Appendix E. AWWA Water Audit

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2019 AWWA Water Audit Level 1 Certified Validation Report

Validator Provided

Audit Information:

Water Supplier Name: Vallecitos Water District PWS ID: 3710002

System Type: Potable Audit Period: Calendar Year 2019

Utility Representation: Michael P. Arthur (Principal Financial Analyst), Chris Robbins (Public Information/Conservation Supervisor), Ed Pedrazzi (Operations & Maintenance Manager), Jeanna Kirby (Meter Service Supervisor)

Validation Date: 9/22/2020 Call Time: 3:00 p.m. Sufficient Supporting Documents Provided: **Yes**

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 70 Data Validity Band (Level): Band III (51-70)

ILI: 1.03 Real Loss: 29.23 gallons/connection/day Apparent Loss: 3.11 gallons/connection/day

Non-revenue water as percent of cost of operating system: 4.5%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☒

Validator Information:

Water Audit Validator: Robert Scholl Qualifications: Water Audit Validator Certificate issued by the CA-NV Section of the AWWA

2019 AWWA Water Audit Level 1 Certified Validation Report

Utility Provided

Water Supplier Name: Vallecitos Water District **Water Supplier ID Number:** CA3710002 **Water Audit Period:** Calendar Year 2019

Water Audit & Water Loss Improvement Steps:

Utility to provide steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

The Vallecitos Water District refined and continued billing the San Marcos fire department training facilities for their water use. This creates a revenue water source not previously captured.

The Vallecitos Water District's 2019 Water Audit also makes an adjustment in the metered usage data time period to align with the audit period. The 2016 and 2017 versions of the water audit had a one-month lag time between metered usage data and metered import data that could create anomalies between the two. This adjustment should better match supply and demand on a per-month basis.

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audit and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Executive Name (Print)	Executive Position	Signature	Date
Glenn Pruim	General Manager		9/28/2020

2019 AWWA Water Audit Level 1 Validation Summary Notes

Pre-Interview Notes	Import and export water volume monthly reports received All import meter signal calibration reports received Primary export meter (>90% volume of total exports) signal calibration report received Authorized consumption per month for each use category spreadsheet received Customer Retail Unit Cost derivation spreadsheet received Variable Production Cost derivation spreadsheet received

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
Volume from Own Sources (VOS)	Supply meter profile: No supply from own sources Confirmed input value: 0.0 acre-feet/year	 Confirmed DVG: N/A
VOS Master Meter Error Adjustment	Adjustment Basis: No supply from own sources Confirmed input value: None	 Confirmed DVG: N/A
Water Imported (WI)	Import meter profile: 5 import connections to San Diego County Water Authority (includes desalinated water connection) through Venturi meters; 1 import connection to the Olivenhain Municipal Water District through a mag meter. WI Data Source: Totaled from all monthly volume reads Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed. Confirmed input value: 16,726.1 acre-feet/year	Percent of WI metered: 100% Signal calibration frequency: Semi-annually for San Diego County Water Authority meters; annually for the Olivenhain Municipal Water District meter. Volumetric testing frequency: None Volumetric testing method: N/A Percent of WI tested and/or calibrated: 100% Comments: Signal calibration testing performed annually for over 90% of the source flow by volume, but no volumetric flow testing Confirmed DVG: 7
WI Master Meter Error Adjustment	Adjustment Basis: No adjustment made in absence of volumetric flow test data.	Import meter read frequency: Continuous Import meter read method: Automatic logging via SCADA telemetry

2019 AWWA Water Audit Level 1 Validation Summary Notes

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
	Comments: Data made available to protect both the selling and purchasing agencies. Data is adjusted to correct for errors when equipment malfunction is detected. Confirmed input value: No Value	Frequency of data review: Monthly Comments: Metered data is reviewed only monthly by the purchasing agency, and so a Data Value Grade of 6 is not supported. Confirmed DVG: 5
Water Exported (WE)	Export meter profile: Total of 4 metered export interconnections. Main export interconnection is with the Carlsbad Municipal Water District. Smaller volume interconnections also exist with the Olivenhain Municipal Water District, the Vista Irrigation District and the City of Escondido. WE Data Source: Totaled from all monthly volume reads Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed. Exclusion of Billed Metered Authorized Consumption confirmed. Confirmed input value: 3,035.6 acre-feet/year	Percent of WE metered: 100% Signal calibration frequency: Annually for Carlsbad Municipal Water District meter; no calibration for the Vista Irrigation District or City of Escondido exchange meters. Volumetric testing frequency: None Volumetric testing method: N/A Percent of WE tested and/or calibrated: 96.5% Comments: Signal calibration testing performed annually for over 90% of the source flow by volume, but no volumetric flow testing Confirmed DVG: 7
WE Master Meter Error Adjustment	Adjustment Basis: No adjustment made in absence of volumetric flow test data. Comments: Data made available to protect both the selling and purchasing agencies. Data is adjusted to correct for errors when equipment malfunction is detected. Confirmed input value: No Value	Export meter read frequency: Continuous Export meter read method: Automatic logging via SCADA telemetry Frequency of data review: Monthly Comments: Metered data is reviewed only monthly by the purchasing agency, and so a Data Value Grade of 6 is not supported. Confirmed DVG: 5

2019 AWWA Water Audit Level 1 Validation Summary Notes

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
Billed Metered Authorized Consumption (BMAC)	Customer Meters & Reads Profile: - Age profile: 95% of meters are 10 years old or less. Older meters may be up to 30 years old. - Reading system: Predominantly AMR with less than 10 accounts manually read due to radio coverage issues. - Read frequency: Monthly Billing Data Pro-rated? Yes, based on customer complaints Comments: Input derivation from supporting documents confirmed; metered data time period is adjusted to align with the audit period. Exclusion of non-potable volumes confirmed. Confirmed input value: 12,765.2 acre-feet/year	Percent of customers metered: 100% Small meter testing policy: Reactive and only performed due to customer complaints Number of small meters testing/year: Less than 3 per year Large meter testing policy: Reactive and only performed due to customer complaints Number of large meter tested/year: Less than 3 per year Meter replacement policy: Upon meter failure or when flagged for consumption anomalies Number of replacements/year: Not quantified, but known to be small Billing data auditing practice: Computer records exist with annual auditing conducted by utility personnel. Comments: Volumes are reviewed by utility personnel during each billing cycle. No proactive meter testing program is in place, and so a Data Value Grade of 6 is not supported. Confirmed DVG: 5
Billed Unmetered Authorized Consumption (BUAC)	Billed Unmetered Profile: One-Day permits from the utility authorize the use up to 10,000 gallons of water. Input Derivation: Assumes 10,000 gallons of potable water use for each One-Day permit issued. Exclusion of non-potable volumes confirmed. Comments: Flat-rate charge with the goal of minimizing such unmetered usage. Confirmed input value: 0.2 acre-foot/year	Policy for metering exemptions: Authorized for small-scale, single-family residence projects only. Commercial landscaping and construction water usage are metered. Comments: Site-specific methods not performed to obtain reliable estimates of consumption. Confirmed DVG: 7

2019 AWWA Water Audit Level 1 Validation Summary Notes

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
Unbilled Metered Authorized Consumption (UMAC)	Unbilled Metered Profile: Vallecitos Water District internal consumption such as water pipeline flushing, sewer pipeline maintenance, headquarters building and water recycling plant potable water usage. Input Derivation: Totaled from all monthly volume reads Comments: Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed. Confirmed input value: 100.8 acre-feet/year	Policy for billing exemptions: Written policy exists regarding internal billing exemptions. Comments: Internal usage is audited monthly by utility personnel. Meters are not calibrated on an annual basis. Policy does not emphasis keeping such accounts to a minimum. Confirmed DVG: 9
Unbilled Unmetered Authorized Consumption (UUAC)	Unbilled Unmetered Profile: Vallecitos Water District potable water tank wash-out water usage. Input Derivation if Estimated: Consumption is quantified via formulae. Exclusion of non-potable volumes confirmed. Comments: No additional comments. Confirmed input value: 7.9 acre-foot/year	Default or Adjusted Default Applied: Value adjusted based on estimated flow methodology. Completeness of Documentation: Good records document each occurrence. Comments: Written policy exists regarding internal potable water usage with the intent of minimizing this type of consumption. Confirmed DVG: 10
Unauthorized Consumption (UC)	Default Applied? Yes Input Derivation if Customized: N/A Comments: No additional comments. Confirmed input value: 34.226 acre-feet/year	Instances and extent of UC documented: None Comments: Default grade applied Confirmed DVG: 5
Customer Metering Inaccuracies (CMI)	Input Derivation: Default value applied. Comments: The meter population includes a mix of new high-performing meters and dated meters with suspect accuracy.	Characterization of meter testing: Reactive and only performed due to customer complaints. Estimated that less than 3 meter tests are performed per year. Characterization of meter replacement: Upon meter failure or when flagged for consumption anomalies. Number of meter replacements each year are believed to be small.

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
		Comments: A reliable electronic recordkeeping system for meters exists. However, with no proactive meter testing program in place, a Data Value Grade of 4 is not supported.
	Confirmed input value: 32.246 acre-feet/year	Confirmed DVG: 3
Systematic Data Handling Errors (SDHE)	Input Derivation: Estimate based on an assumed error of 42,000 cubic feet of water per month.	Characterization of read collection & billing process: Policy and procedures for new account activation in place and reviewed periodically. Oversight of billing operations reviewed monthly. Computerized billing system is in use with reports to confirm billing data and system functionality.
	Comments: No additional comments.	Characterization of billing process and billing data auditing: Internal checks of billing data error conducted monthly. Volume attributed to errant reads, stuck meters, and other shortcomings of the billing process can only be approximated.
	Confirmed input value: 12.0 acre-feet/year	Confirmed DVG: 5
Length of Mains	Input Derivation: Totaled from GIS inputs.	Mapping format: Digital
	Hydrant lateral length included: Yes	Asset management database: GIS assumed as asset management.
	Comments: Hydrant lateral lengths taken from water main to the property line.	Map updates & field validation: Infrastructure updates added as they are constructed and as-builted. However, digital database is not validated through random field verification.
		Comments: Sound written policy exists for managing water main extensions and replacements
	Confirmed input value: 379.5 miles	Confirmed DVG: 9
Number of Active and Inactive	Input Derivation: Standard report run from billing system.	CIS updates & field validation: Meter readers detect and field verify anomalies with billing system. Total meter count between billing and meter departments generally agree.
	Basis for database query: By meter identification number.	Estimated error of total count within: 1%

2019 AWWA Water Audit Level 1 Validation Summary Notes

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
Service Connections	Comments: Number of connections cross-checked with GIS. A deviation of less than 200 meters currently exists between the two systems. Confirmed input value: 22,535	Comments: Written policy and auditing procedures exist for reliable management of service connection population. Confirmed DVG: 9
Average Length of Customer Service Line	Are customer meters at the curbstop? Yes Where are customer meters installed if not at curbstop? N/A Customer service line derivation: N/A Comments: No additional comments. Confirmed input value: 0.0 feet	Comments: Default grade applied Confirmed DVG: 10
Average Operating Pressure	Number of zones, general setup: 26 pressure zones Typical pressure range: 40 psi to 150 psi per policy, although some high-pressure areas can be up to 175 psi if meter type allows. Input derivation: Output from hydraulic model, averaged over the entire distribution system. Comments: Well managed, discrete pressure zones exist. Confirmed input value: 117.4 psi	Extent of static pressure data collection: From fire hydrants or testing stations taken during construction projects and to address customer complaints. Characterization of real-time pressure data collection: Current, full-scale SCADA system in place to monitor water distribution system and collect data, including real-time pressure readings. Hydraulic model in place? Calibrated?: Yes; last calibrated in 2018 against SCADA system data and manual pressure reads. Comments: Since procedures are not reviewed by a third party knowledgeable in the M36 methodology, a Data Value Grade of 10 is not supported. Confirmed DVG: 9
Total Operating Cost (TOC)	Input Derivation: From official financial statements Comments: Confirmed costs limited to water only, including engineering costs and overhead.	Frequency of internal auditing: Annually Frequency of third-party CPA auditing: Annually Comments: Reliable electronic, industry-standard cost accounting system in place.

2019 AWWA Water Audit Level 1 Validation Summary Notes

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
	Confirmed input value: $39,618,684 per year	Confirmed DVG: 10
Customer Retail Unit Cost (CRUC)	Input Derivation: Total consumptive revenue divided by billed metered consumption. Sewer Charges Volumetric? Only commercial accounts. Sewer Charges Included? No Comments: Water rate structure updated annually and applied consistently in billing operations except for construction meters (charged at highest tier for all usage) and agricultural accounts (charged at middle tier for all usage and eligible for discounted agricultural rate). Confirmed input value: $4.80 per 100 cubic feet	Characterization of calculation: Weighted average composite of all CII and other customer rates. Comments: Since rate structure and calculations of composite rate are not reviewed by a third party knowledgeable in the M36 methodology, a Data Value Grade of 10 is not supported. Confirmed DVG: 9
Variable Production Cost (VPC)	Supply profile: Imported potable water supply only. Direct variable costs included: Commodity portion of purchase costs plus variable distribution costs. Secondary costs included: Secondary costs of importer assumed in purchase costs. Comments: Pertinent marginal (variable) supply costs beyond power and additional treatment are included. Confirmed input value: $1,920.93	Characterization of calculation: Total commodity portion of imported costs less utility overhead, all divided by total potable water purchases. Comments: Reliable electronic, industry-standard cost accounting system in place. Data is audited by utility personnel annually; but since the data is not audited by a third party knowledgeable in the M36 methodology, a Data Value Grade of 8 is not supported. Confirmed DVG: 7
Pending Items needed to complete the validation	None	