Certified Validation Report

Audit Information:

Water Supplier Name: West Valley Water District PWS ID: CA3610004

System Type: Potable Audit Period: Calendar Year 2018

Utility Representation: Nadia Loukeh

Validation Date: 9/24/19 Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 65 Data Validity Band (Level): Level III (51-70)

ILI: 2.92 Real Loss: 49.61 (gal/conn/day) Apparent Loss: 18.07 (gal/conn/day)

Non-revenue water as percent of cost of operating system: 12%

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: Mark Wiley Qualifications: Certified AWWA Water Loss Validator

Certified Validation Report

Water Supplier Name: West Valley Water District **Water Supplier ID Number:** CA3610004 **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:

In the previous audit, a customer meter testing /replacement program was identified; the District implemented a meter replacement program and is upgrading to AMR.

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
Clarence Mansell	General Manager	Clarence C Mansell	09/27/19

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Validity Grade
1	Volume from Own Sources	VOS	5	Supply meter profile: The district owns 22 wells, only 16 were operated during the audit period. VOS input derived from Comments: 100% of VoS is metered, some testing has occurred but documentation was not provided. Reads are taken manually daily.	Percent of own supply metered: 100% Signal calibration frequency: N/A Volumetric testing frequency: Occasional Volumetric testing method: Unknown Percent of own supply tested and/or calibrated: Not quantified Comments: No additional comments.
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	2	Input derivation: 2 Net Storage change included in MMSEA input: No Comments: No additional comments	Supply meter read frequency: Daily Supply meter read method: Manual Frequency of data review for trends & anomalies: Monthly Storage levels monitored in real-time: Yes Comments: No additional comments
3	Water Imported	WI	9	Import meter profile: Water is imported from the San Bernardino Municipal Water District (SBMWD) WI input derived from: Totalization of volumes per daily meter reads from importer and exporter. Comments: No additional comments.	Percent of import supply metered: 100% Signal calibration frequency: Annually Volumetric testing frequency: Annually Volumetric testing method: Unknown Percent of import supply testes and/or calibrated:100% Comments: SBMWD tests and calibrates their meters, documentation was provided.
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	3	Input derivation: Based on annual testing but since no documentation was provided, DVG was changed from 3 to 5. Comments: District accepted change in DVG.	Imported meter read frequency: Daily Imported meter read method: Manual and automatic data logging. Frequency of data review for trends and anomalies: Monthly Comments: No additional comments.
5	Water Exported	WE	7	Import meter profile: Daily manual read when in use. WI input derived from: Totalization of volumes per daily meter reads from importer and exporter. Comments: Supporting documentation provided.	Percent of own supply metered: 100% Signal calibration frequency: N/A Volumetric testing frequency: Occasional Volumetric testing method: Unknown Percent of export tested and/or calibrated: Not quantified Comments: No additional comments

6	WE Master Meter & Supply Error Adjustment	WE MMSEA	2	Input derivation: 2 Comments: No additional comments	Percent of import supply metered: 100% Signal calibration frequency: N/A Volumetric testing frequency: Occasional Volumetric testing method: Unknown Percent of export supply testes and/or calibrated: Not quantified. Comments: No additional comments.
7	Billed Metered	BMAC	7	Customer meter profile: 5/8" to 12" Age profile: Meters range in age up to 19 years Reading System: AMR& Manual Read frequency: Monthly Comments: Lag- time correction is not determined in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed. District is converting from manual reading to AMR.	Percent of customers metered: 100% Small meter testing policy: Reactive – complaint based or flagged consumption testing only. Number of small meters tested/year: Not quantified but known to be small. Large meter testing policy: Reactive – complaint based or flagged consumption testing only. Number of large meters tested/year: Not quantified but known to be small. Meter replacement policy: The District implemented a 15 year replacement policy. Number of replacements/year: 1,255 Billing data auditing: Standard billing QC, plus review of volumes by use type each billing cycle. Comments: No additional comments
8	Billed Unmetered	BUAC	n/a		
9	Unbilled Metered	UMAC	n/a		
10	Unbilled Unmetered	UUAC	5	Comments: Custom California default of .25% used.	Comments: Default grade applied.
11	Unauthorized Consumption	UC	5	Comments: Default input applied.	Comments: Default grade applied.
12	Customer Metering Inaccuracies	CMI	3	Input derivation: 2% Industry Standard Comments: See BMAC regarding meter testing & replacement activities.	Characterization of meter testing: Limited (upon request and consumption flag only). Characterization of meter replacement: Customer meters are being converted to AMR. Comments: No additional comments.
13	Systematic Data Handling Errors	SDHA	5	Comments: Default input applied.	Comments: Default grade applied.

14	Length of Mains	LM	7	Input derivation: Total from GIS based Map. Hydrant leads included: Not Included. Comments: No additional Comments.	Mapping format: Digital Asset management database: In place but separate from GIS. Map updates & field validation: Field validation is on-going. Comments: No additional comments.
15	Number of Service Connections	NS	7	Input derivation: Standard report run from billing system. Basis for database query: Account ID, Non- premise based. Comments: Inactive connections are included.	CIS updates & field validation: Accomplished through normal meter reading process. Approximately 100 re-reads occur monthly. Estimated error of total count within: Less than 1% Comments: No additional comments.
16	Average Length of Cust.Service Line	LP	10	Comments: Default input applied.	Comments: Default grade applied.
17	Average Operating Pressure	AOP	3	Number of zones, general profile: The district operateseight pressure zones. Typical pressure range: 45-100 PSI Input derivation: Rudimentary Estimate Comments: No additional comments.	Extent of static pressure data collection: Hydrant flow test and pressures are collected at the request of residents and Fire Department personnel. Characterization of real-time pressure data collection: Real-time monitoring limited to reservoir levels. Hydraulic model: Yes Comments: No additional comments.
18	Total Annual Operating Cost	TAOC	10	Input derivation: From official financial reports Comments: Confirmed costs limited to water only, water service and CIP included.	Frequency of internal auditing:Annually Frequency of third-party CPA auditing:Annually Comments:No additional comments.
19	Customer Retail Unit Cost	CRUC	9	Input derivation:All rate classes included. Comments:Customers are billed on three tiers. This DVG input was increased from an 8 to a 9, the district accepted this input.	Characterization of calculation:This number was derived by dividing the total volume-based revenues by the total volume of potable water delivered in CCF Comments: No additional comments.
20	Variable Production Cost	VPC	5	Supply profile:Own sources and import supply. Primary costs included:Imported & treatment costs. Secondary costs included:Power Comments: No additional comments.	Characterization of calculation:Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.

Key Audit Metrics

(~) VALIDITY Data Validity Score:65 Data Validity Band (Level):Level III (51-70)

(#) VOLUME ILI: 2.92 Real Loss: 49.61 (gal/conn/day) Apparent Loss: 18.07 (gal/conn/day)

($) VALUE Annual Cost of Real Losses: $343,558 Annual Cost of Apparent Losses: $452,768

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Average infrastructure age generally falls around 30 years, and a small amount of infrastructure is 50+ years in age.
Infrastructure replacement policy (current, historic): System deficiencies are evaluated annually and dictate CIP.
Estimated main failures/year: 5 Estimated service failures/year: 307
Extent of proactive leakage management: Leaks generally surface quickly due to area geology; customers are alert and active in reporting leaks.
Other water loss management comments: There is a full time dedicated water conservation staff member for the audit period that promotes water saving activities. The District has a dedicated water leak reporting hot line number.

Comments on Audit Metrics & Validity Improvements

The infrastructure Leakage Index (ILI) of 2.92 describes a system that experiences leakage at 2.92 times the modeled technical minimum for its system characteristics.

The Data Validity Score falling within Band III (51-70) suggests that next steps may be focused simultaneously on improving data reliability and evaluating interventions for water and revenue loss recovery. Opportunities to improve the reliability of audit inputs and outputs include:

- Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.
- Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.
- Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.
- Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.
- Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.

- Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.
- Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.
- Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.
- Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.
- Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.
- Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.
- Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.
- Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.