SWEETWATER SPRINGS WATER DISTRICT

TO: Board of Directors **AGENDA NO. V-D**

FROM: Steve Mack, General Manager

Meeting Date : October 6, 2016

SUBJECT: ACTION DISCUSSION RE STATE WATER LOSS REDUCTION PROGRAM

RECOMMENDED ACTION: Receive a presentation from General Manager Steve Mack regarding the new State mandated Water Loss Reduction Program and provide direction, if needed.

FISCAL IMPACT: none

DISCUSSION:
On August 24, 2016 I attended a workshop that was advertised as required training on the State's new water loss reporting requirement - Water Loss Training Assistance Program was the title of the workshop. At the time of accepting this training I new nothing of any new reporting requirement; I thought this was followup training for similar water loss training I had attended one year ago. It turns out this is a new State mandate from Senate Bill 555 that requires all urban water suppliers in California to conduct validated annual Water Loss audits. I have been using this software (it's an Excel spreadsheet) for reporting this as part of the District's reporting for the California Urban Water Conservation Coalition (CUWCC), so I am familiar with it. For CUWCC, no training is required to use the software (it's somewhat self explanatory); the State mandate requires (I believe) training and all submittals will be reviewed by trained personnel.

The District has been tracking its water losses for some time. We report monthly the water loss as a percentage of the difference between water produced and water sold divided by water produced. To the Water Loss Technical Assistance Program (TAP) staff, that is an insufficient metric - it doesn't explain enough of what's going on with the distribution system.

Senate Bill 555 has established a Statewide Water Loss Management Program. Apparently is has the following stages:

Phase 1 - Establish annual M36 water auditing (M36 is the American Water Works Association (AWWA) bulletin on water loss auditing)
Phase 2 - Achieve minimum standard of audit reliability
Phase 3 - Manage water loss performance for long-term reduction

We are currently starting Phase 1 and I understand its ending goal is submittal of a validated water audit in November 2017.

Water Audits are intended to become as commonplace and standardized as financial audits. We do our finances every year and according to SB 555 we need to do our distribution system too. Not a bad idea, but I worry about State performance standards. Purposes of audits:

1. Systematically account for known water volumes to estimate volumes of later loss.
2. Evaluate data source reliability.
3. Communicate water distribution efficiency.

The table below, which is the water balance table (not even closely to scale), shows what this is all about:

<table>
<tr><td rowspan="6">WATER SUPPLIED</td><td rowspan="4">AUTHORIZED CONSUMPTION</td><td rowspan="2">BILLED AUTHORIZED CONSUMPTION</td><td>BILLED METERED CONSUMPTION</td><td rowspan="2">REVENUE WATER</td></tr>
<tr><td>BILLED UNMETERED CONSUMPTION</td></tr>
<tr><td rowspan="2">UNBILLED AUTHORIZED CONSUMPTION</td><td>UNBILLED METERED CONSUMPTION</td><td rowspan="4">$ $ $
NONREVENUE WATER</td></tr>
<tr><td>UNBILLED UNMETERED CONSUMPTION</td></tr>
<tr><td rowspan="3">WATER LOSSES</td><td rowspan="3">$ $ $
APPARENT LOSSES
<b>$ $ $</td><td>CUSTOMER METER INACCURACIES</td></tr>
<tr><td>UNAUTHORIZED CONSUMPTION</td></tr>
<tr><td>DATA HANDLING ERRORS</td></tr>
<tr><td colspan="2">REAL LOSSES</td></tr>
</table>

The far left column represents all water supplied by the District. What I report each month as water losses is water supplied minus billed authorized consumption (we have very little billed unmetered consumption). The water balance table shows the various components of water losses - unbilled authorized consumption (process water used in District operations, for example), apparent losses - meter inaccuracies, theft of water, data errors, and the real losses caused by leaks.

The water loss reduction program emphasizes attacking the components of water loss and understanding the effects and impacts of these water losses. Customer

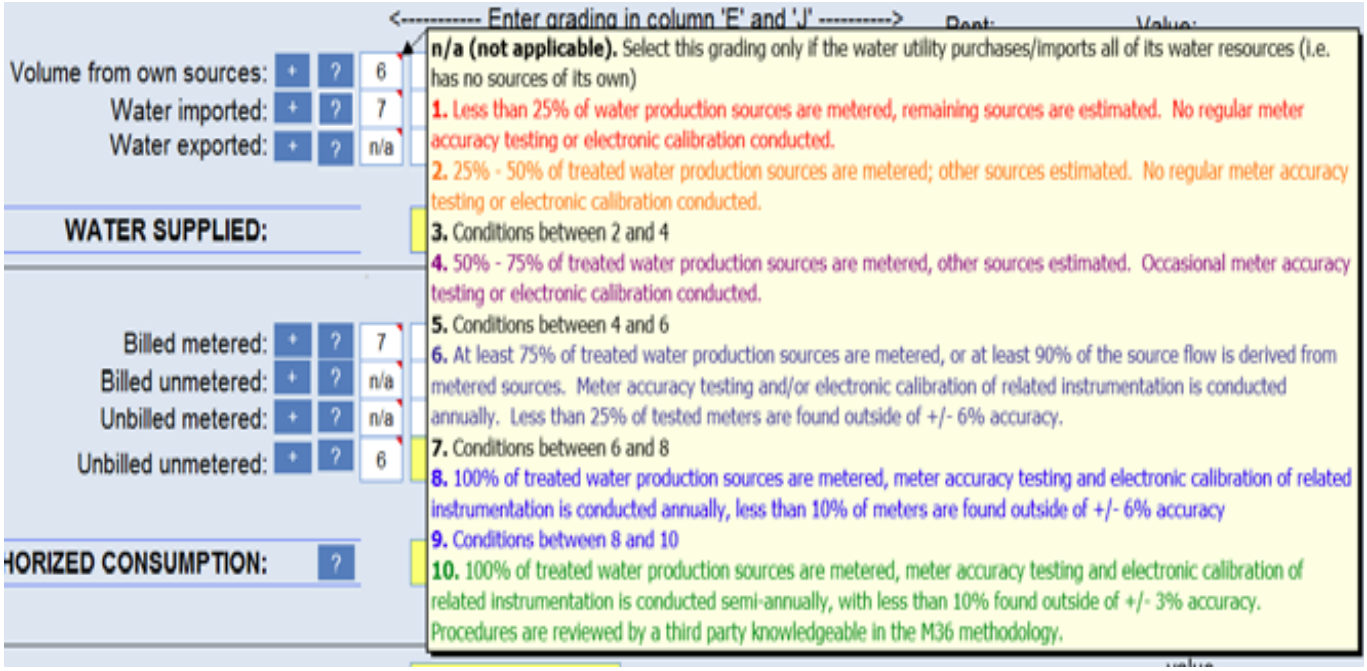
meter error is a water loss if fixed will bring revenue to the District. Process water - flushing, for example, is needed and will always be a component of District operations. Real losses can be reduced by fixing leaks - it's the only loss in the table that gets reduced by our construction programs.

A focus of this water loss reduction program is getting the information correct. How accurate are the many numbers we use in District operations? How accurate are our production meters? What level of customer meter accuracy testing can we (a small district) afford to do?

The output of the water loss reduction program is a completed water audit. Attached to this report is Appendix E of the 2015 Urban Water Management Plan which is the most recent water audit done by District staff. This audit form was completed prior to taking the last training. The audit form has a first page (Reporting Worksheet) which has the input data plus some results and a second page (System Attributes and Performance Indicators) which has performance standards. In this particular month (December 2015 but it was in the February GM report) I reported water losses of 21.2% which is 140 (Non-revenue Water in the worksheet) divided by 658. The Reporting Worksheet gives a lot more detail.

In the performance standards costs are assigned to the various kinds of water losses. I think this approach undervalues the benefits of doing water main and service replacements. Yes, it identifies the money saved in water if we reduce real losses, but it doesn't place values or assign costs to customer interruptions and the looming catastrophes that will occur without a regular water main replacement program.

On the Reporting Worksheet), small numbers are in boxes to the left of the input values. For example, the first data input is Volume from own sources (658). That has an '8' in the box to the left of the 658. Each of these input values has a grade from 1-10 that estimates the accuracy of the input data. Below is the explanation for the range for the first value:



I gave it an 8 but after the training I suspect it should be lower. The mantra given in training was "meet, beat or retreat", meaning if the data does not meet or beat all of the criteria listed, one must go to a lower number. This set of 1-10 values are input for all input data.

Through some calculation not disclosed to us, all the data accuracy numbers are combined to come up with the Water Audit Data Validity Score near the bottom of the Reporting Worksheet which is 74 for this particular iteration. When I went through the spreadsheet after the training and revised some numbers, the validity score came out to 63. Data validators will likely be more critical of our data than I am and the score may be lower when we submit our first validated audit to the State The TAP trainers insisted that the number is not a grade but information about our data. I'm not so certain that it may become a grade some day.

It's important to note that the AWWA water audit software has had a thorough development by experts in the field and has been around for a while. The State of California is following the lead of Georgia which has implemented this program there and the training program uses in part people associated with the Georgia program. I don't understand much of the software but it has been heavily evaluated nationwide and is endorsed by AWWA.

We have more training to go through prior to submitting a validated water audit to the State. The next step (they are calling it a 'wave') is a teleconference with TAP staff. The third wave is a visit to the District by TAP staff (I believe), and the 4th wave is submittal of a validated audit by November 2017.

Benefits of the Program:

- Knowing more about your system is a good thing.

- Having a third party approach to evaluating our system is good for the Board and general public - staff may be giving a rosier picture about what's going on.
- Demonstrates the differences between non-revenue fixes and revenue producing fixes.
- Focusing on data accuracy is a good thing - we should be reporting accurate information.
- Everyone using the same format done in the same way allows for better comparisons with other water utilities.

Concerns:

- This is another report to the State.
- This may lead to performance standards that require spending on items or projects we may not think belong in that order of priority.
- Focus may become on data validity score or some other performance standard and not on fixing leaks - again, I don't think this approach accurately values the cost of water leakage.

Appendix E. AWWA Water Audit Reporting Worksheet

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association.
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? Click to access definition
+ Click to add a comment

Water Audit Report for: Sweetwater Springs Water District (4910004/0028)
Reporting Year: 2015 | 1/2015 - 12/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET 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

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

								Pcnt:		Value:	
Volume from own sources:	+	?	8	658.000	acre-ft/yr	+	?	7			acre-ft/yr
Water imported:	+	?			acre-ft/yr	+	?				acre-ft/yr
Water exported:	+	?			acre-ft/yr	+	?				acre-ft/yr

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

WATER SUPPLIED: 658.000 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

						Pcnt:	Value:	
Billed metered:	+	?	7	518.000	acre-ft/yr			
Billed unmetered:	+	?			acre-ft/yr			
Unbilled metered:	+	?			acre-ft/yr			
Unbilled unmetered:	+	?		8.225	acre-ft/yr			acre-ft/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: ? 526.225 acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 131.775 acre-ft/yr

Apparent Losses

						Pcnt:	Value:	
Unauthorized consumption:	+	?		1.645	acre-ft/yr	0.25%		acre-ft/yr

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

Customer metering inaccuracies:	+	?	5	10.571	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:	+	?		1.295	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 13.511 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 118.264 acre-ft/yr

WATER LOSSES: 131.775 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 140.000 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+	?	9	65.0	miles
Number of active AND inactive service connections:	+	?	8	3,800	
Service connection density:		?		58	conn./mile main

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

Average length of customer service line: + ? (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: + ? 7 75.0 psi

COST DATA

Total annual cost of operating water system:	+	?	9	$1,733,000	$/Year
Customer retail unit cost (applied to Apparent Losses):	+	?	10	$2.73	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	+	?	7	$300.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 74 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

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

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

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

American Water Works Association.
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Water Audit Report for: Sweetwater Springs Water District (4910004/0028)

Reporting Year: 2015 | 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 74 out of 100 ***

System Attributes:

	Apparent Losses:	13.511	acre-ft/yr
+	Real Losses:	118.264	acre-ft/yr
=	Water Losses:	131.775	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	77.43	acre-ft/yr
	Annual cost of Apparent Losses:	$16,065	
	Annual cost of Real Losses:	$35,479	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	21.3%	
	Non-revenue water as percent by cost of operating system:	3.1%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	3.17	gallons/connection/day
	Real Losses per service connection per day:	27.78	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.37	gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL):	118.26	acre-feet/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.53	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline