

WATER AUDITS AND WATER LOSS CONTROL: ENTERING YOUR DATA INTO THE SPREADSHEET

Heather Himmelberger, P.E.
Southwest Environmental Finance Center



When you know better you do better

Maya Angelou

**Remember to
type in
questions at any
time as we go
along**



Part 1: A VERY BRIEF REVIEW OF WATER LOSS & AUDITING



When you know better you do better

Maya Angelou

THIS VALUE IS NON-REVENUE WATER



NON-REVENUE WATER INCLUDES:



Water Use for
City, Town, Muni
Purposes

Illegal Water
Use

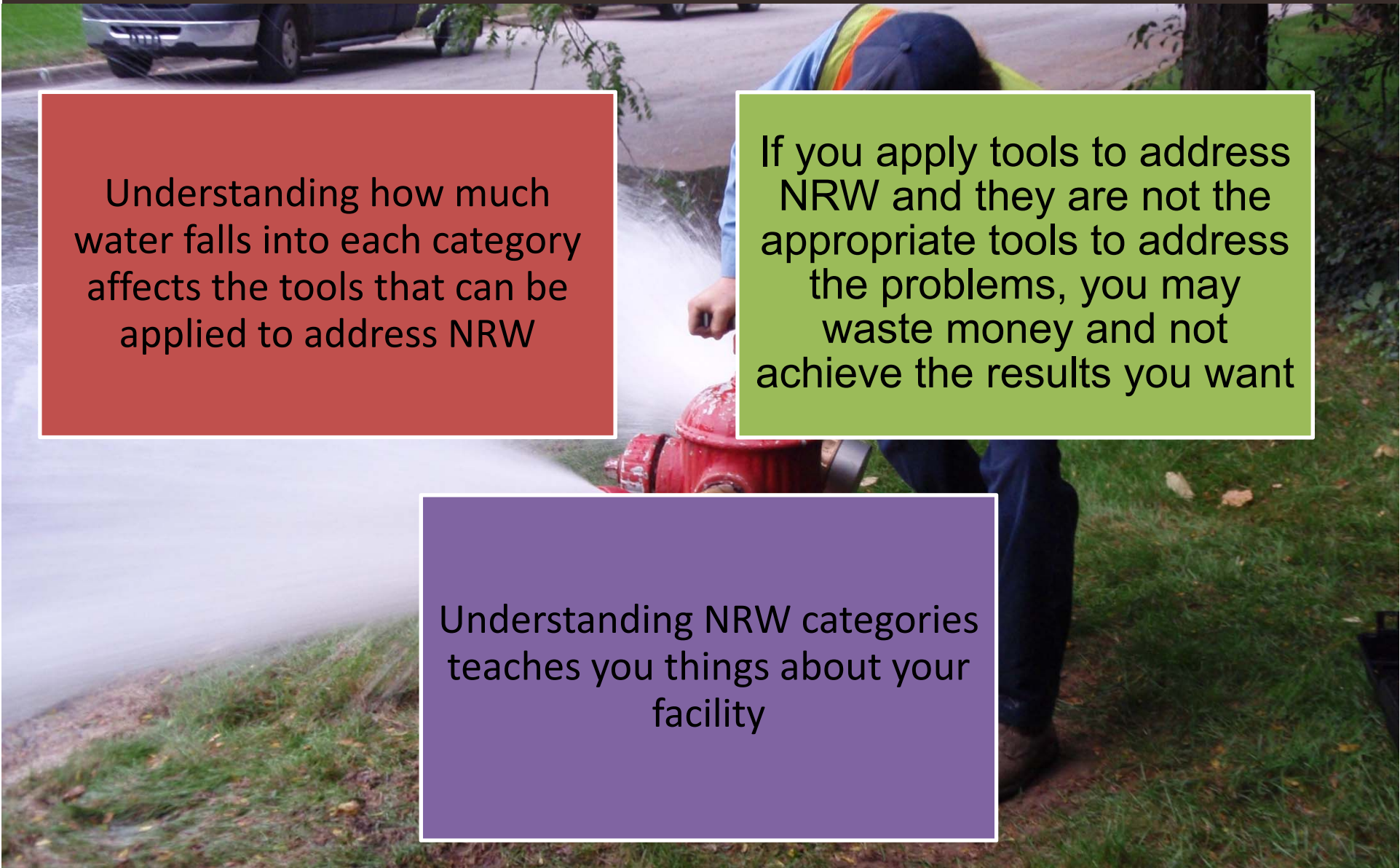
Water Use by
Water Utility for
flushing or other
purposes

Lost Water

Inaccurate
Meters

Poor Data
Handling

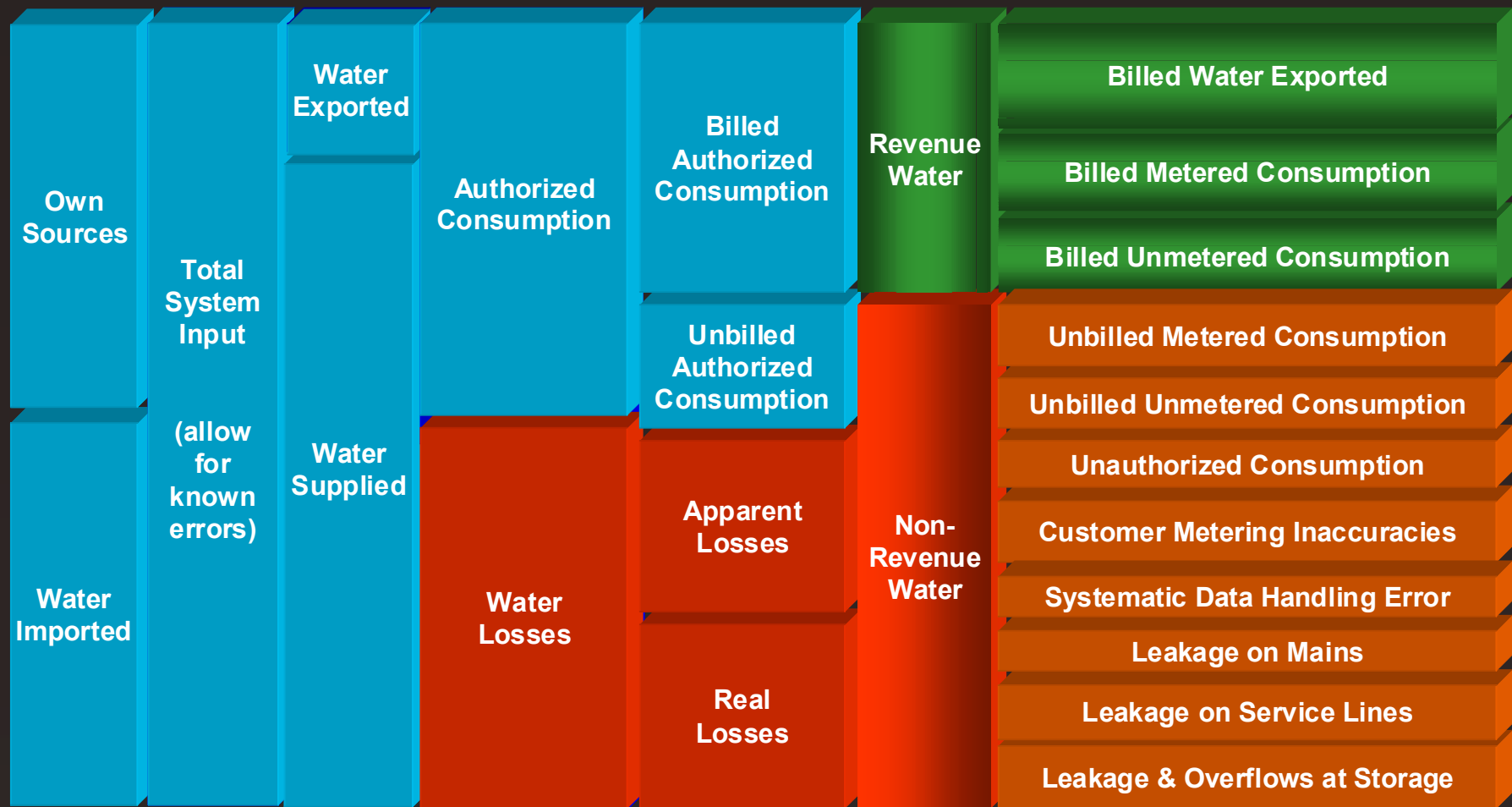
WHY DO WE CARE ABOUT UNDERSTANDING NON-REVENUE WATER



Understanding how much water falls into each category affects the tools that can be applied to address NRW

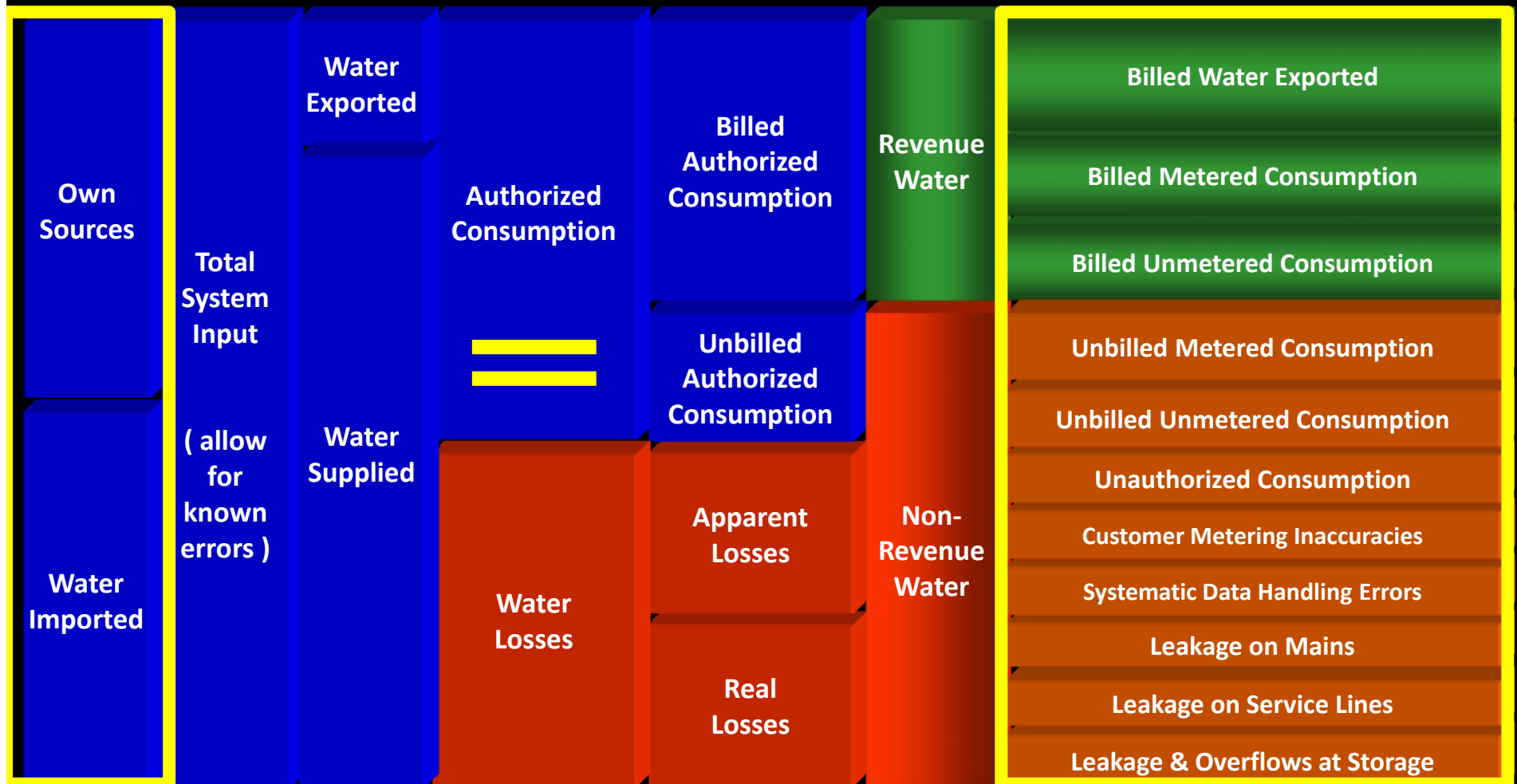
If you apply tools to address NRW and they are not the appropriate tools to address the problems, you may waste money and not achieve the results you want

Understanding NRW categories teaches you things about your facility



**COMPLETING A WATER BALANCE OR
WATER AUDIT WILL HELP DETERMINE
THE CATEGORIES OF YOUR WATER,
INCLUDING NRW**

THEORY: ALL COLUMNS ADD UP TO THE SAME AMOUNT



WHY DOES THIS MATTER?

**WE DETERMINE
REAL LOSSES
THROUGH
SUBTRACTION;
DON'T ACTUALLY
INPUT THIS NUMBER**

Revenue
Water

Non-
Revenue
Water

Losses

Real
Losses

Billed Water Exported

Billed Metered Consumption

Billed Unmetered Consumption

Unbilled Metered Consumption

Unbilled Unmetered Consumption

Unauthorized Consumption

Customer Metering Inaccuracies

Systematic Data Handling Errors

Leakage on Mains

Leakage on Service Lines

Leakage & Overflows at Storage

THE WATER AUDIT SOFTWARE

AWWA Free Water Audit Software: Reporting Worksheet WAS v4.0

Water Audit Report for: **Northern San Leandro Combined Water Sewer Storm Utility District (0007900)**
 Reporting Year: **2013** 1/2013 - 12/2013

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 (via 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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Volume from own sources: 1,000.000 MG/Yr
 Water imported: MG/Yr
 Water exported: 100.000 MG/Yr

WATER SUPPLIED: **825.000** MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: 700.000 MG/Yr
 Billed unmetered: 50.000 MG/Yr
 Unbilled metered: MG/Yr
 Unbilled unmetered: 10.313 MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: **760.313** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) **64.688** MG/Yr

Apparent Losses

Unauthorized consumption: 3.000 MG/Yr

Unauthorized consumption volume entered is greater than the recommended default value

Customer metering inaccuracies: 7.071 MG/Yr
 Systematic data handling errors: 5.000 MG/Yr

Apparent Losses: **15.071** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **49.617** MG/Yr

WATER LOSSES: **64.688** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **75.000** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: 100.0 miles
 Number of active AND inactive service connections: 1,000
 Service connection density: 10 conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: 10 (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 60.0 psi

COST DATA

Total annual cost of operating water system: \$1,000,000 \$/Year
 Customer retail unit cost (applied to Apparent Losses): \$3.50 \$/1000 gallons (US)
 Variable production cost (applied to Real Losses): \$3,000.00 \$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

AWWA Water Audit Software



awwa.org/waterlosscontrol

FREE

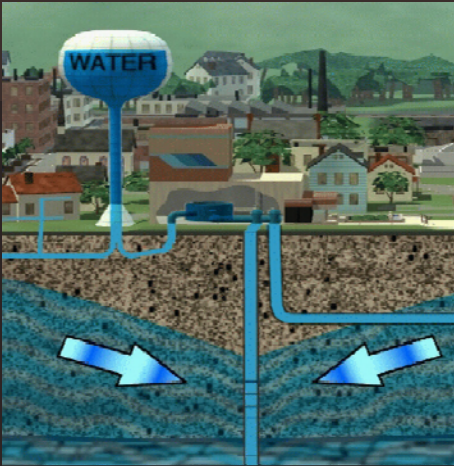
PART 2: REVIEW OF NECESSARY DATA



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DATA FALLS INTO 5 CATEGORIES



Water Supplied



Water Delivered
to Customers



System
Characteristics



Financial
Information



Other
Information

FOCUS OF TODAY'S WEBINAR IS ENTERING INFORMATION INTO THE SOFTWARE NEXT WEBINAR WAS GEARED TOWARDS GATHERING DATA

WATER AUDITS AND WATER LOSS CONTROL: GATHERING YOUR DATA

Heather Himmelberger, P.E.
Southwest Environmental Finance Center



MARCH 1, 2017
(RECORDED)

WATER AUDITS AND WATER LOSS CONTROL: ENTERING YOUR DATA INTO THE SPREADSHEET

Heather Himmelberger, P.E.
Southwest Environmental Finance Center



TODAY

PART 3: ENTERING DATA INTO THE SOFTWARE



When you know better you do better

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THERE IS FREE SOFTWARE FOR A WATER AUDIT...

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= Water Losses + Unbilled Metered + Unbilled Unmetered

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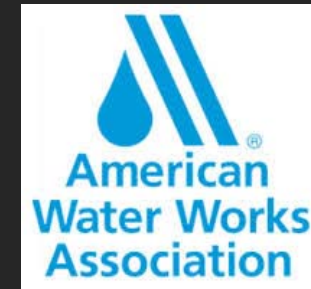
Average length of customer service line: 60.0 psi

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

COST DATA

Total annual cost of operating water system: \$1,000,000 \$/Year
Customer retail unit cost (applied to Apparent Losses): \$3.50 \$/1000 gallons (US)
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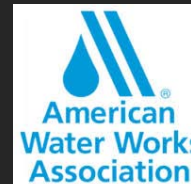
AWWA Water Audit Software



awwa.org/waterlosscontrol

FREE

AWWA Free Water Audit Software



NOT AS BAD AS IT LOOKS. SOME ITEMS WON'T APPLY, OTHERS HAVE DEFAULTS, SO PROBABLY 10 TO 12 OVERALL INPUTS NECESSARY.

YOU CAN LEARN ABOUT YOUR SYSTEM BY DOING THE AUDIT

Defaults provided

~10 Volume Inputs
~7 System Data Inputs

awwa.org/waterlosscontrol

Beginning the Water Audit

AWWA Free Water Audit Software v5.0

American Water Works Association Copyright© 2014, All Rights Reserved.

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

below.

Please begin by providing the following information

Name of Contact Person:

Email Address:

Telephone | Ext.:

Name of City / Utility:

City/Town/Municipality:

State / Province:

Country:

Year:

Start Date: Enter MM/YYYY numeric format

End Date: Enter MM/YYYY numeric format

Audit Preparation Date:

Volume Reporting Units:

PWSID / Other ID:

The following guidance will help you complete the Audit

All audit data are entered on the [Reporting Worksheet](#)

Value can be entered by user

Value calculated based on input data

These cells contain recommended default values

Use of Option (Radio) Buttons:

Pcnt: ☐ 0.25% ☒

Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions

Reporting Worksheet

Performance Indicators

Comments

Water Balance

Dashboard

Grading Matrix

Service Connect

 Choose the Instructions sheet as the starting point

Beginning the Water Audit

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Enter contact information & system information

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Telephone | Ext.:

Name of City / Utility:

City/Town/Municipality:

State / Province:

Country:

Year:

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End Date: Enter MM/YYYY numeric format

Audit Preparation Date:

Volume Reporting Units:

PWSID / Other ID:

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Instructions

Reporting Worksheet

Performance Indicators

Comments

Water Balance

Dashboard

Grading Matrix

Service Connect

Choose calendar year (Jan 1 to Dec 31) or fiscal year. With fiscal year, you choose start and end date

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Please begin by providing the following information

Name of Contact Person:

Email Address:

Telephone | Ext.:

Name of City / Utility:

City/Town/Municipality:

State / Province:

Country:

Year:

Start Date: Enter MM/YYYY numeric format

End Date: Enter MM/YYYY numeric format

Volume Reporting Units:

PWSID / Other ID:

The following guidance will help you complete the Audit

All audit data are entered on the [Reporting Worksheet](#)

<input type="text"/>	Value can be entered by user
<input type="text"/>	Value calculated based on input data
<input type="text"/>	These cells contain recommended default values

Use of Option (Radio) Buttons:

Pcnt:	Value:
<input checked="" type="radio"/> 0.25%	<input type="text"/>

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connect

Choose volume reporting units: million gallons, megaliters, or acre feet. All data will be in the same unit

Beginning the Water Audit

AWWA Free Water Audit Software v5.0

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This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improvement in efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit for

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below

Please begin by providing the following information

Name of Contact Person:	<input type="text" value="Joe Waterman"/>		
Email Address:	<input type="text" value="joe.waterman@waterworld.org"/>		
Telephone Ext.:	<input type="text" value="555-555-1212"/>		
Name of City / Utility:	<input type="text" value="Waterworld Water Utility"/>		
City/Town/Municipality:	<input type="text" value="Greenville"/>		
State / Province:	<input type="text" value="New Mexico (NM)"/>		
Country:	<input type="text" value="USA"/>		
Year:	<input type="text" value="2016"/>	<input type="text" value="Calendar Year"/>	
Audit Preparation Date:	<input type="text" value="3/22/2017"/>		
Volume Reporting Units:	<input type="text" value="Million gallons (US)"/>		
PWSID / Other ID:	<input type="text" value="xxx333xxx"/>		

The following guidance will help you complete the Audit

All audit data are entered on the [Reporting Worksheet](#)

- | | |
|----------------------|---|
| <input type="text"/> | Value can be entered by user |
| <input type="text"/> | Value calculated based on input data |
| <input type="text"/> | These cells contain recommended default |

Use of Option (Radio) Buttons: Pcnt: Value:

<input checked="" type="radio"/>	<input type="radio"/>	<input type="text"/>
0.25%		

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Completed Instructions Page

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association
Copyright © 2014. All Rights Reserved.

Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** **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 be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Volume from own sources: MG/Yr
Water imported: MG/Yr
Water exported: MG/Yr

WATER SUPPLIED: **0.000** MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr
Unbilled unmetered: MG/Yr

AUTHORIZED CONSUMPTION: **0.000** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) **0.000** MG/Yr

Apparent Losses

Unauthorized consumption: MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed
Customer metering inaccuracies: MG/Yr
Systematic data handling errors: MG/Yr

Apparent Losses: **0.000** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **0.000** MG/Yr

WATER LOSSES: **0.000** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **0.000** MG/Yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: miles
Number of active AND inactive service connections:
Service connection density: conn./mile main
Are customer meters typically located at the curbstop or property line?
Average length of customer service line: ft (length of service line, beyond the property boundary, that is the responsibility of the utility)
Average operating pressure: psi

COST DATA

Total annual cost of operating water system: \$/Year
Customer retail unit cost (applied to Apparent Losses): \$/Million gallons
Variable production cost (applied to Real Losses): \$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

PRIORITY AREAS FOR ATTENTION:
Based on the information provided, audit accuracy can be improved by addressing the following components:

**NEXT STEP:
DEVELOP
INPUTS**

Instructions Reporting Worksheet Performance Indicators Comments

Ready Recovered

Choose the Reporting Worksheet for data entry

STARTING POINT: WATER SUPPLIED

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

Volume from own sources: MG/Yr
Water imported: MG/Yr
Water exported: MG/Yr

Master Meter and Supply Error Adjustments

Pcnt: Value: MG/Yr
MG/Yr
MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED 0.000 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr

Click here: for help using option buttons below

Pcnt: Value:

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

Ready Recovered

The volumes from own sources, water imported, and water exported in millions of gallons for the entire year will be entered here.

WATER SUPPLIED: VOLUME FROM OWN SOURCES

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
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All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

Volume from own sources: MG/Yr
Water imported: MG/Yr
Water exported: MG/Yr

Master Meter and Supply Error Adjustments

Pcnt: Value: MG/Yr
MG/Yr
MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED 0.000 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr

Click here: for help using option buttons below

Pcnt: Value:

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

Ready Recovered 120%

Enter the volume from own sources in millions of gallons for the entire year. All sources added together in one number.

VOLUME FROM OWN SOURCES: MONTHLY WELL READINGS

Well 1				Well 2				Well 3			
	Month	Reading	Flow		Month	Reading	Flow		Month	Reading	Flow
	December '15	42,586,000			December '15	58,397,000			December '15	58,409,600	
1	January	42,898,400	312,400	1	January	58,682,300	285,300	1	January	58,908,300	498,700
2	February	43,113,300	214,900	2	February	58,867,100	184,800	2	February	59,358,600	450,300
3	March	43,457,800	344,500	3	March	59,158,600	291,500	3	March	60,040,400	681,800
4	April	43,798,100	340,300	4	April	59,437,800	279,200	4	April	60,696,200	655,800
5	May	44,230,100	432,000	5	May	59,777,600	339,800	5	May	61,475,600	779,400
6	June	44,792,200	562,100	6	June	60,196,700	419,100	6	June	62,403,000	927,400
7	July	45,375,200	583,000	7	July	60,617,000	420,300	7	July	63,291,400	888,400
8	August	46,070,800	695,600	8	August	61,102,300	485,300	8	August	64,341,400	1,050,000
9	September	46,484,900	414,100	9	September	61,390,000	287,700	9	September	64,727,100	385,700
10	October	47,097,000	612,100	10	October	61,798,600	408,600	10	October	65,153,100	426,000
11	November	47,370,200	273,200	11	November	61,980,000	181,400	11	November	65,757,400	604,300
12	December	47,656,700	286,500	12	December	62,342,400	362,400	12	December	66,290,000	532,600
	Total		5,070,700		Total		3,945,400		Total		7,880,400

VOLUME FROM OWN SOURCES: TOTAL OF WELL READS

All Wells Together				
	Well 1	Well 2	Well 3	Total
1	312,400	285,300	498,700	1,096,400
2	214,900	184,800	450,300	850,000
3	344,500	291,500	681,800	1,317,800
4	340,300	279,200	655,800	1,275,300
5	432,000	339,800	779,400	1,551,200
6	562,100	419,100	927,400	1,908,600
7	583,000	420,300	888,400	1,891,700
8	695,600	485,300	1,050,000	2,230,900
9	414,100	287,700	385,700	1,087,500
10	612,100	408,600	426,000	1,446,700
11	273,200	181,400	604,300	1,058,900
12	286,500	362,400	532,600	1,181,500
			Total	16,896,500

NEED VALUE IN
MILLIONS OF
GALLONS, SO
 $16,896,500 / 1,000,000$
 $= 16.8965$

ENTER **16.8965** IN
SOFTWARE FOR
VOLUME FROM
OWN SOURCES

WATER SUPPLIED: VOLUME FROM OWN SOURCES

AWWA Free Water Audit Software: **Reporting Worksheet** WAS v5.0
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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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED		Master Meter and Supply Error Adjustments	
	Enter grading in column 'I'	Pcnt:	Value:
Volume from own sources:	<input type="text" value="16.897"/> MG/Yr	<input type="radio"/>	<input type="text"/>
Water imported:	<input type="text"/> MG/Yr	<input type="radio"/>	<input type="text"/>
Water exported:	<input type="text"/> MG/Yr	<input type="radio"/>	<input type="text"/>

WATER SUPPLIED: **16.897** MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr

Click here: [?](#) for help using option

Instructions **Reporting Worksheet** Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

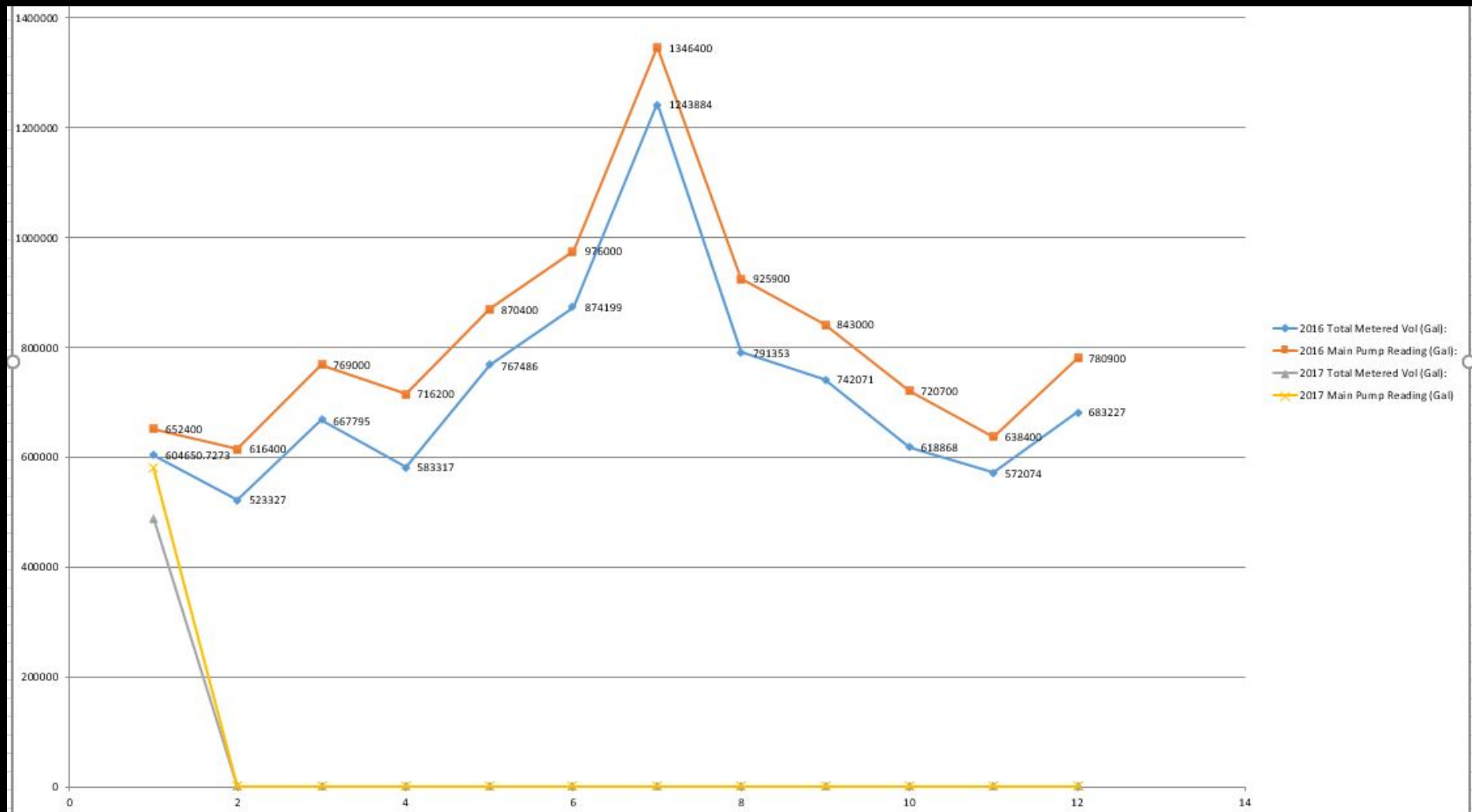
Enter the volume from own sources in millions of gallons for the entire year. All sources added together in one number.

VOLUME FROM OWN SOURCES: TOTAL OF WELL READS

All Wells Together				
	Well 1	Well 2	Well 3	Total
1	312,400	285,300	498,700	1,096,400
2	214,900	184,800	450,300	850,000
3	344,500	291,500	681,800	1,317,800
4	340,300	279,200	655,800	1,275,300
5	432,000	339,800	779,400	1,551,200
6	562,100	419,100	927,400	1,908,600
7	583,000	420,300	888,400	1,891,700
8	695,600	485,300	1,050,000	2,230,900
9	414,100	287,700	385,700	1,087,500
10	612,100	408,600	426,000	1,446,700
11	273,200	181,400	604,300	1,058,900
12	286,500	362,400	532,600	1,181,500
			Total	16,896,500

MONTHLY READINGS PROVIDE THE NECESSARY DATA, BUT DO THEY TELL THE WHOLE STORY?

REVIEW WATER USE FOR THE YEAR, DOES IT MAKE SENSE?



DAILY READS ADD VALUE

1-1-16	127681	97044	124409
1-2-16	87961	71712	86144
1-3-16	127709	102107	122525
1-4-16	165384	137258	160603
1-5-16	187827	153047	180687
1-6-16	99249	80178	97866
1-7-16	135799	114305	130678
1-8-16	104921	91077	102696
1-9-16	111369	86291	108223
1-10-16	110624	83998	106381
1-11-16	202955	151585	197569
1-12-16	117364	86302	109652
1-13-16	132823	95302	129856
1-14-16	85740	60832	83551
1-15-16	177441	135337	170796
1-16-16	150659	112709	142922
1-17-16	125735	90608	117154
1-18-16	120622	82057	99433
1-19-16	129073	86212	106925
1-20-16	159342	101636	145527
1-21-16	130787	83232	120597
1-22-16	10587	73152	98018
1-23-16	117904	79761	105784
1-24-16	95227	65245	88387
1-25-16	116724	79256	107948
1-26-16	116591	77202	106484
1-27-16	121036	79629	110887
1-28-16	119130	77223	111257

1-30-16	153154	99488	141014
1-31-16	122650	82277	115502

DAILY READS
PROVIDE MANY
BENEFITS

BENEFITS OF DAILY READS

No way to verify if monthly readings are accurate without daily reads to back up the information

There may be days of 0 reads with the master meters that will be missed in monthly totals (much more consequential than an individual customer meter reading 0 for a month or two.) Alternatively, there may be days where the reading spikes high due to electrical or equipment malfunction

When meter turns over, or new meter is installed, data can be fixed to ensure proper information

Daily reads allow for the same time frame between customer reads and master meter reads (especially important if you want to look at water use/NRW on a monthly totals in between doing annual water audits)

DAILY READS PROVIDE MUCH MORE INFORMATION ABOUT THE SYSTEM AND ALERT TO PROBLEMS MUCH SOONER



DAILY READS: WHEN METERS TURN OVER, DAILY READS PROVIDE FOR THE OPPORTUNITY TO MAKE ADJUSTMENT RIGHT AWAY

READINGS								
Date	Well #2	Well #3	Well #4	Well #5	Well #6	Well #8	Well #9	PH
10/1/2016	3228300	14822500	2064680	34198100	8295170	8315010	369810	7718120
10/21/2016	3539600	14915100	2092720	34226500	8318420	8332660	401770	9805900
10/22/2016	3567500	14919400	2094050	34228900	8320390	8334140	404480	9917000
10/23/2016	3583800	14923900	2095400	34228900	8320390	8334140	404480	14490 turned over
10/31/2016	3710200	14959100	2106060	34245900	8333980	8344360	423040	818200
PRODUCTION								
Date	Well #2	Well #3	Well #4	Well #5	Well #6	Well #8	Well #9	PH
10/1/2016	9300	3000	900	0	0	0	0	106930
10/21/2016	0	3700	1100	0	0	0	0	98710
10/22/2016	27900	4300	1330	2400	1970	1480	2710	111100
10/23/2016	16300	4500	1350	0	0	0	0	-9902510
10/31/2016	13400	3900	1160	0	0	0	0	94400
TOTALS	481900	136600	41380	47800	38810	29350	53230	-6899920

DAILY READS: “0” READS CAN BE CHECKED AGAINST PUMPING RECORDS TO SEE IF THAT VALUE IS CORRECT

PRODUCTION				
Date	Well #2	Well #3	Well #4	Well #5
10/1/2016	9300	3000	900	0
10/21/2016	0	3700	1100	0
10/22/2016	27900	4300	1330	2400
10/23/2016	16300	4500	1350	0
10/31/2016	13400	3900	1160	0
TOTALS	481900	136600	41380	47800

WITH DAILY, MONTHLY OR ANNUAL READS: LOOK OUT FOR DATA HANDLING ERRORS

1-1-16	127681	97044	124409
1-2-16	87961	71112	86144
1-3-16	127709	102107	122525
1-4-16	165384	137258	160603
1-5-16	187827	153047	180687
1-6-16	99249	80178	97866
1-7-16	135799	114305	130678
1-8-16	104921	91077	108696
1-9-16	111369	86291	108223
1-10-16	110624	83998	106381
1-11-16	202955	151585	197569
1-12-16	117364	86302	109652
1-13-16	132823	95302	129856
1-14-16	85740	60832	83551
1-15-16	177441	135337	170796
1-16-16	150659	112709	142922
1-17-16	125735	90608	117549
1-18-16	120622	82057	99433
1-19-16	129073	86212	106925
1-20-16	159342	101636	145527
1-21-16	130787	83232	120597
1-22-16	10587	73152	98018
1-23-16	117904	79761	105784
1-24-16	95227	65245	88387
1-25-16	116724	79256	107948
1-26-16	116591	77202	106484
1-27-16	121036	79629	110887
1-28-16	109130	72223	101257
1-30-16	153154	99488	141014
1-31-16	122650	82277	115502

Date	Well # 2	Well # 3	Well # 1
01/01/16	127681	97044	124409
01/02/16	87961	71112	86144
01/03/16	127709	120107	122525
01/04/16	165384	137258	160603
01/05/16	187827	153047	180687
01/06/16	99249	80178	97866
01/07/16	135799	114305	130678
01/08/16	104921	91077	108696
01/09/16	113396	86291	108223
01/10/16	110624	83998	106381
01/11/16	202955	151585	197569
01/12/16	117364	86302	109652
01/13/16	132823	95302	129856
01/14/16	85740	60832	83551
01/15/16	177441	135337	170796
01/16/16	150659	112709	142922
01/17/16	125735	90608	117549
01/18/16	120622	82057	99433
01/19/16	129073	86212	106925
01/20/16	159342	101636	145527
01/21/16	130787	83232	120597
01/22/16	10587	73152	98018
01/23/16	117904	79761	105784
01/24/16	95227	65245	88387
01/25/16	116724	79256	107948
01/26/16	116591	77202	106484
01/27/16	121036	79629	110887
01/28/16	109130	72223	101257
01/29/16	116679	75949	107583
01/30/16	153154	99488	141014
01/31/16	122650	82277	115502
Total	3872774	2905011	3733453

NEXT: NEED TO LOOK AT METER ERRORS

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

Volume from own sources: + ? MG/Yr
Water imported: + ? MG/Yr
Water exported: + ? MG/Yr

WATER SUPPLIED: 0.000 MG/Yr

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'F'

Pcnt: Value: MG/Yr
+ ? ☐ ☐ MG/Yr
+ ? ☐ ☐ MG/Yr
+ ? ☐ ☐ MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Click here: ? for help using option buttons below

Pcnt: Value:

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

Ready Recovered 120%

*Enter the own source master meter(s) error(s) in percent error or millions of gallons; use flow weighted average
Negative value if meter under-registers, positive value if it over-registers*

WATER SUPPLIED: MASTER METER ERRORS

Well Number	Date of Test	Well Meter GPM	Controltron average	% variation	Gallons per Minute Difference	Over or Under
1	4/10/2016	39	43	10%	4	under
2	7/20/2016	13	14	8%	1	under
3	4/10/2016	74	87	18%	13	under
4	7/20/2016	88	84	-5%	-4	over
5	7/20/2016	22	23	5%	1	under
6	10/21/2016	60	60	0%	0	N/A

Need to calculate a flow-weighted average for the error so that one number can be entered

Well Number	Flow Per Year	% of flow per well	% variation	Variation based on % of flow
1	3,416,400	13	-10%	-1.32
2	1,138,800	4	-8%	-0.35
3	6,482,400	25	-18%	-4.50
4	7,708,800	30	5%	1.49
5	1,927,200	7	-5%	-0.37
6	5,256,000	20	0%	0.00
Total	25,929,600	100		-5.05

NEXT: NEED TO LOOK AT METER ERRORS

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Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** **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 be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Volume from own sources: + ? 16.897 MG/Yr
Water imported: + ? MG/Yr
Water exported: + ? MG/Yr

WATER SUPPLIED: 17.795 MG/Yr

Master Meter and Supply Error Adjustments

Enter grading in column I and J

Pcnt:	Value:
-5.05%	MG/Yr
	MG/Yr
	MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: + ? MG/Yr

Click here: ? for help using option

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

Enter the error adjustment here

NEXT: NEED TO LOOK AT METER ERRORS

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Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** **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 be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Volume from own sources: + ? 16.897 MG/Yr
Water imported: + ? MG/Yr
Water exported: + ? MG/Yr

Master Meter and Supply Error Adjustments

Pcnt:	Value:
-5.05%	MG/Yr
	MG/Yr
	MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 17.795 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: + ? MG/Yr

Click here: ? for help using option

Instructions **Reporting Worksheet** Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

Note the Increase in Water Supplied due to the under-registration of the meters

IF YOU HAVE WATER IMPORTED, FOLLOW THE SAME PROCESS TO CALCULATE TOTAL FLOW PER YEAR

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J' >>>

WATER SUPPLIED

	Grade	Value	Unit
Volume from own sources:	+	?	MG/Yr
Water imported:	+	?	MG/Yr
Water exported:	+	?	MG/Yr

WATER SUPPLIED: 0.000 MG/Yr

Authorized Consumption

	Grade	Value	Unit
Billed metered:	+	?	MG/Yr
Billed unmetered:	+	?	MG/Yr
Unbilled metered:	+	?	MG/Yr

Click here: ? for help using option buttons below

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

Enter the total of all water imported for the year in millions of gallons per year.

USE SAME METER ERROR PROCESS

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

Volume from own sources: + ? MG/Yr
Water imported: + ? MG/Yr
Water exported: + ? MG/Yr

WATER SUPPLIED: 0.000 MG/Yr

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J' -----

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Click here: ? for help using option buttons below

Pcmt: Value:

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

*Enter the water imported (if any) master meter(s) error(s) in percent or millions of gallons (as a flow weighted average)
Negative value if meter under-registers, positive value if it over-registers*

IF YOU HAVE WATER EXPORTED, FOLLOW THE SAME PROCESS TO CALCUATE TOTAL FLOW PER YEAR

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

WATER SUPPLIED

Volume from own sources: MG/Yr
Water imported: MG/Yr
Water exported: MG/Yr

WATER SUPPLIED: MG/Yr

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr

Master Meter and Supply Error Adjustments

Pcnt: Value: MG/Yr
Pcnt: Value: MG/Yr
Pcnt: Value: MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Click here: for help using option buttons below

Pcnt: Value:

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

Enter the total of all water exported for the year in millions of gallons per year. Total for the entire year from all export locations.

USE SAME METER ERROR PROCESS

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J' ----->

Volume from own sources: + ? MG/Yr
Water imported: + ? MG/Yr
Water exported: + ? MG/Yr

WATER SUPPLIED: 0.000 MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Click here: ? for help using option buttons below

Authorized Consumption: Billed metered: + ? MG/Yr
Billed unmetered: + ? MG/Yr
Unbilled metered: + ? MG/Yr

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram Definitions Loss Control

*Enter the water exported (if any) master meter(s) error(s) in percent or millions of gallons (as a flow weighted average)
Negative value if meter under-registers, positive value if it over-registers*

WATER SUPPLIED VALUE

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Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** **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 be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

		<----- Enter grading in column 'E' and 'J' ----->			Master Meter and Supply Error Adjustments	
					Pcnt:	Value:
Volume from own sources:	+ ?		16.897	MG/Yr	+ ?	-5.05%
Water imported:	+ ?			MG/Yr	+ ?	
Water exported:	+ ?			MG/Yr	+ ?	

WATER SUPPLIED **17.795** MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Instructions **Reporting Worksheet** Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

Water supply will be calculated based on data entered for own sources, water imported and exported (it will correct for over or under meter readings)

NEXT STEP: CUSTOMER DATA

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: 0.000 MG/Yr Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: + ? MG/Yr
Billed unmetered: + ? MG/Yr
Unbilled metered: + ? MG/Yr
Unbilled unmetered: + ? MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: + ? 0.000 MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: + ? 0.000 MG/Yr
Systematic data handling errors: + ? 0.000 MG/Yr

Apparent Losses: ? 0.000 MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr
Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr
0.25% MG/Yr

Enter the total of all water that is metered and billed during the entire year in millions of gallons per year.

CUSTOMER DATA FOR THE ENTIRE YEAR

Total Billed Metered:		118,926,700	In MG	118.9267									
		Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16
Residential	Tier1	2,295,300	2,139,000	2,249,000	2,129,000	1,902,600	1,888,400	1,851,100	1,961,900	1,973,800	2,039,000	2,164,100	2,169,900
	Tier 2	1,767,900	1,411,800	1,630,600	1,379,200	900,200	934,400	947,900	1,106,100	1,055,000	1,151,200	1,531,600	1,543,100
	Tier 3	1,651,600	1,085,700	1,404,900	948,700	409,200	435,400	452,800	606,100	522,600	692,000	1,238,600	1,329,700
	Tier 4	3,329,200	1,817,100	2,482,900	919,500	416,300	540,900	417,300	554,800	290,600	511,700	1,389,800	1,758,200
	Total	9,044,000	6,454,100	7,767,400	5,376,400	3,628,300	3,799,100	3,669,100	4,228,900	3,842,000	4,393,900	6,324,100	6,800,900
Commercial	Tier1	1,051,600	971,700	1,020,100	1,038,200	790,900	848,200	756,200	896,000	846,900	944,400	1,015,100	1,009,900
	Tier 2	521,500	436,100	513,400	496,800	31,200	332,700	281,600	388,800	328,100	387,500	479,400	464,300
	Tier 3	3,699,400	3,447,900	3,295,500	3,724,500	2,892,800	3,657,300	3,205,800	3,568,300	2,638,300	259,900	3,840,700	3,517,500
	Total	5,272,500	4,855,700	4,829,000	5,259,500	3,714,900	4,838,200	4,243,600	4,853,100	3,813,300	1,591,800	5,335,200	4,991,700
Combined Totals		14,316,500	11,309,800	12,596,400	10,635,900	7,343,200	8,637,300	7,912,700	9,082,000	7,655,300	5,985,700	11,659,300	11,792,600

Enter the total of all water that is metered and billed during the entire year in millions of gallons per year.

NEXT STEP: CUSTOMER DATA

AWWA Free Water Audit Software: Reporting Worksheet

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American Water Works Association
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Water Audit Report for: Waterworld Water Utility (xxx333xxx)
Reporting Year: 2016 1/2016 - 12/2016

AUTHORIZED CONSUMPTION

Billed metered:	+	?	118.927	MG/Yr
Billed unmetered:	+	?		MG/Yr
Unbilled metered:	+	?		MG/Yr
Unbilled unmetered:	+	?	1.764	MG/Yr

Enter a positive value, otherwise a default percentage of 1.25% (of billed metered) is applied and a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 120.691 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 20.436 MG/Yr

Apparent Losses

Unauthorized consumption: + ? 0.353 MG/Yr

Pcnt: Value: MG/Yr

Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

Enter the total of all water that is metered and billed during the entire year in millions of gallons per year.

EXAMPLE OF CUSTOMER DATA TO LOOK FOR ANOMALIES

Percentage increase over prior month cutoff:		30%	(Always use positive value)														
Percentagedecrease below prior month cutoff:		-10%	(Always use negative value)														
Days of year accounted for by meter readings:		371															
Est GPD Baseline:		70															
Average Daily Household Use (GPD):		145															
Estimated Average Daily Per Capita Use (GPD):		51.7															
Summary Statistics																	
		Gallons	Millions of Gallons														
Total Billed Metered:		865852	8.659														
Total Unbilled Metered:		13400	0.013														
Total Pumped:		9855700	9.856														
Account Number	Customer Name	Household Size	Spreadsheet Number	High/Low Flag (+/- 50% of average)	Total for January	Total for February	Total for March	Total for April	Total for May	Total for June	Total for July	Total for August	Total for Septemb er	Total for October	Total for Novemb er	Total for December	
			146		5100	5380	4830	3280	3300	7070	6500	4830	3300	1890	1880	2040	
			147	⬆	9290	7650	9290	8410	9610	9050	10570	9200	9220	8490	6850	8760	
			148		0	0	0	0	6480	2280	10290	14920	11830	10830	5100	6370	
			149		5290	4140	4410	3840	4590	4770	8200	6530	5960	5020	4800	5670	
			150	⬇	0	0	0	0	0	0	0	0	0	0	0	0	
			151	⬇	3040	0	5460	3680	3660	0	0	0	0	0	0	0	
			152		4230	3180	3310	1720	3130	2580	3710	2440	1890	1660	1590	1390	
			153	⬆	5360	6420	10450	9640	13860	18640	29700	15510	13020	9340	6540	8610	
			154		5870	7010	10070	8840	4250	10050	9880	4460	4840	3960	3400	6880	
			155	⬇	0	0	0	0	0	0	0	0	0	0	0	0	
			156		2340	3990	4980	3400	6730	11550	17230	4250	7310	3030	7650	1910	
			157	⬆	8380	17660	5340	4720	5720	5500	6960	7400	5490	6180	5810	8320	
			158	⬇	0	0	0	0	0	0	0	0	0	0	0	0	
			159	⬇	1210	1180	1080	820	960	750	990	900	990	800	700	850	

Spreadsheet provides immediate feedback of high or low readings, 0 reads, and above or below 50% of average for the area to allow for further investigation

BILLED UNMETERED DATA

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American WaterWorks Association
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: 0.000 MG/Yr

Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: + ? MG/Yr
Billed unmetered: + ? MG/Yr
Unbilled metered: + ? MG/Yr
Unbilled unmetered: + ? MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: + ? 0.000 MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: + ? 0.000 MG/Yr
Systematic data handling errors: + ? 0.000 MG/Yr

Apparent Losses: ? 0.000 MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr

Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr

0.25% MG/Yr

This use must be estimated. Consider metering all flows even if you do not want to bill based on usage. Without metered data, the audit will be a rough estimate at best.

UNBILLED METERED DATA

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American WaterWorks Association
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: 0.000 MG/Yr Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: + ? MG/Yr
Billed unmetered: + ? MG/Yr
Unbilled metered: + ? MG/Yr
Unbilled unmetered: + ? MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: + ? 0.000 MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: + ? 0.000 MG/Yr
Systematic data handling errors: + ? 0.000 MG/Yr

Apparent Losses: ? 0.000 MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr
Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr
0.25% MG/Yr

*Enter the total of all uses during the year in the following categories in millions of gallons per year.
Billed Metered, Billed Unmetered, and Unbilled Metered,*

UNBILLED METERED DATA

Location	Gallons
Airport Building	72,800
Airport Trees	68,300
City Field House	122,900
City Hall - 1	17,800
City Bldg - 2	400
City Bldg - 3	0
City Bldg - 4	0
City Bldg - 5	72,600
City Bldg - 6	11,300
City Park #1	89,800
City Park #6 Fountain	9,300
City SO Yard (Trees) South Main	334,800
City Softball Restrooms	39,400
Civic Center	9,000
Town Square	32,500
Cemetery	0
North Park	79,000
North Park (Bathroom)	43,800
Safety Building - 1	3,900
Safety Building - 2	7,900
Swimming Pool	15,600
Airport Park	24,800
City Ball Park #2	607,200
City Dog Pound	58,800
Total Unbilled Metered:	1,721,900
In MG	1.7219

Considerations: READ the meters as often as all other customer meters

Total the entire flow for the year to see how much water this is

Look at value of water given away

BILLED UNMETERED DATA

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association
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Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** 1/2016 - 12/2016

Click to access definition
Click to add a comment

AUTHORIZED CONSUMPTION

Billed metered:	118.927	MG/Yr
Billed unmetered:		MG/Yr
Unbilled metered:	1.722	MG/Yr
Unbilled unmetered:		MG/Yr

Enter a positive value, otherwise a default percentage of 1.00% (of billed metered) is applied and a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 122.413 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 18.714 MG/Yr

Apparent Losses

Unauthorized consumption: 0.353 MG/Yr

Pcnt: 0.25% Value: MG/Yr

Click here: ? for help using option buttons below

Use buttons to select percentage of water supplied OR value

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

*Enter the total of all uses during the year in the following categories in millions of gallons per year.
Billed Metered, Billed Unmetered, and Unbilled Metered,*

UNBILLED UNMETERED DATA

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: 0.000 MG/Yr

Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: 0.000 MG/Yr
Unbilled metered: 0.000 MG/Yr
Unbilled unmetered: 0.000 MG/Yr

Default option selected for unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: 0.000 MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: 0.000 MG/Yr
Systematic data handling errors: 0.000 MG/Yr

Apparent Losses: 0.000 MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr

Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr

0.25% MG/Yr

Two choices: use default – best idea if you don't know anything about this flow
Use estimated values from all uses of this type

UNBILLED UNMETERED DATA

Month	Flushing (gal)	sewer flushings (gal)	fire dept
January	257,030	25,388	19,500
February	212,600	69,075	
March	451,895	95,182	10,250
April	562,654	10,090	46,000
May	98,995	108,052	39,500
June	63,460	22,049	80,000
July	105,755	9,522	27,000
August	210,495	5,213	20,000
September	100,465	4,153	36,900
October	204,107	31,167	8,800
November	293,230	15,568	
December	206,500	23,678	7,325
totals (gal)	2,767,186	419,137	295,275
Grand Total	3,481,598 In MG		3.48160

Estimate all uses of this type for the year

Add up total flow and convert to MG

Do NOT include leaks in this number!!!!

UNBILLED UNMETERED DATA

AWWA Free Water Audit Software: Reporting Worksheet

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American Water Works Association
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Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** **1/2016 - 12/2016**

AUTHORIZED CONSUMPTION

Billed metered:	118.927	MG/Yr
Billed unmetered:		MG/Yr
Unbilled metered:	1.722	MG/Yr
Unbilled unmetered:	3.481	MG/Yr

Unbilled Unmetered volume entered is greater than the recommended default value

AUTHORIZED CONSUMPTION: **124.130** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) **10.597** MG/Yr

Apparent Losses

Unauthorized consumption: **0.353** MG/Yr

Pcnt: **0.25%** Value: **3.481** MG/Yr

Click here: ? for help using option buttons below

Use buttons to select percentage of water supplied OR value

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

Ready

Two choices: Enter Data by changing the selection to value from percent

UNBILLED UNMETERED DATA

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: **Waterworld Water Utility (xxx333xxx)**
Reporting Year: **2016** **1/2016 - 12/2016**

AUTHORIZED CONSUMPTION

Billed metered:	118.927	MG/Yr
Billed unmetered:	1.722	MG/Yr
Unbilled metered:	1.764	MG/Yr
Unbilled unmetered:	1.764	MG/Yr

Default option selected for Unbilled unmetered consumption of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: **122.413** MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) **18.714** MG/Yr

Apparent Losses

Unauthorized consumption: **0.353** MG/Yr

Pcnt: **1.25%** Value: **1.25%** MG/Yr

Pcnt: **0.25%** Value: **0.25%** MG/Yr

Click here: ? for help using option buttons below

Use buttons to select percentage of water supplied OR value

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

If you choose the default, the value is calculated based on a percent of water supplied

NEXT STEP: APPARENT LOSSES

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: 0.000 MG/Yr Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: + ? MG/Yr
Billed unmetered: + ? MG/Yr
Unbilled metered: + ? MG/Yr
Unbilled unmetered: + ? 3 0.000 MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: + ? 0.000 MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: + ? 0.000 MG/Yr
Systematic loss handling errors: + ? 0.000 MG/Yr

Apparent Losses: ? 0.000 MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr
Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr
0.25% MG/Yr

For Unauthorized consumption either choose default value of 0.25% or enter a total value of unauthorized flow in millions of gallons per year; Default a good starting place

WHERE DO THE INPUTS GET ENTERED

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: MG/Yr Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr
Unbilled unmetered: MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) MG/Yr

Apparent Losses

Unauthorized consumption: MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: MG/Yr
Systematic data handling errors: MG/Yr

Apparent Losses: MG/Yr

Click here: ? for help using option buttons below

Pcnt: 1.25% Value: MG/Yr
Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: MG/Yr

Pcnt: 0.25% Value: MG/Yr

For customer meter inaccuracies either choose to enter a percentage from less than 10% or a total value in millions of gallons per year; If you've never tested meters consider starting a program to do so.

WHERE DO THE INPUTS GET ENTERED

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

WATER SUPPLIED: MG/Yr Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: MG/Yr
Billed unmetered: MG/Yr
Unbilled metered: MG/Yr
Unbilled unmetered: MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) MG/Yr

Apparent Losses

Unauthorized consumption: MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: MG/Yr
Systematic data handling errors: MG/Yr

Apparent Losses: MG/Yr

Pcnt: Value: MG/Yr
Use buttons to select percentage of water supplied OR value

Pcnt: Value: MG/Yr

Pcnt: Value: MG/Yr

For systematic data handling errors either choose default value of 0.25% or enter a total value of water that resulted from systematic data handling errors in millions of gallons per year; default is a good starting point

WHERE DO THE VALUES SHOW UP?

AWWA Free Water Audit Software: Reporting Worksheet

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American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

Default option selected for unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 0.000 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 0.000 MG/Yr

Apparent Losses

Unauthorized consumption: 0.000 MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: 0.000 MG/Yr

Systematic data handling errors: 0.000 MG/Yr

Apparent Losses: 0.000 MG/Yr

Real Losses (Continuous Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 0.000 MG/Yr

WATER LOSSES: 0.000 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 0.000 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Use buttons to select percentage of water supplied OR value

Pcnt: 0.25% Value: 0.000 MG/Yr

0.25% 0.000 MG/Yr

Non-Revenue Water is calculated by the software, as are its components: authorized consumption, apparent loss, and real loss

OTHER INPUTS TO ENTER

AWWA Free Water Audit Software: Reporting Worksheet

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American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

NON-REVENUE WATER: 0.000 MG/Yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: miles
Number of active AND inactive service connections: conn./mile main
Service connection density: Select... (length of service line, beyond the property boundary, that is the responsibility of the utility)
Are customer meters typically located at the curbstop or property line?
Average length of customer service line: ft
Average operating pressure: psi

COST DATA

Total annual cost of operating water system: \$/Year
Customer retail unit cost (applied to Apparent Losses):
Variable production cost (applied to Real Losses): \$/Million gallons ☐ Use Customer Retail Unit Cost to value real loss

WATER AUDIT DATA VALIDITY SCORE:

System data is entered, including: length of mains, number of connections, customer service curb stop locations, and average operating pressure

OTHER INPUTS TO ENTER

AWWA Free Water Audit Software: Reporting Worksheet

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American Water Works Association.
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Water Audit Report for: << Please enter system details and contact information on the Instructions tab >>
Reporting Year:

NON-REVENUE WATER

NON-REVENUE WATER: 0.000 MG/Yr
= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: miles
Number of active AND inactive service connections:
Service connection density: conn./mile main
Are customer meters typically located at the curbstop or property line? Select... (length of service line, beyond the property boundary, that is the responsibility of the utility)
Average length of customer service line: ft
Average operating pressure: psi

COST DATA

Total annual cost of operating water system: \$/Year
Customer retail unit cost (applied to Apparent Losses):
Variable production cost (applied to Real Losses): \$/Million gallons ☐ Use Customer Retail Unit Cost to value gross loss

WATER AUDIT VALIDITY SCORE:

Financial information is entered, including: total annual cost of operating the system, customer retail unit cost, and variable production cost

GATHERING THE DATA FOR THE AUDIT

Monthly water supplied volume

Production meter testing results (if performed)

Water volume sold by rate code, by month

Retail rate schedule for audit year

Total annual cost of operating the system

What you spent on power and chemicals in the audit year

What you spent purchasing water in the audit year (if applicable)

OTHER SUPPORTING DOCUMENTS THAT CAN BE HELPFUL

Customer meter testing results (if performed)

Pressure data (if available)

Quantities of Unbilled Unmetered Flow

Line break data records (both main and service)



Is the data you
obtain going to
be completely
accurate?



Why or why not?

Water Loss Audits: You've Collected Your Data, How Valid is It?

Determining the Data Grades



When you know better you do better

Maya Angelou

Data Grade Entry: Small Box to The Left of Each Input You Entered

AWWA Free Water Audit Software: Reporting Worksheet

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Water Audit Report for: Watertown USA Water Treatment Works (XXXXYYYY)
Reporting Year: 2014 1/2014 - 12/2014

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

Enter grading in column 'E' and 'J' ----->

WATER SUPPLIED

Volume from own sources:	+	5	95.206	MG/Yr
Water imported:	+	?		MG/Yr
Water exported:	+	?		MG/Yr

Master Meter and Supply Error Adjustments

Pcnt:	Value:	MG/Yr
2	-3.00%	

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered:	+	6	80.408	MG/Yr
Billed unmetered:	+	8	0.048	MG/Yr
Unbilled metered:	+	1	1.250	MG/Yr
Unbilled unmetered:	+	2	1.450	MG/Yr

Unbilled Unmetered volume entered is greater than the recommended default value

WATER SUPPLIED:

96.151 MG/Yr

AUTHORIZED CONSUMPTION:

83.156 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

14.995 MG/Yr

Apparent Losses

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

Data Grades

How Do You Know What Data Grade To Use?

AWWA Free Water Audit Software

Reporting Worksheet

?

Click to access definition

Water Audit Report for: Watertown USA Water Treatment Works (X)

Reporting Year: 2014 1/2014 - 12/2014

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable, estimate 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 red triangle in the corner of the cell to see the grading options.

All volumes to be entered as: MILLION GALLONS (US)

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Volume from own sources:	?	?	?	95.206	MG/Yr
Water imported:	+	?	?		MG/Yr
Water exported:	+	?	?		MG/Yr
WATER SUPPLIED:				98.151	MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:	+	?	6	80.408	MG/Yr
-----------------	---	---	---	--------	-------

How Do You Know What Data Grade To Use?

For data grading for each input, determine the highest grade that meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J' -----> Pcnt Value:

Volume from own sources:	+	?	5	n/a (not applicable). Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own) 1. Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted. 2. 25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted. 3. Conditions between 2 and 4 4. 50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted. 5. Conditions between 4 and 6 6. At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy. 7. Conditions between 6 and 8 8. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy 9. Conditions between 8 and 10 10. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Water imported:	+	?		
Water exported:	+	?		
WATER SUPPLIED:				
Billed metered:	+	?	6	
Billed unmetered:	+	?	8	
Unbilled metered:	+	?	1	
Unbilled unmetered:	+	?	2	
Unmetered volume entered is greater than metered volume				
PERMITS AND RATED CONSUMPTION:				
	?			

The Data Grades will show up in a pop-up box.

The Pop-Up Boxes Can Be a Little Hard to Read and Use.....

For data grading for each input, determine the highest grade that meets or exceeds all criteria for that grade and all grades below

Master Meter and Supply Error Adjustments

Enter grading in column 'E' and 'J' -----> Pcnt Value:

Volume from own sources:	+	?	5	n/a (not applicable). Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own) 1. Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted. 2. 25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted. 3. Conditions between 2 and 4 4. 50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted. 5. Conditions between 4 and 6 6. At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy. 7. Conditions between 6 and 8 8. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy 9. Conditions between 8 and 10 10. 100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Water imported:	+	?		
Water exported:	+	?		
WATER SUPPLIED:				
Billed metered:	+	?	6	
Billed unmetered:	+	?	8	
Unbilled metered:	+	?	1	
Unbilled unmetered:	+	?	2	
Unmetered volume entered is greater than metered volume				
PERMITS AND CONSUMPTION:				
	?			

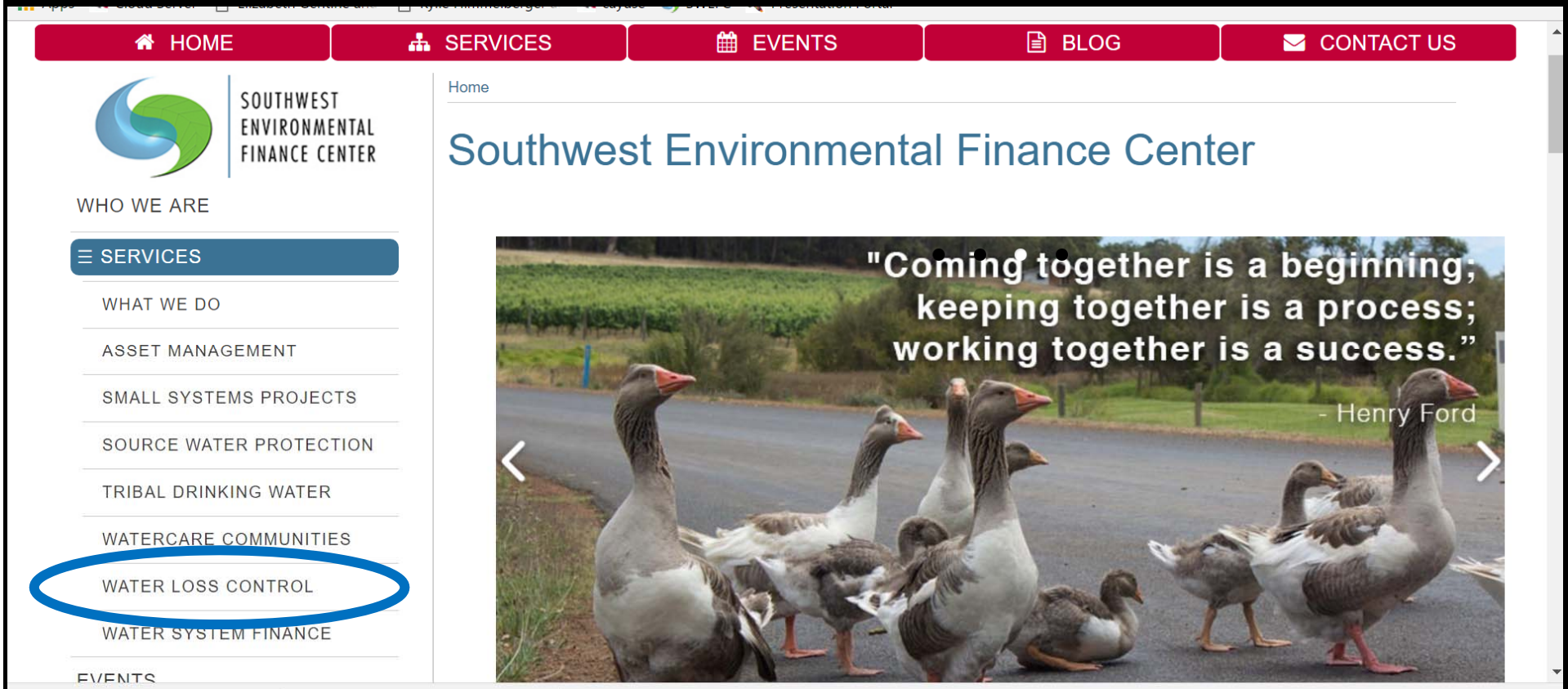
The Data Grades will show up in a pop-up box.

So, Southwest EFC Developed Data Grade Spreadsheets to Help Select Data Grades

Volume from own sources		
GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1		Less than 25% of water production sources are metered, remaining sources are estimated.
		No regular meter accuracy testing or electronic calibration conducted.
2		25% - 50% of treated water production sources are metered; other sources estimated.
		No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4		50% - 75% of treated water production sources are metered, other sources estimated.
		Occasional meter accuracy testing or electronic calibration conducted
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources.
		Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually.
		Less than 25% of tested meters are found outside of +/- 6% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered,
		Meter accuracy testing and electronic calibration of related instrumentation is conducted annually,
		Less than 10% of meters are found outside of +/- 6% accuracy
9		Conditions between 8 and 10
10		100% of treated water production sources are metered,
		Meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy.
		Procedures are reviewed by a third party knowledgeable in the M36 methodology

Obtain from: Southwestefc.unm.edu


OBTAINING DATA GRADING SHEETS



OBTAINING DATA GRADING SHEETS

UNM | Center for Water and the Environment

HOME SERVICES EVENTS BLOG CONTACT US

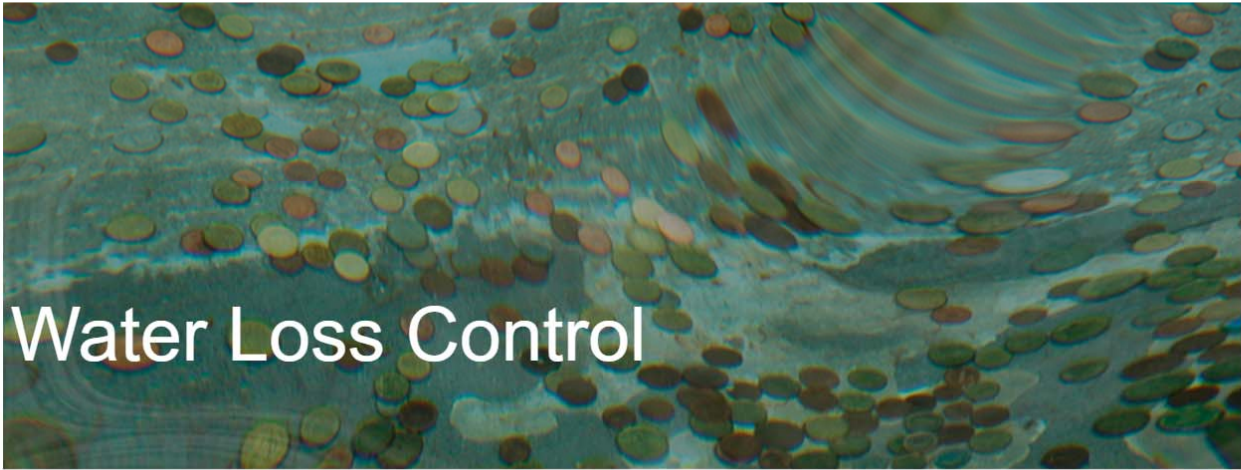
 SOUTHWEST ENVIRONMENTAL FINANCE CENTER

WHO WE ARE

SERVICES

- WHAT WE DO
- ASSET MANAGEMENT
- SMALL SYSTEMS PROJECTS
- SOURCE WATER PROTECTION
- TRIBAL DRINKING WATER
- WATERCARE COMMUNITIES

Home > Services > Water Loss Control



Water Loss Control

Overview Training Resources State Contacts

OBTAINING DATA GRADING SHEETS

 Apps
  Cloud Server
  Elizabeth Gentine and
  Kylie Himmelberger and
  cayuse
  SWEFC
  Presentation Portal

Recent Posts

Regulations: Love 'em or Hate 'em,
Common Sense or Overreach
Are You Paying Too Much? Understanding
your energy rate schedules
Toxic Water – Our Responsibility
Have you seen the electric bill?
Asset Management

Events Calendar

<< Mar 2017 >>

M	T	W	T	F	S	S
27	28	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2

Water Audit Data Grading Sheets

[illegible]

A significant component of the water loss Water Audit Software is data grading. As you will see when you review the AWWA Water Audit software, each data input and output you report in the software is graded for reliability on a scale of 1-10. However, due to the software's Excel format, the data grading criteria are somewhat difficult to read in the spreadsheet. For your convenience we have reproduced the grading criteria and instructions for each input in a Word Document, which can be downloaded [HERE](#).

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

The data grades will be entered in columns E and J of the worksheet in cells denoted with a red triangle in their upper right hand corners as shown in the image at the left. Click on the image to expand.

There is One Sheet for Each Data Input

Volume from own sources

GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1		Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.
2		25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4		50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered, Meter accuracy testing and electronic calibration of related instrumentation is conducted annually, Less than 10% of meters are found outside of +/- 6% accuracy
9		Conditions between 8 and 10
10		100% of treated water production sources are metered, Meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology

Note that Data Grades Are Related to Practices, Policies, Procedures

GRADE	✓	
n/a		Select (of its own)
1		Less than 10%
2		
3		
4		
5		
6		
7		
8		100% of treated water production is metered Meter accuracy testing and calibration is conducted semi-annually, with less than 10% found outside of +/- 3% Procedures are reviewed by a person knowledgeable in the M36 methodology
9		Conditions between 100% of treated water production is metered and 100% of treated water production is metered and meter accuracy testing and calibration is conducted semi-annually, with less than 10% found outside of +/- 3%
10		100% of treated water production is metered and meter accuracy testing and calibration is conducted semi-annually, with less than 10% found outside of +/- 3%

For Example: The Data Grade for Volume of Own Sources is Related to Three Things:

% of water production sources metered

Meter accuracy testing & Electronic Calibration

Accuracy of the Meter

Choose a Starting Point: 1, 10, 4, 6, You Choose

Volume from own sources		
GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1		Less than 25% of water production sources are metered, remaining sources are estimated.
		No regular meter accuracy testing or electronic calibration conducted.
2		25% - 50% of treated water production sources are metered; other sources estimated.
		No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4	✓	50% - 75% of treated water production sources are metered, other sources estimated.
		Occasional meter accuracy testing or electronic calibration conducted.
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered.
		Meter accuracy testing and/or electronic calibration conducted.
		Less than 25% of tested meters are found outside of +/- 3% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered.
		Meter accuracy testing and electronic calibration conducted.
		Less than 10% of meters are found outside of +/- 3% accuracy.
9		Conditions between 8 and 10
10		100% of treated water production sources are metered.
		Meter accuracy testing and electronic calibration conducted.
		10% found outside of +/- 3% accuracy.
		Procedures are reviewed by a third party

Read each item included in that number

If you **meet or exceed** the criteria, check the box

If you can't **meet or exceed** the criteria, leave the box unchecked.

If you are able to check all the boxes for that number, move up to the next higher number

To Use the Data Grade Spreadsheets:

Choose a Starting Point:

1, 10, 4, 6 You Choose

Volume from own sources		
GRADE	✓	DESCRIPTION
1	✓	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1	✓	Less than 25% of water production sources are metered, remaining sources are estimated.
1	✓	No regular meter accuracy testing or electronic calibration conducted.
2		25% - 50% of treated water production sources are metered; other sources estimated.
2		No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4		50% - 75% of treated water production sources are metered.
4		Occasional meter accuracy testing or electronic calibration conducted.
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered.
6		Meter accuracy testing and/or electronic calibration conducted.
6		Less than 25% of tested meters are found outside of +/- 6% accuracy.
7		Conditions between 6 and 8
8		100% of treated water production sources are metered.
8		Meter accuracy testing and electronic calibration of related instrumentation is conducted annually.
8		Less than 10% of meters are found outside of +/- 6% accuracy
9		Conditions between 8 and 10
10		100% of treated water production sources are metered.
10		Meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy.
10		Procedures are reviewed by a third party knowledgeable in the M36 methodology

If you can't **meet or exceed ALL** the criteria, in the box, move down to the next lower number

Choose a Starting Point: 1, 10, 4, 6, You Choose

AWWA Free Water Audit Software Grading Matrix

Volume from own sources		
GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1	✓	Less than 25% of water production sources are metered, remaining sources are estimated.
	✓	No regular meter accuracy testing or electronic calibration conducted.
2	✓	25% - 50% of treated water production sources are metered; other sources estimated.
	✓	No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4		50% - 75% of treated water production sources are metered, other sources estimated.
		Occasional meter accuracy testing or electronic calibration conducted
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources.
		Meter accuracy testing and/or electronic calibration conducted
		Less than 25% of tested meters are found outside of +/- 3% accuracy.
7		Conditions between 6 and 8
		100% of treated water production sources are metered
8		Meter accuracy testing and electronic calibration conducted
		Less than 10% of meters are found outside of +/- 3% accuracy.
9		Conditions between 8 and 10
		100% of treated water production sources are metered
10		Meter accuracy testing and electronic calibration conducted
		10% found outside of +/- 3% accuracy.
		Procedures are reviewed by a third party known to be independent

If you are able to check all the boxes on the number below the “conditions between” number, and none of the boxes on the number above, the “conditions between box” choose the lower number, in this case, number 2.

Some Grades are “Conditions Between” Two Grades

Volume from own sources		
GRADE	✓	DESCRIPTION
n/a		Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)
1	✓	Less than 25% of water production sources are metered, remaining sources are estimated.
	✓	No regular meter accuracy testing or electronic calibration conducted.
2	✓	25% - 50% of treated water production sources are metered; other sources estimated.
	✓	No regular meter accuracy testing or electronic calibration conducted.
3		Conditions between 2 and 4
4	✓	50% - 75% of treated water production sources are metered, other sources estimated.
		Occasional meter accuracy testing or electronic calibration conducted
5		Conditions between 4 and 6
6		At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources.
		Meter accuracy testing and/or electronic calibration conducted
		Less than 25% of tested meters are found outside of +/- 3% accuracy.
7		Conditions between 6 and 8
		100% of treated water production sources are metered
8		Meter accuracy testing and electronic calibration conducted
		Less than 10% of meters are found outside of +/- 3% accuracy.
9		Conditions between 8 and 10
		100% of treated water production sources are metered
10		Meter accuracy testing and electronic calibration conducted
		10% found outside of +/- 3% accuracy.
		Procedures are reviewed by a third party knowledgeable in the M36 methodology

If you are able to check **ALL** the boxes on the number below and only **SOME** of the boxes on the number above, choose the “conditions between...” box.

Data Grade Entry

AWWA Free Water Audit Software: Reporting Worksheet

WASv5.0
American Water Works Association.
Copyright © 2014. All Rights Reserved.

Water Audit Report for: Watertown USA Water Treatment Works (XXXXYYYY)
Reporting Year: 2014 1/2014 - 12/2014

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: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below

Enter grading in column 'E' and 'J' →

WATER SUPPLIED

Volume from own sources:	+	5	95.206	MG/Yr
Water imported:	+	?		MG/Yr
Water exported:	+	?		MG/Yr

WATER SUPPLIED: 96.151 MG/Yr

AUTHORIZED CONSUMPTION

Billed metered:	+	6	80.408	MG/Yr
Billed unmetered:	+	8	0.048	MG/Yr
Unbilled metered:	+	1	1.250	MG/Yr
Unbilled unmetered:	+	2	1.450	MG/Yr

Unbilled Unmetered volume entered is greater than the recommended default value

AUTHORIZED CONSUMPTION: 83.156 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 14.995 MG/Yr

Apparent Losses

Master Meter and Supply Error Adjustments

Pcnt:	Value:
-3.00%	

Enter negative % or value for under-registration
Enter positive % or value for over-registration

Click here: ? for help using option buttons below

Use buttons to select percentage of water supplied OR value

Instructions Reporting Worksheet Performance Indicators Comments Water Balance Dashboard Grading Matrix Service Connection Diagram

The most important thing is to make sure you are honest about what the data grade should be!!!

The right data grade is the one that accurately reflects your situation

Overall Validity Score

AWWA Free Water Audit Software:
Reporting Worksheet

Water Audit Report for: **Green Valley Water System (XXXXXXXX)**
Reporting Year: **2012** **1/2012 - 12/2012**

COST DATA

Total annual cost of operating water system:	+	?	4	\$400,000	\$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	1	\$2.00	\$/1000 gallons (US)
Variable production cost (applied to Real Losses):	+	?	1	\$2,000.00	\$/Million gallons <input type="checkbox"/> Use Customer Retail Unit Cost to value real losses

Retail costs are less than (or equal to) production costs; please review and correct if necessary

WATER AUDIT DATA VALIDITY SCORE:

Add a grading value for 2 parameter(s) to enable an audit score to be calculated


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: Billed metered
- 3: Billed unmetered

If you miss any grades you will get message

Overall Validity Score

 **AWWA Free Water Audit Software:**
Reporting Worksheet WAS v5.0
American Water Works Assoc
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[?](#) Click to access definition **Water Audit Report for:**
[+](#) Click to add a comment **Reporting Year:**

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 49 out of 100 *****

A weighted scale for the components of consumption and metering is used 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: Unbilled metered

3: Customer metering inaccuracies

**Water Audit
Data Validity
Score**

Validity Priorities

 **AWWA Free Water Audit Software:**
Reporting Worksheet WAS v5.0
American Water Works Assoc
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Click to access definition
 Click to add a comment

Water Audit Report for: **Watertown USA Water Treatment Works (XXXXYYYY)**
Reporting Year: **2014** **1/2014 - 12/2014**

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 49 out of 100 ***

A weighted scale for the components of consumption and water loss is inc

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following comp

- 1: Volume from own sources
- 2: Unbilled metered
- 3: Customer metering inaccuracies

**Priority Areas
for Attention to
Increase
Validity Score**

**Note: The data grades do not have
equal value in the calculation of validity**

If the Data Validity Score is Low, What Should be the Response?

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Assoc
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Water Audit Report for: Watertown USA Water Treatment Works (XXXXYYYY)
Reporting Year: 2014 1/2014 - 12/2014

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 49 out of 100 ***

A weighted scale for the components of consumption and metering is used in the calculation of the Water Audit Data Validity Score

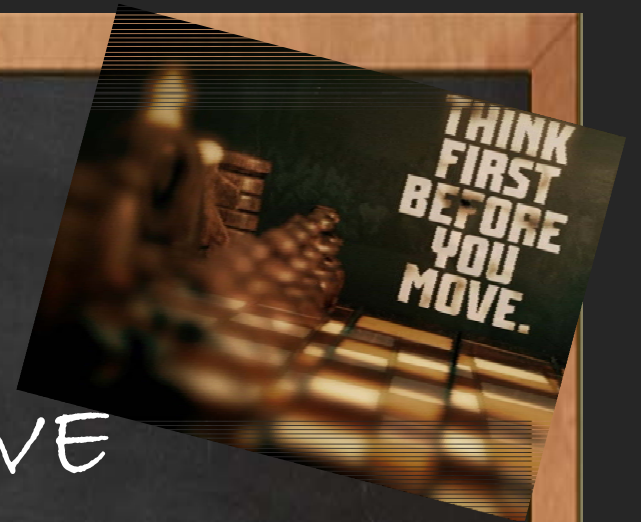
PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

- 1: Volume from own sources
- 2: Unbilled metered
- 3: Customer metering inaccuracies

What
Response?

EVEN THOUGH
RESULTS ARE
PROVIDED, CAN'T MOVE
ON WITH LOW DATA
VALIDITY & BEFORE
THOUGHTFULLY
CHECKING
INFORMATION



BEGINNING THE PROCESS: HOW AND WHY?



**YOU HAVE TO START
SOMEWHERE AND
DO WHAT YOU CAN.**

I don't have any good data on
what is going on in my
system. Can I really do a
water audit?

IT'S NOT AS BAD AS IT LOOKS

Inputs

13 Volume inputs

5 System attribute inputs

3 Cost inputs

21 total

After defaults & n/a's:

only about 10-15 inputs to deal with

AWWA Free Water Audit Software: Reporting Worksheet

Water Audit Report for: County Water Company
Reporting Year: 2013 12/01/13 - 12/31/13

Please enter data in the white cells below. Where available, entered values should be used; if entered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (pts 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: MILLION GALLONS (U.S.) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

Volume from own sources:	5	3,481,590	MG/Yr
Water imported:	10	779,762	MG/Yr
Water exported:	na	0.000	MG/Yr
WATER SUPPLIED:		4,402,160	MG/Yr

Port: 4 Value: -136,890 MG/Yr
10 -0.50% MG/Yr
10 * MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered:	7	3,258,200	MG/Yr
Billed unmetered:	na	0.000	MG/Yr
Unbilled metered:	3	15,420	MG/Yr
Unbilled unmetered:	8	183,820	MG/Yr
Unbilled Unmetered volume entered is greater than the recommended default value			
AUTHORIZED CONSUMPTION:		3,457,440	MG/Yr

Click here for help using option buttons below

Port: Value: 183,820 MG/Yr

Use buttons to select percentage of water supplied (SE) value

Port: 0.25% Value: MG/Yr
0 * 164,300 MG/Yr
0 * 32,920 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 944,720 MG/Yr

Apparent Losses

Unauthorized consumption:	1	11,005	MG/Yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed			
Customer metering inaccuracies:	8	164,300	MG/Yr
Systematic data handling errors:	6	32,920	MG/Yr
Apparent Losses:		208,225	MG/Yr

Real Losses (Current Annual Real Losses or CARR)

Real Losses = Water Losses - Apparent Losses:	736,495	MG/Yr	
WATER LOSSES:		944,720	MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER:	1,143,960	MG/Yr
--------------------	-----------	-------

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	4	256.3	miles
Number of active AND inactive service connections:	4	12,196	
Service connection density:		48	conn./mile main

Are customer meters typically located at the curbside or property line? No

Average length of customer service line: 18.0 ft

Length of service line, beyond the property boundary, that is the responsibility of the utility

Average operating pressure: 65.0 psi

COST DATA

Total annual cost of operating water system:	9	\$9,600,000	\$/Year
Customer retail unit cost (applied to Apparent Losses):	10	\$3.95	\$/1000 gallons (U.S.)
Variable production cost (applied to Real Losses):	9	\$190.00	\$/Million gallons

Use Customer Retail Unit Cost to universal losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 66 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

JUST START WITH THE DATA YOU HAVE



If you take the time
to do a water audit
and check the data
there are cost
benefits to doing it.





REMEMBER

Don't Let what you
can't do stop you from
doing what you can do.

What I
LEARNED

What can you do at
your own facility

CONTACT US WITH QUESTIONS OR FOR HELP

HEATHER HIMMELBERGER

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DAWN NALL

efcnall@gmail.com

<http://efcnetwork.org>



Southwest
Environmental
Finance
Center