

Certified Validation Report - Part A: Provided by Validator

Audit Information:

Water Supplier Name: Shasta Lake, City of PWS ID: 4510006
System Type: Potable Audit Period: Calendar Year 2018
Utility Representation: Tony Thomasy (water department superintendent)
Validation Date: 8/23/19 Call Time: 9:00am Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 67 Data Validity Band (Level): Band III (51-70)
ILI: 0.95 Real Loss: 20.79 (Gal/Conn/day) Apparent Loss: 7.43 (Gal/Conn/Day)
Non-revenue water as percent of cost of operating system: 1.8%

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: Jaclyn Disney Qualifications: Water Audit Validator Certificate issued by the CA-NV Section of the AWWA

Level 1 Validation Notes: City of Shasta Lake, CY 2018

<p>Interview Notes</p>	<ul style="list-style-type: none"> No Major Changes in Operation Audit results indicate that customer metering inaccuracies may be an opportunity for audit score improvement To the extent that it is economically feasible – customer metering program improvements such as the implementation of a formal meter testing and replacement program or improved meter information and record keeping would improve validation score. Billed Metered AF includes the BOR metered billed portion for the CY and is incorporated into in the government rate column of the Authorized Consumption spreadsheet. Unbilled Metered BOR use reflects the 92.3 for the March through Year End, plus the 32.09 AF remainder of the prior water year (Jan-Feb) Production Meter Calibration date for 2018 and 2019 provided
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Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>Volume from Own Sources (VOS)</p>	<p>Supply meter profile: <i>Water is sourced from the Bureau of Reclamation. Volume shown is influent into the 3 filters minus the flow through the recycle flow meter. All 3 filter meters are orifice plate meters. Recycle flow is a turbine meter. Meters are read daily and totaled monthly.</i></p> <p>VOS Input Data Source: <i>SCADA reads from production meters as archived.</i></p> <p>Comments: <i>Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.</i></p> <p>Confirmed input value: 2,186.28 AF/Yr</p>	<p>Percent of VOS metered: 100%</p> <p>Signal calibration frequency: Annual</p> <p>Volumetric testing frequency: None</p> <p>Volumetric testing method: N/A</p> <p>Percent of VOS tested and/or calibrated: 100%</p> <p>Comments: <i>Production meter calibration records provided for the first quarter of 2018 and second quarter of 2019. Calibration occurs a minimum of once a year or as needed. Meters found to be within (+/-)6% accuracy.</i></p> <p>Confirmed DVG: 7</p>
<p>VOS Master Meter Error Adjustment</p>	<p>Adjustment Basis: <i>Left blank in absence of volumetric test data.</i></p> <p>Net Storage Change Included: <i>No.</i></p> <p>Comments: <i>No additional comments.</i></p> <p>Confirmed input value: N/A</p>	<p>Supply meter read frequency: <i>Continuous</i></p> <p>Supply meter read method: <i>Manual and automatic logging.</i></p> <p>Frequency of data review: <i>Each business day.</i></p> <p>Storage level monitoring frequency: <i>Yes</i></p> <p>Comments: <i>No additional comments.</i></p> <p>Confirmed DVG: 5</p>

Level 1 Validation Summary Notes Template

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>Water Imported (WI)</p>	<p>Import meter profile: <i>Two emergency connections – the Redding Intertie is an automatic import/manual export and the Bella Vista Intertie is manual import/export.</i></p> <p>WI Data Source: <i>Metered use from the Redding Intertie.</i></p> <p>Comments:</p> <p>Confirmed input value: 0.231 AF/Yr</p>	<p>Percent of WI metered: <i>100%</i></p> <p>Signal calibration frequency: <i>None</i></p> <p>Volumetric testing frequency: <i>None</i></p> <p>Volumetric testing method: <i>None</i></p> <p>Percent of WI tested and/or calibrated: <i>None</i></p> <p>Comments: <i>>50% is metered but there is no meter accuracy program in place.</i></p> <p>Confirmed DVG: 3</p>
<p>WI Master Meter Error Adjustment</p>	<p>Adjustment Basis: <i>N/A</i></p> <p>Comments: <i>No testing program in place for this meter.</i></p> <p>Confirmed input value: <i>N/A</i></p>	<p>Import meter read frequency: <i>Monthly</i></p> <p>Import meter read method: <i>Manual</i></p> <p>Frequency of data review: <i>As needed</i></p> <p>Comments:</p> <p>Confirmed DVG: 2</p>
<p>Water Exported (WE)</p>	<p>Export meter profile: <i>Two emergency connections – the Redding Intertie is an automatic import/manual export and the Bella Vista Intertie is manual import/export.</i></p> <p>WE Data Source:</p> <p>Comments: <i>No water exported in 2018.</i></p> <p>Confirmed input value: <i>N/A</i></p>	<p>Percent of WE metered: <i>100%</i></p> <p>Signal calibration frequency: <i>None</i></p> <p>Volumetric testing frequency: <i>None</i></p> <p>Volumetric testing method: <i>None</i></p> <p>Percent of WE tested and/or calibrated: <i>None</i></p> <p>Comments:</p> <p>Confirmed DVG: <i>N/A</i></p>

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Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>WE Master Meter Error Adjustment</p>	<p>Adjustment Basis:</p> <p>Comments: <i>No water exported in 2018.</i></p> <p>Confirmed input value: N/A</p>	<p>Export meter read frequency:</p> <p>Export meter read method:</p> <p>Frequency of data review:</p> <p>Comments:</p> <p>Confirmed DVG: N/A</p>
<p>Billed Metered Authorized Consumption (BMAC)</p>	<p>Customer Meters & Reads Profile:</p> <ul style="list-style-type: none"> - Age profile: <i>Approximately 10 yrs old (All replaced with AMI at once)</i> - - Reading system: <i>AMI</i> - - Read frequency: <i>Continuous</i> <p>Comments:</p> <p><i>AMI system so lag-time correction not applicable. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.</i></p> <p>Confirmed input value: 1,966.36 AF/Yr</p>	<p>Percent of customers metered: <i>100%</i></p> <p>Small meter testing policy: <i>Complaint driven and when high consumption is indicated</i></p> <p>Number of small meters testing/year: <i>8 per month approximately</i></p> <p>Large meter testing policy: <i>None yet.</i></p> <p>Number of large meter tested/year: <i>Meters tested as needed</i></p> <p>Meter replacement policy: <i>Leak driven</i></p> <p>Number of replacements/year: <i>Approx. 100 per year</i></p> <p>Billing data auditing practice: <i>Standard billing QC, plus review of volumes by use type each billing cycle. Financial auditor performs sampling review on select accounts each year.</i></p> <p>Comments: <i>DVG of 4+ if >75% of customers are billed for volume.</i></p> <p>Confirmed DVG: 5</p>

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Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>Billed Unmetered Authorized Consumption (BUAC)</p>	<p>Billed Unmetered Profile:</p> <p>Input Derivation:</p> <p>Comments: <i>No flat rate customers exist.</i></p> <p>Confirmed input value: N/A</p>	<p>Policy for metering exemptions:</p> <p>Comments:</p> <p>Confirmed DVG: N/A</p>
<p>Unbilled Metered Authorized Consumption (UMAC)</p>	<p>Unbilled Metered Profile: <i>Metered use by Bureau at Shasta Dam</i></p> <p>Input Derivation: <i>Direct for meter readings.</i></p> <p>Comments: <i>Input derivation from supporting documents confirmed.</i></p> <p>Confirmed input value: 96.47 AF/Yr</p>	<p>Policy for billing exemptions: <i>Per lease agreement with Bureau, the application is 92.3 AF/Year provided in-kind in exchange for lease of property upon which the Utility has its facilities. Bureau water year is March through February.</i></p> <p>Comments: <i>Meter read monthly and written policy place.</i></p> <p>Confirmed DVG: 10</p>
<p>Unbilled Unmetered Authorized Consumption (UUAC)</p>	<p>Unbilled Unmetered Profile: <i>Operational flushing and fire department usage.</i></p> <p>Input Derivation if Estimated:</p> <p>Comments: <i>Custom California default of 0.25%xWS utilized.</i></p> <p>Confirmed input value: 5.09 AF/Yr</p>	<p>Default or Adjusted Default Applied: <i>Default grade applied.</i></p> <p>Completeness of Documentation:</p> <p>Comments:</p> <p>Confirmed DVG: 5</p>

Level 1 Validation Summary Notes Template

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>Unauthorized Consumption (UC)</p>	<p>Default Applied? <i>Default value applied</i></p> <p>Input Derivation if Customized:</p> <p>Comments:</p> <p>Confirmed input value: 5.466 AF/Yr</p>	<p>Instances and extent of UC documented:</p> <p>Comments: <i>Default Value Applied</i></p> <p>Confirmed DVG: N/A</p>
<p>Customer Metering Inaccuracies (CMI)</p>	<p>Input Derivation: <i>Rudimentary estimate.</i></p> <p>Comments: <i>See BMAC Comments regarding meter testing & replacement activities. An estimate of metering uncertainty has been input based on age of meters.</i></p> <p>Confirmed input value: 20.837 AF/Yr</p>	<p>Characterization of meter testing: <i>Complaint driven and when high consumption is indicated</i></p> <p>Characterization of meter replacement: <i>Limited (upon failure only).</i></p> <p>Comments: <i>DVG >2 if there's reliable record keeping and an established meter testing/replacement program</i></p> <p>Confirmed DVG: 2</p>
<p>Systematic Data Handling Errors (SDHE)</p>	<p>Input Derivation:</p> <p>Comments: <i>Default input applied</i></p> <p>Confirmed input value: 4.657 AF/Yr</p>	<p>If custom estimate provided --</p> <p>Characterization of read collection & billing process:</p> <p>Characterization of billing process and billing data auditing:</p> <p>Confirmed DVG: N/A</p>

Level 1 Validation Summary Notes Template

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>Length of Mains</p>	<p>Input Derivation: <i>Totaled from masterplan (prepared by an outside consultant).</i></p> <p>Hydrant lateral length included:</p> <p>Comments: <i>Policies and procedures exist for permitting new mains; GIS and Asset management system is used to store data; length of mains provided by Carollo Engineers who completed the 2016-20206 Water Master Plan (available online)</i></p> <p>Confirmed input value: 79.4 miles</p>	<p>Mapping format: <i>Digital/GIS</i></p> <p>Asset management database: <i>Standard accounting database utilized</i></p> <p>Map updates & field validation: <i>Accomplished through normal work order processes.</i></p> <p>Comments: <i>random field checks of limited number of locations as appropriate</i></p> <p>Confirmed DVG: 8</p>
<p>Number of Active and Inactive Service Connections</p>	<p>Input Derivation: <i>Customer Class counts documentation provided</i></p> <p>Basis for database query: <i>Meter History report generated through query of billing software to see all active and inactive services connections</i></p> <p>Comments:</p> <p>Confirmed input value: 3,752</p>	<p>CIS updates & field validation: <i>Every update is field validated</i></p> <p>Estimated error of total count within: <i>within 2%</i></p> <p>Comments:</p> <p>Confirmed DVG: 8</p>
<p>Average Length of Customer Service Line</p>	<p>Are customer meters at the curbstop? <i>Yes</i></p> <p>Where are customer meters installed if not at curbstop?</p> <p>Customer service line derivation</p> <p>Comments:</p> <p>Confirmed input value: 47 connections/mile</p>	<p>Comments: <i>Default input and grade applied, as customer meters are typically located at the property boundary given California climate.</i></p> <p>Confirmed DVG: 10</p>

Level 1 Validation Summary Notes Template

Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>Average Operating Pressure</p>	<p>Number of zones, general setup: <i>9 zones</i></p> <p>Typical pressure range: <i>45-110 PSI</i></p> <p>Input derivation: <i>Average operating pressure calculated by consultant (Carollo Engineers) and entered into 2016-2026 Water Master Plan</i></p> <p>Comments:</p> <p>Confirmed input value: <i>83 psi</i></p>	<p>Extent of static pressure data collection: <i>Hydrant pressures taken during routine system flushing and/or hydrant testing.</i></p> <p>Characterization of real-time pressure data collection: <i>Basic - telemetry or pressure logging at boundary points (supply locations, tanks, PRVs, boosters).</i></p> <p>Hydraulic model in place? Calibrated?: <i>In place and calibration results are discussed in the 2016-2026 Water Master Plan</i></p> <p>Comments:</p> <p>Confirmed DVG: <i>4</i></p>
<p>Total Operating Cost (TOC)</p>	<p>Input Derivation: <i>From internal budgeting reports</i></p> <p>Comments: <i>Costs limited to water only and water debt service included</i></p> <p>Confirmed input value: <i>\$2,949,172</i></p>	<p>Frequency of internal auditing: <i>Continuous</i></p> <p>Frequency of third-party CPA auditing: <i>Annual</i></p> <p>Comments:</p> <p>Confirmed DVG: <i>10</i></p>
<p>Customer Retail Unit Cost (CRUC)</p>	<p>Input Derivation: <i>Total consumptive revenue divided by Billed Metered Authorized Consumption.</i></p> <p>Sewer Charges Volumetric? <i>N/A</i></p> <p>Sewer Charges Included? <i>No</i></p> <p>Comments:</p> <p>Confirmed input value: <i>\$2.49 per CCF</i></p>	<p>Characterization of calculation: <i>In 2014 3rd party comprehensive rate study conducted. Included a 5 year graduated rate structure. Input calculations have not been reviewed by a M36 water loss expert.</i></p> <p>Comments:</p> <p>Confirmed DVG: <i>9</i></p>

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Audit Input	Confirmation of Input Derivation	Confirmation of DVG Assignment
<p>Variable Production Cost (VPC)</p>	<p>Supply profile: <i>Own Sources Only</i></p> <p>Direct variable costs included: <i>Treatment chemicals and raw water and distribution power</i></p> <p>Secondary costs included: <i>None</i></p> <p>Comments:</p> <p>Confirmed input value: \$104.64 per AF</p>	<p>Characterization of calculation: <i>Primary costs - includes water purchase, chemicals, and energy. Input calculations have not been reviewed by an M36 water loss expert.</i></p> <p>Comments:</p> <p>Confirmed DVG: 5</p>
<p>Pending Items needed to complete the validation</p>		

Certified Validation Report - Part B: Provided by Utility

Water Supplier Name: Shasta Lake, City of

Water Supplier ID Number: CA4510006

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:

- Audit results indicate that customer metering inaccuracies may be an opportunity for validity score improvement
- To the extent that it is economically feasible, customer metering program improvements such as the implementation of a formal meter testing and replacement program or improved meter information and record keeping would improve validation score.

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

JOHN N. DUCKETT, JR.

CITY MANAGER



9/4/2019