Docket:	A.12-04-019
Exhibit Number	ORA - ____
Commissioner	C. Sandoval
Administrative Law Judge	
ORA Witness	G. Weatherford S. Rose

SUPPLEMENTAL TESTIMONY

Application 12-04-019

San Francisco, California
May 9, 2016

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I. BACKGROUND

California American Water Company (Cal Am) filed Application (A.) 12-04-019 on April 23, 2012. In its application, Cal Am seeks a Certificate of Public Convenience and Necessity (CPCN) for the Monterey Peninsula Water Supply Project (MPWSP), and authorization to recover in rates all present and future costs associated with the MPWSP.

Sixteen parties, including the Office of Ratepayer Advocates (ORA), jointly filed a Settlement Agreement,[1] establishing nine findings for the Commission to consider in determining whether Cal Am should construct a 6.4 million gallon per day (MGD) Plant with Ground Water Replenishment (GWR) or a 9.6 MGD Plant without GWR ("GWR Determination").[2] The Settlement Agreement is still pending before the Commission.

On April 18, 2016, eighteen parties filed a Joint Motion for a Separate Phase 2 Commission decision to address three issues: (1) the Water Purchase Agreement (WPA) between Cal Am, Monterey Peninsula Water Management District (MPWMD), and Monterey Regional Water Pollution Control Agency (MRWPCA); (2) Cal Am's construction of the Monterey pipeline and pump station in advance of the decision on the CPCN for the MPWSP; and (3) the financing and ratemaking related to the Monterey pipeline and pump station facilities.[3]

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[1] Settlement Agreement of California-American Water Company, Citizens for Public Water, City of Pacific Grove, Coalition of Peninsula Businesses, County of Monterey, Division of Ratepayer Advocates, Landwatch Monterey County, Monterey County Farm Bureau, Monterey County Water Resources Agency, Monterey Peninsula Regional Water Authority, Monterey Peninsula Water Management District, Monterey Regional Water Pollution Control Agency, Planning and Conservation League Foundation, Salinas Valley Water Coalition, Sierra Club, and Surfrider Foundation submitted on July 31, 2013.

[2] The Settling Parties' Motion to Approve the Settlement Agreement dated July 31, 2013 summarizes the nine findings at p. 5 as follows: "(1) the GWR Project receives approval pursuant to a Final EIR, (2) adequate progress was made and is expected to continue for obtaining permits for the GWR Project, (3) sufficient legal certainty exists concerning long-term viability for GWR source water, (4) there is a lack of evidence showing health and water quality regulators will deny permits or approval, (5) the GWR Project is on schedule for completion, (6) the GWR Project's design is at the required level, (7) a sufficiently detailed funding plan is in place, (8) terms to a Water Purchase Agreement ("WPA") have been agreed to, and (9) the revenue requirement for the combination smaller plant/GWR is just and reasonable compared with the larger plant. A revenue requirement premium for the combination smaller plant/GWR may be just and reasonable if the combination affords significant benefits (including scheduling, diversification of water supply, and environmental benefits) over the larger plant."

[3] April 18, 2015 Joint Motion for a Separate Phase 2 Decision at pp. 1-2.

On April 25, 2016, the Assigned Commissioner and Administrative Law Judge (ALJ) issued a ruling that conditionally granted the Joint Motion for a separate Phase 2 decision ("April 25th Ruling").[4] The April 25th Ruling set May 9, 2016 as the date for serving supplemental testimony on the three subjects identified in the Joint Motion, as well as the issues and proposals discussed in the April 25th ruling. It also set May 19, 2016 as the date for serving concurrent rebuttal testimony on the issues addressed in supplemental testimony.[5]

On January 22, 2016, ORA served supplemental testimony supporting the concept of evaluating the nine findings listed in the Settlement Agreement, and providing specific issues that the Commission should consider in evaluating those findings. ORA served rebuttal testimony on March 22, 2016, recommending that the Commission authorize Cal Am to enter into a WPA for GWR if and only if the WPA is modified such that: 1) the language deeming all costs just and reasonable is removed, and 2) a reasonable and prudent cost cap is provided for the initial purchase price of the GWR water.

As stated in ORA's January supplemental testimony with regard to cost updates provided in Phase 2, Cal Am has agreed to cost caps in the Settlement Agreement, with cost recovery subject to a reasonableness review. Therefore, ORA will not assess the reasonableness of Cal Am's updated cost estimates at this juncture, and instead makes use of these updates only as a means of evaluating the costs and uncertainties of the MPWSP in relation to the GWR Determination. ORA reserves the right to contest the reasonableness of all MPWSP costs in future filings and cost recovery assessments.

II. DISCUSSION

ORA's testimony focuses on two primary issues: 1) Concerns related to the water quality of Indirect Potable Reuse are unfounded; and 2) The $1,325/acre-ft. amount

[4] The condition, as stated in the ruling at p. 5, is that "in addition to anything parties will present, the proposed supplemental and rebuttal testimony of applicant, District, and Agency shall, and other parties may, address certain issues and proposals." Those issues and proposals are discussed in the ruling at pp. 5-10.

[5] April 25th Ruling at p. 11.

discussed in the April 25th Ruling is not the appropriate number to consider for a cost cap.

A. Concerns Related to the Water Quality of Indirect Potable Reuse are Unfounded.

Some concerns have been raised about the GWR Project related to the use of advanced treated wastewater as a component of the drinking water system.[6] The GWR Project involves Indirect Potable Reuse (IPR), where secondary treated wastewater is treated by an additional four-step advanced water purification process using ozone pre-treatment, membrane filtration, reverse osmosis, and oxidation with hydrogen peroxide in the presence of ultra-violet light.[7] The resulting purified water is then pH-adjusted and injected into an aquifer, where it mixes with groundwater for a minimum of six months or more before extraction.[8]

In discussing water reuse in general, it is important to recognize that all water is recycled water. The amount of water on the planet does not change - all water has been used and reused since the beginning of time, by way of the natural recycling processes. Using advanced technology to purify recycled water merely speeds up this natural process,[9] and provides additional quality control.

Throughout the United States, as well as internationally, drinking water utilities are frequently located downstream from wastewater treatment plants that discharge into rivers or lakes. For example, more than 200 wastewater treatment plants discharge effluent into the Colorado River, which is a primary source of drinking water for Southern California.[10] In this way, many communities already "reuse" wastewater in a more informal manner than engineered IPR by drawing water from a river or reservoir that includes wastewater from upstream communities. This is known as "de facto reuse."

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[6] Exhibit WP-8, Supplemental Testimony of Ron Weitzman on behalf of Water Plus, at pp. 7-9.

[7] http://purewatermonterey.org/about-us/project-technology/.

[8] Ibid.

[9] https://watereuse.org/wp-content/uploads/2015/09/Legislative-Update-California-Winter-2015.pdf.

[10] http://www.latimes.com/local/california/la-me-toilet-to-tap-20150525-story.html.

Many studies have shown that the quality of water produced by engineered IPR and Direct Potable Reuse systems provide greater reliability and consistently produce better quality water than de facto reuse.[11] Additionally, studies have shown that communities using drinking water supplemented with IPR water are not at any increased risk of disease compared with those who drink water without an IPR component,[12] and literature supports IPR as a reliable and safe addition to existing drinking water supplies.[13]

Moreover, supplementing water supplies with purified wastewater for drinking is not a new or experimental field. IPR projects have operated successfully for decades in California and worldwide. Attachment 1 lists some of these projects, none of which have reported adverse health impacts in the communities served.[14] California has extensive regulations related to IPR. In 2014, Title 17 and 22 regulations for drinking water and recycled water were updated to include regulations specific to IPR, including sections addressing control of wastewater sources, pathogenic microorganisms, nitrogen compounds, regulated contaminants, physical characteristics, diluent water requirements, and more. Current legislative and regulatory efforts contemplate taking reuse a step further by investigating Direct Potable Reuse (DPR). SB 918 (Pavley 2010) requires the State to evaluate the feasibility of DPR by the end of 2016. SB 322 (Hueso 2013) directs the Department of Public Health, in consultation with the State Water Resources Control Board, to develop a public review draft of the DPR report available by September 2016, and establishes an advisory group representative of the public to provide a forum for public discussion and to assist the expert panel in its deliberations.

[11] For example, "Demonstrating the Benefits of Engineered Direct Potable Reuse versus De Facto Reuse Systems" at https://watereuse.org/watereuse-research/11-05-demonstrating-the-benefits-of-engineered-direct-potable-reuse-dpr-versus-de-facto-reuse-systems/.

[12] "Indirect Potable Reuse: A Sustainable Water Supply Alternative" (March 2009) at Section 6, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2672392/).

[13] Ibid at Section 6.

[14] Ibid at Section 3.

As Governor Jerry Brown wrote in his signing message of SB 322, "California needs more high quality water and recycling is key to getting there." This is especially true in Monterey. The GWR project would provide a safe, high quality, highly treated, highly regulated, and much needed additional local water supply for the Monterey Peninsula.

B. The $1,325/acre-ft Amount Discussed in the April 25th Ruling is not the Appropriate Number to Consider for a Cost Cap.

The April 25th Ruling contemplates setting a cost cap for the GWR water at a "point of indifference" – a cost that would make Cal Am ratepayers initially indifferent between the two projects. The ruling states that testimony establishes this point of indifference at $1,325/acre-ft,[15] and directs Cal Am, MPWMD, and MRWPCA to consider and address the feasibility, reasonableness, and potential for a soft cost cap of $1,325/acre-ft in the revised WPA. As detailed below, based on updated cost estimates and careful consideration of the assumptions impacting cost-comparability, $1,325/acre-ft. is not the appropriate number to consider for a cost cap.

1. A $1,325/acre-ft estimate does not consider subsequent updates to the MPWSP Financial Model.

The April 25th Ruling provides the $1,325/acre-ft. cost as the "point of indifference" based on Rich Svindland's December 15, 2015 testimony. With regard to the cost per acre-foot needed to make the 6.4 MGD small desalination plant plus GWR option ("GWR/Small Desal Option") first year revenue requirement equal to that of the 9.6 MGD desalination plant option ("Large Desal Option"), Svindland's testimony states "[b]ased on the information known to date, a cost of approximately $1,325 per AF is needed to make the revenue requirements equal."[16] However, Svindland does not provide supporting documentation for the number stated, and he does not detail the

[15] April 25, 2016 Assigned Commissioner and ALJ Ruling, p. 7, citing Exhibit CA-40, December 15, 2015 Supplemental Testimony of Svindland at p. 7.

[16] Ibid.

assumptions used to derive the estimated revenue requirements for the two options. Differing assumptions result in widely varying points of indifference, as discussed below.

Additionally, there have been numerous updates and corrections to the MPWSP cost model ("cost model") since December 15, 2015. Cal Am revised the cost model in both its January and March testimony,[17] and Cal Am, MPWMD, MRWPCA, and ORA worked jointly to revise the cost model in April to resolve several inconsistencies addressed in testimony.[18] If a "point of indifference" is to be contemplated, the calculation of that estimated break-point should make use of the most updated information and version of the cost model, with assumptions clearly stated.

2. There is not one single number that represents a "point of indifference" for the first year revenue requirement.

In order to estimate the first year revenue requirements for the GWR/Small Desal Option and the Large Desal Option, a number of critical and highly-sensitive assumptions must be made. These assumptions include, but are not limited to: the capital cost of constructing the large desalination plant, the capital cost of constructing the small desalination plant, the availability of grants and other financing scenarios, the energy cost, the energy escalation rate, and the cost of the outfall lease, which has yet to be negotiated. When any of these individual assumptions are changed, the point of indifference for the purchase price of GWR water changes. Given the large number of assumptions and array of possible values associated with each assumption, there is not one single number that represents a point of indifference.

For example, in attempting to determine a reasonable cap for the purchase price of GWR water, it is useful to compare this cap to the caps that Cal Am and the Settling Parties have agreed to in the Settlement Agreement for the desalination plant costs.

[17] Exhibit CA-36, January 22, 2016 Supplemental Testimony of Linam p. 3-6; Exhibit CA-37, March 22, 2016 Rebuttal Testimony of Linam pp. 3 and 4.

[18] Exhibit JE-1, sponsored by Cal Am, MPWMD, MRWPCA, and ORA, was based on most updated version of the cost model to date.

As discussed in ORA's rebuttal testimony,[19] the assumptions used for the capital cost of the large and small desalination plants in all the analyses presented in testimony thus far regarding the GWR Determination make use of the "most probable" cost for the large and small desalination plants, as provided in Cal Am's Supplemental Testimony of December 15, 2015.

However, these "most probable" costs do not correspond to the cost caps detailed in the Settlement Agreement. The Settlement Agreement provides aggregate amounts for the large and small desalination plants above which a petition for modification would be necessary - $330M for the small or $385M for the large desalination plant.[20] If the capital costs for the large and small desalination plants are assumed to be these amounts (the highest possible amounts that would not trigger a petition of modification), the resulting point of indifference for the purchase price for GWR water would be approximately $2,325/acre-ft.[21] This example provides one scenario in which reasonable assumptions result in a point of indifference significantly higher than the $1,325/acre-ft. presented in Svindland's December 15, 2015 testimony. There are myriad other scenarios of reasonable assumptions, creating a range of possible points of indifference, rather than a single number.

3. Lifecycle costs should be considered in setting a cost cap.

Equally, if not more important than evaluating the first year revenue requirement in the GWR Determination, is consideration of the anticipated life-cycle costs of the two options. A life-cycle analysis provides the opportunity to consider estimated replacement

[19] Exhibit DRA-17, Rebuttal Testimony of Rose at pp. 12-13.

[20] Settlement Agreement, pp. 12-13, provides aggregate cost caps for the 6.4 MGD plant and Cal Am Only Facilities as $295.66M, and for the 9.6 MGD plant and Cal Am Only Facilities as $338.40. Above these amounts, a Tier 2 Advice Letter would be necessary. Aggregate amounts above which a petition for modification would be necessary are $330.38M for the 6.4 MGD plant and $384.68M for the 9.6 MGD plant.

[21] It is not possible to simply change the capital cost for the desalination plants in the cost model, therefore ORA performed an analysis with numbers close to the aggregate cost caps, instead of using the exact cost caps. See Attachment 2 for cost model runs used to calculate this estimate. Assumptions include energy cost at the primary rate for the desalination plants, and a 4.8% energy escalation rate.

costs, estimated escalation for Operations and Maintenance (O&M) costs including energy, and differences in financing costs over a longer timeframe. The Commission often considers life-cycle costs when comparing project alternatives. The GWR Determination warrants such a life-cycle cost analysis for the following reasons.

First, the slant wells necessary for either desalination plant size have a high replacement cost; they may need to be replaced approximately once every 20 years. Cal Am currently estimates the slant wells to cost upwards of $3 million per well[22] for the 7 to 10 slant wells. The replacement cost of the slant wells, as well as other replacement costs for the desalination plant options, are not considered when only evaluating the first year revenue requirement, but should be factored in to the GWR Determination. A life-cycle analysis is necessary to ascertain the impact of the cost of future replacements for the two options.

Second, the two projects have different energy requirements. While the first year revenue requirement takes into account the cost of the energy in that first year, it does not allow a full analysis of the differing costs of the two alternatives as energy prices change over time. A life-cycle analysis provides the opportunity to analyze the effects of various estimated energy escalation rates. Other O&M costs, such as chemicals, filter replacements, insurance, and labor, can also be evaluated more fully in the life-cycle analysis.

Lastly, different financing mechanisms result in different impacts at different points in a project's life-cycle. For example, the typical investor-owned utility project experiences higher initial revenue requirements which decline over time due to depreciation, lowering rate base. Additionally, as discussed in Dave Stoldt's testimony, during the December 11 and 12, 2012 cost and financial workshop conducted by the Commission on A.12-04-019, the Commission's Department of Water and Audits

[22] 2015 Monterey Desalination Model v8.4.xls, "Capital 9.6 MGD" tab.

(DWA) determined that additional reporting should be done by Cal Am and the project proponents on both energy costs and life-cycle net present value analysis.[23]

Contemplating a cost cap at the point of indifference for the first year revenue requirement provides a snapshot of the cost of the two options at one particular point in time. A life-cycle analysis affords a broader, more comprehensive view of the two options, and should therefore be considered before setting a cost cap for the purchase price of GWR water.

4. A cost cap that results in a small first year revenue requirement premium is reasonable in this specific circumstance.

The Settlement Agreement states that parties agree that a revenue requirement premium for the GWR/Small Desal Option may be determined just and reasonable if it affords significant net benefits in comparison to the Large Desal Option when externalities are considered.[24] The Settlement Agreement lists positive benefits that could support the Commission's approval of such a premium, including: (1) a material schedule advantage in that the GWR Project is anticipated to be operable sooner than the desalination plant; (2) water supply resilience and reliability (benefit of the portfolio approach) and (3) other positive externalities of the GWR Project, including, but not limited to, reduced atmospheric carbon emissions, reduced brine discharge, and the implementation and encouragement of State policies regarding water recycling through early adoption of a water reuse project.[25]

In its rebuttal testimony, ORA discussed the positive benefits associated with the GWR project, including, for example, those listed in the Settlement Agreement that could support approval of a revenue requirement premium.[26] Although not all of the benefits quantified in HDR, Inc.'s economic evaluation of GWR externalities accrue exclusively

[23] Exhibit WD-9, Direct Testimony of Stoldt, p. 14.

[24] Settlement Agreement at p. 7.

[25] Ibid.

[26] Exhibit DRA-17, Rebuttal Testimony of Rose at pp. 5-8.

to Cal Am ratepayers, these benefits should not be ignored in determining a reasonable cost cap for the purchase price of the GWR water.[27] In addition to the benefits associated with GWR, there are numerous uncertainties associated with the desalination plant that warrant consideration in determining a reasonable and appropriate cost cap.[28] Attempting to set a cost cap at a point of indifference does not allow for the appropriate consideration of the benefits and uncertainties associated with the two options.

Due to the uncertainties associated with the desalination project and the positive benefits associated with GWR, it is reasonable to consider a cost cap that could result in a small first year revenue requirement premium. After careful consideration of the benefits and uncertainties of the two options[29] and the potential of a 30-year net present value (NPV) benefit for the GWR/Small Desal Option,[30] the $1,720/acre-ft cost cap proposed by MPWMD[31] is a reasonable cost cap for the purchase price for GWR water.[32]

III. CONCLUSION

Indirect Potable Reuse uses advanced technology to speed up the natural process of recycling water. The GWR project would use this technology to provide a safe, high

[27] The April 25th Ruling discusses this at p. 7, referencing Exhibit DRA-17, Rebuttal Testimony of Rose at 6, footnote 21, which states: "The Direct Testimony of Dennis Bruce, which presents HDR, Inc.'s economic evaluation of GWR externalities. While the positive externalities examined in the study do benefit Cal Am ratepayers, the financial benefits quantified in the HDR study would not accrue exclusively to Cal Am ratepayers. Because only a portion of the financial benefit associated with these externalities would accrue to Cal Am ratepayers, the quantification in the HDR study should not be viewed as a direct offset to a GWR premium. The benefits should be considered, but not as a direct offset."

[28] Exhibit DRA-17, Rebuttal Testimony of Rose at pp. 9-11.

[29] Exhibit DRA-17, Rebuttal Testimony of Rose, and Exhibit JE-1.

[30] As seen in two of the scenarios presented in Exhibit JE-1.

[31] Exhibit WD-11, Rebuttal Testimony of Stoldt, p. 6.

[32] Exhibit JE-1 provides a number of scenarios, each with differing assumptions, to estimate the potential impact of a $1,720/acre-ft. purchase price for GWR water. All scenarios utilize the GWR cost cap proposed by MPWMD ($1,720/acre-ft.) and the "most probable" capital costs for the desalination plants provided by Cal Am (not the cost caps). A $1,720/acre-ft. purchase price resulted in the following range of impacts: first year revenue requirement = increase of 2.2% to 4.6%; average residential bill = increase of 0.6% to 1.2%; net present value = decrease of 1.4% to increase of 2.8%.

quality, highly treated, highly regulated, and much needed additional local water supply for the Monterey Peninsula.

The Commission should not consider a $1,325/acre-ft. purchase price for GWR water to be the point of indifference for the GWR Determination. There is no one specific number that represents a point of indifference for revenue requirements for the GWR Determination. Benefits, uncertainties, and life-cycle costs should be considered when determining a just and reasonable purchase price for the GWR water. Given the specific circumstances surrounding the GWR Determination, $1,720 per acre-ft. is a reasonable cost cap for the purchase price for GWR water.

Attachment 1
Direct and Indirect Potable Reuse Projects

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2672392/table/ta1-ijerph-06-01174/

Project	Place	Year[1]	Treatment	Buffer	Population[2]	% Blended[3]	Comments
Orange County Water District (OCWD).	California (USA)	1975–2004	Lime clarification, recarbonation, multimedia filtration, granular activated carbon, filtration and chlorination.	Aquifer	Less than 2 million	3.2% total OC water	Full-scale project Water Factory 21 was built in 1975 and decommissioned in 2004.
Water Factory 21			RO added in 1977.			4.8% OC groundwater	First project that used recycled water to maintain a seawater intrusion barrier. More than half the injected water flows inland and augments potable water supplies. The injected water reaches the nearest drinking water bore after 2 to 3 years.
			Advanced oxidation with hydrogen peroxide and UV added in 2001				Addition of RO in 1977 enabled injection of up to 50% of recycled water.

OCWD Groundwater replenishment system (GRS) (Upgrade of the Water Factory 21 plant)	California (USA)	Pilot plant from 2004 to 2007 Full scale plant since 2007	MF/RO and advanced oxidation (UV and hydrogen peroxide)	Aquifer	2.3 million (300,000 to 700,000 additional residents projected by 2020).	15–18%	Demonstration project conducted before construction of the GRS plant produced 5 mgd. Full scale plant produce 70 mgd per year (10% of Orange County's drinking water supply) Initially 75% of the recycled water injected, later 100% injection The groundwater basin supplies more than half of the population water needs.
West Basin Municipal Water District	California (USA)	Since 1995	MF/ RO UV and advanced oxidation processes	Aquifer	950,000	10–15%	Full scale project which produces three types of tertiary treated recycled water for industrial and irrigation uses, and three types of RO water. Softened RO water for groundwater recharge, Pure RO water for low pressure boiler feed, and ultra-pure RO (which has a second pass RO) water for high pressure Ground water recharge represents 22% of the total production. About 75% of the recycled water injected

Upper Occoquan Sewage Authority (UOSA)	Virginia (USA)	Since 1978	Lime clarification Two-stage recarbonation Flow equalization Sand filtration Granular activated carbon Ion exchange Post carbon filtration Chlorination	Reservoir	1.2 million	10–45 %	Full-scale project. Supplies about 50% of the population's water supply. During drought periods recycled water provides up to 90% of the reservoir inflow. Recycled water is monitored by an independent water monitoring agency and is considered the most reliable source of water in the Occoquan system.
Montebello Forebay Groundwater Recharge Project	California (USA)	Since 1962	Secondary treatment, chloramination and injection. Inert media filtration was added in 1977 as an additional measure for public health protection to enhance virus inactivation.	Aquifer	1.28 million	18.7% up to 35%	Full-scale project comprising three plants located in the central basin of Los Angeles County. Whittier Narrows WRP (built 1962) serves approx 150,000 people. The San Jose Creek WRP (built in early 1970s) serves 1 million and Pomona WRP (built in early 1970s) serves 130,000 people. The recharged water is composed of recycled, storm and imported waters. Injection of up to 50% recycled water is acceptable in any given year providing that the running three year total does not exceed 35% of the recycled water.

Tampa Water Resource Recovery Project	Florida (USA)	1987–1989	Pre-aeration, lime clarification, recarbonation, gravity filtration, and ozone disinfection. Granular activated carbon, RO, and ultrafiltration, were also evaluated after filtration and before disinfection.	Reservoir	NA	NA	Demonstration project to evaluate the treatment efficacy of four advanced water treatment processes. Augmenting the reservoir with recycled water from the Howard F. Cullen WWTP through the Tampa Bypass Canal was selected as the optimum system.
Potomac Estuary Experimental Wastewater Treatment Plant (EEWTP)	Washington D.C. (USA)	1980–1982	Floculation, sedimentation, filtration, granular activated carbon adsorption and disinfection.	Estuary	NA	NA	Two years demonstration project. The EEWTP influent water was 50% recycled water and 50% estuary water. The EEWTP blended water treated with conventional drinking water process (such as: flocculation, sedimentation and disinfection) followed by granular activated carbon and chlorination.
Hueco Bolson Recharge Project	Texas (USA)	1985	Two-stage powdered activated carbon treatment, lime treatment, two-stage recarbonation, sand filtration, ozonation,	Aquifer	250,000	40–100%	Full-scale project.

The Chelmer Augmentation Wastewater Reuse Scheme (Water 2000)	Essex (England)	1997	MF UV	Reservoir	1.7 million	8–12%	Recycled water discharged into the Chelmer river which is used to augment the Hanningfield reservoir. The reservoir storage time is up to 214 days
							Monitoring of viruses and estrogens since 1996. Hormones in reservoir <LOD of 3 ng/L
Water Reclamation Study (NeWater)	Singapore	2000	Ultrafiltration, RO, UV, Stability control and chlorination	Reservoir	4.4 million	Currently 1% and 2.5% by 2012	Initially a demonstration plant, but has operated as a full-scale plant since 2002 when adoption for augmentation of drinking water supplies was recommended.
							Full-scale project with 3 existing plants. Total production of 92 ML/day from 3 plants. The majority of recycled water is used for industry.
							Project supported by a well designed community education program.
Goreangab Water Reclamation Plant	Windhoek (Namibia)	1968–2002	Algae flotation Foam fractionation Chemical clarification Sand filtration Granular activated carbon Chlorination	Reservoir		4%	Sometimes used for direct potable reuse.

		Upgrade 2002–present	Pre-ozonation for Fe/Mn removal Dissolved air flotation Sand filtration Ozonation Granular activated carbon Ultrafiltration Chlorination			25%	
Torreele Reuse Plant	Wulpen (Belgium)	2002	MF/RO + UV disinfection	Aquifer	60,000	40%	Full-scale project that produces between 40 to 50% of the drinking water demand. The minimum retention time in the aquifer is 40 days. Reported improvement in drinking water quality with lower hardness and better color due to decreased organic content.

[1]Year project started;

[2]Population served in the distribution area

[3]% of recycled water blended with alternate sources

Attachment 2

9.6 MGD Desalination Plant with Total Project Capital Cost = $387.5M

Monterey Water Supply Project

Key Assumptions

Plant Assumptions		
Plant Size (MGD)		9.6
Capital Scenario	*This is the 'Hard Cap' =>*	High End
vs. Most Probable Capital Scenario		+25.0%
Include CAW-Only Facilities?		Yes
Include AFUDC? (1=Yes, 0=No)		1
Ground Water Recharge		
Annual AF		0
Cost per AF ($)		
Financing Assumptions		
Cost of Capital		
Cost of Equity		9.99%
CAW Cost of Debt		5.30%
Equity %		53.00%
Debt %		47.00%
Cost of Capital		**7.79%**
CAW Target Equity % of Total Project Costs		27.00%
Rebalance Capital Structure?		Yes
Other Debt Rates		
Short Term Debt Rate		1.00%
Short Term Debt Cap ($MM)		$20.0
SRF Debt Rate		2.50%
SRF Term (yrs)		20
SRF Assets Exempt from Prop Tax?		Yes
CAW Financing Scenario		3 - CAW Equity & Debt / SRF
% of SRF Debt in CAW Cap Structure? (Max = 47.0%)		47.0%
SRF Borrowings ($MM)		**$93.5**
Discount Rate for NPV (2013 Settlement Discussions)		11.43%

Surcharge & Contribution Assumptions

Utilize a Surcharge? Yes

Period	Months	% of Mont Revenue Req	Start Date	End Date
Period 1	5	24.7%	11/01/16	04/30/17
Period 2	4	44.0%	05/01/17	08/31/17
Period 3	4	51.3%	09/01/17	12/31/17
Period 4	4	49.8%	01/01/18	04/30/18
Period 5	4	56.9%	05/01/18	08/31/18
Period 6	5	50.9%	09/01/18	01/31/19
Period 7	5	55.3%	02/01/19	06/30/19

Non CAW Debt via Public Agencies (ie. Public Agency Contribution, SRF Funding off CAW Debt Balance Sheet)

		Tranche 1	Tranche 2	Tranche 3
Contribution Date (End of Month)		Jul-18	Oct-16	Jan-17
Contribution Amount ($MM)	126.5	$125.0	$0.0	$0.0
Reserve ($MM)		$0.0	$0.0	$0.0
Issuance Costs ($MM)		$0.0	$0.0	$0.0
Total Borrowing ($MM)		$125.0	$0.0	$0.0
Financing Rate		3.6%	4.5%	5.0%
Financing Term		30	25	10

Project Summary ($MM)

Capital Investment	
Desal Plant	$254.6
CAW-Only Facilities	$115.4
Capitalized AFUDC, Net of Tax	$17.5
Total Project Cost	**$387.5**
CAW Rate Base - Aug 2019	
Utility Plant *	$403.1
SRF Funded Costs *	(93.5)
Surcharge Funded Costs *	(71.5)
Pub Agency Funded Costs	(125.0)
Deferred Taxes	(0.3)
Total CAW Rate Base	**$112.7**
** Net of depreciation & amortization*	
Total Cost to Customer	
CAW Pre-Tax Equity Cost	$18.7
CAW Pre-Tax Debt Cost	$0.0
Depreciation & Amortization	$1.3
General Taxes	$1.1
Fixed O&M	$3.8
Variable O&M	$9.6
Year 1 CAW Rev Req ($MM)	**$34.5**
Customer SRF Surcharge	6.0
Public Agency Costs	6.9
Total Yr 1 Cost to Customer	**$47.41**
Fixed Cost per AF	*$3,520*
Variable Cost per AF	*$890*
Total Cost per AF	***$4,411***
NPV at 11.4% of cash flows through 2056	**$282.0**

Notes: - Pre-tax cash flows should be discounted at a pre-tax rate
- NPV is as of 2013

CAW Captial Structure	
CAW Equity	53.0%
CAW Debt	0.0%
SRF Debt	47.0%
Total	**100.0%**

Attachment 2

6.4 MGD Desalination Plant with Total Project Capital Cost = $337.8M

Monterey Water Supply Project
Key Assumptions

Plant Assumptions		
Plant Size (MGD)		6.4
Capital Scenario	*This is the 'Soft Cap' =>*	Most Probable
vs. Most Probable Capital Scenario		+.0%
Include CAW-Only Facilities?		Yes
Include AFUDC? (1=Yes, 0=No)		1
Ground Water Recharge		
Annual AF		3,500
Cost per AF ($)		$2,325
Financing Assumptions		
Cost of Capital		
Cost of Equity		9.99%
CAW Cost of Debt		5.30%
Equity %		53.00%
Debt %		47.00%
Cost of Capital		**7.79%**
CAW Target Equity % of Total Project Costs		27.00%
Rebalance Capital Structure?		Yes
Other Debt Rates		
Short Term Debt Rate		1.00%
Short Term Debt Cap ($MM)		$20.0
SRF Debt Rate		2.50%
SRF Term (yrs)		20
SRF Assets Exempt from Prop Tax?		Yes
CAW Financing Scenario		3 - CAW Equity & Debt / SRF
% of SRF Debt in CAW Cap Structure? (Max = 47.0%)		47.0%
SRF Borrowings ($MM)		**$79.7**
Discount Rate for NPV (2013 Settlement Discussions)		11.43%

Surcharge & Contribution Assumptions

Utilize a Surcharge? Yes

Period	Months	% of Mont Revenue Req	Start Date	End Date
Period 1	5	24.7%	11/01/16	04/30/17
Period 2	4	44.0%	05/01/17	08/31/17
Period 3	4	51.3%	09/01/17	12/31/17
Period 4	4	49.8%	01/01/18	04/30/18
Period 5	4	56.9%	05/01/18	08/31/18
Period 6	5	50.9%	09/01/18	01/31/19
Period 7	5	55.3%	02/01/19	06/30/19

Non CAW Debt via Public Agencies (ie. Public Agency Contribution, SRF Funding off CAW Debt Balance Sheet)

		Tranche 1	Tranche 2	Tranche 3
Contribution Date (End of Month)		Jul-18	Oct-16	Jan-17
Contribution Amount ($MM)	101.2	$101.2	$0.0	$0.0
Reserve ($MM)		$0.0	$0.0	$0.0
Issuance Costs ($MM)		$0.0	$0.0	$0.0
Total Borrowing ($MM)		$101.2	$0.0	$0.0
Financing Rate		3.6%	4.5%	5.0%
Financing Term		30	25	10

Project Summary ($MM)

Capital Investment	
Desal Plant	$219.3
CAW-Only Facilities	$102.6
Capitalized AFUDC, Net of Tax	$15.9
Total Project Cost	**$337.8**
CAW Rate Base - Aug 2019	
Utility Plant *	$351.6
SRF Funded Costs *	(79.8)
Surcharge Funded Costs *	(71.5)
Pub Agency Funded Costs	(101.2)
Deferred Taxes	(0.2)
Total CAW Rate Base	**$98.9**
** Net of depreciation & amortization*	
Total Cost to Customer	
CAW Pre-Tax Equity Cost	$16.4
CAW Pre-Tax Debt Cost	$0.0
Depreciation & Amortization	$1.1
General Taxes	$1.0
Fixed O&M	$3.4
Variable O&M	$14.7
Year 1 CAW Rev Req ($MM)	**$36.7**
Customer SRF Surcharge	5.1
Public Agency Costs	5.6
Total Yr 1 Cost to Customer	**$47.41**
Fixed Cost per AF	*$3,062*
Variable Cost per AF	*$1,382*
Total Cost per AF	***$4,444***
NPV at 11.4% of cash flows through 2056	**$282.4**

Notes: - Pre-tax cash flows should be discounted at a pre-tax rate
- NPV is as of 2013

CAW Captial Structure	
CAW Equity	53.0%
CAW Debt	0.0%
SRF Debt	47.0%
Total	**100.0%**