to survive fault displacement along the Hayward fault. Analysis requires dynamic simulation of the seismic response of a 72-in pipeline installed in a segmented vault with custom designed slip joints and ball joints.
- Provided assessment of likely damage and service outage durations for the natural gas and water systems operated by Memphis Light Gas & Water for several earthquake scenarios as part of an overall MLGW seismic risk assessment project.
- Member of MMI Engineering project team that provided assessment and risk mitigation strategies to Contra Costa Water District for prioritizing capital improvement funds to reduce the severity of service interruption that may result from an earthquake on the Concord fault.
- Member of MMI Engineering project team that evaluated risks to the water system operated by the Sonoma County Water Agency to support preparation of the Agency's Local Hazard Mitigation Plan. Subsequently, was a consultant to MMI Engineering providing analytical assessment of proposed pipeline mitigation options.
- Subconsultant to Golder Associates on five major projects since 2005 for the Greater Vancouver Regional District in British Columbia, Canada (now Metro Vancouver) to assess the seismic adequacy of water pipelines ranging in size from 18 to 54 inches at key river crossings in the Vancouver region.

- Provided consulting services to MMI Engineering related to recommendations to the City of Hayward, CA to reduce potential damage and service interruptions to key water and wastewater pipelines in the event of a rupture of the Hayward fault

HIGH-VOLTAGE BURIED ELECTRICAL CABLE EXPERIENCE

- Provided analytical assessment of 230kV subsea cable response to earthquake-triggered slope instability for BC Hydro as part of the risk assessment process for installing new power transmission lines across the Georgia Strait
- Provided summary of mitigation alternatives to San Diego Gas and Electric Company for placing buried 230kV duct banks within zones of potential surface fault displacement to assist in responding to regulatory inquiries regarding electric power reliability

RESEARCH AND TESTING EXPERIENCE

- Project director and contributor on a research project for PRCI at the University of British Columbia investigating the use of geosynthetic fabrics to improve pipeline performance under large ground movement.
- Providing on-going testing services to Southern California Gas Company for a field testing program to systematically measure axial soil friction forces on existing pipelines.
- Primary technical consultant for a 3-year research program aimed at understanding the earthquake generated the ground motions that occurred in the 1994 Northridge, California earthquake and the mode of failure in gas transmission pipelines. The research, funded by US and Japanese gas utilities, included field testing, subsurface exploration, geotechnical studies, pipeline testing, and analytical studies of pipeline response.
- Performed an investigation of fire ignition characteristics and ground motion from the 1994 Northridge earthquake to support development of new actuation criteria for a revision to the standard governing earthquake actuated automatic gas shutoff devices

PROFESSIONAL HISTORY

President, D.G. Honegger Consulting, 1995-present
EQE International, Irvine, California, Technical Manager, 1989-1995
National Technical Systems, Long Beach, California, Project Engineer, 1985-1989
Structural Mechanics Associates, Houston, Texas, Staff Engineer, 1982-1985

EDUCATION

University of Illinois, M.S. Civil Engineering, 1981
University of Illinois, B.S. Civil Engineering, 1980

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Earthquake Engineering Research Institute
Seismological Society of America

SELECTED PUBLICATIONS

Books and Guidelines

Contributor to Seismic Risk Analysis and Management of Civil Infrastructure Systems, edited by S. Tesfamariam (UBC, Canada) and K. Goda (Bristol, UK), to be published by Woodhead Publishing Ltd. 2013.

Guidelines for Constructing Natural Gas and Liquid Hydrocarbon Pipelines Through Areas Prone to Landslide and Subsidence Hazards, final report to Pipeline Research Council International, Inc., with C-CORE and SSD, Inc., Catalog No. L52292, 2009.

Guidelines for the Seismic Design and Assessment of Natural Gas and Liquid Hydrocarbon Pipelines, with D.J. Nyman, Pipeline Research Council International, Inc., Catalog No. L51927, 2004

Fire Following Earthquake, TCLEE Monograph 26, contributing author, American Society of Civil Engineers, 2005.

Guidelines for the Design of Buried Steel Pipe, project manager and contributor, www.americanlifelinesalliance.com, 2001.

Guide to Post-Earthquake Investigation of Lifelines, contributing author, American Society of Civil Engineers, 1997

Guidelines for the Seismic Design of Natural Gas Distribution Systems, TCLEE Monograph No. 9, contributing author, American Society of Civil Engineers, 1995

Recent Papers

"Regional Pipeline Vulnerability Assessment Based Upon Probabilistic Lateral Spread Hazard Characterization," with D. Wijewickreme and T.L. Youd, 10th National Conference on Earthquake Engineering, 2014.

"Response Of Buried Pipelines Subjected To Ground Displacements Under Different Trench Backfill Conditions," with D. Wijewickreme, M. Monroy, and D. Nyman, 10th National Conference on Earthquake Engineering, 2014.

"Design of Welded Steel Pipeline Crossings of Thrust Faults," with D. Nyman and G.A. Carver, 10th National Conference on Earthquake Engineering, 2014.

"Effectiveness of Geotextile-Lined Pipeline Trenches Subjected To Relative Lateral Seismic Fault Ground Displacements," with M. Monroy and D. Wijewickreme, 15th World Conference on Earthquake Engineering, Lisbon, Portugal, 2012.

"Challenges in Assessing the Seismic Vulnerability of Two Water Main River Crossings in British Columbia, Canada," with Upul Atukorala, Humberto Puebla, Roberto Olivera, Jusheng (Mark) Qian, and Murray Gant, 15th World Conference on Earthquake Engineering, Lisbon, Portugal, 2012.

"Recent PRCI Guidelines for Pipelines Exposed to Landslide and Ground Subsidence Hazards," with R. Phillips, J. Hart, C. Popelar, and R. Gailing, 8th ASME International Pipeline Conference, September, 2010.

"Definition of Lateral Spread Displacement for Regional Risk Assessments of Pipeline Vulnerability," with H. Puebla, D. Wijewickremea, A. Augello, and M. Rahman, 8th ASME International Pipeline Conference, September, 2010.

Guidelines for Managing Risks to Pipelines Through Landslide and Subsidence Hazard Areas," with R. Gailing, J. Hart, R. Phillips, and C. Popelar, 17th Joint Technical Meeting on Pipeline Research, Milan, Italy, May, 2009.

"Geotechnical Challenges for Design of a Crude Oil Pipeline Across an Active Normal Fault in an Urban Area," with Jeffery Keaton, 6th ASME International Pipeline Conference, September, 2008.

"Considerations for Selecting Approaches to Estimate Lateral Spread Displacements for Assessing Pipeline Performance," 4th ASME International Pipeline Conference, September, 2006.

"Buried Pipelines Subjected to Transverse Ground Movement: Comparison Between Full-Scale Testing and Numerical Modeling," with H. Karimian and D. Wijewickreme, Proceedings of OMAE2006 25th International Conference on Offshore Mechanics and Arctic Engineering, June 4-9, 2006.

"Liquefaction Hazard Mitigation for Oil and Gas Pipelines," with D.J. Nyman and T.L. Youd, Proceedings of the 8th National Conference on Earthquake Engineering, April, 2006.

"Seismic Vulnerability Assessment and Retrofit of a Major Natural Gas Pipeline System: A Case History," with D. Wijewickreme, T. Fitzell, and A. Mitchell, EERI SPECTRA, Vol. 21, No. 2, 2005.

"Numerical Modeling of Permanent Ground Deformation Hazard to a Natural Gas Pipeline In California," with Y. Prashar, R. Stauber, and Z. Zafir, Proceedings of Geo-Frontiers 2005 Conference, American Society of Civil Engineers, January, 2005.

"Trans-Alaska Pipeline System Performance in the M7.9 Denali Fault Earthquake," with D.J. Nyman, E.R. Johnson, L.S. Cluff, and S.P. Sorensen, EERI SPECTRA,Vol. 20, No. 3, 2004.

"Improving Natural Gas Safety in Earthquakes – California Recommendations," with F. Turner, Proceedings of the 6th U.S. Conference on Lifeline Earthquake Engineering, August, 2003.

Thomas K. Rockwell

Professor
Department of Geological Sciences
San Diego State University
5500 Campanile Dr.
San Diego, CA 92182-1020

Curriculum Vitae

Dr. Thomas Rockwell is a nationally and internationally renowned paleoseismologist and geomorphologist who has published over 120 articles in major international journals, coauthored a number of book chapters, published 40 papers in conference proceedings and guidebooks, and coauthored over 300 papers presented at professional meetings. Having served as Geology Group Leader for the Southern California Earthquake Center for many years, he is an expert on the tectonics and earthquake hazards of southern California and Baja California, has conducted extensive trenching programs to date earthquakes on faults in the western U.S., South and Central America, the Middle East and Asia, and routinely uses soil stratigraphy and geomorphology combined with various radiometric dating techniques to assess rates of fault activity, determine recency of faulting, and date past earthquakes. His research focuses on understanding earthquake occurrence in time and space. Current projects include the characterization of fault systems behavior by understanding patterns of past recurrence of large earthquakes on faults in southern California, northern Mexico, Panama, Argentina, Portugal, Turkey, India, and Israel. This work includes resolving information on slip per event, as it relates to understanding the controls on segmentation and rupture termination. He has also worked extensively on the affects of tectonism on the landscape, and using geomorphology to constrain rates and timing of tectonic events. Included in this latter aspect is detailed mapping and dating of marine terraces along the west coast of North America and assessment of paleosea level during the late Quaternary.

Education

B.S. Univ. of Nevada, Reno - December l976 (Geology)
Ph.D Univ. of Calif., Santa Barbara - December, l983 (Geology)

Positions

9/76-6/82	Research and teaching assistant at the University of Nevada (9/76-12/76), the University of California at Santa Barbara (9/77-6/82 with two absences), and the University of Illinois (9/80-12/80)
3/80-8/80	Geologist, Dames and Moore, Los Angeles, California
9/82-12/82	Lecturer, California Inst. of Technology, Pasadena
1/83-7/86	Assistant Professor, San Diego State University
7/86-7/89	Associate Professor, San Diego State University
7/89-present	Professor, San Diego State University

Professional Affiliations and Societies

Sigma Xi
Seismological Society of America – Board of Directors, 2002-2004
Southern California Earthquake Center (SCEC)
Geological Society of America - Fellow
Soc. of Economic Paleontologists and Mineralogists, Pac. Section
San Diego Association of Geologists
American Geophysical Union
Association of Engineering Geologists

Published Refereed Papers Related to Neotectonics and Paleoseismology of the southern San Andreas fault system (including the San Jacinto and Elsinore faults), past 4 years

Onderdonk, N., McGill, S., and T.K. Rockwell, 2015 in press, Variations in slip rate and size of pre-historic earthquakes during the past 2000 years on the northern San Jacinto fault zone, a major plate boundary structure in southern California. Accepted in Lithosphere, 12/2014

Haaker, E. C., Rockwell, T.K., Kennedy, G.L., Grant-Ludwig, L., Freeman, S.T., Zumbro, J.A., Mueller, K.J., and Edwards, R. L., (2015 in press) Long – Term Uplift of the Southern California Coast Between San Diego and Newport Beach Resolved with New dGPS Survey Data: Testing Blind Thrust Models in the Offshore California Borderland: *in* Anderson, R. L., and Ferriz, H., Applied Geology in California: Association of Environmental and Engineering Geologists Special Publication 26.

Rockwell, T.K., T.E. Dawson, J. Young-Ben Horton, and G. Seitz, 2015, A 21 event, 4,000-year history of surface ruptures in the Anza Seismic Gap, San Jacinto Fault and implications for long-term earthquake production on a major plate boundary fault. Pure and Applied Geophysics, published on-line, November, 2014.

Rockwell, T.K., K.M. Scharer, T.E. Dawson, 2014 in press, Paleoseismology of the San Andreas Fault Zone. *in* Anderson, R. L., and Ferriz, H., Applied Geology in California: Association of Environmental and Engineering Geologists Special Publication 26.

Scharer, K.M., Salisbury, J.B., Arrowsmith, J.R., and Rockwell, T.K., 2014, Southern San Andreas Fault Evaluation field activity: Approaches to measuring small geomorphic offsets - challenges and recommendations for active fault studies, accepted, Seismological Research Letters, v. 85, p. 68-76, doi:10.1785/0220130108.

Blisnuik, K., M. Oskin, A-S. Mériaux, T. Rockwell, R. Finkel, and F. J. Ryerson, 2013, Stable, Rapid Rate of Slip Since Inception of the San Jacinto Fault, California, Geophys. Res. Lttrs. , v. 40, 4209–4213, doi:10.1002/grl.50819.

Rockwell, T.K. and Klinger, Y., 2013, Surface rupture and slip distribution of the 1940 Imperial Valley earthquake, Imperial Fault, southern California: Implications for rupture segmentation and dynamics. Bulletin of the Seismological Society of America, Vol. 103, No. 2A, pp. 629-640, April 2013, doi: 10.1785/0120120192.

Onderdonk, N., Rockwell, T.K., McGill, S., and Marliyani*, G., 2013, Evidence for seven surface ruptures in the past 1600 years on the Claremont fault at Mystic Lake, northern San Jacinto fault, California. Bulletin of the Seismological Society of America, v. 103, no. 1, p. 519-541. doi: 10.1785/0120120060

Kimberly Blisniuk, Michael Oskin, Kathryn Fletcher, Thomas Rockwell, Warren Sharp, 2012, Assessing the Reliability of U-series and ^{10}Be dating techniques on Alluvial Fans in the Anza Borrego Desert, California, Quaternary Geochronology, doi.org/10.1016/j.quageo.2012.08.004

Salisbury, J.B., Rockwell, T.K., Middleton, T.J., and Hudnut, K.W., 2012, LiDAR and Field Observations of Slip Distribution for the Most Recent Surface Ruptures Along the Central San Jacinto Fault. Bulletin of the Seismological Society of America, v. 102, no. 2, p. 598-619. doi: 10.1785/0120110068.

Fletcher, K.E.K., Rockwell, T.K., and Sharp, W.D., 2011, Late Quaternary slip rate of the southern Elsinore fault, southern California: Dating offset landforms via 230^{TH}/U on pedogenic carbonate. J. Geophysical Research, 116, F02006, doi:10.1029/2010JF001701.

Blisniuk, K., Rockwell, T., Owen, L., Oskin, M., Lippincott, C., Caffee, M., and Dortch, J., 2010, Late Quaternary slip rate gradient defined using high-resolution topography and 10Be dating of offset landforms on the southern San Jacinto Fault zone, California: *J. Geophysical Research* v. 115, B08401, doi:10.1029/2009JB006346, 2010.

Gingery, James R., Rugg, Scott H., Hilton, Bruce, and Rockwell, Thomas K., 2010, Fault hazard characterization for a transportation tunnel project in Coronado, California. Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, May 24-29, 2010, San Diego, California, Paper No. 7.02C, 13 pgs. http://5geoeqconf2010.mst.edu

Rockwell, T.K., 2010, The Rose Canyon Fault in San Diego. Proceedings of the Fifth International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, May 24-29, 2010, San Diego, California, Paper No. 7.06C, 9pgs. http://5geoeqconf2010.mst.edu

Other Candidate Professional Subconsultant Resumes

Lisa Grant Ludwig, Ph.D. (a.k.a. Lisa B. Grant)

Professor, Public Health
University of California, Irvine
Phone: (949) 824-2889 / 5491
e-mail: lgrant@uci.edu

Education

B.S. with distinction, 1985, Stanford University, Applied Environmental Earth Science
M.S. 1989, California Institute of Technology, Environmental Engineering and Science
M.S. 1990, California Institute of Technology, Geology
Ph.D. 1993, California Institute of Technology, Geology with Geophysics minor

Selected Academic Positions:

Professor, 2013 - present; Associate Professor, 2006 -2013 Program in Public Health, UC Irvine
Graduate Director, 2009 – 2014, Program in Public Health , University of California, Irvine Associate Director, California Institute for Hazards Research, University of California, 2006-11
Assistant Professor, 1998-2006, Environmental Health, Science and Policy School of Social Ecology, UC Irvine,
Assistant Professor of Environmental Science and Geology and Program Director for Environmental Science, 1995-1998; Chapman University, Orange, CA,
Graduate Research and Teaching Assistant 1989-1992, Caltech Division of Geological & Planetary Sciences; and Keck Hydraulics Lab

Selected Professional Positions:

Independent Consultant for GeoPentech Consultants, Santa Ana CA, 2009 - 2013
Senior Staff to Assistant Project Scientist, 1993 - 95 (part-time to 1998) Woodward-Clyde Consultants, GeoEngineering Group, Santa Ana, CA
Research Scientist, 1985-1987, California Research & Technology / Titan Systems, Chatsworth, CA
Hydrologic Technician, 1983-4 (part-time) U.S. Geological Survey, Menlo Park, CA

Selected Professional Leadership or Service Positions:

Member, Advisory Committee on Earthquake Hazard Reduction, Federal Advisory Committee reporting to Director of National Institute of Standards and Technology (NIST), 2014-17
Member, Committee on Seismology and Geodynamics, standing committee of the National Research Council, Board on Earth Sciences and Resources, 1/01/2015 – 12/31/2017
President, President-Elect, Seismological Society of America, April 2013 - present
Member, Board of Directors, Seismological Society of America, 2010 – present
Member, Board on International Scientific Organizations, National Academies, Policy and Global Affairs, 2012 – 2015
Leader, Earthquake Geology Group, Southern California Earthquake Center, 2012 - 2014
Vice Chair, Board of Directors, Southern California Earthquake Center, 2007 - 2011 At-Large Elected Member of the Board of Directors, 2002 - 2011
Member, National Academy of Sciences U. S. National Committee to the International Union of Geodesy and Geophysics (IUGG). 2003 -2011.
National Correspondent, International Association for Seismology and Physics of the Earth's Interior (IASPEI) 2008 – 2011.
Member, Community Executive Committee, Orange County Essential Facilities Risk Assessment (OCEFRA) Project, FEMA Region IX Floodplain Mapping Program, 2007- 2008

Selected Awards and Fellowships:
NASA 2012 Software of the Year Co-Winner QuakeSim 2.0 (Sept. 11, 2012)
Outstanding Outreach Certificate, Southern California Earthquake Center, 1999
Award for Excellence, Chapman University 1997

Selected publications

1. Akciz, S. O., Grant Ludwig, L., Zielke*, O., and Arrowsmith, J R. (2014). Post-1857 fracturing and deflection of an apparent offset channel along the San Andreas fault in the Carrizo Plain. *Bull. Seismol. Soc. Amer.* vol 104, no 6, doi: 10.1785/0120120172
2. Donnellan, A, J Parker, M Glasscoe, E De Jong, M Pierce, G Fox, D McLeod, J Rundle, L. Grant Ludwig (2012). A Distributed Approach to Computational Earthquake Science: Opportunities and Challenges, *Computing In Science & Engineering*, v. 14, no 5, 1521-9615/12, IEEE, Sept/Oct 2012, p31-42.
3. Noriega*, G. R. and Grant Ludwig, L. (2012). Social vulnerability assessment for mitigation of local earthquake risk in Los Angeles County, *Natural Hazards*, Accepted July 11, 2012. doi: 10.1007/s11069-012-0301-7, published online August 24, 2012
4. Vidale, J., Atkinson, G., Green, R., Hetland, E., Grant Ludwig, L., Mazzoti, S., Nishenko, S. and L. Sykes (2011). Report of the Independent Expert Panel on New Madrid Seismic Zone Earthquake Hazards to the National Earthquake Prediction Evaluation Council (NEPEC) and Dr. Marcia McNutt, Director of the U.S. Geological Survey, April 16, 2011. http://earthquake.usgs.gov/aboutus/nepec/reports/index.php
5. L. Grant Ludwig, S. O. Akciz, G. R. Noriega, O. Zielke and J R. Arrowsmith (2010). Climate-modulated channel incision and rupture history of the San Andreas fault in the Carrizo Plain. Published 21 January 2010 on *Science* Express, DOI: 10.1126/science.1182837; print version featured on cover; v. 327, 26 Feb 2010, 1117-1119.
6. O. Zielke*, J R. Arrowsmith, L. Grant Ludwig, and S. O. Akciz (2010). Slip in the 1857 and earlier large earthquakes along the Carrizo Plain, San Andreas fault, Published 21 Jan 2010 *Science* Express, DOI: 10.1126/science.1182781; prin v. 327, 26 Feb 2010, 1119-1122.
7. Plesch, A., Shaw, J. H., Bensen, C., Bryant, W. A., Carena, S., Cooke, M., Dolan, J., Fuis, G., Gath, E., Grant, L., Hauksson, E., Jordan, T., Kamerling, M., Legg, M., Lindvall, S., Magistrale, H., Nicholson, C., Niemi, N., Oskin, M., Perry, S., Planasky, G., Rockwell, T., Shearer, P., Sorlien, C., Suss, M. P., Suppe, J., Treiman, J., and R. Yeats. Community fault model (CFM) for Southern California. . *Bull. Seism. Soc. Amer*, v. 97, no. 6, 1793-1802, December 2007. doi:10.1785/0120050211
8. Grant, L. B., Gould, M. M., Donnellan, A., McLeod, D., Chen*, A. Y., Sung, S., Pierce, M., Fox, G. C., and Rundle, P. (2005). A Web-service based universal approach to heterogeneous fault databases, *Computing in Science & Engineering*, July/Aug. 2005, 51- 57. 10.1109/MCSE.2005.63
9. Grant, L. B. and P. M. Shearer (2004). Activity of the offshore Newport-Inglewood Rose Canyon fault zone, coastal southern California, from relocated microseismicity. *Bull. Seism. Soc. Amer*, 94, 747-752.
10. Grant, L. B. L. J. Ballenger, and E. E. Runnerstrom (2002). Coastal uplift of the San Joaquin Hills, Southern Los Angeles basin, California, by a large earthquake since 1635 A.D. *Bull. Seism. Soc. Amer,* v. 92, no. 2, p.590-599, 2002.
11. Grant, L. B., K. J. Mueller, E. M. Gath, H. Cheng, R. L. Edwards, R. Munro and G. L. Kennedy (1999). Late Quaternary Uplift and Earthquake Potential of the San Joaquin Hills, southern Los Angeles Basin, California, *Geology*, v. 27, no. 11, p. 1031-1034.
12. Grant, L. B., J. T. Waggoner, C. von Stein and T. Rockwell (1997) Paleoseismicity of the North Branch of the Newport-Inglewood Fault Zone in Huntington Beach , California, from Cone Penetrometer Test Data. *Bull. Seism. Soc. Amer*, v. 87, no. 2, p.277 - 293, 1997.
13. Grant, L. B. (1996) Uncharacteristic Earthquakes on the San Andreas Fault, *Science*, 272, 826 - 827, 1996.

THOMAS D. O'ROURKE

Thomas R Briggs Professor of Engineering,
Civil and Environmental Engineering,
Cornell University,
273 Hollister Hall
Ithaca, NY 14853-3501

Education

Ph D, University of Illinois at Urbana-Champaign, 1975

MSCE, University of Illinois at Urbana-Champaign, 1973

BSCE, Cornell University, 1970

Experience

Professor O'Rourke has been a member of the teaching and research staffs at Cornell University and the University of Illinois at Urbana-Champaign His teaching and professional practice have covered many aspects of geotechnical engineering including foundations, earth retaining structures, slope stability, soil/structure interaction, underground construction, laboratory testing, and elements of earthquake engineering He has authored or co-authored over 300 publications on geotechnical, underground, and earthquake engineering.

He was elected a member of the National Academy of Engineering in 1993 and a Fellow of the American Association for the Advancement of Science in 2000. He was awarded the C.A. Hogentogler Award from ASTM in 1976 for his work on the field monitoring of large construction projects. In 1983 and 1988, Prof. O'Rourke received the Collingwood and Huber Research Prizes, respectively, from ASCE for his studies of soil and rock mechanics applied to underground works and excavation technologies. In 1995 he received the C. Martin Duke Award from ASCE for his contributions to lifeline earthquake engineering, and in 1997 he received the Stephen D Bechtel Pipeline Engineering Award from ASCE for his contributions to the profession of pipeline engineering. In 2002 he received the Trevithick Prize from the British Institution of Civil Engineers and was designated as an NSF Distinguished Lecturer. He received the 2003 Japan Gas Association Best Paper Award and the 1996 EERI Outstanding Paper Award. In 2005 he received the Ralph B Peck Award from ASCE. In 1998, he was elected to the EERI Board of Directors and served as President from 2003-2005. In 1998 and 2003, Prof O'Rourke received Cornell University's College of Engineering Daniel Lazar and Kenneth Goldman Excellence in Teaching Awards, respectively. He received both the College of Engineering Distinguished Service Award and the CEE Distinguished Alumnus Award from the University of llinois in 2005 and 2000, respectively. He testified before the US House of Representatives Science Committee in 1999 on engineering implications of the 1999 Turkey and Taiwan earthquakes and in 2003 on the reauthorization of the National Earthquake Hazards Reduction Program. He has served on numerous earthquake reconnaissance missions, and holds a US patent for innovative pipeline design. He was elected as an Overseas Fellow of Churchill College, University of Cambridge, in 2006 and awarded a Fulbright Senior Specialist grant to work with the New Zealand Department of the Prime Minister and Cabinet to develop policy on critical infrastructure and natural hazards in 2007.

Professor ORourke has developed engineering solutions for problems concerning foundation performance, ground movement effects on structures earth retaining structures, pipelines, earthquake engineering tunneling and infrastructure rehabilitation, both on a research and consulting basis. He has served as chair or member of the consulting boards of many large underground construction projects, as well as the peer reviews for projects associated with highway, rapid transit, water supply, and energy distribution systems. Such projects include the NYC Second Avenue Subway, Boston CA/T, Third NYC Water Tunnel, Tren Urbano Rapid Transit, NYC Fulton St Transit Center, soft and hard rock tunneling for the Massachusetts Water Resources Authority, Dulles Airport underground expansion, San Francisco TJPA Downtown Extension Project involving hard and soft ground tunneling, seismic design of tunnels in Turkey, Trans-bay Tube Seismic Retrofit, seismic design for the San Francisco water supply (including the SFPUC Crystal Springs By-pass Tunnel, Bay Tunnel, Irvington Tunnel and Bay Division Pipelines),

underground stations for BART in San Jose, CA, geotechnical and seismic criteria for The Alaskan Way Viaduct in Seattle, WA, and many others. He has assisted in the development and application of advanced polymer and composite materials for the in-situ rehabilitation of water supply and gas distribution facilities. He has developed techniques for evaluating ground movement patterns and stability for a variety of excavation, tunneling, micro-tunneling, and mining conditions. He has developed analytical methods and siting strategies to mitigate pipeline and tunnel damage during earthquakes, analyze and design high pressure pipelines, and established full-scale testing facilities for transmission and distribution pipelines and tunnel facilities. He has developed geographical information systems (GIS) and network analysis procedures for water supply systems in areas vulnerable to earthquakes and other natural disasters. He and his co-workers have developed a computer model for the Los Angeles water supply, including all 12,000 km of pipelines and related facilities, which has been adopted by the Los Angeles Department of Water and Power as its decision support system for seismic planning and design.

He is a member of the ASCE, ASME, ASTM. AAAS, ISSMEE, EERI, and IAEG. He was a member of the NSF Engineering Directorate Advisory Committee, and serves on the Executive Committee of the Multidisciplinary Center for Earthquake Engineenng Research and he was chair of the U.S. National Committee on Tunneling Technology and co-chair of the Institute for Civil Infrastructure Systems. He was a member of the NRC Geotechnical Board and Board on Energy and Environmental Systems. He is a past chair of the UTRC Executive Committee and both the ASCE TCLEE Executive Committee and Technical Committee on Gas and Liquid Fuel Lifelines. He is a past chair of the ASCE Earth Retaining Structures Committee, as well as past president of the ASCE Ithaca Section, and was a member of the intermunicipal water commission in his home town.

Attachment B
Cost Estimates

GeoPentech Estimated Cost

GeoPentech 2014 Schedule of Fees and ODC Contract Fee Schedule

Professional Subconsultant Hourly Rates

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
NORTH ORANGE COUNTY WATER SUPPLY SYSTEM RELIABILITY PLAN
PART A. SEISMIC HAZARD ASSESSMENT
GEOPENTECH, INC. ESTIMATED COST

Labor Rate ($/hr): Personnel Title: *Task Item Description*	Total Consultant Hours	Subtotal Consultant Cost	Total Subconsultant Hours	Subtotal Subconsultant Cost[1]	Consultant Reimbursable Expenses[4]	Total Task Item Cost
Task A.1: Identify and Characterize Faults of Interest						
Subtask A.1-1: Prepare Maps of Faults Relative to Critical Water Supply Facilities in NOC (on Appropriate Base Maps)	41	$4,320	2	$500	$100	$4,920
Subtask A.1-2: Prepare Map of Historic Earthquakes and Instrumentally-Recorded Earthquakes in Southern California	25	$2,880	0	$0	$0	$2,880
Subtask A.1-3: Identify Recency of Activity of the Faults and Timing of Past Ruptures	23	$2,850	4	$1,000	$100	$3,950
Subtask A.1-4: Report Fault Slip Rate Estimates	11	$2,850	0	$0	$0	$2,850
Subtask A.1-5: Estimate the Maximum Credible Earthquake (MCE; i.e., the 2,475-year average return period earthquake) for the Faults	0	$2,090	8	$2,000	$100	$4,190
Subtask A.1-6: Additional Evaluation of Faults outside NOC Relative to Major Aqueducts	15	$2,090	4	$1,000	$500	$3,590
Total Tasks A.1	**115**	**$17,080**	**18**	**$4,500**	**$800**	**$22,380**
Task A.2: Identify Broad-Scale Ground Shaking Hazard						
Subtask A.2-1: Prepare Map of 2014 NSHM Regional-Scale Hazard Corresponding to 2% in 50 Years (the 2,475-yr Return Period) Relative to Critical Water Supply Facilities in NOC	27	$3,515	0	$0	$0	$3,515
Total Tasks A.2	**27**	**$3,515**	**0**	**$0**	**$0**	**$3,515**
Task A.3: Identify Potential Primary Fault Rupture Hazard Areas						
Subtask A.3-1: Prepare Maps of California AP Zones Relative to Critical Water Supply Facilities in NOC (on Appropriate Base Maps)	27	$3,010	0	$0	$0	$3,010
Subtask A.3-2: Estimate Primary Fault Offsets Using Common Empirical Magnitude-Area-Displacement Regressions	14	$2,020	8	$2,000	$100	$4,120
Total Task A.3	**41**	**$5,030**	**8**	**$2,000**	**$100**	**$7,130**
Task A.4: Identify Potential Secondary Earthquake Hazard Areas						
Subtask A.4-1: Prepare Maps of California Seismic Hazard (Liquefaction and Landslide) Zones Relative to Critical Water Supply Facilities in NOC (on Appropriate Base Maps)	30	$3,435	0	$0	$0	$3,435
Subtask A.4-2: Identify Generalized Areas of Potential Coseismic Uplift and Subsidence	36	$4,680	8	$2,000	$200	$6,880
Total Task A.4	**66**	**$8,115**	**8**	**$2,000**	**$200**	**$10,315**
Task A.5: Reporting and Presentations						
Subtask A.5-1: Prepare One Draft Technical Memorandum Summarizing the Findings of the "Part A. Seismic Hazard Assessment"	40	$6,000	4	$1,000	$0	$7,000
Subtask A.5-2: Prepare One Final Technical Memorandum Summarizing the Findings of the "Part A. Seismic Hazard Assessment"	36	$5,360	0	$0	$0	$5,360
Subtask A.5-3: Prepare and Participate in Four Presentations	96	$16,400	20	$5,000	$500	$21,900
Total Task A.5	**172**	**$27,760**	**24**	**$6,000**	**$500**	**$34,260**
Total Tasks A.1 through A.5	**421**	**$61,500**	**58**	**$14,500**	**$1,600**	**$77,600**
Optional Task A.O.1: Scenario-Specific Ground Shaking Hazard						
Subtask A.O.1-1: Selection of One Scenario Earthquake (MCE) for One Fault	7	$1,090	0	$0	$0	$1,090
Subtask A.O.1-2: Compute Ground Shaking at Two Spectral Periods for NOC Area for Scneario	25	$3,640	0	$0	$0	$3,640
Subtask A.O.1-3: Prepare Maps of Ground Shaking at Two Spectral Periods for NOC Area for Scenario	31	$3,775	0	$0	$0	$3,775
Total for One Run of Optional Task A.O.1	**63**	**$8,505**	**0**	**$0**	**$0**	**$8,505**
Optional Task A.O.2: Scenario-Specific Ground Deformation						
Subtask A.O.2-1: Selection of One Scenario Earthquake (MCE) for One Fault	14	$2,380	0	$0	$0	$2,380
Subtask A.O.2-2: Compute Regional (NOC Area) Ground Deformation for Scenario	36	$5,760	0	$0	$0	$5,760
Subtask A.O.2-3: Prepare Maps and Profiles of Ground Deformation for Scenario	36	$4,185	0	$0	$0	$4,185
Total for One Run of Optional Task A.O.2	**86**	**$12,325**	**0**	**$0**	**$0**	**$12,325**
Total Tasks A.0.1 and A.0.2	**149**	**$20,830**	**0**	**$0**	**$0**	**$20,830**
Optional Task B.1: Workshops						
Subtask B.1-1: Coordination of Two Workshops	56	$9,700	8	$2,000	$0	$11,700
Subtask B.1-2: Conduct Workshop 1	62	$10,550	64	$16,500	$1,000	$28,050
Subtask B.1-3: Conduct Workshop 2	62	$10,550	64	$16,500	$1,000	$28,050
Total Tasks B.1	**180**	**$30,800**	**136**	**$35,000**	**$2,000**	**$67,800**
Optional Task B.2: Documentation of Workshops						
Subtask B.2-1: Prepare One Draft Technical Memorandum Documenting Workshop 1	31	$4,725	16	$3,500	$0	$8,225
Subtask B.2-2: Prepare One Final Technical Memorandum Documenting Workshop 1	15	$2,075	0	$0	$0	$2,075
Subtask B.2-3: Prepare One Draft Technical Memorandum Documenting Workshop 2	31	$4,725	16	$3,500	$0	$8,225
Subtask B.2-3: Prepare One Final Technical Memorandum Documenting Workshop 2	15	$2,075	0	$0	$0	$2,075
Total Tasks B.2	**92**	**$13,600**	**32**	**$7,000**	**$0**	**$20,600**
Total Tasks B.1 through B.2	**272**	**$44,400**	**168**	**$42,000**	**$2,000**	**$88,400**

Notes:
1. Hours and costs for Lisa Grant not included in Subconsultant costs based on understanding that she will not charge fees for this project.
2. Subconsultant reimbursable expenses included in subconsultant total costs.

Summary

Total - Tasks A.1 Through A.5	$77,600
Total - Optional Tasks B.1 and B.2	$88,400
Total - Tasks A.1 through A.5 and Optional Tasks B.1 and B.2	**$166,000**

GeoPentech, Inc.

2014 SCHEDULE OF FEES

Position	*Rate* **($/hr)**
Principal	240
Associate	210
Senior Project Professional	175
Project Professional	150
Assistant Project Professional	125
Senior Staff Professional	115
Staff Professional	110
Technician	95
Administrative Support	75

Legal and Expert Witness Fees

Time for staff assigned as expert witness at court trials, mediation, arbitration hearings, and depositions will be charged at $350/hour.

Subcontracts, Equipment Rental and Document Reproduction

The costs of outside services subcontracted by GeoPentech to others such as drilling subcontractors, laboratory testing, equipment rentals, consultants, document reproduction will be charged at cost plus 10%.

Mileage

The mileage charge for personal autos will be at the current IRS reimbursement rate.

GeoPentech ODC CONTRACT FEE SCHEDULE

Item Description	Billing Unit	Amount
Mileage charge – Automobiles[1]	Miles	IRS rate
Truck Usage	$ per day	$100
Subcontractor Services		Cost
Outside Service/Rental Expenses (including reproduction, plots, postage, handling and delivery service, messenger services, transportation, lodging and other expenses)[1]		Cost
Refraction Geophysical Equipment	$ per day	$1,000
Downhole Geophysical Equipment (1-inch + diameter cased hole)	$ per day	$1,000
Rental of specialized geophysical equipment (ground penetrating radar, field resistivity, swept frequency hammer for reflection seismic, and other)	$ per day	Cost
Vibration Monitoring Geophones and readout	$ per day	$600
Generator	$ per day	$50
Ground Water Test Equipment: Laptop Instrumentation NW DL-2 Data Logger 15 PSI Transducer Water Level Indicator Slug test Kit	 $ per day $ per day $ per day $ per day $ per day	 $75 $75 $75 $25 $15
Slope Inclinometer	$ per day	$200

Professional Subconsultant Hourly Rates

Ronald T. Eguchi, (ImageCat, Inc.) – $200/hr.
Douglas G. Honegger, (D.G. Honegger Consulting) – $200/hr.
Tom O'Rourke, (Cornell University) – $275/hr.
Tom Rockwell, (San Diego State University) – $250/hr.
Lisa Grant, (UC Irvine) – No Fees*

*Lisa Grant will not charge consulting fees to this project unless further involvement beyond the current scope of work is requested and it meets her schedule requirements.

ACTION ITEM
March 18, 2015

TO: **Public Affairs & Legislation Committee**
(Directors Barbre, Tamaribuchi & Hinman)

FROM: **Robert Hunter, General Manager**

Staff Contact: Jessica H. Ouwerkerk

SUBJECT: **CONSIDER FINANCIAL PARTICIPATION IN SCIENCE FAIR**

STAFF RECOMMENDATION

Staff recommends the Public Affairs & Legislation Committee decide whether or not to participate in the 2016 Orange County Science and Engineering Fair through the 2015-16 budgeting process.

COMMITTEE RECOMMENDATION

Committee will discuss this item on March 16, 2015 and make a recommendation to the Board.

SUMMARY

MWDOC was recently approached by representatives of the Orange County Science and Engineering Fair (Science Fair) with a request to fund awards for 2015 Science Fair participants. For a number of years (through 2010), MWDOC awarded $50 checks to six Science Fair participants who completed water-related projects. Due to the relative scarcity of water-related projects that directly pertained to MWDOC's mission statement, as well as the burden placed on staff to participate in the Science Fair judging process, this expenditure was eliminated from the budget in 2011.

Typically, MWDOC's process has been to consider funding requests exclusively through the budgeting process. Accordingly, staff recommends the following:

- MWDOC not fund 2015 Science Fair awards as this expenditure was not included in the 2015-16 budget.

Budgeted (Y/N): N	Budgeted amount: $0	Core _X_	Choice __
Action item amount: $300	Line item:		
Fiscal Impact (explain if unbudgeted):			

- The Public Affairs & Legislation Committee consider participation in the 2016 Science Fair through the 2015-16 budgeting process.
    - If Science Fair awards are included in the 2015-16 budget, determine what level of funding is appropriate and under what conditions a project will be deemed appropriate to receive an award. If no projects are directly relevant to MWDOC's mission statement, no awards should be given.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 9-4

ACTION ITEM
March 18, 2015

TO: **Public Affairs and Legislative Committee**
(Directors Barbre, Tamaribuchi, Hinman)

FROM: **Robert Hunter, General Manager**

Staff Contact: K. Seckel/R. Bell

SUBJECT: **San Diego Gas & Electric Company**
South Orange County Reliability Enhancement (SOCRE) Project
Authorization to Submit Comments in Support of the Project

STAFF RECOMMENDATION

Staff recommends that the Board of Directors authorize the General Manager to submit comments and present testimony before the California Public Utilities Commission at one of two project Public Hearings to be held on March 25, 2015 in San Juan Capistrano and San Clemente in support of the subject electrical reliability grid enhancement project for South Orange County.

COMMITTEE RECOMMENDATION

Committee will review this item on March 16, 2015 and make a recommendation to the Board.

SUMMARY

SDG&E is proposing to construct several improvements to its transmission and distribution system that serves South Orange County. The purpose of the project is to increase the reliability and operational flexibility of their aging 138-kV system so as to reduce the risk of electrical outages. The South Orange County Reliability Enhancement (SOCRE) project would also upgrade older electrical infrastructure in the area, including SDG&E's Capistrano Substation in the City of San Juan Capistrano.

Budgeted (Y/N): NA	Budgeted amount: NA	Core X	Choice __
Action item amount: NA	Line item:		
Fiscal Impact (explain if unbudgeted):			

The SOCRE Project by SDG&E will:

- Rebuild the substation in San Juan Capistrano last renovated in the 1950's
- Upgrade the transmission lines from 69kV and 138kV to 230kV in order to provide the electric reliability needed today
- Replace existing structures with taller steel poles to enhance safety and reliability
- Improve reliability to the existing electric system
- Modernize electric transmission system and replaces outdated equipment
- Meet current and future energy needs of local home and business demands
- Allow for operating flexibility

Water supply and system reliability are integral to our mission and having a reliable electrical power grid is critical to pumping, conveying, treating and recycling of our water supplies. Significant and dependable power is necessary to pump and treat imported and local water supplies that are conveyed to homes and businesses throughout the county.

Like water, power is a commodity that every resident and business has simply come to expect day in and day out. And like water, electrical power is often taken for granted and only missed when it is not available.

San Diego Gas & Electric (SDG&E) is proposing to develop and build a $500 million reliability project that will both modernize equipment that is more than 50 years old as well as provide for a dependable electrical transmission system with sufficient critical facilities that will provide reliable service to reduce the risks of power outages. We cannot afford half measures regarding the viability of our infrastructure.

A key aspect of the reliability project will be the construction of a second 230-kV power source feed to the area, modernizing aging infrastructure, including rebuilding the Capistrano Substation. Currently, 100% of the electrical power into South Orange County flows through the Talega substation – the new project will allow added reliability by providing an alternate flow of electrical energy to either the Talega or the Capistrano substations, thus greatly enhancing the reliability. The rebuilt Capistrano Substation will provide the power supply to the Doheny Ocean Desalination Project. A key purpose of the Doheny Desal Project is to provide improved water supply reliability to the region and a reliable power grid is critical to providing a reliable water supply. We have been working with SDG&E for several years in planning for the future electrical service to the Doheny Desal Project and they have included the project in their projected service load in this area. The SOCRE project will provide critical improvements to assuring a reliable electrical supply to the area and to its critical water supply facilities and should be strongly supported.

The CPUC conducts two parallel processes when considering development proposed by a regulated utility: (1) an application process to consider whether the project is needed and is in the public interest; and (2) an environmental review process pursuant to CEQA. CPUC deemed SDG&E's application complete in May 2012 and is now currently receiving comments on its Draft EIR. Two public meetings will be held on March 25 in San Juan Capistrano and San Clemente to explain the proposed project, to discuss the

project's significant impacts, and to receive public comments on the Draft EIR. The public comment period ends on April 10, 2015. Previously, the CPUC issued a Notice of Preparation and held two previous public scoping meetings in South Orange County to receive comments on project alternatives.

Attached is the draft comment letter. Staff is planning on providing comments at the March 25 meeting.

DRAFT

March XX, 2015

California Public Utilities Commission
RE: SOCRE Project
c/o Ecology and Environment, Inc.
505 Sansome Street, Suite 300
San Francisco, CA 94111

Also via email at socre.ceqa@ene.com

RE: SUPPORT - South Orange County Electrical Reliability Enhancement (SOCRE) by SDG&E

Beginning on Thursday, September 8, 2011, at about 3:30 pm the electrical grid serving the San Diego–Tijuana area, southern Orange County, the Imperial Valley, Mexicali Valley, and Coachella Valley, and parts of Arizona went down for about 11 hours, leaving about 11 million residents without power. The electrical outage brought many metropolitan areas to a standstill, streets and freeways became jammed, one hospital was left without power when its back up generator failed, significant losses occurred to restaurants and grocery stores from spoiled food, and some sewage pumping stations failed resulting in contaminated beaches and potentially unsafe water supplies in several areas. This event, while not caused by local issues, serves to demonstrate the impacts of what can happen if we are not diligent in investing in our future infrastructure needs such as the SOCRE Project.

The SOCRE Project by SDG&E will:

- Rebuild the substation in San Juan Capistrano that was last renovated in the 1950's;
- Upgrade the transmission lines from 69kV and 138kV to 230kV in order to provide the electric reliability needed today; and
- Replace existing structures with taller new steel poles, which enhance safety and reliability.
- Improve reliability to the existing electric system
- Modernize electric transmission system and replaces outdated equipment
- Meet current and future energy needs of local home and business demands
- Allow for operating flexibility

The Municipal Water District of Orange County (MWDOC) provides imported water in Orange County to 2.4 million residents through 28 agencies covering most of the County (with the exception of Anaheim, Fullerton and Santa Ana). Water supply and system reliability are integral to our mission and having a reliable electrical power grid is critical to pumping, conveying, treating and recycling of our water supplies. It can sometimes take significant power to pump the water through elevation gains to service the homes and businesses throughout the county.

Like water, power is a commodity that every resident and business has simply come to expect day in and day out. And like water, electrical power is often taken for granted and only missed when it is not available.

San Diego Gas & Electric (SDG&E) is proposing to develop and build a $500 million reliability project that will both modernize equipment that is more than 50 years old as well as provide a redundant electrical transmission system that provides reliability and reduces the chances of a power outage. We cannot afford half measures regarding the viability of our infrastructure.

I strongly encourage you to support SDG&E's proposed project – the South Orange County Reliability Enhancement (SOCRE) for the benefit of the 300,000 plus residents and businesses who demand and deserve electric reliability.

Thank you,

Rob Hunter
General Manager
Municipal Water District of Orange County

GENERAL MANAGER'S REPORT OF STAFF ACTIVITIES MARCH 2015

Managers' Meeting	MWDOC held its Member Agency Managers' meeting in Fountain Valley on Thursday, February 17. In attendance were Joone Lopez, Matt Collings and Mark Serna (MNWD); Howard Johnson (Brady); Phil Lauri (Mesa); Jose Diaz (Orange); Keith Van Der Maaten and Eric Bauman (San Juan Capistrano); Andy Brunhart (SCWD); Art Valenzuela (Tustin); Brian Ragland (Huntington Beach); Scott Miller (Westminster); Renae Hinchey (LBCWD); George Murdoch (Newport Beach); Bob Hill (ETWD); Lisa Ohlund (EOCWD); Dan Ferons (SMWD); Ken Vecchiarelli (GSWC); Dave Rebensdorf (San Clemente); Hector Ruiz (TCWD); Mike Markus and John Kennedy (OCWD); Paul Weghorst (IRWD); Steve Conklin (YLWD); and Karl Seckel, Harvey De La Torre; Joe Berg; Richard Bell; Kevin Hostert; Jessica Ouwerkerk; Kelly Hubbard; Keith Lyon and myself of staff. The agenda included the following: 1. MNWD's Water Audit Loss Presentation by Marc Serna 2. MWDOC's FY15-16 Budget Development 3. Water Supply and Potential Drought Allocations 4. SWRCB Potential Action in March 5. Managers' Meetings – Survey Results 6. Alert OC Live Notification Drill 7. May meeting moved to May 28 8. MWDOC's Administrative Code The next meeting is scheduled for March 19.
ACWA DC Conference	In Washington, DC, Director Sat Tamaribuchi and Heather and I participated in the ACWA DC Conference February 25—27. On February 25 at the Rayburn Building, MWDOC co-hosted a Southern California Water Issues Congressional Delegation Briefing Luncheon with Eastern MWD, IEUA, and Western MWD. With the assistance of Director Barbre, Jim Barker and Congressman Issa's office, we hosted over 60 attendees. Its focus was the Bay Delta Conservation Plan and to emphasize this, two posters (borrowed from MET) were on display in the room, along with a BDCP table that was showcased by a large standing banner, and two BDCP handouts for attendees. Congressmen Royce, Rohrabacher Calvert and Lowenthal and Congresswoman Sanchez attended and spoke at the event. From our member agencies, IRWD and SMWD participated and Mesa Water District included information in the electronic briefing book.

MET ITEMS CRITICAL TO ORANGE COUNTY

MET's Water Supply Conditions	Reports have shown that 2015 will be the fourth consecutive year of a drought for California. This is due to below average precipitation and an extremely low snowpack for the State. As of February 26, the accumulated precipitation at the 8-Station (Northern Sierra) index measured 30.3 inches or 89% of normal to date; and the snowpack for the Sierra measured 17% of normal to date. This has caused DWR to set the 2015 SWP "Table A" allocation at 20% - far below the average of 60%. This improved precipitation has improved key state reservoirs, such as Lake Oroville and San Luis which are currently at 70% and 74% of normal to date, respectfully. Unfortunately, this multiple year drought has drained local groundwater supplies and regional imported storage that requires several years of above average conditions to refill. In 2014, MET used over 1.1 million AF of dry-year storage to meet demands. The National Weather Service projects Northern California will continue to have below average precipitation and above average temperatures over the next three months. This does not appear to improve the snowpack conditions for the Northern Sierra which play a significant part in determining this year's final "Table A" allocation. As for the Colorado River system, precipitation and snowpack are slightly below average to date. The snowpack is currently at 80% of normal to date, and additional precipitation is expected at the end of February. Based on these conditions, it appears MET is likely to implement its Water Supply Allocation Plan in April to reduce demands and stretch dry-year storage supplies for the coming year. MET staff plans to provide a recommended Allocation Shortage Level to the Board in April. If the Board approves the implementation of the Allocation Plan, the effective date would be July 1, 2015 to June 30, 2016.
MET's Finance and Rate Issues	At March's Metropolitan (MET) Finance and Insurance Committee, MET staff provided a brief financial report. For cumulative water sales through the end of February, MET is currently 122,000 Acre-Feet (AF)

MET's Finance and Rate Issues (Continued)	higher than budget. This is due to increased untreated water sales. Treated water sales, however, are on-track to budget projections. These increased sales will generate approximately $84.6 million in additional revenue. Expenses are currently $40 million under budget, due to State Water Contract costs projected to come in below budget as a result of a significantly low "Table A" SWP allocation this year.
Colorado River Issues	Representatives from agencies within the Colorado River Basin States, including Metropolitan, met with the U.S. Bureau of Reclamation (Reclamation) to begin development of a follow-up agreement with Mexico that would follow Minute 319 to the United Stated-Mexico International Water Treaty. Minute 319 and the implementing agreements were signed in November 2012 and will remain in place through 2017. The agreements include provisions for Mexico to store water in and recover water from Lake Mead, surplus and shortage sharing, development of environmental projects, and development of a binational water conservation project in Mexico, with the conserved water being made available to funders in the United States initially and then to Mexico. Because of the formal process involved in international negotiations, it is anticipated that the follow-up to Minute 319 will take years to develop, which is why the United States representatives are beginning to formulate their position well in advance of the termination of the current agreements. Concurrent with the development of a new international agreement, Metropolitan continues to work with the other agencies and Mexico to fund the lining of a water supply canal in Mexico, which will provide the funding agencies with a total of 95,000 acre-feet of Intentionally Created Surplus (ICS) storage credits in Lake Mead by 2017.
Bay/Delta State Water Project Issues	**<u>Turbidity Forecasting and State Water Project Operations</u>** The U.S. Fish and Wildlife Service) recently accepted a proposal by Reclamation to modify the method of calculating the adult Delta smelt cumulative salvage index and incidental take limit (ITL). The determination more than doubles the ITL from 78 to 196 for water year 2015. USFWS evaluated the proposal in light of a report prepared by the Independent Review Panel to the Delta Science Program and concluded that the proposed method, with modification, represents a viable interim approach to addressing incidental take. The increased ITL is based primarily upon a method developed by Bay-Delta Initiatives staff, and it will reduce the frequency with which salvage at the export pumps represents a constraint on operations.

Bay/Delta State Water Project Issues (Continued)	Last month, Reclamation and DWR voluntarily reduced pumping for several days in mid-December in an attempt to avoid establishing a turbidity "bridge" across the Delta. In 2012, it is believed that a similar "first flush" condition allowed Delta smelt to move into the south Delta; their presence resulting in months of pumping restrictions. The expectation was that by disrupting the movement of turbidity into the south Delta, pumping later in the season will be less constrained. In spite of several high wind events that exacerbated turbidity conditions, the voluntary pumping reductions appear to have averted significant Delta smelt salvage and thus averted triggering the USFWS Biological Opinion Reasonable and Prudent Action during the "first flush". MET staff indicated this voluntary action resulted in a net gain of 67,000 AF for exports. Fish trawling data continues to indicate few Delta smelt in the south Delta. Trawl and turbidity monitoring will continue to be closely watched. The Delta Conditions Team will continue to hold weekly calls and closely monitor trawl and turbidity data and evaluate turbidity forecast information. The water contractors are collaborating to develop an estimate of water savings associated with the preemptive action taken by Reclamation and DWR. In addition to these already realized savings, the action could potentially stem the loss of a significant amount of water over the coming months if rains continue. State and federal water project operations have been constrained by the National Marine Fisheries Service Biological Opinion's calendar-based restriction on reverse flows in Old and Middle River since January 1. **<u>Delta Flood Emergency Management Plan</u>** A DWR department-wide exercise will be conducted in April 2015 to evaluate response to Delta levee failures resulting from a major earthquake on the Hayward fault. The exercise will complement recent exercises focusing on flood-initiated emergencies. DWR has advised that interagency review comments to the Delta Flood Emergency Management Plan (DFEMP), along with results of the April 2015 Delta emergency exercises, will be incorporated into the DFEMP by mid-2015. Later this year, a construction contract will be awarded by DWR at the Stockton storage site to augment rock stockpiles, build all-weather access and a major warehouse, and recondition two existing warehouses. A temporary barge loading and off-loading facility is available at the Stockton storage site, but will be replaced by a permanent facility in 2016. At the Rio Vista storage site, a contract

Bay Delta State Water Project Issues (Cont'd.)	will be awarded in 2015 to augment rock stockpiles and build loading ramps and all-weather access. Grant programs to local and county emergency response agencies are focusing on emergency planning, communications, and training.
ENGINEERING & PLANNING	
Baker Treatment Plant	MWDOC has been asked to help secure MET's concurrence on the quality of water being introduced into the South County Pipeline from the Baker Treatment Plant project. A number of discussions have been held with MET on this issue. MWDOC received a letter from MET dated February 18, 2015 that summarizes MET's position in a number of areas and indicates that MET has "no comments" with respect to the SCP Tie-in. Karl and Kevin participated in a shutdown meeting to plan for the March 2015 connection of the Baker Treatment Plant Pipeline to the South County Pipeline.
Doheny Desalination Project	On Friday February 13, Director Susan Hinman and Karl and Heather Baez in conjunction with South Coast WD Directors, Bill Green and Rick Erkeneff, hosted a Doheny Desal Tour. There were a total of 18 attendees, including: • OC Supervisor Lisa Bartlett • Victor Cao, staff to Supervisor Bartlett • Duane Cave, MNWD Director • Renae Hinchey, GM of LBCWD • Chris Regan, AGM of LBCWD • Marvin Johnson, Commissioner for LBCWD • Debbie Neev, Commissioner for LBCWD • Cheryl Kinsman, Commissioner for LBCWD and her son • Kathy Ward, Councilmember for San Clemente • Barbara Szemenyer, applicant for SJC Water Commissioner • Richard Hartl, SJC Water Commissioner • Dick Dietmeier, South Coast WD Director Richard participated in the kick-off meeting with South Coast WD and the Consultant Team from Chambers and Merkel to begin the baseline environmental monitoring work that will provide the baseline for future CEQA work. This is great news that this work is beginning.

Poseidon Resources Ocean Desalination Project in Huntington Beach	In January, the OCWD Board authorized their staff to enter into negotiations with Poseidon on the terms and conditions for the Huntington Beach Project. One meeting was held so far. Staff is to report back at their March Board meeting. OCWD is also establishing a Citizen's Advisory Committee on the Project. MWDOC is working on securing the ability to convey either groundwater or Poseidon water in the EOCF#2. Securing the ability to do so will open up a number of opportunities in OC.
Orange County Water Reliability Study	Karl and Richard hosted the February Workgroup meeting for the OC Water Reliability Study following the Managers' meeting where discussion focused on proposals obtained by MWDOC to update the Seismic Assessment Mapping and Facility Vulnerability Review. MWDOC was successful in securing proposals from four firms to provide assistance in better understanding the risks to water facilities, particularly wells. Additional work is proposed as part of the OC Water Reliability Study. IRWD provided a preliminary review of the economic and reliability issues associated with the Poseidon Project that was beneficial in generating quite a bit of discussion among the workgroup.
South OC IRWMP	Karl and Joe participated in the South Orange County IRWMP Management Group discussions on: • Water supplies, including recycled supplies, stormwater capture and groundwater quality • Flood • Water Use Efficiency • Watershed Management • Water Quality Follow-up discussions will occur with the workgroup in preparation for a March 12 meeting for the Exec. Committee for all of South OC.
San Juan Basin Authority	Richard attended the San Juan Basin Authority meeting in February where discussions continued on basin monitoring and management. Cathrene Glick reported on the status of the basin activities related to the Groundwater Management Plan.
MET's LRP	Karl and Harvey met with Paul Weghorst and Mark Tettemer from IRWD and the MET staff in charge of the Local Resources Program (LRP), James Bodnar and Ray Mokhtari, to discuss how recycled projects, including seasonal storage reservoirs, might be better formulated in seeking funding under MET's LRP Program. The meeting was helpful in understanding how MET views the various components of recycled water systems.

Center for Demographic Research	Karl and Kevin attended the February 9 meeting of the Center for Demographic Research (CDR) Management Oversight Committee. CDR is hosted in facilities owned by Cal State Fullerton. A new Dean is conducting work related to campus space and is considering relocating CDR to an alternate location. CDR would like to stay where they are and may request that support members participate in future discussions regarding the value and exposure brought to Cal State Fullerton by the work conducted by CDR. CDR provided background information on the history of the County's Forecast and Analysis Center and how the services were transferred to CDR during the County's bankruptcy.
Orange County Feeder Shutdown	Karl, Keith and Kevin participated in a shutdown planning meeting to test the ability of the City of Newport Beach to provide emergency water to Laguna Beach CWD. MET staff was involved as they will be required to shut down the lower portion of the Orange County Feeder at service connection CM-1 to simulate an outage and they will need to take their CM-1A meter totalization off-line to eliminate double billing for LBCWD during the test. Kevin and Brandon visited the sites during the flow test, which proceeded as planned. Newport Beach made improvements to the City's flow control facility to be able to provide water to LBCWD during emergencies, and the test successfully showed that the water could be conveyed. Keith participated in the discussions for the upcoming shutdown of the Orange County Feeder in the City of Fullerton for relocating a portion of the pipeline. The shutdown was pushed out into the April timeframe.
OC-45	Keith and Kevin are working with MET and the City of La Habra to test the shutoff valve at OC-45. La Habra is preparing to rebuild the flow control facility and needs to know if the MET valve will hold tight during the 6 month construction process. They met with Scott Reierson from MET and Elias Saykali, Brian Jones, Steve Garcia and Eldon Davidson from La Habra to plan a leak test. Keith visited the site during the actual shutdown of OC-45, and there was confirmation that there was no leakage.
San Diego Gas & Electric	Karl met with Duane Cave, MNWD director and External Relations Manager for SDG&E. SDG&E has a $475 million electrical reliability program they are now starting with the release of the Environmental Documents. They will be holding hearings in March in San Clemente and San Juan Capistrano and would like support from the water industry. They are investing to provide multiple paths for electricity to be distributed in South OC compared to how it is organized today where the entire area flows through a single substation. Similar to the flow of water, having alternative delivery options is good for electrical reliability planning.

ISTAP	Richard Bell attended the recent Independent Science Technical Advisory Panel (ISTAP) Meeting with the Coastal Commission, Concur (the meeting convener) and the Science Panel. This was the second workshop in Phase 2 to further discuss Seabed Infiltration Galleries (SIG's). At the meeting, the shoreline alternative was determined to be "not feasible" and will not be considered in further deliberations. The further offshore seabed option is still under consideration; an alternative construction methodology was discussed for this option. The ISTAP group will be preparing a final report on their findings.
OCWA Luncheon	Director Susan Hinman and Karl and Kevin attended the OCWA Luncheon where Deven Upadhyay from MET spoke about the drought and the potential for MET to impose allocations later this year. Deven characterized the current drought as the 8th year out of the past 9 where water supplies and precipitation have been below the long term average with the exception of only one year. When asked about important "take-a-ways" from the current situation we're in, Deven indicated the need to operate groundwater basins in So. CA differently than we have been operating them as over 1 MAF of water has been pulled out of the basins in recent years, leaving them in a less than desirable position at this time. Deven also noted the need for more recycling, indirect potable reuse and potable reuse. When pressed, he indicated that ocean desal investments by MET beyond the LRP contributions may come up in the IRP update.
Urban Water Management Plans	Karl met with Anona Dutton from EKI, a consulting firm that works on Urban Water Management Plans, as MWDOC is preparing an RFP to prepare plans for MWDOC and a number of our agencies.
Office Maintenance	Karl and Cathy Harris met with Mike Markus and John Kennedy to discuss building budget issues for preparation of MWDOC's Budget.
MET Audit of Tustin LRP/GRP	To conduct an audit of Tustin's costs related to the Tustin Desalter Project, Keith met with Jose Vergara from MET, Art Valenzuela and Joe Lozano from Tustin, and Jeri Marcia from Mayer Hoffman McCann. Tustin's Desalter receives MET LRP incentives as a Groundwater Recovery Project, and it is MET's policy to audit LRP/GRP projects every 5 years. Tustin's Desalter has been off since August 2012 for work on the wells, and is scheduled to restart operations no later than May 2015. The Tustin LRP/GRP Agreement will expire October 2016.
OCWD Producers Meeting	At the January 11 meeting, Keith and Kevin heard about the National Contingency Plan process for the North Basin Groundwater Protection Project; FY15/16 Budget presentation and recommended BPP & RA; a Poseidon update; OCSD Service Area 7, and work related to Laguna Beach CWD's potential groundwater production. OCWD has included purchasing 65,000 AF of MET recharge water with a recommended BPP of 70% within the draft FY15/16 budget.

EMERGENCY PREPAREDNESS

General Activities	Kelly Hubbard has been asked to speak at the American Water Works Association 2015 Annual Conference and Exposition (ACE) in June at the Anaheim Convention Center. She has been asked to be a speaker at three different sessions on water utility coordination and response. The sessions are largely similar with slightly different target audiences. She is working with a group of water security and emergency managers to host her sessions and a series of sessions on emergency management at the conference. These sessions will be promoted to WEROC member agencies. Kelly was asked to tape a Cox OC Civic Connection segment in which she was interviewed by Lacy Kelly on water emergency preparedness and response coordination. It was taped on February 2 and is currently available online. Kelly attended the Independent Special Districts of Orange County (ISDOC) Executive Committee meeting to confirm her representation of ISDOC to the Operational Area Executive Board. Kelly, Karl, Cathy and Katie coordinated the interview and hiring process for the WEROC Coordinator position. Kelly went on the State Water Project Tour with Director McKenney February 20-21. Kelly has been working on the WEROC budget for Fiscal Year 2015-2016.
Coordination with Member Agencies	Kelly attended a lunch meeting with Santa Margarita Water District's Director Chuck Gibson, Joyce Crosthwaite (Assistant to the General Manager), and Dan Ferons (General Manager). The lunch was requested by Director Gibson to learn more about the WEROC program, what water utilities should do to be prepared and how he could support his own district's efforts. WEROC held its Quarterly Emergency Coordinator Meeting on February 3 which included a great presentation by Sprint on their disaster response programs that are available to local government. Additionally, the group had good discussions regarding a WEROC

Coordination with Member Agencies (Continued)	Radio System Assessment, WebEOC Forms review for the newest update, Member Agency section of In Case of Crisis, water utility Alert OC Live Drill, Orange County Intelligence Assessment Center Water System Assessment and the May disaster exercise for planning purposes. Kelly started to work with MWDOC Public Affairs staff and County Emergency Management staff for the planning of the Alert OC live drill. Because of the timeline (live drill is April 7), political sensitivity and training needed, WEROC will be hosting 3 trainings, 3 coordination meetings, and a hotline at the County EOC for the actual drill. Materials for the exercise, training dates and drill information have been provided to the general managers, emergency coordinators and public affairs staff of the utilities, as well as the city staff with responsibility for Alert OC and emergency management. This is the first time the water utilities have been provided the opportunity to use the "test" slot for AlertOC. A water conservation message will be conveyed to registered participants. Kelly provided 12 member agency staff with a 2 hour training called "Bare Bones of Response" which covered what the bare minimum information is that is needed from member agencies during emergencies and the various communication methods that can be utilized. Overall, the message to the agencies was to keep their response concepts simple, as long as WEROC receives critical pieces of information. The training was well received and has been requested again. Mesa Water District has been working with a consultant to update their emergency operations plan and provide emergency response training. Kelly worked with MESA Water staff and the consultant to provide resources for the process and to provide review and comment on the draft plan.
Coordination with the County of Orange	At the County emergency operations center,.Kelly attended the Urban Area Working Group (UAWG) Meeting February 11. UAWG is one of the approval bodies for the Urban Area Security Initiative grant funds. At the meeting, Kelly requested more funding for emergency manager specific training and to allow the water and wastewater utility staff to participate in fire services training that the water utilities also conduct (trench rescue, confined space rescue, hazardous materials response, etc.). Kelly advised the group that the water and wastewater utilities train and staff their own rescue and response teams to provide greater likelihood of rescue during high risk operations, but would appreciate the opportunity to train with fire officials to build common understanding of processes and familiarity with one another's equipment.

Coordination with the County of Orange (Continued)	Battalion Chief Black, Orange County Fire Authority Emergency Coordinator, liked the idea of including the water utilities in the training and assured that he would open up OCFA assigned seats to water utilities. In Santa Ana, Kelly attended the Operational Area (OA) Executive Board Meeting on February 11 as the voting representative of ISDOC. The meeting was attended by several members of the Grand Jury and a representative of the OC Vector Control District in addition to its voting representatives. Kelly provided input into the Operational Area Power Outage Annex to include lessons and planning concepts that have been developed by WEROC and the Cal WARN working group. This plan was approved at the meeting.
Coordination with Outside Agencies	Kelly participated in the California Office of Emergency Services (Cal OES) Southern Region Drought Conference Call. These conference calls are now once a month and new information has slowed considerably within Southern California as small storms and temporary measures have relieved pressure on the counties hardest hit by the drought. Kelly facilitated the February California Emergency Services Association (CESA) Southern Chapter Board Meeting in Norwalk as the chapter President. Kelly participated in the Cal WARN State Steering Committee as Region 1 Chair. Cal WARN is largely working on several emergency response plans in coordination with the state regarding water planning and response, as well as recruitment of water utilities to sign the agreement prior to a disaster occurring. The Public Water Agency Group (PWAG) is a group of small utilities in LA County that use agreements to share costs for selected common interest projects and issues. The PWAG agencies are familiar with WEROC, and would eventually would like a similar organization for their member agencies (recognizing that WEROC is decades in the making). They have hired a consultant to perform an assessment of where PWAG agencies are now with respect to emergency preparedness and mutual aid, and then develop a "roadmap" that identifies options, opportunities, constraints and general costs to plan and develop a PWAG mutual aid program. The report will include identification of desired program elements, prioritization of elements, a phased implementation schedule, preliminary budgets, and funding models. Kelly met with their consultant to provide guidance on how

Coordination with Outside Agencies (Continued)	WEROC developed over time and what she considers to be essential elements for an effective program. The PAWG agencies include: Three Valleys Municipal Water District, South Montebello Irrigation District, La Puente Valley County Water District, Orchard Dale Water District, Pico Water District, Crescenta Valley Water District, San Gabriel County Water District, Newhall County Water District, Valley County Water District, Rowland Water District, Walnut Valley Water District, and Palmdale Water District.
WATER USE EFFICIENCY	
California Urban Water Conservation Council	On February 10, Melissa Baum-Haley, as the Landscape Committee co-chair representative, participated in a conference call with the California Urban Water Conservation Council (CUWCC) to discuss committee direction and planning. On February 11, Joe Berg attended the CUWCC Finance and Governance Committee meetings at the Council's office in Sacramento. Committee members from water agencies and environmental organizations from throughout the state participated in this meeting. Items discussed at the Finance Committee included: • Approve Minutes from October Meeting • Review and Approve 2014 Quarter 4 Financials • Member Funds on Deposit • Executive Directors Report Items discussed at the Governance Committee included: • Approve Minutes from October Meeting • Data Sharing Policy • Executive Session Re: Executive Directors Performance Review • BMP Reporting • BMP 1.4 (Water Rates) Submission of Occidental Community Services District • BMP 1.4 (Water Rates) Revision Process Update • Engaging Board Committee Liaisons with their Committees • Development of February Board Agenda and March Plenary Agenda The next meeting is scheduled for May 6 at the Council's office in Sacramento.

California Urban Water Conservation Council (Continued)	On February 25, Joe hosted the CUWCC Board meeting at MWDOC this month where about 20 representatives from water agencies and environmental organizations attended. Agenda items included: • New Board Member Orientation and Handbook Updates • Adoption of Consent Calendar • Strategic Planning Discussion • Quarter 4 Financials • Member Overages and Funds on Deposit • Council Policy on Data Requests • BMP 1.4 (Water Rates) Revision Update • Executive Directors Report • March Plenary Agenda The next meeting is scheduled for May 20 at the Sonoma County Water Agency. On March 3, Melissa participated in the quarterly general Landscape Committee meeting. The meeting focused on drought-related topics and areas of comment to the Independent Technical Panel on Demand Management Measures for the California Department of Water Resources.
Vista Sir Homeowners Association	On February 18, Joe provided the Homeowners Association (HOA) with a Water Supply Update and a description of the available water use efficiency programs. It was exciting to see how concerned HOA Board members were about responding to the drought. They are developing a plan for participating in the Orange County Turf Removal Rebate Program that will include a community outreach effort to incorporate local residents in the planning process.
One Water One Watershed 2015 Integration and Pillar Workshop	On February 26, Joe attended the One Water One Watershed 2015 Integration and Pillar workshop hosted by the Santa Ana River Watershed Project Authority (SAWPA) at their Riverside office. Approximately 75 stakeholders from throughout the watershed participated in this workshop. The meeting focused on the drought and implementation of the Drought Response Grant awarded to SAWPA for Turf Removal, Landscape Area Measurements, Budget-Based Tiered Rates, and Technology-Based Customer Outreach. The grant agreement is anticipated to be signed in early summer, with implementation to start soon after. Northern Orange County will benefit as a stakeholder to this grant.
MET's Program Advisory Comm.	On February 26, Melissa, along with staff from the Los Angeles Department of Water and Power, the San Diego County Water

MET's Program Advisory Comm. (Continued)	Authority, Eastern Municipal Water District, and Inland Empire Utilities Agency, participated in MET's Project Advisory Committee (PAC). The purpose of the PAC is to develop refinements to MET's water use efficiency programs. Refinements discussed included establishment of both a regional commercial drip irrigation rebate and a rain water cistern rebate.
SBx7-7 Urban Stakeholder Landscape Area Measurement Subcommittee	On March 2, Melissa participated in the SBx7-7 Urban Stakeholder Landscape Area Measurement Subcommittee meeting whose objectives included presentations by several companies and water agencies that are using remote sensing to measure landscape area, a discussion of current possibilities and limitations to the effective use of remote sensing for landscape area measurement, and a discussion of possible guidance that could help facilitate landscape area measurement.
State Water Resources Control Board	On March 3, Joe participated via WebEx in a meeting of the State Water Resources Control Board (SWRCB). The key item of interest was the January progress report on implementation of the Emergency Regulation. State-wide, January 2015 water use was down 8.8% compared to January 2013. In the South Coast Region, January 2015 water use was down 9.2% compared to January 2013, beating the state average reduction. On March 5, Joe participated in a conference call hosted by staff at the SWRCB. Over 270 people from throughout the state participated in the call. The purpose of the call was to present the staff recommendation regarding extending and updating the Emergency Regulations, which includes: • A prohibition on irrigation of turf or ornamental landscapes during and 48 hours following measurable precipitation. • Hospitality sector restrictions requiring that water only be served on request in restaurants and bars, and requiring the operators of hotels and motels to offer patrons the option of not having their towels and linens washed daily. • A requirement for urban water suppliers that do not already have a limit on the number of days that outdoor irrigation of ornamental landscapes or turf with potable water is allowed, to limit such irrigation to no more than two days per week. • A requirement that urban water suppliers promptly notify their customers when they are aware of leaks within the customer's control. • Additional reporting requirements for urban water suppliers on compliance and enforcement efforts being undertaken within their service areas.

SWRCB	• Clarification that small urban water suppliers are required to limit outdoor irrigation of ornamental landscapes or turf with potable water to no more than two days per week or implement other mandatory conservation measures intended to achieve a 20 percent reduction in water consumption. Staff composed, with input from the member agencies, a comment letter to the SWRCB and has been engaging in the ACWA Water Conservation Committee to further provide input into the process and content of the Emergency Regulations. The SWRCB will consider this item at their March 17 Board Meeting.
Proposition 84 Customer Handbook Committee Meeting	On March 4, Melissa participated in the Proposition 84 Customer Handbook Committee Meeting held at SAWPA and attended by approximately 30 governmental agencies and environmental stakeholders. The Proposition 84 Customer Handbook will focus on landscape and irrigation information for the residential user. The end result will be an online interactive handbook, with print copies available as requested. The effort is expected to take two years.
Orange County Garden Friendly Event – Cypress	On March 7, Melissa and Beth Fahl participated in the OC Garden Friendly Event at the Cypress Home Depot which included representatives from MWDOC, County of Orange Stormwater Prevention, University of California Cooperative Extension (UCCE), UCCE Master Gardeners, City of Cypress, and Golden State Water Company. The event highlighted the climate appropriate plants available for sale, water efficient devices and rebates, and a Home Depot Kids Workshop. While MWDOC directly engaged with 60 customers, approximately 300 were in attendance.

Orange County Water Use Efficiency Coordinators Workgroup	On March 5, Melissa, Beth, and Jessica Ouwerkerk attended the Orange County WUE Coordinators Workgroup meeting hosted by the City of Orange, and approximately 15 agencies participated. Highlights on the agenda included:
	• Agency Welcome
	• MWDOC Updates
	  o Water Supply Update/Allocations
	  o SWRCB Potential Action
	• Agency Roundtable/Problem Solving Roundtable
	  o Agency Drought Response Update
	• Public Affairs/Marketing Update Home Certification Program Marketing
	  o OC Garden Friendly
	  o School Program
	  o New Infographic
	  o Bill Inserts
	  o Poster/Slogan Contest

WUE Coordinators' meeting (Continued)	• Metropolitan Update
	  o Conservation Program Board Update
	  o SoCal WaterSmart Update
	  o Water Savings Incentive Program Update
	  o Media/Outreach Campaign Update
	  o California Friendly Landscape Classes Update
	• Water Use Efficiency Programs Update
	  o Turf Removal Program
	  o California Sprinkler Adjustment Notification System
	  o Program Evaluations
	• California Urban Conservation Council
	
	The next meeting is scheduled for April 2 and will be hosted by Mesa.

PUBLIC/GOVERNMENT AFFAIRS	
Member Agency Relations	Tiffany accompanied Director McKenney on a State Water Project Inspection Trip February 20 – 21. She is working with Director Barbre and Al Mendez of MET regarding Director Barbre's upcoming State Water Project trip which will be co-hosted by Director Lewinger from San Diego. The 3-day trip is scheduled for March 20 – 22 and will include stops in the Central Valley as well as Edmonston. Two additional Diamond Valley Lake trips are in process. The trip dates are March 27 and April 17 and Director McKenney is hosting both. Tiffany is sending out invitations, accepting reservations, and managing guest, MWD, and Director needs for these trips as well. Darcy has been scheduling member agency meetings with Stetson Engineering regarding the Consumer Confidence Reports. The agency meetings will be held here at MWDOC March 30 – April 1. Darcy facilitated the February Public Affairs Workgroup meeting. Harvey provided the group with an overview of water supply conditions and possible allocation scenarios. Kelly provided an overview of the upcoming AlertOC exercise and encouraged the agencies to participate in coordination with the cities they serve. Tiffany also attended.

Member Agency Relations (Continued)	Darcy and Jessica worked with Kelly to develop press release templates, social media posts and AlertOC message templates for the upcoming regional AlertOC Test on April 7. In addition, Darcy participated in the first planning meeting with member agencies, cities and the County. More coordination meetings are planned in the next few weeks as well as additional training opportunities. Darcy is drafting a regional Drought Communications plan for regional messaging and outreach efforts. Darcy and Jessica participated in Metropolitan's PIO meeting on March 12 and Jessica participated in the February 19 Member Agency Managers' Meeting during which she shared results of the recent Managers' Meeting survey. South Coast Water District borrowed the Ricki Raindrop mascot for community events the weekend of March 7-8. Heather met with Christine Compton from IRWD & Alicia Dunkin from OCWD to discuss working together on gathering Prop. 1 information and working together to maximize benefits to the region. Heather met with Stacy Taylor from Mesa Water District and Christine Compton from IRWD to discuss upcoming legislative proposals and the ACWA State Legislative Committee meeting.
Community Relations	In Palm Springs, Darcy participated as a speaker and panelist at the Urban Water Institute's Spring Conference. President Dick moderated the panel. Darcy and Jessica are working with City of Anaheim staff to coordinate a Water Expo at the new Anaheim Regional Transportation Center on June 6. Jessica developed and distributed the February issue of eCurrents which featured articles on the allocations/water supply, Orange County's water-saving efforts, emergency preparedness, Mesa Water District's Drought-Reach campaign, and more. Jessica developed an infographic showcasing Orange County's long-term water use efficiency efforts. The infographic was distributed to the member agencies, shared on our social media pages, and posted on our website.

Community Relations (Continued)	Tiffany is working with Laura Loewen and Directory contacts to complete the MWDOC member agencies and OC special districts 2015 MWDOC and ISDOC Directories. Jessica, Tiffany, Bryce, and Marey implemented MWDOC's social media activities through Facebook, Twitter, and Pinterest. Jessica updated several pages on the MWDOC website, Open Government site, and WUE microsite. Tiffany staffed the monthly WACO meeting on March 6.
Education	Jessica is coordinating a School Program Working Group comprised of member agency representatives from EOCWD, Mesa Water, SMWD, and MNWD (all agencies were invited to participate). The group met on March 9 to outline the School Program Request for Proposals Process and discuss next steps. Jessica accompanied SMWD staff at School Program observations on May 4.
Special Projects	Tiffany is continuing to work with Immersiv Media on the OC Water Hero Program phone app. Tiffany, Jessica, Bryce and OCWD representatives met with Greg Osti on March 4 to review the overall development of the app and the accompanying website. Darcy and Jessica are working with Fraser Communications on the development and production of the short Value of Water Video. In addition, Darcy has provided the participating agencies with Field Crew talking points on the drought, message points on the three pillars and social media posts. Efforts are underway on the electronic Consumer Confidence Report templates, newsletter articles and presentation templates. Darcy participated in an Orange County Water Summit Planning Committee meeting and has been working with OCWD staff and Disney to finalize the collateral materials. The next full committee meeting is scheduled for April 9. Darcy is working with other water stakeholders on the development of a recycled water operator certification program. Jessica developed draft speaking points regarding drought and water supply conditions. The speaking points were distributed to member agency public affairs staff for their use.

Special Projects (Continued)	Tiffany and Bryce continue to manage the administrative process for the annual Poster Slogan Contest and Digital Arts Contest, and will continue to work on a variety of elements leading up to the Awards Ceremony in May 2015. Tiffany and Bryce prepared the February cover image for social media, eCurrents, and the website. Jessica, Tiffany and Darcy participated in the interview process for the Value of Water Assistant position. 5 candidates were interviewed. Tiffany provided Laguna Beach County Water District with outreach materials for the 2015 Poster & Slogan, and 2015 Photography & Digital Arts Contests. Tiffany, Bryce and Marey researched, provided recommendations, and ordered several marketing giveaways and community event materials. Tiffany coordinated with Cena Swisher, contractor to EPA's WaterSense Program, to secure artwork for a promotional banner to be used at public events. Tiffany has created a new template for briefing papers and will begin transitioning information from the original briefing papers to the new template over the next few months. Heather attended the ISDOC Executive Committee meeting.
Water-Use Efficiency Marketing	Jessica developed and coordinated water use efficiency bill inserts promoting smart timers, the CA Sprinkler Adjustment Notification System, high efficiency clothes washers and toilets. The 260,000 bill inserts are being distributed by 17 retail water agencies during the months of March through May; e-bill inserts will also be distributed to customers of select water agencies. Jessica completed the WUE Master Plan Annual Update. It is currently being reviewed by management staff. Jessica is working with the OC Stormwater Program on post-turf removal lawn signs that will be funded by the County. The signs are currently being printed, and will soon be offered to the retail water agencies for distribution to successful Turf Removal Program participants. Jessica participated in the OC Stormwater Program Public Education meeting on February 24 and the OC WUE Coordinators workgroup meeting March 5.

WUE Marketing (Cont'd.)	Jessica designed and ordered four Public Spaces Landscape Program signs customized for ETWD and the City of Lake Forest. The signs will be displayed at participating sites as part of a grant requirement.
Legislative Affairs	Heather attended the "Water 2015" conference sponsored by Capitol Weekly and heard from the following panels/panelists: <u>The Money: Who Pays & How Much?</u> Anthony York, Grizzly Bear Project; Joe Byrne, California Water Commission; Joe Caves, Conservation Strategy Group; Denise Kruger, Golden State Water; Roger K. Patterson, Metropolitan Water District; Cindy Tuck, ACWA. <u>Drought Impact</u> Jennifer Bowles, Water Education Foundation; Jim Branham, Sierra Nevada Conservancy; Adrian Covert, Bay Area Council; Laurel Firestone, Community Water Center; Bo Mazzetti, Rincon Band of Luisneo Indians; Assemblyman Henry Perea. <u>The Delta</u> Amy Quinton, Capital Public Radio; Osha Meserve, Soluri Meserve Law Corporation; Marguerite Patil, Contra Costa Water District; Mary Piepho, Contra Costa Board of Supervisors; Richard Stapler, California Natural Resources Agency. **<u>ACC-OC/OCBC Sacramento Advocacy Trip</u>** Heather participated in the ACC-OC/OCBC Sacramento Advocacy Trip and heard from the following VIPs: Rob Lapsley, President of the California Business Roundtable; Dave Cogdil, CEO California Building Industry Association; Kathy Cole, Executive Legislative Representative, Metropolitan; and Janet Napolitano, President, University of California. Legislative appointments included: • Senator Andy Vidak • Assemblyman Anthony Rendon • Lieutenant Governor Gavin Newsom • Assemblyman Jimmy Gomez Assembly Speaker Toni Atkins • Secretary of Labor & Workforce Development David Lanier

Legislative Affairs (Continued)	• Assemblyman Jose Medina • Secretary of CA EPA Matt Rodriquez • California Insurance Commissioner Dave Jones • Dinner – included a guest appearance by Governor Jerry Brown, and the entire Orange County delegation. Heather met with Senate Republican Caucus Policy Director, Greg Maw, to discuss SB 143 (Stone) which the Board voted to oppose on February 18, 2015. In Sacramento, Heather participated in ACWA's State Legislative Committee. Heather had a meet & greet with the Rural County Representatives of California. Heather met with Steve McCarthy, consultant for the Assembly Parks & Wildlife Committee, and shared MWDOC's 2015 Policy Principles. Heather attended the Water Agencies of the Inland Empire and Orange County State Legislative Reception. **ACWA's Legislative Symposium** Director Tamaribuchi and Heather participated in ACWA's Legislative Symposium and heard from the following panels/panelists: To Adjudicate or Not to Adjudicate? That is the Question Eric Garner, Attorney at BB&K; Gordon Burns, Undersecretary at CalEPA; Dennis O'Connor, Principal Consultant for Senate Natural Resources & Water Committee; & Jack Rice, Associate Counsel for the California Farm Bureau Federation. Prop. 218: Storm Water & Disadvantaged Community, Changes Headed Our Way? Kathy Cole, Legislative Representative, Metropolitan Water District of Southern California; Omar Carrillo, Community Water Center; Justin Malan, EcoConsult; Jason Rhine, Legislative Representative, League of California Cities.

Legislative Affairs (Continued)	**<u>ACWA DC Conference</u>** In DC at the ACWA Conference, Director Tamaribuchi and Heather and I attended the Welcome Breakfast and afterward, heard from the following Congressional Staff Panel: • Roger Cockrell, Professional Staff Member, Senate Energy and Water Appropriations Subcommittee • Kirk Weaver, Staff Director, House Water and Power Subcommittee • Matthew Muirragui, Professional Staff Member, House Natural Resources Committee That afternoon, the Congressional Speech Program included: Representative Valadao Representative Huffman Representative LaMalfa Representative Denham Representative Garamendi Representative Knight Representative Calvert Representative Costa.

pat meszaros
03/12/15

ITEM NO. 11

INFORMATION CALENDAR

MWDOC GENERAL INFORMATION ITEMS

MWDOC BOARD OF DIRECTORS

- Brett R. Barbre
- Larry D. Dick
- Wayne Osborne
- Joan Finnegan
- Sat Tamaribuchi
- Jeffery M. Thomas
- Susan Hinman

action.sht\agendas\mwdocact.pac