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Commissioner	:	Genevieve Shiroma
Administrative Law Judge	:	Jacob Rambo
Public Advocates Office Witness	:	Isaac Gendler

PUBLIC ADVOCATES OFFICE
CALIFORNIA PUBLIC UTILITIES COMMISSION

REPORT ON DEPRECIATION, EARTHQUAKE INSURANCE, CUSTOMER SERVICE, WILDFIRE, AND SAFETY

CALIFORNIA AMERICAN WATER COMPANY
General Rate Case Application 22-07-001
Test Year 2024

San Francisco, California
April 13, 2023

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MEMORANDUM

The Public Advocates Office at the California Public Utilities Commission ("Cal Advocates") examined application material, data request responses, and other information presented by California American Water Company ("Cal Am") in Application ("A.") 22-07-001 to provide the California Public Utilities Commission ("Commission" or "CPUC") with recommendations in the interests of ratepayers for safe and reliable service at the lowest cost. Mr. Cortney Sorensen is Cal Advocates' project lead for this proceeding. This Report is prepared by Mr. Isaac Gendler. Mr. Mukunda Dawadi is the oversight supervisor. Ms. Angela Wuerth and Ms. Emily Fisher are the legal counsel.

Although every effort was made to comprehensively review, analyze, and provide the Commission with recommendations on each ratemaking and policy aspect presented in the Application, the absence from Cal Advocates' testimony of any particular issue connotes neither agreement nor disagreement of the underlying request, methodology, or policy position related to that issue.

Chapter #	Description	Witness
1	Depreciation	Isaac Gendler
2	Earthquake Insurance	Isaac Gendler
3	Customer Service	Isaac Gendler
4	Wildfire and Safety	Isaac Gendler

CHAPTER 1 Depreciation

I. INTRODUCTION

This chapter presents analyses and recommendations for Cal Am's depreciation rates and values.

II. SUMMARY OF RECOMMENDATIONS

The Commission should reject Cal Am's proposed depreciation rates from its Depreciation Rate Study and instead maintain the depreciation rates currently in effect. According to Cal Am's depreciation study numbers, Cal Advocates' recommendation would reduce Cal Am's proposed annual depreciation expense by approximately $2 million.[1]

Cal Am's proposed depreciation rate calculation methodology violates the cost causation principle. Specifically, Cal Am proposes to use depreciation parameters (Life Parameters[2] and Net Salvage Values[3]) on a state-wide basis for each account. Cal Advocates recommends district-specific depreciation parameters for each account, to ensure that customers' rates are not impacted by plant expenses that are not within or related to their district.

The Commission should reject Cal Am's request to shift Accounts 339-340, 342-344, and 346-348 to an Accounting Release 15 (AR-15) automatic retirement system because Cal Am's proposal for automatic retirements is inconsistent with Standard Practice U-38-W and would result in prematurely retiring still-useful assets.

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[1] Direct Testimony of Mr. Stephen (Wes) Owens, July 7, 2022, at 62.

[2] An asset group's Life Parameter is its expected lifespan and survival curve (the graph showing what percentage of the asset group will be alive by years of service).

[3] An asset group's Net Salvage Value is the difference between the value of the asset group at the end of its life and the cost to remove it. The net salvage rate is quantified in terms of percentage of the initial value of the asset group. A negative net salvage value/percentage means that the utility will need to pay for the removal, and this will increase the depreciation rate and depreciation expense.

III. ANALYSIS

A. Statewide Depreciation Parameters

Instead of each account having district-specific Life Parameters[4] and Net Salvage Values[5], Cal Am's Depreciation Rate Study merges all districts and uses statewide asset data and applies the resulting statewide depreciation parameters (life and net salvage characteristics) for each account. With Cal Am's proposed methodology, districts with infrastructure that has a longer lifespan and higher net salvage value than the companywide parameters would incur unnecessarily high depreciation expenses.

Using district-specific life characteristics and net salvage percentages instead of companywide parameters would treat ratepayers in each district more fairly. Each district has unique plant age ranges and weather conditions. For example, Cal Am's internal Subject Matter Experts (SMEs)[6] stated, "[i]n San Diego, there is more new development [than some of the other districts]. In Ventura, there is more new development than [Los Angeles (LA)]. This may cause earlier replacement of assets in certain classes of property in LA than in other districts."[7] When asked in discovery to provide any industry rules and standards, CPUC decisions and resolutions, and/or written company policy documents

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[4] An asset group's Life Parameter is its expected lifespan and survival curve (the graph showing what percentage of the asset group will be useful by years of service).

[5] An asset group's Net Salvage Value is the difference between the value of the asset group at the end of its life and the cost to remove it. The net salvage rate is quantified in terms of percentage of the initial value of the asset group. A negative net salvage value/percentage means that the utility will need to pay for the removal, and this will increase the depreciation rate and depreciation expense.

[6] Attachment 1-1: Cal Am's Response to Cal Advocates' Data Request ISC-004, Q002.

[7] Attachment 1-2: Cal Am's Response to Cal Advocates' Data Request ISC-004, Q002, Attachment 1

supporting its recommendation, Cal Am was unable to provide the supporting documents.[8]

The Commission should adhere to the cost causation principle to ensure customers' rates are not unreasonably impacted by plant expenses that are not within or related to their district. Accordingly, Cal Am's request to adopt the depreciation rates from the Depreciation Rate Study should be denied. According to Cal Am's depreciation study numbers, this would reduce Cal Am's annual depreciation expense by approximately $2 million.[9]

B. Accounting Release-15 Early Retirements

Cal Am requests to shift Accounts 339-340, 342-344, and 346-348 to an Accounting Release 15 (AR-15) automatic retirement system.[10] Assets will be automatically retired once they reach their average service life.[11] All assets currently at or above the average service life would be retired instantly.[12] All assets in these accounts in operation below the average retirement age would be amortized.[13] Specifically, the accounts would offset the difference between the current book depreciation reserve and what this amount would have been if the proposed depreciation rates were applied during their service life over a six-year

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[8] Attachment 1-1: Cal Am's response to Cal Advocates' data request ISC-004, Q002c.

[9] Direct Testimony of Mr. Stephen (Wes) Owens, July 7, 2022, at 62.

[10] Depreciation Rate Study at 118.

[11] Depreciation Rate Study at 118. ("Annually, assets are retired after reaching the average service life for that account.")

[12] Depreciation Rate Study at 118. ("Properties are retired from the affected accounts that, at the date of the adoption of vintage year accounting, meet or exceed the average service life of properties in that account.")

[13] Depreciation Rate Study at 119. ("After those assets are retired, the remaining plant in service for each account will be amortized using the amortization rates shown in Appendix A-1")

period. The Commission should deny Cal Am's request because it would result in retiring assets that are still used and useful.

The values of assets Cal Am is planning to instantly retire under this method is on average over 18% of its still useful plant-in-service for these accounts for 2020. For the Los Angeles district the value is nearly 60% as reflected below in **Table 1-1**.

Table 1-1: Plant in Service[14]

District	Selected Account Plant Balance at 12/31/20	Total Assets to Retire	% Plant Balance to be Retired
Coronado	$1,165,678.00	$156,149.00	13.40%
Corporate	$34,038,302.00	$564,753.00	1.66%
Larkfield	$586,031.00	$280,457.00	47.86%
Los Angeles	$2,496,257.00	$1,480,880.00	59.32%
Monterey	$11,482,966.00	$5,066,482.00	44.12%
Sacramento	$14,906,577.00	$3,963,294.00	26.59%
Ventura	$2,091,389.00	$728,930.00	34.85%
Monterey Wastewater	$353,232.00	$105,112.00	29.76%
Total	$67,120,432.00	$12,346,057.00	18.39%

Automatic retirement of assets is inconsistent with Standard Practice U-38-W, which states that "[e]ach utility shall keep its work order system in such manner as to show the nature of each addition to or retirement of utility plant, the

[14] Depreciation Rate Study, Appendix A-1: Computation of Annual Amortization Rate.

total cost thereof, the source or sources of costs and the utility plant account or accounts to which charged or credited."[15]

Also, Standard Practice U-04-W defines average service life for plant mortality as "the average expected life of all units when new."[16] Assets in a group with the same initial service date are expected to be retired or removed from service at different times, but the average of these service lives is expected to be an average service life set by a depreciation study.[17] Longer lasting assets balance out shorter-lived equivalents.[18] By prematurely retiring useful assets that are older than the average service life, this balance between longer and shorter service lives is interrupted. Asset groups that would otherwise last longer than the average service life will unnecessarily undergo early retirement. As a result, ratepayers will have to pay the full cost without receiving the full benefit for assets that are still used and useful but retired early.

Cal Am also does not provide justification for the loss of useful plant from group early retirement. Premature retirement would unreasonably increase costs to ratepayers and prematurely take useful assets out of service.

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[15] California Public Utilities Commission, Water Division, Uniform System of Accounts for Class A Water Utilities, Standard Practice U-38-W, January 1, 2018.

[16] California Public Utilities Commission, Water Division, Standard Practice for Determination of Straight-Line Remaining Life Depreciation Accruals, Standard Practice U-4-W, January 3, 1961 (Standard Practice U-04-W), Chapter 5: Methods of Estimating the Remaining Life Expectancy A – Remaining Life and Plant Mortality, at 15.

[17] Standard Practice U-04-W Chapter 3: Factors Influencing Depreciation Accruals - Unit and Group Bases for Accounting, at 8 ("In group accounting all units having like mortality characteristics or all units of an account are considered together. Accruals for the group are based on composite or weighted average values of salvage and service life expectancy. The resulting values are applied to the surviving plant balances each year or each accounting period.")

[18] Standard Practice U-04-W Chapter 3: Factors Influencing Depreciation Accruals - Unit and Group Bases for Accounting, at 8 ("A deficiency due to early retirement of a particular unit is made up through greater accruals on a unit which outlives the average.")

The Commission should deny Cal Am's proposal because it would result in premature retirement of useful assets and increased costs for ratepayers.

IV. CONCLUSION

The Commission should deny Cal Am's proposed depreciation rates from its Depreciation Rate Study and instead maintain the depreciation rates currently in effect. According to Cal Am's depreciation study numbers, Cal Advocates' recommendation would reduce Cal Am's proposed annual depreciation expense by approximately $2 million.[19]

Cal Am's proposed depreciation rate calculation methodology from the Depreciation Rate Study uses companywide depreciation parameters (Life Parameters and Net Salvage Values) for each asset group. The Commission should maintain the principle of cost causation to ensure ratepayers in each district are not burdened by plant items in other districts that they do not use and from which they receive no benefit.

The Commission should not allow Cal Am to use AR-15 automatic retirement for accounts 339-340, 342-344, and 346-348 because automatic retirements are inconsistent with Standard Practice U-38-W. Furthermore, automatic retirement would result in premature retirement of useful assets.

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[19] Direct Testimony of Mr. Stephen (Wes) Owens, July 7, 2022, at 62.

CHAPTER 2 Earthquake Insurance

I. INTRODUCTION

This chapter presents analyses and recommendations on Cal Am's request for earthquake insurance.

II. SUMMARY OF RECOMMENDATIONS

The Commission should deny Cal Am's request to recover $3.3 million per year in insurance premiums. The estimated annual cost of approximately $3.3 million would result in increased costs to customers that would likely exceed the benefits of the proposed earthquake insurance policy.

The Commission also should deny Cal Am's request to track earthquake insurance premiums in a Catastrophic Event Memorandum Account (CEMA) because this proposal is inconsistent with the purpose of CEMA.

III. ANALYSIS

A. Earthquake Insurance Cost

Cal Am requests to recover an anticipated $3.3 million per year in earthquake insurance premiums via a surcharge added to customer bills. This annual earthquake insurance premium would provide a maximum annual benefit of $10 million per year in coverage for underground assets after a $25 million per event deductible is reached.[20] Cal Am proposes to track and recover the actual premiums through the Catastrophic Event Memorandum Account (CEMA).[21]

Cal Am's proposed earthquake insurance policy is unreasonable, as the costs would likely outweigh the benefits to ratepayers. According to Cal Am, the

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[20] Direct Testimony of Stephen (Wes) Owens (Owens Testimony), July 7, 2022, at 19, lns. 3 – 5.

[21] Owens Testimony at 18, lns. 20-22.

$25 million "proposed deductible is per event"[22] and the proposed $10 million policy limit is annual.[23] Under its proposal, Cal Am's annual insurance payout could be as low as $0, or as high as $10 million dollars, while ratepayers would pay $3.3 million in premiums each year.

In the event an earthquake takes place, the damage might not exceed the $25 million deductible, in which case Cal Am would not receive an insurance payout. And even if the damage exceeds the $25 million deductible, the policy will cover, at most, $10 million in damages annually beyond the $25 million per event deductible. Either scenario would leave ratepayers paying for disaster recovery costs and insurance premiums.[24]

Cal Am's proposed earthquake insurance policy would only cover "[f]irst party property damage and business interruption to underground pipes."[25] The policy would not cover damages to employees or other people, or to any real or personal property owned and/or controlled by Cal Am other than the underground assets.[26]

Before pursuing costly earthquake insurance options with limited benefits, a reasonable manager would pursue all low- and no-cost earthquake resilience and

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[22] Attachment 2-1: Cal Am's Response to Cal Advocates' Data Request ISC-011, Question 1.b.

[23] Attachment 2-1: Cal Am's Response to Cal Advocates' Data Request ISC-011, Question 1.c.

[24] The deductible for Cal Am's proposed earthquake insurance policy is significantly higher than the indemnity threshold for the earthquake insurance policy that Cal Am proposed in the last General Rate Case. See Attachment 2-2: Direct Testimony of Stephen (Wes) Owens (July 18, 2019), A.19-07-004 (PUBLIC) at 21; see generally, Attachment 2-3: Report and Recommendations on California American Water Company's Safety, Water Quality, Service Quality and Compliance With Commission Rules, A.19-07-004 (Public); see also, Attachment 2-4: A.19-07-004, Cal Am's Response to Cal Advocates' Data Request Cal PA YCC 04, Q006.a Attachment 1 (Public Version Sent to Cal Advocates on December 12, 2022) at 1, 4. In the CPUC-approved settlement for the last GRC, the parties removed Cal Am's request for recovery of earthquake insurance premiums. D.21-11-018 at 45.

[25] Attachment 2-1: Cal Am's Response to Cal Advocates' Data Request ISC-011, Question 1.d.

[26] Attachment 2-1: Cal Am's Response to Cal Advocates' Data Request ISC-011, Question 1.h. - j.

preparation actions first. For example, the US Environmental Protection Agency ("EPA") released an Earthquake Resilience Guide for Water and Wastewater Utilities ("Earthquake Resilience Guide") showcasing best earthquake resilience practices for water utilities.[27] The Earthquake Resilience Guide includes three low-cost steps that water utilities should take to be more resilient to earthquakes: (1) understand the earthquake threat; (2) identify vulnerable assets and determine consequences; and (3) pursue mitigation and funding options.[28] Within Step 1 (understand the earthquake threat), the Earthquake Resilience Guide recommends that water utilities "contact [their] state hazard mitigation officer and work with [their] local mitigation planner," who "may have already assessed and characterized [the water utility's] local earthquake hazard."[29] Within Step 2 (identify vulnerable assets and determine consequences), the Earthquake Resilience Guide recommends that water utilities take three actions, the first of which is to "inventory critical assets and plot on hazard maps."[30] Within Step 3 (pursue mitigation and funding options), the Earthquake Resilience Guide recommends that water utilities ensure that local governments' local mitigation plans "include language about mitigating earthquakes at your utility so that proposed mitigation projects become eligible for federal funding."[31]

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[27] Attachment 2-5: EPA Earthquake Resilience Guide for Water and Wastewater Utilities (Earthquake Resilience Guide), *available at* https://www.epa.gov/sites/default/files/2018-02/documents/180112-earthquakeresilienceguide.pdf.

[28] Attachment 2-5: Earthquake Resilience Guide at 1-14.

[29] Attachment 2-5: Earthquake Resilience Guide, Step 1, at 1.

[30] Attachment 2-5: Earthquake Resilience Guide, Step 2, at 2.

[31] Attachment 2-5: Earthquake Resilience Guide, Step 3 at 13.

Cal Am states it "has not plotted all critical assets on 'earthquake/seismic hazard maps'",[32] "has not contacted the California State Hazard Mitigation Officer in the past five years pertaining to earthquake hazards or mitigation,"[33] and that it "has not joined in earthquake/seismic hazard mitigation planning efforts with local governmental entities."[34] Cal Am has not undertaken the most basic low-cost earthquake preparation measures recommended by the EPA specifically for water utilities.

Cal Am's request for an earthquake insurance premium budget is unreasonable because the costs of its proposed earthquake insurance policy likely outweigh the benefits, and it has failed to pursue basic, low-cost preparation measures as recommended by the EPA for water utilities. The Commission should deny Cal Am's request.

B. Catastrophic Memorandum Account to Track Earthquake Insurance Premium Costs

Cal Am is requesting to recover the proposed earthquake insurance premium budget through surcharges by tracking in the CEMA.[35] This request is unreasonable. As Cal Am admits in its testimony, CEMA is intended to track costs *after* a catastrophic event occurs.[36] Specifically, CEMA was authorized for "unforeseeable" costs associated with disasters.[37] Insurance premiums are not unforeseeable and they are not paid after a disaster. Instead, insurance premiums

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[32] Attachment 2-6: Cal Am's Corrected Response to Cal Advocates' Data Request ISC-009, Question 1a (November 4, 2022 Cal-Am Corrected Response) at 4.

[33] Attachment 2-7: Cal Am's Response to Cal Advocates' Data Request ISC-009, Question 4 at 7.

[34] Attachment 2-7: Cal Am's Response to Cal Advocates' Data Request ISC-009, Question 5 at 8.

[35] Direct Testimony of Stephen (Wes) Owens, July 7, 2022, at 18, lns. 20-22.

[36] Direct Testimony of Stephen (Wes) Owens, July 7, 2022, at 19, ln. 27– 20, ln. 1.

[37] Resolution E-3238 at 1.

are prepaid amounts to receive insurance for future disasters. The cost of the insurance premiums—unlike costs arising from a future disaster—can be calculated if Cal Am gets appropriate quotations from insurance companies. The reasonableness of such costs can therefore be determined before a disaster occurs.

Cal Am's proposal to recover insurance premiums (a cost known in advance) in CEMA accounts is therefore inconsistent with the purpose of CEMA. Therefore, the Commission should deny Cal Am's request to track its proposed earthquake insurance premium budget in the CEMA account.

IV. CONCLUSION

The Commission should deny Cal Am's request to recover the costs of an earthquake insurance policy. The proposed earthquake insurance policy is unreasonable because the costs of this policy will likely outweigh the benefits and Cal Am has failed to pursue more reasonable low-cost earthquake preparedness as recommended by the EPA for water utilities.

Even if the costs of Cal Am's proposed earthquake insurance are approved, the Commission should not allow Cal Am to track earthquake insurance premiums in a CEMA account. CEMA was authorized for "unforeseeable" costs associated with disasters,[38] and insurance premiums are not "unforeseeable."

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[38] Resolution E-3238 at 1.

CHAPTER 3 Customer Service

I. INTRODUCTION

This chapter presents analyses and recommendations for Cal Am's customer service performance and financing.

II. SUMMARY OF RECOMMENDATIONS

The Commission should reduce Cal Am's proposed revenue requirement (budget) for the Service Company by $39,691, to align with Cal Am's failure to meet customer service performance standards over the past five years. This would result in a $2,646,094 Service Company budget for Test Year 2024 and ratepayer savings of $39,691. Cal Advocates witness Kerrie Evans recommends further reductions to the Service Company budget.

Cal Am should also track CSC and Local Office Complaints and report this information in its Minimum Data Requirement (MDR) II H.1 response in future GRCs.

III. ANALYSIS

A. Customer Service Funding

General Order (GO) 103-A requires all Class A and Class B water utilities that employ automated call distribution systems to comply with customer service and reporting standards laid out in ten metrics: (1) call answering service level; (2) abandoned call rate during normal business hours; (3) percentage of bills rendered (mailed) within seven calendar days of the scheduled billing date; (4) bills found inaccurate; (5) payment posting errors; (6) final read and final bill; (7) percentage of actual meter readings per billing cycle; (8) keeping scheduled appointments; (9) percentage of customer-requested work not completed on or before the scheduled date; and (10) percentage of customers who file complaints with the

Commission's Consumer Affairs Branch (CAB).[39] For five consecutive years, Cal Am consistently failed two out of these ten metrics: (1) abandoned call rate during normal business hours ("abandoned call rate"), and (2) percentage of bills rendered (mailed) within seven calendar days of the scheduled billing date ("percentage of bills rendered within 7 days").[40]

The abandoned call rate is the percentage of calls abandoned before reaching a utility representative (requested by the customer) during normal business.[41] This amount is calculated by dividing the number of calls abandoned by the number of attempts to reach a utility representative.[42] General Order 103-A sets a standard of 5% for this metric.[43] Therefore, Class A and B water utilities should have an abandoned call rate of equal to or less than 5%. However, Cal Am had an average abandoned call rate of 17.6% for the five-year period from 2017 to 2021,[44] which is more than triple the 5% standard.[45] [46]

The percentage of bills rendered is the percentage of bills mailed within seven calendar days of the scheduled billing date.[47] General Order 103-A sets a

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[39] GO 103-A, Appendix E.

[40] Attachment 3-1: Cal Am's Response to Cal Advocates' Data Request ISC-001, Q002.i-iv, Attachment 1.

[41] GO 103-A, Appendix E, Section 1.B at 1.

[42] GO 103-A, Appendix E, Section 1.B at 1.

[43] GO 103-A, Appendix E, Section 1.B at 2.

[44] Attachment 3-1: Cal Am's Response to Cal Advocates' Data Request ISC-001, Q002.i-iv, Attachment 1. Five-year average for % Abandoned Call Rate → (12% + 25% + 7% + 16% + 28%)/5 → 17.6%.

[45] GO 103-A, Appendix E, Section 1.B at 2.

[46] There is a 12.6% difference between Cal Am's recorded values and the 5% standard for its abandoned call rate.

[47] GO 103-A, Appendix E, Section 2.A at 2.

standard of 99% for this metric.[48] Therefore, the percentage of bills rendered by Class A and B should be equal to or greater than 99%.[49] However, Cal Am has an average percentage of bills rendered of 97% for the five-year period from 2017 to 2021.[50] [51]

Utilities should only receive ratepayer funding for services that provide adequate service to customers. As discussed below, Cal Advocates recommends that the Commission reduce the budget for the Service Company to account for Cal Am's failure to meet the service standards for these two metrics.

The Service Company operates the Customer Service Centers ("CSCs") that handle customer calls, billing, and collection activities for California American Water and its public utility affiliates.[52] The CSCs handle customer inquiries and correspondence, and process service order requests.[53] The Service Company's Customer Service Organization costs for the past five years (2017-2021) has averaged 17.3% of its budget.[54] Because Cal Am is proposing $15,295,341 in TY 2024 for Operational Expenditure ("OpEx") costs for the

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[48] GO 103-A, Appendix E, Section 2.A.at 2.

[49] G.O 103-A, Appendix E, Section 2.A at 2.

[50] Attachment 3-1: Cal Am's Response to Cal Advocates' Data Request ISC-001, Q002.i-iv, Attachment 1. Five-year average for % Bills Rendered in 7 Days → (97% + 98% + 95% + 97% + 98%)/5 → 97%.

[51] The data for the calculation of the averages is from Attachment 3-1: Cal Am's Response to Cal Advocates' Data Request ISC-001, Q002.i-iv, Attachment 1.

[52] Direct Testimony of John M. Watkins, July 7, 2022, at 3.

[53] Direct Testimony of John M. Watkins, July 7, 2022, at 3.

[54] Attachment 3-2: Customer Service Org - Operational Expenditure Cost Ratio; See also, Attachment 3-3: Cal Am's Response to Cal Advocates' Data Request KKE 01, Q007, Attachment 1 (yearly customer service organization costs highlighted in yellow, yearly total OpEx costs highlighted in blue).

Service Company,[55] a reasonable estimate of the Customer Service Organizations budget is $2,646,094 for the test year.[56]

The Commission should remove 1.5% off the estimated $2,646,094 budget of the Customer Service Organization ("CSO") ($39,691) to account for the minimum service levels not being received by ratepayers.[57] Cal Am's funding request for CSO should be reduced to be commensurate with the service level customers are receiving. Therefore, Cal Am's proposed OpEx costs for TY 2024 should be reduced by $39,691.

B. Customer Complaint Tracking

The Rate Case Plan requires Cal Am to provide information about the number of customer complaints received in last three years, categorized by major subject areas, in GRCs.[58] MDR II.H.1 reflects this requirement.[59]

In this GRC, Cal Am reported the number of Informal PUC Complaints[60] it received in response to MDR II.H.1.[61] It did not report any other categories of

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[55] RO Model file ALL_CH04_O&M_RO_Service Co workpage Ser Co Costs W-Spec Adj WS7 2024 projected amounts.

[56] $15,295,341* 17.3% = $2,646,094 . Since Customer Service Organization has averaged 17.3% of all (OpEx)-related costs for the Service Company, using 17.3% as an estimate for the TY 2024 proposed Service Organization OpEx costs for Customer Service Organization is reasonable.

[57] (12.6% + 2.0%+0%+0%+0%+0%+0%+0%+0%+0%)/10 = 1.5%. In the numerator of this formula, 12.6% and 2.0% represent the difference between Cal Am's actual performance and the standard for two metrics: (1) abandoned call rate, and (2) percentage of bills rendered within 7 days. The eight 0% values in the numerator represent the other eight metrics; Cal Advocates assigned a value of 0% because Cal Am met the standard for those metrics. The denominator is 10 because there are ten metrics total.

[58] D.07-06-052, Appendix A at A-30; MDR II.H.1.

[59] "The Results of Operation Report must contain information about the number of customer complaints received in the last three years for the district, categorized by major subject areas."

[60] Informal customer complaints about Cal Am sent to the CPUC.

[61] Cal American Application, Exhibit B, MDR II.H.1 Response.

complaints, even though it admitted to receiving complaints in addition to the informal PUC complaints provided in its MDR response.[62]

In contrast, in the last GRC, Cal Am reported all complaints received, including customer inquiries/complaints received by Cal Am or Customer Service Center ("CSC").[63] When asked why it suddenly and without explanation changed its interpretation of the question to provide different information in the current GRC, Cal Am indicated that it does not track these company customer complaints and could not provide them.[64]

Cal Am's explanation that it does not track company customer complaints and its decision to provide different types of information to the same question in different GRCs is inconsistent with the Rate Case Plan.[65] Also, Cal Am's explanation is unreasonable because water suppliers are legally required to "maintain records on all water quality and system water outage complaints received, both verbal and written."[66]

Cal Am attempts to justify its actions by citing Decision ("D.") 21-11-018; specifically, Cal Am claims that D.21-11-018 allows it to cease tracking company complaints.-[67] However, the decision eliminated the need for Cal Am to submit

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[62] Attachment 3-4: Cal Am's response to Cal Advocates' data request ISC-005 Question 1.a.

[63] Attachment 3-5: Cal American 2019 GRC Final Application Exhibit B MDR II.H.1 Response; Attachment 3-6 Cal Am's Response to Cal Advocates' Data Request ISC-012, Question 1.c. ("California American Water's response to MDR II.H.1 in its last GRC is comparable to "Total Division Complaints" data shown in response to DR ISC-05 Q001 Attachments 01-09 meaning the MDR data included informal CPUC complaints."); Attachment 3-7: Cal American Water 01/19 – 03/21 Complaint History, DR ISC-005 Q001 Attachments 1-9.

[64] Attachment 3-4: Cal Am's response to Cal Advocates' data request ISC-005 Question 1.b.

[65] D.07-06-052, Appendix A at A-30; MDR II.H.1.

[66] Cal. Code Regs. Tit. 22, § 64470.

[67] Attachment 3-4: Cal Am's response to Cal Advocates' data request ISC-005 Question 1.b.

quarterly complaint data to the Commission.[68] Nothing in D.21-11-018 alleviates Cal Am of its legal requirement to track all water quality and system water outage complaint data.

By providing only informal complaint data received by the Commission and not all internal customer complaints received by the company, Cal Am provides a misleadingly favorable impression of customer satisfaction. As seen below in **Table 3-1**, the complaints filed with the Commission comprise only 0.38% of the total complaints that were received between January 2019 and March 2021 (when Cal Am allegedly stopped internal tracking of customer complaints).[69]

Table 3-1: Complaints Received January 2019 – March 2021[70]

Timeframe	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints	% CPUC Complaints
Jan - Mar 2019	1343	8	1351	0.59%
Apr - Jun 2019	3407	8	3415	0.23%
Jul - Aug 2019	4815	11	4826	0.23%
Sep - Dec 2019	1693	14	1707	0.82%
Jan - Mar 2020	3086	7	3093	0.23%
Apr - Jun 2020	1649	9	1658	0.54%
Jul - Aug 2020	5197	18	5215	0.35%
Sep - Dec 2020	3818	19	3837	0.50%
Jan - Mar 2021	821	4	825	0.48%
Total	25829	98	25927	0.38%

Additionally, the Rate Case Plan requires Cal Am to provide information about the number of customer complaints received in last three years, *categorized*

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[68] D. 21-11-018 Page 161 "Cal-Am is authorized to eliminate the Monterey District rebate and audit reports and the customer complaint reports"..

[69] As explained in Attachment 3-6: Cal Am's Response to Cal Advocates' Data Request ISC-012 Question 1.a., " "CSC and Local Office Complaints" [refers to] customer inquiries and customer complaints that were received by the Customer Service Center ("CSC") as well as any of California American Water's district offices or corporate office."

[70] Attachment 3-7: Cal American Water 01/19 – 03/21 Complaint History, DR ISC-005 Q001 Attachments 1-9.

by major subject areas, in GRCs.[71] However, the informal complaint data that Cal Am submitted in response to MDR II.H.1 in this GRC lacks many of the major categories that Cal Am presented in its previous GRC responses to the same question. For example, the very important categories of Leaks, Pressure, and Distribution are no longer separately identified.[72] [73]

If Cal Am's explanation for providing a different type of data in the current GRC is accurate, namely that it no longer keeps records of company customer complaints, then it is in inconsistent with the Rate Case Plan[74] and the legal requirements for water suppliers to "maintain records on all water quality and system water outage complaints received."[75] If Cal Am is continuing to internally track customer complaints, then it has failed to provide the requested information for analysis by the Commission and the Public Advocates Office and failed to provide justification for why it has changed the type of information it provides in response to MDR II.H.1. For either scenario, the Commission should provide Cal Am with the necessary guidance.

IV. CONCLUSION

The Commission should reduce Cal Am's proposed Service Company budget by $39,691, to align with Cal Am's customer service performance over the past five years.

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[71] D.07-06-052, Appendix A at A-30; MDR II.H.1.

[72] Attachment 3-6: Cal Am's Response to Cal Advocates' Data Request ISC-012 Question 3.c. When asked if Cal Am tracked complaints related to leaks, pressure, and distribution from the second quarter of 2021 to the present data, Cal Am responded with the statement "California American Water tracks the major subject areas identified in its response to MDR II.H.1."

[73] Attachment 3-6: Cal Am's Response to Cal Advocates' Data Request ISC-012 Question 1.c.

[74] D.07-06-052, Appendix A at A-30; MDR II.H.1.

[75] Cal. Code Regs. Tit. 22, § 64470.

Cal Advocates witness Kerrie Evans recommends further reductions to the Service Company budget.

The Commission should require Cal Am to track all complaints, including CSC and Local Office Complaints and CPUC Complaints, by major subject area, and report this information in the MDR II H.1 response data in future GRCs.

CHAPTER 4 Wildfire and Safety (Portable Generator Study)

I. INTRODUCTION

This chapter presents analyses and recommendations for Cal Am's wildfire and safety plans concerning the portable generator study.

II. SUMMARY OF RECOMMENDATIONS

Prior to authorizing Cal Am additional funds for stationary generators, the Commission should require Cal Am to complete a Portable Generator Planning Study that considers alternatives to installing stationary generators. Cal Am had agreed to do this study in its previous GRC but failed to do so.[76]

Accordingly, the Commission should adjust Cal Am's proposed capital projects budget as described in the testimony of Sari Ibrahim and Justin Menda.

III. ANALYSIS

A. Portable Generator Planning Study

In Cal Am's last GRC, Cal Am agreed and was required to prepare a Portable Generator Planning Study to consider alternatives to installing stationary generators at its facilities.[77] Cal Am did not prepare this study. Instead, Cal Am prepared an Emergency Power Study Report, which contains only three paragraphs discussing portable generators as alternatives to stationary generators.[78] Without analysis and meaningful consideration of site specifics, Cal Am automatically categorized all critical sites as needing stationary generators,

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[76] Decision D. 21-11-018 at 43, 189, Ordering Paragraph 11, Appendix B (Settlement Agreement) at 32.

[77] Decision D. 21-11-018 at 43, 189, Ordering Paragraph 11, Appendix B (Settlement Agreement) at 32.

[78] Attachment 4-1: Cal Am's Response to Cal Advocates' Data Request ISC-010, Question 01; Attachment 4-2: Excerpt from Cal Am's response to Cal Advocates' data request ISC-010 Attachment 01 - Emergency Power Study (Redacted) at 2.

mistakenly claiming that the Environmental Protection Agency's (EPA) 2019 Power Resilience Guide for Water and Wastewater (Power Resilience Guide) "recommends installing stationary generators with automatic transfer switches at all 'critical' facilities."[79] Except for one site that did not have space for a stationary generator, Cal Am did not analyze or present any alternatives to stationary generators.[80]

Cal Am's explanation for automatically assigning stationary generators to critical sites and not performing the previously agreed-upon analysis is based on mischaracterization of the EPA Power Resilience Guide. The Power Resilience Guide states that utilities should "*[c]onsider* installing stationary generators with automatic transfer switches at all 'critical' facilities."[81] More importantly, the EPA Power Resilience Guide indicates that utilities should "[d]etermine whether a portable or stationary generator will work best for your critical infrastructure assets."[82]

In fact, the Power Resilience Guide states that "[p]ortable generators are better for smaller electric demands that do not require uninterrupted power."[83] However, because Cal Am did not perform the required study, it failed to consider electric demand as a factor in selecting whether a portable or stationary generator

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[79] Attachment 4-2 Excerpt from Cal Am's response to Cal Advocates' data request ISC-010 Attachment 01 - Emergency Power Study (Redacted) at 2.

[80] Attachment 4-2: Excerpt from Cal Am's response to Cal Advocates' data request ISC-010 Attachment 01 - Emergency Power Study (Redacted) at 15, Table 6.2 (Generator Recommendations by Division). Stations received portable generators only if they did not have space for a space for a stationary generator. Attachment 4-2 at 2. This study recommended only one additional portable generator compared to 36 stationary generators. Attachment 4-2 at 15, Table 6.2.

[81] Attachment 4-3: EPA 2019 Power Resilience Guide for Water and Wastewater Utilities at 2-2 (emphasis added).

[82] Attachment 4-3: EPA 2019 Power Resilience Guide for Water and Wastewater Utilities at 3-2.

[83] Attachment 4-3: EPA 2019 Power Resilience Guide for Water and Wastewater Utilities at 3-2.

was appropriate for each site. Multiple sites where Cal Am proposes a stationary generator could potentially use a less-expensive portable generator while still ensuring reliability. However, Cal Am did not consider alternatives to installing stationary generators, as recommended by the EPA Power and Resilience Guide and required by the CPUC-approved settlement agreement for Cal Am's last GRC.[84]

Accordingly, the Commission should adjust Cal Am's proposed capital projects budget as described in the testimony of Sari Ibrahim and Justin Menda to remove any ratepayer funding for additional generators until Cal Am has completed and the Commission has evaluated the required study of alternatives to stationary generators.

IV. CONCLUSION

Prior to receiving additional ratepayer funds for generators, Cal Am should complete and submit the Portable Generator Planning Study that considers alternatives to installing stationary generators which Cal Am was required to complete in its last GRC.[85]

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[84] Decision D. 21-11-018 at 43, 189, Ordering Paragraph 11, Appendix B (Settlement Agreement) at 32.

[85] Decision D. 21-11-018 at 43, 189, Ordering Paragraph 11, Appendix B (Settlement Agreement) at 32.

Attachment 1-1: Cal Am's Response to Cal Advocates' Data Request ISC- 004

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service by $55,771,300 or 18.71% in the year 2024, by $19,565,300 or 5.50% in the year 2025, and by $19,892,400 or 5.30% in the year 2026.	A.22-07-001 (Filed July 1, 2022)

CALIFORNIA-AMERICAN WATER COMPANY'S RESPONSE TO PUBLIC ADVOCATES OFFICE'S DATA REQUEST ISC 04

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Attorneys for California-American Water Company

Dated: September 23, 2022

California-American Water Company (U-210- W; "California American Water," "CAW" or the "Company") hereby sets forth the following objections and responses to Public Advocates Office's ("Cal Advocates") Data Request ISC 04 ("Data Requests" or "RPD"), propounded on September 9, 2022, in A.22-07-001.

RESERVATION OF RIGHTS

1. California American Water's investigation into the Data Requests is ongoing. The Company reserves the right, without obligating itself to do so, to supplement or modify its responses and to present further information and produce additional documents as a result of its ongoing investigation.

2. Any information or materials provided in response to the Data Requests shall be without prejudice to California American Water's right to object to their admission into evidence or the record in this proceeding, their use as evidence or in the record, or the relevance of such information or materials. In addition, California American Water reserves its right to object to further discovery of documents, other information or materials relating to the same or similar subject matter upon any valid ground or grounds, including without limitation, the proprietary nature of the information, relevance, privilege, work product, overbreadth, burdensomeness, oppressiveness, or incompetence.

GENERAL OBJECTIONS

1. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they purport to impose upon California American Water any obligations broader than those permitted by law.

2. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they improperly seek the disclosure of information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privilege or doctrine, and/or the client confidentiality obligations mandated by Business and Professions Code Section 6068(e)(1) and Rule 3-100(A) of the California Rules of Professional Conduct. Such responses as may hereafter be given shall not include information protected by such privileges or

doctrines, and the inadvertent disclosure of such information shall not be deemed as a waiver of any such privilege or doctrine.

3. California American Water objects to the Data Requests to the extent that the requests are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, unreasonably expensive, oppressive, or excessively time consuming to California American Water.

4. California American Water objects to the Data Requests to the extent they seek documents that are and/or information that is neither relevant nor material to this proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

5. California American Water objects to the Data Requests to the extent they seek an analysis, calculation, or compilation that has not previously been performed and that California American Water objects to performing.

6. California American Water objects to the Data Requests insofar as they request the production of documents or information that are publicly available or that are equally available to Cal Advocates because such requests subject California American Water to unreasonable and undue annoyance, oppression, burden and expense.

7. California American Water objects to the Data Requests to the extent the requests are vague, ambiguous, use terms that are subject to multiple interpretations but are not properly defined for purposes of the Data Request, or otherwise provide no basis from which California American Water can determine what information is sought.

8. The objections contained herein, and information and documents produced in response hereto, are not intended nor should they be construed to waive California American Water's right to object to the Data Requests, responses or documents produced in response hereto, or the subject matter of such Data Requests, responses or documents, as to their competency, relevancy, materiality, privilege and admissibility as evidence for any purpose, in or at any hearing of this or any other proceeding.

9. The objections contained herein are not intended nor should they be construed to waive California American Water's right to object to other discovery involving or relating to the subject matter of the Data Requests, responses or documents produced in response hereto.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Dane Watson**
Title:	**Principal**
Address:	**Alliance Consulting Group** **1410 K Ave # 1105A** **Plano, TX 75074**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC-04**
Company Number:	**Cal ADV ISC 04 Q001**
Date Received:	**September 9, 2022**
Date Response Due:	**September 23, 2022**
Subject Area:	**Depreciation Info I**

DATA REQUEST:

1. In the Depreciation Study on PDF P. 164 of the Direct Testimony of Stephen (Wes) Owens, July 1, 2022 ("Owens Testimony"), Cal Am stated that for determining which survival curve to use for some accounts, "[t]he historical observed life table was plotted and compared with various Iowa Curves to obtain the most appropriate match."
   a. How many curves were plotted for each account? List each account name or description, account number, and the number of curves used.
   b. Was there a methodology to determining the number of curves to plot?
   c. Was any quantitative verification (such as a method of least squares) used to evaluate the best fit in addition to visual matching? If so, please describe the quantitative verification method used. If not, please explain why.

CAL-AM'S RESPONSE

a. See CAW Response Cal Adv ISC 04 Q001 Attachment 01.
b. In general, the process involved plotting the existing curve in the widest possible placement and experience band. Then judgment was applied as various bands were plotted to match the observed life table to the proposed curve. Sound depreciation practice and authoritative guidance advise that a recommended life curve needs to drop to take into account at least 50% of the life cycle (i.e., 50% of the historical experience) of the assets in the account to offer a fully predictive analysis.[1] Visual matching is my preference in fitting historical data, in part

[1] Public Utility Depreciation Practices, p 120 ("It is generally desirable to have the stub curve drop below 50%.").

because it allows the analyst to see the underlying data that is used to create the single numerical statistic and better describes how the “fit” is at various points in the life of the curve. I have used this methodology consistently in performing more than 300 depreciation studies over the course of my career.

c. While we compute mathematical fitting for each account, we do not rely on its results for curve fitting. Mathematical fitting uses a computer model to minimize the sum of squares differences between the observed data and a proposed survivor curve in order to approximate the most accurate life curve. In real-world applications, theoretical statistical models are not always accurate due to the interrelationship of the data in various years (e.g. storms would trigger common causes of retirement between vintages, inflation would change the unit price from year to year, etc.). Visual matching does not have this issue. Over my decades of performing depreciation studies, I believe that visual fitting is a superior approach.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Dane Watson**
Title:	**Principal**
Address:	**Alliance Consulting Group** **1410 K Ave # 1105A** **Plano, TX 75074**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC-04**
Company Number:	**Cal ADV ISC 04 Q002**
Date Received:	**September 9, 2022**
Date Response Due:	**September 23, 2022**
Subject Area:	**Depreciation Info I**

DATA REQUEST:

2. In the Depreciation Study on PDF P. 164 of the Owens Testimony, Cal Am stated,"[i]nterviews with Company subject matter experts ('SMEs') recommended that the assets be combined for those account, since CAW operates their assets with a combined strategy and similar equipment across its service territory."

a. Please provide the list of the SMEs and what subject(s) of expertise each SME has.
b. Please provide records of any recommendations from the SMEs, including, but not limited to, emails, memoranda, notes from meetings and calls, and any other documents evidencing any such recommendation.
c. Please provide any industry rules and standards, CPUC decisions and resolutions, and/or written company policy documents supporting this recommendation.

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully here. California American Water further objects to this request as overbroad and unduly burdensome. California American Water also objects to this request on the grounds it seeks information irrelevant to this proceeding and to the extent is seeks the disclosure of information protected by the attorney-client privilege and the attorney work-product doctrine. Subject to, but without waiving, those objections, California American Water responds as follows.

a. The following California American Water employees participated in interviews with the depreciation consultant, Mr. Watson:
    - Jeff Linam, Senior Director of Rates and Regulations

- Wes Owens, Director of Rates and Regulations
- Christopher Cook, Central Division Director of Operations
- Tim O'Halloran, Engineering Manager, Central Division
- Lakhjit Thind, Rates & Regulatory Analyst
- Mark Hernandez, Capital Program Senior Administrator
- Christina Baril, Southern Division Director of Operations at the time of the interviews
- Mark Reifer, Southern Division Engineering Manager
- Jennifer Williams, Ventura Operations Manager
- Robert Becerra, San Diego Operations Manager
- Jessica Taylor, LA Operations Manager at time of interviews (now Southern Division Director of Operations)
- Garry Hofer, VP of Operations
- Audie Foster, Northern Division Director of Operations
- Lacy Carothers, Northern Division Engineering Manager.
- Margaret DiGenova, Operations Superintendent
- Angelique Smith, Senior Accountant
- Karen Craig, Senior Manager Plant Accounting

b. Copies of interview notes are provided in CAW Response Cal ADV ISC 04 Q002 Attachment 01.

c. None are provided, but the recommendation is reasonable based on CPUC experience and the number of transactions available to be analyzed.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Dane Watson**
Title:	**Principal**
Address:	**Alliance Consulting Group** **1410 K Ave # 1105A** **Plano, TX 75074**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC-04**
Company Number:	**Cal ADV ISC 04 Q003**
Date Received:	**September 9, 2022**
Date Response Due:	**September 23, 2022**
Subject Area:	**Depreciation Info I**

DATA REQUEST:

3. In the Depreciation Study on PDF P. 158 of the Owens Testimony, Cal Am stated that "numerous discussions were conducted with Company engineers and field operations personnel to obtain information that would assist in formulating life and salvage recommendations." Please provide:
   a. The list of the Company engineers and field operations personnel involved.
   b. Please provide records of any discussions with the company engineers and field operations personnel, including, but not limited to, emails, memoranda, notes from meetings and calls, and any other document evidencing any such discussions.

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully here. California American Water further objects to this request as overbroad and unduly burdensome. California American Water also objects to this request on the grounds it seeks information irrelevant to this proceeding and to the extent is seeks the disclosure of information protected by the attorney-client privilege and the attorney work-product doctrine. Subject to, but without waiving, those objections, California American Water responds as follows.

a. The same individuals participated in both portions of the interviews. See response to question CAL ADV ISC 04 Q002.
b. Copies of interview notes are provided in response to question CAL ADV ISC 04 Q002.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Dane Watson**
Title:	**Principal**
Address:	**Alliance Consulting Group** **1410 K Ave # 1105A** **Plano, TX 75074**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC-04**
Company Number:	**Cal ADV ISC 04 Q004**
Date Received:	**September 9, 2022**
Date Response Due:	**September 23, 2022**
Subject Area:	**Depreciation Info I**

DATA REQUEST:

4. In the Depreciation Study on PDF P. 165 of the Owens Testimony, Cal Am stated, "SPR does not lend itself to analyzing history when there have been acquisitions of systems, which has occurred across CAW's service territory." Please provide a list of previous acquisitions detailing:

a. Please provide any industry rules and standards, CPUC decisions and resolutions, and any other documents supporting the notion that SPR does not lend itself well to analyzing history where there have been acquisitions of systems.

CAL-AM'S RESPONSE

a. See the text, Depreciation Systems, Iowa State University Press, 1994, by Dr. Frank K. Wolf and W. C. Fitch, p 222. They state, "The model requires the history of annual additions, and retirements, and /or balances for the property group being simulated. The balances, as calculated by adding the observed additions and subtracting the observed retirements, are compared with the observed balances to check the consistency of the data."

   Details available from the acquisitions closed to utility plant after 12/31/2020 did not include historical additions, retirements and balances that could be used in the SPR analysis model. Therefore, any results from the SPR analysis would not be conclusive or provide sufficient guidance for use in selecting average service lives for asset groups affected by the acquisitions. Acquisitions closed to utility plant prior to 12/31/2020 were included in the analysis.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Karen Craig**
Title:	**Senior Manager, Plant Accounting**
Address:	**American Water** **1 Water Street** **Camden NJ 08102**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC-04**
Company Number:	**Cal ADV ISC 04 Q004**
Date Received:	**September 9, 2022**
Date Response Due:	**September 23, 2022**
Subject Area:	**Depreciation Info I**

DATA REQUEST:

4. In the Depreciation Study on PDF P. 165 of the Owens Testimony, Cal Am stated, "SPR does not lend itself to analyzing history when there have been acquisitions of systems, which has occurred across CAW's service territory." Please provide a list of previous acquisitions detailing:
   b. What system(s) were acquired in the past 15 years?
   c. Date of acquirement of each system.
   d. Amount for acquisition of each system.
   e. For any assets acquired, please fill out the spreadsheet Attachment ISC-03 Acquisition Assets, providing the following details as of the date of acquisition (Please use a separate worksheet for each system.):
      i. Account number
      ii. Account description
      iii. Vintage year
      iv. Vintage plant value
      v. Accumulated depreciation

CAL-AM'S RESPONSE

4.
   b. See table below
   c. See table below
   d. See table below.
   e. See CAW Response Cal Adv IS 04 Q004 Attachment 01

Acquisition	Date	Purchase Price
Toro Water Service, Inc.	12/31/2007	$408,000
Garrapata Water Company	03/31/2013	$50,000
Dunnigan Water Works	12/31/2015	$2,000,000
Adams Ranch Mutual Water Company	03/10/2016	$800,000
Geyserville Water Works	11/16/2016	$1,415,200
Meadowbrook	04/01/2017	$4,005,276
Ox Bow Marina Mutual Water Company	07/18/2017	$495,000
Rio Plaza Water Company, Inc.	06/04/2019	$1,750,000
Fruitridge Vista Water Company	02/04/2020	$20,750,000
Hillview Water Company, Inc.	06/23/2020	$6,500,000
East Pasadena Water Company	09/20/2021	$34,000,000

Response Provided By:	**Dane Watson**
Title:	**Principal**
Address:	**Alliance Consulting Group** **1410 K Ave # 1105A** **Plano, TX 75074**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC-04**
Company Number:	**Cal ADV ISC 04 Q005**
Date Received:	**September 9, 2022**
Date Response Due:	**September 23, 2022**
Subject Area:	**Depreciation Info I**

DATA REQUEST:

5. For the Depreciation Rate Study (December 31, 2020) included as Attachment 6 to the Owens Testimony
   a. Provide Appendices A - E in excel format for all districts and the corporate office with all underlying formulas, inputs and outputs, multipliers, and calculations intact.

CAL-AM'S RESPONSE

5.
   a. See attachments as follows:
      - Appendix A – see CAW Response Cal Adv ISC 04 Q005 Attachment 01
      - Appendix A1 – see CAW Response Cal Adv ISC 04 Q005 Attachment 02
      - Appendix B – see CAW Response Cal Adv ISC 04 Q005 Attachment 03
      - Appendix C – see CAW Response Cal Adv ISC 04 Q005 Attachment 04
      - Appendix D-1 – see CAW Response Cal Adv ISC 04 Q005 Attachment 05
      - Appendix D-2 – see CAW Response Cal Adv ISC 04 Q005 Attachment 06
      - Appendix E – see CAW Response Cal Adv ISC 04 Q005 Attachment 07

Attachment 1-2: Cal Am's Response to Cal Advocates' Data Request ISC- 004, Q002 Attachment 1

CAW Interviews

Central Division Interviews 1-24-2022
1540 Monterey
1542 Monterey Waste Water
1548 Toro
1549 Garrapata

Wes Owens, Christopher Cook, Tim O'Halloran, Lakhjit Thind, Mark Hernandez,

Mains - the Monterey peninsula has not been growing "water wise" for a while – unlike LA. Fire flow is the only real reason to change capacity. They did install a large pipeline in recent years (36" for about 7 miles). They see no operational reason to see the life shorter than from the currently approved life. A life in the high 70s or low 80's would be reasonable from an operational standpoint. A few hundred leaks per year for mains and services is not unusual. Will clamp or replace small sections.

Services – very few additional services. Only replacing services as needed and try to renew if there is a leak. A little over 40k services and it will be relatively static. Only "lots of record" are allowed to have new services (a few dozen total) if they comply with other regulations. There are a fair amount of galvanized services that need to be replaced over time. Allknown Polybutylene has been replaced (had a very short life). Moved to Polyethylene. Life of a service is shorter than the life of a main. Smaller pipe take more velocity and wear faster. Type of service will also be a factor. Galvanic corrosion and brittleness of plastic are drivers of retirement. Copper can have kinks and will cause leaks eventually. More people will dig through services also. In the past year, got to over 90% of service leaks will trigger the replacement of the service. Depending on the type of services, some would be shorter than the approved (e.g. galvanized). More research will be done by operations on a reasonable life.

Reservoirs and ground level tanks – 2 reservoirs are out of service. The short life in the analytics is likely due to the rehab of the tanks, not the full life of the tank. Majority of distribution tanks are metal. Of the metal tanks, most are welded (which tend to last longer that panel tanks). Tanks may last 60-75 years with proper maintenance. Reservoirs should have around the same average life. Around 100 tanks in the system. In the past several years, did a lot of retrofitting on tanks that may have skewed the analysis in the past compared to the steady state. No elevated tanks in Monterey. Earthquakes, foundations and corrosion are issues for tanks. With proper maintenance and design, tanks should have a long life. The current life is still reasonable for the tanks on the system. The 30-year indications are too short.

Pumping Equipment – Would expect a 20-25 year average life for pumping equipment. A lot of challenges with the electrical supply. There are still a lot of systems on 3-wire systems (which would stress the motors). There are a lot of challenges with pumping conditions – will shorten the life when the hydraulics are not good. This is one of the most complex systems in the US. Pumps and motors run very hard – too much on/off for example. They are lucky to get 10-15 years out of the electrical equipment (e.g. motors) in this area – both the stress on the system and the salt environment. Starting to take more active conditioning of the electrical components – may expect to see a slightly longer life in

the future. This type of asset should have a consistent life across all divisions (maybe a slightly higher life in Sacramento due to more heat). This may need to be run as a combined system.

Wells – Motor or major part replacement is capital. There is no operational reason for the life to move longer than currently approved. Drilled a number of wells in 2004-2006 and some (all?) are already showing signs of degradation. In some aquifers, the wells will plug fairly quickly.

Supply mains – would have the same relative life as the T&D mains. There was a number of assets retired with the Dam and more are to be removed and not replaced. The shorter life seen in the analysis is not operationally reasonable. The currently approved life is reasonable.

Water Treatment – Non media – Pressure filters 60 years or longer, Analyzers 2-5 years, chemical feed pumps 2-5 years, filter control valves 7-10 years, water level and control instrumentation 10 years, reclaim pumps 10-15 years, tanks 30-40 years for poly tanks, open concrete basins 50 years, metal tanks 50-65 years. Around 40 year average for the mix of short and long lived life may be reasonable. It depends on the investment mix in the account for the district. They are refurbishing the Begonia plant at close to the 40 year mark.

Structures and Improvement – Treatment – 50 years is very reasonable (between 40 and 60 years).

Southern Division Interviews 1-24-2022

1530 Coronado (San Diego)
1550 Los Angeles
1551 Village (Ventura)
1557 Rio Plaza

Started condition-based assessments for Mains around 2009-2010 and later (2012 and 2019) (Coronado and LA – only pump station for Ventura). This started stretching the lives out. The expectation is that the lives will lengthen a little over time. Company would suggest an average of 75 or 80 years. In LA, there is more “redevelopment” than some of the other districts. In San Diego, there is more new development. In Ventura, there is more new development than LA. This may cause earlier replacement of assets in certain classes of property in LA than in other districts. Every second GRC, they will target new condition-based assessments. They are not quite at the replacement rate in LA as they need to be – this may be affecting the analytics.

Did condition based assessment for pumping capacity. San Diego and Ventura have no wells. San Diego has not material pumping or booster stations. LA has a lot of older facilities – replacing pumps/motors that are inefficient due to SCE rebates for replacements (Ventura (20-40 years old) would have some of the same characteristics – only newer than LA (which are 40-60 years old). The motors and pumps would likely have been replaced over time. The condition-based assessments from the last GRC addresses both the replacement of pumps/motors and booster stations as well.

50 years is in a reasonable range for LA Water Treatment structures

CPUC estimate for average service life of water pumping equipment 40 (20-60 year range) for structures, 25 (15-35 range) for pumping equipment, and 20 (15-25 range) for other pumping equipment.

Current smaller diameter mains may not always meet current fire flow requirements and need to be replaced.

The general office building in Rosemead may be significantly remodeled or replaced in the next 5-10 years. Some smaller building structures have been replaced (some booster station structures). Two additional booster station replacements planned in the next 3 years.

Reservoirs – Steel tanks – they will do more refurbishments. LA has more concrete tanks (Ventura as well) than Coronado. Rosemead Reservoir has been placed in service – existing tank is being retired. One additional reservoir (Patton reservoir) is planned for replacement in the next 5 years – just obtained City approval. Will rehab tanks as appropriate – painting, sanding, relining below grade reservoirs, etc… There may be more coming.

306 – Intake (turnout) – 40 is reasonable for LA. Village is all purchased water – large trunk lines. Much of the assets in Village are SCADA (RTUs). El Rio has a well but is consolidated with LA.

307 – Wells – There are several wells that are older than 55 years – motors/pumps and sometimes packers/liners have also been replaced. There are several redrill/new well projects in process. They are seeing that more treatment is needed in the wells in LA. Adding treatment could have the effect of extending the life of the well. LA – with drought conditions, some wells are declining in pumping capacity (may have to rehab or drill wells deeper due that issue).

309 – Supply Mains – 70-year life for LA is reasonable. They don't see any operational reason for a different life for Village.

310 – Power Gen – life looks ok

3112 – Life looks reasonable – where booster stations are booked.

320 – Mainly chlorine dosing sites – Coronado does no dosing – all imported water (same for Ventura). Pumps may have a shorter life but the buildings and tanks may last 40 years.

330 – LA life for this account is reasonable.

331 – Mains – a 76-year average (mid-point) for a life is very reasonable.

333 – Services should have a shorter life than mains. More failures and leaks at connection points and materials. 50-60 years is reasonable. Village has different soil conditions and more plastic pipe (with corresponding higher leak and break rates) – creating shorter life expectations. Even copper in Village will have more leaks due to the corrosive soil.

3341 – Meters – verified meter replacement order from CPUC has not changed from 20 years. For smaller meters, they are still on a 15-year cycle. Ventura is looking at an AMI installation in the next couple years. In Southern California, they are on a 15-year change-out for larger meters but moving to the 20 year cycle.

334300 - Meter vaults include turnouts.

335 – Hydrants – They exercise 20% of hydrants every year. Hydrant replacement sometimes coincide with Fire Department testing or damage from vehicles, etc… Also, the Company will replace older hydrants (which have smaller diameter opening) with newer, larger diameter hydrants. They don't see any operational reason for the life to extend. Look to condition-based assessment for hydrants. They are replaced with main replacement projects.

Removal cost – generally use a percentage allocation to removal cost – varies based on type of pipe and conditions.

Northern Division interviews – 1-26-2022

Audie Foster, Christina Baril, Lacy Carothers, Mark Hernandez, Lakhjit Thind, Wes Owens

1560 Sacramento
1561 Larkfield
1562 Dunnigan Waste Water
1563 Dunnigan Water
1564 Geyserville
1565 Meadowbrook
1566 Fruitridge
1567 Hillview

Acquired new assets (Fruitridge - FRV) in January 2020. They have spent a large $ to repair system. Around 4800 customers – around 3k are unmetered. A lot more work is still needed. Most of the work is still in CWIP (around $14M). Primarily built-up post WWII. Materials are poor, maintenance was not robust, etc.

Northern division is somewhat similar to Southern. There are several noncontiguous systems. Build by different developers at different times prior to the purchase by Citizens, and subsequently purchased by CAW.

Reservoirs – Since 2016, Sacramento has built 3 additional tanks. In Larkfield, the oldest tank was burned down (perhaps 60-70 years at minimum). Refurbishments are capitalized but painting is not capital. They are replacing 2 tanks in Geyserville next year. They are replacing all tanks in Hillview.

Mains - No operational reason to see lives increasing. A lot of the acquisitions over the last several years have been in the Northern Division. The acquisitions were generally of older assets. State-wide, they are trying to increase the replacement rate for assets. The largest portion of Sacramento assets will be replaced at the 70- or 80-year point at maximum. Most are post WWII. Some of Monterey assets may have been installed even earlier.

Supply Mains – They would not see any material difference in life from TD mains.

Services – The Tubbs wildfire highly affected the Larkfield system (over 600 homes were destroyed). This would drive a shorter life for services. Sacramento (2008-2013) did a meter replacement program. Service saddles are the weak link in services. The material has gotten better over the years. Asbestos concrete mains can have saddles that fail more frequently. In GRC, there is a project to replace service saddles (and line). They would expect a shorter life than mains (perhaps a 15-20 years difference). They have a number of back yard main replacement projects where the services would be replaced as well. Meter set is where ownership changes.

Meters – CPUC General Order 103A – 20-year life (5/8/ and ¾). Bigger meters have a shorter life. 50k would be residential customers. 2009-2013 – did an unmetered to metered program and another will start soon.

Pumping Equipment – Equipment includes a variety of assets at a well site. The acquisitions would have older assets. They have been doing a lot of replacements on motor controls. Motor controls can last 15-20 years. There is no operational reason to increase the life of this account. Increasing efficiency may decrease the lifecycle of the equipment.

Hydrants – maintain on a regular basis. There is no operational reason for a movement in life.

Vehicles – there are $900k (43% percent of total) in lease buyout vehicles. They will set up a separate subaccount. Maybe a 5-year amortization. 2014 and 2015 vehicles.

Attachment 2-1: Cal Am's Response to Cal Advocates' Data Request ISC-011

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service by $55,771,300 or 18.71% in the year 2024, by $19,565,300 or 5.50% in the year 2025, and by $19,892,400 or 5.30% in the year 2026.	A.22-07-001 (Filed July 1, 2022)

CALIFORNIA-AMERICAN WATER COMPANY'S RESPONSE TO PUBLIC ADVOCATES OFFICE'S DATA REQUEST ISC 11

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Attorneys for California-American Water Company

Dated: November 16, 2022

California-American Water Company (U-210- W; "California American Water," "CAW" or the "Company") hereby sets forth the following objections and responses to Public Advocates Office's ("Cal Advocates") Data Request ISC 11 ("Data Requests" or "RPD"), propounded on November 2, 2022, in A.22-07-001.

RESERVATION OF RIGHTS

1. California American Water's investigation into the Data Requests is ongoing. The Company reserves the right, without obligating itself to do so, to supplement or modify its responses and to present further information and produce additional documents as a result of its ongoing investigation.

2. Any information or materials provided in response to the Data Requests shall be without prejudice to California American Water's right to object to their admission into evidence or the record in this proceeding, their use as evidence or in the record, or the relevance of such information or materials. In addition, California American Water reserves its right to object to further discovery of documents, other information or materials relating to the same or similar subject matter upon any valid ground or grounds, including without limitation, the proprietary nature of the information, relevance, privilege, work product, overbreadth, burdensomeness, oppressiveness, or incompetence.

GENERAL OBJECTIONS

1. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they purport to impose upon California American Water any obligations broader than those permitted by law.

2. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they improperly seek the disclosure of information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privilege or doctrine, and/or the client confidentiality obligations mandated by Business and Professions Code Section 6068(e)(1) and Rule 3-100(A) of the California Rules of Professional Conduct. Such responses as may hereafter be given shall not include information protected by such privileges or

doctrines, and the inadvertent disclosure of such information shall not be deemed as a waiver of any such privilege or doctrine.

3. California American Water objects to the Data Requests to the extent that the requests are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, unreasonably expensive, oppressive, or excessively time consuming to California American Water.

4. California American Water objects to the Data Requests to the extent they seek documents that are and/or information that is neither relevant nor material to this proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

5. California American Water objects to the Data Requests to the extent they seek an analysis, calculation, or compilation that has not previously been performed and that California American Water objects to performing.

6. California American Water objects to the Data Requests insofar as they request the production of documents or information that are publicly available or that are equally available to Cal Advocates because such requests subject California American Water to unreasonable and undue annoyance, oppression, burden and expense.

7. California American Water objects to the Data Requests to the extent the requests are vague, ambiguous, use terms that are subject to multiple interpretations but are not properly defined for purposes of the Data Request, or otherwise provide no basis from which California American Water can determine what information is sought.

8. The objections contained herein, and information and documents produced in response hereto, are not intended nor should they be construed to waive California American Water's right to object to the Data Requests, responses or documents produced in response hereto, or the subject matter of such Data Requests, responses or documents, as to their competency, relevancy, materiality, privilege and admissibility as evidence for any purpose, in or at any hearing of this or any other proceeding.

9. The objections contained herein are not intended nor should they be construed to waive California American Water's right to object to other discovery involving or relating to the subject matter of the Data Requests, responses or documents produced in response hereto.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Patrick Barrett**
Title:	**Insurance and Enterprise Risk Management Analyst**
Address:	**American Water Works Service Company, Inc. 1 Water Street Camden, NJ 08102**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 11**
Company Number:	**Cal ADV ISC 11 Q001**
Date Received:	**November 2, 2022**
Date Response Due:	**November 17, 2022**
Subject Area:	**Earthquake Insurance Info**

DATA REQUEST:

1. The questions below relate to the proposed earthquake insurance policy described in the Direct Testimony of Stephen (Wes) Owens, July 1, 2022 ("Direct Testimony) at 18 to 20:
   a. Please provide a copy of the proposed Earthquake Insurance policy.
   b. Is the proposed $25 million deductible on the proposed Earthquake Insurance policy per incident or per year? Please explain what period the deductible covers (i.e., annual) and the number of incidents per year that are covered.
   c. Is the proposed $10 million policy limit on the proposed Earthquake Insurance policy per incident or per year? Please explain what period the policy limit covers (i.e., annual) and the number of incidents per year that are covered.
   d. Please describe what damages are covered by the proposed Earthquake Insurance policy in the event of an earthquake.
   e. Please describe what damages are excluded from coverage by the proposed Earthquake Insurance policy in the event of an earthquake.
   f. Please provide an estimate of the value of the assets that would be covered by the proposed Earthquake Insurance policy.
   g. Would the proposed Earthquake Insurance policy cover damages to all Cal Am assets that "do not reside on fee simple parcels or properties" (underground assets) in the event of an earthquake? (Owens Testimony at 18.) Please explain.
   h. Would the proposed Earthquake Insurance policy cover damages to any real or personal property owned and/or controlled by Cal Am other than the underground assets, in the event of an earthquake? Please explain.

i. Would the proposed Earthquake Insurance policy cover damages to Cal Am's employees in the event of an earthquake?
j. Would the proposed Earthquake Insurance policy cover damages to anyone other than Cal Am's employees in the event of an earthquake? If so, describe the other people who would be covered by the proposed Earthquake Insurance policy.

CAL-AM'S RESPONSE

a. We do not have a policy specimen.
b. Proposed deductible is per event. It covers all events for the policy period. Coverage is provided until the $10 million has been paid out.
c. Proposed limit is annual. Coverage is provided until the limit has been paid out.
d. First party property damage and business interruption to underground pipes.
e. Typical exclusions under a commercial property insurance policy.
f. An estimate of the underground pipe assets proposed to be covered is approximately $4 billion.
g. No. This policy would cover the underground pipes in California.
h. No.
i. No.
j. No.

Attachment 2-2: Direct Testimony of Stephen (Wes) Owens (July 18, 2019), A.19-07-004 (PUBLIC) at 21

Compensation costs were capitalized based on the projected capitalization rates determined in the labor analysis workpapers.

The exception to using the escalation factors was the use of a projected increase to the Company's Property Insurance coverage for 2020. The Company is projecting an increase of at least 25% for 2020. This increase is being driven for a number of reasons. The Company's property insurance program is at the end of a four year rate guarantee where premiums (using a set rate) did not adjust unless the insured values increased greater than 5%. On 1/1/2020, the property insurance rates will be adjusting to current market conditions along with a readjustment of the insurable values. The projected 25% increase for 2020 was provided by the Company's broker given the insurance program and current property insurance markets.

Q45. Please discuss the inclusion of Earthquake Insurance in the Company's projected IOTG Expense.

A45. California American Water operates within one of the most seismically active states in the United States of America. Potential damage to California American Water assets that do not reside on fee simple parcels or properties, such as distribution system mains, valves and hydrants are not covered by any of California American Water's existing insurance policies. In order to mitigate the risk associated with potential earthquake damage the Company has identified an earthquake insurance policy that provides coverage for underground assets. The policy pays out based on the magnitude earthquake (i.e. the event trigger) and the size of the loss sustained. Thus, the higher the magnitude earthquake and the relative direct or indirect loss the higher the potential payout. Payout is capped at $50M for the policy term. The premium is $4.225M for the three year term covering 2021-2023. This policy term is amortized over the three year GRC cycle within the RO Model.

Attachment 2-3: Report and Recommendations on California American Water Company's Safety, Water Quality, Service Quality and Compliance With Commission Rules, A.19-07-004 (Public)

Docket:	:	A.19-07-004
Exhibit Number	:	Cal Advocates - ____
Commissioner	:	Genevieve Shiroma
Administrative Law Judge	:	Gerald F. Kelly
Cal Advocates Witness	:	Cameron Reed

REPORT AND RECOMMENDATIONS ON CALIFORNIA AMERICAN WATER COMPANY'S SAFETY, WATER QUALITY, SERVICE QUALITY AND COMPLIANCE WITH COMMISSION RULES

Application 19-07-004

PUBLIC VERSION

San Francisco, California
February 18, 2020

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MEMORANDUM

The requests and data presented by California American Water ("Cal Am") in Application ("A.") A.19-07-004 were examined in order to provide the Commission with recommendations that represent the interests of ratepayers for safe and reliable service at lowest cost. Mukunda Dawadi is Public Advocates Office's project lead for the proceeding. Richard Rauschmeier is the oversight supervisor and Kerriann Sheppard and Robyn Purchia are legal counsels.

Although every effort was made to comprehensively review, analyze and provide the Commission with recommendations on each ratemaking and policy aspect presented in the application, the absence from the Public Advocates Office's testimony of any particular issue does not necessarily constitute its endorsement or acceptance of the underlying request, methodology, or policy position related to that issue.

CHAPTER 1: SAFETY

A. INTRODUCTION

As a public utility, California-American Water Company (Cal Am) is obligated to provide safe and reliable service. As part of its review of Cal Am's General Rate Case (GRC) application, the California Public Utilities Commission (Commission) should examine Cal Am's emergency preparedness and ability to operate safely.

Public Utilities Code (Pub. Util. Code) Section (§) 451 requires that each utility furnish and maintain adequate services, equipment, and facilities to provide for safe service.[1] Both the United States Congress, in the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (2002 Bioterrorism Act), and the California Legislature, in Assembly Bill 1650 on Public Utilities: emergency and disaster preparedness, recognize that planning responses for emergencies and disasters are critical for ensuring public safety.[2] The California Legislature codified this requirement in Pub. Util. Code §768.6 directing the Commission to establish standards for emergency preparedness plans (EPPs) that Class A water utilities are required to follow.[3] The Assigned Commissioner's Scoping Memo and Ruling (Scoping Memo) recognizes Cal Am's obligation to

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[1] Pub. Util. Code § 451.

[2] 2002 Bioterrorism Act - Title IV – Drinking Water Security and Safety directed community water systems to conduct a vulnerability assessment and prepare an emergency response plan.

[3] Pub.Util. Code §768.6 (f)(1) – "A water company regulated by the commission shall develop, adopt, and update an emergency and disaster preparedness plan in compliance with the standards established by the commission..."

1 provide safe and reliable service by asking whether there are any safety issues the
2 Commission needs to address.[4]

3 An emergency plan outlines a written methodology for responding to
4 emergencies and contains contact information for internal and external resources.
5 The emergency plan should help assure that the company is best able to protect
6 life and infrastructure during an emergency, as well as contain the information
7 needed to ensure continuity of operations and services.[5] A company needs to
8 review the information within an emergency plan to keep it relevant and useful.
9 Companies should regularly update the emergency plan to correct outdated
10 information and to account for new hazards and threats. Emergency planning also
11 includes preparations undertaken before an emergency to hardened infrastructure
12 to make it more resilient to disruption. Companies should also ensure any steps
13 taken to mitigate or prepare for disasters are reasonable, which includes periodic
14 review of older mitigating measures. Recently, the United States Congress passed
15 the America's Water Infrastructure Act of 2018 (AWIA) which requires all
16 community water systems serving 3,300 or more customers to conduct a risk
17 assessment.[6] Following the risk assessment, the AWIA directs these community
18 water systems to revise their emergency plans to incorporate and address any
19 findings from the risk assessments.[7]

20 The following testimony examined Cal Am's General Rate Case (GRC)
21 Application (A.)19-07-004, responses to data requests, discussions with engineers

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[4] Scoping Memo Question 7.

[5] CPUC GO-166: Purpose http://www.cpuc.ca.gov/gos/GO166/GO166_startup_page.html.

[6] American Water Infrastructure Act of 2018 section 1433 (a).

[7] American Water Infrastructure Act of 2018 section 1433 (b).

from the Division of Drinking Water at the California Water Resources Control Board (DDW), and publicly available sources and standards to evaluate Cal Am's safety preparedness and practices.

B. SUMMARY OF RECOMMENDATIONS

The Commission should adopt the following recommendations to improve Cal Am's emergency preparedness and take reasonable steps to prepare for future emergencies:

- Cal Am should complete their missing emergency plans for scenarios 19, 20, 21, 22, and 23 and submit revised emergency plans to the Commission within 90 days of the issuance of the decision resolving this GRC.
- Cal Am should schedule, conduct, and keep records of emergency exercises including evacuation drills and emergency operations center exercises by its next GRC.
- The Commission should reduce Cal Am's proposed Insurance Other Than Group (IOTG) Expenses budget by $4.225 million dollars (Amortized over 2021, 2022, and 2023) because Cal Am's proposed earthquake insurance policy is unreasonable.
- Cal Am should create a portable generator emergency plan to distribute and deploy portable generators to its service areas to maintain power during an emergency including a plan for Public Safety Power Shutoffs (PSPS).
- The Commission should make the adjustments to Cal Am's proposed generator projects outlined in the testimony of the Public Advocates Office's witness, Justin Menda to remove $2,154,079 from rate base in 2021 and $2,995,054 from rate base in 2022 concerning standby generator improvement proposed projects in Los Angeles, Monterey, Ventura, and Sacramento.

C. DISCUSSION

Cal Am's districts' emergency plans, testimony, and safety proposals have significant gaps. While Cal Am has developed tools and protocols for improving day-to-day safety, such as its safety management system and near miss program,[8] its long-term planning shows gaps in planning responses to operational threats and in documenting emergency drills. Furthermore, Cal Am has proposed to recover $4.225 million in IOTG Expenses for an unreasonable earthquake insurance policy. Cal Am has also included numerous new generator projects in the proposed revenue requirement despite having a large inventory of existing portable and stationary generators without conducting a portable generator planning study to consider alternatives other than installing stationary generators.

As discussed further below, Cal Am should remedy gaps in its emergency planning, the Commission should remove $2,154,079 from rate base in 2021 and $2,995,054 from rate base in 2022 concerning standby generator improvement proposed project, and the Commission should remove Cal Am's proposed $4.225 million earthquake insurance from the IOTG expense budget.

1) Cal Am's Emergency Plan Lacks Critical Information and Its Districts' Emergency Plans Should be Updated.

Cal Am organizes its emergency planning by district and has a written plan for each district. These plans contain both general and specific information about Cal Am's response to an emergency and are generally robust. The emergency plans contain between **<<Begin Confidential>>** [redacted] **<<End Confidential>>** incident specific action plans for various threats and hazards along with necessary contact information, records of drills, and mutual aid information. However, some of Cal Am's action plans are blank and incomplete leaving potential threats

[8] A.19-07-004 Cal Am 2019 GRC Direct Testimony of Mr. Garry Hofer at p. 36.

without plans or prepared responses. Furthermore, Cal Am generally has not verified completion of emergency drills since **<<Begin Confidential>>** [redacted] **<<End Confidential>>**. These are significant gaps in emergency preparedness that Cal Am should remedy immediately.

Cal Am should update and complete its emergency plan because threats evolve and change annually. For example, the Department of Homeland Security has phased out its color-coded terror alert levels for biannual bulletins in 2015 that document how threats change such as terrorists using social media coordination and the rise of homegrown terrorists.[9] Furthermore, cyber attackers have increasingly targeted water utilities in recent years.[10] Both industrial control systems and utility computer networks are vulnerable. Water utilities in other states have been subject to cyber-attacks in 2018 and in 2019, including a sophisticated ransomware attack that wiped out a North Carolina water utilities' computers and databases.[11] The American Water Works Association (AWWA) recognized cybersecurity as a top priority for the water and wastewater sectors. The AWWA notes in a 2019 report on cybersecurity risk that cyberattacks are the top threat facing business and critical infrastructure in the United States.[12] The

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[9] The Bulletin for July 2019 can be found here:

https://www.dhs.gov/sites/default/files/ntas/alerts/19_0718_ntas-bulletin_0.pdf

[10] Water Utilities are 'The New Target of Cyber Attacks"

https://www.waterisac.org/portal/water-utilities-are-%E2%80%9C-new-target-cyber-attacks%E2%80%9D-according-annual-cyber-threat-report

[11] "Hackers force Water Utilities to Sink or Swim" E&E News

https://www.eenews.net/stories/1060131769

[12] The AWWA Cybersecurity Risk and Responsibility in the Water Sector Report can be found here:

(continued on next page)

AWWA noted that "a robust and tested cybersecurity program is critical to protect public health and safety."[13] It is critical that utilities consider and plan for these evolving threats each time it reviews its emergency plan.

(a) Cal Am Should Update Its Districts' Emergency Plans to Complete Action Plans 19, 20, 21, 22, and 23.

Cal Am has **<<Begin Confidential>>** [redacted] **<<End Confidential>>** action plans within its July 2019 Los Angeles Emergency Response Plan (ERP). Action Plans (AP) are described as a **<<Begin Confidential>>** [redacted] **<<End Confidential>>**.[14] Table 1-1 Summarizes these APs within the Los Angeles ERP and their status.

Table 1-1: Summary of Cal Am Emergency Action Plans

<<Begin Confidential>>

[redacted]

https://www.awwa.org/Portals/0/AWWA/Government/AWWACybersecurityRiskandResponsibility.pdf?ver=2018-12-05-123319-013

[13] AWWA Cybersecurity Risk and Responsibility in the Water Sector at p. 5.

[14] Exhibit C-1 – Cal Am Los Angeles District Emergency Response Plan Appendix B at p. B-1.

[redacted]

<<End Confidential>>

Table 1-1 illustrates that Cal Am has gaps in preparing specific responses to the hazards it has identified as present and relevant to its operations including **<<Begin Confidential>>** [redacted] **<<End Confidential>>**. Figure 1-1 is an example which demonstrates that some of these action plans are simply blank.

Figure 1-1: Los Angeles ERP Cal Am AP 22[15]

<<Begin Confidential>>

[redacted]

<<End Confidential>>

It is imperative that emergency planning is done before an emergency occurs. The Commission should direct Cal Am to complete APs 19, 20, 21, 22, and 23 as it completes its new vulnerability assessment pursuant to the America's Water Infrastructure Act of 2018, include these action plans within its new ERPs, and submit the updated ERPs to the Commission within 90 days of the adoption of a decision resolving this GRC.

[15] Exhibit C-1 – Cal Am Los Angeles District Emergency Response Plan Appendix B at B22-1.

(b) Cal Am Should Schedule and Document Annual Emergency Drills.

Cal Am's ERPs document emergency drills and exercises that the company conducts to prepare for disasters.[16] This documentation includes after action reports with descriptions and notes taken during the exercise.[17] Cal Am's Los Angeles ERP shows that completion of these emergency drills stopped being documented in **<<Begin Confidential>>** [redacted] **<<End Confidential>>**. Annual drills are important as they allow Cal Am to rehearse responses to emergencies in a safe environment before the occurrence of an actual emergency. This allows Cal Am's employees to become familiar with specific action plans, learn where improvements are needed, and increases the effectiveness of emergency responses. The Commission should direct Cal Am to resume conducting and documenting annual emergency evacuations, fire drills, and emergency operations centers exercises.

2) The Commission Should Remove $4.225 Million in IOTG Expenses Because Cal Am's Proposed Earthquake Insurance Policy is Unreasonable.

Cal Am has requested $4.225 million in IOTG expenses, amortized over three years, for an earthquake insurance policy. The insurance policy term is three years. The payout for this plan scales with the size of the earthquake, and damage sustained and is capped at a $50 million maximum payout.[18] Cal Am generally described the earthquake insurance as covering assets not located on fee simple

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[16] Exhibit C-1 – Cal Am Los Angeles District Emergency Response Plan at p. 6.

[17] Exhibit C-1 – Cal Am Los Angeles District Emergency Response Plan at Appendix M.

[18] A.19-07-004 Cal Am 2019 GRC Direct Testimony of Wes Owens at p. 21.

1 parcels or properties such as water mains.[19] As discussed further below, the
2 Commission should exclude this unreasonable expense from the revenue
3 requirement.

4 Generally, insurance is contingency planning focused on mitigating
5 potential financial risk by guaranteeing compensation for loss in exchange for a
6 premium paid before a potential damaging event occurs.[20] To evaluate the
7 reasonableness of such a contingency, the Commission should look at all the
8 factors that go into such contingency planning, including the hazard posed to Cal
9 Am by earthquakes, the potential for damage, the compensation guaranteed, the
10 circumstances of said compensation being awarded, and the cost of the premium.
11 The relationship between these factors dictates the extent of the financial risk to
12 Cal Am's operation and how effective the earthquake insurance would be at
13 mitigating said financial risk. The sections below explore these factors in more
14 detail.

15 **(a) Cal Am's Northern and Central Divisions Have Lower**
16 **Hazard from Significant Earthquakes.**

17 The National Centers for Environmental Information (NCEI) of the
18 National Oceanic and Atmospheric Administration (NOAA) maintains a
19 Significant Earthquake Database with records on earthquakes from 2150 B.C. to

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[19] A.19-07-004 Cal Am 2019 GRC Direct Testimony of Richard Svindland at p. 16. In this context Fee simple parcels are parcels of land that Cal Am has the title to. As such, the insurance policy would cover infrastructure on land that Cal Am does not own.

[20] Department of Homeland Security Ready.gov "Insurance is Financial Risk Mitigation" and Investopedia "Insurance policies are used to hedge against the risk of financial losses, both big and small, that may result from damage to the insured or [their] property."

present day.[21] The database contains information on earthquake magnitude, the geographic location of the quake's epicenter, and date. Overall, the database provides a picture of where significant earthquakes happen around the world. The NOAA database provides a specific view of earthquakes in California as well. This data shows Cal Am's northern and central districts face lower hazard from significant earthquakes.

Geographic Information System (GIS) analysis of Cal Am's service territory and the database information shows the proximity of Cal Am's water systems to major earthquakes. GIS analysis results shows that aside from a 4.8 magnitude earthquake that occurred in 1969 four miles from Larkfield, Cal Am's northern and central divisions are not close to California's historic, significant earthquakes.[22] Generally, earthquakes will cause less damage to infrastructure the more distance between that infrastructure and the epicenter of an earthquake. While earthquakes do not behave uniformly, the Commission can examine previous earthquakes to understand the potential impact of future earthquakes.

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[21] National Geophysical Data Center / World Data Service (NGDC/WDS): Significant Earthquake Database. National Geophysical Data Center, NOAA. https://www.ngdc.noaa.gov/nndc/struts/form?t=101650&s=1&d=1 last visited 2/3/20. A significant earthquake is defined as either: Causing $1 million or more in approximate damage, causing 10 or more deaths, having a magnitude of 7.5 or greater, a Modified Mercalli Intensity of X or greater, or causing a tsunami. Exhibit C-21 includes a table summarizing California's historic significant earthquakes with a recorded magnitude.

[22] Attachment 1 provides the Public Advocates Office's rendered maps of Cal Am's service territory and the Earthquake Database.

As an example, the 2019 Ridgecrest earthquake which occurred on a fault line approximately 11 miles into the desert outside of Ridgecrest.[23] Another example is the 1994 Northridge earthquake in Los Angeles which exhibited very strong shaking according to the Modified Mercalli Intensity (MMI) scale capable of causing moderate damage up to 12.5 miles from the epicenter.[24] These earthquakes serve as reference points to examine the financial risk posed to Cal Am's water systems by historic, significant earthquakes. Generally, Cal Am's northern water systems are separated from the epicenters of recorded significant earthquakes by more than 11 miles. GIS analysis shows that none of the significant earthquakes within 25 miles of Cal Am's northern or central division systems have been at or above a 6.5 magnitude. This means Cal Am's northern California service areas are outside of the areas where the two example earthquakes would cause significant damage. While earthquakes are not uniformly consistent across the state and damage from earthquakes can vary based on many factors such as ground conditions and fault type, the lower magnitude and larger distances of historic earthquakes relative to Cal Am's northern and central districts illustrates Cal Am's hazard from significant earthquakes is lower than in its southern California districts.

Similarly, GIS analysis can approximate the significant earthquake hazard in Cal Am's southern California districts. The data shows that Cal Am's southern

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[23] Eleven miles is picked as a representative distance based on the damage done by the recent 7.1 magnitude Ridgecrest earthquake which had an epicenter approximately 11 miles into the desert. The 7.1 earthquake was preceded by a 6.4 magnitude earthquake with a similar epicenter which did significantly less damage: https://www.cnbc.com/2019/07/06/powerful-southern-california-quake-second-in-two-days-causes-damage-injuries.html.

[24] See Figure 1-4 below which can also be found here: CISN ShakeMap for Northridge can be found here at: https://www.cisn.org/shakemap/sc/shake/Northridge/intensity.html

districts and water systems are closer to areas where significant earthquakes have occurred in the past than in the northern and central divisions. Figure 1-2 illustrates the significant earthquakes near Cal Am's southern California service territory.

Figure 1-2: Significant Earthquakes Near Cal Am's Southern Districts

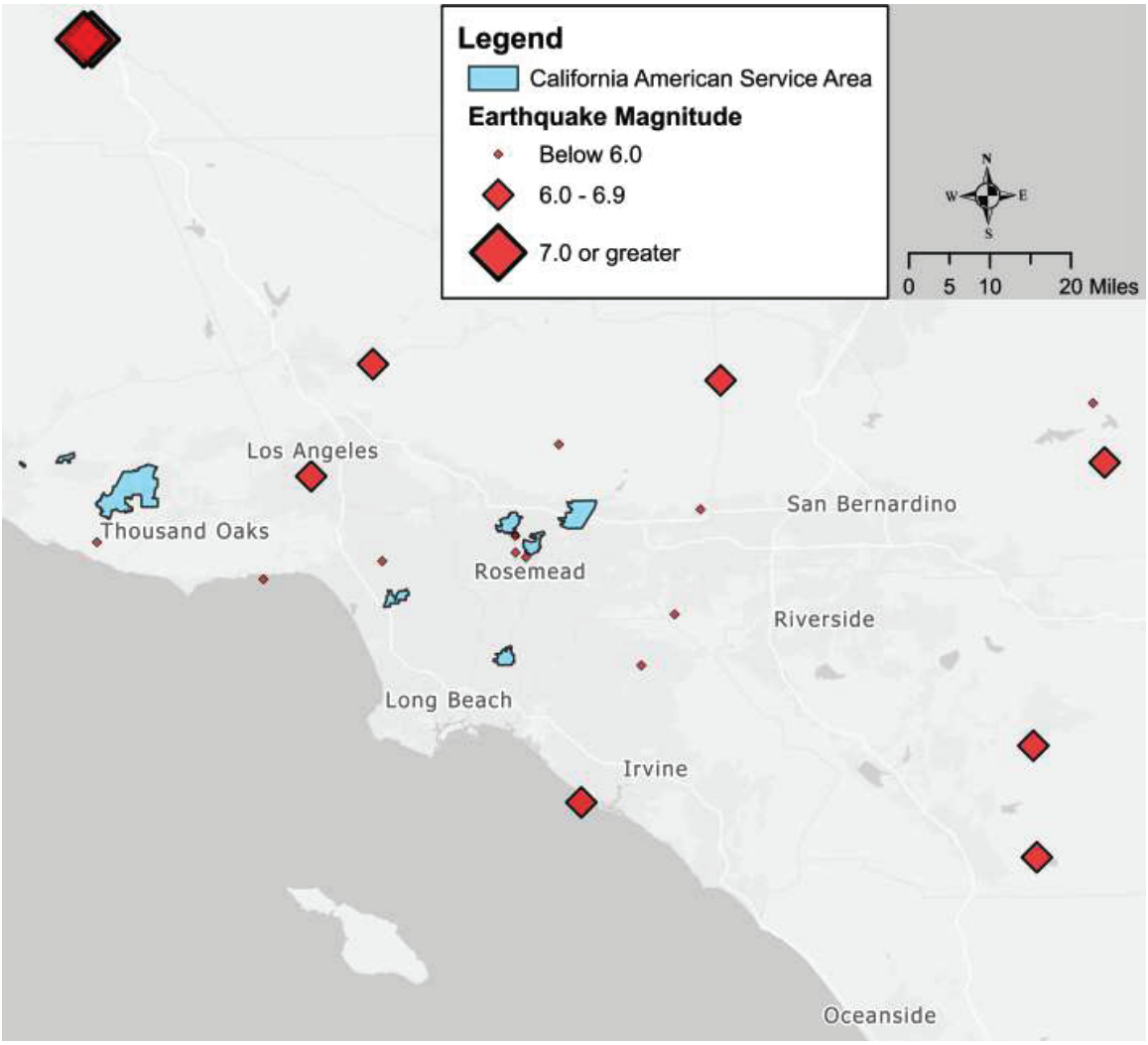


Figure 1-2 reveals several earthquakes within ten miles of Cal Am's southern California district service areas; Table 1-2 below summarizes these earthquakes magnitudes and the years they happened.

Table 1-2: Sample of Significant Earthquakes Near Cal Am's Southern California Systems

Year of Earthquake	Magnitude	Systems Nearby	Approximate Distance Epicenter to Centroid (Miles)
1855	6.0	San Marino	1.6
1885	6.0	Duarte	8.22
1987	5.7	San Marino	1.6
1987	5.7	Bellflower	12.64
1973	5.7	Thousand Oaks	8.82
1862	5.9	Coronado	10.11
1994	6.7	Baldwin Hills, Thousand Oaks, San Marino	18.5

Table 1-2 summarizes five earthquakes, including the 1994 Ridgecrest earthquake, and their proximity to Cal Am's service areas. Some earthquakes occurred within 11 miles of Cal Am's service territory but two of the largest earthquakes occurred over a century ago. For example, the gap between significant earthquakes near the San Marino service area is 122 years in frequency and the single significant earthquake that struck Coronado did so over 150 years ago. Furthermore, both Table 1-2 and Figure 1-2 demonstrate that the three earthquakes of magnitude 7.0 or higher occurred over 25 miles outside the Los Angeles metro area. This demonstrates a potentially high hazard of earthquakes in southern California, that the highest magnitude earthquakes occur outside the Los Angeles metro area, and that these earthquakes do not occur very often.[25]

Because the northern and central divisions face lower hazard of significant earthquakes, the following analysis of financial risk and the proposed mitigating factor will focus only on the southern California water systems that have higher

[25] Exhibit C-2 – UCERF3: A New Earthquake Forecast for California's Complex Fault System, Table 1. Updates to earthquake models indicate that the expected time between significant earthquakes has increased. The average time between 7.0 earthquakes in the Los Angeles region is 61 years.

earthquake hazards: Thousand Oaks, San Marino, Duarte, Baldwin Hills, Bellflower, and Coronado.

(b) Cal Am's Proposed Insurance Policy Would Not Cover Most Earthquakes Making the Policy Ineffective and Unreasonable.

The NOAA database confirms that Cal Am's southern California service areas are close to more significant earthquakes than Cal Am's other service territories; however, that alone does not make the proposed insurance policy reasonable. While the potential for damage exists along with clear hazard, the policy pay-out and triggering conditions will not lead to worthwhile compensation in any significant earthquake consistent with history.

Although Cal Am said it has yet to select an insurance plan, it requested recovery of $4.225 million in customer rates over three years. Under this plan, Cal Am's ratepayers would pay roughly $1.4 million each year for the amortized policy premiums. This requested value closely matches with the 3-year premium for **<<Begin Confidential>>** [redacted]. **<<End Confidential>>**[26] This insurance plan would pay out **<<Begin Confidential>>** [redacted] **<<End Confidential>>** Taking the policy into account, Figure 1-3 shows the significant earthquakes in the past that would have been eligible for compensation.

[26] Exhibit C-3 – Cal Am Response to Public Advocates Office Data Request YCC 04 Q006.a Attachment 1 Confidential

Figure 1-3: Los Angeles Area Earthquakes That Qualify for Coverage Based on Magnitude

<<Begin Confidential>>

[redacted]

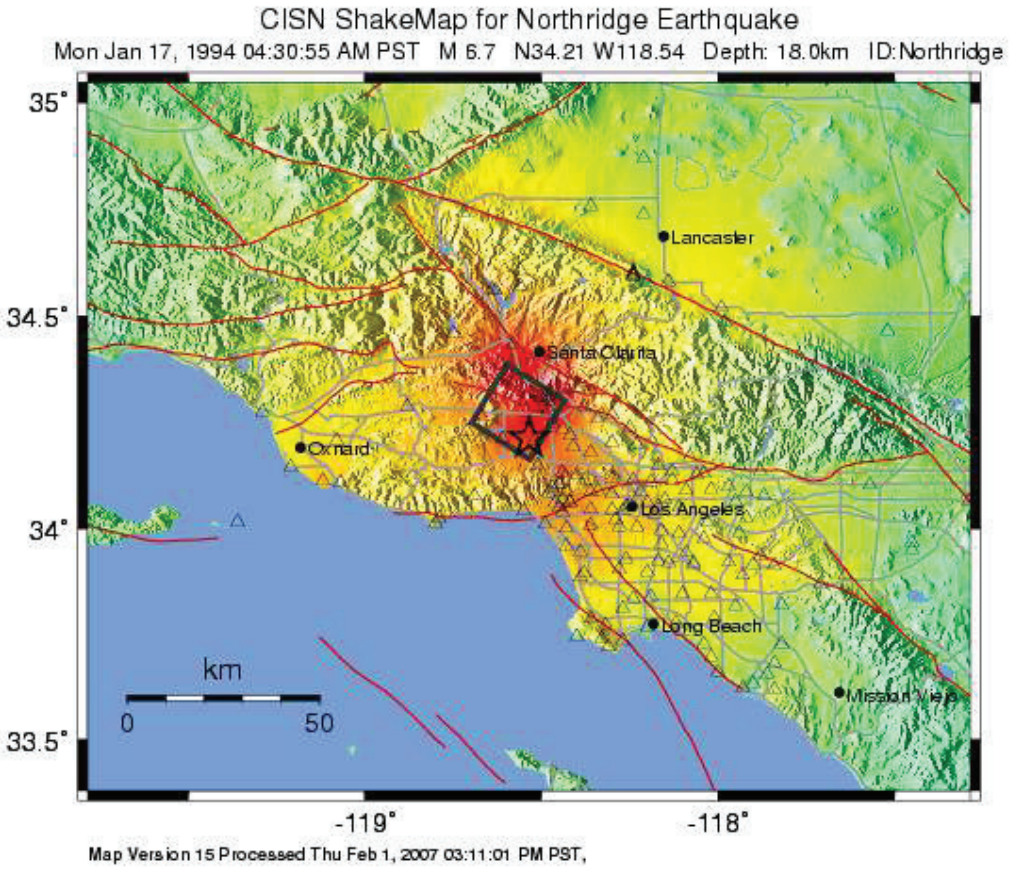
<<End Confidential>>

As demonstrated, the proposed policy is very limiting. Figure 1-3 shows that **<<Begin Confidential>>** [redacted] **<<End Confidential>>** only the 1994 Northridge earthquake and a 1971 San Fernando earthquake are close enough to Cal Am's territory to potentially cause damage that qualifies for compensation. Compensation is awarded only if the earthquake inflicts **<<Begin**

Confidential>> [redacted] [redacted] **<<End Confidential>>** At 6.7 magnitude, an earthquake on par with the Northridge earthquake would pay out **<<Begin Confidential>>** [redacted] **<<End Confidential>>** assuming it damages Cal Am's infrastructure at all.

This is further compounded by the distance between Cal Am's water systems and the two largest Los Angeles earthquakes. Figure 1-4 is a California Integrated Seismic Network (CISN) ShakeMap that illustrates why this distance is important.

Figure 1-4: CISN ShakeMap of the Northridge Earthquake[27]



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Figure 1-4 demonstrates the intensity of shaking caused by the Northridge earthquake and its potential to cause damage. Cal Am's southern California

[27] CISN ShakeMap for Northridge can be found here at:

https://www.cisn.org/shakemap/sc/shake/Northridge/intensity.html CISN has ShakeMaps for Eight Major Earthquakes including the San Fernando Earthquake:

https://www.cisn.org/shakemap/sc/shake/archive/major.html

service territory is over 15 miles from the epicenter of the 1994 earthquake and generally experienced between a VI (6) on the Modified Mercalli Index where the potential for damage is light to moderate. Based on historic data, it's possible that even if an earthquake occurred, the **<<Begin Confidential>>** [redacted] **<<End Confidential>>** would not trigger and Cal Am would not receive an insurance payout. This scenario would leave ratepayers potentially paying for both the disaster recovery and for the insurance premium.

<<Begin Confidential>> [redacted] **<<End Confidential>>**[28] described above is one of **<<Begin Confidential>>** [redacted] **<<End Confidential>>** earthquake insurance quotes that Cal Am attained as a gauge of market indications. The **<<Begin Confidential>>** [redacted] **<<End Confidential>>** for earthquake insurance that Cal Am received quotes for. The other options are **<<Begin Confidential>>** [redacted] **<<End Confidential>>** and have more onerous terms and conditions on the policy such as a **<<Begin Confidential>>** [redacted] **<<End Confidential>>**.[29] When considering the lower financial risk significant earthquakes pose to Cal Am's infrastructure and the cost of quoted insurance premiums to ratepayers, none of the quoted insurance plans provide a reasonable level of financial risk mitigation.

In summary, Cal Am's proposed earthquake insurance policy is unreasonable because its northern and central divisions do not face high financial

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[28] Exhibit C-3 – Cal Am Response to Public Advocates Office Data Request YCC 04 Q006.a Attachment 1 Confidential

[29] Exhibit C-3 – Cal Am Response to Public Advocates Office Data Request YCC 04 Q006.a Attachment 1 Confidential

risk from significant earthquakes and the policy will not adequately mitigate the financial risks significant earthquakes present in Cal Am's southern California districts. Furthermore, based on the insurance policy pay-out structure Cal Am's ratepayers would pay more in premiums than the policy would likely cover in **<<Begin Confidential>>** [redacted] **<<End Confidential>>**. For these reasons, the Commission should not provide advanced ratepayer funding of Cal Am's proposed $4.225 million in IOTG expenses (amortized over three years).

3) Cal Am Should Improve its Emergency Preparedness with a Comprehensive New Portable Generator Plan.

Cal Am has proposed several standby generator improvement programs for its California districts.[30] Cal Am states that it was important to transition to a permanent stand-by generator program and claimed that the only alternative to installing a plethora of fixed stand-by generators is to do nothing.[31] Cal Am uses this reasoning to justify roughly $10 million in proposed generator projects from 2019 through 2026.[32]

However, installing numerous back-up generators or doing nothing are not the only two options available. For example, Cal Am should reevaluate its approach to portable generators and how it can plan for PSPS events by distributing its portable generators more evenly among its Los Angeles service areas as opposed to centrally in the Rosemead operations center. Additionally, Cal

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[30] For Example, see the Los Angeles project in the A.19-07-004 Cal Am 2019 GRC Direct Testimony of Ian Crooks at p. 176.

[31] Exhibit C-5 – Cal Am Engineering Workbook Tab 028.

[32] A.19-07-004 Cal Am 2019 GRC Results of Operation Model Chapter 07 Plant Forecast at Tab "Y_CAPEX OTH By Project WS-2" under CAW Capital Expenditures Other Direct Costs for 2019-2022 for the stand-by generator improvement projects. Snapshot attached as Exhibit C-22.

Am already has a large inventory of existing fixed and portable generators that protect against power outages. Accordingly, the Commission should adjust Cal Am's proposed capital projects budget as described in the testimony of Justin Menda and referenced below.

Cal Am has an existing inventory of at least **<<Begin Confidential>>** [redacted] **<<End Confidential>>**[33] Table 1-3 summarizes Cal Am's emergency generator inventory.

Table 1-3: Cal Am's Emergency Generator Inventory

<<Begin Confidential>>

[redacted]

<<End Confidential>>

Table 1-3 shows that Cal Am has an existing inventory of portable and fixed generators. Table 1-3 also shows that these generators are distributed throughout Cal Am's districts with a significant number of generators in the Central and Northern districts, **<<Begin Confidential>>** [redacted]

[33] Exhibit C-4 – Cal Am Generator Inventory

[redacted] **<<End Confidential>>.**[34] Cal Am's portable generators in Southern California are mostly concentrated at either the **<<Begin Confidential>>** [redacted] **<<End Confidential>>.**[35] These generators provide protection for Cal Am's operations in the event of commercial power outages. Generally, Cal Am has installed generators for back-up power at its treatment plants, pump stations, and wells.[36] However, the recent PSPS events are not typical commercial power outages. PSPS events are noticed proactive shutoffs that should be addressed differently than standard contingency planning for commercial power outages.

Typically, PSPS events are preceded by 24 to 48 hours of notice by the power company.[37] This allows one to two working days to deploy portable generators to affected areas to keep systems operational during the power shutoffs. A PSPS action plan would augment Cal Am's readiness by identifying which sites within a district need portable generators in the event of a PSPS. Furthermore, working with local electric utilities to receive priority notifications would further increase the amount of time available to acquire and deploy portable generators.

In addition, not all of Cal Am's service areas face potential PSPS events. For example, some are served by the Sacramento Municipal Utilities District,

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[34] Exhibit C-4 – Cal Am Generator Inventory

[35] Exhibit C-4 – Cal Am Generator Inventory

[36] Attachment 2 uses GIS analysis to show where Cal Am has distributed its emergency generators in relation to its districts.

[37] Decision 19-05-042 at p. 87. The Commission also adopted a 48 to 72 hour advanced notice for priority notification entities.

which is not part of the PSPS program. Therefore, additional generators are not needed for all of Cal Am's service areas. PSPS events are dynamic and in response to environmental conditions such as wind speeds, dry vegetation, and low humidity.[38] As such, portable generators are more flexible in allowing Cal Am to respond to these events. Cal Am can look at what areas were affected or threatened by PSPS events in 2019 to evaluate the need for portable generators. Larkfield was affected by a PSPS event in October 25, 2019. As such, Larkfield is a service area where additional portable generators are reasonable.[39]

Cal Am's proposed plan to deploy dozens of new fixed generators across its various districts outlined below is unreasonable. As Table 1-3 shows, Cal Am has a large existing inventory of fixed and portable generators it can use to respond to PSPS events and commercial power outages. Furthermore, Portable generators provide flexibility in responding to PSPS events over fixed generators. This is because PSPS events do not have defined footprints that can change even between PSPS events in the same service areas. A fixed generator located at a facility that is outside a PSPS area within a district is not useful in responding to a PSPS event elsewhere. But a portable generator at that facility that can be moved to an affected facility allows that generator to be useful during most potential PSPS situations. Likewise, Cal Am's proposed funding would construct fixed generators in service areas with infrequent or no recorded PSPS events, such as the Los Angeles County District,[40] Ventura District,[41] Sacramento District,[42] and the

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[38] D.19-05-042 Finding of Fact 31 at p. 119.

[39] Exhibit C-9 – PG&E report for October 23-25 PSPS events at p. AppA-5.

[40] Exhibit C-5 – Cal Am Engineer Workbook Tab 028.

[41] Exhibit C-6 – Cal Am Engineer Workbook Tab 128.

[42] Exhibit C-7 – Cal Am Engineer Workbook Tab 092.

1 Monterey District.[43] Stationary generators installed at areas not experiencing
2 power outages are not useful and cannot be repositioned to keep other
3 infrastructure experiencing power outages active. Portable generators have other
4 advantages, such as allowing Cal Am to maintain and test them in one location in
5 a district. This would help Cal Am avoid performing required testing and
6 maintenance of generators in potentially sensitive areas (i.e. near schools or
7 residential areas). As such, Cal Am should focus on performing a back-up
8 generator and PSPS study and creating an action plan as a compliment to the risk
9 assessment required by the AWIA.

10 Creating a back-up generator and PSPS action plan will allow Cal Am to
11 examine crucial information, such as which of their service areas are affected
12 regularly by PSPS events.[44] This information is very important to understand the
13 risk of power shutoffs in the future and identify which areas may need fixed on-
14 site generation, which areas Cal Am can deploy portable generators, and where
15 Cal Am can store portable generators for expedited deployment. The study should
16 also examine which areas do not have connections for back-up generators and
17 whether Cal Am needs to install transfer switches to facilitate the portable
18 generator coverage plan.[45] A PSPS action plan and portable generator plan will
19 allow Cal Am to leverage its existing capital investment in portable generators.

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[43] Exhibit C-8 – Cal Am Engineer Workbook Tab 069.

[44] Areas such as the Larkfield service territory. The Larkfield service area has been subject to at least two PSPS events in Fall of 2019. As described in the testimony of Justin Menda, the Commission should include $482,083 in rate base for 2021 and $534,558 in rate base for 2022 for new generator projects in Sacramento, Larkfield, and Monterey.

[45] Exhibit C-10 – January 13, 2020 Duarte Sanitary Survey at p. 3. DDW recommended that Cal Am update its Emergency Response Plan to explore how to respond to a power outage that affects all three Los Angeles water systems simultaneously.

As such, the Commission should direct Cal Am to conduct a study to evaluate where it needs to store portable generators and what facilities need transfer switches to mitigate a PSPS event affecting any of Cal Am's water systems. As this is a study of Cal Am's current readiness for and vulnerability to PSPS events, Cal Am should be able to complete this study with internal resources as a component of the risk and vulnerability assessment required under AWIA section 1433. Furthermore, the Commission should accordingly adjust Cal Am's capital budget as described in the testimony of Justin Menda to remove $2,154,079 from rate base in 2021 and $2,995,054 from rate base in 2022 in standby generator improvement proposed projects in Los Angeles, Monterey, Ventura, and Sacramento. The Commission should include Cal Am's recommended $482,083 in 2021 and $534,558 in 2022 for capital budget to install standby generators in its Larkfield service area.

D. CONCLUSION

Cal Am's emergency preparedness is generally robust, but there are significant gaps in Cal Am's planning responses to operational threats and in documenting emergency drills. The Commission should direct Cal Am to close these gaps by completing its APs numbered 19-23, scheduling and documenting emergency drills, and conduct an emergency back-up power study to redistribute its portable generators and plan for a PSPS event. The Commission should remove $4.225 million in IOTG expenses for earthquake insurance from the proposed revenue requirement as the insurance is unreasonable because it does not mitigate Cal Am's financial risk from significant earthquakes.

Furthermore, the Commission should adjust Cal Am's capital budget as described in the testimony of Justin Menda to remove $2,154,079 from rate base in 2021 and $2,995,054 from rate base in 2022 in standby generator improvement proposed projects in Los Angeles, Monterey, Ventura, and Sacramento. Should

1 Cal Am need more generators in 2021 or 2022, Cal Am can purchase generators as
2 capital investments and the Commission can review the prudency of
3 reasonableness of those capital assets' inclusion in rate base during Cal Am's next
4 GRC.

CHAPTER 2: WATER QUALITY

A. INTRODUCTION

As a public utility, Cal Am is required to deliver safe, high quality water to its customers.[46] Water quality is especially important to maintain public health and public safety.[47] To this end, the Commission should continue to review Cal Am's water quality reporting to ensure it is operating safely.

Water Quality requirements mean that utility-provided water should not be harmful or dangerous to human health and as free from odors, taste, color, and turbidity as practicable. Water utilities must provide water that does not exceed maximum contaminant levels (MCLs) established by federal agencies, such as the Environmental Protection Agency (EPA), and state authorities such as the Division of Drinking Water (DDW) of the California State Water Resources Control Board (SWRCB).[48]

MCLs covering substances that are health risks such as nitrates, lead, uranium, and benzene are referred to as Primary MCLs.[49] MCLs covering aesthetic qualities such as taste, odor, and turbidity are referred to as secondary maximum contaminant levels (SMCLs). Cal Am provides information on its

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[46] Pub. Util. Code § 451 and GO 103-A Section II. 2. A.

[47] A.19-07-004 Cal Am 2019 GRC Direct Testimony of Mr. Garry Hofer, at p. 16:21-22.

[48] MCLs refer to the maximum amount of a given contaminant what can be present in water. Usually expressed in milligrams per liter or one part per million (ppm) or part per billion (ppb).

[49] *See* California Code of Regulations Title 22 Division 4 Chapter 15 Article 4 and https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chemicalcontaminants.html

MCL samples to customers through its Consumer Confidence Reports (CCR). In preparing this testimony, the Public Advocates Office reviewed Cal Am's CCRs, direct testimony, responses to data requests, conversations with DDW engineers, and the sanitary surveys from DDW.

B. SUMMARY OF RECOMMENDATIONS

The Commission should adopt the following recommendations to improve Cal Am's water quality monitoring:

- Cal Am should inspect its tanks twice a year. If drone inspection finds signs of corrosion or damage that would allow animal entry, Cal Am should inspect the interior of the tank.
- Cal Am should implement reasonable steps, such as email alerts or notifications, to avoid missing required water sampling and monitoring in the future.

C. DISCUSSION

1) Cal Am Should Inspect its Tanks Twice Annually, Consistent with Division of Drinking Water's Recommendations.

On June 29, 2018 engineers from DDW discovered a dead rodent inside the Crest Reservoir in the Monterey District. Part of the reservoir's hatch was corroded, and the tank vent's screens had large gaps that allowed small animal ingress to the tank.[50] Subsequently, DDW issued a compliance order for Cal Am to inspect all finished water storage tanks on a semi-annual basis.

To comply with this order, Cal Am is proposing to perform one inspection by unmanned aerial drone and another inspection using contractors with

[50] A.19-07-004 Cal Am 2019 GRC – MDR II.G.5 at p. 24.

specialized fall protection equipment.[51] Cal Am estimated an annual cost of $72,000 to inspect approximately 55 tanks that lack adequate fall protection. The Commission should approve this request. Furthermore, Cal Am should have the drone inspection teams evaluate the condition of vent screens and tank hatches. To protect public safety and health, the Commission should direct Cal Am to inspect the interior of a tank if the drone inspection reveals significant corrosion or large gaps in vent screens or hatches to ensure no small animals have gotten inside the tank.

2) Cal Am Should Create Notifications and Alerts to Ensure It Does Not Miss Required Sampling and Monitoring.

Generally, Cal Am has not exceeded or violated MCL standards for most water systems since its last GRC.[52] Some wells have high concentrations of contaminants that are handled in treatment, such as raw arsenic at Well 01A in Larkfield[53] or the Arlington Well 2 that has triggered enhanced monitoring due to high nitrate levels.[54] The Sacramento district has several wells that are either inactive or on standby for exceeding MCLs for nitrates, tetrachloroethylene, or arsenic, and some wells occasionally have results exceeding MCLs that may need to be placed on stand-by.[55]

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[51] A.19-07-004 Cal Am 2019 GRC – MDR II.G.10 at p. 2.

[52] A.19-07-004 Cal Am 2019 GRC – MDR II.G.1.

[53] A.19-07-004 Cal Am 2019 GRC – MDR II.G.6 at p. 31.

[54] A.19-07-004 Cal Am 2019 GRC – MDR II.G.6 at p. 53.

[55] A.19-07-004 Cal Am 2019 GRC – MDR II.G.1 at p. 2 and MDR II.G.6 at pp. 338, 404, 661. "Standby" wells are wells that have been taken offline (made inactive) but are expected to return to service at some point.

While Cal Am reports it has not violated any MCLs, there are some inconsistencies in the company's CCRs. For example, the 2017 CCR for Baldwin Hills indicated that the SMCL for aluminum is 1 part per million (ppm) and that the average amount detected from Weymouth was 170 ppm.[56] The Public Advocates Office previously highlighted anomalies regarding the aluminum MCL and SMCL during Cal Am's last GRC.[57] This inconsistency has persisted since reports from 2015.[58] Cal Am has an obligation to operate its systems safely and report information to its customers and the Commission clearly and correctly.

Furthermore, while Cal Am is generally complying with MCL standards DDW issued several citations in 2018 because Cal Am missed required monitoring standards. Cal Am missed samples for 1,2,3 trichloropropane in 2018 for San Marino,[59] bacteriological samples in May 2017 for Garrapata,[60] and failed to collect upstream and downstream samples in Ventura in 2019 when a total coliform sample tested positive.[61] Cal Am should implement steps to ensure that

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[56] A.19-07-004 Cal Am 2019 GRC – MDR II.G.4 at p. 85.

[57] *See* The Report and Recommendations on Rate Consolidation and General Aspects of Safety, Reliability, and Customer Service in Application 16-07-002 sponsored by witness Richard Rauschmeier at p. 19. "In reviewing the annual CCR for each water system, ORA noticed anomalies in the reported primary and secondary detection level MCL amounts for Aluminum."

[58] A.19-07-004 Cal Am 2019 GRC – MDR II.G.4 at p. 186 for Thousand Oaks and p. 136 for San Marino.

[59] A.19-07-004 Cal Am 2019 GRC – MDR II.G.5 at p. 1.

[60] A.19-07-004 Cal Am 2019 GRC – MDR II.G.5 at p. 10.

[61] A.19-07-004 Cal Am 2019 GRC – MDR II.G.2 at p. 2.

sampling and monitoring standards are not missed in the future such as email notifications or alerts.

Cal Am's should incorporate these alerts and notifications for its water quality monitoring into its proposed sampling and monitoring system (SAMS) program.[62] SAMS can send email and text notifications to Cal Am's water quality teams but does not have notifications for all monitoring requirements.[63] Cal Am should finish implementing notifications for all of its monitoring requirements for all of its service areas to ensure it does not miss future sampling and monitoring. Because Cal Am's proposed SAMS program will implement a system to notify Cal Am of upcoming water sampling, the Public Advocates Office does not oppose Cal Am's proposal for three SAMS modules of $131,500 in 2021, $99,000 in 2022, and $77,500 in 2023.[64]

D. CONCLUSION

Cal Am has a duty and obligation to ensure it is operating its water system safely and reliably and deliver high quality water. Part of that duty and obligation is to ensure water samples are taken when required, ensure tanks are regularly inspected, and that customers and the Commission receive accurate information. As such, the Commission should direct Cal Am to create notifications for sampling and monitoring schedules and to inspect the interior of tanks when drone inspections discover signs of corrosion or damage that would allow animal entry.

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[62] A.19-07-004 Cal Am 2019 GRC Direct Testimony of Mr. Garry Hofer at p. 21:4-17.

[63] Exhibit C-14 - Cal Am Response to Public Advocates Office Data Request CR5-04 Question 2.b.

[64] A.19-07-004 Cal Am 2019 GRC Direct Testimony of Mr. Garry Hofer at p. 21:24-25.

CHAPTER 3: CUSTOMER SERVICE QUALITY

A. INTRODUCTION

General Order (GO) 103-A adopted reporting requirements and standards for six customer service quality metrics including: (1) Telephone Performance Standards, (2) Billing Performance Standards, (3) Meter Reading Performance Standard, (4) Work Completion Performance Standards, (5) Response to Customer and Regulatory Complaints Performance Standard, and (6) Service Interruptions.[65] Class A and B utilities must report on their compliance with these standards in their annual report.[66] The Commission should hold Cal Am accountable to these standards, ensuring customers are receiving high quality customer service. The following sections analyze Cal Am's customer service performance from 2014 through 2018 looking to GO 103-A standards, Consumer Affairs Branch (CAB) complaints, customer inquiries to Cal Am, and service interruptions.

B. SUMMARY OF RECOMMENDATIONS

To improve Cal Am's customer service quality and comply with GO 103-A standards, the Commission should adopt the following recommendations:

- Cal Am should reduce its abandoned call rate below the 5% standard established in GO 103-A.

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[65] General Order 103-A Appendix E

[66] Class A and B Water Utilities do not report on Service Interruptions annually but must retain a complete record of interruptions.

- Cal Am should increase its percentage of bills rendered in seven days to be consistently above 99% and meet the standard established in GO 103-A.

C. DISCUSSION

1) Cal Am Should Reduce its Abandoned Call Rate and Improve the Percentage of Bills Rendered Within Seven Days of the Billing Date

GO 103-A requires annual reporting on performance on service quality standards. Cal Am has generally met most of GO 103-A's reporting standards but has had recent issues with meeting the telephone performance standards and bill rendered standards. Figure 3-1 below summarizes Cal Am's GO 103-A performance for the past five years. Cal Am has not met the telephone performance standard of having less than 5 percent abandoned calls in 2017 and 2018, did not meet answering more than 80 percent of customer calls within 30 seconds in 2018, and did not consistently rendered 99 percent of bills within seven days of the scheduled billing date.

Figure 3-1: Cal Am's GO 103-A Performance from 2014-2018 (Years where standards are not met are highlighted orange)[67]

Performance Standards Each Year	Standard	2014	2015	2016	2017	2018
Total Calls Received		242,098	166,299	157,648	169,879	151,650
Total Calls Answered in 30 seconds		195,966	159,323	150,987	149,857	111,739
% of Calls Answered in 30 seconds	**≥ 80%**	**81%**	**96%**	**96%**	**88%**	**74%**
Total Abandoned Calls		7,668	6,979	6,661	20,022	37,781
% Abandoned Call Rate	**≤ 5%**	**3%**	**4%**	**4%**	**12%**	**25%**
Total Bills Rendered		2,136,534	2,162,448	2,150,183	2,153,762	2,153,598

[67] Exhibit C-16 - California American Water General Order 103-A Service Quality Reports for 2014 through 2018

Total Bills Rendered in 7 days		2,056,122	2,144,979	2,075,013	2,098,660	2,107,558
% Bills Rendered in 7 days	**≥ 99%**	**96%**	**99%**	**97%**	**97%**	**98%**
Total Inaccurate Bills		14,945	10,280	11,985	27,751	8,560
% of Inaccurate Bills	**≤ 3%**	**0.69%**	**0.48%**	**0.55%**	**1.29%**	**0.40%**
Total Payments Posted		1,843,763	1,834,845	1,840,408	1,880,583	1,927,756
Total Errored Payments		9,945	7,869	7,681	6,374	5,571
% Payment Posting Error	**≤ 1%**	**0.54%**	**0.43%**	**0.43%**	**0.34%**	**0.29%**
Total Number of Final Bills		24,108	20,960	22,197	23,690	22,465
Final Bills Issued after 14 days		2,936	3,877	2,525	2,772	2,214
% Final Read and Final Bill Issued after 14 days	**≤ 14 Days**	**12%**	**18%**	**11%**	**12%**	**10%**
Total Scheduled Actual Meter Reads		2,081,012	2,078,653	2,081,730	2,074,583	2,104,149
Total Estimated Meter Reads		16,879	20,091	32,742	25,234	24,237
% Scheduled Meters not Read	**≤ 3%**	**0.84%**	**0.96%**	**1.60%**	**0.96%**	**1.10%**
% Total Customer Met Appointments	**≥ 95%**	**95%**	**96%**	**97%**	**96%**	**98.50%**
% Total Missed Customer Appointments	**≤ 5%**	**5%**	**4%**	**3%**	**3%**	**1%**
Total Scheduled Work Orders Customer Requested		37,746	88,207	89,929	86,147	84,271
Total Completed Work Orders as Scheduled		55,344	82,824	85,699	82,359	88,803
Total Incomplete /Canceled Work Orders		5,856	5,303	4,230	3,788	3,885
% Customer Work Orders Not Completed	**≤ 5%**	**15.50%**	**6.00%**	**5.00%**	**4.00%**	**4%**
Total Number of Customers		173,354	174,765	177,614	177,521	177,501
# of CAB Formal and Informal Complaints		70	37	36	51	43
% Rate of Complaints to CAB	**≤ .1%**	**0.04%**	**0.02%**	**0.02%**	**0.03%**	**0.02%**

Figure 3-1 demonstrates clear issues with answering customer calls and rendering customer bills promptly that Cal Am should address. In response to a data request, Cal Am stated that the recent increases in customer call abandonment were due to upgrades to a new Interactive Voice Response feature, a customer call back feature, and a transition to a new telephone vendor. Cal Am took more time implementing this upgrade than anticipated and customer faced long call wait

times during peak hours. Some customers choose to call local offices with inquiries to avoid the lengthy wait time. In order to reduce wait times and the abandoned call rate, Cal Am assigned its California Customer Advocacy Teams to take customer calls.[68] Cal Am states the upgrades are complete and the abandoned call rate has dropped to around 6%.[69] However, the 2019 abandoned call rate data indicates a spike in abandoned call rates for July through September of 2019. Furthermore, 6 percent average abandoned calls is still above the 5 percent or less standard set for abandoned call rate. As such, Cal Am still needs to improve its performance to meet the less than 5 percent abandoned call rate standard set forth in GO 103-A.

While GO 103-A does not contain punitive measures for failure to meet performance standards, other Commission general orders related to service quality do. GO 133-D sets a rule for imposing fines on reporting telecommunication carriers that fail to meet GO 133-D's performance standards for three or more consecutive reporting units.[70] This is called "chronic failure status." GO 133-D includes performance standards for taking customer calls, such as the percentage of calls answered within 60 seconds.[71] As such, it is reasonable for the Commission to evaluate Cal Am's performance on customer call standards using GO 133-D's framework as a proxy.

Under this framework, Cal Am would have entered chronic failure for the percentage of bills rendered in seven days performance standard and could enter

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[68] Exhibit C-14 - Cal Am Response to Public Advocates Office DR CR5-04 Question 01

[69] Exhibit C-14 - Cal Am Response to Public Advocates Office DR CR5-04 Question 01.

[70] Commission GO 133-D at §9.

[71] Commission GO 133-D at §3.5.

chronic failure for abandoned call rate if the average rate for 2019 remains above 5 percent. While GO 133-D does not apply to water utilities like Cal Am, the Commission can use GO 133-D as a proxy and impose a fine or implement another penalty if Cal Am continues to miss the performance standards in GO 103-A.

Cal Am should continue to make is Customer Advocacy Team available for inquiries and reduce its abandoned call rate to pre-customer contact center upgrade numbers. Furthermore, Cal Am should improve its performance and meet the percentage of bills rendered in seven days performance standard. If Cal Am continues to miss the performance standards set in GO 103-A in 2020, 2021, or 2022, the Commission should consider penalties such as fines or other measures to encourage compliance with its GO 103-A.

2) Cal Am Has a Generally Reasonable Rate of Customer Complaints and Inquiries.

Cal Am remarks that it has reduced its customer complaints in the recent years. Figure 3-1 corroborates this claim, showing a reduction in informal and formal complaints to CAB in 2015 and 2016 with a slight increase in 2017. Cal Am's customer complaint and inquiries shows a similar reduction, then increase in the rate at which customers contacted Cal Am. Table 3-1 summarizes the total customer contacts and average percentage of customers that contacted Cal Am across all districts.

Table 3-1: Total Customer Contacts and Average Percentage of Contacts Compared to Total Customers with Cal Am (2014-2018)[72]

Year	Total Complaints and Inquiries	Average of Percentage Customer Contact
2014	5,986	3.26%
2015	4,911	2.86%
2016	4,880	2.61%
2017	5,840	3.31%
2018	5,728	3.66%

Table 3-1 demonstrates a similar trend to Figure 3-1; customer complaints and contacts decreased in 2015 and 2016 and then increased in 2017 and 2018. Table 3-1 shows that, on average less than four percent of customers contacted Cal Am on a given year. While GO 103-A examines customer complaints specifically to CAB to examine service quality, other Commission GOs can provide context for Cal Am's performance on customer inquiries. GO 133-D sets a standard for customer trouble reports for telephone corporations. Customer trouble reports represent any oral or written contact a customer has with the telephone company or a company representative expressing dissatisfaction with their service.[73] Telephone corporations who serve more than 3,000 customers must have less than six trouble reports per 100 working lines (active connections) or, six percent of customers with trouble reports when compared to total working lines, to be in compliance with GO 133-D.[74]

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[72] Exhibit C-17 - California American Water Customer Complaints and Inquiries from 2014 through 2018

[73] Commission GO 133-D at §1.3 v.

[74] Commission GO 133-D at §3.3.

While GO 133-D does not apply to water companies, the customer trouble reports standard is a useful proxy to contextualize the percentage of Cal Am's customer that reach out with inquiries and contacts and Cal Am's service quality. Using GO 133-D customer trouble reports standard as a framework, Table 3-1 shows that Cal Am has a reasonable rate of customer contacts and inquiries compared to total customers. Table 3-1 aggregates customer contacts and inquiries across all districts however, and specific data shows that Monterey and Baldwin Hills have higher percentages of customer complaints and inquiries than other districts.[75] Still, the data in Attachment 3 to this testimony shows that each district remains below the six percent comparative threshold for customer contacts.

Considering Cal Am's customer contacts and CAB complaints have generally reduced to reasonable levels, the Public Advocates Office does not oppose Cal Am's Special Request 14 to eliminate certain service quality and audit reporting requirements, as described in the testimony of Daphne Goldberg.

D. CONCLUSION

The Commission should ensure that Cal Am is meeting its performance obligations under General Order 103-A and provides high quality service to its customers. If Cal Am continues to miss the performance standards set in GO 103-A in 2020, 2021, or 2022, the Commission should consider penalties such as fines or other measures to encourage compliance with GO 103-A. While Cal Am's call performance service quality has not met Commission standards in recent years, Cal Am's customer complaints and contacts have reached a level that meets Commission service quality standards. As such, the Public Advocates Office does not oppose special request 14 to eliminate certain service quality reporting required in D.06-11-050.

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[75] Attachment 3 tabulates these customer contacts and percentages.

CHAPTER 4: COMPLIANCE WITH DECISION 18-12-021

A. INTRODUCTION

Commission Decision (D.) 18-21-021 Ordering Paragraph (OP) 21 directed Cal Am to provide confirmation that seven tank improvement projects for its Monterey District were completed including: Lower Pasadera Tank, Upper Pasadera Tank #1, Upper Pasadera Tank #2, Huckleberry Tank #2, Boots Tank, Forest Lake Tank #1, and High Meadows Tank #1. OP 22 directed Cal Am to provide historical expenses for Cal Am's deferred tank maintenance program.[76] D.18-21-021 ordered compliance with OPs 21 and 22 in Cal Am's next GRC, as such Cal Am must demonstrate compliance with OP 21 and 22 in A.19-07-004.

B. DISCUSSION

Cal Am's direct testimony responded to OPs 21 and 22 by providing Table XVII-G and XVII-H respectively.[77] Table VXII-G simply noted the date at which each tank improvement project was completed and explained that Cal Am chose to rehabilitate the Forest Lake #2 Tank instead of the Forest Lake #1 Tank. In order to confirm compliance with OP 21, the Commission should examine the most recent reports to ensure the rehabilitations were completed.

In response to a data request, Cal Am provided tank inspection reports for the seven tank rehabilitation projects.[78] The inspection reports acknowledge that

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[76] D.18-12-021 at p. 325.

[77] A.19-07-004 Cal Am 2019 GRC Direct Testimony of Ian Crooks at p. 267-268.

[78] Exhibit C-13 – Cal Am Response to Public Advocates Office DR CR5-03

each tank is in at least good condition.[79] Furthermore, recent photos show the exteriors of each tank to have been recently repainted.

To comply with OP 22, Cal Am provided data on actual tank maintenance expenses for 2016 through 2018. In response to a data request, Cal Am provided additional information for years 2014 and 2015. Table 4-1 summarizes Cal Am's actual tank expenses by district incorporating 2014 and 2015.

Table 4-1: Cal Am's Actual Tank Maintenance Expenses 2014 through 2018

Tank Maintenance Actual Expenditure	2014	2015	2016	2017	2018	Total
San Diego	$0	$0	$3,965	$17,878	$5,900	$27,743
Los Angeles	$353,966	$0	$9,529	$0	$227,842	$591,337
Ventura	$260,094	$63,357	$540,488	$309,514	$533	$1,173,986
Monterey Water	$79,738	$26,503	$1,637,534	$1,162,384	$273,591	$3,179,750
Toro	$0	$0	$0	$0	$0	$0
Garrapata	$0	$0	$3,516	$0	$0	$3,516
Sacramento	$1,926	$10,315	$456,379	$37,527	$1,249,673	$1,755,820
Larkfield	$77,944	$25,358	$4,113	$115,389	$20,007	$242,811
Geyserville	$0	$0	$0	$0	$3,079	$3,079
Meadowbrook	$0	$0	$0	$0	$0	$0
Total	$773,668	$125,533	$2,655,524	$1,642,692	$1,780,625	

Table 4-1 shows that Cal Am's tank maintenance expenses have increased in the past three years. Table 4-1 provides five years of historical information consistent with Commission forecasting standard practices.[80] Considering the

[79] Exhibit C-18 – Tank Inspection Reports for Lower Pasadera Tank, Upper Pasadera Tank #1, Upper Pasadera Tank #2, Huckleberry Tank #2, Boots Tank, Forest Lake Tank #2, and High Meadows Tank #1

[80] The Commission's Water Rate Case Plan (Adopted in D.07-05-062) generally requires or relies on five years of recorded data to forecast expenses, revenues, or otherwise support a

(continued on next page)

additional information Cal Am provided through data requests, Cal Am has complied with D.18-12-021 OPs 21 and 22.

C. CONCLUSION

Cal Am has complied with OPs 21 and 22 and rehabilitated Lower Pasadera Tank, Upper Pasadera Tank #1, Upper Pasadera Tank #2, Huckleberry Tank #2, Boots Tank, Forest Lake Tank #2, and High Meadows Tank #1 as ordered by the Commission in D.18-21-021.

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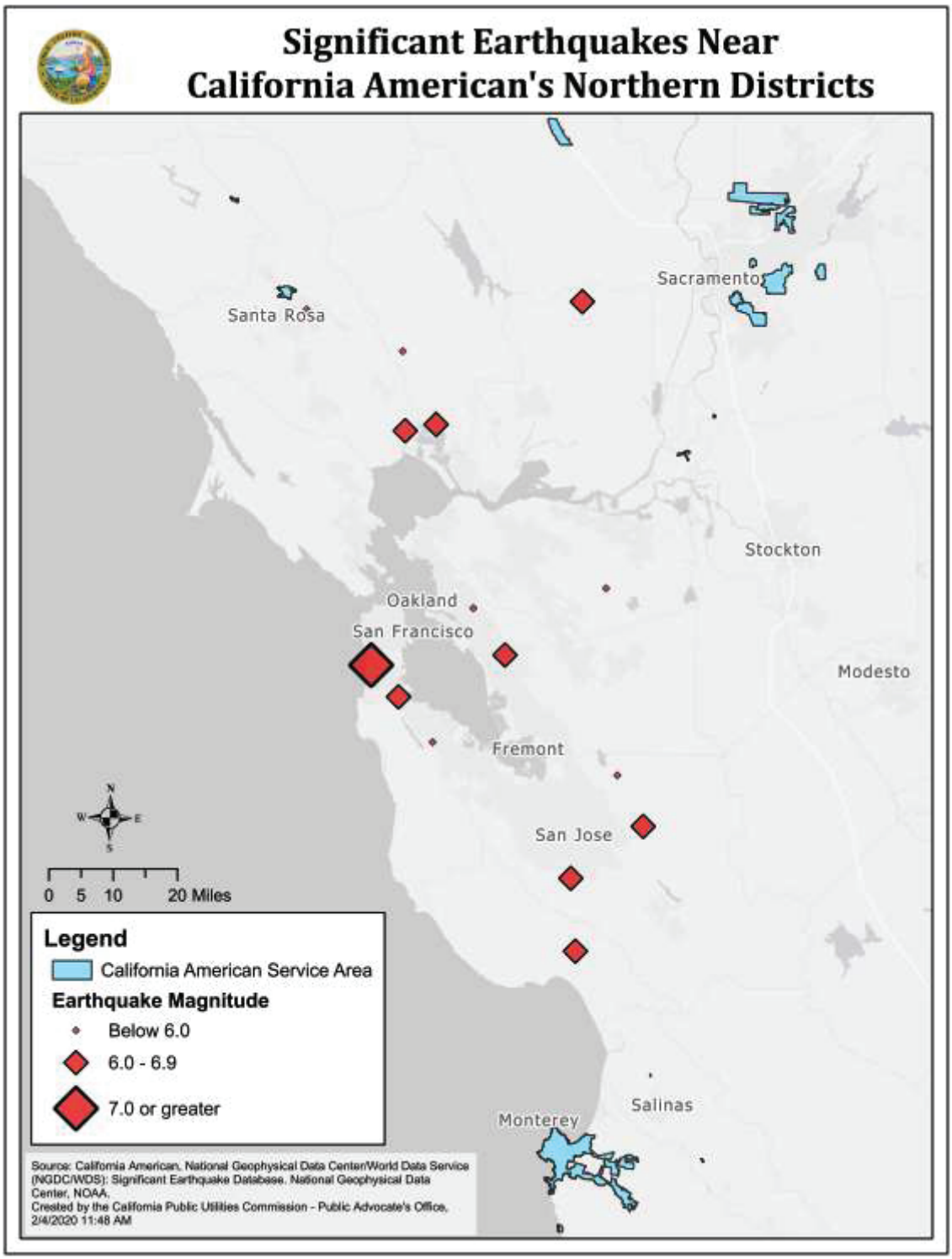
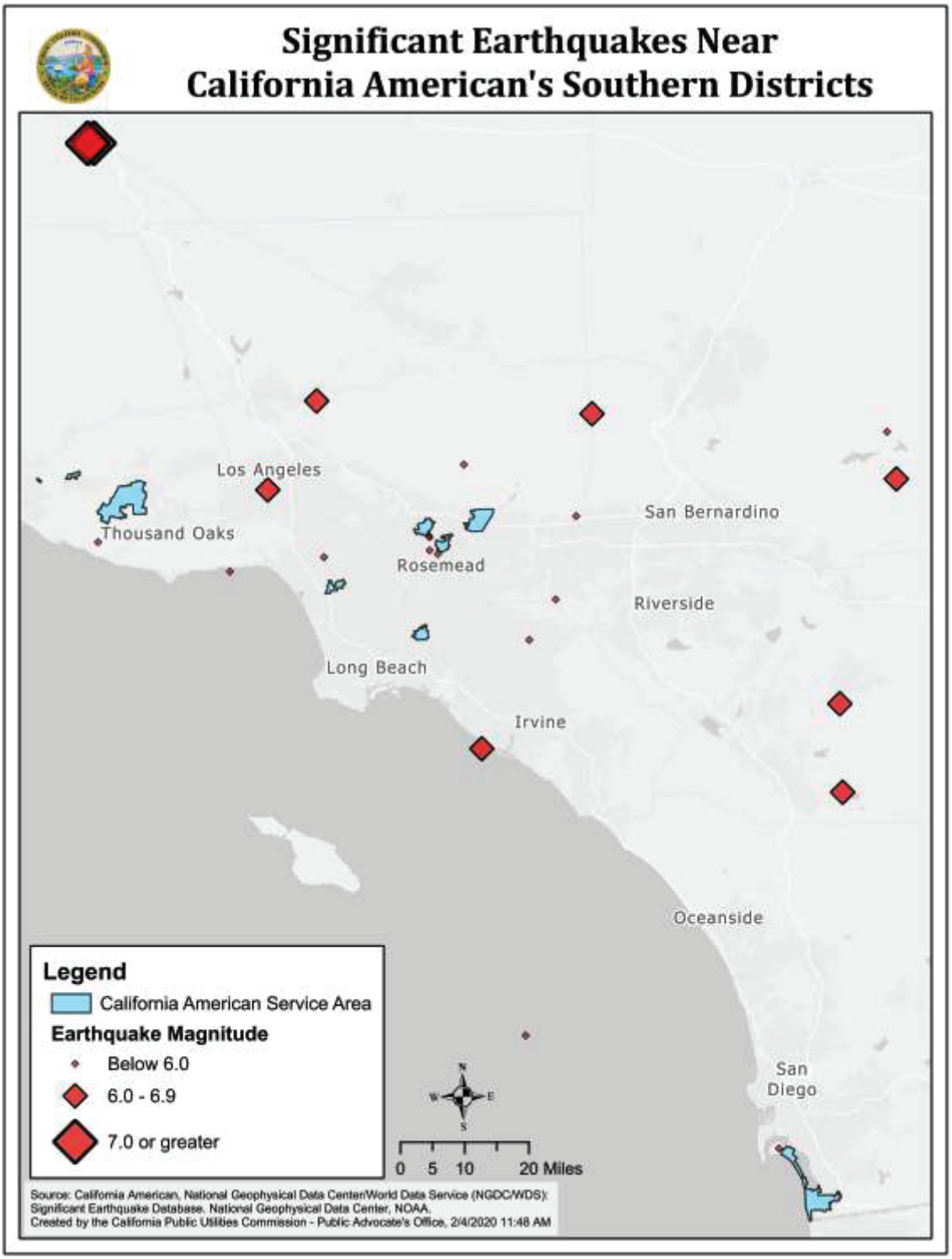
revenue requirement.

Attachment 1: Significant Earthquakes Near California American Water's Districts


Significant Earthquakes Near
California American's Northern Districts
Sacramento
Santa Rosa
Stockton
Oakland
San Francisco
Modesto
Fremont
San Jose
Salinas
Monterey
N
W
E
S
0 5 10 20 Miles
Legend
California American Service Area
Earthquake Magnitude
Below 6.0
6.0 - 6.9
7.0 or greater
Source: California American, National Geophysical Data Center/World Data Service (NGDC/WDS): Significant Earthquake Database. National Geophysical Data Center, NOAA.
Created by the California Public Utilities Commission - Public Advocate's Office, 2/4/2020 11:48 AM


Significant Earthquakes Near
California American's Southern Districts
Los Angeles
Thousand Oaks
Rosemead
San Bernardino
Riverside
Long Beach
Irvine
Oceanside
San
Diego
Legend
California American Service Area
Earthquake Magnitude
Below 6.0
6.0 - 6.9
7.0 or greater
N
W
E
S
0 5 10 20 Miles
Source: California American, National Geophysical Data Center/World Data Service (NGDC/WDS):
Significant Earthquake Database. National Geophysical Data Center, NOAA.
Created by the California Public Utilities Commission - Public Advocate's Office, 2/4/2020 11:48 AM

<<Begin Confidential>>

Confidential - Los Angeles Area Earthquakes that Qualify for Coverage Based on Magnitude

[redacted]

<<End Confidential>>

Attachment 2: Map of Cal Am's Existing Generators

[Confidential]

<<Begin Confidential>>

California American Northern Division
Generator Locations

[redacted]

California American Central Division
Generator Locations

[redacted]

California American Southern Division
Generator Locations - Los Angeles

[redacted]

California American Southern Division
Generator Locations - San Diego

[redacted]

<<End Confidential>>

Attachment 3: Cal Am Customer Contacts and Inquiries 2014 through 2018.

District	Year	Total	Customers	Percentage Total Trouble
San Diego	2014	482	21,125	2.28%
San Diego	2015	427	21,155	2.02%
San Diego	2016	392	21,265	1.84%
San Diego	2017	511	21,398	2.39%
San Diego	2018	562	21,536	2.61%
Monterey	2014	2575	39,604	6.50%
Monterey	2015	1772	39,706	4.46%
Monterey	2016	1752	39,685	4.41%
Monterey	2017	1934	39,593	4.88%
Monterey	2018	1835	39,675	4.63%
Los Angeles - Baldwin	2014	249	6,238	3.99%
Los Angeles - Baldwin	2015	235	6,239	3.77%
Los Angeles - Baldwin	2016	221	6,230	3.55%
Los Angeles - Baldwin	2017	279	6,234	4.48%
Los Angeles - Baldwin	2018	284	6,230	4.56%
Los Angeles - Duarte	2014	239	7,455	3.21%
Los Angeles - Duarte	2015	215	7,464	2.88%
Los Angeles - Duarte	2016	219	7,468	2.93%
Los Angeles - Duarte	2017	300	7,473	4.01%
Los Angeles - Duarte	2018	310	7,486	4.14%
Los Angeles - San Marino	2014	392	14,137	2.77%
Los Angeles - San Marino	2015	408	14,121	2.89%
Los Angeles - San Marino	2016	369	14,313	2.58%
Los Angeles - San Marino	2017	436	14,340	3.04%
Los Angeles - San Marino	2018	443	14,345	3.09%
Los Angeles - Total	2014	880	27,830	3.16%
Los Angeles - Total	2015	858	27,824	3.08%
Los Angeles - Total	2016	809	28,011	2.89%
Los Angeles - Total	2017	1015	28,047	3.62%

Los Angeles - Total	2018	1037	28,061	3.70%
Ventura	2014	491	21,079	2.33%
Ventura	2015	471	21,088	2.23%
Ventura	2016	526	21,063	2.50%
Ventura	2017	566	21,060	2.69%
Ventura	2018	556	21,088	2.64%
Larkfield	2014	59	2,416	2.44%
Larkfield	2015	58	2,419	2.40%
Larkfield	2016	43	2,424	1.77%
Larkfield	2017	136	1,858	7.32%
Larkfield	2018	67	2,074	3.23%
Sacramento	2014	1499	58,841	2.55%
Sacramento	2015	1325	59,076	2.24%
Sacramento	2016	1356	59,662	2.27%
Sacramento	2017	1599	59,698	2.68%
Sacramento	2018	1606	60,261	2.67%
Northern Div - Dunnigan (Acq 12/15)	2016	2	120	1.67%
Northern Div - Dunnigan (Acq 12/15)	2017	0	121	0.00%
Northern Div - Dunnigan (Acq 12/15)	2018	11	121	9.09%
Northern Div - Geyserville (acq 11/16)	2016	0	0	
Northern Div - Geyserville (acq 11/16)	2017	6	1000	0.60%
Northern Div - Geyserville (acq 11/16)	2018	11	1000	1.10%
Northern Div - Meadowbrook (acq 3/17)	2016	0	0	
Northern Div - Meadowbrook (acq 3/17)	2017	73	1,671	4.37%
Northern Div - Meadowbrook (acq 3/17)	2018	43	1,688	2.55%

Attachment 4: Witness Qualifications

QUALIFICATIONS AND PREPARED TESTIMONY OF CAMERON REED

Q.1 Please state your name and business address.

A.1 My name is Cameron Reed and my business address is 505 Van Ness Ave, California 94102.

Q.2 By whom are you employed and in what capacity?

A.2 I am a Utilities Engineer in the Communication and Water Policy Branch of the Public Advocates Office of California Public Utilities Commission (Cal Advocates).

Q.3 Briefly describe your pertinent educational background.

A.3 I have a Bachelor of Science in Mechanical Engineering from the University of California-Davis. My studies included courses in engineering control systems, fluid mechanics, thermo-fluid mechanics, experimental methodology, and mechanical systems design.

Q.4 Briefly describe your professional experience.

A.4 I joined Communications and Water Policy branch of the Public Advocates Office as a Utilities Engineer in July of 2016. During my time at the Commission I have submitted testimony concerning Telecommunications Public Safety and/or Service Quality in three general rate case applications of small local exchange carriers: Sierra Telephone Company (Application 16-10-003), Ducor Telephone Company, (Application 17-10-003), and Foresthill Telephone Company (Application 17-10-004). I have submitted testimony regarding Public Safety and Cybersecurity in the Application of Pacific Gas and Electric for a Certificate of Public Convenience and Necessity to become a Competitive Local Exchange Carrier (Application 17-04-010). I have submitted opening, supplemental, and reply testimony on Safety, Service Quality, and Fifth Generation Wireless Networks in the consolidated Applications 18-07-011 and 18-07-12, the proposed merger of T-Mobile USA, Inc. and Sprint Communications Company. I have attended and completed the 38th Western National Association of Regulatory Utility Commissioners Utility Rate School.

Q.5 What is your responsibility in this proceeding?

A.5 I am responsible for the testimony on Cal Am's Safety, Service Quality, Water Quality, and Compliance with Decision 18-12-021 regarding Ordering Paragraphs 21 and 22, as presented in this report.

Q.6 Does that conclude your direct testimony?

A.6 Yes, it does.

Attachment 2-4: A.19-07-004, Cal Am's Response to Cal Advocates' Data Request Cal PA YCC 04, Q006.a Attachment 1 (Public Version Sent to Cal Advocates on December 12, 2022)

American Water Works

Summary of Market Indications for EQ Insurance on Underground Pipes in CA

Terms	Traditional Indemnification - Various Cos.	Parametric Solution #1	Parametric Solution #2
Carrier(s)	– Munich Re: 20% – Sompo Bermuda: 5% – AIG: 40% to 60% – Lloyd's: 10% to 25%	Swiss Re 100%	Berkshire Hathaway 100%
Coverage Trigger	Loss or Damage from EQ	Event Trigger: EQ intensity as measured by Peak Spectral Acceleration (PSA). Triggers expressed in % of earth's acceleration (g-force) 65% and 115%	Event Trigger: EQ exceeding (Richter Scale): Option A: 7.0 and 7.5 Option B: 6.5/7.0 and 7.5
Contract Structure	Insurance/Indemnity	Insurance /Derivative for Payout in excess of actual loss or damage Insurance/Indemnity	Insurance /Derivative for Payout in excess of actual loss or damage
Limit – PD & BI	$25M per occ. /aggregate	$50M per occ./aggregate; subject to max payout per zip code – see Exhibits A & B – Option A: approx. 5% to 10% – Option B: approx. 7% to 15%	$50M per occ./aggregate; subject to specific payouts by region – see Exhibit C
Deductible	$5M per occ.	N/A for events x/s trigger	N/A - 20% damage threshold of payout limit before payment
Term	1 year	3 year term only	3 year term only
Premium	$3.75M to $4.25M annual *Indication - need to finalize terms/pricing before binding*	Option A: $8,625,000 to $9,375,000 Option B: $10,875,000 to $11,850,000 *Indication - need to finalize terms/pricing before binding*	Option A: $3.25M for term Option B: $4.225M for term *Indications need to finalize terms/pricing before binding*

Exhibit A – Swiss Re Option A Payout Schedule - MMI 7.5 ~ 65%, MMI 8.5~115%

Sacramento-Sonoma Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
95403	50,206,631	2,398,000	4,796,000
95404	748,280	36,000	72,000
95439	1,975,259	94,000	188,000
95492	653,910	31,000	62,000
95610	133,666	6,000	12,000
95621	147,649,388	7,053,000	14,106,000
95624	538,201	26,000	52,000
95626	16,523,144	789,000	1,578,000
95628	8,917,136	426,000	852,000
95641	10,722,082	512,000	1,024,000
95655	1,473,736	70,000	140,000
95670	34,732,346	1,659,000	3,318,000
95742	6,174,354	295,000	590,000
95815	272,102	13,000	26,000
95823	65,754,474	3,141,000	6,282,000
95825	32,839,855	1,569,000	3,138,000
95826	126,741,888	6,054,000	12,108,000
95827	121,320,829	5,795,000	11,590,000
95828	183,666,419	8,768,000	17,536,000
95841	17,202,095	822,000	1,644,000
95842	43,180,903	2,063,000	4,126,000
95843	132,632,956	6,336,000	12,672,000
95690	4,615,530	220,000	440,000
95747	34,691,564	1,657,000	3,314,000
95627	3,506,032	167,000	334,000

– **Maximum Payout all regions - $50M**

Monterey Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
93907	840,996	42,000	84,000
93908	51,071,383	2,543,000	5,086,000
93955	117,230,406	5,838,000	11,676,000
93923	233,662,608	11,637,000	23,274,000
93924	98,841,988	4,922,000	9,844,000
93925	2,368,549	118,000	236,000
93940	258,388,838	12,868,000	25,736,000
93944	12,604,747	628,000	1,256,000
93943	1,163,553	58,000	116,000
93950	105,410,874	5,250,000	10,500,000
93953	122,412,734	6,096,000	12,192,000

Ventura Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
91320	238,120,042	14,297,000	28,594,000
91360	141,813,949	8,515,000	17,030,000
91361	14,642,890	879,000	1,758,000
93010	21,397,460	1,285,000	2,570,000
93012	244,503	15,000	30,000
93066	146,998	9,000	18,000

Los Angeles Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
90008	9,917,263	455,000	910,000
90043	56,164,271	2,578,000	5,156,000
90045	656,708	30,000	60,000
90056	41,536,121	1,906,000	3,812,000
90302	946,408	43,000	86,000
91007	3,186,468	146,000	292,000
91008	31,699,939	1,455,000	2,910,000
91010	117,788,836	5,411,000	10,822,000
91016	9,816,212	451,000	902,000
91106	4,798,561	220,000	440,000
91107	20,276,120	931,000	1,862,000
91108	105,815,199	4,857,000	9,714,000
91706	790,710	36,000	72,000
91731	21,224,871	974,000	1,948,000
91770	54,486,775	2,501,000	5,002,000
91775	22,566,318	1,036,000	2,072,000
91776	9,152,518	420,000	840,000
91780	33,765,352	1,550,000	3,100,000

San Diego Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
91911	6,603,184	332,000	664,000
91932	71,308,761	3,582,000	7,164,000
92118	89,679,179	4,505,000	9,010,000
91935	129,621,954	6,511,000	13,022,000
92155	244,693	12,000	24,000
92173	1,145,443	58,000	116,000

Exhibit B – Swiss Re Option B Payout Schedule - MMI 7.5 ~ 65%, MMI 8.5~115%

Sacramento-Sonoma Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
95403	50,206,631	3,597,000	7,194,000
95404	748,280	54,000	108,000
95439	1,975,259	141,000	282,000
95492	653,910	46,500	93,000
95610	133,666	9,000	18,000
95621	147,649,388	10,579,500	21,159,000
95624	538,201	39,000	78,000
95626	16,523,144	1,183,500	2,367,000
95628	8,917,136	639,000	1,278,000
95641	10,722,082	768,000	1,536,000
95655	1,473,736	105,000	210,000
95670	34,732,346	2,488,500	4,977,000
95742	6,174,354	442,500	885,000
95815	272,102	19,500	39,000
95823	65,754,474	4,711,500	9,423,000
95825	32,839,855	2,353,500	4,707,000
95826	126,741,888	9,081,000	18,162,000
95827	121,320,829	8,692,500	17,385,000
95828	183,666,419	13,152,000	26,304,000
95841	17,202,095	1,233,000	2,466,000
95842	43,180,903	3,094,500	6,189,000
95843	132,632,956	9,504,000	19,008,000
95690	4,615,530	330,000	660,000
95747	34,691,564	2,485,500	4,971,000
95627	3,506,032	250,500	501,000

- **Maximum Payout all regions - $50M**

Monterey Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
93907	840,996	63,000	126,000
93908	51,071,383	3,814,500	7,629,000
93955	117,230,406	8,757,000	17,514,000
93923	233,662,608	17,455,500	34,911,000
93924	98,841,988	7,383,000	14,766,000
93925	2,368,549	177,000	354,000
93940	258,388,838	19,302,000	38,604,000
93944	12,604,747	942,000	1,884,000
93943	1,163,553	87,000	174,000
93950	105,410,874	7,875,000	15,750,000
93953	122,412,734	9,144,000	18,288,000

Ventura Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
91320	238,120,042	21,445,500	42,891,000
91360	141,813,949	12,772,500	25,545,000
91361	14,642,890	1,318,500	2,637,000
93010	21,397,460	1,927,500	3,855,000
93012	244,503	22,500	45,000
93066	146,998	13,500	27,000

Los Angeles Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
90008	9,917,263	682,500	1,365,000
90043	56,164,271	3,867,000	7,734,000
90045	656,708	45,000	90,000
90056	41,536,121	2,859,000	5,718,000
90302	946,408	64,500	129,000
91007	3,186,468	219,000	438,000
91008	31,699,939	2,182,500	4,365,000
91010	117,788,836	8,116,500	16,233,000
91016	9,816,212	676,500	1,353,000
91106	4,798,561	330,000	660,000
91107	20,276,120	1,396,500	2,793,000
91108	105,815,199	7,285,500	14,571,000
91706	790,710	54,000	108,000
91731	21,224,871	1,461,000	2,922,000
91770	54,486,775	3,751,500	7,503,000
91775	22,566,318	1,554,000	3,108,000
91776	9,152,518	630,000	1,260,000
91780	33,765,352	2,325,000	4,650,000

San Diego Area

ZIP	TIV	Payouts MMI 7.5	Payouts MMI 8.5
91911	6,603,184	498,000	996,000
91932	71,308,761	5,373,000	10,746,000
92118	89,679,179	6,757,500	13,515,000
91935	129,621,954	9,766,500	19,533,000
92155	244,693	18,000	36,000
92173	1,145,443	87,000	174,000

Exhibit C – Berkshire Payout Schedule

Option A

San Diego	32.610363, -117.110731	30	7.0/7.5	10M/25M
Los Angeles	34.144583, -118.519738	50	7.0/7.5	25M/50M
Monterey	36.576307, -121.868621	30	7.0/7.5	25M/50M
Sacramento	38.587736, -121.369389	50	7.0/7.5	25M/50M
Santa Rosa	38.57531, -122.779015	30	7.0/7.5	10M/15M

Option B

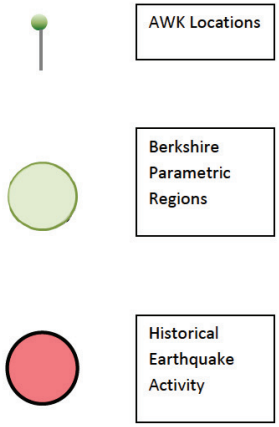
San Diego	32.610363, -117.110731	30	6.5/7.0/7.5	5M/10M/25M
Los Angeles	34.144583, -118.519738	50	6.5/7.0/7.5	10M/25M/50M
Monterey	36.576307, -121.868621	30	6.5/7.0/7.5	10M/25M/50M
Sacramento	38.587736, -121.369389	50	6.5/7.0/7.5	10M/25M/50M
Santa Rosa	38.57531, -122.779015	30	6.5/7.0/7.5	5M/10M/15M

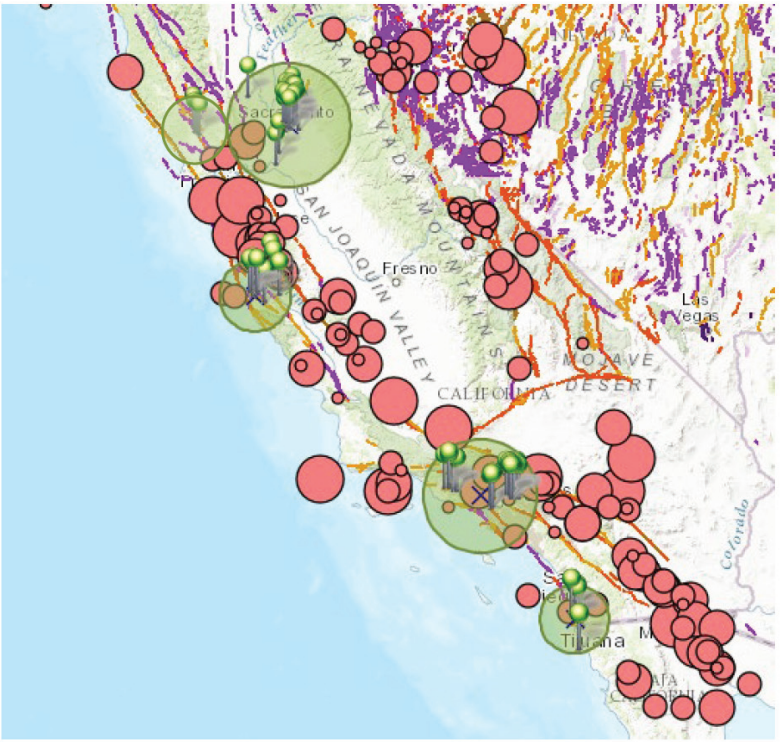
Indemnity Threshold: The insured must sustain direct or indirect loss arising from the covered Parametric Trigger event that results in a loss greater than or equal to 20% of the triggered payout/limit.

Aggregate: $50m aggregate limit for the term. In no instance will the policy pay more than $50m in the policy term.

Reporting Agency: United States Geological Survey

Exhibit D – Historical Earthquake Activity in relation to AWK Locations



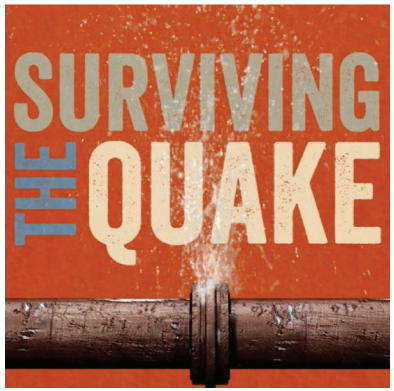


5

Attachment 2-5: EPA Earthquake Resilience Guide for Water and Wastewater Utilities

EARTHQUAKE RESILIENCE GUIDE
for Water and Wastewater Utilities

Select a menu option below.



Introduction and Video

Step 1. Understand the Earthquake Threat

Step 2. Identify Vulnerable Assets and Determine Consequences

Step 3. Pursue Mitigation and Funding Options

Disclaimer: This guide is not intended to serve as regulatory guidance. Mention of trade names, products or services does not convey official United States Environmental Protection Agency (EPA) approval, endorsement or recommendation for use.

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Introduction and Video

An earthquake is a sudden and violent shaking of the ground caused by movement within the earth's crust or by volcanic activity. While certain regions are more prone to seismic activity, earthquakes can occur anywhere in the country.

Earthquakes are difficult to predict and they may result in large-scale social and economic impacts.

Estimated Annualized Earthquake Losses for the United States. *Losses are increasing due to more development in earthquake-prone areas, vulnerability of older infrastructure and increased public and private sector interdependencies. Estimated losses are $6.1 billion per year with the largest in California (61%), Oregon and Washington (12%) and the central states (8%).*

The water sector is particularly vulnerable to earthquake damage and service disruptions. As stated in Resilience by Design from the Los Angeles Mayoral Seismic Safety Task Force, "the water system is the utility most vulnerable to earthquake damage, and that damage could be the largest cause of economic disruption following an earthquake."

By understanding the threat of earthquakes and the potential impacts to both the water infrastructure and the community, water utility owners and operators can make more informed decisions on earthquake mitigation options. While requiring financial investment, earthquake mitigation can significantly reduce or even prevent much costlier damages and economic impacts from future earthquakes. Also, the faster a water or wastewater utility recovers from an earthquake, the faster the community it serves can recover.

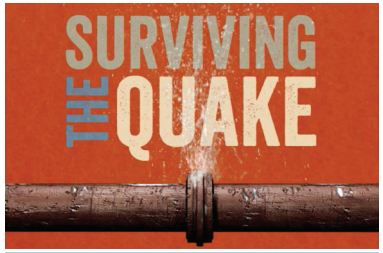
This guide helps water and wastewater utilities to be more resilient to earthquakes. It contains best practices from utilities that have used mitigation measures to address the earthquake threat. However, utilities should be cautious about proposing major seismic upgrades based solely on the information in this guide - a more detailed analysis is recommended. The guide is primarily meant to help:

- Utilities that know they are in earthquake-prone areas, but have not taken steps to address the hazard.
- Small and medium-sized utilities that need to better understand their seismic hazards.

There are three steps in this guide:

Step 1 - Understand the Earthquake Threat.
Step 2 - Identify Vulnerable Assets and Determine Consequences.
Step 3 - Pursue Mitigation and Funding Options.

Click the Surviving the Quake icon to watch a video about potential earthquake impacts to water systems.



Earthquake Resilience Video

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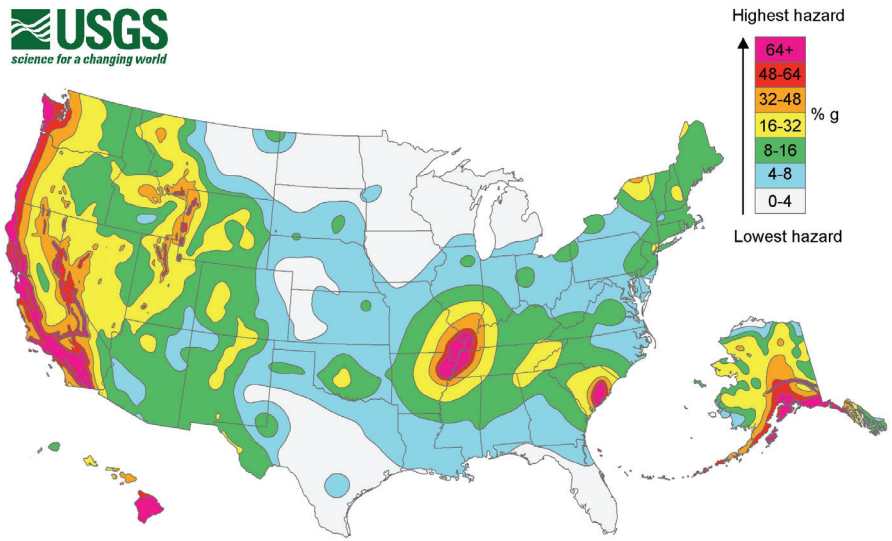
Step 1. Understand the Earthquake Threat

More than 143 million Americans, almost half the population of the United States, live in areas that are vulnerable to earthquakes.

- The western United States is particularly vulnerable due to a large number of faults or fractures in the earth's crust.
- In the central United States, the New Madrid Seismic Zone is a significant threat to at least eight states.
- In the eastern United States, earthquakes are smaller in magnitude; however, South Carolina has a significant seismic hazard.
- Both Alaska and Hawaii are prone to major earthquakes.

With thousands located across the country, many water and wastewater utilities are in earthquake hazard areas.



Is your Utility in an Earthquake Hazard Area?

- First, determine the earthquake threat to your utility. Use EPA's Earthquake Interactive Maps to locate your utility on the hazard maps.
- Then, contact your state hazard mitigation officer and work with your local mitigation planner. They may have already assessed and characterized your local earthquake hazard.

Click "Next" to learn about types of earthquakes.

Click for Earthquake Interactive Maps

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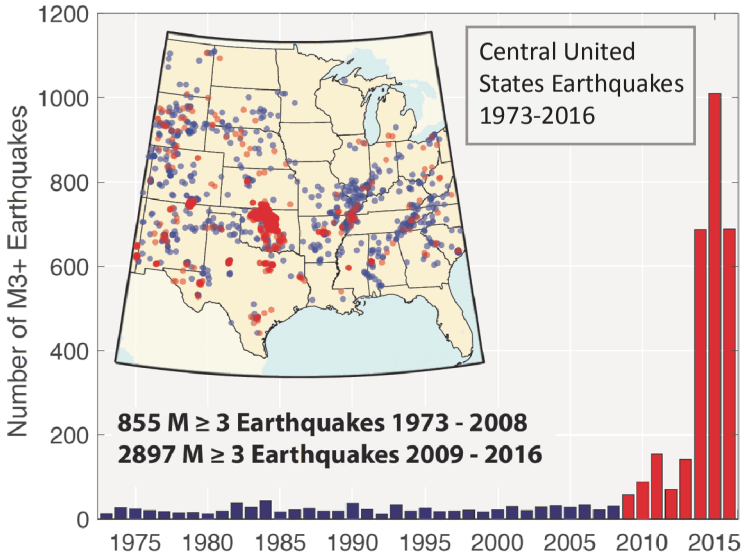
Step 1. Understand the Earthquake Threat

Types of Earthquakes

- **Natural Earthquakes.** Earthquakes occur on fault lines when rock bodies slip relative to each other. Seismic activity can happen deep in the earth or closer to the surface. The deepest earthquakes occur at subduction zones, where dense oceanic crust will sink, or subduct, under the lighter continental crust. Because of the large amount of seismic energy released at subduction zones, such earthquakes can shake the ground over many hundreds of miles. In contrast, crustal earthquakes are generally shallower. They can still cause intense shaking in more localized areas and are more likely to have fault displacement that ruptures the ground surface.

DETOUR
Learn about earthquake severity, or intensity scales

- **Induced Earthquakes.** Induced earthquakes are caused by human activity and may be triggered by such actions as impoundment of reservoirs, surface and underground mining, withdrawal of fluids and gas from the subsurface and injection of fluids into underground formations. For example, when injected fluid finds its way to a stressed earthquake fault, the fluid can prompt fault movement and induce earthquakes. In the central United States, the number of earthquakes has increased dramatically since 2009 based on United States Geological Survey data. Typically, the seismic intensity of induced earthquakes is relatively small and not likely to cause much damage to water and wastewater utilities. However, larger and potentially damaging induced earthquakes have occurred in the past.



Natural and Induced Earthquakes > 3 Magnitude (USGS, 2016 data)

Click "Next" to learn about the types of ground movement that affect utilities.

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Step 1. Understand the Earthquake Threat

Types of Ground Movement

- **Shaking and Ground Displacement.** Earthquakes are characterized by shaking that can damage structures. Shaking may be increased or amplified by the type of topography. For instance, ground shaking is worse in basins with soft sediments (e.g., Seattle) than in mountainous regions. If you know your utility is located on soft soils, damage may be worse than expected. The ground can also displace horizontally or vertically at the faults. This can cause surface ruptures and breaks in piping and other utility assets that cross these ground displacements.

- **Liquefaction.** When earthquakes occur in areas that are saturated and have loose, sandy soils (e.g., by rivers, lakes), the shaking can turn the ground to liquid. This phenomenon, called liquefaction, can be very destructive to your utility because buildings can sink into the liquefied ground. Buried drinking water pipes also will sink, however sewer pipes, manholes and pump stations (assets partially filled with air) may float to the surface. After the earthquake, the liquefied soil will re-solidify, locking tilted buildings and broken connections into place. To help identify potential liquefaction areas, use the liquefaction maps in EPA's Earthquake Interactive Maps or contact your state geological survey office.

Manhole floats from liquefaction

- **Lateral Spreading.** Lateral spreading is the sideways movement of liquefied soils on gentle slopes. This happens when liquefaction occurs in the subsurface layer, the movement of which can result in the opening of large fissures in the ground which can reach distances of several hundred feet. It can damage pipes, treatment facilities, wells, tanks and other water and wastewater assets. If the liquefied material is located far below the surface and there is a significant slope, the liquefied material and the ground surface can undergo significant down slope movement. This flow can particularly damage buried pipes and tanks.

- **Settling.** Earthquakes can cause the ground to change elevation and eventually settle. This is called ground subsistence and it can have serious impacts on water and wastewater systems, especially in locations dependent upon gravity flow. For example, in Christchurch, New Zealand, severe ground settlement of pipes prevented the proper flow of sewage.

DETOUR
Learn about other earthquake hazards

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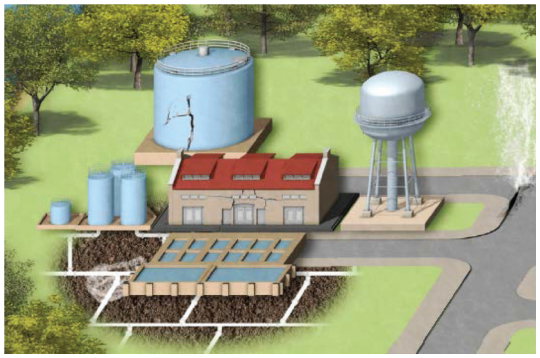

Water and wastewater utilities are particularly vulnerable to earthquakes because of the extensive network of above and below ground pipelines, pump stations, tanks, administrative and laboratory buildings, reservoirs, chemical storage and treatment facilities.

For a drinking water system, an earthquake can cause hundreds … even thousands … of breaks in water pipelines, ruptures in storage and process tanks and the collapse of buildings. This can cause a loss of water system pressure, contamination and drinking water service disruptions for your customers.

A wastewater system can also expect infrastructure damage from an earthquake, including breaks in the collection system. Sewers and wastewater treatment plants tend to be built on ground which is subject to liquefaction. Damage can lead to sewage backups in homes and potential releases of untreated sewage into the environment.

To protect your utility, you will need to assess the potential damage to buildings and key assets. This step is broken into three actions:

- Action 1 – Inventory critical assets and plot them on hazard maps.
- Action 2 – Characterize critical assets, types of failures and consequences to your utility.
- Action 3 – Summarize results and prioritize mitigation.

DETOUR
Learn about assessment tools

Click “Next” to learn more about these three actions.

Ultimately, these actions will help you determine the types of mitigation measures and strategies that are worth considering. However, you still may require technical expertise and analysis from other professionals. State agencies, other utilities, consultants and free assessment tools may be helpful.

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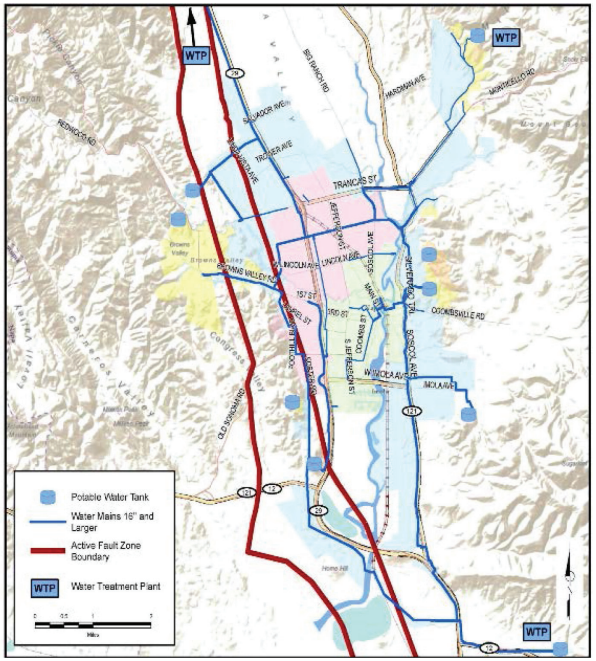
Step 2. Identify Vulnerable Assets and Determine Consequences

Action 1 – Inventory Critical Assets and Plot on Hazard Maps

List and plot the location of your key assets on a seismic hazard map. Locate the assets relative to earthquake threats, including shaking, surface faults and liquefaction.



Assets on Hazard Map

Action 2 – Characterize Critical Assets, Types of Failures and Consequences to Your Utility

Characterize your building structures, pipelines, tanks, reservoirs, pumps, lift stations, wells, treatment facilities and power assets to determine their vulnerability. Note that the construction materials, design or age can make an asset particularly vulnerable. Other factors to consider when assessing possible asset failures and the consequences to your utility include:

- Potential for loss of power.
- Direct hazard to employee and public safety.
- Possible gas line ruptures and fires near utility assets.
- Impacts to firefighting and hospitals.
- Time for repairs.
- Availability and cost of spare parts.
- Need to provide emergency drinking water or alternate wastewater services.

Click “Next” to see how to characterize the vulnerability of your buildings and pipelines and then click “Next” again for tanks and reservoirs, pumps, lift stations and wells, treatment facilities and power assets.

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Step 2. Identify Vulnerable Assets and Determine Consequences

Action 2 – (continued)

2a) Characterize Buildings. Characterize the age and construction type of your buildings to determine their vulnerability to earthquakes. Note that building failure and collapse are critical dangers to your personnel. See the table to the right for summary information relating anticipated earthquake damage to building construction type (see Association of Bay Area Governments Resilience Program). Also, consult the American Society of Civil Engineers (ASCE) Standard 41-06 Seismic Rehabilitation of Existing Buildings (2007). In general, buildings older than 1995 are more vulnerable to earthquake damage.

Building Structure	Anticipated Damage
Unreinforced masonry	Severely cracked or collapsed walls. Separation between floors and walls jeopardize vertical support of roof and floor systems, leading to collapse
Unreinforced brick	Substantial damage
Tilt up concrete	Connection between the roof and walls can fail causing roof collapse
Non-ductile concrete frame	Lateral movement can strain frame with catastrophic consequences
Non-Structural elements (cladding)	Detach from building injuring people and impeding evacuation or access

2b) Characterize Pipelines. Characterize pipelines to determine vulnerability to earthquakes. Consider factors including pipe location, age, compatibility with soils, construction materials and number of joints. From ground shaking, pipes often crack at brittle joints or are crushed at the bell or pipe barrel. From liquefaction or lateral spreading, pipes often break or separate at the joints. For example, in the Kobe, Japan earthquake, more than half of the drinking water pipe failures were from joints pulling apart.

Crushed pipe

Drinking water pipes are commonly made with ductile iron (DI) (historically cast iron), welded steel, polyvinyl chloride (PVC), pre-stressed concrete or asbestos cement. Cast iron pipes have the highest break rate in both liquefaction and non-liquefaction areas. Asbestos cement pipes are known to have moderate to high vulnerability, especially in liquefaction areas.

DETOUR
Learn more about pipe vulnerability

Wastewater pipes are more prone to damage than drinking water pipes, however in terms of function, damaged sewer pipes may still be operational with some leakage. Wastewater pipes are typically made of reinforced concrete, PVC, vitreous clay and fiberglass. Such pipes and manholes may buoyantly float in liquefied soils, causing severe problems.

In general, pipelines are prone to failure at connections to aboveground structures, such as reservoirs, treatment plants, pump stations and at bridge or fault crossings.

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Step 2. Identify Vulnerable Assets and Determine Consequences

Action 2 – (continued)

2c) Characterize Tanks and Reservoirs. Damage to storage tanks can occur from the actual shaking as well as the permanent ground deformation caused from liquefaction, landslides, etc. Types of damage include sliding on the foundation, elephant foot buckling for steel tanks, stretching of bars for wood tanks or cracking or shearing of walls for concrete tanks. Also, liquids in tanks or reservoirs can slosh and create forces on tank walls beyond the design capacity. In the 1994 Northridge earthquake, movement of a water tank caused the piping to sever. A steel tank at a utility in Los Angeles suffered elephant foot buckling from sloshing.

Severed pipe

Elephant foot buckling

2d) Characterize Pumps, Lift Stations and Wells. Pay particular attention to wastewater pump stations and booster pumps in liquefiable soils as they often float, which severs connecting piping. An inoperable lift station can cause wastewater to overflow and backup into residences and commercial buildings. Manholes may also float. For wells, ground movement, including liquefaction-induced lateral spreading, can bend casings, distort vertical shafts and disable well pumps.

2e) Characterize Treatment Facilities. Treatment structures at water and wastewater utilities have a wide variety of equipment, processes and chemicals. Wastewater treatment buildings tend to be near rivers in areas subject to liquefaction. Also (as in the 1989 Loma Prieta earthquake in California), clarifiers can be heavily damaged due to sloshing wastewater. In another example, an earthquake created a chemical spill that entered the collection system of a wastewater utility, which then caused the biological treatment process to fail. Coupled with the loss of power to the blowers, the secondary treatment system was inoperable for several weeks.

Damaged clarifier

2f) Characterize Power Assets. Maintaining electric power is key for both water and wastewater operations. Earthquake damage to power lines, transformers, generators and feeds will disrupt equipment functionality. Assets from both the power utility and the water and wastewater utility need to be assessed for possible failure and restoration.

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Step 2. Identify Vulnerable Assets and Determine Consequences

Action 3 – Summarize results and prioritize mitigation

After completing Actions 1 and 2, summarize your asset vulnerability and consequences in a simple table such as the one below. Then, determine the "Priority for Mitigation" (last column) based on your best professional judgment and advice from government or private sector experts.

Critical Asset or Resource	Sample Evaluation Factors												Priority for Mitigation		
	Subject to liquefaction	Not seismically protected	May endanger employees	Close to earthquake fault	In earthquake hazard zone	Reliant on grid power	Materials, design or age make asset vulnerable	Impacts firefighting ability	Critical for clean water and sewage treatment	Enhances response and/or recovery	Failure may endanger public	Consequence	Low	Medium	High
Pump #5		✓		✓	✓	✓						Pump is the backup for Pump #6. Loss of pump could be handled by…		✓	
Cast iron pipe near treatment facility	✓	✓			✓		✓	✓	✓			Cast iron pipes fail at joints to above-ground buildings. Result in loss of system pressurization. No drinking water for weeks and limited water available for firefighting.			✓
Occupied building #1		✓	✓		✓	✓			✓			Building could collapse and endanger workforce.			✓

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Step 3. Pursue Mitigation and Funding Options

Consider mitigation actions and projects to help your utility better withstand an earthquake, minimize damage and rapidly recover from disruptions to service. An example is to replace vulnerable buried pipe with seismic resistant pipe. Such efforts can be part of a long term capital improvement and asset management plan. As one strategy, when you replace aging equipment after its design life, install seismic upgrades, which are typically not major added costs.

Mitigation Options

Fortunately, many utilities have evaluated the threat of earthquakes and taken actions to mitigate damage. Explore some of these mitigation approaches, including several low cost options.

Mitigation for Immediate Life Safety

Mitigation for Key Systems in Hazard Areas

Mitigation through Emergency Response

Mitigation by Specific Asset

Learn more about mitigation from other sources

Learn more about seismic building codes

Funding Options

Utilities have many options to implement and fund earthquake mitigation projects. Click Funding Options:

Funding Options

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Mitigation for Immediate Life Safety

✓	Mitigation Options	Cost
1. Protect your employees		
	a. Make sure employees know your emergency response plans and practice emergency action drills.	$
	b. Maintain emergency generators (seismically certified) at employee locations to help mitigate widespread power outages.	$$
	c. Prevent collapse of occupied buildings. For seismic protection of new buildings, follow ASCE 7 Standard Minimum Design Loads for Buildings. To retrofit buildings (e.g., bracing or shear walls), follow ASCE 41-06 Seismic Rehabilitation of Existing Buildings.	$$$
	d. Anchor equipment (e.g., computers, bookshelves) as well as laboratory equipment and chemical and fuel tanks.	$
	e. Identify people who can perform post-earthquake building inspections for safety.	$
2. Protect the public from catastrophic failures of vulnerable storage tanks or reservoirs		
	a. Seismically retrofit water tanks (e.g., anchoring to foundations).	$$$
	b. Strengthen concrete tank walls, replace non-flexible connections and improve roof structures over large reservoirs.	$$$
	c. For new tank installations in high risk seismic zones, determine if liquefaction or other permanent ground movements are possible. If so, stabilize the foundation to minimize movement. Design the tank height to safely account for sloshing forces during an earthquake.	$$$
3. Plan for emergency public health and firefighting		
	a. Work with your community and state on an emergency plan for drinking water and sewage treatment (e.g., improvised chemical toilets).	$
	b. Develop a plan for emergency sewage capability, including portable or improvised chemical toilets.	$
	c. Plan for use of temporary bypasses to move wastewater flow away from the public following ground movement.	$$
	d. Address high consequence sewers like those that are difficult to repair (e.g., under rivers, highways or buildings).	$$$
	e. Coordinate with firefighters on a plan to obtain alternate water supplies like swimming pools, reclaimed water and seawater.	$

Cost Key (Ranks relative costs of mitigation measures - actual costs may differ for your utility)
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Mitigation for Key Systems in Hazard Areas

✓	Mitigation Options	Cost
1. Reinforce "backbone" of your utility (e.g., treatment facilities, transmission lines, large diameter pipelines and storage tanks)		
	a. For a water system, consider installing isolation valves on main transmission lines. For pipes in areas with a moderate to high liquefaction hazard or that traverse active faults, replace with pipes designed to the specifications in Seismic Guidelines for Water Pipelines (ALA, 2005). In general, use steel with welded joints, high-density polyethylene (HDPE) pipes with fused joints, ductile iron with seismic joints and molecularly oriented PVC (PVCO) with restrained joints (American Water Works Association C909 PVCO Pressure Pipe, 4 In. through 24 In., for Water, Wastewater, and Reclaimed Water Service; 2010).	$$$
	b. Design the backbone of your utility to supply water to critical facilities (e.g., hospitals and fire suppression points). This strategy might require special points of distribution or other ways to deliver water from the backbone. Also, consider quick fixes (e.g., temporary piping to maintain capability) in the short term as you wait for completion of expensive mitigation projects that may take years to implement.	$$-$$$
	c. For a wastewater system, seismically harden major trunk lines and pump stations.	$$$
2. Address liquefaction areas and fault lines		
	a. Consider options to protect fixed water system assets, including improving soils with soil mixing, cement grouting, stone columns, piles, compaction or movement of assets into non-liquefaction areas. Consult geotechnical engineers and engineering geologists experienced in liquefaction hazard mitigation.	$$$
	b. Position drinking water wells outside of seismic hazard zones if possible.	$$$
	c. Require mitigation for key pipelines that cross known and active fault lines. Consider installing a bypass or temporary emergency pumping systems as well as replacing hard (inflexible) tank joints with soft (flexible) or ball joints to limit breakage.	$$$

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Mitigation through Emergency Response

✓	Mitigation Options	Cost
1. Plan for Response		
	a. Develop an emergency response plan (ERP) that includes procedures for earthquakes.	$-$$
	b. Ensure that employees are trained on the ERP and periodically exercise its procedures to maintain an acceptable level of readiness. Also, train workers in the incident command system so that utility responders can better coordinate with other local and state responders. Participate in community-wide earthquake preparedness training and exercises.	$
	c. Consider back-up locations for your Emergency Operations Center and back-up systems for emergency communications (e.g., 800 MHz radios)	$$
	d. Consider preparing emergency "Go Kits" for employees and their families.	$
	e. Establish and maintain a current list of key contacts and phone numbers for local agencies, contractor services support, material supply vendors and interdependent services within the community.	$
	f. Coordinate earthquake preparedness activities with interdependent services within the community, such as power providers, and with critical customers, such as hospitals and major commercial entities.	$
2. Maintain Assets for Response		
	a. Have adequate spare parts (e.g., temporary piping, pre-made hose bibs and hydrant cable connections), equipment and certified, trained staff to rapidly fix damage after an earthquake.	$$
	b. Address how power will be restored to pump stations (e.g., permanent or portable generators, portable pump connections and whether to own, share or contract fuel trucks for generators).	$$-$$$
	c. Join a mutual aid network like the Water and Wastewater Agency Response Network (WARN). During the Napa earthquake, the Napa water utility used the California WARN to request seven teams from other utilities to help repair pipelines.	$
	d. If appropriate, maintain a fleet of small water tanker trucks or water buffaloes and the fuel needed to operate them.	$$

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Mitigation by Specific Asset

Click a photograph below and get information on specific earthquake mitigation options for that asset.

Pipes

Buildings

Treatment Facilities, Pumps, Lift Stations and Sewers

Basins, Reservoirs and Impoundments

Above Ground Storage Tanks

Power Supply and Electrical Components

Wells, Source Water and Dams

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Mitigation for Pipes

✓	Mitigation Options	Cost
1. Above Ground Pipes		
	a. Brace pipes with ties or other methods; provide flexibility and connections to hard points.	$$
2. Underground Pipes – Non Liquefaction Areas		
	a. Use modern pipe (e.g., DI, PVC) which is typically adequate for areas with small to moderate ground motions and no permanent ground deformation.	$$
	b. Replace vulnerable transmission and backbone piping first before distribution piping. For vulnerable pipelines, consider installing redundant pipes in locations with less seismic activity.	$$$
3. Underground Pipes – Liquefaction Areas		
	a. Use seismic resistant pipe such as steel with welded joints, HDPE with fused joints, DI with seismic joints or molecularly oriented PVC with restrained joints (AWWA C909) for transmission pipelines subject to ground deformation from liquefaction and landslides.	$$
	b. Slip line existing pipe with HDPE to decrease the pipe's vulnerability.	$$
	c. Replace pipes in accordance with Seismic Guidelines for Water Pipelines (ALA, 2005) in areas with moderate to high liquefaction or that traverse active faults.	$$$
	d. Consider changing pipe alignment to avoid liquefiable areas or replace with new pipe. Intake pipes are often susceptible to liquefaction. Stabilization of soils (e.g., deep soil mixing and stone columns) is possible, but expensive.	$$$
	e. Install portable facilities (e.g., hoses, pumps) to allow pipelines to bypass areas of liquefaction.	$$

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Mitigation for Buildings

Follow ASCE 7 for new buildings and ASCE 41-06 for retrofitting of buildings. Retrofits could be accomplished by adding new seismic bracing or shear walls. Do not forget to anchor equipment within buildings (e. g., computers, bookshelves and vending machines). You can find additional suggestions in the Association of Bay Area Governments Resilience Program or ASCE 41-06.

✓	Mitigation Options	Cost
1. Unreinforced Masonry Buildings		
	a. Tie walls to floor and ceiling elements or anchor unsupported masonry walls, install bracing or apply wall overlays to add strength.	$$$
2. Non-Ductile Concrete Frame Buildings		
	a. Add interior walls or jacketing or wrap concrete structural columns for strength and ductility.	$$$
3. Tilt-up Concrete Building		
	a. Bracket the walls to the roof.	$$

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Mitigation for Treatment Facilities, Pumps, Lift Stations and Sewers

✓	Mitigation Options	Cost
1. For Both Liquefaction and Non Liquefaction Areas		
	a. Anchor or brace pumps, process and lab equipment.	$
	b. Maintain seismically certified (see the International Building Code) emergency generators at key facilities to help mitigate widespread power outages.	$$
2. For Liquefaction Areas		
	a. Consider mitigation approaches, including improving soils with soil mixing, cement grouting, stone columns, compaction and piles for treatment facilities. Piping associated with treatment facilities may also benefit from these strategies.	$$$
	b. Provide flexible connections for pipeline connections to pump stations.	$-$$
	c. Consider what design might be best for new sewers in liquefiable soils, as sewers and manholes will float during an earthquake. HDPE with tie downs is one alternative, another is adding concrete to manholes to reduce their buoyancy.	$$

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Mitigation for Basins, Reservoirs and Impoundments

✓	Mitigation Options	Cost
1. For Both Liquefaction and Non Liquefaction Areas		
	a. Reinforce concrete structures, strengthen concrete tank walls, use flexible connections to pipes (e.g., ball joints) and improve roof structures over large reservoirs.	$$$
	b. Strengthen reservoirs by buttressing basin walls.	$$$
	c. Increase capacity for buried, seismically-protected drinking water storage. Consider redundancy of these assets for the short term, but you will need to evaluate cost effectiveness.	$$$
	d. Replace hard (inflexible) tank joints with soft (flexible) joints to limit breakage especially where tank wall uplift is anticipated (e.g., unanchored tanks).	$$
	e. Anchor older pre-stressed concrete tanks with seismic cables.	$$
	f. Use AWWA Standards D100-10 (Welded Carbon Steel Tanks for Water Storage, 2010) D110-13 (Wire and Strand Wound, Circular, Prestressed Concrete Water Tanks, 2013) and D115-06 (Tendon Prestressed Concrete Water Tanks, 2006). For concrete tanks and basins, use ACI 350-06 (Code Requirements for Environmental Engineering Concrete Structures, 2006).	$

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Mitigation for Above Ground Storage Tanks

✓	Mitigation Options	Cost
1. Water Tanks		
	a. Conduct site-specific subsurface investigations for new tank installations in high seismic zones to determine the potential for permanent ground movements. If the site has a moderate to high potential for movement, use steel tanks rather than concrete unless the hazard is mitigated.	$$$
	b. Reinforce the foundation on large horizontal tanks. Some unanchored tanks will sustain damage where they connect to fixed piping.	$$$
	c. Consider automatic shutoff valves on tanks. Use only on tanks in pressure zones with multiple reservoirs and feeds.	$$
	d. Seismically retrofit water tanks, which can include anchoring to foundations, strengthening concrete tank walls, replacing non-flexible pipe connections and improving roof structures over large reservoirs.	$$$
2. Chemical Tanks		
	a. Anchor or restrain chlorine containers and chemical tanks.	$

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Mitigation for Power Supply and Electrical Components*

✓	Mitigation Options	Cost
1. Power Supply		
	a. Consider purchasing or renting seismically-certified backup power generators. Fixed generators and associated systems must be anchored.	$$
	b. Have portable generators available to dispatch with capacities determined and plug-ins designed for specific facilities.	$$
	c. Test emergency power options regularly.	$
	d. Communicate with your power company to prioritize electricity restoration to water and wastewater utilities.	$
2. Electrical Components		
	a. Add electrical redundancy at treatment plants. Note that multiple feeds may come from the same high voltage substation, which may itself be vulnerable to earthquakes.	$
	b. Install new anchorages for transformers and reroute electrical boxes.	$$

*Refer to Power Resilience Guide for Water and Wastewater Utilities for additional suggestions.

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Mitigation for Wells, Source Water and Dams

✓	Mitigation Options	Cost
1. Wells		
	a. Consider locating wells outside of seismic hazard zones. Wells are vulnerable if exposed to ground deformation from liquefaction, fault activity and landslides.	$$-$$$
	b. Design the upper casing (approximately 40 feet) to resist all imposed loads due to liquefaction and/or lateral spread.	$$
	c. Use stainless steel screens rather than slotted casings to avoid corrosion failures that can result in a loss of capacity or water quality issues.	$$
	d. Provide well discharge piping with the ability to accommodate differential settlement between the well head and buried pipe.	$$
2. Source Water		
	a. Explore a diversity of water sources (e.g., river, groundwater or reservoir) and associated supporting facilities. Certain water sources may be more vulnerable to earthquakes.	$$-$$$
3. Dams		
	a. Assess dam vulnerability with an expert. The consequence of dam failure can be very high in terms of public safety.	$$$

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Funding Options

Become Eligible for Funding by Joining Local Mitigation Efforts. Local governments are required to develop hazard mitigation plans and have strategies in place to mitigate the effects of natural disasters, including earthquakes. Be sure that local mitigation plans include language about mitigating earthquakes at your utility so that proposed mitigation projects become eligible for federal funding. Also, adopt seismic design standards for new facilities, so that if the facility is damaged in an earthquake, the Federal Emergency Management Agency (FEMA) will reimburse you to the adopted standard. How can you partner with your local mitigation planner? Check out EPA's Hazard Mitigation Guide for Natural Disasters.

Federal Funding for Mitigation Projects. Receiving federal funding for an earthquake mitigation project often requires diligence, good connections with local mitigation planners and a strong application. To help utilities understand and obtain federal disaster and mitigation funds, EPA developed Fed FUNDS. Fed FUNDS can help you quickly screen for applicable funding programs from FEMA, EPA, the United States Department of Housing and Urban Development (HUD), the United States Department of Agriculture (USDA) and the Small Business Administration (SBA). It also provides examples of successful utility applications and tips to get funding.

Utilities in Utah became involved in their local hazard mitigation process and ended up receiving significant FEMA and Bureau of Reclamation funds for earthquake mitigation.

FEMA has three individual programs to fund mitigation projects for earthquake resilience:

- Public Assistance (PA) Grant Program.
- Hazard Mitigation Grant Program (HMGP).
- Pre-Disaster Mitigation (PDM) Program.

Each program has specific project eligibility and funding requirements. Typically, the proposed mitigation projects must go through a benefit-cost analysis and show clear benefits. See the FEMA STAPLEE Method for a formal benefit-cost review used for FEMA funded projects.

When evaluating the mitigation approaches, consider:

- *Effectiveness in mitigating asset damage.*
- *Practicality in implementing mitigation options.*
- *Costs, including capital, operations and maintenance.*

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Funding Options

Develop a Plan to Implement Earthquake Mitigation Projects. The plan should identify the actions to implement the project, the time to complete the project, the lead person or agency responsible for taking the actions and the costs and funding sources (e.g., grant funds or capital expenditures). The plan should reflect a long-term commitment to the project. Depending on the size, cost and complexity, some mitigation actions may be completed through internal work orders, capital improvement planning or supplemental funding. The use of multiple funding sources is an effective strategy. See a sample mitigation project plan below.

Mitigation Project	Actions to Implement Mitigation Project	Time to Complete	Lead Individual or Agency	Funding Source
Seismic Retrofit of Water Tanks	• Develop proposal that outlines basic engineering plans and a benefit-cost analysis to retrofit tanks (2 months). • Incorporate project into local hazard mitigation plan and capital improvement budget (3 to 10 months). • Take proposal to town manager for preliminary approval (4 months). • Work with local mitigation official and pursue FEMA mitigation funds (4 months to 1 year).	1 year	Operations and Financing	Capital improvement funding and FEMA HMGP
Seismic Emergency Power Generator	• Develop proposal that outlines basic engineering plans and a benefit-cost analysis for a seismic generator (note benefits for other disasters); include costs for operations, maintenance and fuel (2 months). • Talk to power utility about priority restoration of electricity as well as possibility of a generator (2 to 3 months). • Talk to fuel vendors to establish agreements (within 2–3 months). • Take proposal to town manager for preliminary approval (4 months). • Work with local mitigation official and explore idea of getting FEMA mitigation funds for generator, perhaps bundled with other measures (4 months to 1 year).	1 year	Operations and Financing	Capital improvement funding and FEMA HMGP

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Measuring Earthquake Severity

Modified Mercalli Intensity Scale Scale ranging from I to XII based on damage at a particular location. The more the damage, the higher the number.		
Intensity	Shaking	Description and Damage
I	Not felt	Not felt.
II	Weak	Felt only by people sitting or those on upper floors of buildings.
III	Weak	Felt by almost all persons indoors. Hanging objects swing. Vibrations felt similar to the passing of a truck. May not be recognized as an earthquake.
IV	Light	Felt by all indoors and a few outdoors. Some awakened at night. Stopped cars rock. Windows, dishes and doors rattle. Glasses clink. In the upper range of IV, wooden walls and frames creak.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes and windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all. People walk unsteadily. Windows crack. Dishes, glassware, knickknacks and books fall off shelves. Pictures fall off walls. Furniture moved or overturned. Weak plaster, adobe buildings and some poorly built masonry buildings crack. Trees and bushes shake visibly.
VII	Very strong	Difficult to stand or walk. Noticed by drivers in cars. Damage to poorly built masonry buildings. Weak chimneys broken at roof line. Plaster, loose bricks, stones, tiles, cornices, unbraced parapets and porches fall. Some masonry buildings crack. Waves on ponds.
VIII	Severe	Steering of cars affected. Extensive damage to unreinforced masonry buildings, including partial collapse. Some masonry walls collapse. Chimneys twist and fall. Wood-frame houses moved on foundations if not bolted; loose partition walls thrown out. Tree branches broken.
IX	Violent	General panic. Damage to masonry buildings ranges from collapse to serious damage unless modern design. Wood-frame structures rock and, if not bolted, shift off foundations. Underground pipes broken. It is also likely that pipes are broken at lower intensities.
X	Extreme	Some well-built wooden structures and bridges destroyed; most masonry and frame structures destroyed with their foundations. Rails bent. Poorly built structures destroyed with their foundations.
XI		Rails bent greatly. Underground pipelines completely out of service.
XII		Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.

Richter Scale*	
Magnitude	Strength of Earthquake
3-3.9	minor
4-4.9	light
5-5.9	moderate
6-6.9	strong
7-7.9	major
8+	great

*Logarithmic measure of total energy (magnitude) released at epicenter (point on earth's surface directly above where earthquake starts). Scale does not relate to damage.

Moment Magnitude

- logarithmic measure of energy release.
- function of the length, width and fault offset.
- replacing Richter Scale.

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Learn More about Earthquake Hazards

Below are other hazards that can accompany earthquakes. Also, the United States Geological Survey has a wealth of information on earthquakes.

Tsunamis. In the ocean, an earthquake may generate significant tsunamis (huge waves of water) that can severely damage your coastal infrastructure. Tsunamis can be generated from displacement of faults under the ocean or from generation of large landslides. For example, an earthquake at the Cascadia subduction zone could cause a tsunami off the coasts of Oregon, Washington and northern California. One study looked at flood inundation and evacuation maps for two small coastal towns in Oregon. Tsunamis can also strike coastal states even though they may be generated by earthquakes in other states and countries.

Landslides and Rockfalls. Shaking can trigger landslides and rockfalls. Both can damage aboveground utility structures as well as buried pipelines.

Flooding. Earthquakes can damage dams and reservoirs that can potentially release floods that can threaten populations and damage infrastructure.

Fires. Outbreaks of fires often accompany earthquakes. This presents a potential challenge when fires are near utility assets as well as an added responsibility of the utility to maintain water availability for firefighting.

Computer modeling of a tsunami after a hypothetical magnitude 7.8 earthquake on the Cascadia subduction zone.

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Tools to Assess Your Specific Structures

If you want to perform a seismic analysis of your specific structures (e.g., treatment buildings, biosolids building, administration building, electrical controls), there are free tools to help, but it may take some time and experience to use them.

FEMA Hazus - Contains models for estimating potential losses from earthquakes, floods and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic and social impacts of disasters. Chapter 8 of the Technical Manual for Earthquakes Model focuses on direct damage to water utilities and wastewater utilities as well as estimated restoration time.

ROVER - Rapid Observation of Vulnerability and Estimation of Risk, is FEMA's free mobile software to inventory buildings (including location) and help building managers prioritize evaluation and rehabilitation after an earthquake.

ShakeCast and **ShakeMaps** - During earthquake response, these free USGS software products predict damage to your buildings from actual earthquakes and notify you so that you can take quick actions to ensure safety and restore your utility. For earthquake planning, ShakeMaps has earthquake scenarios that you can use to determine the potential damage to your buildings.

Pipe Vulnerability

Pipe Material Type and Diameter	AWWA Standard	Joint Type*
Low Vulnerability		
Ductile Iron	C1xx Series	B&S, RG, R
Polyethylene	C906	Fused
Steel	C2xx Series	Arc Welded
Molecularly Oriented PVC	C909	B&S, RG, R
Ductile Iron Seismic Joint	C1xx Series	B&S, RG, R
Low to Medium Vulnerability		
Concrete Cylinder	C300, C303	B&S, R
Ductile Iron	C1xx Series	B&S, RG, UR
PVC	C900, C905	B&S, R
Steel	C2xx	B&S, RG, UR
Moderate Vulnerability		
AC > 8" D	C4xx Series	Coupled
Cast Iron > 8" D	None	B&S, RG
PVC	C900, C905	B&S, UR
Concrete Cylinder	C300, C303	B&S, UR
Moderate to High Vulnerability		
AC <= 8" D	C4xx Series	Coupled
Cast Iron <= 8" D	None	B&S, RG
Steel	None	Gas Welded
High Vulnerability		
Cast Iron	None	B&S, Rigid

*B&S – bell and spigot; RG – rubber gasket; R-restrained; UR – unrestrained
Vulnerability was based on consideration of ruggedness, bending, joint flexibility and joint restraint.
Source: Overview of Piping Systems and their Seismic Vulnerability; Donald Ballantyne, Ballantyne Consulting LLC; National Water and Wastewater Association meeting (2014).

Utilities can use empirical relationships developed by the American Lifelines Alliance (ALA, 2005) to predict the number of breaks and leaks in your pipeline system. Estimate the time required to both repair the breaks and leaks and restore system functionality based on historical crew productivity data.

Standards and Building Codes for Utility Earthquake Resilience

Newly built utility structures should conform to seismic building codes. Existing assets should conform to various standards. The International Building Code (IBC) specifically addresses seismicity in both "design" and "installation" of building systems. Check your local and state building codes.

Title	Code	Standard	Guideline
IBC International Building Code (2015) or applicable jurisdictional building code	X		
ASCE-7, Minimum Design Loads for Buildings and Other Structures (2016)		X	
ALA* Seismic Design and Retrofit of Piping Systems (2002) (primarily above ground pipe)			X
ALA Seismic Fragility Formulations for Water Systems (2001) (used to estimate system pipeline damage)			X
ALA Seismic Guidelines for Water Pipelines (2005)			X
ALA Guidelines for Implementing Performance Assessments of Water Systems (2005)			X
ALA Wastewater System Performance Assessment Guideline (2004)			X
ASCE 41-06 Seismic Rehabilitation of Existing Buildings (2007)		X	
ACI 350-06 Code Requirements for Environmental Engineering Concrete Structures (2006)		X	
AWWA D100-11 Welded Carbon Steel Tanks for Water Storage (2011)		X	
AWWA D110-13 Wire and Strand Wound, Circular, Prestressed Concrete Water Tanks (2013)		X	
AWWA D115-06 Tendon Prestressed Concrete Water Tanks (2006)		X	

*Note: The American Lifelines Alliance (ALA) is no longer in existence, but some of the guidelines they developed are useful for assessing and designing pipelines.

For underground pipelines in water and wastewater systems, there are no earthquake design standards, only guides. Often, the Chief Engineer of a utility is responsible for establishing its design practices and criteria. For example, the San Francisco Public Utilities Commission developed its own internal standard, called General Seismic Requirements for Design of New Facilities and Upgrade of Existing Facilities.

Additional Earthquake Mitigation Resources

There are many publications and resources for identifying cost effective mitigation measures for earthquakes. These include:

Resource	Description
Recent Earthquakes: Implications for United States Water Utilities	Potential impacts of earthquakes on water utilities and effectiveness of seismic upgrades to tanks, buildings, equipment and pipes. (Water Research Foundation)
Oregon Earthquake Resiliency Plan	Mitigation measures for the anticipated Cascadia Earthquake. Chapter 8 addresses water and wastewater systems. (Oregon Seismic Safety Policy Advisory Commission)
Seismic Guidelines for Water Pipelines	Overview of how to design and install pipelines to mitigate damage from earthquakes. (FEMA, National Institute of Building Sciences, and American Lifelines Alliance)
Earthquake Hazard Mitigation for Utility Lifeline Systems	An overview of strategies for mitigation and response planning for utilities. (FEMA)
Incident Action Checklist - Earthquake	Checklist of activities that water and wastewater utilities can take to prepare for, respond to and recover from earthquakes. (EPA)
Power Resilience Guide	Guide promotes coordination and communication between water sector utilities and their electric utilities; and provides strategies to increase water utilities' resilience to power loss. (EPA)
Water Utilities Fact Sheet	Factsheets of best practices for utilities in earthquake areas. (East Bay Municipal Utilities District)
Is your Water or Wastewater System Prepared? What you need to know about Generators.	An explanation of how to integrate generators into a utility's emergency response operation. Includes an explanation of different types of generators. (EPA)
Seismic Options for New and Old Reservoirs	Presentation of building codes, seismic options and associated costs for water reservoir storage tanks. (Pacific Northwest States AWWA)

Attachment 2-6: Cal Am's Corrected Response to Cal Advocates' Data Request ISC-009

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service by $55,771,300 or 18.71% in the year 2024, by $19,565,300 or 5.50% in the year 2025, and by $19,892,400 or 5.30% in the year 2026.	A.22-07-001 (Filed July 1, 2022)

CALIFORNIA-AMERICAN WATER COMPANY'S CORRECTED RESPONSE TO PUBLIC ADVOCATES OFFICE'S DATA REQUEST ISC 09, QUESTION 1

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Attorneys for California-American Water Company

Dated: November 4, 2022

California-American Water Company (U-210- W; “California American Water,” “CAW” or the “Company”) hereby sets forth the following objections and corrected response to Public Advocates Office’s (“Cal Advocates”) Data Request ISC 09, Question 1 (“Data Requests” or “RPD”), propounded on October 6, 2022, in A.22-07-001.

RESERVATION OF RIGHTS

1. California American Water’s investigation into the Data Requests is ongoing. The Company reserves the right, without obligating itself to do so, to supplement or modify its responses and to present further information and produce additional documents as a result of its ongoing investigation.

2. Any information or materials provided in response to the Data Requests shall be without prejudice to California American Water’s right to object to their admission into evidence or the record in this proceeding, their use as evidence or in the record, or the relevance of such information or materials. In addition, California American Water reserves its right to object to further discovery of documents, other information or materials relating to the same or similar subject matter upon any valid ground or grounds, including without limitation, the proprietary nature of the information, relevance, privilege, work product, overbreadth, burdensomeness, oppressiveness, or incompetence.

GENERAL OBJECTIONS

1. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they purport to impose upon California American Water any obligations broader than those permitted by law.

2. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they improperly seek the disclosure of information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privilege or doctrine, and/or the client confidentiality obligations mandated by Business and Professions Code Section 6068(e)(1) and Rule 3-100(A) of the California Rules of Professional Conduct. Such responses as

may hereafter be given shall not include information protected by such privileges or doctrines, and the inadvertent disclosure of such information shall not be deemed as a waiver of any such privilege or doctrine.

3. California American Water objects to the Data Requests to the extent that the requests are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, unreasonably expensive, oppressive, or excessively time consuming to California American Water.

4. California American Water objects to the Data Requests to the extent they seek documents that are and/or information that is neither relevant nor material to this proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

5. California American Water objects to the Data Requests to the extent they seek an analysis, calculation, or compilation that has not previously been performed and that California American Water objects to performing.

6. California American Water objects to the Data Requests insofar as they request the production of documents or information that are publicly available or that are equally available to Cal Advocates because such requests subject California American Water to unreasonable and undue annoyance, oppression, burden and expense.

7. California American Water objects to the Data Requests to the extent the requests are vague, ambiguous, use terms that are subject to multiple interpretations but are not properly defined for purposes of the Data Request, or otherwise provide no basis from which California American Water can determine what information is sought.

8. The objections contained herein, and information and documents produced in response hereto, are not intended nor should they be construed to waive California American Water's right to object to the Data Requests, responses or documents produced in response hereto, or the subject matter of such Data Requests, responses or documents, as to their competency, relevancy, materiality, privilege and admissibility as evidence for any purpose, in or at any hearing of this or any other

proceeding.

9. The objections contained herein are not intended nor should they be construed to waive California American Water's right to object to other discovery involving or relating to the subject matter of the Data Requests, responses or documents produced in response hereto.

Response Provided By:	**Nina Miller**
Title:	**Manager Engineering-Asset Planning**
Address:	**California American Water 511 Forest Lodge Road, Suite 100 Pacific Grove CA**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 09**
Company Number:	**Cal ADV ISC 09 Q001 Corrected**
Date Received:	**October 6, 2022**
Date Response Due:	**October 20, 2022; Corrected Response Sent November 4, 2022**
Subject Area:	**Earthquake Hazard Mitigation**

DATA REQUEST:

1. Has Cal Am plotted all critical assets (i.e. those assets necessary to uphold minimum water service obligations) on earthquake/seismic hazard maps?
   a. If so, please provide any earthquake/seismic hazard maps showing critical assets.

CAL-AM'S RESPONSE

California American Water has plotted all critical assets as part of the Risk and Resiliency Assessments (RRA) required for all water systems serving more than 3,300 people, per America's Water Infrastructure Act of 2018. California American Water understands that it is not required to disclose its RRAs pursuant to 42 U.S.C. section 300i-2(a)(3)(B).

NOVEMBER 4, 2022 CAL-AM CORRECTED RESPONSE:

California American Water has not plotted all critical assets on "earthquake/seismic hazard maps."

Although California American Water does not have a "map" of it, California American Water has plotted critical assets against seismic activity information to determine the risk of earthquake probability as part of the Risk and Resiliency Assessments (RRA) required for all water systems serving more than 3,300 people, per America's Water Infrastructure Act of 2018. California American Water understands that it is not required to disclose its RRAs pursuant to 42 U.S.C. section 300i-2(a)(5).

Attachment 2-7: Cal Am's Response to Cal Advocates' Data Request ISC-009

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service by $55,771,300 or 18.71% in the year 2024, by $19,565,300 or 5.50% in the year 2025, and by $19,892,400 or 5.30% in the year 2026.	A.22-07-001 (Filed July 1, 2022)

CALIFORNIA-AMERICAN WATER COMPANY'S RESPONSE TO PUBLIC ADVOCATES OFFICE'S DATA REQUEST ISC 09

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Attorneys for California-American Water Company

Dated: October 19, 2022

California-American Water Company (U-210- W; "California American Water," "CAW" or the "Company") hereby sets forth the following objections and responses to Public Advocates Office's ("Cal Advocates") Data Request ISC 09 ("Data Requests" or "RPD"), propounded on October 6, 2022, in A.22-07-001.

RESERVATION OF RIGHTS

1. California American Water's investigation into the Data Requests is ongoing. The Company reserves the right, without obligating itself to do so, to supplement or modify its responses and to present further information and produce additional documents as a result of its ongoing investigation.

2. Any information or materials provided in response to the Data Requests shall be without prejudice to California American Water's right to object to their admission into evidence or the record in this proceeding, their use as evidence or in the record, or the relevance of such information or materials. In addition, California American Water reserves its right to object to further discovery of documents, other information or materials relating to the same or similar subject matter upon any valid ground or grounds, including without limitation, the proprietary nature of the information, relevance, privilege, work product, overbreadth, burdensomeness, oppressiveness, or incompetence.

GENERAL OBJECTIONS

1. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they purport to impose upon California American Water any obligations broader than those permitted by law.

2. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they improperly seek the disclosure of information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privilege or doctrine, and/or the client confidentiality obligations mandated by Business and Professions Code Section 6068(e)(1) and Rule 3-100(A) of the California Rules of Professional Conduct. Such responses as may hereafter be given shall not include information protected by such privileges or

doctrines, and the inadvertent disclosure of such information shall not be deemed as a waiver of any such privilege or doctrine.

3. California American Water objects to the Data Requests to the extent that the requests are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, unreasonably expensive, oppressive, or excessively time consuming to California American Water.

4. California American Water objects to the Data Requests to the extent they seek documents that are and/or information that is neither relevant nor material to this proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

5. California American Water objects to the Data Requests to the extent they seek an analysis, calculation, or compilation that has not previously been performed and that California American Water objects to performing.

6. California American Water objects to the Data Requests insofar as they request the production of documents or information that are publicly available or that are equally available to Cal Advocates because such requests subject California American Water to unreasonable and undue annoyance, oppression, burden and expense.

7. California American Water objects to the Data Requests to the extent the requests are vague, ambiguous, use terms that are subject to multiple interpretations but are not properly defined for purposes of the Data Request, or otherwise provide no basis from which California American Water can determine what information is sought.

8. The objections contained herein, and information and documents produced in response hereto, are not intended nor should they be construed to waive California American Water's right to object to the Data Requests, responses or documents produced in response hereto, or the subject matter of such Data Requests, responses or documents, as to their competency, relevancy, materiality, privilege and admissibility as evidence for any purpose, in or at any hearing of this or any other proceeding.

9. The objections contained herein are not intended nor should they be construed to waive California American Water's right to object to other discovery involving or relating to the subject matter of the Data Requests, responses or documents produced in response hereto.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Nina Miller**
Title:	**Manager Engineering-Asset Planning**
Address:	**California American Water 511 Forest Lodge Road, Suite 100 Pacific Grove CA**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 09**
Company Number:	**Cal ADV ISC 09 Q001**
Date Received:	**October 6, 2022**
Date Response Due:	**October 20, 2022**
Subject Area:	**Earthquake Hazard Mitigation**

DATA REQUEST:

1. Has Cal Am plotted all critical assets (i.e. those assets necessary to uphold minimum water service obligations) on earthquake/seismic hazard maps?
   a. If so, please provide any earthquake/seismic hazard maps showing critical assets.

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully here. California American Water further objects to this request to the extent it seeks information that is protected by 42 U.S.C. section 300i-2(a)(3)(B). Subject to, but without waiving, those objections, California American Water responds as follows.

California American Water has plotted all critical assets as part of the Risk and Resiliency Assessments (RRA) required for all water systems serving more than 3,300 people, per America's Water Infrastructure Act of 2018. California American Water understands that it is not required to disclose its RRAs pursuant to 42 U.S.C. section 300i-2(a)(3)(B).

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Nina Miller**
Title:	**Manager Engineering-Asset Planning**
Address:	**California American Water 511 Forest Lodge Road, Suite 100 Pacific Grove CA**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 09**
Company Number:	**Cal ADV ISC 09 Q002**
Date Received:	**October 6, 2022**
Date Response Due:	**October 20, 2022**
Subject Area:	**Earthquake Hazard Mitigation**

DATA REQUEST:

2. Has Cal Am characterized critical assets, types of failures, and consequences to the utility as a result of earthquake/seismic activity?
   a. If so, please provide a document containing the aforementioned information.

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully here. California American Water further objects to this request to the extent it seeks information that is protected by 42 U.S.C. section 300i-2(a)(3)(B). Subject to, but without waiving, those objections, California American Water responds as follows.

Yes, California American Water completed Risk and Resiliency Assessments (RRA) for all of its water systems serving more than 3,300 people, per the America's Water Infrastructure Act of 2018. This included following AWWA's J100 standard, which incorporates identifying risk as a function of the consequences, vulnerabilities, and likelihood of man-made threats, natural hazards, and dependency and proximity hazards, including earthquakes. California American Water understands that it is not required to disclose its RRAs pursuant to 42 U.S.C. section 300i-2(a)(3)(B).

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Nina Miller**
Title:	**Manager Engineering-Asset Planning**
Address:	**California American Water 511 Forest Lodge Road, Suite 100 Pacific Grove CA**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 09**
Company Number:	**Cal ADV ISC 09 Q003**
Date Received:	**October 6, 2022**
Date Response Due:	**October 20, 2022**
Subject Area:	**Earthquake Hazard Mitigation**

DATA REQUEST:

3. Has Cal Am created any earthquake mitigation plan(s) for its critical infrastructure?
   a. If so, please provide the earthquake mitigation plan(s).

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully here. California American Water further objects to this request to the extent it seeks information that is protected by 42 U.S.C. section 300i-2(a)(3)(B). Subject to, but without waiving, those objections, California American Water responds as follows.

In addition to the Risk and Resilience Assessments, California American Water completed Tank Seismic Assessments in Los Angeles and Ventura Districts in 2022. California American Water is currently reviewing the Tank Seismic Assessments and recommended mitigation projects.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**JD Danielson**
Title:	**Senior Program Manager, Safety & Health**
Address:	**California American Water 4701 Beloit Dr Sacramento, CA 95838**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 09**
Company Number:	**Cal ADV ISC 09 Q004**
Date Received:	**October 6, 2022**
Date Response Due:	**October 20, 2022**
Subject Area:	**Earthquake Hazard Mitigation**

DATA REQUEST:

4. Has Cal Am contacted the California State Hazard Mitigation Officer in the past five years (see https://www.fema.gov/grants/mitigation/state-contacts) pertaining to earthquake hazards or mitigation?
   a. If so, please provide records of all discussions, including, but not limited to, emails, notes from calls and meetings, meeting summaries, memoranda, and meeting agendas.
   b. Please also describe when the communication occurred and provide a summary of the communication.

CAL-AM'S RESPONSE

No. California American Water has not contacted the California State Hazard Mitigation Officer in the past five years pertaining to earthquake hazards or mitigation. California American Water performs regular reviews of Emergency Action Plans that include earthquake drills. Varying districts throughout California American Water previously periodically participated in the Great California Shake Out.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**JD Danielson**
Title:	**Senior Program Manager, Safety & Health**
Address:	**California American Water 4701 Beloit Dr Sacramento, CA 95838**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 09**
Company Number:	**Cal ADV ISC 09 Q005**
Date Received:	**October 6, 2022**
Date Response Due:	**October 20, 2022**
Subject Area:	**Earthquake Hazard Mitigation**

DATA REQUEST:

5. Has Cal Am joined in earthquake/seismic hazard mitigation planning efforts with local governmental entities?
    a. If so, please:
        i. Fill out Attachment ISC-09 Earthquake Seismic Mitigation tab "Joint Mitigation Efforts" with the list of collaboration efforts describing:
            1. Collaboration Organization Name (the name of the organization in Cal Am is collaborating with for joint planning).
            2. Organization Type (private, federal government, state government, local government, non-profit, citizens organization, or other)
            3. District(s) (The Cal Am district(s) they operate in).
            4. Start Date (The beginning date of collaboration).
            5. Details (Summary of what collaboration entails).
        ii. Provide all documentation earthquake/seismic hazard detailing joint mitigation efforts.

CAL-AM'S RESPONSE

No, California American Water has not joined in earthquake/seismic hazard mitigation planning efforts with local governmental entities. See also California American Water's response to ISC 09 Q004.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Nina Miller**
Title:	**Manager Engineering-Asset Planning**
Address:	**California American Water 511 Forest Lodge Road, Suite 100 Pacific Grove CA**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 09**
Company Number:	**Cal ADV ISC 09 Q006**
Date Received:	**October 6, 2022**
Date Response Due:	**October 20, 2022**
Subject Area:	**Earthquake Hazard Mitigation**

DATA REQUEST:

6. Has Cal Am applied for federal funding for earthquake/seismic mitigation plans or projects?
    a. If so, please fill out Attachment ISC-09 Earthquake Seismic Mitigation tab "Federal Funding" with the list of federal funding initiatives detailing:
        i. Funding Source
        ii. Funding Amount Requested.
        iii. Date of Funds Received, if applicable.
        iv. Status of Funding Request.

CAL-AM'S RESPONSE

California American Water has not applied for any federal funding for earthquake/seismic mitigation plans or projects.

Attachment 3-1: Cal Am's Response to Cal Advocates' Data Request ISC-001 Q002.i-iv Attachment 1

California American Water

GO 103A Customer Service Performance Measures

Companywide Information 2017

Performance Standards	Performance Measure	2017
Telephone Performance		
Total Calls Received		169,879
Total Calls Answered in 30 seconds		149,857
% of Calls Answered in 30 seconds	**≥ 80%**	**88%**
Total Abandoned Calls		20,022
% Abandoned Call Rate	**≤ 5%**	**12%**
Billing		
Total Bills Rendered		2,153,762
Total Bills Rendered in 7 days		2,098,660
% Bills Rendered in 7 days	**≥ 99%**	**97%**
Total Inaccurate Bills		27,751
% of Inaccurate Bills	**≤ 3%**	**1.29%**
Total Payments Posted		1,880,583
Total Errored Payments		6,374
% Payment Posting Error	**≤ 1%**	**0.34%**
Total Number of Final Bills		23,690
Final Bills Issued after 14 days		2,772
% Final Read and Final Bil Issued after 14 days	**≤ 14 Days**	**12%**
Meter Reading		
Total Scheduled Actual Meter Reads		2,074,583
Total Estimated Meter Reads		25,234
% Scheduled Meters not Read	**≤ 3%**	**0.96%**
Work Order Completion		
% Total Customer Met Appointments	**≥ 95%**	**96%**
% Total Missed Customer Appointments	**≤ 5%**	**3%**
Total Scheduled Work Orders Customer Requested		86,147
Total Completed Work Orders as Scheduled		82,359
Total Incomplete /Canceled Work Orders		3,788
% Customer Work Orders not Completed	**≤ 5%**	**4.00%**
Customer/Regulatory Complaints		
Total Number of Customers		177,521
# of CAB Formal and Informal Complaints		51
% Rate of Complaints to CAB	**≤ .1%**	**0.03%**

California American Water

GO 103A Customer Service Performance Measures

Companywide Information 2018

Performance Standards	Performance Measure	2018
Telephone Performance		
Total Calls Received		151,650
Total Calls Answered in 30 seconds		111,739
% of Calls Answered in 30 seconds	**≥ 80%**	**74%**
Total Abandoned Calls		37,781
% Abandoned Call Rate	**≤ 5%**	**25%**
Billing		
Total Bills Rendered		2,153,598
Total Bills Rendered in 7 days		2,107,558
% Bills Rendered in 7 days	**≥ 99%**	**98%**
Total Inaccurate Bills		8,560
% of Inaccurate Bills	**≤ 3%**	**0.40%**
Total Payments Posted		1,927,756
Total Errored Payments		5,571
% Payment Posting Error	**≤ 1%**	**0.289%**
Total Number of Final Bills		22,465
Final Bills Issued after 14 days		2,214
% Final Read and Final Bil Issued after 14 days	**≤ 14 Days**	**10%**
Meter Reading		
Total Scheduled Actual Meter Reads		2,104,149
Total Estimated Meter Reads		24,237
% Scheduled Meters not Read	**≤ 3%**	**1.1%**
Work Order Completion		
% Total Customer Met Appointments	**≥ 95%**	**98.5%**
% Total Missed Customer Appointments	**≤ 5%**	**1%**
Total Scheduled Work Orders Customer Requested		84,271
Total Completed Work Orders as Scheduled		88,803
Total Incomplete /Canceled Work Orders		3,885
% Customer Work Orders not Completed	**≤ 5%**	**4%**
Customer/Regulatory Complaints		
Total Number of Customers		177,501
# of CAB Formal and Informal Complaints		43
% Rate of Complaints to CAB	**≤ .1%**	**0.02%**

California American Water

GO 103A Customer Service Performance Measures

Companywide Information 2019

Performance Standards	Performance Measure	2019
Telephone Performance		
Total Calls Received		124,374
Total Calls Answered in 30 seconds		115,423
% of Calls Answered in 30 seconds	**≥ 80%**	**93%**
Total Abandoned Calls		8,677
% Abandoned Call Rate	**≤ 5%**	**7%**
Billing		
Total Bills Rendered		2,173,348
Total Bills Rendered in 7 days		2,068,165
% Bills Rendered in 7 days	**≥ 99%**	**95%**
Total Inaccurate Bills		9,201
% of Inaccurate Bills	**≤ 3%**	**0.42%**
Total Payments Posted		1,916,092
Total Errored Payments		6,227
% Payment Posting Error	**≤ 1%**	**0.325%**
Total Number of Final Bills		22,513
Final Bills Issued after 14 days		2,534
% Final Read and Final Bill Issued after 14 days	**≤ 14 Days**	**11%**
Meter Reading		
Total Scheduled Actual Meter Reads		2,135,488
Total Estimated Meter Reads		20,598
% Scheduled Meters not Read	**≤ 3%**	**1.0%**
Work Order Completion		
% Total Customer Met Appointments	**≥ 95%**	**98.0%**
% Total Missed Customer Appointments	**≤ 5%**	**2%**
Total Scheduled Work Orders Customer Requested		74,233
Total Completed Work Orders as Scheduled		88,803
Total Incomplete /Canceled Work Orders		3,604
% Customer Work Orders not Completed	**≤ 5%**	**4%**
Customer/Regulatory Complaints		
Total Number of Customers		179,260
# of CAB Formal and Informal Complaints		41
% Rate of Complaints to CAB	**≤ .1%**	**0.02%**

California American Water

GO 103A Customer Service Performance Measures

Companywide Information 2020

Performance Standards	Performance Measure	2020
Telephone Performance		
Total Calls Received		114,822
Total Calls Answered in 30 seconds		95,302
% of Calls Answered in 30 seconds	**≥ 80%**	**83%**
Total Abandoned Calls		18,870
% Abandoned Call Rate	**≤ 5%**	**16%**
Billing		
Total Bills Rendered		2,238,070
Total Bills Rendered in 7 days		2,178,699
% Bills Rendered in 7 days	**≥ 99%**	**97%**
Total Inaccurate Bills		17,406
% of Inaccurate Bills	**≤ 3%**	**0.78%**
Total Payments Posted		1,958,859
Total Errored Payments		5,215
% Payment Posting Error	**≤ 1%**	**0.27%**
Total Number of Final Bills		20,350
Final Bills Issued after 14 days		1,991
% Final Read and Final Bill Issued after 14 days	**≤ 14 Days**	**10%**
Meter Reading		
Total Scheduled Actual Meter Reads		2,175,447
Total Estimated Meter Reads		31,687
% Scheduled Meters not Read	**≤ 3%**	**1%**
Work Order Completion		
% Total Customer Met Appointments	**≥ 95%**	**99.20%**
% Total Missed Customer Appointments	**≤ 5%**	**1%**
Total Scheduled Work Orders Customer Requested		62,135
Total Completed Work Orders as Scheduled		71,705
Total Incomplete /Canceled Work Orders		1,781
% Customer Work Orders not Completed	**≤ 5%**	**2%**
Customer/Regulatory Complaints		
Total Number of Customers		186,167
# of CAB Formal and Informal Complaints		53
% Rate of Complaints to CAB	**≤ .1%**	**0.03%**

California American Water

GO 103A Customer Service Performance Measures

Companywide Information 2021

Performance Standards	Performance Measure	2021
Telephone Performance		
Total Calls Received		115,777
Total Calls Answered in 30 seconds		82,604
% of Calls Answered in 30 seconds	**≥ 80%**	**71%**
Total Abandoned Calls		32,830
% Abandoned Call Rate	**≤ 5%**	**28%**
Billing		
Total Bills Rendered		2,256,739
Total Bills Rendered in 7 days		2,213,318
% Bills Rendered in 7 days	**≥ 99%**	**98%**
Total Inaccurate Bills		9,050
% of Inaccurate Bills	**≤ 3%**	**0.40%**
Total Payments Posted		1,962,826
Total Errored Payments		6,751
% Payment Posting Error	**≤ 1%**	**0.344%**
Total Number of Final Bills		20,105
Final Bills Issued after 14 days		2,123
% Final Read and Final Bill Issued after 14 days	**≤ 14 Days**	**11%**
Meter Reading		
Total Scheduled Actual Meter Reads		2,158,001
Total Estimated Meter Reads		38,013
% Scheduled Meters not Read	**≤ 3%**	**2%**
Work Order Completion		
% Total Customer Met Appointments	**≥ 95%**	**99.0%**
% Total Missed Customer Appointments	**≤ 5%**	**1%**
Total Scheduled Work Orders Customer Requested		66,602
Total Completed Work Orders as Scheduled		67,858
Total Incomplete /Canceled Work Orders		1,317
% Customer Work Orders not Completed	**≤ 5%**	**2%**
Customer/Regulatory Complaints		
Total Number of Customers		189,348
# of CAB Formal and Informal Complaints		28
% Rate of Complaints to CAB	**≤ .1%**	**0.01%**

Attachment 3-2: Customer Service Org - Operational Expenditure Cost Ratio

Customer Service Organization (CSO) Cost/Operational Expenditures (OpEx) Cost						
Year	**2017**	**2018**	**2019**	**2020**	**2021**	**5-Year Average**
CSO	$ 2,596,552	$ 2,054,862	$ 1,873,277	$ 2,037,675	$ 1,755,758	$ 2,063,625
OpEx	$11,436,577	$ 11,759,403	$ 11,835,892	$ 12,226,662	$ 12,609,609	$ 11,973,629
Percentage	22.70%	17.47%	15.83%	16.67%	13.92%	17.32%

Attachment 3-3: Cal Am's Response to Cal Advocates' Data Request KKE 01, Q007, Attachment 1 (Highlighted)

California American Water
Service Co - Total OPEX Costs for 2017

Account	Account Description	Business Development	Central Lab	Corp Admin
50100000	Labor Natural Account	$104,159	$104,524	$25,480
50100001	Labor Expense Accrual	1,197	(120)	(1,419)
50110000	Labor Non-scheduled Overtime - Natural Account	202	799	0
50120000	Labor Overtime - Natural Account			
50171000	Annual Performance Plan	28,860	11,343	(7,318)
50171600	Compensation Exp - Options	1,911	257	
50171800	Compensation Exp - RSU's	15,995	1,589	657
50185000	Severance			3,173
50421000	401k Expense	3,180	3,660	1,061
50422000	Defined Compensation Plan Expense	3,451	3,500	975
50423000	Employee Stock Purchase Plan Expense			14,786
50424000	DCP Restoration Expense	1,203		
50425000	401k Restoration Expense	720		
50426000	Retiree Medical Expense			829
50450000	Other Welfare - Natural Account	143	59	10,396
50451000	Employee Awards	20	85	11
50452000	Employee Physical Exams	19	8	191
50454000	Safety Incentive Awards			
50456000	Tuition Aid			308
50457000	Training	291	1,653	375
50458000	Referral Bonus		71	
50510000	PBOP Expense	469	728	(6,850)
50550000	Group Insurance Expense	8,428	19,853	(4,855)
50560000	Health Savings Account Expense		280	14
50610000	Pension Expense	8,842	13,717	5,902
50620000	Pension Expense - SRP			
52000000	M & S (O&M) - Natural Account	72	(435)	4
52500000	Misc Exp (O&M) - Natural Acct	855	11,371	(13)
52503000	Advertising	(1)		

52510000	Bank Service Charges - Natural Account			
52512500	Books & Publications			86
52513200	Business Development	(0)		
52514000	Charitable Contribution Deductible			
52514500	Charitable Donations - Health/Education/Environmnt			165
52514600	Charitable Donations - Community			
52514903	Customer Education Communication - Issues			
52514905	Customer Education Communication - Printed			
52514906	Customer Education - Bill Inserts			
52514907	Customer Education - Press Releases			
52514909	Customer Education - Video & Photo			
52522000	Community Relations			
52524000	Co Dues/Membership Deductible	929	100	17,953
52525000	Condemnation Costs			
52526000	Credit Line Fees			
52527000	Directors Fees			34,386
52527100	Directors Expenses	124		6,799
52532000	Electricity - Natural Account		7,324	
52534000	Employee Expenses	12,062	759	2,208
52534200	Conferences & Registration	281	277	6,096
52535000	Meals Deductible	1,457	202	(1,085)
52535100	Meals Non-Deductible			
52542000	Forms - Natural Account			
52546000	Grounds Keeping - Natural Account		694	
52548000	Heating Oil/Gas - Natural Account			
52548100	Hiring Costs			
52550000	Janitorial - Natural Account		919	
52554500	Lab Supplies	52	70,485	
52556000	Lobbying Expenses			
52562000	Office & Admin Supplies - Natural Account	76	510	34
52562500	Overnight Shipping - Natural Account	27	9,802	
52564000	Penalties Nondeductible			33
52566000	Postage - Natural Account			280
52566700	Printing			

52567000	Relocation Expenses	123		
52568000	Research & Development			
52571000	Security Service - Natural Account		1,283	241
52571500	Software Licenses		3,098	4
52574000	Telephone - Natural Account	113	3,992	616
52574100	Cell Phone - Natural Account	348	285	4,949
52574200	Data Lines - Admin & General			
52578000	Trash Removal - Natural Account		362	
52582000	Uniforms - Natural Account		(3)	
52583000	Water & WW - Natural Account			
52585000	Discounts Available			
53110000	Contract Svc-Eng - Natural Account			
53150000	Contract Svc-Other - Natural Account	8,437	1,994	2,567
53151000	Contract Svc-Temp Empl - Natural Account		(28)	(0)
53152000	Contract Svc-Lab Testing - Water Treatment		(33,011)	
53153000	Contract Services - Accounting			4,713
53154000	Contract Services - Audit Fees			14,577
53155000	Contract Services - Legal	544		1,193
53157000	Contract Services - Outplacement			
53158000	Contract Services - BT Related Incr Ext Costs			
54110000	Rents-Real Property - Natural Account		322	15,788
54115000	Rents-Real Property Interco		15,674	
54140000	Rents-Equipment - Natural Account		740	
55000000	Transportation (O&M) - Natural Account			
55010100	Transportation Lease Costs			(0)
55010200	Transportation Lease Fuel			
55010300	Transportation Lease Maint			
55010500	Transportation - Reimburse Employee Personal Use	88	120	191
55110000	Insurance Vehicle	28	37	15
55710000	Insurance General Liabilty	1,248	1,650	680
55711000	Insurance Casualty Reserve			(26,508)
55720000	Insurance Workers Compensation	1,386	1,832	755
55730000	Insurance Other	449	552	260
55735000	Insurance Other - Intercompany			24,800

55740000	Insurance Property	51	68	28
57010000	Uncollectible Accounts Exp - Natural Account			6,132
59011000	Gains/Losses Non-Utility Property Disposals			
62502600	Misc Maint - Admin & General		4,320	0
62520800	Misc Maint Permits - Natural Account			
68011200	Depreciation Exp - Non-Utility Property			1,105,773
68520000	Property Taxes		4,669	849
68532000	FUTA	30	89	15
68533000	FICA	7,646	8,469	4,077
68535000	SUTA	509	944	(522)
68543000	Other Taxes and Licenses			38,489
69011000	FIT - Current			(873,128)
69012000	FIT - Prior Year Adjustment			171,665
69021000	SIT - Current			174
69022000	SIT - Prior Year Adjustment			168
69062000	Deferred FIT - Prior Year Adjustment			(83,892)
69065000	Deferred FIT - Other			560,916
69072000	Deferred SIT - Prior Year Adjustment			(91,161)
69073500	Deferred SIT - Other			(7,257)
71712000	Gains/Losses Other Non-Operating	675		21,536
75815000	Donations Non-deductible	688		
81035000	Interest Capital Lease Intercompany			97,852
81500000	Interest Other			1
81815100	Interest Income - STD Intercompany			(38,642)
82016000	Amortize Debt Exp Inside-Revolving Credit Line			2,321
	Total	$217,388	$281,472	$1,070,894

Corporate Security	Customer Service Organization (CSO)	Environmental Leadership	External Affairs & Public Policy	Facilities
$57,521	$1,205,176	$102,476	$315,710	$5,025
885	(13,865)	1,278	1,483	14
	877	61	79	
	84,906		12	
11,159	41,186	17,021	22,145	560
105	990	622	1,179	
1,645	8,899	2,645	8,703	
	420			
1,596	17,523	3,152	6,095	164
2,521	11,344	2,961	5,662	262
	684		367	
	205			
2	400	507	882	
5	5,211		12	
	69	35		
	40			
560	6,125	72		
438	3,767	153	330	25
	586			
122	15,458	405	587	
8,840	372,524	12,423	22,371	54
7	319	190	56	
2,300	291,130	7,626	11,069	
674	409	545	38	26
736	13,590	21,953	5,132	1,113
(65)	18		17	

11	0	0		
		275		
			4,796	
	219			
			2,318	
			4,632	
	519			
	725		1,243	
266	1,003	541	16,497	
8	15,789			21,501
5,245	12,209	8,066	5,481	(21)
265	99	865	609	
1,375	2,940	1,077	882	26
	5			
	74			
2	871			
			16	
	5,779			1,997
		611		
4				
752	1,457	6,136	348	4,543
118	899	974	154	5,009
	620			5,030
	744		171	

		4,710	(0)	
		(45,478)		
	3,169			2,693
12,077	131	401	437	
401	130,327	(427)	644	6,574
1,474	2,008	291	2,607	232
	187			
	1,472			477
-	2	9	-	
	738			4
15,806				
11,036	54,397	15,377	24,243	2,667
20,874	18,057		2,169	20,643
290				
	1,646	1,460		
	103,795			111,369
196		2,276		77,429
	3,587	598	13	8,333
	45			51
2,379	726	3		86
781	133	2		118
197	16			206
413	174	232	283	
25	421	20	35	2
1,079	18,579	883	1,562	79
1,200	20,644	974	1,736	87
368	6,411	289	547	27

44	764	36	64	3
(146)	8			
1,187	0		7	
	953			
29	1,324	46	84	2
4,945	97,055	7,583	15,709	441
506	11,583	772	952	44
	2,900			3
	3,357	2,262	227	
$172,257	$2,596,552	$184,988	$490,396	$276,895

Finance	Human Resources	Investor Relations	Legal	Operations Excellence	Regulated Ops	Safety	Supply Chain
$918,521	$379,886	$12,312	$132,865	$283,346	$42,962	$18,886	$55,398
(3,466)	(1,911)	(176)	765	617	(630)	(654)	(197)
5,666	3,471	16	234	1,494	99	41	
5	61			3,846			
143,288	60,494	7,168	48,754	49,220	44,595	5,425	9,035
5,205	1,215	951	4,150	2,062	9,526	652	
39,546	12,517	6,085	29,438	12,729	55,102	2,746	1,581
(1,256)	5,802		(4,222)	16,071	1,831	9,724	671
31,453	14,918	372	4,599	7,131	960	219	1,638
36,447	16,507	590	5,358	7,490	315	383	1,865
2,393	1,233	111	2,112		722		(17)
522	142	231	428		567		(23)
			128	-			
1,998	3,427	4	210	277	546	2	1,630
378	158	44	4	1,445	6	43	30
487	166	0			95	-	
3,025	747	109	533	526	300	190	173
5,508	2,215	14	614	1,187	204	296	142
451				1	83		
3,922	1,242	59	702	1,265	1,327	375	286
117,393	46,305	776	10,624	67,020	3,024	2,496	5,538
1,039	108			152	53		14
73,956	23,147	1,113	13,231	23,807	24,998	7,064	5,389
	233						
734	272	0	1	1,164	66	142	24
(87,484)	752	0	38	1,525	361	7,903	84
	103			-	78		

1,994							
24	57			25			-
					-		
					107		
							11
6,787	1,536	30	1,540	1,404	194	(510)	3,366
	2				126		
							3
				306	12		
22,844	16,593	1,231	4,937	5,663	6,535	2,134	4,190
647	47		218	100	370	67	131
6,979	3,473	151	694	1,448	1,689	408	704
0							
				94	4		
3,818	210						27
				1,149			
5							
903	831	59	96	252	465	64	154
183	422	4	55	34	41	30	3
-							
2	165	584		2			
2	563			0			

4,890	6,405	60	5,735		(1,250)		8,567
			3				
7,609	2,967		453	38		792	
639	546		76	1,579	156	92	120
3,373	2,648	381	457	516	581	310	555
				18			
1	-		-	8	11	7	21
				39			
(829)							
172,277	130,278	7,109	27,691	1,806	1,950	(5,224)	692
21,732	8,186		-	113		(34)	2,191
30,557							
7,945	18,258		14,580	195		253	
						207	(23)
-				(1)			
112	205				27		
449	140			6,873	1,345		
	19	5		692			
0				2			
				292	(14)		8
	10			100	18		
				25	40		
434	2,170	11	389	207	1,098	142	185
283	179	9	64	58	43	10	23
12,477	7,883	401	2,833	2,557	1,892	445	1,025
13,879	8,762	446	3,148	2,833	2,099	495	1,130
4,274	2,711	137	937	854	655	152	341

513	324	17	116	105	78	18	42
				2			
4	1			132	4		(15)
	112						
					112		
501	202	9	44	212	17	8	24
76,500	33,905	1,294	11,413	23,693	7,609	1,863	4,401
8,085	3,205	170	785	2,193	246	122	402
3	(1)				0		
4,727	5,398	1,751	1,715	151	15,923	426	88
$1,714,361	$831,620	$43,641	$328,547	$538,145	$229,371	$58,208	$111,623

Technology and Innovation (T&I)	Total
$655,895	$4,420,141
(9,819)	(26,019)
1,947	14,988
77	88,907
157,337	650,271
1,733	30,558
12,529	212,405
62,131	94,347
21,534	119,256
25,718	125,349
	14,786
905	9,714
212	3,003
	957
1,617	22,099
264	7,716
4	1,073
	40
1,096	13,764
36,049	53,259
	1,192
2,853	22,951
80,161	772,975
295	2,526
53,740	567,032
	233
2,238	5,976
6,873	(15,212)
17	167

	1,994
-	204
	(0)
	275
	165
	4,796
	107
	219
	2,318
	4,632
	519
	1,980
5,326	56,961
	128
	3
	34,386
	6,923
5,153	50,094
20,113	130,250
1,079	11,149
7,691	30,108
	5
(39)	(39)
	768
3	975
6,296	10,367
	9,844
	71,147
	9
365	17,047
459	18,214
	33
	6,684
3	1,484

4,628	33,867
	(45,478)
	7,388
65,504	93,513
19,310	164,756
6,731	27,746
110,438	110,625
13	2,342
8	63
	781
	(829)
424	16,230
413,924	871,219
11,942	105,846
	(33,011)
	35,561
	14,577
11,346	57,420
5,221	5,405
	(1)
5,838	237,457
19,824	124,206
80	14,066
	99
809	4,288
327	1,488
158	643
2,782	8,918
257	1,511
11,384	66,656
	(26,508)
12,603	74,011
3,735	22,700
	24,800

466	2,739
	6,132
(341)	(478)
347,292	352,933
	112
	1,105,773
	6,583
406	3,043
59,786	366,390
6,792	36,785
	41,393
	(873,128)
	171,665
	174
	168
	(83,892)
	560,916
	(91,161)
	(7,257)
6,679	64,914
	688
	97,852
	1
	(38,642)
	2,321
$2,290,221	$11,436,577

California American Water
Service Co - Total OPEX Costs for 2018

Account	Account Description
50100000	Labor Natural Account
50100001	Labor Expense Accrual
50110000	Labor Non-scheduled Overtime - Natural Account
50120000	Labor Overtime - Natural Account
50171000	Annual Incentive Plan
50171600	Compensation Exp - Options
50171800	Compensation Exp - RSU's
50185000	Severance
50421000	401k Expense
50422000	Defined Compensation Plan Expense
50423000	Employee Stock Purchase Plan Expense
50424000	DC SERP Expense
50425000	401k Restoration Expense
50426000	Retiree Medical Expense
50450000	Other Welfare - Natural Account
50451000	Employee Awards
50452000	Employee Physical Exams
50456000	Tuition Aid
50457000	Training
50458000	Referral Bonus
50510000	PBOP Expense
50550000	Group Insurance Expense
50560000	Health Savings Account Expense
50610000	Pension Expense
51510000	Purchased Power - Natural Account
52000000	M & S (O&M) - Natural Account
52500000	Misc Exp (O&M) - Natural Acct
52503000	Advertising
52510000	Bank Service Charges - Natural Account
52512500	Books & Publications
52513200	Business Development
52514000	Charitable Contribution Deductible
52514905	Customer Education Communication - Printed
52514906	Customer Education - Bill Inserts
52514907	Customer Education - Press Releases
52514909	Customer Education - Video & Photo
52515000	Community Relations - Events
52520000	Collection Agencies
52522000	Community Relations
52524000	Co Dues/Membership Deductible
52527000	Directors Fees
52527100	Directors Expenses

52532000 Electricity - Natural Account
52534000 Employee Expenses
52534200 Conferences & Registration
52535000 Meals Deductible
52535100 Meals Non-Deductible
52542000 Forms - Natural Account
52546000 Grounds Keeping - Natural Account
52548000 Heating Oil/Gas - Natural Account
52548100 Hiring Costs
52550000 Janitorial - Natural Account
52554500 Lab Supplies
52556000 Lobbying Expenses
52562000 Office & Admin Supplies - Natural Account
52562500 Overnight Shipping - Natural Account
52564000 Penalties Nondeductible
52566000 Postage - Natural Account
52566700 Printing
52567000 Relocation Expenses
52568000 Research & Development
52571000 Security Service - Natural Account
52571500 Software Licenses
52574000 Telephone - Natural Account
52574100 Cell Phone - Natural Account
52574200 Data Lines - Admin & General
52578000 Trash Removal - Natural Account
52582000 Uniforms - Natural Account
52583000 Water & WW - Natural Account
52585000 Discounts Available
53110000 Contract Svc-Eng - Natural Account
53150000 Contract Svc-Other - Natural Account
53151000 Contract Svc-Temp Empl - Natural Account
53152000 Contract Svc-Lab Testing - Water Treatment
53153000 Contract Services - Accounting
53154000 Contract Services - Audit Fees
53155000 Contract Services - Legal
53157000 Contract Services - Outplacement
53185000 Contract Services - Interco
54110000 Rents-Real Property - Natural Account
54115000 Rents-Real Property Interco
54140000 Rents-Equipment - Natural Account
55000000 Transportation (O&M) - Natural Account
55010100 Transportation Lease Costs
55010200 Transportation Lease Fuel
55010300 Transportation Lease Maint
55010500 Transportation - Reimburse Employee Personal Use
55110000 Insurance Vehicle
55710000 Insurance General Liabilty

55711000	Insurance Casualty Reserve
55720000	Insurance Workers Compensation
55730000	Insurance Other
55735000	Insurance Other - Intercompany
55740000	Insurance Property
57010000	Uncollectible Accounts Exp - Natural Account
59011000	Gains/Losses Non-Utility Property Disposals
62502600	Misc Maint - Admin & General
68011200	Depreciation Exp - Non-Utility Property
68520000	Property Taxes
68520100	Tax Discounts
68532000	FUTA
68533000	FICA
68535000	SUTA
68543000	Other Taxes and Licenses
69011000	FIT - Current
69012000	FIT - Prior Year Adjustment
69021000	SIT - Current
69062000	Deferred FIT - Prior Year Adjustment
69065000	Deferred FIT - Other
69072000	Deferred SIT - Prior Year Adjustment
69073500	Deferred SIT - Other
71611000	Misc Nonutility Revenue
71621000	Misc Nonutility Expense
71712000	Gains/Losses Other Non-Operating
71810000	Other Non-Service Pension Benefit Cost
71820000	Other Non-Service PBOP Benefit Costs
72803000	Salvage/Scrap Receipt Clearing
75815000	Donations Non-deductible
81035000	Interest Capital Lease Intercompany
81500000	Interest Other
81815100	Interest Income - STD Intercompany
82016000	Amortize Debt Exp Inside-Revolving Credit Line
	Total

Business Development	Central Lab	Corp Admin	Corporate Security
$192,773	$88,454	$11,127	$71,009
6,147	689	180	881
308	1,146	81	58
25,372	9,585	(12,456)	32,490
394	116		53
17,158	1,848	(82)	4,536
1,549			31,548
6,578	3,016	2,653	2,114
8,946	3,015	636	2,840
		16,339	
1,644			
946			
		942	
33	50	11,902	834
	218	5	84
278	34		
	45	497	871
603	267	1,420	6,005
			171
321	282	(9,621)	296
17,516	16,343	1,417	8,131
51	213	15	28
4,258	5,563	708	1,705
		-	1,625
121	182	57	(193)
298	5,857	(28,996)	1,504
		3	94
		(9)	
		112	3
1,817			
3,435	110	8,604	60
		41,903	
6		10,259	

	5,878		0
9,042	1,248	1,325	7,057
264	101	205	311
1,086	127	1,945	1,293
		9	
	442		
			294
	724		
	77,504		
			0
63	336	12	788
18	11,267	6	1,310
	915	(747)	
		18	28
		7	0
			1,209
	785	271	539
		10	14,652
170	1,475	687	943
358	327	4,850	2,192
		(1)	
	262		
	(4)	0	14
			12,456
6,569	12,034	21,130	32,700
	898		3,579
	(60,714)		
		6,227	
		16,267	
1,000		4,311	516
			410
		1,421	
	12,801		192
	646		
		-	3,053
			725
			179
43	(15)	112	1,112
16	18	11	17
1,501	1,658	1,052	1,564

		(4,759)	
1,261	1,391	885	1,315
523	1,570	522	540
		25,950	
43	47	30	45
		1,744	
			(570)
	4,134		14,950
		1,328,734	
	3,688	797	
33	70	21	32
12,267	6,908	2,172	8,842
506	545	239	594
		56,202	
		862,655	
		174,470	
		0	
		(82,093)	
		(529,048)	
		(20,202)	
		113,005	
-	38	0	0
(3)		(0)	
-	94	-	-
-	(25)	-	-
			-
693			
		14,307	
		220	
		(140,833)	
		1,948	
$326,005	$224,209	$1,923,788	$279,627

Customer Service Organization (CSO)	Environmental Leadership	External Affairs & Public Policy
$976,278	$74,319	$345,452
2,295	(1,000)	1,944
622	1	478
58,603		
43,200	14,665	19,102
333		512
7,203	5,423	11,618
1,479	9,324	4,343
16,024	2,555	8,200
11,892	2,690	5,631
236	400	49
9		
348	210	1,756
8,811	100	22
2	265	
10,255	165	1,195
4,178	2,737	389
762		
639	290	1,199
295,236	9,387	21,778
429	108	88
142,078	4,560	7,697
1,331	1,060	125
8,180	2,108	13,614
4,329		54
3	16	
	277	
724		34
		1,313
		4,993
(202)		
4		1
1		182
580		374
1,086	407	5,572

16,434		
10,040	5,943	3,475
75	84	262
3,166	1,113	564
11		
397		
79	21	
12,004	-	
	6,606	
		695
1,041	5,594	168
539	1,483	184
6,073		11
2,120		304
	878	2,321
	(11,016)	
1,497		
110	163	1,056
135,212	109	340
2,514	340	1,981
161		
1,016		
1	52	
704		
24		
32,517	7,016	43,973
13,338	4,124	
1,594	896	
	438	
84,306		
628	2,292	
1,172	1,467	
138		
734		
89	1	
48		
67	378	157
198	12	23
18,391	1,145	2,136

15,480	964	1,794
4,884	272	2,172
526	33	61
705		
1,179	46	95
77,865	5,220	20,117
6,581	710	1,003
2,449		
(77)	(0)	(0)
-	(0)	0
1,907	(0)	-
(21)	-	-
$2,054,862	$166,454	$540,608

Facilities	Finance	Human Resources	Investor Relations	Legal
$7,332	$898,835	$366,158	$9,014	$154,381
93	8,305	2,044	68	901
	5,087	2,574	24	308
	7	291		
693	144,847	67,630	7,241	49,958
	3,190	714	486	2,186
	67,838	24,014	7,950	41,026
	3,027	3,099		10,113
323	30,250	13,273	378	5,376
391	36,457	16,275	495	6,420
	2,895	1,573	367	1,039
	1,459	572	265	328
		88		
1	7,103	7,028		1,488
	244	(236)	21	30
	382	160	(0)	
	2,560	2,390		159
15	4,221	16,509	(11)	929
	97			
	3,899	870		961
81	109,786	44,726	978	13,137
	808	252		127
	39,457	13,888	2,975	9,776
(20)				
152	1,087	354	0	102
1,584	(78,767)	1,595	30	158
		52	1	
	2			
	1,178	3		
654	5,887	2,176	6	1,242

17,953				
(24)	18,096	23,157	866	7,276
	391	162		502
37	6,129	3,819	116	1,480
1,177		1		
	1,889	1,214		
1,934				
	2			
2,430	2,063	386	20	54
4,287	237	224	6	98
5,637		51	515	
7	2	365	18	6
	19,387	3,295	700	37
	133			
2,617				
	4,184	2,480		47
9,654	(1,244)	772		68
288	3,930	2,710	206	692
629				
	86	5		10
3				
	(281)			
2,310	147,705	126,116	7,780	20,222
18,531	28,520	409		
	36,732			
	30,124	40,544		54,318
18,760				
106,801	105	363		4
107,212	1,033	822		519
6,617		8	3	5
11	1			
(992)				
14		5		
175				
56	496	1,983		238
1	169	102	5	37
130	15,683	9,535	489	3,417

109	13,197	8,011	411	2,872
27	4,207	4,953	188	2,276
4	449	272	14	97
	59	2		
5	474	165	3	46
601	71,959	31,307	1,184	12,136
89	7,480	2,825	90	861
1	32			
	0	0	-	(0)
	33	0	(1)	3
	(0)	0	-	(0)
	-	0		-
$318,387	$1,713,603	$854,138	$42,901	$407,469

Operations Excellence	Regulated Ops	Safety	Supply Chain	Technology and Innovation (T&I)
$279,983	$47,755	$15,843	$62,143	$447,665
(1,547)	210	(19)	1,527	(3,478)
248	274	35	47	1,451
1,414				
46,618	57,582	5,110	20,197	111,407
502	4,107		31	556
14,412	120,124	(620)	4,092	22,542
(1,346)				79,587
6,616	1,195	201	2,165	13,821
6,427	618	585	2,306	18,766
	571		86	1,689
	473		27	161
372	1,475	1	343	2,859
1,531	34	30	139	306
	371	-		-
416	295	472	215	252
550	121	975	464	34,045
	61			365
1,446	968	157	219	2,102
60,685	3,868	2,189	6,076	54,786
204	19		25	580
11,580	15,471	2,667	2,375	20,350
				332
568	23	712	57	1,663
687	3,754	1,017	(9,880)	8,183
36	(52)		409	183
			1	41
	6			
39			74	
1,418	1,176		2,704	2,807

37	2			12,100
5,447	5,758	1,164	8,263	20,691
34	126		668	55
1,383	909	279	1,639	10,500
			37	
				10
49	2			1
			540	9,770
220				
				254
148	86	1,360	603	4,607
5	46	46	7	987
	28			
	3		3	
0	5,668		5	9,034
403	17	-	8,887	(9,860)
1,682	110	82	167	24,059
897	493	152	1,230	6,143
				85,506
10				2
7	(11)	129	9	343
36				
561				621
1,202	675	1,340	4,008	480,441
1,005			1,209	25,439
599			2,559	17,029
	200			3,230
	9,335			5,522
6,239	363			13,381
428	13			54
28	8		-	84
15	(0)			195
6	1			148
295	601	107	282	830
31	25	5	10	113
2,881	2,288	424	884	10,657

2,430	1,927	356	747	8,839
838	1,317	247	220	2,525
83	65	12	26	301
				345,483
	(27)			
	(1)			
176	15	8	25	338
21,777	9,264	1,422	5,340	37,608
1,149	222	127	385	4,870
				(967)
(0)	(0)	-	-	(0)
5	66	6	1	117
1	-	(0)	-	(0)
(1)	-	-	-	(0)
$482,966	$300,093	$36,621	$133,593	$1,954,081

Total
$4,048,521
19,237
12,742
60,316
643,240
13,182
349,081
142,724
114,736
124,391
16,339
10,551
4,241
1,030
35,803
11,339
1,492
19,787
73,416
1,456
4,027
666,120
2,946
285,109
1,938
7,402
(69,074)
5,108
(7)
1,356
1,823
277
758
1,313
4,993
(202)
5
183
1,066
37,345
41,903
10,265

52,404
128,827
3,239
35,586
1,225
10
453
745
13,514
14,882
84,364
698
19,759
20,748
168
12,361
2,834
42,536
(10,883)
5,709
22,148
174,285
29,304
85,666
1,919
642
743
(281)
13,661
947,739
97,051
(60,714)
42,959
16,267
153,491
4,278
18,760
207,857
145,482
10,415
150
2,915
1,044
556
6,741
792
73,835

(4,759)
61,988
27,282
25,950
2,108
1,744
(570)
364,629
1,328,734
5,163
(1)
2,731
325,989
28,277
58,685
862,655
174,470
0
(82,093)
(529,048)
(20,202)
113,005
(967)
(39)
227
2,002
(47)
-
693
14,307
220
(140,833)
1,948
$11,759,403

California American Water
Service Co - Total OPEX Costs for 2019

Account
50100000
50100001
50110000
50120000
50171000
50171600
50171800
50185000
50421000
50422000
50423000
50424000
50425000
50426000
50450000
50451000
50452000
50456000
50457000
50458000
50510000
50550000
50560000
50610000
51510000
52000000
52500000
52503000
52510000
52512500
52513200
52514600
52514905
52514906
52514907
52515000
52522000
52524000
52527000
52527100
52532000
52534000

52534200
52535000
52535100
52546000
52548000
52548100
52549000
52550000
52554500
52556000
52562000
52562500
52564000
52566000
52566700
52567000
52568000
52571000
52571500
52574000
52574100
52574200
52578000
52582000
52583000
52585000
53110000
53150000
53151000
53152000
53153000
53154000
53155000
53157000
53159100
53185000
54110000
54115000
54140000
55000000
55010100
55010200
55010300
55010500
55110000
55710000
55711000

	55720000
	55730000
	55735000
	55740000
	57010000
	59011000
	62502600
	68011200
	68520000
	68532000
	68533000
	68535000
	68543000
	69011000
	69012000
	69021000
	69022000
	69062000
	69065000
	69072000
	69073500
	71712000
	72803000
	75810000
	81035000
	81500000
	81810000
	81815100
Pension Adjustment*	50610000
Group Insurance Adjustment*	50510000

*Adjustment to reclassify non-service cost as refl

Account Description	Business Development	Central Lab
Labor Natural Account	$111,658	$111,513
Labor Expense Accrual	(5,133)	1,606
Labor Non-scheduled Overtime - Natural Account	178	2,197
Labor Overtime - Natural Account		209
Annual Incentive Plan	32,014	17,377
Compensation Exp - Options	4	0
Compensation Exp - RSU's	17,133	552
Severance	13,073	
401k Expense	3,050	4,772
Defined Compensation Plan Expense	3,721	3,765
Employee Stock Purchase Plan Expense		
DC SERP Expense	1,048	
401k Restoration Expense	797	
Retiree Medical Expense		0
Other Welfare - Natural Account	970	477
Employee Awards	64	127
Employee Physical Exams	100	
Tuition Aid		-
Training	287	46
Referral Bonus		
PBOP Expense	233	304
Group Insurance Expense	10,347	21,866
Health Savings Account Expense		365
Pension Expense	5,036	6,376
Purchased Power - Natural Account		
M & S (O&M) - Natural Account	16	1,613
Misc Exp (O&M) - Natural Acct	124	11,746
Advertising		
Bank Service Charges - Natural Account		
Books & Publications		
Business Development	(825)	
Charitable Donations - Community		
Customer Education Communication - Printed		
Customer Education - Bill Inserts		
Customer Education - Press Releases		
Community Relations - Events		
Community Relations	14	
Co Dues/Membership Deductible	2,918	281
Directors Fees		
Directors Expenses		
Electricity - Natural Account		7,922
Employee Expenses	13,756	1,011

Conferences & Registration	503	254
Meals Deductible	1,560	555
Meals Non-Deductible		
Grounds Keeping - Natural Account		786
Heating Oil/Gas - Natural Account		122
Hiring Costs		
Injuries and Damages		
Janitorial - Natural Account		1,940
Lab Supplies		96,443
Lobbying Expenses		
Office & Admin Supplies - Natural Account	78	523
Overnight Shipping - Natural Account	51	16,356
Penalties Nondeductible		182
Postage - Natural Account	6	
Printing		
Relocation Expenses	2,657	
Research & Development		
Security Service - Natural Account		981
Software Licenses	41	1,362
Telephone - Natural Account	42	1,438
Cell Phone - Natural Account	400	437
Data Lines - Admin & General		
Trash Removal - Natural Account		682
Uniforms - Natural Account		(10)
Water & WW - Natural Account		
Discounts Available		
Contract Svc-Eng - Natural Account		
Contract Svc-Other - Natural Account	9,126	3,268
Contract Svc-Temp Empl - Natural Account		4,634
Contract Svc-Lab Testing - Water Treatment		(84,195)
Contract Services - Accounting		
Contract Services - Audit Fees		
Contract Services - Legal	1,538	
Contract Services - Outplacement		
Contract Services - Hardware Services		
Contract Services - Interco		
Rents-Real Property - Natural Account		14
Rents-Real Property Interco		14,883
Rents-Equipment - Natural Account		760
Transportation (O&M) - Natural Account		
Transportation Lease Costs		
Transportation Lease Fuel		
Transportation Lease Maint		
Transportation - Reimburse Employee Personal Use	98	18
Insurance Vehicle	16	18
Insurance General Liabilty	1,818	1,934
Insurance Casualty Reserve		

Insurance Workers Compensation	1,350	1,443
Insurance Other	345	648
Insurance Other - Intercompany		
Insurance Property	30	33
Uncollectible Accounts Exp - Natural Account		
Gains/Losses Non-Utility Property Disposals		
Misc Maint - Admin & General		11,187
Depreciation Exp - Non-Utility Property		
Property Taxes		4,288
FUTA	64	69
FICA	8,527	8,269
SUTA	318	64
Other Taxes and Licenses		
FIT - Current		
FIT - Prior Year Adjustment		
SIT - Current		
SIT - Prior Year Adjustment		
Deferred FIT - Prior Year Adjustment		
Deferred FIT - Other		
Deferred SIT - Prior Year Adjustment		
Deferred SIT - Other		
Gains/Losses Other Non-Operating		
Salvage/Scrap Receipt Clearing		
Donations Deductible		
Interest Capital Lease Intercompany		
Interest Other		
Interest Income		
Interest Income - STD Intercompany		
Pension Expense	5,387	6,821
PBOP Expense	(1,639)	(3,491)
Total	$242,897	$286,840

ected in RO Model workpaper "ALL_CH04_O&M_RO_Service Co" tab "Trf-Elim WS2"

Corp Admin	Corporate Security	Customer Service Organization (CSO)	Environmental Leadership
$3,377	$138,910	$884,903	$51,325
21	4,887	8,008	(96)
-	9	22,228	
		10,166	
0	33,828	70,983	10,860
	0	1	
	11,953	20,038	3,491
	22,691		
285	3,865	16,191	1,428
173	6,268	13,132	1,647
23,812			
		339	(9)
		253	
736		8,084	
11,292	1,881	56	348
295	68	4,691	
			73
	915	5,046	571
4,650	696	1,687	145
		113	219
(6,619)	1,023	505	141
15,712	17,862	236,600	7,165
(0)	236	1,113	137
	10,547	97,622	2,663
1	688	1,372	1,795
(48,076)	2,685	921	(746)
	(14)	(1,084)	
112		72	
		197	
		191	
		254	
14,425	4	651	604
49,573			
7,319			
		13,265	
4,546	6,226	9,480	4,315

47	119	86	(9)
2,011	857	2,585	554
	6		
		-	
		550	
		(13)	
32,100			1,659
		12,268	6
		-	389
4	279	1,046	629
158	1,131	426	222
-			
167		2,006	3
1,133		357	
-	139		1,392
			8,591
209	1,485	2,328	
	17,455	42	
201	2,179	127,087	36
3,309	6,209	1,706	342
		190	
		565	
	18	21	
		325	
	64		
18,624	127,292	36,931	1,038
0	3,479	(80)	6,603
22,517			
21,875			
(52)	228		572
	1,283		
46,238	9	77,903	
	198	630	2,288
926		2,050	41
	31	-	
1,331	1,557	(77)	
	436	71	
	121	24	
2	625	47	56
2	55	141	8
196	6,089	15,724	852
(10,081)			

147	4,520	11,661	632
13,934	922	2,823	181
26,818			
3	100	257	14
1,852			
18,404		(15)	
	14,701		
1,107,261			
750		978	
2	96	950	29
81	15,351	71,243	3,532
27	910	3,574	199
61,863	9	2,267	
(362,291)			
46,878			
(27,951)			
9,413			
(33,548)			
373,438			
(50,274)			
46,529			
		-	
107,174			
13,908			
(3)			
(134,237)			
	11,283	104,431	2,849
(1,409)	(2,962)	(36,907)	(1,153)
$1,441,317	$481,502	$1,873,277	$117,632

External Affairs & Public Policy	Facilities	Finance	Human Resources	Investor Relations
$218,403	$15,400	$1,008,887	$449,795	$6,553
(7,265)	641	1,173	7,402	(176)
375	21	5,511	2,143	15
			43	
27,103	1,261	189,680	87,396	2,016
1		9	2	0
13,510		86,088	25,793	1,535
		1,855	23,940	
6,391	507	31,442	15,601	465
6,780	780	40,885	19,580	341
326		3,772	1,261	379
		1,800	554	285
2,196	2	5,684	3,166	0
34		188	40	2
		320	2	
328		3,707	2,582	
868	131	3,034	1,918	14
		158	145	16
886		3,513	768	
13,453	2,503	124,728	56,207	585
291		1,246	659	
5,745		32,844	9,476	1,985
263	(92)	1,206	1,004	4
1,781	1,663	(87,120)	725	(24)
156		125	130	
		1,408		
			2,760	
74				
1,525				
5,106				
821				
2,249	1,231	6,077	3,844	
	137			
4,800	4	27,254	21,947	1,658

396	44	508	332	50
674	6,857	6,052	4,208	246
	(7,959)	5		
		(259)	2,250	
2	176		1	
		2		
218	5,963	936	909	13
94	3,610	368	172	4
		144		
0	2,862	39	1,859	538
63	1,643	187	112	6
5,762	4	10,934	211	
	(192)			
2,315	16	8,055	39,874	129
82	10,597	89	94	
1,956	2,659	3,950	2,514	199
	383			
10	0	75	20	
	3			
		(225)		
	1,471			
31,710	12,119	193,465	141,799	12,712
173	6,214	62,113	19	
		36,232		
		553		
		14,514	14,578	
		531	-	
	97,426			
	30,277	37	159	
	189,728	784	655	
	(638)	35	(82)	
	2	-		
	12			
	23	15		
	18			
217	19	360	1,772	3
15	3	155	71	4
1,670	381	17,255	7,950	405

1,242	282	12,801	5,910	301
986	51	2,990	2,472	97
28	6	282	131	7
		80		
	89,725			
87	13	502	195	4
16,435	1,261	82,073	38,319	736
231	135	3,707	1,121	37
		8		
	51,248			
	21,321			
6,145		35,135	10,137	2,123
(2,267)	(388)	(20,061)	(8,929)	(91)
$374,446	$551,563	$1,969,899	$1,007,715	$33,173

Legal	Operations Excellence	Regulated Ops	Safety	Supply Chain
$187,235	$242,001	$67,778	$41,702	$104,165
3,384	603	550	1,112	1,538
1,111	923	391	30	57
27	713			
67,301	86,879	39,178	9,619	29,733
7	1	11		0
43,838	15,507	53,871	5,599	4,935
			1,647	
5,257	6,435	1,102	1,160	3,473
7,707	6,000	519	2,017	4,008
1,423		434	226	94
277		417		36
	(32)			
6	59	76	716	144
13	1,150	34		86
		185	3	0
187	3	47		480
182	399	1,649	14	707
730	933	665	151	366
17,187	45,072	4,164	3,889	13,028
188	436	1		68
5,939	9,312	9,278	2,284	2,855
32	1,009	133	155	104
193	238	4,333	1,529	373
	-	-	6	8
	33			209
	40			
866	622	2,625	567	882
4,501	5,769	5,779	3,175	10,643

426	88	141		58
1,461	1,743	1,910	591	1,532
	349			
				1
199	134	133	435	142
47	5	39	9	41
		50		
			181	
	258	10,532	2,070	
	(49)			
402	3,656	1		3,228
(15)	120	18		116
865	898	795	214	1,758
-	6		-	37
	13			
	93			
27,303	955	14,448	5,201	335
	4,237			73
57,440	98		1,551	1,624
	23	6,107		
412	3,876	443		
	51			
	3		93	
	433	(192)		
	157	0		
	39	0		
166	1,074	191	219	382
26	25	17	4	17
2,873	2,733	1,855	453	1,954

2,135	2,025	1,379	337	1,448
1,080	538	684	148	279
47	44	30	8	32
		39		
59	159	(216)	20	43
14,496	19,690	7,358	3,877	8,198
178	893	159	156	267
		248		
6,353	9,962	9,925	2,444	3,054
(2,805)	(7,195)	(748)	(626)	(2,086)
$460,739	$471,243	$248,567	$92,983	$200,522

Technology and Innovation (T&I)	Total
$329,193	$3,972,798
3,465	21,719
79	35,268
27	11,185
154,009	859,238
1	40
53,847	357,690
10,083	73,289
9,802	111,226
15,429	132,752
	23,812
1,028	10,321
1,723	6,141
	8,787
10,288	37,362
124	6,917
	684
2,822	16,690
14,467	30,892
624	1,274
846	4,444
35,646	626,013
1,057	5,797
7,958	209,921
20	20
11,416	20,720
6,387	(103,267)
118	(556)
	1,408
26	3,211
	(825)
	74
	197
	1,525
	5,106
	191
	1,129
1,107	38,953
	49,573
	7,319
16,188	37,511
9,789	134,653

183	3,226
1,578	34,972
1	(7,598)
	786
18	690
8,128	10,107
	33,759
	14,394
(62)	96,770
	2
1,435	13,076
110	22,845
	326
1	7,530
	3,681
26,958	60,918
	8,542
	4,811
99,947	176,522
12,098	154,180
6,121	34,330
125,552	125,742
	1,631
46	224
	341
	(225)
	1,628
631,745	1,268,069
7,694	95,160
	(84,195)
	58,749
4,491	26,919
25,519	117,608
697	2,510
1,696	1,696
	97,426
41,719	202,487
2,197	216,093
22	3,165
	129
(122)	2,941
59	763
115	317
197	5,447
51	627
5,650	69,793
	(10,081)

4,225	51,838
1,091	29,270
	26,818
97	1,149
	1,852
	18,388
241,463	267,430
	1,196,986
	6,056
260	2,335
28,862	328,307
1,469	13,442
	64,147
	(362,291)
	46,878
	(27,951)
	9,413
	(33,548)
	373,438
	(50,274)
	46,529
	51,248
	-
	248
	128,494
	13,908
	(3)
	(134,237)
8,513	224,563
(5,817)	(98,575)
$1,981,576	$11,835,892

California American Water
Service Co - Total OPEX Costs for 2020

Account	Account Description
50100000	Labor Natural Account
50100001	Labor Expense Accrual
50110000	Labor Non-scheduled Overtime - Natural Account
50120000	Labor Overtime - Natural Account
50171000	Annual Performance Plan
50171800	Compensation Expense - RSU/PSU
50185000	Severance
50421000	401k Expense
50422000	Defined Compensation Plan Expense
50423000	Employee Stock Purchase Plan Expense
50424000	DC Restoration Expense
50425000	401k Restoration Expense
50426000	Retiree Medical Expense
50450000	Other Welfare - Natural Account
50451000	Employee Awards
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50456000	Tuition Aid
50457000	Training
50458000	Referral Bonus
50510000	PBOP Expense
50550000	Group Insurance Expense
50560000	Health Savings Account Expense
50610000	Pension Expense
52000000	M & S (O&M) - Natural Account
52001600	M & S Oper - Admin & General
52500000	Misc Exp (O&M) - Natural Acct
52503000	Advertising
52512500	Books & Publications
52513200	Business Development
52514000	Charitable Contribution Deductible
52514600	Charitable Donations - Community
52514900	Customer Education
52514905	Customer Education Communication - Printed
52514907	Customer Education - Press Releases
52514910	Customer Education - Online Development/Production
52515000	Community Relations - Events
52520000	Collection Agencies
52522000	Community Relations
52524000	Co Dues/Membership Deductible
52527000	Directors Fees
52527100	Directors Expenses
52532000	Electricity - Natural Account

52534000 Employee Expenses
52534200 Conferences & Registration
52535000 Meals Deductible
52535100 Meals Non-Deductible
52542000 Forms - Natural Account
52546000 Grounds Keeping - Natural Account
52548000 Heating Oil/Gas - Natural Account
52548100 Hiring Costs
52549000 Injuries and Damages
52550000 Janitorial - Natural Account
52554500 Lab Supplies
52562000 Office & Admin Supplies - Natural Account
52562500 Overnight Shipping - Natural Account
52564000 Penalties Nondeductible
52566000 Postage - Natural Account
52566700 Printing
52567000 Relocation Expenses
52568000 Research & Development
52571000 Security Service - Natural Account
52571500 Software Licenses
52572000 Telemetering - Source of Supply
52574000 Telephone - Natural Account
52574100 Cell Phone - Natural Account
52574200 Data Lines - Admin & General
52578000 Trash Removal - Natural Account
52582000 Uniforms - Natural Account
52583000 Water & WW - Natural Account
52585000 Discounts Available
53110000 Contract Svc-Eng - Natural Account
53150000 Contract Svc-Other - Natural Account
53151000 Contract Svc-Temp Empl - Natural Account
53152000 Contract Svc-Lab Testing - Water Treatment
53153000 Contract Services - Accounting
53154000 Contract Services - Audit Fees
53155000 Contract Services - Legal
53157000 Contract Services - Outplacement
53159100 Contract Services - Hardware Services
53185000 Contract Services - Interco
54110000 Rents-Real Property - Natural Account
54115000 Rents-Real Property Interco
54140000 Rents-Equipment - Natural Account
55000000 Transportation (O&M) - Natural Account
55010100 Transportation Lease Costs
55010200 Transportation Lease Fuel
55010300 Transportation Lease Maint
55010500 Transportation - Reimburse Employee Personal Use
55110000 Insurance Vehicle

	55710000	Insurance General Liabilty
	55711000	Insurance Casualty Reserve
	55720000	Insurance Workers Compensation
	55730000	Insurance Other
	55735000	Insurance Other - Intercompany
	55740000	Insurance Property
	57010000	Uncollectible Accounts Exp - Natural Account
	62502600	Misc Maint - Admin & General
	68011200	Depreciation Exp - Non-Utility Property
	68520000	Property Taxes
	68532000	FUTA
	68533000	FICA
	68535000	SUTA
	68543000	Other Taxes and Licenses
	69011000	FIT - Current
	69012000	FIT - Prior Year Adjustment
	69021000	SIT - Current
	69022000	SIT - Prior Year Adjustment
	69062000	Deferred FIT - Prior Year Adjustment
	69065000	Deferred FIT - Other
	69072000	Deferred SIT - Prior Year Adjustment
	69073500	Deferred SIT - Other
	75810000	Donations Deductible
	81035000	Interest Capital Lease Intercompany
	81315000	Interest Short Term Debt Intercompany
	81815100	Interest Income - STD Intercompany
Pension Adjustment*	50610000	Pension Expense
Group Insurance Adjustment*	50510000	PBOP Expense
		Total

*Adjustment to reclassify non-service cost as reflected in RO Model workpaper "ALL_CH04_O&M_RO_Service C

Business Development	Central Lab	Corp Admin	Corporate Security
$116,200	$130,169	$126	$83,638
(2,875)	(3,319)		(6,840)
96	3,353		702
	(167)		56
33,447	13,162		(0)
5,337	2,139		2,376
808			
2,306	4,117	5	1,935
3,475	4,415	5	3,637
		28,536	
1,565			
976			
		81	
5,289	462	11,248	(39)
13	39	(214)	
104	4	-	
	805		321
1,401	64	(63)	466
2	385	(10,885)	10
10,130	21,625	(103)	11,199
82	248		245
2,200	8,707		108
20	1,063	7	4,598
126	28,931	4,141	3,782
		111	
6,343			
2,418			94
4,932	89	10,525	12
		56,014	
		3,790	
	9,557		

2,870	858	(2,756)	1,667
236			
103	92	24	211
	1,282		
4,382		10,366	
	2,614		
	109,568		
18	1,331		875
23	12,851	19	1,402
3	1	(1,363)	
		544	
7,508		1,332	0
	988	184	2,223
3,079	871	2,095	5,746
		1,544	
43	2,511	797	2,101
346	307	1,887	5,291
	452		
	(3)		105
2,851	7,666	230	152,563
	1,920	(444)	692
	(74,479)		
		53,278	
		20,782	
1,069		1,487	5,607
		-	-
		966	
	15,820		199
	934	1,304	
		2,428	1,520
		0	224
		0	168
57			107
10	12	100	

1,633	2,018	17,805	(456)
		(71)	
1,089	1,310	11,019	
296	338	730	753
		24,632	
113	141	1,266	(43)
		(6,478)	
	8,598		22,140
		1,279,839	
	1,910	(342)	
31	75	36	108
7,553	10,110	(5,397)	4,025
295	740	(592)	960
		50,235	8
		179,707	
		(18,815)	
		(7,613)	
		6,478	
		1,765	
		(147,107)	
		66,972	
		7,137	
		57,750	
		-	
		(47,160)	
(992)	(3,925)		(49)
(1,456)	(3,174)	1,567	(1,633)
$225,551	$329,582	$1,671,487	$312,816

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Customer Service Organization (CSO)	Environmental Leadership	External Affairs & Public Policy
$1,039,459	$90,342	$185,686
(31,187)	(1,647)	(4,833)
32,686		16
2,836		
72,013	11,819	27,175
21,616	4,314	17,227
1,093		
18,506	2,513	6,285
15,180	2,895	7,745
498	62	510
269		
7,520		
523	341	1,113
5,588	79	44
	248	
4,746		161
1,253	199	190
77		
661	98	1,069
285,203	12,055	11,504
807	310	314
135,554	2,364	7,467
12,084	3,011	82
	4	
34,730	1,358	562
1		
29	4	
		304
(86)		
5		
		4,559
		2,839
-		
63		
776	85	4,575
14,133		

2,890	1,357	714
592	59	117
851	(956)	72
	3	
355		
(1)		
754		
555		
9,613	8	
	1,857	
943	1,408	224
345	240	100
59,153		
	243	4
	(8,105)	
2,535		
15,877		2,220
100,042	51	81
13,626	359	1,714
294		
402		
24		12
439		
(2)		
32,612	5,946	36,523
(1)	743	
1,020	1,042	351
90,564		
(3,758)	3,016	
3,889	415	
760		
10		
3		
60	63	128
113	6	11

18,854	895	1,903
12,436	619	1,248
2,988	166	287
1,312	61	133
534		
667		
926	23	58
80,082	7,085	13,387
7,926	(6,218)	506
2,742		
(61,115)	(1,066)	(3,367)
(40,875)	(1,777)	(1,838)
$2,037,675	$137,994	$329,185

Facilities	Finance	Human Resources	Investor Relations	Legal
$16,124	$1,053,875	$515,015	$7,102	$200,227
(530)	(25,254)	(15,398)	(10)	(6,959)
74	6,003	3,782	0	824
	7	4		20
1,203	181,056	83,886	1,728	71,806
	73,866	30,875	1,690	71,625
	(263)	2,813		5,182
527	31,578	16,389	271	5,457
803	39,441	22,433	357	8,132
	1,733	1,420	382	2,063
	456	637	291	341
	4			
(1)	4,498	4,356		10
4	236	740	0	19
	141			138
154	2,374	2,466		1,021
8	6,123	8,675	459	1,048
	220	73	16	
	3,457	1,360		895
3,103	142,105	74,058	789	19,209
	1,560	830		187
	36,038	16,746	2,564	7,839
818	480	126	(2)	(1)
2,511	(92,614)	332	14	560
3,591	14,773	5,160		917

42	4,335	2,286	95	1,435
	472	75	9	507
13,061	1,110	377	18	312
(379)		14		
196				
	1,420			
		1,294		
26	2			
5,014	1,035	(1,483)	5	179
3,270	431	242	10	47
	19			
5,177	20	632	515	
(192)		728		
	9,409	8		
3,374				
	12,954	(5,882)	303	47
4,598	1,575	114		
1,958	5,459	3,608	271	1,077
12				
126				
	11	2		
(1)				
	(1,214)			
761				
8,535	120,556	130,222	8,442	36,724
6,608	16,500	4,284		
	27,637			
	61,374			
	11,087	22,146		40,272
	(203)			
95,483				
	(1,150)	(13)		
180,719	1,454	1,252		14
525	35			
299				
10				
4				
1				
	268	552		30
2	93	55	3	26

291	15,468	9,276	501	4,441
197	10,308	6,079	327	2,870
61	2,709	1,381	71	546
20	1,072	647	35	311
	248			
		35		
74,087				
12	394	201	2	50
1,249	80,124	40,113	525	13,779
181	7,508	2,297	25	755
	19			
		462		
13,989				
	(16,248)	(7,550)	(1,156)	(3,534)
(442)	(20,977)	(10,872)	(113)	(2,893)
$447,262	$1,837,205	$979,357	$25,543	$487,554

Operations Excellence	Regulated Ops	Safety	Supply Chain	Technology and Innovation (T&I)
$290,314	$43,024	$48,306	$109,660	$618,942
(4,260)	(1,874)	(970)	(3,362)	(9,693)
2,388	58	16	58	45
552		41	21	
73,095	0	10,622	25,859	137,858
21,871	42,508	9,027	5,457	36,540
	1,651			28,070
7,292	1,338	1,446	3,520	20,533
7,481	1,040	2,419	4,133	31,117
160	701	285	140	(1,135)
	152	191	43	(591)
(1)				(0)
43	1,833	226	416	7,499
758			66	56
69	207	(3)		
		55		6,553
452	2,003	1,498	628	13,866
87				174
1,680	2,369	1	458	428
57,534	3,281	5,805	14,857	78,599
144		113	133	1,552
17,816	20,406	24	4,679	7,269
1,843	43	317	38,825	1,489
598	4,160	1,725	(568)	5,104
-			(0)	
12			830	(0)
	2			
14				
5			126	
			274	
327	(0)		4,562	203
				13,122

1,339	1,404	560	3,767	1,006
	214		100	
432	76	126	115	380
285	2			
		2,740		7,047
				-
6			-	
375				
884	52	29	69	129
27	26	14	41	693
	22		-	27
	12,799	298		19,114
2,092	467		5,198	96,165
374	4		281	8,127
1,457	1,340	99	2,427	12,431
				117,762
11	22		8	25
			(2)	
760				
1,297	3,451	4,701	1,461	763,286
5,818	69		992	5,951
	92			
				2,196
			262	43,535
				0
				21,646
9	6,550			(3,241)
527	1,947		462	93
				95
7				
559	6			24
102				18
36				65
949	46	25	45	109
18	12	4	12	75

3,002	1,951	678	1,939	12,926
2,023	1,297	438	1,366	8,317
496	327	84	344	1,531
207	135	48	132	907
178			10	255,784
	(29)			
119	11	18	47	257
21,737	2,545	3,438	10,133	53,729
529	108	262	973	4,601
(8,032)	(9,200)	(11)	(2,110)	(3,277)
(8,464)	(806)	(844)	(2,203)	(11,489)
$509,437	$147,838	$93,851	$236,681	$2,417,642

Total
$4,548,209
(119,013)
50,101
3,370
744,729
346,469
39,354
124,019
154,708
28,536
8,384
2,764
7,604
37,817
7,428
908
18,657
38,269
645
1,990
750,951
6,525
269,781
64,801
4
(4,548)
1
985
6,649
2,512
14
45
5
4,559
2,839
274
-
63
50,528
56,014
3,790
36,813

23,869
2,380
16,405
(75)
355
1,477
754
11,207
16,596
12,269
111,801
10,711
19,780
19
64,186
1,081
50,714
(8,105)
9,305
141,233
1,544
120,700
53,659
118,068
981
218
437
(1,215)
1,519
1,317,066
43,131
(74,387)
80,914
84,352
127,877
(203)
21,646
95,483
93,685
201,745
7,196
305
5,307
357
272
2,437
553

93,127
(71)
60,944
13,108
24,632
6,498
(6,230)
287,279
1,353,926
2,206
2,367
344,215
20,854
53,004
179,707
(18,815)
(7,613)
6,478
1,765
(147,107)
66,972
7,137
462
71,738
-
(47,160)
(121,632)
(108,288)
$12,226,662

California American Water
Service Co - Total OPEX Costs for 2021

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50425000	401k Restoration Expense
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52513200	Business Development
52514000	Charitable Contribution Deductible
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52514901	Customer Education Communication - Reg
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52574000 Telephone - Natural Account
52574100 Cell Phone - Natural Account
52574200 Data Lines - Admin & General
52574300 Wireless - Service First - Natural Account
52578000 Trash Removal - Natural Account
52582000 Uniforms - Natural Account
52583000 Water & WW - Natural Account
52585000 Discounts Available
52599800 PCard Undistributed
53110000 Contract Svc-Eng - Natural Account
53150000 Contract Svc-Other - Natural Account
53151000 Contract Svc-Temp Empl - Natural Account
53152000 Contract Svc-Lab Testing - Water Treatment
53153000 Contract Services - Accounting
53154000 Contract Services - Audit Fees
53155000 Contract Services - Legal
53157000 Contract Services - Outplacement
53159100 Contract Services - Hardware Services
53185000 Contract Services - Interco
54110000 Rents-Real Property - Natural Account
54115000 Rents-Real Property Interco
54140000 Rents-Equipment - Natural Account
55000000 Transportation (O&M) - Natural Account
55010100 Transportation Lease Costs
55010200 Transportation Lease Fuel
55010300 Transportation Lease Maint
55010400 Transportation - Employee Reimbursement to Company
55010500 Transportation - Reimburse Employee Personal Use

	55110000	Insurance Vehicle
	55710000	Insurance General Liabilty
	55711000	Insurance Casualty Reserve
	55720000	Insurance Workers Compensation
	55730000	Insurance Other
	55735000	Insurance Other - Intercompany
	55740000	Insurance Property
	57010000	Uncollectible Accounts Exp - Natural Account
	62502600	Misc Maint - Admin & General
	68011200	Depreciation Exp - Non-Utility Property
	68520000	Property Taxes
	68532000	FUTA
	68533000	FICA
	68535000	SUTA
	68543000	Other Taxes and Licenses
	69011000	FIT - Current
	69012000	FIT - Prior Year Adjustment
	69021000	SIT - Current
	69022000	SIT - Prior Year Adjustment
	69062000	Deferred FIT - Prior Year Adjustment
	69065000	Deferred FIT - Other
	69072000	Deferred SIT - Prior Year Adjustment
	69073500	Deferred SIT - Other
	75810000	Donations Deductible
	81035000	Interest Capital Lease Intercompany
	81815100	Interest Income - STD Intercompany
Pension Adjustment*	50610000	Pension Expense
Group Insurance Adjustment*	50510000	PBOP Expense
		Total

*Adjustment to reclassify non-service cost as reflected in RO Model workpaper "ALL_CH04_O&M_RO_Service Co'

Business Development	Central Lab	Corp Admin	Corporate Security
$52,869	$192,156	$334	$180,005
(1,038)	3,441	(82)	4,437
1	1,265		1,802
			298
14,147	21,684		62,982
3,778	2,151		5,334
2,052			
1,247	6,324	(407)	5,919
2,084	6,933	(5)	8,979
		32,894	
(478)			
(438)			
		219	
1,124	588	939	141
29	124	9	24
		15	
	711		1,715
171	521	(91)	5,955
	488	(8,124)	32
6,846	38,893	(14)	33,094
84	284		263
4,953	16,211		
	(1,321)	585	2,090
3	11,993	(2,148)	565
40			
6,536	143	11,184	11
		62,862	
		4,584	
	13,485		

522	155	379	1,440
5			
99	114	22	728
	1,485		
	114		
		(200,144)	
	5,718		
	138,195		
-	335	6	1,149
15	15,407	4	1,793
2		13	
		380	
		316	
3		(1,331)	
	1,197	356	72
4,524	48	3,473	88,168
2	2,342	137	1,456
258	134	365	2,189
	275	(0)	1,697
51	2	2	78
	2,018		
	(49)		72
0	(3)		313
231			
5,022	11,806	19,413	204,626
			(6)
	(68,494)		
		53,789	
		22,041	
-		(0)	273
		-	-
-	-	-	(111)
	23,116		
	1,554	1,261	
			180
		(40)	(1,214)
			29
			119
-			175

10	24	107	34
2,129	4,266	22,121	2,612
		(20,297)	
760	1,752	7,922	2,520
271	514	2,062	410
		24,993	
125	239	1,296	68
		(3,429)	
	11,243	-	95,008
		984,425	
	19,848	(215)	
18	102	2,814	83
4,833	14,771	(31)	19,830
184	438	(163)	980
		53,409	
		164,776	
		4,618	
		12,477	
		(6,224)	
		(6,993)	
		(152,929)	
		6,975	
		(7,899)	
		27,532	
		(7,845)	
(7,604)	(24,889)		
(1,119)	(6,406)	1,314	(5,392)
$104,350	$473,444	$1,114,015	$733,027

" tab "Trf-Elim WS2"

Customer Service Organization (CSO)	Environmental Leadership	External Affairs & Public Policy
$931,636	$86,027	$180,190
13,633	6	(518)
64,420		8
1,810		
68,435	19,475	32,550
13,901	4,505	17,800
10,500		9,705
19,050	2,762	6,398
15,234	2,713	7,530
552	51	787
286	55	
7,473		
779	1,022	632
8,384	217	5
	246	
2,468		753
1,285	70	194
1,756		75
1,342	458	593
265,598	12,758	14,815
1,623	327	230
150,141	6,059	6,666
368	3,169	587
6	121	
4,632	1,328	869
116		
0		(172)
		21
		1
		174
8		
		4,311
		45
1,593		994
266	111	1,745
12,978		

2,083	831	1,426
	336	434
745	79	372
5		
1,414		
8,557	10	
	1,457	
246	997	163
209	120	88
(1,763)		1
(0)	2	9
	218	
1,834		
28,535	28	1,932
92,120	2	3
7,159	460	901
224		
2,491	3	
40		47
(5)		3
1,632		
(41)	1	21
51,861	4,756	42,743
1,925		
2,901	463	(63)
88,124	-	-
(11,365)	2,211	190
2,844	182	
597		
28		
15		
99	11	17

112	9	11
23,225	1,604	2,374
8,249	684	807
2,855	189	290
1,356	88	141
1,972		
238		
1,228	41	74
78,188	7,435	14,315
6,574	497	513
22,853		
(230,508)	(9,302)	(10,234)
(43,371)	(2,187)	(2,525)
$1,755,758	$152,705	$341,042

Facilities	Finance	Human Resources	Investor Relations	Legal
$90,544	$1,132,608	$572,758	$33,864	$233,092
5	3,698	1,577	678	1,243
4	7,367	2,426		513
	10	19		
64,144	198,001	97,073	4,349	70,150
173,213	88,317	31,353	4,775	89,727
	18,979	28,375		
1,383	38,364	20,196	1,407	6,964
1,302	43,510	26,344	1,693	9,457
112	4,665	1,552	427	2,021
1,044	2,935	716	325	609
	2,502	5,221	9	950
	390	315	2	30
	192	148		
170	3,202	1,626		1,424
	1,027	11,606	26	819
	90	226	16	
	3,595	936		749
5,470	166,308	83,307	4,274	25,173
	2,210	1,284	4	233
	47,567	16,327	3,136	8,851
(338)	259	407	-	345
1,365	(104,139)	(1,661)	1	483
	13			
	423	1		261
	11			
	1,488			
		165		
3,892	9,346	2,986		823
				567

(20)	3,481	1,046	173	1,163
	83	56	85	324
11,225	1,941	284	71	383
(25)			0	
	2,166	202		
		318		
5				
2,074	1,770	242	1	100
1,110	886	621	6	108
	160			
3,440	3	576	556	
335		302		
	3,565	749		2,657
2,957				
	9,721	14,415	617	6,173
3,210	944	5		
1,875	4,570	3,423	162	1,489
95	47			16
	41	2	57	65
70				
-	12	1		
	(2,915)			
-	130	(7)	(0)	81
163	79			
1,691	129,416	138,125	10,211	34,208
(5,936)	40,421	9,358		
	34,698			
	63,750			
	8,729	7,427		44,788
	-	(0)		0
90,876				
-	(565)	(11)	-	-
172,001	1,406	1,015		508
463	(1)	(9)		
15				
2				
2				
			1	
	25	335		

2	129	70	4	36
408	23,798	12,992	672	6,415
159	9,559	5,213	260	2,655
53	2,875	1,505	78	700
23	1,338	731	38	356
2	1,467			
76,508				
22	482	239	11	58
14,080	92,808	47,093	2,763	17,229
256	6,431	2,844	147	858
	288			
	30			
14,615				
	(73,028)	(25,066)	(4,815)	(13,588)
(883)	(27,795)	(13,812)	(691)	(4,224)
$733,179	$2,015,884	$1,115,567	$65,393	$557,041

Operations Excellence	Regulated Ops	Safety	Supply Chain	Technology and Innovation (T&I)
$314,143	$36,876	$47,417	$98,749	$359,621
343	1,038	4	77	(5,733)
2,525	0	10	36	301
475				
76,597	6,583	10,160	30,575	108,038
28,334	14,861	8,656	5,385	54,323
	10,090			22,538
10,104	883	1,535	3,763	17,711
12,211	880	2,429	3,952	22,828
183	924	279	125	706
	123	193	83	429
239				
23		3	756	1,597
815	8		76	98
	177			121
131	-	219		4,511
650	20	724	136	9,975
			179	112
2,222	567		335	264
62,746	2,488	5,923	11,688	59,326
100		42	178	2,043
24,986	17,531		4,843	5,330
681	5	4	4,999	1,198
593	2,800	658	606	2,136
93		84	1	
			19	
			3,229	
400	1,686	1,077	3,136	55
	228			
				9,660

3,520	891	322	576	1,532
200			0	
547	347	1	80	382
		-		258
126	15		11	1,652
39	5	35	256	2,135
			1	17
	1,932	3	241	(10)
2,573	153	34	4,152	369,640
53	2		29	13,612
2,648	1,659	242	1,467	10,193
	63	14		143,289
216	640	4	25	12,108
				5
23			(7)	35
0	0	-		95
8,912	10	4,003	3,132	658,490
3,902				3,832
				4,459
			369	8,213
-				337
				2,163
7	11,926	-	-	(30,474)
2,171	2,301		349	50
				208
5				
523	9		19	21
252				14
61	(1,195)			56
606	10	5	18	222

24	12	5	13	44
4,626	2,814	889	2,647	10,869
1,775	923	337	961	3,314
558	359	100	326	1,224
265	169	51	155	686
444				597,300
	25			
170	5	14	41	333
26,121	3,353	3,542	9,977	42,588
1,074	93	220	793	4,733
55				
(38,360)	(26,915)	(7,436)	(8,183)	-
(10,508)	(493)	(963)	(1,970)	(9,953)
$551,225	$96,878	$80,840	$188,404	$2,530,858

Total
$4,542,888
22,811
80,679
2,613
884,942
546,414
102,238
143,603
168,072
32,894
11,904
6,360
7,931
16,285
10,525
900
16,931
33,088
2,453
3,455
798,691
8,906
312,600
13,039
127
(79,916)
13
980
(102)
4,717
21
1
174
8
4,311
45
165
2,587
43,396
62,862
5,380
36,123

19,521
1,524
17,422
(25)
1,490
1,528
2,627
(199,827)
14,290
139,652
8,886
22,837
175
3,211
952
7,819
218
6,417
534,186
113,918
39,195
145,719
15,786
2,180
83
1,632
(2,915)
590
474
1,328,423
53,497
(68,494)
88,487
90,250
73,100
337
2,163
90,876
68,895
193,953
6,502
185
(71)
325
(942)
1
1,525

646
124,462
(20,297)
47,851
14,369
24,993
7,126
(3,429)
707,436
1,060,933
19,896
5,733
398,894
26,473
76,549
164,776
4,618
12,477
(6,224)
(6,993)
(152,929)
6,975
(7,899)
30
42,203
(7,845)
(479,928)
(130,980)
$12,609,609

Attachment 3-4: Cal Am's response to Cal Advocates' data request ISC-005

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service by $55,771,300 or 18.71% in the year 2024, by $19,565,300 or 5.50% in the year 2025, and by $19,892,400 or 5.30% in the year 2026.	A.22-07-001 (Filed July 1, 2022)

CALIFORNIA-AMERICAN WATER COMPANY'S RESPONSE TO PUBLIC ADVOCATES OFFICE'S DATA REQUEST ISC 05

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Attorneys for California-American Water Company

Dated: September 26, 2022

California-American Water Company (U-210- W; "California American Water," "CAW" or the "Company") hereby sets forth the following objections and responses to Public Advocates Office's ("Cal Advocates") Data Request ISC 05 ("Data Requests" or "RPD"), propounded on September 12, 2022, in A.22-07-001.

RESERVATION OF RIGHTS

1. California American Water's investigation into the Data Requests is ongoing. The Company reserves the right, without obligating itself to do so, to supplement or modify its responses and to present further information and produce additional documents as a result of its ongoing investigation.

2. Any information or materials provided in response to the Data Requests shall be without prejudice to California American Water's right to object to their admission into evidence or the record in this proceeding, their use as evidence or in the record, or the relevance of such information or materials. In addition, California American Water reserves its right to object to further discovery of documents, other information or materials relating to the same or similar subject matter upon any valid ground or grounds, including without limitation, the proprietary nature of the information, relevance, privilege, work product, overbreadth, burdensomeness, oppressiveness, or incompetence.

GENERAL OBJECTIONS

1. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they purport to impose upon California American Water any obligations broader than those permitted by law.

2. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they improperly seek the disclosure of information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privilege or doctrine, and/or the client confidentiality obligations mandated by Business and Professions Code Section 6068(e)(1) and Rule 3-100(A) of the California Rules of Professional Conduct. Such responses as may hereafter be given shall not include information protected by such privileges or

doctrines, and the inadvertent disclosure of such information shall not be deemed as a waiver of any such privilege or doctrine.

3. California American Water objects to the Data Requests to the extent that the requests are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, unreasonably expensive, oppressive, or excessively time consuming to California American Water.

4. California American Water objects to the Data Requests to the extent they seek documents that are and/or information that is neither relevant nor material to this proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

5. California American Water objects to the Data Requests to the extent they seek an analysis, calculation, or compilation that has not previously been performed and that California American Water objects to performing.

6. California American Water objects to the Data Requests insofar as they request the production of documents or information that are publicly available or that are equally available to Cal Advocates because such requests subject California American Water to unreasonable and undue annoyance, oppression, burden and expense.

7. California American Water objects to the Data Requests to the extent the requests are vague, ambiguous, use terms that are subject to multiple interpretations but are not properly defined for purposes of the Data Request, or otherwise provide no basis from which California American Water can determine what information is sought.

8. The objections contained herein, and information and documents produced in response hereto, are not intended nor should they be construed to waive California American Water's right to object to the Data Requests, responses or documents produced in response hereto, or the subject matter of such Data Requests, responses or documents, as to their competency, relevancy, materiality, privilege and admissibility as evidence for any purpose, in or at any hearing of this or any other proceeding.

9. The objections contained herein are not intended nor should they be construed to waive California American Water's right to object to other discovery involving or relating to the subject matter of the Data Requests, responses or documents produced in response hereto.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Patrick Pilz**
Title:	**Senior Manager Field Operations**
Address:	**California American Water 655 West Broadway, #1410 San Diego, CA 92101**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 05**
Company Number:	**Cal ADV ISC 05 Q001**
Date Received:	**September 12, 2022**
Date Response Due:	**September 26, 2022**
Subject Area:	**Customer Inquiries**

DATA REQUEST:

1. Please refer to the Cal Am's response to MDR II.H.1 filed with the current GRC application. In the MDR response, Cal Am provided number of "informal PUC complaints" by district and major subject areas.
   a. Did Cal Am receive any complaints from customers in addition to the "informal PUC complaints" provided in the current MDR response for the years 2019 to 2021?
   b. If answer to the above question a. is "yes", please provide all the complaints Cal Am received in the last three years (2019 to 2021) for each district, broken down by "informal PUC complaints" and other complaints and categorized by major subject areas (such as billing, collections, conservation, etc.) within each complaint type.
   c. Did Cal Am receive any customer complaints related to any of the following major subject areas in addition to "informal PUC complaints"? Give a response for each listed subject area.
      i. Leaks
      ii. Pressure
      iii. Distribution
   d. If answer to any part of question c. is "yes," please include the complaints related to the major subject area(s) in the response b. above.

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully here. California American Water also objects to this request as vague

and ambiguous, particularly as to the term “complaint.” California American Water further objects to this request to the extent it seeks an analysis, calculation, or compilation that has not previously been performed and is therefore unduly burdensome. California American Water additionally objects to this request on the grounds that any benefit of receiving the information is outweighed by the undue burden and expense of providing that information. California American Water also objects to this request on the grounds it seeks information irrelevant to this proceeding and because it seeks information that is publicly available or that is equally available to Cal PA. Subject to, but without waiving, those objections, California American Water responds as follows.

1.a.) Yes, California American Water received complaints in addition to the informal PUC complaints provided in the current MDR response.

1.b.) Attachments CAW Response Cal Adv ISC 05 Q001 Attachments 1 through 9 are quarterly customer complaint and inquiry reports from Q1 2019 through Q1 2021 that were filed on a quarterly basis with the Public Utilities Commission. California American Water had previously been ordered to track Customer complaints in such format and file quarterly reports. In A.19-07-004, Special Request 14, California American Water requested to cease providing these reports on the grounds they are unnecessary and highly subjective. There was no clear distinction between a customer “complaint” versus a customer inquiry. Many listings in these reports could be classified as a customer inquiry and not a customer complaint. Cal Advocates agreed that Special Request 14 should be approved, and the Commission adopted that finding in Decision D.21-11-018, allowing California American Water to cease tracking and reporting on these customer complaints. California American Water therefore provides the prior reporting that Cal Advocates agreed was not necessary to track going forward.
To the extent Cal Advocates is requesting information on formal customer complaints, Cal Advocates is already aware of those proceedings. Nonetheless, California American Water provides the following docket numbers:
C1908011
C2010016
C2010017
C2101018

1.c.) Yes, please refer to the quarterly complaint and inquiry reports provided as Attachments CAW Response Cal Adv ISC 05 Q001 Attachments 1 through 9.

1.d) Please refer to the quarterly complaint and inquiry reports provided as Attachments CAW Response Cal Adv ISC 05 Q001 Attachments 1 through 9.

Attachment 3-5: Cal American 2019 GRC Final Application Exhibit B MDR II.H.1 Response.

MINIMUM DATA REQUIREMENT

General Rate Case Application – Testimony/Results of Operation Requirements
II.H.1 – Number of Customer Complaints

The Results of Operation Report must contain information about the number of customer complaints received in the last three years for the district, categorized by major subject areas.

Response:

Please see attached Excel Spreadsheet MDR II.H.1.for the number of Complaints and escalated Customer Inquiries categorized by major subject areas and service area.

MDR II.H.1

CALIFORNIA AMERICAN WATER
STATEWIDE

CUSTOMER COMPLAINTS AND ESCALATED INQUIRIES FOR THE PERIOD 2016 - 2018

2019 GENERAL RATE CASE

District	Year	Billing	Collections	Conservation	Customer Service	Distribution	Leaks	Pressure	Rates	Water Quality	Total
0510 - San Diego Div - Coronado	2016	47	20	1	0	123	195	5	0	1	392
	2017	69	25	6	0	244	158	0	7	2	511
	2018	102	20	9	0	203	218	10	0	0	562
0520 - Central Div - Monterey	2016	360	81	83	0	344	846	27	3	8	1,752
	2017	451	99	87	0	610	668	0	16	3	1,934
	2018	365	69	33	0	586	708	67	4	3	1,835
0530 - Los Angeles Div - Baldwin Hills	2016	25	6	2	0	68	110	6	0	4	221
	2017	41	7	7	0	150	74	0	0	0	279
	2018	35	11	8	0	112	107	11	0	0	284
0540 - Los Angeles Div - Duarte	2016	30	8	1	0	57	118	4	0	1	219
	2017	40	5	3	0	125	127	0	0	0	300
	2018	40	10	4	0	107	136	11	0	2	310
0550 - Los Angeles Div - San Marino	2016	45	9	1	0	75	229	9	0	1	369
	2017	76	11	4	0	146	197	0	1	1	436
	2018	85	12	8	0	140	181	16	1	0	443
0550 - Los Angeles Div - Total	2016	100	23	4	0	200	457	19	0	6	809
	2017	157	23	14	0	421	398	0	1	1	1,015
	2018	160	33	20	0	359	424	38	1	2	1,037
0560 - Ventura Div - Village	2016	107	28	6	0	130	243	9	3	0	526
	2017	149	22	8	0	204	182	0	0	1	566
	2018	95	22	5	0	176	238	17	0	3	556

MDR II.H.1

CALIFORNIA AMERICAN WATER
STATEWIDE

CUSTOMER COMPLAINTS AND ESCALATED INQUIRIES FOR THE PERIOD 2016 - 2018

2019 GENERAL RATE CASE

District	Year	Billing	Collections	Conservation	Customer Service	Distribution	Leaks	Pressure	Rates	Water Quality	Total
0580 - Northern Div - Larkfield	**2016**	5	0	0	0	9	28	0	0	1	43
	2017	34	0	2	0	72	28	0	0	0	136
	2018	15	6	1	0	20	24	1	0	0	67
0595 - Northern Div - Sacramento	**2016**	110	88	19	0	393	704	33	4	5	1,356
	2017	261	85	24	0	648	578	0	1	2	1,599
	2018	311	81	22	0	570	583	35	1	3	1,606
0596 - Northern Div - Dunnigan (Acq 12/15)	**2016**	0	0	0	0	1	1	0	0	0	2
	2017	0	0	0	0	0	0	0	0	0	0
	2018	0	1	0	0	4	5	1	0	0	11
0597 - Northern Div - Geyserville (acq 11/16)	**2016**	0	0	0	0	0	0	0	0	0	0
	2017	0	0	0	0	4	2	0	0	0	6
	2018	4	0	0	0	3	3	1	0	0	11
0598 - Northern Div - Meadowbrook (acq 3/17)	**2016**	0	0	0	0	0	0	0	0	0	0
	2017	14	22	1	0	18	18	0	0	0	73
	2018	5	2	0	0	19	11	5	0	1	43
2016 Totals		729	240	113	0	1,200	2,474	93	10	21	4,880
2017 Totals		1,135	276	142	0	2,221	2,032	0	25	9	5,840
2018 Totals		1,057	234	90	0	1,940	2,214	175	6	12	5,728

Attachment 3-6: Cal Am's Response to Cal Advocates' Data Request ISC-012

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service by $55,771,300 or 18.71% in the year 2024, by $19,565,300 or 5.50% in the year 2025, and by $19,892,400 or 5.30% in the year 2026.	A.22-07-001 (Filed July 1, 2022)

CALIFORNIA-AMERICAN WATER COMPANY'S RESPONSE TO PUBLIC ADVOCATES OFFICE'S DATA REQUEST ISC 12

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Attorneys for California-American Water Company

Dated: November 17, 2022

California-American Water Company (U-210- W; "California American Water," "CAW" or the "Company") hereby sets forth the following objections and responses to Public Advocates Office's ("Cal Advocates") Data Request ISC 12 ("Data Requests" or "RPD"), propounded on November 2, 2022, in A.22-07-001.

RESERVATION OF RIGHTS

1. California American Water's investigation into the Data Requests is ongoing. The Company reserves the right, without obligating itself to do so, to supplement or modify its responses and to present further information and produce additional documents as a result of its ongoing investigation.

2. Any information or materials provided in response to the Data Requests shall be without prejudice to California American Water's right to object to their admission into evidence or the record in this proceeding, their use as evidence or in the record, or the relevance of such information or materials. In addition, California American Water reserves its right to object to further discovery of documents, other information or materials relating to the same or similar subject matter upon any valid ground or grounds, including without limitation, the proprietary nature of the information, relevance, privilege, work product, overbreadth, burdensomeness, oppressiveness, or incompetence.

GENERAL OBJECTIONS

1. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they purport to impose upon California American Water any obligations broader than those permitted by law.

2. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they improperly seek the disclosure of information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privilege or doctrine, and/or the client confidentiality obligations mandated by Business and Professions Code Section 6068(e)(1) and Rule 3-100(A) of the California Rules of Professional Conduct. Such responses as may hereafter be given shall not include information protected by such privileges or

doctrines, and the inadvertent disclosure of such information shall not be deemed as a waiver of any such privilege or doctrine.

3. California American Water objects to the Data Requests to the extent that the requests are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, unreasonably expensive, oppressive, or excessively time consuming to California American Water.

4. California American Water objects to the Data Requests to the extent they seek documents that are and/or information that is neither relevant nor material to this proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

5. California American Water objects to the Data Requests to the extent they seek an analysis, calculation, or compilation that has not previously been performed and that California American Water objects to performing.

6. California American Water objects to the Data Requests insofar as they request the production of documents or information that are publicly available or that are equally available to Cal Advocates because such requests subject California American Water to unreasonable and undue annoyance, oppression, burden and expense.

7. California American Water objects to the Data Requests to the extent the requests are vague, ambiguous, use terms that are subject to multiple interpretations but are not properly defined for purposes of the Data Request, or otherwise provide no basis from which California American Water can determine what information is sought.

8. The objections contained herein, and information and documents produced in response hereto, are not intended nor should they be construed to waive California American Water's right to object to the Data Requests, responses or documents produced in response hereto, or the subject matter of such Data Requests, responses or documents, as to their competency, relevancy, materiality, privilege and admissibility as evidence for any purpose, in or at any hearing of this or any other proceeding.

9. The objections contained herein are not intended nor should they be construed to waive California American Water's right to object to other discovery involving or relating to the subject matter of the Data Requests, responses or documents produced in response hereto.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Patrick Pilz**
Title:	**Senior Field Manager, Operations**
Address:	**California American Water 655 West Broadway, #1410 San Diego, CA 92101**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 12**
Company Number:	**Cal ADV ISC 12 Q001**
Date Received:	**November 2, 2022**
Date Response Due:	**November 17, 2022**
Subject Area:	**Customer Complaint Data**

DATA REQUEST:

1. In response to Cal Advocates DR ISC-005 Question 1, Cal Am provided the quarterly customer complaint and inquiry reports from Q1 2019 through Q1 2021.
   a. Please refer to the response to Cal Advocates DR ISC—05 Question 01 Attachment 01 Page 01. This page contains a column entitled "CSC and Local Office Complaints".
      i. Please describe the data contained in this column and the process Cal Am uses to collect, track, and report this data.
      ii. Please clarify what CSC is an abbreviation for.
   b. Does Cal Am have the customer complaint and inquiry reports for Q2, Q3, and Q4 2021 as well as any data for 2022?
      i. If so, please provide this data in the same format as Cal Am's response to DR ISC-05 Q001 Attachments 01 – 09.
      ii. If not, please explain if Cal Am is still tracking this data and if it is Cal Am's understanding that Cal Am is not required to record these customer complaints.
   c. Did Cal Am's response to MDR II.H.1 in its last GRC (in proceeding A.19-07-004) use the "CSC and Local Office Complaints" data or the "Total Division Complaints" data from Q1 2016 to Q4 2018? If neither, please explain.

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully herein. California American Water further objects to this request to the extent it seeks an analysis, calculation, or compilation that has not previously been performed and is therefore unduly burdensome. California American Water additionally objects to this request on the grounds that any benefit of receiving the information is outweighed by the undue burden and expense of providing that information. Subject to, but without waiving, those objections, California American Water responds as follows.

1) a.i In D.06-11-050, Ordering Paragraph 9, the Commission ordered California American Water to submit quarterly call center static reports that break out types of calls and final disposition of all complaints. CAW Response Cal ADV Data Request ISC 05 Q001 Attachments 1 through 9 are copies of those reports that California American Water was ordered to provide.

As required by D.06-11-050, the data contained in the column labeled "CSC and Local Office Complaints" lists customer inquiries and customer complaints that were received by the Customer Service Center ("CSC") as well as any of California American Water's district offices or corporate office. As previously explained in response to Cal ADV Data Request ISC 05 Q001.b and explained extensively in the Direct Testimony of Patrick Pilz, Section B.2, submitted in California American Water's last general rate case (A.19-07-004):

"The distinction between a customer inquiry and a customer complaint is a fine line, subject to interpretation. All customer interactions are captured within California American Water's Customer Information System ("CIS"); however, in order to compile data for the report in question, California American Water must undertake a detailed analysis of account notes or interaction records for each individual customer interaction just to determine whether the interaction is a complaint or simply an inquiry. The difficulty in retrospectively categorizing customer interactions into complaints versus inquiries based on account notes makes it very tough to compare with any accuracy the results between reports."

Cal Advocates agreed these reports were unnecessary and in Decision D.21-11-018 the Commission authorized California American Water could cease the tracking and reporting required by D.06-11-050.

a.ii "CSC" is short for the centralized Customer Service Center where a majority of customer service calls are received. The Customer Service Center is staffed with Customer service agents to respond to customer calls from 7am to 7pm Monday through Friday and 24/7 for water emergencies.

b.i As authorized by D.21-11-018, California American Water does not have customer complaint and inquiry reports, such as those reflected in CAW Response Cal ADV Data Request ISC 05 Q001 Attachments 1 through 9, after Q2 2021. Please also see California American Water's response to a.i. above.

b.ii. California American Water continues to record customer interactions in customer account notes, but, pursuant to D.21-11-018, is not required to track or report those interactions in the same format as reflected in CAW Response Cal ADV Data Request ISC 05 Q001 Attachments 1 through 9.

c. Although not required by the MDR, California American Water's response to MDR II.H.1 in its last GRC is comparable to "Total Division Complaints" data shown in response to DR ISC-05 Q001 Attachments 01-09 meaning the MDR data included informal CPUC complaints.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Patrick Pilz**
Title:	**Senior Field Manager, Operations**
Address:	**California American Water 655 West Broadway, #1410 San Diego, CA 92101**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 12**
Company Number:	**Cal ADV ISC 12 Q002**
Date Received:	**November 2, 2022**
Date Response Due:	**November 17, 2022**
Subject Area:	**Customer Complaint Data**

DATA REQUEST:

2. Please refer to Cal Am's response to MDR II.H.1 in this proceeding (A.22-07-001). In the MDR response, Cal Am provided the number of "informal PUC complaints" by district and major subject areas.
   a. In addition to informal complaints made to the CPUC, has the company tracked any formal complaints made to the CPUC?
      i. If so, please verify that this data is included in the "CPUC Complaints" column (as that term is used in Cal Am's response to DR ISC-05 Q001 Attachment 01 Page 01).
      ii. Does Cal Am track any complaints made to CPUC other than "CPUC Complaints" (as that term is used in Cal Am's response to DR ISC-05 Q001 Attachment 01 Page 01)? If so, please also provide the data for these other complaints in the same format as Cal Am's response to MDR II.H.1 from proceeding A.19-07-004.
      iii. If not, please explain why.
   b. In addition to tracking complaints made to the CPUC, does Cal Am track complaints made by its customers or others to Cal Am?
      i. If so, please verify that this data is included in the "CSC and Local Office Complaints" column (as that term is used in Cal Am's response to DR ISC-05 Q001 Attachment 01 Page 01).
      ii. Does Cal Am track any complaints other than "CSC and Local Office Complaints" and "CPUC Complaints" (as those terms are used in Cal Am's response to DR ISC-05 Q001 Attachment 01 Page 01)? If so, please also provide the data for these other complaints in the same format as Cal Am's response to MDR II.H.1 from proceeding A.19-07-004
      iii. If not, please explain why.

c. Did Cal Am record any data on the following major subject areas for any type of complaint (such as formal CPUC informal complaints, CPUC formal complaints, and any complaints made by customers to Cal Am) from Q2 2021 to the present? If so, please provide a breakdown for each type of complaint by each subject area:
   i. Leaks
   ii. Pressure
   iii. Distribution

CAL-AM'S RESPONSE

California American Water incorporates its General Objections as though each is submitted fully herein. California American Water also objects to this request as vague and ambiguous, particularly as to the term "complaint." California American Water further objects to this request to the extent it seeks an analysis, calculation, or compilation that has not previously been performed and is therefore unduly burdensome. California American Water additionally objects to this request on the grounds that any benefit of receiving the information is outweighed by the undue burden and expense of providing that information. Subject to, but without waiving, those objections, California American Water responds as follows.

a.i. California American Water tracks both informal and formal CPUC customer complaints.

The column labeled "CPUC Complaints" in response to DR ISC-05 Q001 Attachment 01 Page 01 only contains informal CPUC complaints. Generally, formal CPUC complaints start as informal CPUC complaints. Of the four formal CPUC complaints identified in California American Water's response to DR ISC-05 Q001b, C2010016, C2010017, C2101018 were included in CPUC complaints. C1908011, stems from a customer service issue from 2017 and would not have been included in MDR II.H.1 in this proceeding.

a.ii The CPUC's Consumer Affairs Branch informally distinguishes between customer telephone inquiries and informal and formal complaints. Informal and formal CPUC complaints must be made in writing and are tracked by California American Water. Customer inquiries are those received by the CPUC via telephone are generally resolved via three-way call between the customer, CPUC representative and a California American Water Customer Service Supervisor. Because Cal Advocates agreed and the Commission authorized California American Water to stop tracking and reporting required by D.06-11-050. As explained in response to ISC 12 question 1a, California American Water was formerly required to track and report on customer inquiries and outcomes, and did so in the "CSC and Local Office Complaints" column of the former quarterly customer complaint and inquiry report. California American Water is no longer required to provide such reports.

a.iii Please see response a.ii. above.

b.i. The column “CSC and Local Office Complaints” in DR ISC-05 Q001 Attachment 01, Page 01 includes complaints and inquiries from customers to California American Water as explained in response to ISC 12, question 1a.
b.ii “CSC and Local Office Complaints” and “CPUC Complaints” is comprehensive of all complaints California American Water receives and responds to. Please also see the response to question 2aii above.
b iii. Please see response 2.b.ii. above.
c. California American Water tracks the major subject areas identified in its response to MDR II.H.1.

Attachment 3-7: Cal American Water 01/19 – 03/21 Complaint History, DR ISC-005 Q001 Attachments 1-9.

California American Water
Customer Complaints
Jan- Mar 2019

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	144	0	144
Los Angeles			
Baldwin Hills	73	0	73
Duarte	64	0	64
San Marino	96	0	96
Ventura	95	1	96
Central Division- Monterey	466	2	468
Northern Division			
Sacramento	362	5	367
Larkfield	27	0	27
Geyserville	7	0	7
Dunnigan	1	0	1
Meadowbrook	8	0	8
Total Division Complaints	**1343**	**8**	**1351**

California American Water
Customer Complaints
Apr- Jun 2019

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	299	1	300
Los Angeles			
Baldwin Hills	122	0	122
Duarte	173	0	173
San Marino	259	0	259
Ventura	330	0	330
Central Division- Monterey	962	2	964
Northern Division			
Sacramento	1113	4	1117
Larkfield	65	1	66
Geyserville	58	0	58
Dunnigan	26	0	26
Meadowbrook	0	0	0
Total Division Complaints	**3407**	**8**	**3415**

California American Water
Customer Complaints
Q3- Jul - Sep 2019

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	431	0	431
Los Angeles			
Baldwin Hills	199	1	200
Duarte	244	2	246
San Marino	360	1	361
Ventura	443	0	443
Central Division- Monterey	1381	3	1384
Northern Division			
Sacramento	1562	3	1565
Larkfield	83	1	84
Geyserville	69	0	69
Dunnigan	5	0	5
Meadowbrook	38	0	38
Total Division Complaints	**4815**	**11**	**4826**

PUBLIC VERSION

California American Water Customer Complaints Q 4 - Oct- Dec 2019			
Division	**CSC and Local Office Complaints**	**CPUC Complaints**	**Total Division Complaints**
Southern Division			
San Diego	163	0	163
Los Angeles			
Baldwin Hills	83	0	83
Duarte	117	0	117
San Marino	139	0	139
Ventura	135	0	135
Central Division- Monterey	480	4	484
Northern Division			
Sacramento	516	9	525
Larkfield	23	1	24
Geyserville	11	0	11
Dunnigan	6	0	6
Meadowbrook	20	0	20
Total Division Complaints	**1693**	**14**	**1707**

California American Water
Customer Complaints
Q 1 - Jan- Mar 2020

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	267	0	267
Los Angeles			
Baldwin Hills	123	0	123
Duarte	118	1	119
San Marino	274	0	274
Ventura	293	3	296
Central Division- Monterey	897	2	899
Northern Division			
Sacramento	882	1	883
Larkfield	178	0	178
Geyserville	18	0	18
Dunnigan	4	0	4
Meadowbrook	32	0	32
Total Division Complaints	**3086**	**7**	**3093**

California American Water
Customer Complaints
Q2- 2020 Apr- Jun

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	127	1	128
Los Angeles			
Baldwin Hills	64	0	64
Duarte	94	0	94
San Marino	240	1	241
Ventura	161	0	161
Central Division- Monterey	480	4	484
Northern Division			
Sacramento	441	3	444
Larkfield	25	0	25
Geyserville	2	0	2
Dunnigan	4	0	4
Meadowbrook	11	0	11
Total Division Complaints	**1649**	**9**	**1658**

California American Water
Customer Complaints
Q 3- Jul- Sep 2020

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	312	1	313
Los Angeles			
Baldwin Hills	176	1	177
Duarte	177	0	177
San Marino	347	3	350
Ventura	458	1	459
Central Division- Monterey	1244	1	1245
Northern Division			
Sacramento	2281	9	2290
Larkfield	109	1	110
Geyserville	15	0	15
Dunnigan	7	0	7
Meadowbrook	71	0	71
Hillview	0	1	1
Total Division Complaints	**5197**	**18**	**5215**

California American Water
Customer Complaints
Q 4 - Oct- Dec 2020

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	244	1	245
Los Angeles			
Baldwin Hills	130	0	130
Duarte	174	1	175
San Marino	259	0	259
Ventura	350	1	351
Central Division- Monterey	998	7	1005
Northern Division			
Sacramento	1432	7	1439
Larkfield	130	0	130
Geyserville	36	0	36
Dunnigan	2	0	2
Meadowbrook	63	0	63
Hillveiw	0	2	2
Total Division Complaints	**3818**	**19**	**3837**

California American Water
Customer Complaints
Q 1 - Jan - Mar 2021

Division	CSC and Local Office Complaints	CPUC Complaints	Total Division Complaints
Southern Division			
San Diego	49	0	49
Los Angeles			
Baldwin Hills	70	0	70
Duarte	42	0	42
San Marino	57	0	57
Ventura	78	0	78
Central Division- Monterey	249	3	252
Northern Division			
Sacramento	249	1	250
Larkfield	10	0	10
Geyserville	1	0	1
Dunnigan	1	0	1
Meadowbrook	9	0	9
Hillview	6	0	6
Total Division Complaints	**821**	**4**	**825**

Attachment 4-1: Cal Am's Response to Cal Advocates' Data Request ISC-010

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Authorization to Increase its Revenues for Water Service by $55,771,300 or 18.71% in the year 2024, by $19,565,300 or 5.50% in the year 2025, and by $19,892,400 or 5.30% in the year 2026.	A.22-07-001 (Filed July 1, 2022)

CALIFORNIA-AMERICAN WATER COMPANY'S RESPONSE TO PUBLIC ADVOCATES OFFICE'S DATA REQUEST ISC 10

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Attorneys for California-American Water Company

Dated: November 16, 2022

California-American Water Company (U-210- W; "California American Water," "CAW" or the "Company") hereby sets forth the following objections and responses to Public Advocates Office's ("Cal Advocates") Data Request ISC 10 ("Data Requests" or "RPD"), propounded on November 1, 2022, in A.22-07-001.

RESERVATION OF RIGHTS

1. California American Water's investigation into the Data Requests is ongoing. The Company reserves the right, without obligating itself to do so, to supplement or modify its responses and to present further information and produce additional documents as a result of its ongoing investigation.

2. Any information or materials provided in response to the Data Requests shall be without prejudice to California American Water's right to object to their admission into evidence or the record in this proceeding, their use as evidence or in the record, or the relevance of such information or materials. In addition, California American Water reserves its right to object to further discovery of documents, other information or materials relating to the same or similar subject matter upon any valid ground or grounds, including without limitation, the proprietary nature of the information, relevance, privilege, work product, overbreadth, burdensomeness, oppressiveness, or incompetence.

GENERAL OBJECTIONS

1. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they purport to impose upon California American Water any obligations broader than those permitted by law.

2. California American Water objects to the Data Requests as improper, overbroad, and unduly burdensome to the extent they improperly seek the disclosure of information protected by the attorney-client privilege, the attorney work-product doctrine, or any other applicable privilege or doctrine, and/or the client confidentiality obligations mandated by Business and Professions Code Section 6068(e)(1) and Rule 3-100(A) of the California Rules of Professional Conduct. Such responses as may hereafter be given shall not include information protected by such privileges or

doctrines, and the inadvertent disclosure of such information shall not be deemed as a waiver of any such privilege or doctrine.

3. California American Water objects to the Data Requests to the extent that the requests are duplicative and overlapping, cumulative of one another, overly broad, and/or seek responses in a manner that is unduly burdensome, unreasonably expensive, oppressive, or excessively time consuming to California American Water.

4. California American Water objects to the Data Requests to the extent they seek documents that are and/or information that is neither relevant nor material to this proceeding nor reasonably calculated to lead to the discovery of admissible evidence.

5. California American Water objects to the Data Requests to the extent they seek an analysis, calculation, or compilation that has not previously been performed and that California American Water objects to performing.

6. California American Water objects to the Data Requests insofar as they request the production of documents or information that are publicly available or that are equally available to Cal Advocates because such requests subject California American Water to unreasonable and undue annoyance, oppression, burden and expense.

7. California American Water objects to the Data Requests to the extent the requests are vague, ambiguous, use terms that are subject to multiple interpretations but are not properly defined for purposes of the Data Request, or otherwise provide no basis from which California American Water can determine what information is sought.

8. The objections contained herein, and information and documents produced in response hereto, are not intended nor should they be construed to waive California American Water's right to object to the Data Requests, responses or documents produced in response hereto, or the subject matter of such Data Requests, responses or documents, as to their competency, relevancy, materiality, privilege and admissibility as evidence for any purpose, in or at any hearing of this or any other proceeding.

9. The objections contained herein are not intended nor should they be construed to waive California American Water's right to object to other discovery involving or relating to the subject matter of the Data Requests, responses or documents produced in response hereto.

California-American Water Company

APPLICATION NO. A.22-07-001
DATA REQUEST RESPONSE

Response Provided By:	**Nina Miller**
Title:	**Manager Engineering-Asset Planning**
Address:	**California American Water 511 Forest Lodge Road, Suite 100 Pacific Grove CA**
Cal Adv Request:	**A2207001 CAL ADV DATA REQUEST # ISC 10**
Company Number:	**Cal ADV ISC 10 Q001**
Date Received:	**November 1, 2022**
Date Response Due:	**November 16, 2022**
Subject Area:	**Portable Generator Planning Study**

DATA REQUEST:

1. In Decision D.21-11-018 at 189 (OP 11), the Commission ordered Cal-Am to prepare a Portable Generator Planning Study to consider alternatives to installing stationary generators at its facilities and budget $150,000 or $50,000 per Division, as a planning study expense in Test Year 2021 to complete this portable generator planning study. Furthermore, Appendix B to D.21-11-008 (Settlement between California American Water, the Public Advocates Office at the California Public Utilities Commission; and the Cities of Duarte, San Marino, and Thousand Oaks) at 126 states, "CAW further agrees to prepare a Portable Generator Planning Study prior to the 2022 GRC filing to determine a comprehensive strategy for deployment of portable generators at a budget of $150,000 in Test Year 2021."
   a. Has Cal Am completed the Portable Generator Planning Study as described in this question? If so, please provide:
      i. The study.
      ii. The recorded costs for the study broken down by district and year.
   b. If not, please explain why.

CAL-AM'S RESPONSE

a) Yes, California American Water completed the Emergency Power Study Report.
   i) See CAW Response Cal Adv ISC 10 Q001 Attachment 1.
   ii) Recorded costs for the study by district.

District	2021 $ Spend
Larkfield District	4,562
Los Angeles County District	31,106

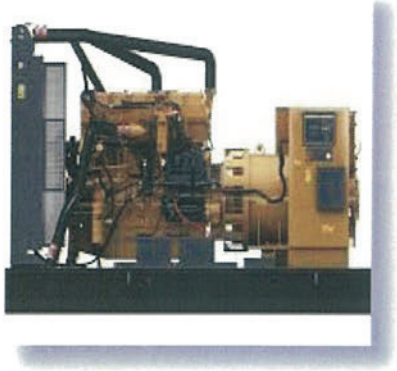
Monterey County District	85,022
Sacramento District	65,322
San Diego County District	2,696
Ventura County District	18,663

b) N/A

Attachment 4-2: Excerpt from Cal Am's response to Cal Advocates' data request ISC-010 Attachment 01 - Emergency Power Study (Redacted)

CALIFORNIA
AMERICAN WATER

Water System Redundancy Emergency Power Study Report



FINAL REPORT

AUGUST 2022

REGISTERED PROFESSIONAL ENGINEER
RAMESH NARASIMHAN
No. 51059
CIVIL
STATE OF CALIFORNIA
8/16/22

CELEBRATING 25 YEARS
NCS Engineers
DELTA SYSTEMS
Established 1997

202 E. Earll Drive, Suite 110
Phoenix, AZ 85012
Phone: (602) 629-0206

California American Water

CALIFORNIA
AMERICAN WATER

Water System Redundancy

Emergency Power Study Report

AUGUST 2022

REGISTERED PROFESSIONAL ENGINEER
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California American Water
Water System Redundancy
Emergency Power Study Report

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LIST OF ABBREVIATIONS

ADD	average day demand
AWIA	America's Water Infrastructure Act
BESS	battery energy storage system
BPS	booster pump station
CalAm	California American Water
CAT	caterpillar
CPS	comprehensive planning studies
EPA	environmental protection agency
gpm	gallons per minute
MTS	manual transfer switch
OPS	operations
PS	pump station
SCADA	supervisory control and data acquisition
SGIP	self-generation incentive program
UPS	uninterruptible power supply
WTP	water treatment plant

California American Water
Water System Redundancy
Emergency Power Study Report

1.0 INTRODUCTION

To ensure adequate and reliable potable water delivery, California American Water's (CalAm's) policy is to provide adequate emergency standby power to supply at least 100% of the Average Daily Demand (ADD) to each water system during an electrical power outage. CalAm's three Divisions currently utilizes standby generators in 24 of its 33 water systems.

This report includes an assessment of the current standby power equipment and identifies generator needs for each system.

Based on discussions with CalAm, NCS Engineers (NCS) developed an approach to identify the sites in each water system that would benefit from emergency backup power. NCS used current hydraulic models and developed two (2) power outage scenarios (at selected substations) to identify water supply deficiencies and provide recommendations.

This report summarizes the data and information received for this analysis and the methodology utilized for the modeling analysis. Based on the hydraulic modeling analysis, certain key sites were recommended for emergency backup power in each water system, so reliable water deliveries could continue during the power outages. The recommendations were reviewed by Operations Staff (OPS) and their feedback was used to prepare a final list of sites to determine generator sizing.

In addition to the modeling analysis and OPS feedback, this report also includes results of an analysis of sites for emergency backup power based on historical power outage data and Comprehensive Planning Studies (CPS).

Detailed discussions of modeling results for each of the systems are provided in the appendices.

<u>Generator Program</u>
The generator program manages the existing standby generator facilities in three Divisions including record keeping and infrastructure improvements. The generators provide standby power to groundwater supply wells, water treatment facilities, booster stations and intertie booster pumps within the systems. CalAm has both permanent and portable generators, the later of which can be moved as needed to supply emergency needs. Each classification of generators has a different set of regulations.

2.0 COMPARISON OF PORTABLE AND STATIONARY GENERATORS

CalAm recently completed PSPS analyses and the Federally required, confidential AWIA Risk and Resilience Assessments. These two exercises provided a consolidated list of critical assets for the individual systems. Emergency power at critical assets ensures CalAm can maintain water service to most customers. EPA's 2019 "Power Resilience Guide for Water and Wastewater Utilities" recommends installing stationary generators with automatic transfer switches at all 'critical' facilities. CalAm and NCS utilized the recommendation in this study and has reviewed each site based on criticality and operator safety.

Critical sites were automatically categorized as needing stationary generators. However, some critical sites do not have the space for a stationary generator, so portable generators will be utilized. Other sites were evaluated on their location and terrain (Safety and Response Time), the number of historical power outages, and the functional space at the site.

Operator safety is also reflected in this study's results. The terrain of the various sites, the increased frequency and intensity of storms, and the threat of wildfires, often resulting in minimal to no access to facilities, necessitated a review of the risks of hauling portable generators during these events. In order to ensure our utility workers are exposed to the least risk, CalAm evaluates how risks can be reasonably engineered out and avoided. Therefore, installing stationary emergency generators were recommended in the highest risk locations.

3.0 ONSITE POWER

In addition to the analysis of portable and stationary generators, CalAm has explored other options to boost its ability to maintain continuity of service to mitigate impacts to our customers including Onsite power generation.

The California Public Utility Commission and regulated electric utilities have partnered to create a program called the Self Generation Incentive Program ("SGIP"). The program offers financial incentives to applicants for the installation of clean, efficient, on-site distributed energy systems at their facilities. Those systems are designed to meet all or a portion of the facilities' electric energy needs.

Participation in the SGIP program provides a flexible and environmentally responsible path to achieve this goal. Additionally, the increased resiliency offered by the energy storage systems is expected to allow future participation in demand response, load shedding, and other similar programs designed to decrease stress on the state's electric grid. CalAm's participation reinforces our commitment to being a leading example of environmental responsibility for our customers as well as our neighbors in the communities we serve.

CalAm has partnered with Scale Microgrid Solutions to install battery energy storage systems ("BESS") at the Dewey Booster Pump Station ("BPS") and the American Oaks BPS in its Ventura County District, and at the Lower Wikiup BPS in its Larkfield District. The BESS is expected to provide up to 24 hours of electric power that can be utilized during planned or unplanned power outages.

CalAm also recently received tentative SGIP funding reservations to install similar systems at two water treatment plants in the Hillview area in Madera County. The Company intends to pursue projects at both locations: Sierra Lakes Water Treatment Plant and Forest Ridge Water Treatment Plant/Ditton 4 well site.

4.0 INFORMATION AND DATA RECEIVED

CalAm operates 35 public water systems divided into three divisions, i.e., Northern Division, Southern Division, and Coastal Division. For seven of the 35 water systems, hydraulic modeling analysis was not performed by NCS because either the hydraulic model was never developed (not needed for these small, single pressure zone systems) or the hydraulic model is currently being developed. Generator requirements for those seven systems was obtained from CalAm (based on current CPS) and generator sizing for those systems was/will be performed by NCS. Tables 4.1 and 4.2 provide the list of the water systems with and without hydraulic models.

NCS was provided with the following information to perform this analysis.

- Hydraulic model and the scenario to be used for the analysis: The specified scenario is referred as a parent scenario throughout this report. For many systems, scenario with future demands was specified. (Attachment A)

- Available substation (or circuit level) and existing emergency power (generator) information at each site in the system: This information was compiled for each water system, and was verified by CalAm. Attachment B shows the list of sites with stationary generators used in the modeling analysis.

  Los Angeles Department of Water and Power refused to provide any substation (or circuit level) information to CalAm for this and the wildfire study. Substation information was also not available for a few sites in some water systems. Based on location, it was assumed that those sites are served by a unique substation that does not serve any other facility. This information is documented in respective appendices.

  Emergency power information was not available for a few sites in some water systems. It was assumed that the emergency power does not exist at the site. This information is documented in respective appendices.

- In addition to the substation and emergency power information, CalAm also provided the following for each water system:
  - Operational restrictions (e.g. Well 3A and Well 3B in Isleton cannot operate at the same time),
  - Inactive or abandoned assets,
  - Whether to use interties as the first alternate (i.e. before using non-critical assets) in case of a power outage

  This information is presented along with details of model results for each water system in the appendices.

- Critical assets: This information was provided based on the most recent Risk and Resiliency Assessments (RRA) study. A site was assumed non-critical if this information was not provided for the site.

- Well pumping capacity (Attachment C)

- Supply agreement with interties (Attachment D)
- Arc Flash Studies (Attachment E)
- System maps of sites with existing and recommended stationary generators (Attachment F)
- Generator recommendations based on historical power outage data
- Generator recommendations for seven systems using analyses from the system's CPS – Geyserville, El Rio, East Pasadena, Coarsegold, Goldside, Oakhurst, and Raymond

Table 4.1. Water Systems - Hydraulic Model Provided

Division	Water System	Division	Water System
Northern	Antelope	Southern	Baldwin Hills
	Arden		Duarte
	Dunnigan		Los Posas
	Fruitridge		Thousand Oaks
	Isleton		San Diego
	Son Lark (Larkfield)		San Marino
	Lincoln Oaks	Coastal	Ambler
	Meadowbrook		Chualar
	Parkway		Garrapata
	Security Park		Hidden Hills
	Suburban-Rosemont		Monterey
	Walnut Grove		Toro
	West Placer		

Table 4.2. Water Systems - Hydraulic Model Not Provided – Incorporated CPS Recommendations

Division	Water System
Northern	Coarsegold
	Geyserville
	Goldside
	Oakhurst
	Raymond
Southern	East Pasadena
	Rio Plana (El Rio)
Coastal	Ralph Lane

5.0 METHODOLOGY

5.1 Modeling Analysis

5.1.1 Approach

Based on discussions with CalAm, the following approach was developed for this assessment.

1. Additional sites for emergency power were recommended based on a maximum 24-hour power outage at one major substation. Sufficient water supply should be present during this period with emergency generators as recommended.
2. For each system, a major substation was determined as –
    a. Scenario 1 - The one that affects maximum number of sites; if the substation serves a site that has an existing generator, that site is considered not affected.
    b. Scenario 2 - The one that affects maximum number of critical sites; if the substation serves a site that has an existing generator, that site is considered not affected.

    In case of a tie in determining the major substation (i.e. total number of facilities impacted are the same), well production data (flow rate) was used to break the tie.

    For some systems, the major substation definition for Scenario 1 and 2 were identical.

5.1.2 Methodology

The following acceptance criteria and methodology were followed to develop a power outage scenario under the parent scenario to determine the deficiencies and recommend sites for emergency power.

Acceptance Criteria

1. Minimum system wide pressure in the distribution system must be above 40 psi or should not be worse than the parent scenario used for the analysis.
2. If there are floating tanks in the system, the tanks should not drain completely during 48-hr EPS simulation, meaning the system should be able to serve for at least 24-hours power outage (assuming that the tanks are half full at the start of power outage).
3. If all the tanks in the system are on the suction side of the BPS(s), a check was made on the production capacity of the wells that feed the tank and the BPS discharge flow to make sure the tank will be able to maintain water level.

Methodology

1. Use the sites in the model for which information is provided by CalAm.
2. Activate the critical site(s) in the model, if it is inactive in the parent scenario. Use the physical and other information already input in the model.
3. Turn off all the sites powered by the major substation except the ones with existing generators.
4. Then, if required to meet demands and minimum pressures, use critical sites powered by other substations (as these sites are not affected by the power outage).

5. Then, if required to meet demands and minimum pressure, use interties (if marked by CalAm, to use as first alternate) before using non-critical assets (as these sites are not affected by the power outage). Use interties only up to the guaranteed supply (Attachment D).
6. Then, if required to meet demands and minimum pressures, use non-critical assets powered by other substations (as these sites are not affected by the power outage).
7. Then, if required to meet demands and minimum pressures, use critical assets powered by the major substation – this will result in generator recommendation.
8. Then, if required to meet demands and minimum pressures, use non-critical assets powered by the major substation – this will result in generator recommendation.
9. Follow the same logic for Scenario 2.

Assumptions

It was assumed that the system/facility inputs, the operational controls and other settings in the parent scenario are up to date and the system performance in the parent scenario is acceptable for this analysis.

5.2 Generator Sizing

Generators were sized/modeled using CAT SpecSizer software utilizing the following parameters:

1. Fuel Source: Diesel
2. Generator Classification: Standby
3. Emissions Certification Type: EPA Stationary Emergency
4. Maximum Allowed Frequency Dip: 10%
5. Maximum Allowed Voltage Dip: 20%
6. Maximum Allowed Generator Set Loading – 100%
7. Assumption that major motor loads will not be started simultaneously
8. Site Conditions:
   - Sacramento Area: Ambient Temp. – 106 deg. F Altitude – 394ft. ASL
   - Monterey Area: Ambient Temp. – 90 deg. F Altitude – 16ft. ASL
   - Los Angeles Area: Ambient Temp. – 115 Deg. F Altitude – 285 ft. ASL

Site information used in generator sizing models (i.e. site voltage/phase, loads to be backed by generator, motor starter types, source of system information):

Northern Division

1. Salmon Falls Well (Suburban Rosemont System)
   - 480V/3PH system
   - Loads: (1) 75hp well pump w/ soft-start based starter & 5KVA worth of misc. 120/240V load.
   - Source of System Information: Arc flash study completed by Telstar Instruments on 12/4/14.

2. Woodman Well (Suburban Rosemont System)
   - 480V/3PH system
   - Loads: (1) 150hp well pump w/ VFD based starter & 5KVA worth of misc. 120/240V load.
   - Source of System Information: Arc flash study completed by Telstar Instruments on 12/4/14.

3. Courtney Lane Tank & BPS (Oakhurst System)
   - 240V/1PH system
   - Loads: (1) 1.5hp booster pump w/ across-the-line based starter, 2KVA worth of misc. 120/240V load.
   - Source of System Information: Service and motor size information provided by CalAm, misc. 120/240V load info approximated.

4. Indian SP10 Tank & BPS (Oakhurst System)
   - 240V/1PH system
   - Loads: (1) 1hp booster pump w/ across-the-line based starter, 2KVA worth of misc. 120/240V load.
   - Source of System Information: Service and motor size information provided by CalAm, misc. 120/240V load info approximated.

5. Vista Heights Tank & BPS (Oakhurst System)
   - 480V/3PH system
   - Loads: (1) 7.5hp booster pump w/ across-the-line starter (assumed) & 3KVA worth of misc. 120/240V load.
   - Source of System Information: Service and motor size information provided by CalAm, misc. 120/240V load info approximated.

6. Central/Sunrise BPS, Well and Reservoir (Security Park System)
   - 480V/3PH system
   - Loads: (1) 40hp well pump w/ across-the-line based starter, (2) 30hp booster pumps w/ across-the-line based starters, (1) 5hp air compressor w/ across-the-line based starter, & 15KVA worth of misc. 120/240V load.
   - Source of System Information: Arc flash study completed by Telstar Instruments on 2/3/15.

Coastal Division

1. Cypress Well #2 (Monterey System)
   - 480V/3PH system
   - Loads: (1) 300hp well pump w/ auto-transformer/reduced voltage based starter & 5KVA worth of misc. 120/240V load.
   - Source of System Information: Well pump size and service info provided by CalAm, misc. 120/240V load info approximated.

2. Lower Toyon PP32 (Monterey System)
   - 208V/3PH system
   - Loads: (2) 20hp pumps w/ across-the-line based starter & 5KVA worth of misc. 120/240V load.
   - Source of System Information: Service and motor size info taken from arc flash study completed by Telstar Instruments on 12/8/15, misc. 120/240V load info approximated.

3. Tierra Grande PP 38A (Monterey System)
   - 480V/3PH system
   - Loads: (2) 25hp pumps w/ across-the-line based starter & 8.5KVA worth of misc. 120/240V load.
   - Source of System Information: Arc flash study completed by Telstar Instruments on 12/8/15.

4. Lower Tierra Grande PP39 (Monterey System)
   - 208V/3PH system
   - Loads: (2) 25hp pumps w/ across-the-line based starter & 3KVA worth of misc. 120/240V load.
   - Source of System Information: Service and motor size info taken from arc flash study completed by Telstar Instruments on 12/8/15, misc. 120/240V load info approximated.

5. Middle Tierra Grande PP40 (Monterey System)
   - 208V/3PH system
   - Loads: (2) 15hp pumps w/ across-the-line based starter & 3KVA worth of misc. 120/240V load.
   - Source of System Information: Arc flash study completed by Telstar Instruments on 12/8/15.

6. Stirrup PP70 (Hidden Hills System)
   - 480V/3PH system
   - Loads: (2) 30hp pumps w/ across-the-line based starters & 5KVA worth of misc. 120/240V load.
   - Source of System Information: Pump sizes and service info provided by CalAm, misc. 120/240V load info approximated.

Southern Division

1. Duarte Road Well #9 (East Pasadena System)
   - 480V/3PH system
   - Loads: (1) 250hp well pump w/ soft-start based starter & 5KVA worth of misc. 120/240V load.
   - Source of System Information: Pump size and service info provided by CalAm, misc. 120/240V load info approximated.

6.0 RECOMMENDATIONS

Table 6.1 presents the sites that were recommended to have an emergency power back up based on modeling analysis. The table also includes the generator recommendations from recent CPS findings for those seven systems for which modeling analysis was not performed by NCS. These sites were reviewed by CalAm OPS staff and their feedback was used to prepare a comprehensive list. Generator sizing at these sites was performed.

Table 6.1 also includes generator recommendations based on historical power outage data (provided by CalAm). The generators at these sites are to be sized during the design phase.

Table 6.1. Generator Recommendations

Sr. No.	System	Site	Operational Pump at the Recommended Site During Power Outage Scenario	CalAm Notes	Recommended Generator Size (KW)
1	Antelope	No additional recommendation(1)			-
2	Arden	No additional recommendation(1)			-
3	Coarsegold	Coarsegold BPS (WTP) and Well 2(2)		No real need for a generator; may install an MTS and rent generator	-
4	Dunnigan	No additional recommendation(1)			-
5	Fruitridge	No additional recommendation(1)			-
6	Geyserville	Planned Well 4(2)		Generator to be sized to only operate new Well 4	(4)
7	Goldside	Boulder BPS(2)			(4)
		Well 4, 6 and 7, and WTP(2)		Generator will be sized for Well 4,6,7 and WTP	(4)
8	Isleton	Well 3A(1)		Well 3A is located at WTP and existing generator runs well and WTP at the same time.	-
		BPS at WTP(1)	Pumps 2,3,4	BPS located at WTP needs an additional generator to run BPS	(4)
9	Larkfield	Upper Wikiup BPS(1)	Pumps 1A, 1B	Pump station to be upgraded in the future with larger booster pumps. Generator to be sized at that time.	?
		Well 5(2)			(4)
10	Lincoln Oaks	No additional recommendation(1)			-
11	Meadowbrook	Well 5(1)		Well 5 (700 gpm); OPS preference is Well 6	-
		Well 6(2)		Well 6(2) (1,400 gpm)	(4)
12	Oakhurst	Courtney Ln BPS(2)			15(5)
		Indian Springs Well 10 and BPS(2)			10(5)

Sr. No.	System	Site	Operational Pump at the Recommended Site During Power Outage Scenario	CalAm Notes	Recommended Generator Size (KW)
	Oakhurst	Courtney[2]			(4)
		Vista Heights BPS[2]			40
		Forest Ridge WTP and Ditton[2]		Stationary	(4)
		Well 4[2]			?
		Ditton Well 2 and BPS[2]		Stationary	(4)
		Shilo BPS[2]		Portable-critical site, but has no room for permanent generator	?
		Well 1A[2]			?
13	Parkway	No additional recommendation[1]			-
14	Raymond	No additional generators needed[2]			-
15	Security Park	Central/Sunrise BPS – BP 1 and 2[1]	Pump 1	Non Community Water System, CalAm to evaluate need for real generator	300
		Central/Sunrise Well[1]			
16	Suburban Rosemont	Point Reyes Well[1]		No stationary generator to be added due to site space constraints	-
		Rogue River Well[1]		No stationary generator to be added due to site space constraints	-
		Salmon Falls Well[1]			125
		West Porter Well[1]		No stationary generator to be added due to site space constraints	-
		Whitewater Well[1]		No stationary generator to be added due to site space constraints	-
		Wildrose Well[1]		No stationary generator to be added due to site space constraints	-
		Woodman Well[1]			150
17	Walnut Grove	No additional recommendation[1]			-
18	West Placer	No additional recommendation[1]			-

Sr. No.	System	Site	Operational Pump at the Recommended Site During Power Outage Scenario	CalAm Notes	Recommended Generator Size (KW)
19	Baldwin Hills	No additional recommendation(1)			-
20	Duarte	Wiley Well(1)		No generator to be added due to site space constraints	-
		Las Lomas BPS(1)	Pumps 1,2,3	Generator (sizing) not required, BPS is to be relocated to Las Lomas well site, which already has a generator capable of running either well or boosters.	-
				Instead of Wiley Well, OPS selected Buena Vista Well	(4)
21	East Pasadena	Zone 1; Well 8(2)		Treatment plant to be installed at a future date, generator to be sized and installed at that time	(4)
		Duarte Road Well #9(2)			350
		Mountain View Well, WTP and BPS(2)		Generator needs to be sized to operate well, WTP and two booster pumps	(4)
22	El Rio	Well, BPS Site(2)		Existing generator to be replaced with new 250 KW generator, no modeling is required	-
23	Los Posas	BPS at Price Road Turnout(1)	Pump 1		-
24	Thousand Oaks	Springwood Street BPS Pumps 1 and 2(1)	Pump 1		(4)
		Deer Valley BPS Pumps 1 and 2(1)	Pump 1		(4)
		White Stallion Transmission BPS – Pumps 1,2 and 4(1)	Pump 1		(4)
		Borchard Road Pump Station(2)			(4)
		DOS Vientos III BPS(3)		)	(4)
		Los Robles BPS(3)			(4)
25	San Diego	No additional recommendation(1)			-
26	San Marino	Richardson #3(1)		Portable/permanent generator exists that runs Richardson #3 and Rosemead therefore, no generator required	-

Sr. No.	System	Site	Operational Pump at the Recommended Site During Power Outage Scenario	CalAm Notes	Recommended Generator Size (KW)
27	Ambler	Meyers Hydropneumatic(2)			30
28	Chualar	No additional recommendation(1)			-
29	Garrapata	No additional recommendation(1)			-
30	Hidden Hills	Stirrup BPS70(2)		priority 1	100
31	Monterey	Castro (BPS#7A) (1)	Pump 1	Castro pumps to Fairways, it is a secondary source therefore, no need for generator	-
		Cypress Well#2(2)		priority 1	250
		Lower Toyon BPS32(2)		priority 2	80
		Tierra Grande BPS38A(2)		priority 1	100
		Lower Tierra Grande BPS39(2)		priority 2	80
		Middle Tierra Grande BPS40(2)		priority 3	40
		Seaside Middle School Well #4(2)			(4)
32	Ralph Lane	No additional recommendation(2)			-
33	Toro	Upper Markham(2)			80

Note 1: Based on modeling analysis
Note 2: Recommendations provided by CalAm (based on CPS)
Note 3: Recommendations provided by CalAm (based on historical power outage data); to be sized during design phase
Note 4: Generator sizing to be completed in design phase of project.
Note 5: Generator sized using Cummins Power Suite software due to lack of availability of small generators (<80 KW) from CAT.

As presented in Table 6.1, a total of 33 sites are recommended to have an emergency power back up. These recommendations include one portable generator in (Monterey) Northern system. The Table 6.2 presents the generator recommendations information by division.

Table 6.2. Generator Recommendations by Division

Division	Generator Recommendations	Stationary	Portable
Northern			
Geyserville	1	1	0
Goldside	2	2	0
Isleton	1	1	0
Larkfield	1	1	0
Meadowbrook	1	1	0
Oakhurst	9	8	1
Security Park	1	1	0
Suburban-Rosemont	2	2	0
Subtotal	**18**	**17**	**1**
Southern			
Duarte	1	1	0
East Pasadena	3	3	0
Thousand Oaks	6	6	0
Subtotal	**10**	**10**	**0**
Coastal			
Monterey	9	9	0
Subtotal	**9**	**9**	**0**
Total	**37**	**36**	**1**

Refer to Appendix U (Generator Sizing) for generator sizing/modeling reports associated with recommended generator sizes reflected in Table 6.1.

In addition to installing standby generators, it is recommended that battery back-up (i.e. UPS) be installed at all sites to ensure uninterrupted operation of site SCADA monitoring and alarming operations. This recommendation also includes sites that have back-up generators installed as there is typically a 10-60 second loss of site power whenever site electrical distribution system transitions from utility to generator power.

Attachment A

Specified (Parent) Model Scenario for Each Water System

Service Area	Model Scenario	Last Calibration	Notes
Antelope	2030 ADD	2018	Demand is the only significant change from calibration year scenario (2016)
Arden	ADDEPS-2025	2015	Demand is the only significant change from calibration year scenario (2014)
Baldwin Hills	2030 ADD	2018	Includes modifications at Garth PS
Coarsegold	N/A	N/A	No model - small, single-pressure zone system
Duarte	2035 ADD	2018	Differences from calibration year scenario (2016) include demand and Live Oak Tank online
Dunnigan	Base Scenario	2019	Only one scenario
East Pasadena	N/A	N/A	Model currently being developed, expected completion December 2021
El Rio	N/A	N/A	Model currently being developed, expected completion December 2021
Fruitridge	ADD	2020	No future scenarios yet, new model expected December 2021
Geyserville	N/A	N/A	No model - small, single-pressure zone system
Goldside	N/A	N/A	No model - small, single-pressure zone system
Isleton	2025 - New PS	2010	No future scenarios beyond 2025 as demand is expected to be constant
Larkfield/Son Lark	2030 ADD	2018	Assumes the following improvements are complete: - Upsize creek crossing - Isolate supply line from Lower Wikiup to Middle Wikiup; transfer service to Upper Wikiup - Add pressure reducing valves in Middle/Upper Wikiup Pressure zones to reduce pressures in pipes - Upsize pressure zone supply lines and install a third pump at the Lower Wikiup Booster Station - Construct storage tank and booster pump station at Larkfield Water Treatment Plant
Los Posas	ADD EPS Target Year - 2035 (0.47 MGD)	2018	Demand is the only significant change from calibration year scenario (2017)
Lincoln Oaks	2030 ADD	2018	Demand is the only significant change from calibration year scenario (2016)
Meadowbrook	2030 Future Scenarios (ADD)	2018	Demand is the only significant change from calibration year scenario (2016)
Monterey	2035 ADD and 2035 MDD		Includes all Monterey County systems System operates different in winter and summer so run ADD and MDD
Oakhurst	N/A	N/A	Model currently being developed, expected completion December 2021
Parkway	2030 ADD	2018	Demand is the only significant change from calibration year scenario (2016)
Raymond	N/A	N/A	No model - small, single-pressure zone system
San Diego	2035 ADD	2018	Steady state only
San Marino	2025 - 2035 ADD	2018	Demand is the only significant change from calibration year scenario (2016)
Security Park	2011 ADD Steady	2012	Steady state model only
Suburban-Rosemont	MDDEPS-2020-PropMiniZone-02	2015	Incorporates new pressure zone on east end, no ADD scenario for this
Thousand Oaks	ADD EPS - Target Year - 2035	2018	Demand is the only significant change from calibration year scenario (2017)
Walnut Grove	2030 ADD	2018	Changes include demand and Treated Water Storage Tank and Booster Station
West Placer	2030 ADD	2018	Changes include demand and added mains for new development

Attachment B

List of Sites with Stationary Generators Used in the Modeling Analysis

Division	System	Site with Existing Permanent Generator
Northern	Antelope	Cook Riolo Well
		Don Julio Well
		Covered Wage Well
		Palmerson Well
		Falcon View Well
	Arden	Fairlake 2 Well
	Dunnigan	WTP/Tank
	Fruitridge	Well 19
		Well 20
		Well 18
		Well 17
		Well 16
	Iselton	5th St Water Treatment Facility
		Union Tank
	Larkfield	Lower Wikiup Tank and BPS
		North Wikiup Tank and BPS
		WTP
		Well #4A
	Lincoln Oaks	Andrea #1
		Rushmore Well
		Lincoln Oaks Tank/BPS
		Treelark Well
		Daly Well
		Twin Parks Well
		Van Maren Well
		Oak forest well
	Meadowbrook	Well 4
	Parkway	Parkside Treatment Plant
		Parkside BPS
		Rockhurst Well
		Countryside Treatment Plant
		Countryside BPS
		Vintage BPS
		Vintage Treatment Plant
		Parkway Booster Station (BPS at Sacramento Intertie)
	Suburban Rosemont	Folsom PS at intertie
		Mather BPS
		Caldera Well
		College Greens Well
		Mather Tank at BPS
		Rose Parade tank at BPS/WTP
	Walnut Grove	Grove Well 1
		Grove Well 3
		Grove Booster Pump Station
		Grove 3 Plant Facility
	West Placer	Walerga Tank and Booster Station

Division	System	Site with Existing Permanent Generator
Southern	Baldwin Hills	Olympiad Tank and BPS - Pumps 1, 2, 3, and 4
	Duarte	Encanto Well
		Las Lomas #2 Well
		Scott Tank and BPS
	San Marino	Rosemead Yard/Main Office
	Thousand Oaks	White Stallion Road BPS
		Warwick - Twenty Oaks BPS Pumps 1,2,3 plus FP 1
		Wildwood Tank and BPS Pumps 1 and 2
		Grande Vista
		Hillcrest OPS Yard
Coastal	Monterey	Boyd (PP#26A)
		Carmel Woods (PP#8)
		Corona (PP#13)
		Cypress (PP#14)
		Eardley (PP#1A)
		High Meadows (PP#45)
		Hilby Pneumatic (PP#27A)
		Huckleberry Hill (PP#23B)
		Lower Walden (PP#41)
		Mar Monte (PP#35)
		Ord Grove Well
		Ord Grove WTP Booster
		POM (PP#86) 626
		Rancho Canada Well #2
		Sand City Effluent
		Schulte Well #2
		Segunda (PP#58)
		Upper Los Tulares (PP#52)
		Upper Tierra Grande (PP#44)
		Vista Hermosa Eddy Rd (PP#49)
		Withers (PP#12)
		BEGONIA IRON REMOVAL PLANT
		PBCSD aka VISCAINO BPS #11A
		PEBBLE BEACH TANK #1, #2, & #3 AND BPS #6

Attachment 4-3: EPA 2019 Power Resilience Guide for Water and Wastewater Utilities

Office of Water (4608T) EPA 800–R–19–001 June 2019

POWER RESILIENCE

Guide for Water and Wastewater Utilities

EPA

epa.gov/waterresilience

Overview

This guide includes information from water industry professionals on how to increase power resilience at drinking water and wastewater utilities. The purpose of this guide is to:

- Promote coordination and communication between water sector utilities and their electric and gas utilities
- Provide information on how to build power resilience using generators, fuel supply planning, on-site power, microgrids and other methods
- Highlight case studies from water utilities that have successfully implemented power resilience measures
- Identify planning considerations and resources for both short (e.g., 2-3 days) and long (e.g., several weeks) duration power outages

Power loss can have devastating impacts on drinking water and wastewater utilities and the communities they serve. Inoperable pumps at a drinking water utility can make firefighting difficult and cause local health care facilities and restaurants to close. Pressure loss can allow contaminants to enter the drinking water distribution system from surrounding soil and groundwater. For wastewater utilities, pump failure may lead to direct discharge of untreated sewage to rivers and streams or sewage backup into homes and businesses. Power loss can also impact water utilities through cascading infrastructure failures. For example, a chemical plant without power could discharge contaminants into source water supplies.

Eight areas in which water sector utilities can increase power resilience are:

1. **Communication** – Establish capability to communicate with electric providers, local agencies and the public to help your utility respond more quickly and efficiently to a power loss.
2. **Power Assessments** – Conduct a power assessment to understand your essential equipment energy needs.
3. **Emergency/Standby Generators** – Learn how to select, maintain and register requirements for a fixed or portable emergency generator for your utility.
4. **Fuel** – Develop plans to ensure you have enough fuel for your generator during a power outage emergency.
5. **Energy Efficiency** – Increase your energy efficiency to allow you to operate on back-up power longer during emergencies and to reduce your electricity bills during normal operations.
6. **On-site Power** – Consider options for generating your own power.
7. **Black Sky Planning** – Prepare for long-duration, widespread power outages.
8. **Funding** – Learn about possible funding sources for resilience measures.

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1. Communication

TOP TIP: Get your utility on the priority list for power restoration.

Good relationships, information sharing and collaboration between water and electric utilities and local emergency management agencies (e.g., county, parish or city) are critical to having power restored quickly after an outage. Depending on the nature of the emergency and your local communication and response procedures, you may call your electric utility directly or you may need to coordinate through an emergency management agency (EMA). For more information on working with your EMA, see the EPA's Connecting Water Utilities and Emergency Management Agencies.

Becoming familiar with your county's emergency protocols and how response and recovery decisions are made, can help ensure that your utility is high on the power restoration prioritization list. Depending on your county's emergency protocols, the order in which power is restored to local critical infrastructure, such as your water utility, may be determined by your electric power provider, the local EMA or elected officials such as county commissioners. Communicate your emergency power needs and the consequences to the community should you have to cease operations due to a power failure. This should include details regarding "minimum" power requirements for essential functions only and any existing capabilities for back-up power and corresponding fuel requirements. Be sure you know who makes the power restoration prioritization list for your community and take steps to share relevant information with them. You should also become aware of and involved in the total community restoration plan. Your assistance may be needed to locate, prioritize and restore parts of the drinking water distribution system and wastewater collection system that serve critical infrastructure, such as mass care shelters.

Did you know?

When an electric utility is restoring service after a major outage, it generally prioritizes generating plants, transmission lines, substations, main circuits, critical customers, residential lines, transformers and then individual houses.

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Step 1 – Make Contacts and Establish Emergency Communications Protocol

- Get to know the key staff or points of contact at your electric utility responsible for power restoration prioritization. You may find that you have a dedicated account representative who fulfills this role for your utility. If this is not the case, find that person who prioritizes your restoration. When possible, have face-to-face meetings.
- Ask for 24/7 emergency contact information for the electric utility, the local EMA and the local Emergency Operations Center (EOC) and save these numbers in your phone.
- Establish or verify, as applicable, the proper structure for the most efficient communications for power prioritization and restoration. Make sure that this structure is National Incident Management System (NIMS) compliant.
- Ensure that your community's emergency manager has your contact information in his or her cell phone so that when you call, your name will be recognized.

Did you know?

Many agencies and organizations share information and resources to support incident management activities at Emergency Operations Centers (EOCs). EOCs focus on the response to and the short-term recovery from an incident or natural disaster and provide access for cross-sector key personnel.

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Step 2 - Request Key Information

- **Physical locations of critical assets.** Make sure your electric utility has the physical locations (Global Positioning System (GPS) latitude and longitude in degrees-minutes-seconds or in decimal degrees of the location) of all critical components of your water or wastewater system, as the physical address of your facilities can differ from your administrative address where bills are delivered. Give the physical address when reporting an outage. Also, request a review of the corresponding electric grid infrastructure that supports your critical assets. Depending on how your system is laid out, there may be different distribution feeders or substations for the treatment facility and individual pumping stations. Assess risks associated with the current electric power plan.
- **Critical Interdependencies.** You should also maintain situational awareness of activated, deactivated and non-activated mass care facilities, 911 centers, and other critical infrastructure locations. There may be a need to coordinate the restoration of electric power, water service and wastewater services to these assets.
- **Communication Resources.** Learn what communication resources, such as two-way radios or satellite phones, are available in your community. Be sure your radios are compatible with your response partners (e.g., P25 Standard). During a long-duration power outage, landlines and cellular phones may stop working. Conduct periodic tests with partners to ensure communications interoperability. Make sure you understand the procedures and processes for communicating with your electric utility during an outage and during the recovery process.
- **EOC street address.** Know where your local EOC is so that you can send a liaison there during an emergency if needed.
- **Mutual Aid Agreements.** Share information about your membership in mutual aid agreements such as your state's Water and Wastewater Agency Response Network (WARN).
- **Access.** Discuss what identification requirements or procedures are necessary to ensure that utility staff can access critical assets during an emergency when there are road closures and security checkpoints.

Did you know?

Most EOCs have representatives from the electric utility, gas utility, transportation sector and other critical infrastructure sectors. During a disaster, call the EOC if you have trouble contacting your electric utility. Better yet, obtain a seat for your utility at the EOC and you will be able to directly coordinate with the electric utility, fuel and transportation representatives.

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Amateur Radio Emergency Service

The Prince William County Service Authority has a great relationship with two local amateur radio clubs. Both clubs have their primary repeater sites on Service Authority property, including antennas on top of water towers. The Service Authority, county and radio clubs are working to establish alternative communications paths between the Service Authority Department Operations Center (DOC), the Prince William County Emergency Operations Center (EOC) and the Service Authority's Advanced Water Reclamation Facility. In November 2018, the Service Authority and the Prince William County Amateur Radio Emergency Service (PWCARES) entered into a Memorandum of Understanding (MOU) for emergency cooperation. During a widespread power outage when land lines and cellular phones may no longer work, amateur radio operators can provide vital communication services to the Service Authority.

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Step 3 – Get on the Priority Power Restoration List

- Learn how critical customers are managed and prioritized in your community.
- Engage the power restoration prioritization list manager.
- Determine your utility's prioritization status and take additional measures to get as high on the priority list as possible.
- Inform the prioritization list manager of your "storm-ready" capabilities and be sure that he or she understands the consequences to the community of drinking water and wastewater service disruptions and reduced service levels. Ensure the list manager understands how quickly water services can degrade without power and how long it takes to restore water services once power is lost.
- Inform the list manager of the critical assets at your utility that rely on grid power including their individual power requirements (e.g., critical functions vs. administration building).
- Gain an understanding of the other critical infrastructure facilities prioritized in the community so that you can align water and wastewater support accordingly.
- Ask for annual updates to the critical customer and prioritization lists.

Critical Customers

Dominion Energy has worked closely with Virginia Emergency Operation Centers (EOCs) to identify the 10-20 most critical services in each of the EOC's jurisdictions. Once identified, these critical facilities are further assigned Special Condition Categories, and water and sewage treatment facilities are considered "Critical Infrastructure." These "Special Conditions" accounts are flagged so Dominion knows instantly when a water or wastewater treatment facility loses power. An intranet application allows Dominion Energy to remain focused on these locations to ensure critical infrastructure accounts receive the highest restoration priority.

In addition, during large-scale power outages, Dominion Energy establishes Electric Regional Operations Centers to better manage its response. Water utilities have a direct line to these centers and to representatives of Dominion Energy.

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Step 4 – Planning, Training and Exercises

Planning, training and exercises allow power and water utility staff to learn, practice, test and improve emergency response plans (ERPs) and procedures. Often, these plans and procedures involve response partners. Consider the following options to enhance the quality of your training and exercises:

- Plan with your electric utility to know how various power outage scenarios will affect your utility and what steps you can take together to mitigate impacts.
- If your utility conducts planning activities or annual exercises, invite staff from your electric utility and local EMA.
  - The EPA offers a Tabletop Exercise Tool for Water Systems to help utilities develop exercises for different scenarios.
  - The EPA has also developed How to Develop a Multi-Year Training and Exercise (T&E) Plan to help water utilities create successful training plans.
- Ask your electric utility to allow you to attend any exercises or planning activities it hosts.
- Participate in national exercises focused on grid resilience such as GRIDEX and EARTH EX.
- Ask your local EMA to include both your utility and the electric utility in its exercises.
- Share your emergency response plans with your electric utility and EMA and ask for information and updates on their plans. Consider a dedicated planning component to emergency back-up power (generators).

Grid hardening - *Activities such as tree-trimming help prevent weather related power outages. When talking to your electric utility, you can ask what grid hardening steps are being taken and what you can do to help. For example, do you have the resources to assist in tree-trimming? If your water utility has a remote pump station in the woods serviced by electric power from street lines, consider installing that service line underground along the access road. Although this is more expensive than typical pole installation, the service line will be better protected from tree falls.*

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Step 5 – Communicating with the Public

Develop a plan for how you will communicate boil water notices, water use restrictions and other information during a power outage. Many of the strategies below will only work during the first 24-48 hours of a power outage when cellular towers still have back up or battery power. Consider approaches for reaching the public that would work even if landlines, cellular phones and the Internet are not working

- Appoint a communications manager or Public Information Officer who can assist in getting the correct messages out to your customers before, during and after emergencies.
- Contact local news and radio stations to broadcast your messages or post on their social media accounts.
- Ask the fire department, local EMA and municipal office to help with your public messages. They may already have emergency communication systems such as reverse 911 in place. Check whether such systems would work for an extended period of time without power furnished by the electric grid.
- Develop an automated system to send emails and text messages to customers. Some areas may already have an emergency texting service that you can use.
- Post frequent, time-stamped updates on your utility's website.
- Utilize social media by posting updated information with a Facebook or Twitter account.
- Collaborate with homeowners' associations to post signs near different community gates and on community bulletin boards at the Town or City Hall.
- Train communications personnel in Crisis and Emergency Risk Communications (CERC) and Message Mapping for timely, accurate and productive crisis communications. The EPA offers numerous tools for Water Utility Communication During Emergency Response.

Eye on the Weather *- Weather services can usually forecast storms 24 hours or more ahead of time. The EPA's mobile app Water Utility Response On-the-Go allows you to monitor and track all types of weather. For ice storms, you can also check the Sperry-Piltz Ice Accumulation Index (SPIA IndexTM), which gives a 0-5 ice accumulation and ice damage prediction index. The SPIA IndexTM covers the continental United States and provides predictions days before a storm, including power outage duration possibilities. In California, the Public Safety Power Shutdown (PSPS) is an operational practice of shutting off the power to a limited area during extreme and potentially dangerous weather conditions based on several factors such as red flag warnings, humidity levels and high wind conditions. Check to see if you have something similar in your state and ensure your utility is closely coordinated with the agency issuing the PSPS.*

2. Power Assessments

TOP TIP: Register your power assessment needs into the U.S. Army Corps of Engineers (USACE) Emergency Power Facility Assessment Tool (EPFAT) database.

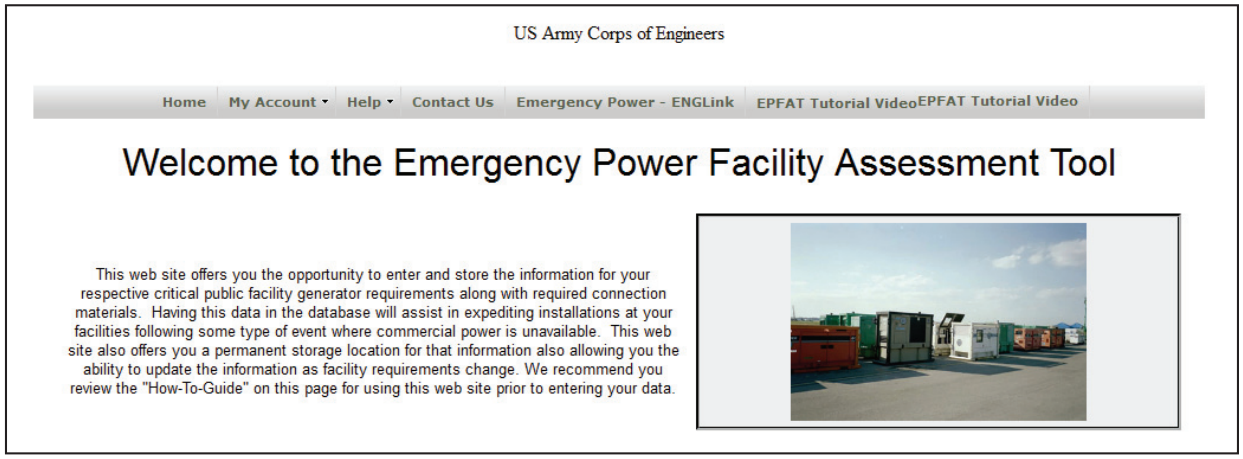
Power assessments determine your utility's emergency power requirements for critical equipment to maintain water and wastewater services. A power assessment team typically includes electrical, mechanical and operational subject matter experts. These are the appropriate utility professionals who can fully assess utilities' power needs and operational implementation requirements. They will inspect all infrastructure assets at your utility. You will determine electrical assets critical to your operation. Critical infrastructure components will be unique at each utility, but usually include treatment processes and key pumping stations. This information is required to properly size an emergency generator(s), and a reference to its location should be included in your ERP. You can learn more about power assessments and generators in the free, 2-hour online course, IS-815: ABCs of Temporary Emergency Power, offered by the Federal Emergency Management Agency (FEMA) Emergency Management Institute.

Step 1. – Conduct an Emergency Power Assessment at Your Utility

- Conduct a Self-Assessment – Perform your own emergency power assessment, with the assistance of a qualified power assessment team.
- Consider Calling Prime Power – The USACE 249th Engineer Battalion may be able to provide free electric power assessments for utilities. They can be reached at 800-243-3472 or 703-805-2562.
- When you upgrade your facilities or build new components, re-assess your power requirements to determine if you also need to add generator capacity, battery banks or on-site renewable energy.
- Periodically review and update your emergency power requirements, especially when replacing assets and remodeling buildings.
- Consider installing stationary generators with automatic transfer switches at all "critical" facilities to ensure they will stay in operation should the power go out.
- If possible, conduct a hydraulic model-based assessment of how performance measures would be impacted when your facility is powered by generators instead of the electric grid, and how failures of one or more generators would affect performance.

Step 2. – Keep Records of Your Assessment

- Maintain a copy of all information from the power assessment with your ERP, so you can easily locate it during emergencies. You should have a summary of the power requirements, siting requirements, location and capacity of any existing on-site generators at all critical infrastructure components.
- Generator-specific information requirements include the kilowatt, voltage and phase of the generator required. The assessment should also include the electrical connection type, either delta or wye.
- Appendix A is an example of a Generator Information Sheet* that a utility could use for each of its generators.
- The assessment should include the GPS latitude and longitude in degrees-minutes-seconds or in decimal degrees of the location of any existing or needed generators. If possible, record any decimal degree GPS data values to the sixth place to the right of the decimal point.
- The assessment should also include a basic order of materials with information on the number and length of cables needed to connect a generator to the utility's electrical system, the number and size of lugs to connect the cable runs, and the number and designed location of grounding rods required.
- Input your generator information in the USACE EPFAT database. States and FEMA use this database during widespread power outages to quickly determine where and what kind of generators may be needed. When possible, use GPS to identify the location of any existing generators. Enrollment in EPFAT is free.
- Keep your power assessment information up to date. The EPFAT database will remind you every three years to review your data.



** Clicking this link will open a MS Word document you can modify and/or complete.*

3 Generators
Step 1 Size
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3. Generators

TOP TIP: Know what type of generators you need and where you would get them during a power outage.

Choosing a Generator

Once you know your generator requirements, you need to make several decisions to find the best one for your utility. A generator is classified by its power rating. Two distinct power ratings are prime power and emergency standby. The average load factor for both types is 80 percent. The table below compares some general characteristics of the two types of generators.

	Prime Power	Emergency Standby
Length of use	Rated for extended periods of operation at variable loads	Designed for short-term use; typically rated to operate no more than 200 hours per year
Impact of operating longer than prescribed hours	N/A	More frequent breakdowns and malfunctioning
Cost	More expensive because they are designed to meet operational loads for an extended period of time	Less expensive

Regulations

As you compare generator options, check local, state and federal regulations on generators, fuel storage and use and maximum permissible testing. In most cases, a local or state air permit is needed to install and operate a stationary generator. There are also federal regulations for stationary reciprocating internal combustion engines (RICE). Most states implement the federal air quality program and states can also impose additional requirements. The specific requirements depend on your jurisdiction, as well as the age, type and size of the generator. The regulatory requirements also depend on the type of fuel. Compression Ignition (CI) RICE run on diesel fuel while Spark Ignition (SI) RICE use natural gas, propane and gasoline.

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Step 1 – What Size Generator Do I Need?

The first step in choosing a generator for your utility is to determine the right size. Your power assessment can help you size your generator(s). The key components of a generator are: Voltage, Load, Phase and Rotation.

1. **Voltage** - The generator must have the appropriate voltage to match the motor(s) it will be powering.
2. **Load** - You need to know the Full Load Amps (FLA) of all the motor(s) you intend to run off the generator. This is the amount of current (amps) the motors will draw from the generator when producing their rated output horsepower. If running more than one motor you need to know the startup (inrush power) in kW's needed to start multiple motors. There are formulas for calculating this value.
3. **Phase (Rotation)** – Phase is a requirement for a single or multiphase generator based on what the generator will be powering. The direction of the motor rotation (i.e., clockwise or counterclockwise) determines the order of voltage waveform sequences, or the phase rotation. If incorrect, it could damage the pump(s) at startup.

In addition to knowing your equipment's electricity requirements, consider the following when sizing your generator:

- If you are relying on a single, large generator (e.g., greater than 500 kW), consider installing two smaller generators in parallel instead to increase backup power reliability. It is unlikely that both of the smaller generators will fail at the same time. While you would not be able to power everything if one failed, you could still maintain part of the load.
- There are limited generators that produce 2 MW or more. Segmenting your load (e.g., pumps) so that smaller generators used in combination can meet the demand will increase your chances of locating and receiving generators during an emergency and thus increase resilience.
- Determine whether a portable or stationary generator will work best for your critical infrastructure assets. Portable generators are better for smaller electric demands that do not require uninterrupted power. These generators can also be transported to multiple sites.
- If your electric demands are significant, consider larger, stationary generators fueled by either natural gas or diesel. These generators can start-up within 7 to 10 seconds of a power outage and provide power to critical equipment quickly.
- Supplement your planning with hydraulic modeling across multiple 'what if' scenarios to determine the service consequences of reduced power support and to explore the potential benefits of portable generators and 'rolling blackouts' of specific components.

Step 2 – Should I Buy, Rent or Borrow a Generator?

- Your state's Water and Wastewater Agency Response Network (WARN) can make it easier to borrow a generator and other resources during a regional emergency. If you are not a member, consider joining.
- Know what "type" of generator you may need and can receive from WARN partners. AWWA's Resource Typing Manual provides information on resource typing.
- Investigate how your state water sector associations and local emergency management agencies can help. In Florida, both the Florida Rural Water Association and the Florida Division of Emergency Management maintain generator pools for distribution as needed. A good working relationship with your local emergency manager will be critical to receiving a state or federal generator.
- Many private vendors sell or rent generators. If you plan to rent a generator, set up a contract with a vendor. Since many people may need to rent generators during a power outage, know where you stand in terms of priority with your generator vendor.
- Another option is to rent and store a portable generator during storm season.
- Appendix B is an example of a Generator Request Form*.

Generator	Pros	Cons
On-site (purchased)	• You know you have one • Reduced time to respond	• Could be costly and unaffordable • You perform the maintenance • The disaster that strikes your utility could also damage your generator
Off-site (rented or borrowed)	• Multiple sources to get one – EOC, WARN, vendor, FEMA • Someone else performs the maintenance • Costs less than buying	• Travel delays to get it to your site • Your utility might not be high on the priority list to get a generator

** Clicking this link will open a MS Word document you can modify and/or complete.*

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Step 3 – What Type of Fuel Should I Use to Run my Generator?

In addition to portability, fuel type is an important consideration for selecting a generator.

- Diesel generators are the most common and offer the largest selection, availability and power range.
- Smaller water utilities with lower power requirements and fewer resources might consider portable, gasoline powered generators.
- Smaller water utilities can rotate several portable, gasoline generators between lift and pump stations as necessary. This method (rolling blackout) allows a utility to have backup power without buying a dedicated generator for each site.
- You could also consider bi-fuel generators to increase your fuel options during an emergency. These generators can switch between two different fuel types, such as natural gas and diesel. Usually this choice is automated and dictated by what fuel type is more efficient for the given conditions and needs, but the choice can also be made manually based on what fuel type is available. For example, if natural gas lines are broken or shut off during a disaster, diesel can be used.
- Natural gas generators do not require truck refueling and usually run quieter and with less air emissions than diesel generators. However, natural gas generators tend to produce less power than diesel generators and therefore your utility may require a larger natural gas generator to power the same load as a smaller diesel generator. You should also consider that the incident may affect natural gas delivery and prepare a contingency plan for such situation. For example, an earthquake could cause breaks in natural gas pipes, which would shut off supply to affected areas.

Starting Currents and Generator Sizing - *Cross-line starts (as opposed to soft starts) of equipment require higher starting currents and therefore a larger generator. High and premium-efficiency motors also require higher starting currents and therefore a larger generator to handle the startup current draw.*

Useful Tip:
If using multiple generators, try to select generators from the same manufacturer to make servicing the units easier.

Step 3 – What Type of Fuel Should I Use to Run my Generator?

Fuel Type	Pros	Cons
Diesel	• Powers large generators • Lasts longer than gasoline • Readily available • Safer to handle and store	• Requires deliveries • Requires on-site storage • Risk of spills • Environmental restrictions • Limited storage life
Natural Gas	• Does not require truck delivery • Does not require on-site storage • Does not expire • Supply is relatively inexhaustible	• Generator cost may be more expensive • If natural gas service is interrupted, there are limited back-up options • Risk of explosion
Propane	• Does not expire • Easily available in rural areas	• Requires deliveries • Requires on-site storage • Limitation of generator size • Leased storage tanks limit fuel provider choice • Risk of explosion
Gasoline	• Powers smaller, portable generators • Readily available	• Typical shelf life is 2-3 months or less if stored in the equipment • Requires deliveries • Requires on-site storage • Risk of spills • Worst storage life of all options • Size limitations • Risk of explosions

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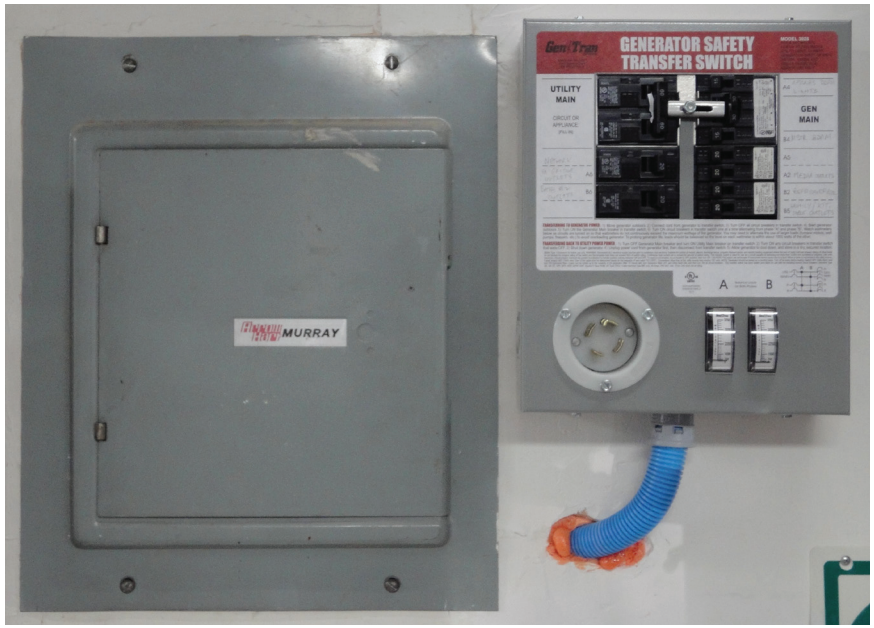
Step 4 – How Will I Connect a Generator to my Loads?

Generators require a special connection, or transfer switch, to rapidly connect to your facility's equipment and prevent potentially-harmful back-feeding into electric lines. Transfer switches allow you to easily switch back and forth between grid power and on-site generator power sources. See the additional tips below on installing transfer switches.



- Clearly depict the location of the transfer switch on site maps.
- Install transfer switches at eye level to make generators easier to connect in an emergency under poor weather and lighting conditions.
- Consider installing automatic transfer switches that automatically move from grid power to generator power when an outage is detected at unmanned facilities or at critical equipment.
- Consider connecting these sites into the utility SCADA system to know when the automatic transfer switch has been activated.
- Consider installing a manual transfer switch for facilities or other pieces of equipment that do not need to be automatically transferred to an alternate power source during a power outage. The likely dispatch time for an operator to access the site should be considered in the determination of a manual versus automatic transfer switch.
- Ensure that personnel responsible for manual transfers receive appropriate training on switch operations.
- The connection type for portable generators must be considered when sharing resources or ordering from an outside vendor. Examples of some known plug types are Appleton, single cable cam-locks, hardwired and outside building tap-box.

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Step 5 – Where Will I Keep a Generator?

Make sure you keep your generator at a secure location. Some tips include:

Video: Generator Placement

- Locate generators and their fuel tanks above flood levels. A common height requirement for critical infrastructure is 3 feet above the 100-year floodplain, although some utilities are using the 500-year floodplain for an added margin of safety. Check your local and state requirements.
- Consider installing a concrete pad to provide a stable surface for a portable generator during an outage.
- Use weatherproof enclosures to protect generators and electric equipment.
- Get an enclosure large enough to provide easy access to the generator's radiator, fuel tanks, air and oil filters and charging system.
- Cover a generator with a roof to increase its life expectancy. Position the generator pad so that a roof can be added later.
- Maintain three or four feet of clear space on all sides of the generator for adequate ventilation.
- Buy or rent a generator built with acoustical steel and sound insulation if it will be in a residential area.
- Address security at all planned mobile generator locations.
- For portable generators, consider where you will store them and how you will transport them to their potential areas of use.

3 Generators
Step 1 Size
Step 2 Ownership
Step 3 Fuel Type
Step 4 Connection
Step 5 Placement
Step 6 Maintenance
Tips

Case Study:

In southern Monmouth County, New Jersey, a wastewater pumping station was redesigned to utilize a mobile trailer to house the pumping station's expensive primary electric equipment and controls. This way, the trailer can be moved out of danger during floods. Cables and plugs provide the connection between the pump station and the electric and control equipment in the trailer. When a storm threatens, the utility removes the trailer and mounts a cheaper secondary electric and control system at the site. The secondary system then powers and operates the pump station on either grid or generator power until after the storm, when the trailer can be safely returned to the pumping station. A mobile enclosure may seem costly, but it saved the South Monmouth Regional Sewerage Authority an estimated $1.5 million in repair and recovery after Hurricanes Irene and Sandy.

3 Generators
Step 1 Size
Step 2 Ownership
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Tips

Step 6 – How Should I Maintain a Generator?

If generators are not maintained, they will not function properly during emergencies. This could leave your utility without backup power when you need it the most. Maintenance requirements for generators vary, so be sure to have a contractor or trained utility staff perform scheduled maintenance as recommended by the manufacturer. Store printed maintenance manuals where they are protected and accessible.

Generator Operation and Maintenance Tips

- Regularly run generators under full load for extended periods to test for any problems.
- Test the generator under load every time after it is serviced. One utility has specific requirements for load tests for a specific run time at each interval of 50%, 75% and 100% to fully test under expected loads for a proper time duration.
- Perform additional maintenance requirements for a generator that is planned to be used for 10 days or longer.
- Record all maintenance activities to assess performance and operating costs to inform predictive maintenance requirements and future buying decisions.
- When you change the oil in your generator, consider sending a sample to be tested for the presence of metals. Metals could indicate engine wear, which may indicate that other repairs are needed.
- Test fuel to make sure it is still viable. Consider fuel conditioning or fuel replacement on a regular basis to maintain the quality of the fuel in the tank.
- Consider service requirements when selecting the generator location for ease of service access and replacement.
- Consider National Fire Prevention Association (NFPA) 110 requirements.

3
Generators

Step 1
Size

Step 2
Ownership

Step 3
Fuel Type

Step 4
Connection

Step 5
Placement

Step 6
Maintenance

Tips

Step 6 – How Should I Maintain a Generator?

Generator Servicing Requirements

The manufacturer provides recommendations for operational generator service requirements. The standard service interval is 240 operational hours or 10 days of continuous operations. During emergencies, scheduled maintenance should be used instead of 'condition-based' or 'predictive' maintenance. Typical items serviced at this interval include:

- Change diesel engine oil.
- Change diesel engine oil filter(s).
- Change diesel engine fuel filter(s).
- Change diesel engine air filter(s).
- Check diesel engine coolant levels and replenish as required.
- Check items such as the fan belts for any abnormal wear or damage while the engine is turned off.

Did you know? *During Hurricane Sandy, many generators failed after 24 to 48 hours because they had not been properly exercised and maintained.*

Generator Use Tips

Your utility can take basic actions to prepare for disasters that may include power loss. Below are tips for utilities using generators in emergency situations. Keep in mind that when operating under emergency power protocols, you now have the added requirement of operating like an electric power utility: operating, providing logistics for and staffing your generators.

- ☐ Conduct a facility-specific generator needs assessment. This can significantly reduce response time during an emergency. If possible, couple this with a hydraulic modeling-based assessment of system service performance.
- ☐ Give completed assessment forms to your local EOC or emergency management agency and register the results in EPFAT.
- ☐ For large scale "notice" incidents, such as Category 3 and above hurricanes or major ice storms, go off the grid and use your generators in anticipation of a power outage. This can prevent operational disruptions and protect electric equipment.
- ☐ Monitor power quality and go off the grid and switch to generators if there is poor power quality. Power fluctuations can damage equipment.
- ☐ Consider using SCADA programming to inhibit some wells and boosters if a generator is installed. Some stations have too many motors for a portable generator to run. Running all the motors could cause the generator to kick-off due to the high load.
- ☐ Identify three-phase requirements and require monitoring capabilities and procedures. When power is restored, all three phases may not be available, which can damage three-phase equipment.
- ☐ Determine the need for protection against equipment failure caused by undervoltage, overvoltage or frequency variance.
- ☐ Keep smaller generators on trailers for emergencies. The generators can be safeguarded during the incident, but easily transported to sites when needed. Address operations, security and logistics (maintenance, fuel, parts) for mobile generators at each site.

Generator Use Tips (continued)

- ☐ If possible, outfit portable generators with GPS to keep track of their locations when moved both inside the system, or outside (in the case of sharing a WARN resource).
- ☐ Maintain printed maintenance manuals and keep readily accessible.
- ☐ Keep basic maintenance supplies on hand (e.g., coolant, belts, oil, fuel filters) to quickly repair or service a generator if it breaks down.
- ☐ Develop an Asset Management Plan for your generators to make sure they and their resources are maintained properly.
- ☐ Plan for a "backup" to your backup power. One option is to reserve a portable generator from a rental pool during storm season and determine how you will connect it to your backup system.
- ☐ Outfit equipment connected to stationary generators with another generator cable connection to bring in an additional unit should the stationary generator fail.

Video: Paralleling Generators

4. Fuel

TOP TIP: Have multiple ways to get and move fuel during an emergency.

You must maintain fuel on-site and have multiple ways to obtain additional fuel from vendors and other sources during emergencies. It may be difficult or impossible to get fuel from outside sources to keep your generators operating for an extended period. Your fuel suppliers may stop their operations due to the power loss, transportation difficulties or other damage. If you lease propane fuel tanks, the supplier from whom you leased them is typically the only one who can fill them. Buying your own propane storage tanks may give you more supplier options.

Video: Fuel

To keep your generators running during an emergency, you should develop a fuel plan that addresses:

- How much fuel you need to operate each of your generators for one day
- Total on-site fuel capacity
- How you will re-fuel your generators, including those in remote locations
- Contracts with multiple fuel vendors
- Plans for using alternate fuel, such as for bi-fuel generators
- Multiple options to move fuel during an emergency
- Staffing the significant 'extra' operation of fuel supply
- Risks associated with conducting a resupply operation in a seriously-disrupted operational environment

Fuel Tank Sizing - *You do not want to run out of fuel during a power outage. One utility manager recommends storing enough fuel to run a generator at 70% load for five days. Typically, having this amount of fuel on hand enables this utility to run a generator for seven to nine days without running out of fuel, while it transitions to a continual resupply situation.*

The rule of thumb that the USACE and 249th Engineering Battalion uses to calculate diesel fuel requirements is:

0.07 gallons/hour x kW size of the generator x 24 hours/day = gallons of fuel required per day

Tips

- ☐ Determine fuel storage constraints (regulatory and security). Fuel regulations vary by state and local jurisdiction.
- ☐ Know and continually update your fuel demands – how much fuel do you need to run your generators for 24 hours? One week? One month? Do some generators burn through fuel faster than others?
- ☐ Write refueling requirements into generator rental contracts. For example, the generator must be delivered with a 24-hour fuel supply.
- ☐ Add fuel management into your generator maintenance schedule to ensure availability of clean, reliable fuel.
- ☐ Clean all fuel tanks at least every five years to avoid sludge build up.
- ☐ Use gel and fuel additives (e.g., algaecides) to reduce biological activity that produces fuel sludge.
- ☐ Use a portable fuel polishing unit to avoid contamination and to ensure fuel is always ready to use.
- ☐ Refill fuel tanks before they are empty to avoid drawing up any fuel sludge accumulation.
- ☐ Ask if your fuel service provider can remotely monitor your fuel tank levels and automatically dispatch a truck to fill them when they fall below an agreed upon level. This ensures your tanks are as full as possible in the event of a no-notice incident such as an earthquake.
- ☐ Have multiple vendors from different supplier regions under contract so that you can maintain your fuel supplies if one vendor cannot deliver.
- ☐ Create a map of all your fuel providers and note details such as the types of fuel they sell and their backup power options (e.g., do they have their own generator or would they need you to hookup one of your portable generators in order to pump fuel?).
- ☐ Ask your vendor to store additional fuel for your utility during storm months.
- ☐ Ask your WARN and local EOC to help provide fuel for your utility's generators during an emergency.

Tips (continued)

- ☐ Coordinate your fuel needs with other critical infrastructure in your area (e.g., hospitals, police stations, schools), as it may be possible to have multiple deliveries from one fuel truck and realize economies of scale when establishing contracts.
- ☐ Be aware of limits on who can refuel leased fuel storage tanks. You can purchase your own tanks if necessary.
- ☐ Have fuel filters (at least one complete filter set per generator) on hand because they will not be readily available during an emergency.
- ☐ Be prepared to move your own fuel without contractors. Trucks with mounted 100-gallon fuel tanks do not need HazMat placards. Generally, any tank over 119 gallons requires hazardous materials placarding and licensing.
- ☐ Reduce your energy consumption while using generators using pre-planned protocols to make the most of the available fuel.
- ☐ Consider green power options that could supply some of your equipment during an outage and offset the need for a generator and fuel supply.
- ☐ Consider establishing a local and regional emergency fuel plan to increase the availability through emergency channels during a disaster.

Reducing Fuel Consumption

In 2012, the New Brunswick Water Utility in New Jersey was able to stay operational for an additional six days during Superstorm Sandy by reducing generator fuel consumption. Thinking creatively, the operators put the entire plant on gravity filters, shutting down the energy consumptive membrane filters. This operational change successfully reduced fuel consumption by approximately two-thirds (from 120,000 gal/day to 40,000 gal/day).

5. Energy Efficiency

TOP TIP: Install energy efficient equipment to reduce energy needs and increase power resilience.

Energy efficiency will help your utility save on annual electric bills and increase your resilience during power outages. If you decrease your energy use, you can run your generators longer with less fuel. For more information regarding energy efficiency for water utilities, see the EPA's Ensuring A Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities.

You can also conduct an energy assessment at your drinking water or wastewater utility using the ENERGY STAR Portfolio Manager®. Following this initial assessment, you can perform a more detailed audit to determine what energy efficiency projects would be most beneficial for your utility. Many electric power providers will conduct an energy efficiency audit to help you reduce your energy needs. Your municipal or local government may be willing to help pay for a portion of the audit's costs.

Electricity Savings through Efficiency

Stockbridge Water in Massachusetts spent nearly one-third of its budget on electric costs and decided to look for ways to increase energy efficiency. The utility was able to reduce energy use by changing all lighting to electronic ballast lighting. In addition, by changing to heat pumps (keeping the older electric heat system as a backup), the utility saved 60-65% in annual electric costs.

Useful Tip: *The Database of State Incentives for Renewables & Efficiency (DSIRE) is a comprehensive source of information on incentives and policies that support renewable energy and energy efficiency in the United States. Funded by the U.S. Department of Energy, DSIRE finds programs and resources that can help you attain your energy goals.*

6. On-Site Power

TOP TIP: Generate power on-site to allow your utility to function during grid outages.

Another option to prevent power outages at your utility is to consider installing on-site, off-grid power, known as distributed energy resources (DER). DER refers to self-sufficient, off-grid power generation, power storage and electric load control technologies that are located on-site at your utility and operated for your benefit. The opportunities and regulations for DER vary by state so check your local and state requirements. DER options include:

- **Anaerobic digestion of biomass** and waste methane can be pressurized and filtered as a low-BTU natural gas to produce electric power and heat. Over 600 wastewater facilities utilize their waste gas for energy.
- **Photovoltaic Solar panels** absorb sunlight as a source of energy to generate electricity. They can be installed in a variety of ways at water utilities including ground mount, canopy and rooftop systems.
- **Wind turbines** convert kinetic energy from wind into electrical energy and can be installed at water utilities.
- **Battery banks** are now standardized systems that store energy from the grid or from on-site renewable sources that generate power only during certain times of the day (e.g., solar, wind).
- **Fuel cells** are devices that convert the energy from either natural gas, biogas or hydrogen into electricity through a chemical reaction.
- **Traditional internal combustion engines** are engines that burn fuel to produce power, such as generators.
- **Combined Heat and Power (CHP)** is the simultaneous generation of electricity and heat from a source such as biogas, natural gas or comingled gas. CHP can be 75% efficient. There is significant opportunity for CHP technology at wastewater treatment plants with anaerobic digesters, which produce biogas as a waste product. Benefits of CHP at a wastewater utility include energy cost savings, government and utility incentives, emissions reductions and enhanced power resilience.

Renewable Energy Portfolio

The Narragansett Bay Commission operates the two largest wastewater treatment facilities (WWTF) in Rhode Island. Its annual energy use is 36,312,890 kilowatt-hours/year. In response to statewide goals for renewable energy, the Narragansett Bay Commission completed several renewable energy projects. In 2012, it installed three 1.5 MW wind turbines at the Field Point WWTF. At Bucklin Point WWTF, there are three anaerobic digesters. The commission has been using about half of the biogas to heat the digesters. In 2018, it built a new combined heat and power (CHP) system to burn the remaining biogas in reciprocating engines to produce power. In addition to these projects, the commission receives net metering allowances for its offsite wind turbines and solar photovoltaic energy farms. The Narragansett Bay Commission now utilizes renewable energy for more than 90 percent of its annual energy demands.

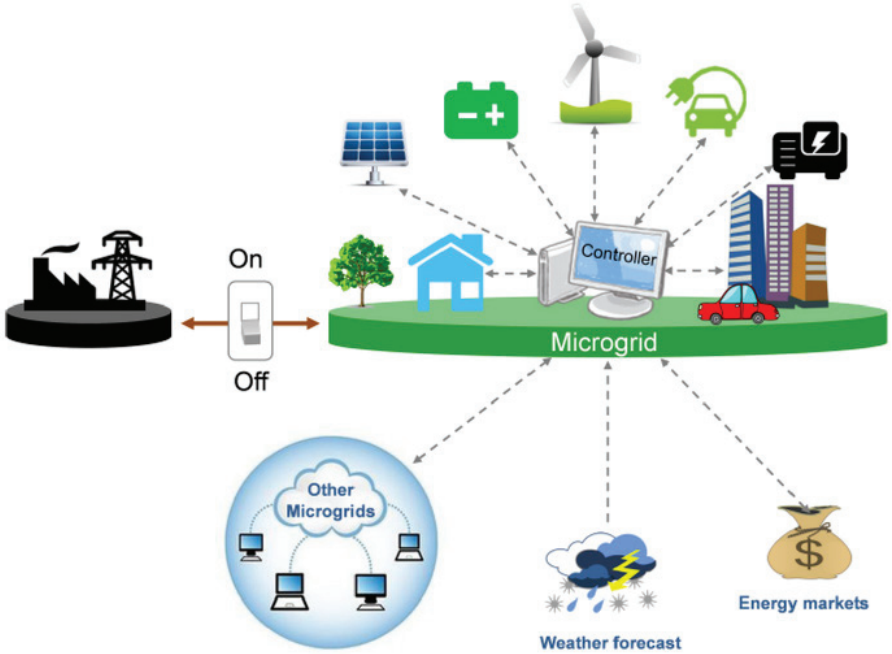
Wind, Solar and Batteries

The Atlantic County Utilities Authority (ACUA) serves 14 municipalities in Atlantic County, New Jersey and a population of over 230,000 residents. Its wastewater treatment plant has a capacity of 40 million gallons per day (MGD) and currently treats about 26 MGD. The treatment plant has an energy demand of approximately 2.5 MW. The 7.5 MW Jersey Atlantic Windfarm provides about 60 percent of the utility's electricity through a fixed purchase agreement. ACUA also has 500 kW of solar onsite, including ground mount, canopy and rooftop systems. ACUA has a land lease agreement with Viridity Energy, who installed, owns and operates a 1 MW battery energy storage at ACUA. Viridity uses the frequency regulation market to get a return on its investment and shares in the savings ACUA sees from a reduction in peak load charges on its electric bills. The 1 MW battery storage could provide 15 minutes of back-up power to the entire treatment plant. During a longer power outage, the utility would switch from battery storage to back-up generators. ACUA plans to obtain additional batteries so it can operate as an island, independent of the grid.

Microgrid

A central concept to DER is the microgrid. According to the U.S. Department of Energy Microgrid Exchange Group, "A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can connect and disconnect from the grid to enable it to operate in both grid-connected or island-mode." During a power outage, you could switch to your own electric microgrid powered by various sources such as solar photovoltaics, wind turbines, biogas and usually battery banks. In the community, microgrids are often used to link critical public services and critical private businesses together in their own, larger microgrid. These key facilities could become "islands" of power during an outage.

DER and microgrids are emerging technologies and you need to check your state regulatory commission rules on grid interconnection if the system is to interface on-and-off the electric grid. If the microgrid is only dedicated to critical loads, you may not need to address those regulatory issues. The EPA offers a number of energy resources on renewable energy, energy efficiency and emerging technologies.



One Use for On-Site Power

As you consider the benefits of various types of DER at your utility, think about using solar or wind power for telemetry systems. Then your source of information about remote facilities would be independent from grid power.

Microgrid

Microgrid with Combined Heat and Power

The Greater Lawrence Sanitary District (GLSD) augments its Combined Heat and Power (CHP) fuel source digestion facilities with food waste at its 52 MGD treatment plant. This greatly boosts methane production and the ability to power the District's treatment processes and net-meter power to the grid for its off-site pumping station. GLSD benefits from a Massachusetts law that does not allow producers of one ton or more of food waste per week to use landfills or incinerators to dispose of that waste. A Waste Management CORe® facility creates an engineered bioslurry from food waste and delivers three to five truckloads of slurry to GLSD each day.

Based on this project, GLSD can:

- *Fuel its cogeneration engines with natural gas*
- *Fuel its cogeneration engines with biogas*
- *Produce 3.2 MW of power, enough to sustain full wastewater treatment plant (WWTP) operations during an extended power outage*

In the event of a power outage, the CHP shuts down, but can then be restarted by GLSD using natural gas. The natural gas can then be switched to biogas. These abilities provide operational reliability and flexibility and demonstrate that continued WWTP operations during a long-duration power outage with a clean energy source is possible. Off-site pumping stations still require backup diesel generators in the event of a power outage, but GLSD is well on its way to net zero operations.

7
Black Sky Planning

Step 1
Define Top Level Goals

Step 2
Establish Minimalist Service Levels

Step 3
Develop Internal Requirements

Step 4
Develop External Requirements

7. Black Sky Planning

TOP TIP: Consider how your utility could sustain operations during a power outage lasting several weeks or longer.

A black sky incident is generally defined as a long duration power outage, lasting at least 30 days, that impacts a large region including several states. Hazards that could cause a black sky incident include a cyber attack, high altitude electromagnetic pulse (EMP), coordinated kinetic attack (e.g., physical attacks on key elements of power grid), geomagnetic disturbance (i.e., space weather), large-scale earthquake and extreme terrestrial storm (e.g., Hurricane Maria). The National Oceanic and Atmospheric Administration issues alerts, watches and warnings for space weather just like it does for hurricanes and other weather events, which may provide you some time to take pre-planned actions in advance. Learn more at www.swpc.noaa.gov/alerts-watches-and-warnings.

Many utilities that are prepared for power outages lasting two to three days may not be able to maintain full operations during an outage lasting one week or longer. Fuel, treatment chemicals, transportation and other critical interdependencies could be a challenge for water utilities due to disruption of supply chains and extreme competition for resources. The Electric Infrastructure Security (EIS) Council published the free EPRO Handbook II Volume 2: Water Sector Resilience for Black Sky Events. Some key planning considerations identified in the book as well as recent EPA Black Sky Exercises are outlined.

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Step 1 – Define Top Level Goals

- ☐ What are the basic, overarching goals your utility wants to achieve during a black sky incident?
- ☐ What are the threats to public health and safety due to long-term disruption of drinking water or wastewater services that you wish to avoid?

Long-term Backup Generator Use

During Superstorm Sandy in 2012, the Bay Park Sewage Treatment Plant on Long Island, New York lost all power. The utility produced its own power with on-site generation units, and the flooding from Sandy damaged multiple secondary systems on which those units relied. Bay Park was effectively left without primary power for more than one year. The plant operated with backup power from two pods of two diesel generators each, each pod capable of producing 3 MW. Based on Bay Park's experiences post-Sandy, here are some considerations for long-term operation of standby generators:

- *Despite having 5,000 gallons of diesel fuel storage at each standby generator pod, fuel deliveries were required every 24 hours. Fortunately, the roads around Bay Park were passable within one week after Sandy made landfall.*
- *Frequent load shedding to perform maintenance on the standby generators was challenging. Therefore, the 2 MW generators in each pod were replaced with two 1 MW generators each to make maintenance easier.*
- *Diesel generators are noisy, and since the generators were used long-term, there were numerous community complaints. Bay Park regularly conducted public meetings on the progress and timeline to restore primary power.*
- *"Emergency" use of the generators was allowed for 500 hours before state air quality standards applied. Therefore, Bay Park eventually replaced their standby diesel generators with natural gas generators to meet emission requirements.*
- *FEMA reimbursement for the rental charges of the standby generators became difficult because Bay Park had used them so long. In this case, purchasing the generators would have cost less than renting them.*
- *The flooding and noise issues led Bay Park to reconsider its standby generator placement. Bay Park's generators are now on the roof (out of a flood's reach), shielded by a building for noise abatement and as far as possible from residential neighbors.*
- *Continuous run or prime power rated backup generators, not standby rated, can typically provide up to full power for your utility as long as you need it. Standby or emergency generators are not designed to run continuously for long periods of time. They need to be frequently taken offline for maintenance and if used for longer periods of time, need to be de-rated, or run below their full power rating.*

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Step 2 – Establish Minimalist Sustainable Service Levels

- ☐ What are the "bare minimum" goals for meeting customer needs as your fuel and treatment chemical supplies dwindle during an extended wide area blackout?
- ☐ Will you reduce treatment and/or stop serving some pressure zones?
- ☐ Have you discussed or developed plans on your expected levels of treatment and service during a prolonged power outage with your local EMA, critical customers and your state regulatory authority so that they can plan appropriately?
- ☐ Have you segregated the electric loads to their own breaker boxes so that the facility could have the option for dedicated on-site electric renewable or generator systems?

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Step 3 – Develop Internal Requirements

- ☐ Make carefully prioritized investments in backup power, onsite fuel storage and other necessary infrastructure to support your goals and minimum service levels.
  - What alternative and temporary emergency power resources do you have at your treatment plant(s) and pumping stations?
  - How much fuel do you have onsite? How many days will it last? How will you source and deliver it?
  - How many days of treatment chemicals do you need to store?
  - Obtain renewable energy resource assessments on what the facility has available on-site: waste heat, solar, wind, methane, biomass (for biogas) and water.
- ☐ Develop the specific procedures within your utility's emergency response plan to achieve those service levels.
  - What is your plan for pumping and treating water, based on your available alternative and temporary emergency power resources, fuel and chemicals? Does this correspond with your goals for providing services during an extended power outage?
  - Do you have plans to ensure that your employees can work (e.g., do they have transportation, do their families have the support they need?) during extended power outages?
  - What is your plan for restoration of service following a prolonged outage of the electric grid, especially when you have not been able to operate for an extended period of time (e.g., reactivating wastewater treatment, transitioning a contaminated distribution system from Do Not Use to Boil Water Notice to Potable)? What are your requirements for additional resources? Have you incorporated risk into your activities, supply chain for resources, etc.?
- ☐ Evaluate the opportunities, challenges, benefits and risks of expanded onsite fuel and chemical storage.
- ☐ Procure black sky-secure communications capabilities that can operate for over 30 days without satellite, cell service and grid power.

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Black Sky Planning

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Step 4 – Develop External Requirements

☐ What are the support requirements your utility will need to achieve black sky service levels?

- Do you have contracts to rent generators, if you do not own them? Have you installed transfer switches?
- Are your emergency power needs listed in the U.S. Army Corps of Engineers' Emergency Power Facility Assessment Tool (EPFAT)?
- Who will repair and maintain your emergency generators during a prolonged period of use?
- Does your electric provider know which of your facilities are the highest priorities for power restoration?
- Do you have contracts to provide fuel during an emergency? Is your vendor prepared to pump and move fuel without grid power?
- Have you worked with your local EMA to establish a local and regional emergency fuel plan and to coordinate fuel deliveries to generators from multiple agencies in the most efficient manner possible?
- How resilient are your chemical vendors and their supply chains?
- How will you communicate with your local EMA during a widespread power outage when landlines, cell phones and the Internet do not work?
- How will you communicate information about water advisories, reductions in service and emergency disinfection to the public during a widespread power outage when landlines, cell phones and the Internet do not work?

☐ What are the policy changes your utility will need to achieve black sky service levels?

- Clean Air Act waivers
- Other local air quality regulation waivers
- Fuel storage and transportation waivers
- Water quality waivers from primacy agencies
- Regional level emergency fuel planning

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Black Sky Planning

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Step 4 – Develop External Requirements (continued)

- ☐ What are your ongoing activities with key external service providers?
  - Coordination and contact information exchange
  - Collaboration regarding planning and resilience investments
  - Mutual conduct of workshops and exercises
- ☐ Compile a list of resilience investments that address specific black sky events
  - Differentiate from gray sky resilience investments but leverage them as much as possible

8
Funding

Federal Resources

Sample Projects and Funding Sources

8. Funding

TOP TIP: Use EPA's Fed FUNDS website to determine your eligibility for funding power resilience projects.

Power resilience may require an investment from your utility. This investment can reduce recovery costs and help to maintain operations during disasters. Utilities can implement some power resilience measures using internal funding. Other efforts may require capital investment through the utility's capital improvement plan and/or local government funding. Also, there is some external funding from state and federal agencies that is available to utilities depending on the type of utility and the measures that you are trying to fund. Examples of power resilience projects that have been funded successfully through external sources include:

- Purchase, rental or upgrade of emergency generators and fuel supply facilities
- Electric connections (transfer switches) to receive emergency generators
- Elevation or protection of electric panels and generators from hazards
- Flood protection around an electric substation and transformers
- Purchase or subsidized costs of microgrid technology
- Energy efficiency measures

Utilities should identify, prioritize and prepare a list of resilience investments to be used in the event of a disaster. Besides providing a schedule of restoration projects, such list can serve as guidance when conducting initial restoration activities, during a period of major confusion. For example, you could replace 3 large pumps with 4 or 5 smaller pumps that enable you to get under the 2MW threshold that would otherwise restrict the number of available emergency generators.

8
Funding

Federal Resources

Sample Projects and Funding Sources

8. Funding

On-site renewable energy, energy storage and energy efficiency have unique sources of financing that attract private sector dollars to pay for installation. Most of these approaches are common throughout the United States, and some are explicitly supported by state laws or regulations:

1. Energy Performance Service Contracts (ESPC) are where these energy efficiency and renewable options are financed and installed by a private company, for a price competitive to what would be paid to the electric utility. Companies that perform this kind of work are called Energy Service Companies (ESCO).

2. Energy Leases are offered routinely by renewable energy and energy storage companies (battery banks). Usually leases are for 3 – 7 years, some longer. At the end of the lease the system is retrieved or may be able to be acquired for a nominal fee.

3. Power Purchase Agreements (PPAs) are 15 to 20-year contracts which sell electric power at a pre-approved electric rate that is competitive with power from the electric utility grid. These have escalating clauses for component repair. In the twelve months through May 2018, utility scale solar power generated over 50 terawatt-hours (TWh) primarily financed through PPAs. As of January 30, 2018, the 89,077 MW of wind power installed across 41 states was financed primarily through PPAs.

What these three financial tools have in common is that they do not impose cost to the customer, but those customers also have the option to sign a long-term contract for electric power or energy savings.

Federal Resources

The EPA's tool Federal Funding for Utilities – Water/Wastewater – in National Disasters (Fed FUNDS) provides comprehensive information on funding programs from various federal agencies including FEMA, the EPA, the U.S. Department of Agriculture (USDA), the U.S. Department of Housing and Urban Development (HUD) and the Small Business Administration (SBA). For example, the state-administered Drinking Water State Revolving Fund (SRF) and Clean Water SRF support a wide range of infrastructure projects. Eligible projects could include resilience components such as energy efficient upgrades and alternative power sources. States establish priorities for using SRF funds and assistance is typically in the form of low-interest loans. To access Fed FUNDS, click the image below.

Federal Funding for Water and Wastewater Utilities in National Disasters (Fed FUNDS)

This website gives utilities information about federal disaster funding programs. Although Fed FUNDS focuses on major disasters, you can use the information for any incident that disrupts water or wastewater services or damages critical infrastructure. Learn more about water resilience.

Find the Right Funding

- Answer a series of questions to find the best disaster funding program(s) for your utility

Overview of Funding Opportunities

- Eligibility and application process information (and more!) for all funding opportunities

Sample Projects and Funding Sources

To assist you in locating potential funding sources, the table below has been completed based on a broad interpretation of funding eligibility and policy. Individual utility projects will need evaluation on a case-by-case basis. Talk to your utility supervisor, local emergency manager, town manager and state hazard mitigation officer to determine the availability of funding opportunities for your power resilience project.

Sample Power Resilience Project	Possible Funding Sources				
	EPA SRF	FEMA PA	FEMA HMG	HUD CDBG	USDA WEP
Repair generator or fuel tank		X			X
Elevate existing generators, electric equipment etc.	X	X	X		X
Purchase generators and fuel storage	X		X	X	X
Install electric wiring hookups (e.g., transfer switches) to accept generators	X		X		X
Develop and implement emergency power plan	X		X		X
Harden grid link or multiple independent feeds	X		X		X
Replace damaged equipment with energy efficient versions	X	X		X	X
Add power (e.g., dual fuel, cogeneration, solar, wind)	X	X	X		X

Table Key: *SRF = State Revolving Fund; PA = Public Assistance; HMG = Hazard Mitigation Grant; CDBG = Community Development Block Grant; WEP = Water and Environmental Programs*

Appendices

Appendix A: Existing Generator Information Sheet

1. Facility Information

Site Name: _____ Address: _____

Latitude (N):_____ Longitude (W): _____

Major motors, in starting order, used for facility operations (*e.g., 75 HP 2 Quantity 460 Volts 3 Phase*):

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

2. Generator Information

Power (kW): _____ Voltage (V):_____ Phase(s): _____

Configuration: ☐Wye ☐Delta

Transfer Switch: ☐Auto ☐Manual

Generator Location: ☐Inside ☐Outside

Generator Type: ☐Portable ☐Stationary

Cable Length (ft): _____ Cable Size (MCM or AWG): _____

3. Engine Information

Engine Make: _____ Engine Model: _____

Engine Serial Number: _____ Battery Voltage: _____

Primary Fuel Filter: _____ Secondary Fuel Filter: _____ Coolant Filter: _____

Oil Filter: _____ Oil Type: _____ Oil capacity: _____

Air Filter: _____ Fuel Type: _____ Fuel Capacity: _____

Gallons per hour: _____ Max Run Hours (100% load)*: _____

Diesel Emissions Fluid (DEF) Tank Capacity: _____

4. Additional Notes (e.g., hitch requirements for portable generator, site specific directions, clearance issues with overhead lines)

Facility Information

Site Name: site name for stationary generator or write "portable" for portable generator

Address: physical location for stationary generator; storage location for portable generator

Latitude and Longitude: provide six places to the right of the decimal point for latitude and longitude to indicate a more precise location. If presented in degrees-minutes-seconds, the seconds should be listed four decimal places to the right of the whole number of seconds for equivalent accuracy.

Major motors: provide the horsepower, quantity, volts, and phases of the major motors that will be powered by the generator, in starting order, and whether they are soft start or across the line start

Generator Information

Power: the power output of the generator in kilowatts (kW)

Voltage: voltage is a measure of pressure

Phase(s): generators can be single or three-phase

Configuration: 3-phased power can be in a wye configuration in the shape of a "Y" or a delta configuration in the shape of a triangle

Transfer switch: does the generator start up automatically or require a manual switch?

Generator Location: is the generator located inside or outside?

Generator Type: a portable generator can be moved between locations and a stationary one is at a fixed location

Cable Length: length of cable between generator and load

Cable Size: size of cable in Thousand Circular Mils (MCM) or American Wire Gauge (AWG)

Engine Information

Engine Make and Model: the manufacturer of the engine and the engine model number

Engine serial number: the serial number on the engine

Battery voltage: the size and number of batteries the engine requires

Filters: the type of filters each system requires; note – some engines do not have a secondary fuel filter

Oil: the type and capacity of oil

Fuel: the type and capacity of fuel (e.g., diesel)

Gallons per hour: the number of gallons of fuel needed per hour

**Max run hours:* for fuel planning only, the maximum number of hours the engine can run before refueling assuming 100% load (generators should run closer to 70% or 80% load)

Diesel Emissions Fluid (DEF) Tank Capacity: the capacity of DEF tank

Appendix B: Generator Request Form

1. Facility Information

Site Name: _____ Address: _____

Latitude (N):_____ Longitude (W): _____

Contact Name: _____ Phone: _____ Email: _____

Major motors, in starting order, used for facility operations (*e.g., 75 HP 2 Quantity 460 Volts 3 Phase*):

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

_____ HP _____ Quantity _____ Volts _____ Phase ☐soft start ☐ACL (across the line)

2. Needed Generator

Power (kW): _____ Voltage (V): _____ Phase(s): _____

Configuration: ☐Wye ☐Delta Cable Length (ft): _____ Cable Size (MCM or AWG): _____

On-site cable configuration: _____ Preferred Fuel Type: _____

3. Assessment Details

Main Breaker Current (Amps): _____

Service Drop Type: ☐Overhead ☐Underground

If overhead, is there sufficient clearance for trailer? ☐ Yes ☐No ☐N/A

Anticipated On-site Location of Temporary Generator: _____

4. Hitching Requirements

Trailer Hitch: ☐ Pintel ☐ Ball Trailer Height: _____

Electrical connections: _____ Generator and Trailer Weight: _____

5. Additional Notes (e.g., site specific directions, clearance issues with overhead lines)

Facility Information

Site Name and Address: location and address for requested generator

Latitude and Longitude: provide six places to the right of the decimal point for latitude and longitude to indicate a more precise location. If presented in degrees-minutes-seconds, the seconds should be listed four decimal places to the right of the whole number of seconds for equivalent accuracy.

Contact: name, email and phone number for a point of contact for the generator

Major motors: provide the horsepower, quantity, volts, and phases of the major motors that will be powered by the generator, in starting order, and whether they are soft start or across the line start

Needed Generator

Power: the power output of the generator in kilowatts (kW)

Voltage: voltage is a measure of pressure

Phase(s): generators can be single or three-phase

Configuration: 3-phased power can be in a wye configuration in the shape of a "Y" or a delta configuration in the shape of a triangle

Cable Length: length of cable needed to connect generator to load in feet

Cable Size: size of cable in Thousand Circular Mils (MCM) or American Wire Gauge (AWG)

On-site cable configuration: onsite cable connection for a generator (e.g, appleton, camlock, etc.)

Preferred Fuel Type: type of fuel (e.g., diesel) that is preferred

Assessment Details

Main Breaker Current: size of the circuit breaker in amps that controls all electric current in the building

Service Drop Type: are the electrical lines overhead or underground?

Transformer Mount Type: is the transformer mounted on a pad or a pole?

Anticipated On-site location: describe where the generator will be placed

Hitching Requirements

Trailer Hitch: type of hitch

Trailer Height: height of the trailer/hitch

Electrical connections: describe electrical connections needed for trailer

Generator and Trailer Weight: combined weight of generator and trailer

Attachment 5-1: Qualifications of Witness

QUALIFICATIONS AND PREPARED TESTIMONY

OF

ISAAC GENDLER

Q.1 Please state your name and address.

A.1 My name is Isaac Gendler, and my business address is 505 Van Ness Avenue, San Francisco, California 94102.

Q.2 By whom are you employed and what is your job title?

A.2 I am employed by the California Public Utilities Commission Public Advocates Office as a Utilities Engineer.

Q.3 Please describe your educational and professional experience.

A.3 I received a Bachelor of Science Degree in Mechanical Engineering from San Jose State University in May 2019.

I have worked for the Public Advocates Office – Water Branch since September 2020. In this position I have been a plant witness on the 2020 SCE Catalina, 2020 San Jose Water Company, and 2021 California Water Services Company Proceedings.

Q.4 What is your area of responsibility in this proceeding?

A.4 I am responsible for evaluating California American Water Company's proposals related to Depreciation, Earthquake Insurance Policy, Customer Service, Wildfire, Water Quality, and Safety.

Q.5 Does that complete your prepared testimony?

A.5 Yes.