Validator Provided

Certified Validation Report

Audit Information:

Water Supplier Name: City of Petaluma

PWS ID: 4910006

System Type: Potable

Audit Period: Calendar year 2018

Utility Representation: Chelsea Thompson, Dan Herrera

Validation Date: 9/12/2019

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 64

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

ILI: 2.11

Real Loss: 27.56 (gal/conn/day)

Apparent Loss: 8.39 (gal/conn.day)

Non-revenue water as percent of cost of operating system: 12.0%

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. ☒

If not, rejected recommendations are included here.

Validator Information:

Water Audit Validator: Gregory Plumb

Qualifications: Certified California Water Audit Validator, CA-NV AWWA

Level 1 Water Audit Validation Notes

September 12, 2019

Utility	Validator
Utility Name: City of Petaluma Utility Contact: Chelsea Thompson	Validator: Gregory Plumb, Sonoma Water Validator Qualifications: Water Audit Validator Certificate from the AWWA California Nevada Section

#	AWWA Water Audit Input	Final DVG	Confirmation of Input Derivation	Confirmation of Data Validity Grade Assignment
1	Volume from Own Sources (VOS)	N/A	Supply meter profile: Zero of 15 wells operated in 2018	Percent of VOS metered: 100% Signal calibration frequency: None Volumetric testing frequency: None Volumetric testing method: N/A Percent of VOS tested and/or calibrated: N/A Comments: DVG limited to 3 as no testing or calibration
2	VOS Master Meter & Supply Error Adjustment (VOS MMSEA)	N/A	Adjustment basis: Blank – no test data	Supply meter read frequency: Continuous via SCADA with daily to weekly manual reads as a backup Supply meter read method: Automatic logging via SCADA Frequency of data review: Weekly Storage level monitoring frequency: Yes Comments: DVG limited to 3 as tank/storage elevation changes are not employed in calculating VOS

#	AWWA Water Audit Input	Final DVG	Confirmation of Input Derivation	Confirmation of Data Validity Grade Assignment
3	Water Imported (WI)	7	Import meter profile: WI from Sonoma Water WI data source: AMI Comments: Taken from Sonoma Water invoices as provided by connection.	Percent of WI metered: 100% Signal calibration frequency: No calibration reports Volumetric testing frequency: Annual Volumetric testing method: Comparative meter tests Percent of WI tested and/or calibrated: 100% Comments: DVG limited to 7 as no calibration report
4	WI Master Meter & Supply Error Adjustment (WI MMSEA)	N/A	Adjustment basis: Bench test – value not used since not in-situ	Import meter read frequency: Continuous Import meter read method: AMI Frequency of data review: AMI has alerts for data outside typical ranges facilitating daily review Comments: DVG limited as Sonoma Water review protocols not detailed.
5	Water Exported (WE)	N/A	No emergency tie ins	
6	WE Master Meter & Supply Error Adjustment (WE MMSEA)	N/A		
7	Billed Metered Authorized Consumption (BMAC)	5	Customer meters & reads profile: - Age profile: AMR conversion almost completed, started about 8-years ago. Replacements in mid-2000's so 10-15 yrs old - Reading System: >95% AMR - Read frequency: Monthly	Percent of customers metered: 100% Small meter testing policy: Reactive – complaint based or flagged-consumption Number of small meters tested/year: Not quantified

#	AWWA Water Audit Input	Final DVG	Confirmation of Input Derivation	Confirmation of Data Validity Grade Assignment
			Comments: No lag time correction. Confirmed input derivation from source data.	Large meter testing policy: Reactive – complaint based or flagged-consumption. Number of large meters tested/year: No quantified Meter replacement policy: Upon failure since project completed in 2014 Number of replacements/year: Not quantified Billing data auditing practice: Standard billing QC, plus review of volumes by use type each billing cycle Comments: DVG limited to 5 as no meter testing conducted. Considering implementing meter testing program on large meters 3" and larger in the future
8	Billed Unmetered Authorized Consumption (BUAC)	10	Billed unmetered profile: Water field office stand pipe for water trucks. Customer brings in a sheet to the office reporting their water use according to an honor-system Input derivation: Direct estimate Comments: 290 HCF rounded to 0.22 MG	Policy for metering exemptions: Limited to one use Comments: Small volume, single use, directly estimated in a site specific manner
9	Unbilled Metered Authorized Consumption (UMAC)	N/A		

#	AWWA Water Audit Input	Final DVG	Confirmation of Input Derivation	Confirmation of Data Validity Grade Assignment
10	Unbilled Unmetered Authorized Consumption (UUAC)	7	Unbilled unmetered profile: Flushing, fire, sweeper/vac uses Input derivation if estimated: Incident log used to report incidents, data from SCADA or estimated Comments: None	Default of adjusted default applied: Value based on records kept by operator for fire hydrants Completeness of documentation: Comments: DVG 7 as not all water uses captured
11	Unauthorized Consumption (UC)	5	Default applied? Yes	Comments: None
12	Customer Metering Inaccuracies (CMI)	1	Input derivation: Rudimentary estimate increased from 1% to 2% due to meter age profile of 10-15 years Comments: N/A	Characterization of meter testing: Limited – upon request AND consumption flag Characterization of meter replacement: Limited - failure Comments: DVG based on no testing and rough estimate %
13	Systematic Data Handling Errors (SDHE)	5	Input derivation: Default value applied	
14	Length of Mains (Lm)	7	Input derivation: Totaled from GIS map Hydrant lateral length included: Yes Comments: Can increase to 8 for 2019 since Lucity now in place	Mapping format: Digital Asset management database: Lucity Map updates & field validation: Accomplished through normal work order processes Comments: DVG limited by no asset management system.

#	AWWA Water Audit Input	Final DVG	Confirmation of Input Derivation	Confirmation of Data Validity Grade Assignment
15	Number of Active and Inactive Service Connections (Ns)	5	Input derivation: Standard report from billing system. Possible that this is a count of meters. Extent of meter-lateral count variance, as well as quantification of inactive laterals unknown Comments: GIS inventory has a difference of about 500	CIS updates & field validation: Accomplished through meter reading processes Estimated error of total count within: within 5% Comments: DVG limited by verification of query basis to get true lateral count and estimated error
16	Average Length of Customer Service Line (Lp)	10	Are customer meters at the curbstop? Yes Comments: Default applied	
17	Average Operating Pressure (AOP)	4	Number of zones, general profile: 5 zones, 1 & 4 function similarly, 2, 3, and 5 are on varying HGLs Typical pressure range: 30 – 90 PSI Input derivation: Inferred from observations of pressure readings in field or review of pressure measurements Comments: Average of the top and bottom pressures from each zone. Limited by PRVs at turnouts into system so pressure per zone is fairly constant.	Extent of static pressure data collection: Hydrant pressures during routine flushing and/or hydrant testing. SCADA data in each zone monitored continuously – tank sites and incoming and outgoing pressures. Characterization of real-time pressure data collection: Basic telemetry or pressure logging at boundary points Hydraulic model in place? Calibrated?: No Comments: DVG limited by extent of pressure data collection

#	AWWA Water Audit Input	Final DVG	Confirmation of Input Derivation	Confirmation of Data Validity Grade Assignment
18	Total Operating Cost (TOC)	10	Input derivation: From official financial reports Comments: Confirmed costs limited to water only, and water debt service, excludes CIP	Frequency of internal auditing: Annual . Frequency of third-party CPA auditing: Annual Comments: None
19	Customer Retail Unit Cost (CRUC)	4	Input derivation: Average of fixed residential monthly charges and average of SFR tiers 1-4 - Sewer charges volumetric? Yes - Sewer charges included? No Changed from last year as previously didn't include fixed charges. Comments: Recommend to calculate as total consumptive water and sewer revenue divided by BMAC, converted to $/CCF	Characterization of calculation: Selected simple average rate with sewer excluded. Input calculations not reviewed by M36 expert Comments: DVG limited to 4 by not using a volume weighted average residential rate
20	Variable Production Cost (VPC)		Supply profile: Mixed source portfolio, variable production cost valued at most expensive source. Direct variable costs included: Yes – purchase rate, water pumping, transmission/ distribution, divided by BMAC Secondary costs included: No Comments: None	Characterization of calculation: Primary costs only. Comments:

Key Audit Metrics			
VALIDITY	Date validity score: 64	Data Validity Band (Level): Band III (51-70)	
VOLUME	ILI: 2.11	Real Loss: 27.56 (gal/conn/day)	Apparent Loss: 8.39 (gal/conn/day)
VALUE		Annual Cost of Real Losses: $817,581	Annual Cost of Apparent Losses: $1,074,028

Comments on Audit Metrics & Validity Improvements

- Opportunities for improvement include:
    - Customer meter testing
    - Real loss component analysis to determine cost-effective leak detection strategy

Utility Provided

Certified Validation Report

Water Supplier Name: City of Petaluma **Water Supplier ID Number:** 4910006 **Water Audit Period:** Calendar year 2018

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:

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
Kent Carothers	Operations Manager		9/16/19