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Georgia's Approach to Developing Performance Measures After 2 Years of More Than 200 Validated Water Audits

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Outline

- Background and Regulatory Drivers
- Current Requirements for Water Suppliers
- Water Audit Validation
- Benchmarks Development
- Summary
History of Lake Lanier Rulings

- **2009: Fed Court Ruling**
  - Water supply was not originally authorized purpose of Lanier
  - Current supply use exceeds Army Corps authority
  - Restricts future water use (2012 deadline)

- **June 2011: Court of Appeals**
  - Reversed 2009 Ruling
  - Vacated the 2012 deadline
  - Dismissed requirement for Congressional approval

- **June/July 2012**
  - US Supreme Court declines to hear appeal.
  - Army Corps must determine how it will operate Lanier to meet water supply and the other authorized purposes.
Water Stewardship Act of 2010

- WSA was enacted by 2010 General Assembly
- Recognizes imminent needs:
  - to create a culture of water conservation in the State of Georgia
  - to plan for water supply enhancement during future extreme drought conditions and water emergencies
- Six key provisions …
- 1) Requires state agencies to review and enhance conservation programs
- 2) Revises standards for plumbing fixtures and devices
  - High efficiency plumbing fixtures (toilets, showerheads and urinals)
  - Sub-metering for multi-unit buildings (after July ‘12)
  - High efficiency cooling towers for commercial and industrial (after July ’12)
WSA - Key Provisions

- 3) Mandates public water systems to conduct annual water audits and follow leak abatement best practices
- 4) Modifies authorities to restrict outdoor water use and establishes a schedule for outdoor irrigation
- 5) Calls for amendments to permitting system for farm water use
- 6) Created a Water Supply Study Commission to study and analyze the state’s reservoir system and strategic needs for additional water supply
Water Audit Background and Regulatory Drivers

- GA WSA requires annual water system audits (calendar year)

- Phased-in approach based on size of service area:
  - Water systems serving >10,000 individuals initial audit by 2012
  - Water systems serving 3,300 to 10,000 individuals audits by 2013
  - Infrastructure leakage index (ILI)
  - In accordance with the International Water Association (IWA) method/standard

- Submitted 2011 large system audits posted on EPD website
Utilized existing resources
- AWWA M36 Manual and Software
- Metropolitan North Georgia Water Planning District
- 2013: Addition of sample calculations addendum
- Manual to be revised in 2014 – include systems serving below 3,300
Non-Revenue Water (NRW)

- Is the difference between the volume of water produced and the volume of water billed to customers
- It consists of three elements with different values in $/gallon:
  - Real Losses
  - Apparent Losses
  - Unbilled authorized consumption
- Calculate the $ value of each NRW component
IWA/AWWA Standard Water Balance

- **Own Sources**
  - Total System Input
    - Water Exported
  - Water Supplied

- **Water Imported**
  - (allow for known errors)

- **Water Losses**
  - Apparent Losses
  - Real Losses

- **Authorized Consumption**
  - Billed Authorized Consumption
  - Unbilled Authorized Consumption

- **Non-Revenue Water**
  - 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

- **System Input**
  - Total System Input
  - Allow for known errors
Transition away from “Unaccounted-for Water Percentage”

- No consistent definitions for the components
- Percentage indicators have been found to be suspect in measuring technical performance
- Percentage indicators translate nothing about water volumes and costs
- Water systems now translating UAW components into IWA/AWWA standard water balance about water volumes and costs
  - EPD is in the process of changing reporting forms to not use UAW
Real Losses

- Also called *Physical Losses* – water that enters the distribution system, but never reaches a user
- Includes:
  - Leakage on transmission and distribution mains
  - Storage tank overflows
  - Service Line leakage up to customer meter
- Reducing real losses creates an additional resource which reduces operating costs and can be used to defer capital expenditure
Apparent Losses

- Also called *Paper* or *Economic* Losses – water that reaches a user, but is not properly measured or paid for.
- Includes:
  - Theft
  - Customer metering inaccuracies
  - Data handling errors
- Reducing Apparent losses increases revenue but creates no *new* water.
Unbilled Authorized Consumption

- Could be metered or unmetered
- Does *NOT* include leaks and breaks
- System operations and maintenance (unbilled unmetered)
  - Fire fighting, pressure/flow testing, water quality or complaint flushing, sewer jet trucks, street sweeper trucks, line flushing after repair, tank draining for maintenance, etc.
- City/County use (unbilled metered)
  - Water plant, wastewater plant, city hall, fire station, police station, etc.
Non-Revenue Water (NRW)

- Is the difference between the volume of water supplied and the volume of water billed to customers
- It consists of three elements with different values in $/gallon:
  - Real Losses
  - Apparent Losses
  - Unbilled Authorized Consumption
- Use this term instead of “unaccounted-for-water”
% Water Loss is Not a Reliable Metric

- Volume of Real and Apparent Water Loss divided by your Water Supplied
- Percentages can vary widely from year-to-year as production and consumption vary

\[
\text{Real Losses} + \text{Apparent Losses} = \% \text{ Water Loss} \div \text{Water Supplied}
\]
Water Loss Metrics

- Consider the volume of Real and Apparent Losses
- Metrics to consider for goal setting:
  - Real Loss volume per connection (or mile of main)
  - Apparent Losses per connection
  - Infrastructure Leakage Index (ILI)
Need for Validation was Evident from the Start on Large and Small Systems

- Need for validation – based on initial review of 2011 large system audits
- GEFA technical assistance for small systems implemented as result of observations of audit results from large systems (2012 audits)
- Teaching circuit across the State for small systems, starting in June 2012 through February 2013
  - 3 sub-regional teaching workshops
  - In-progress validation step
  - Application phase
  - Reinforcement and continuous improvement
  - Final validation step
AWWA WLCC Water Audit Validation Process

- Standard set of questions
- Individual water system discussions about input and grading
- Uniform adherence to grading matrix definitions
- Consistent definitions and calculations
- Consistent Validation Team

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<th>Component</th>
<th>Submitted Quantity</th>
<th>Submitted Grading</th>
<th>Evaluation Comments</th>
<th>Final Quantity</th>
<th>Final Grading</th>
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<td>Volume from Own Sources</td>
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<td>Master meter error adjustment</td>
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<td>Unbilled Metered</td>
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<td>Unbilled unmetered</td>
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<td>Unauthorized consumption</td>
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<td>Meter Inaccuracy</td>
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Observations from Validated Audit Results

- Volume from own sources was the top area for improving audit results for both large and small validated systems.
- For large validated systems, second top priority is master meter error adjustment, for small systems it is billed metered.
- Validity scores decreased due to validation for both large and small systems; ILI scores increased.
- Large system average validation score (63) was higher than average small system validation score (54).
- Trending for all metrics for unvalidated 2012 large systems show mixed results – need for ongoing validation.
Validated Audit Results from the Large and Small Systems

- Resulted in 100 validated audits for 2012 - small systems
- 107 large system audits for 2011 also validated in Fall 2012/Spring 2013
  - Combined 207 validated audits!!!
- 107 validated large system and 100 validated small system water audits (207)
  - Largest set of validated audits in North America, perhaps even in the world!!
- More water audit validation in progress!

*GAWP/GAWWA Water Loss Control Committee
- Formed in Summer 2012 to assist in promoting water audits and leak detection and abatement programs state wide
- Provides assistance to EPD with updating and revising the Georgia Water Loss Control Manual
Validated Audits May Still Need Improvement Before Target/Goal Setting

- Validated just means it is an accurate reflection of current data and activities
- Improving data scores on inputs
- Improve the quality/reliability data and practices
- Confidence in the results of the audit
- Low confidence in water audit can result in bad financial decisions
Bottom-up Data Validation

- Improve the data going into the audit
  - Production meter testing
  - Customer meter testing
  - Meter reading system evaluation
  - Billing system evaluation
  - Business process evaluation
Drivers for Benchmarks Development

The Board of Natural Resources shall by January 1, 2011, adopt rules for the minimum standards and best practices for monitoring and improving the efficiency and effectiveness of water use by public water systems to improve water conservation. The best practices program shall include without limitation:

1. The establishment of an infrastructure leakage index;
4. A phased-in approach requiring public water systems to implement water loss detection programs.
What are Others Doing?

- Tennessee – Increasing validity scores and % NRW by Cost
- Texas – proposed water loss thresholds for financial assistance
- Ohio – 15% UFW, ILI targets for Water Utilities
- California – processes, validity score, specific improvement
- Other states: WaterOnline Article, Jernigan
Planned Use of Water Audit Results by EPD

- Establish benchmarks for water loss based on process and performance measures – ILIs, validity scores, Op23, Op24, Economic Level of Leakage (ELL), and other factors.

- Audit results will inform decisions on:
  - water withdrawal permit applications
  - drinking water plant expansions
  - needs assessments for reservoir projects
  - GEFA funding for water projects
  - Regional Water Planning
GWLCC Draft Benchmarks Framework

- Group started in November 2013 with goal of advising EPD
- Provide water systems with a framework to set goals and monitor system-specific water loss improvement over time.
- Improvement is measured in terms of performance (metrics) and process (business practices), with an emphasis on process.
- Incorporation of Validation/Certification of water audit
- Not built on universal targets, or comparison between utilities, but system-specific improvement.
- Recognizes that data validity will improve over time to a limit.
- Include a suite of performance and process measures, recognizing there is not 1 measure that is applicable and appropriate for every utility.
- Overall framework should be applicable to all utilities 3,300 population and greater.
- Improvements should be focused on cost-effective conservation, and empower utilities to make business decisions that are appropriate to their specific situation.
- In keeping with best practices recognized by AWWA and IWA.
Stakeholder Draft Rule was released on October 6, 2014

- Public meeting on October 22, 2014

Components are similar to GWLCC framework
- Codify audit submission
- Require validation
- Individualized goals
- Reporting
- Demonstrable progress

SUMMARY

- Water Loss Benchmarking should be based on system specific improvements and goal setting
- Industry best practice methodology should be followed, IWA AWWA Methodology, M36 Manual, AWWA Water Audit Software
- GAWP/GAWWA Water Loss Control Committee was formed to support water system education on water auditing, water loss and technical assistance
- Georgia EPD rulemaking process has been informed by this process and will benefit from advance stakeholder involvement
Questions

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