

**Audit Information:**

Utility: City of San Luis Obispo Utilities

PWS ID: CA4010009

System Type: Potable

Audit Period: Calendar 2019

Utility Representation: Mychal Boerman (Deputy Director, Water); Jason Meeks (Production); Marcus Henderson (Distribution); Miguel Barcenas (Engineer)

Validation Date:

Call Time:

Sufficient Supporting Documents Provided: Yes

**Validation Findings & Confirmation Statement:**

Key Audit Metrics:

Data Validity Score: 53

Data Validity Band (Level): III

ILI: 0.93

Real Loss: 13.54 Gallons/Connection/Day

Apparent Loss: 6.25 Gallons/Connection/Day

Non-revenue water as percent of cost of operating system: 2.2%

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.

**Validator Information:**

Water Audit Validator: Bryan Chen

Validator Qualifications: AWWA California Water Audit Validator

**Water Supplier Name:** City of San Luis Obispo Utilities **Water Supplier ID Number:** CA4010009

**Water Audit Period:** Calendar 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:

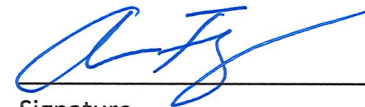
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- SCADA system was installed for all of the water distribution system
  - Increased meter replacement frequency
  - Began accuracy and calibration of large water meters
  - Began recording Water Treatment Plant effluent meter readings
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**Certification 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.

Aaron Floyd

Utilities Director



09/24/2020

Executive Name (Print)

Executive Position

Signature

Date

Validator Provided

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Validation Date:

Call Time:

Sufficient Supporting Documents Provided:

**Validation Findings & Confirmation Statement:**

**Key Audit Metrics:**

Data Validity Score: 53

Data Validity Band (Level): III

ILI: 0.93

Real Loss: 13.54 Gallons/Connection/Day    Apparent Loss: 6.28 Gallons/Connection/Day

Non-revenue water as percent of cost of operating system: 2.2%

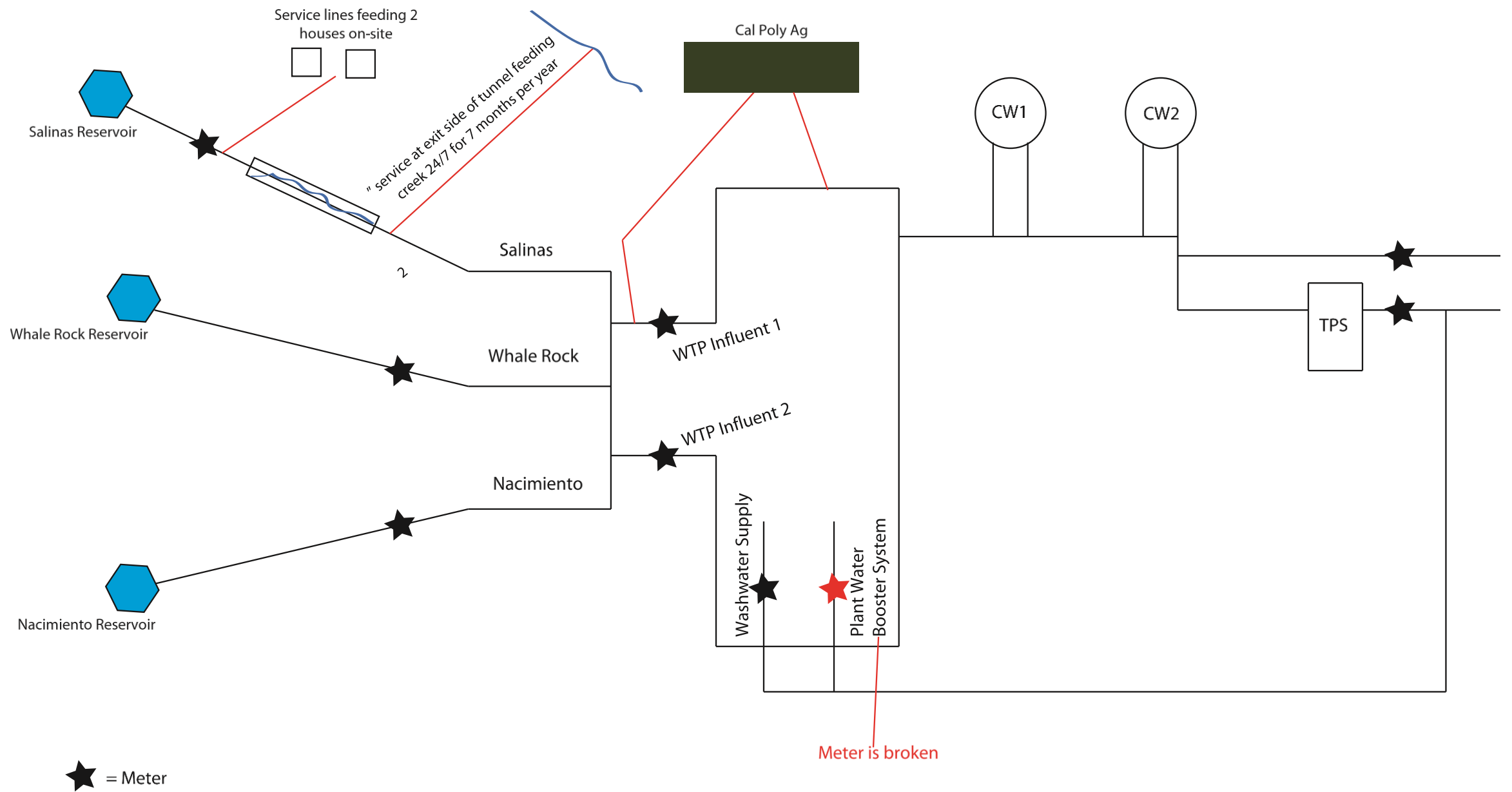
**Certification Statement by Validator:**

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.

**Validator Information:**

Water Audit Validator: Bryan Chen

Validator Qualifications: AWWA California Water Audit Validator



#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	3	<p><b>Supply meter profile:</b> Whale Rock, Salinas, Nacimiento Reservoirs, groundwater per supporting documents. Influent and production meters are used, limited effluent meters. Not regularly calibrated or tested.</p> <p><b>VOS input derived from:</b> SCADA reads from production meters.</p> <p><b>Comments:</b> Data taken from supporting documents. Potable water only</p>	<p><b>Percent of own supply metered:</b> 99+%</p> <p><b>Signal calibration frequency:</b> No data</p> <p><b>Volumetric testing frequency:</b> None</p> <p><b>Volumetric testing method:</b> N/A</p> <p><b>Percent of own supply volumetrically tested:</b> N/A</p> <p><b>Comments:</b> DVG 3 assigned due to lack of testing and calibration.</p>
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	<p><b>Input derivation:</b> No data, left blank</p> <p><b>Net storage change included in MMSEA input:</b> No</p> <p><b>Comments:</b> Production meter data is logged electronically (SCADA) with monthly adjustment</p>	<p><b>Supply meter read frequency:</b></p> <p><b>Supply meter read method:</b></p> <p><b>Frequency of data review for trends &amp; anomalies:</b></p> <p><b>Storage levels monitoring frequency:</b></p> <p><b>Comments:</b> Estimate of daily changes in storage required for DVG 4</p>
3	Water Imported	WI	n/a	<b>Comments:</b> No connections for imported water	
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	n/a		
5	Water Exported	WE	3	<p><b>Export meter profile:</b> 8 Meters to Cal Poly, no testing or calibration info</p> <p><b>Comments:</b> Data taken from supporting documents. Potable only. Not included in BMAC</p>	<p><b>Percent of export supply metered:</b> 100</p> <p><b>Signal calibration frequency:</b> None</p> <p><b>Volumetric testing frequency:</b> None</p> <p><b>Volumetric testing method:</b> N/A</p> <p><b>Percent of export supply volumetrically tested:</b> N/A</p> <p><b>Comments:</b> Testing or maintenance required for DVG 4</p>

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	1	<p>Input derivation: No test data</p> <p>Comments:</p>	<p>Export meter read frequency: Monthly</p> <p>Export meter read method: Manual</p> <p>Frequency of data review for trends &amp; anomalies: Monthly</p> <p>Comments: Written meter testing agreement required for DVG 2</p>
7	Billed metered	BMAC	5	<p>Customer meter profile:</p> <ul style="list-style-type: none"> <li>Age profile: ~20 Years</li> <li>Reading system: Manual</li> <li>Read frequency: Monthly</li> </ul> <p>Comments: Data taken from supplemental documents. Potable only. Month column on consumption spreadsheet corresponds with meter read date; read reflects usage for month prior. No lag time correction. Current CIP in progress to replace meters. Billing data on Springbrook.</p>	<p>Percent of customers metered: 100%</p> <p>Small meter testing policy: Upon customer request.</p> <p>Number of small meters tested/year: 0.</p> <p>Replaced upon failure.</p> <p>Large meter testing policy: None.</p> <p>Number of large meters tested/year: 0</p> <p>Replaced upon failure.</p> <p>Meter replacement policy: Replaced upon failure and customer request. CIP started 2018, in progress.</p> <p>Number of replacements/year:</p> <p>Billing data auditing: Standard QC by billing division. Volumes are reviewed by account type/class. Financial auditor performs sampling review on select accounts each year.</p> <p>Comments:</p>
8	Billed unmetered	BUAC	n/a		
9	Unbilled metered	UMAC	10	<p>Profile: Serrano Trough, Reservoir Canyon 1, Miozzi Trough, Mission Prep, WRRF Make-up water.</p> <p>Input derivation: Monthly meter reading.</p> <p>Comments: Data taken from supporting documents. Clear consumption data provided.</p>	<p>Policy for billing exemptions: Legacy accounts. Policy is to not add any new accounts to this category; accounts existed prior to developing the policy.</p> <p>Comments:</p>

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
10	Unbilled unmetered	UUAC	7	<p><b>Profile:</b> Fire department usage, operational flushing.</p> <p><b>Comments:</b> Estimated for wastewater collection system flushing and cleaning (number of truck loads), hydrant flushing (flow rate) and firefighting (number of fires).</p>	<p><b>Comments:</b> Policy is restricted to Utilities and Fire Department usage. Volumes inferred based on time in field.</p>
11	Unauthorized consumption	UC	5	<p><b>Comments:</b> Default input (0.25%) applied</p>	<p><b>Comments:</b> Default grade applied</p>
12	Customer metering inaccuracies	CMI	4	<p><b>Input derivation:</b> Estimated based on consultant recommendation.</p> <p><b>Comments:</b></p>	<p><b>Characterization of meter testing:</b> Upon request and consumption flag.</p> <p><b>Characterization of meter replacement:</b> Upon failure. CIP for meter replacement started 2018, in progress.</p> <p><b>Comments:</b> No routine meter testing.</p>
13	Systematic data handling errors	SDHE	5	<p><b>Comments:</b> Default input (.25%) applied</p>	<p><b>Comments:</b> Default grade applied</p>
14	Length of mains	Lm	8	<p><b>Input derivation:</b> GIS based</p> <p><b>Hydrant leads included:</b> Yes</p> <p><b>Comments:</b></p>	<p><b>Mapping format:</b> Digital</p> <p><b>Asset management database:</b> In place and integrated with GIS</p> <p><b>Map updates &amp; field validation:</b> Routine through work orders</p> <p><b>Comments:</b> Until active, random asset verification is practiced, DVG will remain &lt;10.</p>
15	Number of service connections	Ns	8	<p><b>Input derivation:</b> Meter installations correspond with billing operations. All data exists in computerized information systems. Monthly meter reading results in continuous data updates.</p> <p><b>Basis for database query:</b> All assets exist in GIS and Springbrook billing data.</p> <p><b>Comments:</b></p>	<p><b>GIS updates &amp; field validation:</b> Manual meter reading conducted monthly; meter information (serial number, physical location, address) updated with billing information</p> <p><b>Estimated error of total count within:</b> &lt;2%</p> <p><b>Comments:</b></p>
16	Ave length of cust. service line	Lp	10	<p><b>Comments:</b> Default input and grade applied, as customer meters are typically located at the property boundary.</p>	

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
17	Average operating pressure	AOP	7	<p>Number of zones, general profile: 16 pressure zones. The average pressure is 70 psi under peak hour demand (PHD), and 78 psi under average day demand (ADD).</p> <p>Typical pressure range: 30-130 psi</p> <p>Input derivation: Information gathered by engineer from hydraulic model.</p> <p>Comments:</p>	<p>Extent of static pressure data collection: Hydrant pressures taken during routine system flushing and/or hydrant testing.</p> <p>Characterization of real-time pressure data collection: None</p> <p>Hydraulic model: In place and calibrated within the last 5 years.</p> <p>Comments: SCADA system for all PRV's, plants, tanks.</p>
18	Total annual operating cost	TAOC	10	<p>Input derivation: Financial report</p> <p>Comments: Water only, water debt included</p>	<p>Frequency of internal auditing: Annual</p> <p>Frequency of third-party CPA auditing: Annual</p> <p>Comments:</p>
19	Customer retail unit cost	CRUC	8	<p>Input derivation: Total consumption revenue divided by Billed Metered Authorized Consumption. Sewer charges are based on water usage and not included in calculation.</p> <p>Comments:</p>	<p>Characterization of calculation: Weighted average composite of all rates. Calculations have not been reviewed by an M36 water loss expert.</p> <p>Comments:</p>
20	Variable production cost	VPC	4	<p>Supply profile: Own sources</p> <p>Primary costs included: Electrical, chemical</p> <p>Secondary costs included: Not included</p> <p>Comments:</p>	<p>Characterization of calculation: Primary costs only. Calculations have not been reviewed by an M36 water loss expert.</p> <p>Comments:</p>

### Key Audit Metrics

(~) VALIDITY  
 (#) VOLUME  
 (\$) VALUE

Data Validity Score: 53  
 ILI: 0.93      Real Loss: 13.54 gal/conn./day  
 Annual Cost of Real Losses: \$62,342

Data Validity Band (Level): III  
 Apparent Loss: 6.28 gal/conn./day  
 Annual Cost of Apparent Losses: \$357,213