

Appendix D – AWWA Water Loss Audits



	AWWA Free Wate <u>Reporting</u>	r Audit Software: <u>Worksheet</u>	WAS vē American Water Works At Copyright © 2014, All Rights	5.0 .ssociation. Reserved.		
Click to access definition Water Audit + Click to add a comment Report	Report for: City of Roseville (311 orting Year: 2019 1/20	0008) 19 - 12/2019				
Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades						
To select the correct data grading for e utility meets or exceed	ach input, determine the highest gra s <u>all</u> criteria for that grade and all gra	de where the ades below it.	Master Meter and Supply Error Adjustments			
WATER SUPPLIED	<	Enter grading in column 'E' and 'J'	> Pcnt: Value:			
Volume from o Wat	wn sources: + ? 7 er imported: + ? 5	28,372.970 acre-ft/yr + 1,264.500 acre-ft/yr +	? 7 3.744 ac ? 2 ac	cre-ft/yr cre-ft/yr		
Wat	er exported: + ? 3	1,336.300 acre-ft/yr +	? 1 Image: Constraint of the second	cre-ft/yr on		
WATER	SUPPLIED:	28,297.426 acre-ft/yr	Enter positive % or value for over-registration	I		
AUTHORIZED CONSUMPTION Bill	ed metered: + ? 6	26.276.770 acre-ft/vr	Click here: ? for help using option			
Billed	unmetered: + ? 10	132.020 acre-ft/yr	buttons below Pont: Value:			
Unbilled	unmetered: + ? 8	23.320 acre-ft/yr	23.320 ac	cre-ft/yr		
	SUMPTION: ?	26.432.190 acre-ft/vr	Use buttons to select			
			<u>OR</u> value			
WATER LOSSES (Water Supplied - Authorized Consump	tion)	1,865.236 acre-ft/yr				
Apparent Losses Unauthorized c	onsumption: + ?	70.744 acre-ft/vr	Pcnt:	cre-ft/vr		
Default option selected for unaut	norized consumption - a grading o	f 5 is applied but not displayed				
Customer metering ir Systematic data han	accuracies: + ? 4 dling errors: + ? 5	265.423 acre-ft/yr 65.692 acre-ft/yr	1.00% O ac 0.25% O ac	cre-ft/yr cre-ft/yr		
Default option selected for Sys	tematic data handling errors - a g	rading of 5 is applied but not disp	ayed			
Appare	ent Losses: ?	401.858 acre-ft/yr				
Real Losses (Current Annual Real Losses or CARL)		4 400 070				
WATE	R LOSSES:	1,865.236 acre-ft/yr				
NON-REVENUE WATER						
NON-REVENI = Water Losses + Unbilled Metered + Unbilled Unmetered	JE WATER: ?	1,888.636 acre-ft/yr				
SYSTEM DATA						
Leng Number of <u>active AND inactive</u> service o	th of mains: + ? 9 connections: + ? 9	633.4 miles 45,395				
Service connec	tion density: ?	72 conn./mile main				
Are customer meters typically located at the curbstop or pi <u>Average</u> length of customer	operty line?	Yes (length of serv that is the resp	ce line, <u>bevond</u> the property boundary, onsibility of the utility)			
Average length of customer service line Average operatin	e has been set to zero and a data g	grading score of 10 has been appli	ed			
COST DATA						
Total annual cost of operating wa Customer retail unit cost (applied to Appar	ater system: + ? 10 ent Losses): + ? 9	\$14,408,821 \$/Year \$1.30 \$/100 cubic feet (ccf)				
Variable production cost (applied to R	eal Losses): + ? 5	\$208.00 \$/acre-ft	Use Customer Retail Unit Cost to value real losses			
WATER AUDIT DATA VALIDITY SCORE:						
*** YOUR SCORE IS: 70 out of 100 ***						
A weighted scale for the compon	ents of consumption and water loss is in	cluded in the calculation of the Water Auc	it Data Validity Score			
Based on the information provided audit accuracy can be improved	by addressing the following component	5:				
1: Volume from own sources						
2: Customer metering inaccuracies						
3: Billed metered						

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 Click to access definition Click to add a comment 	Water Audit Report for: Reporting Year:	City of Rosev 2018	ille (3110008) 1/2018 - 12/2018				
Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades							
To select the other the ut	orrect data grading for each input lity meets or exceeds all criteria fo	, determine the or that grade ar	highest grade where ad all grades below it.		Master Meter	and Supply Error Adjustm	ents
WATER SUPPLIED		<- + 2 7	Enter grading	in column 'E' and 'J'	> Pcnt:	Value:	coro ft/ur
	Water exported:	+ ? 5	1,106.030 1,123.700	acre-ft/yr + acre-ft/yr +	? 1 ? 1		acre-ft/yr acre-ft/yr
	WATER SUPPLIED:		28,292.820	acre-ft/yr	Enter negativ Enter positive	e % or value for under-regi e % or value for over-regist	stration
AUTHORIZED CONSUMPTION	Dille Location d		00.007.000			Click here: ?	
	Billed metered: Billed unmetered: Unbilled metered:	+ ? 5 + ? 10 + ? 8	26,007.220 74.700 47.560	acre-ft/yr acre-ft/yr	Pont [.]	for help using option buttons below Value:	
	Unbilled unmetered:	+ ? 8	22.394	acre-ft/yr		22.394	acre-ft/yr
	AUTHORIZED CONSUMPTION:	?	26,151.874	acre-ft/yr		Use buttons to select percentage of water sup	t plied
WATER LOSSES (Water Supplied - ,	Authorized Consumption)		2,140.946	acre-ft/yr		value	
Apparent Losses	Unauthorized consumption:	+ ?	70.732	acre-ft/yr	Pcnt: 0.25%	value: ● ● ○	acre-ft/yr
Default option	selected for unauthorized cons Customer metering inaccuracies:	sumption - a g	rading of 5 is applied 263.180	but not displayed acre-ft/yr	1.00%		acre-ft/yr
Default op	Systematic data handling errors: ion selected for Systematic data	+ ? 5 a handling err	65.018 ors - a grading of 5 is	acre-ft/yr applied but not displa	0.25%	I O C	acre-ft/yr
	Apparent Losses:	?	398.930	acre-ft/yr			
<u>Real Losses (Current Annual Real L</u> Real Losses = W	<u>osses or CARL)</u> ater Losses - Apparent Losses:	?	1,742.016	acre-ft/yr			
	WATER LOSSES:		2,140.946	acre-ft/yr			
NON-REVENUE WATER	NON-REVENUE WATER:	?	2,210.900	acre-ft/yr			
SYSTEM DATA	illed Unmetered						
Number of <u>active /</u>	Length of mains: <u>ND inactive</u> service connections: Service connection density:	+ ? 9 + ? 9 ?	627.5 44,467 71	miles conn./mile main			
Are customer meters typically locate	d at the curbstop or property line?	• 2	Yes	(length of servic	e line, <u>beyond</u> the pr	roperty	
Average length of c	ustomer service line has been s Average operating pressure:	et to zero and + ? 6	a data grading score 82.1	e of 10 has been applied	d	r the utility)	
COST DATA							_
Total annu Customer retail unit c Variable product	al cost of operating water system: ost (applied to Apparent Losses): on cost (applied to Real Losses):	+ ? 10 + ? 9 + ? 5	\$14,859,449 \$1.17 \$179.67	\$/Year \$/100 cubic feet (ccf) \$/acre-ft Us	e Customer Retail Unit	t Cost to value real losses	
WATER AUDIT DATA VALIDITY SCOR	<u>E:</u>						_
	*:	* YOUR SCOF	RE IS: 68 out of 100 **	*			
A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score							
Based on the information provided, audit	accuracy can be improved by address	sing the following	g components:				
1: Volume from own sources							
3: Billed metered							

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Click to access definition Water Audit Report for: Click to add a comment Reporting Year:	City of Roseville (3110008) 2017 1/2017 - 12/2017					
Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades						
All	volumes to be entered as: ACRE-FEET PER YEAR					
To select the correct data grading for each input, the utility meets or exceeds <u>all</u> criteria fo	that grade and all grades below it.	Master Meter and Supply Error Adjustments				
WATER SUPPLIED	<pre>< Enter grading in column 'E' and 'J'</pre>	> Pcnt: Value:				
Volume from own sources: Water imported:	+ ? 7 28,449.624 acre-ft/yr + ?	2 8 <u> </u>				
Water exported:	+ ? 3 1,207.900 acre-ft/yr + ?	1 Image: Constraint of the second				
WATER SUPPLIED	28 349 734 acre-ft/vr	Enter negative % or value for under-registration				
AUTHORIZED CONSUMPTION Billed metered:	+ ? 5 25,483.030 acre-ft/yr	Click here: for help using option				
Billed unmetered:	+ ? 10 159.840 acre-ft/yr	buttons below				
Unbilled metered: Unbilled unmetered:	+ ? 8 23.920 acre-ft/yr	Pcnt: Value:				
AUTHORIZED CONSUMPTION:	? 25,666.790 acre-ft/yr	Use buttons to select percentage of water supplied OR				
WATER LOSSES (Mater Sumplied Authorized Consumption)	2 692 044	value				
Apparent Lesses (water Supplied - Authorized Consumption)	2,682.944 acre-tt/yr	Popt: T Value:				
Unauthorized consumption:	+ ? 70.874 acre-ft/yr	0.25% O acre-ft/yr				
Default option selected for unauthorized cons	Imption - a grading of 5 is applied but not displayed	,				
Customer metering inaccuracies:	+ ? 3 257.404 acre-ft/yr	1.00% O acre-ft/yr				
Systematic data handling errors: Default option selected for Systematic data	+ ? 5 63.708 acre-ft/yr	0.25% (C acre-ft/yr				
Apparent Losses:	? 391.986 acre-ft/yr	54				
Real Losses (Current Annual Real Losses or CARL)						
Real Losses = Water Losses - Apparent Losses:	2,290.957 acre-tt/yr					
WATER LOSSES:	2,682.944 acre-ft/yr					
NON-REVENUE WATER NON-REVENUE WATER: = Water Losses + Linbilled Metered + Linbilled Linmetered	? 2,706.864 acre-ft/yr					
SYSTEM DATA						
Length of mains:	+ ? 9 615.0 miles					
Number of <u>active AND inactive</u> service connections: Service connection density:	+ ? 9 43,618					
Are customer meters typically located at the curbstop or property line?	Yes (length of service	line, <u>beyond</u> the property				
Average length of customer service line has been se	t to zero and a data grading score of 10 has been applied	The responsibility of the utility)				
Average operating pressure:	+ ? 5 83.6 psi					
	+ 2 40 \$14.025.646 \$24					
Customer retail unit cost of operating water system:	+ ? 9 \$14,825,046 \$/Year					
Variable production cost (applied to Real Losses):	+ ? 5 \$112.40 \$/acre-ft Use	Customer Retail Unit Cost to value real losses				
WATER AUDIT DATA VALIDITY SCORE:						
**	YOUR SCORE IS: 67 out of 100 ***					
A weighted scale for the components of consum	tion and water loss is included in the calculation of the Water Audit [Data Validity Score				
PRIORITY AREAS FOR ATTENTION:						
Based on the information provided, audit accuracy can be improved by address	ng the following components:					
1: Volume from own sources						
2: Customer metering inaccuracies						
3: Billed metered						

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 Click to access definition Click to add a comment 	Water Audit Report for: Reporting Year:	City of Rosevi 2016	ille 1/2016 - 12/2016				
Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades							
	All	volumes to b	e entered as: ACRE-F	FEET PER YEAR			-
l o select ti	the correct data grading for each input, ne utility meets or exceeds <u>all</u> criteria fo	determine the r that grade an	highest grade where ad all grades below it.		Master Meter and	d Supply Error Adjustmen	ts
WATER SUPPLIED		<	Enter grading	in column 'E' and 'J'	> Pcnt:	Value:	_
	Volume from own sources: Water imported:	+ ? 7	25,813.000	acre-ft/yr +	? 3		acre-ft/yr
	Water exported:	+ ? 3	911.700	acre-ft/yr +	? 1		acre-ft/yr
			05 040 550	<i></i>	Enter negative %	or value for under-regist	ration
	WATER SUPPLIED:		25,816.550	acre-tt/yr	Enter positive %	or value for over-registra	
AUTHORIZED CONSUMPTION	Billed metered:	+ 2 5	22 956 000	acre_ft/vr		Click here: ?	
	Billed unmetered:	+ ? 9	212.000	acre-ft/yr		buttons below	
	Unbilled metered:	+ ? 8	296.200	acre-ft/yr	Pcnt:	Value:	
	Undilied unmetered:	+ - 1	21.880	acre-π/yr			_acre-π/yr
	AUTHORIZED CONSUMPTION:	?	23,486.080	acre-ft/yr		Use buttons to select percentage of water supplied	
WATER LOSSES (Water Suppl	ied - Authorized Consumption)		2.330.470	acre-ft/vr		OR value	
Apparent Losses	···· · ·······························	L	_,		Pcnt:	✓ Value:	
	Unauthorized consumption:	+ ?	64.541	acre-ft/yr	0.25%		acre-ft/yr
Default o	ption selected for unauthorized cons	umption - a g	rading of 5 is applied	l but not displayed			-
	Customer metering inaccuracies:	+ ? 3	234.871	acre-ft/yr	1.00%		acre-ft/yr
Defau	It option selected for Systematic data	a handling err	ors - a grading of 5 is	s applied but not display	ved		acie-it/yi
	Apparent Losses:	?	356.802	acre-ft/yr	•		
Real Losses (Current Annual Real Losses	Real Losses or CARL)	2	1 973 668	acre_ft/vr			
	WATER LOSSES:		2 330 470	acre_ft/vr			
	WATER ECOCED.		2,000.410	acie-in yi			-
NON-REVENUE WATER	NON-REVENUE WATER:	?	2,648.550	acre-ft/yr			
= Water Losses + Unbilled Metered	+ Unbilled Unmetered						-
SYSTEM DATA			200.0				
Number of ac	Length of mains: tive AND inactive service connections:	+ ? 10 + ? 8	600.0 42,655	miles			
	Service connection density:	?	71	conn./mile main			
Are customer meters typically lo	ocated at the curbstop or property line?	[Yes	(longth of convice	line boyond the prope	set /	
<u>A</u>	verage length of customer service line:	+ ?		boundary, that is	the responsibility of the	e utility)	
Average lengt	of customer service line has been s Average operating pressure:	et to zero and	a data grading score	e of 10 has been applied	1		
COST DATA							
Total	annual cost of operating water system:	+ ? 10	\$9,313,891	\$/Year			
Customer retail	unit cost (applied to Apparent Losses):	+ ? 8	\$1.54	\$/100 cubic feet (ccf)			
Variable pro	oduction cost (applied to Real Losses):	+ ? 5	\$109.00	\$/acre-tt Use	e Customer Retail Unit Cos	st to value real losses	
							-
WATER AUDIT DATA VALIDITY S							т
	**	* YOUR SCOR	RE IS: 67 out of 100 **	*			
A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score							
PRIORITY AREAS FOR ATTENTI	<u>ON:</u>						
Based on the information provided,	audit accuracy can be improved by address	sing the following	g components:				
1: Volume from own sources							
2: Customer metering inaccura	acies						
3: Billed metered							

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? Click to access definition + Click to add a comment Click to add a comment Reporting Year: 2015 1/2015 - 12/2015					
Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades					
All volumes to be entered as: ACRE-FEETPER YEAR To select the correct data grading for each input, determine the highest grade where					
the utility meets or exceeds <u>all</u> criteria for that grade and all grades below it. Master Meter and Su	pply Error Adjustments				
Volume from own sources: + ? 7 22,991.000 acre-ft/yr + ?	Value:				
Water imported: + ? 9 853.500 acre-ft/yr + ? • <	acre-ft/yr				
	value for under-registration				
WATER SUPPLIED: 23,062.600 acre-tf/yr Enter positive % or v	alue for over-registration				
Billed metered: + ? 7 20,499.000 acre-ft/yr	Click here: for help using option				
Billed unmetered: + ? 9 222.000 acre-ft/yr Unbilled metered: + ? 8 182.000 acre-ft/yr Pcnt:	buttons below Value:				
Unbilled unmetered: + ? 7 32.080 acre-ft/yr	32.080 acre-ft/yr				
AUTHORIZED CONSUMPTION: ? 20,935.080 acre-ft/yr	Use buttons to select percentage of water				
	OR value				
WATER LOSSES (Water Supplied - Authorized Consumption) 2,127.520 acre-ft/yr Apparent Losses Pont:	Value:				
Unauthorized consumption: + ? 57.657 acre-ft/yr 0.25% (acre-ft/yr				
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed					
Customer metering inaccuracies: + 2 5 208.899 acre-ft/yr 1.00% 0.25\% 0.25\% 0.2	acre-ft/yr				
Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed					
Apparent Losses: 317.803 acre-ft/yr					
Real Losses (Current Annual Real Losses or CARL)					
Real Losses = Water Losses - Apparent Losses: ? 1,809.717 acre-ft/yr					
WATER LOSSES: 2,127.520 acre-tryr					
NON-REVENUE WATER: ? 2,341.600 acre-ft/yr					
= Water Losses + Unbilled Metered + Unbilled Unmetered SYSTEM DATA					
Length of mains: + ? 10 583.0 miles					
Number of <u>active AND inactive</u> service connections: + ? 8 41,832 Service connection density: 2 72 conn./mile main					
Are sustance tunically leasted at the surfactor or property line?					
Are customer meters typically located at the curbstop of property line? (length of service line, beyond the property boundary, that is the responsibility of the utilit	y)				
Average operating pressure: + ? 8 78.0 psi					
Customer retail unit cost (applied to Apparent Losses): + ? 8 \$0.72 \$/100 cubic feet (ccf)					
Variable production cost (applied to Real Losses): + ? 8 \$242.69 \$/acre-ft Use Customer Retail Unit Cost to v	alue real losses				
WATER AUDIT DATA VALIDITY SCORE:					
*** YOUR SCORE IS: 72 out of 100 ***					
A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score					
PRIORITY AREAS FOR ATTENTION:					
Based on the information provided, audit accuracy can be improved by addressing the following components:					
1: volume from own sources					
2. Customer metering inaccuracies					