

Guidance for Demonstrating Progress in Improving Water Efficiency
Georgia Department of Natural Resources
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Version 1.0

Purpose

The purpose of this document is to provide guidance to public water supply systems for meeting the requirements of Section 391-3-33-.05 of the Rules for Water Efficiency (Rules) when applying for a permit renewal or a new or modified permit for additional capacity under the Safe Drinking Water Act or water withdrawals under the Water Quality Control Act or Groundwater Use Act. This rule requires applicants to demonstrate progress in improving water efficiency. This guidance will discuss what actions applicants will need to take to adequately demonstrate progress in improving water efficiency and the criteria the Environmental Protection Division (EPD) will consider in evaluating those demonstrations for adequacy during the application review process.

Background and Overview

Section 391-3-33-.05 of the Rules requires public water systems serving populations of 3300 to make progress in improving water supply efficiency. As outlined in the Rules, this is generally accomplished in a three step process which involves 1) developing and implementing a water loss control program, 2) establishing system-specific water efficiency goals, and 3) demonstrating progress towards achieving those goals using performance measures. These systems are required to demonstrate progress to EPD when applying for a permit renewal or a new or modified permit for additional capacity under the Safe Drinking Water Act or water withdrawals under the Water Quality Control Act or Groundwater Use Act.

Georgia Water System Audits and Water Loss Control Manual

The Georgia Water System Audits and Water Loss Control Manual (water loss manual) establishes a framework for how public water systems improve water efficiency. It also describes the current best practices needed to complete a water system audit and elements necessary to implement a water loss control program, largely incorporating the AWWA methodology. Accordingly, actions described in the water loss manual for improving water efficiency play an important role in how systems demonstrate progress in water efficiency improvement. Section 391-3-33-.04 of the Rules requires that public water systems conduct an annual water loss audit in accordance with the latest version of the American Water Works Association (AWWA) methodology as provided for in the water loss manual. In evaluating an applicant's demonstration of progress in improving water efficiency, EPD will consider how well the applicant has improved on the basic measures of performance discussed later, and what progress has been made in developing and implementing a water loss control program. In summary, an adequate demonstration of progress will be evaluated by considering the applicant's adoption of the metrics, goals, and practices described in the water loss manual, how

well the applicant is performing with respect to these metrics, goals, and practices, and progress in implementing water loss control activities.

Goal-Setting

As provided for in Section 391-3-33-.05(2) of the Rules, water systems are required to establish system-specific water efficiency goals. All systems should have goals for defined improvements in their **data validity scores** and reductions in **operational basic apparent and real losses**. These parameters are determined through the annual water auditing process. Additionally, all systems should work toward establishment of an economic level of leakage (EOL) since this goal represents the highest level of efficiency achievable for a specific system given its unique conditions and resources. A system-specific target infrastructure leakage index (TILI) may also represent the highest level of efficiency achievable for a system; however, note that ILI may not be an appropriate measure of water efficiency for all systems. The processes for developing system specific TILIs and EOLs are described in Section 4.4 of the water loss manual.

In addition to establishing system-specific goals, Section 391-3-33-.05(2) of the Rules also provides that water systems may establish other goals for themselves not specifically enumerated in the Rules. Use of alternative goals may be appropriate when setting interim targets for achieving a system-specific TILI or EOL, particularly when reaching the TILI or EOL may take an extended period of time. Alternative goals may also be helpful in establishing benchmarks for systems to use in measuring progress in improving water efficiency with respect to regional benchmarks established in a regional Water Development and Conservation Plan. Such Plans are approved by the Director in accordance with the Metropolitan North Georgia Water Planning Act or the Georgia Comprehensive Statewide Water Management Planning Act. In any case, the ultimate water efficiency goal for each system should be their system-specific TILI or EOL unless the alternative goal represents a higher degree of efficiency.

Inherent in achieving these goals, each system should establish intermediate milestones and implementation schedules for each and identify costs and funding sources for anticipated projects.

Demonstrating Progress in Improving Water Efficiency

In reviewing a permit applicant's request, EPD will consider to what degree the applicant has shown progress towards achieving their system-specific water efficiency goals. Section 4.4 of the water loss manual describes what is needed to demonstrate progress in improving water efficiency. In order demonstrate progress in improving water efficiency, permit applicants may need to:

- 1) Show a net and consistent improvement in data validity score since beginning the water audit process;
- 2) Show that they have implemented (or are implementing) a water loss control program (WLCP) as described in Section 4 of the water loss manual and demonstrate that it is effective in helping them achieve their system-specific-specific goals. Note that an effective water loss control program should demonstrate a net improvement in

Operational Basic Real Losses and Operational Basic Apparent Losses over time up to the level represented by the ELOL. Losses may be quantified in volumes, volume/connection/day, or volume/length of main/day.

- 3) Establish a system-specific ELOL and/or TILI and demonstrate progress toward achieving these values over time. Once the ELOL and/or TILI have been achieved, the system must maintain them in lieu of continuing to demonstrate progress. Note that the TILI may not be an appropriate measure of water efficiency for all systems.

If an applicant has also chosen an alternative goal that is based upon a Water Development and Conservation Plan approved by the Director in accordance with the Metropolitan North Georgia Water Planning Act or the Georgia Comprehensive Statewide Water Management Planning Act, and the alternative goal represents a lower degree of efficiency than the system-specific TILI or ELOL, it would be incumbent upon the applicant to demonstrate to EPD's satisfaction why achieving the TILI and/or ELOL may not be appropriate in their particular case. This would require that the applicant examine the difference between the degree of water efficiency that could be achieved if TILI and/or ELOL were set as goals versus the degree of efficiency that would be achieved using an alternative goal and demonstrate why achieving the TILI and/or ELOL is not practicable.

Documentation Needed to Demonstrate Progress in Improving Water Efficiency

At a minimum, permit applicants will need to submit the following documentation in support of their demonstration that they are making progress in improving water efficiency:

- 1) Annual Water Audit – Since the annual water audit is already submitted to EPD by March 1st for the previous calendar year, applicants would not be required to resubmit their audit as part of the application unless otherwise requested by EPD;
- 2) Water Loss Control Program (WLCP) –The applicant should provide a summary of past actions taken, planned future actions, and schedules for all recurring actions, to address water loss for both apparent and real losses. For apparent losses, this would include, at a minimum, action taken and planned to address unauthorized consumption, customer metering inaccuracies, systematic data handling errors, and any other actions taken. For real losses, this would include steps taken and planned to control and repair leaks, pressure management, and storage losses. As noted above, any implementation schedules submitted may become part of the entity's water withdrawal permit, and therefore enforceable under the Rules. If an applicant has not yet submitted this program to EPD, this requirement may be included in a renewed or modified permit or requested as part of the application process for a new or modified permit. Note that the issues addressed in the WLCP should be consistent with the recommendations produced by the applicant's annual water audits.
- 3) System-specific water efficiency goals – In addition, an applicant should be able to describe the actions that have been taken to conduct a leakage component analysis for the purpose of establishing an Economic Level of Leakage (ELOL). If no actions have yet been taken toward this end, a defined timeline with actions toward this goal must be

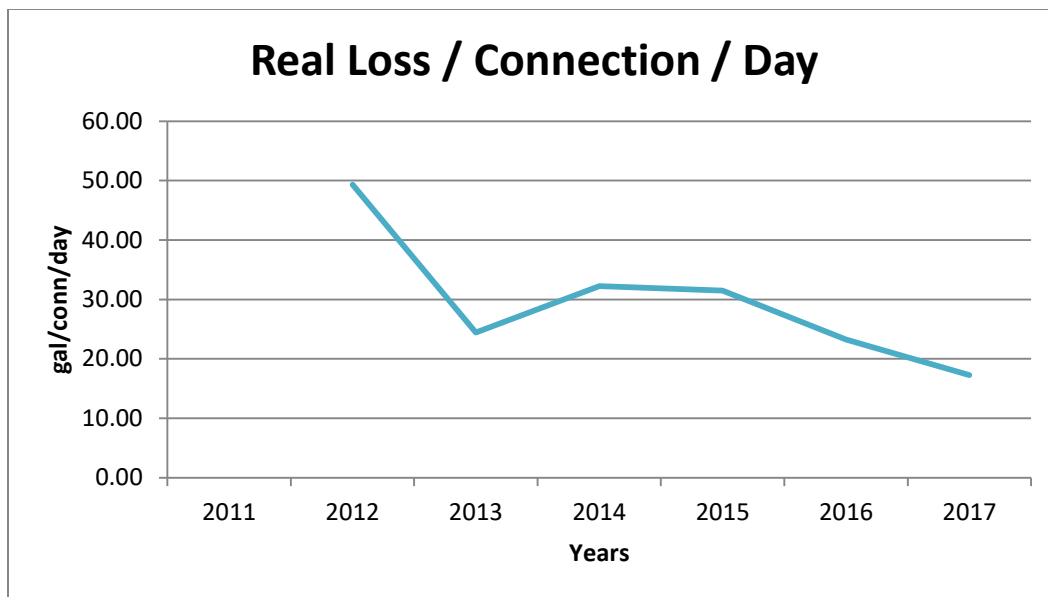
submitted. Note that any implementation schedules submitted may become part of the entity's water withdrawal permit, and therefore enforceable under the Rules. The applicant may also show that they have established a Target Infrastructure Leakage Index (TILI) appropriate for their system, justifying all relevant assumptions and considerations. Methodologies for developing the TILI and ELOL are described in the Section 4.4 of the water loss manual and as follows:

- a. TILI – Using the decision matrix presented in Table 4 of Section 4.4 of the water loss control manual, the applicant should identify the target ILI range they have selected for themselves based upon the system-specific considerations presented in the table.
 - b. ELOL – The results of the leakage component analysis and the economic evaluation of leakage intervention strategies are used to design the applicant's water loss control program and calculate the ELOL. At a minimum, this includes the results of the Leakage Component Analysis Model described in the Water Research Foundation publication “Real Loss Component Analysis: A Tool for Economic Water Loss Control” (Web Report #4372a) which is available for free at <https://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx>.
- 4) Performance Measures – The applicant should identify the parameters being used to measure their progress in improving water efficiency and show net improvement in those measures over time. At a minimum, this would consist of showing net improvement in the Data Validity scores, Annual Operational Basic Real Losses, and Apparent Losses over time. If the applicant has also selected one or more alternative measures in addition to Annual Operational Basic Real Losses and Apparent Losses, the rationale for selecting these alternative measures should also be presented along with an analysis of how these measures also demonstrate improvement.
- 5) Evaluating progress in achieving alternative goals – if applicants are making progress towards achieving their system-specific goals they should also be making progress towards achieving any goals that have been established pursuant to a regional water development and conservation plan. Systems are not excluded from establishing system-specific goals simply because they have a goal established pursuant to a regional water development and conservation plan.

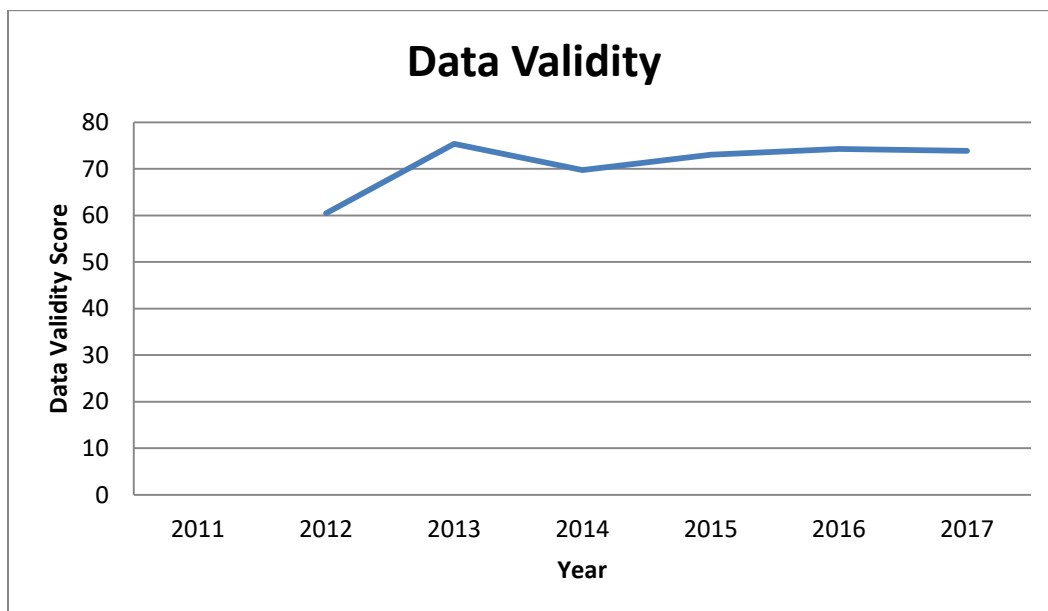
Examples of Demonstrated Progress in Improving Water Efficiency

The below figures have been assembled from submitted water audit data in the State of Georgia and represent multiple scenarios in which progress toward increasing water efficiency is evident in the data alone. These figures are intended to serve as examples and are not all-inclusive of all scenarios that could be considered progress, as derived from the results of annual water audits alone.

- 1) Sharp Decrease in Infrastructure Leakage Index, Real Losses / Conn / Day; Consistent Increase in Data Validity Score:

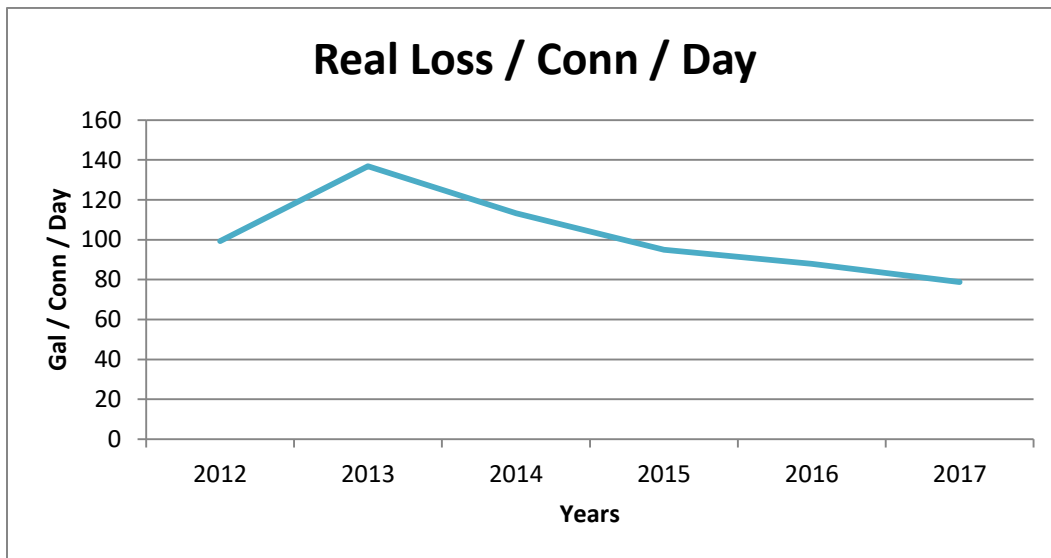


Real Loss = 65% decrease (2012 – 2017)

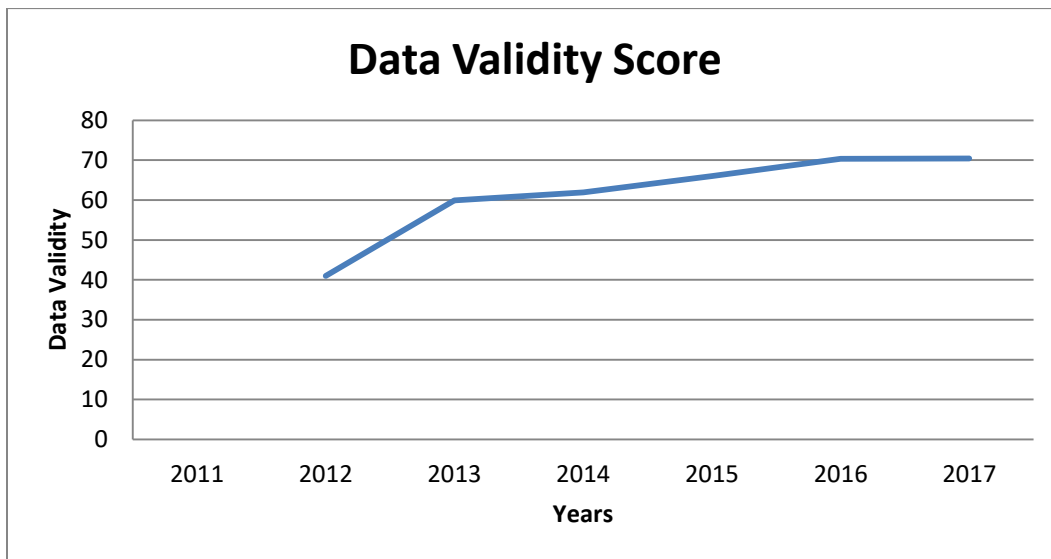


DV = 22% increase (2012 – 2017)

- 2) Consistent Decrease in ILI, Real Losses / Conn / Day, Sharp Increase in Data Validity Score:

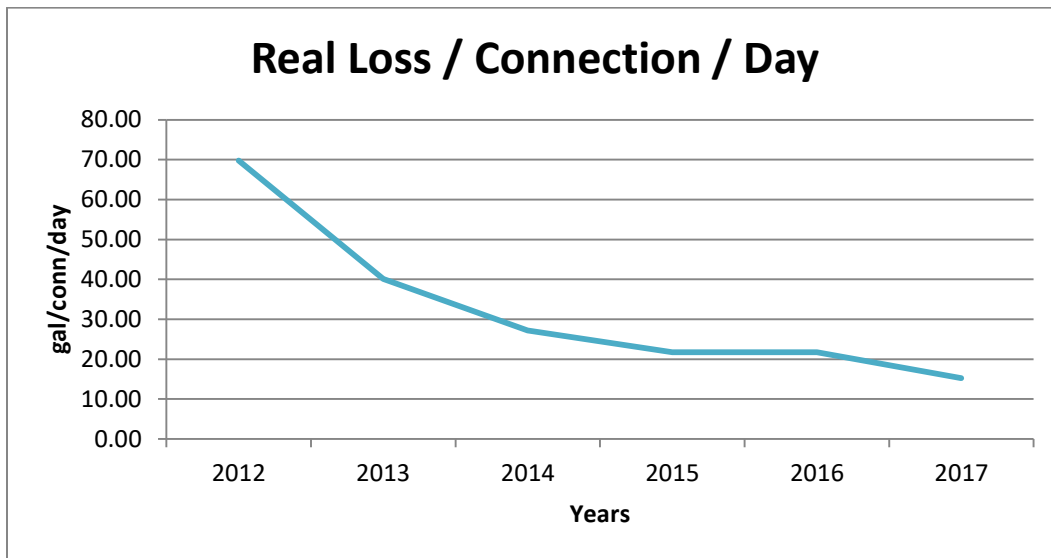


Real Loss = 20% decrease (2012 – 2017)

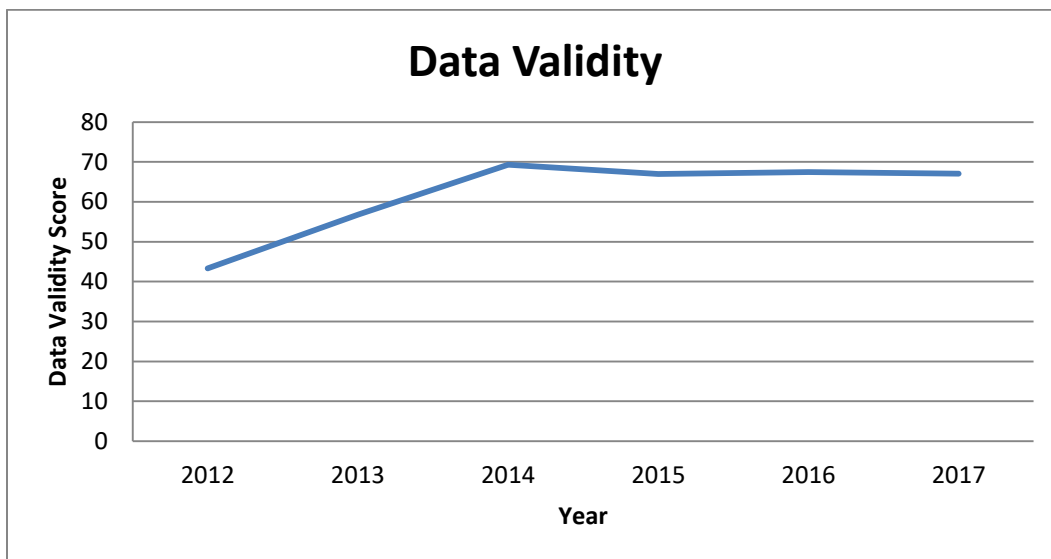


DV = 72% increase (2012 – 2017)

3) Sharp Decrease in ILI, Real Losses / Conn / Day, Stable Data Validity Score:



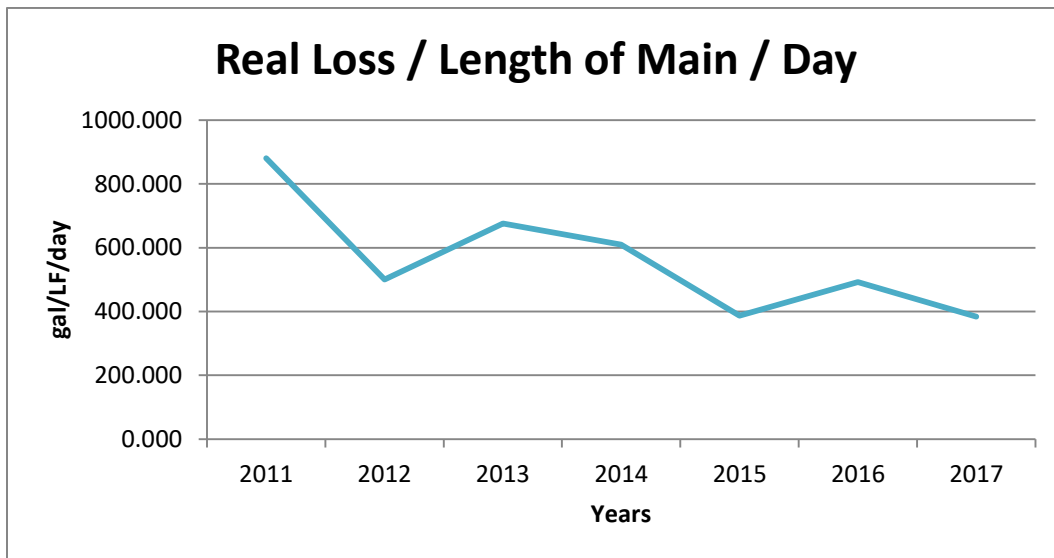
Real Loss = 78% decrease (2012 – 2017)



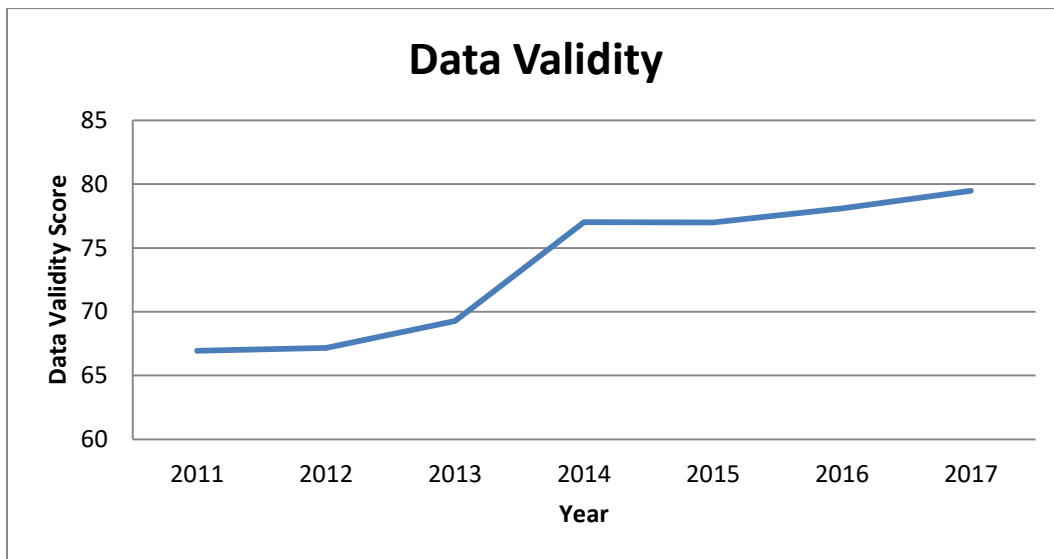
DV = 54% increase (2012 – 2017);

DV = 3% decrease (2014 – 2017)

- 4) Consistent Decrease in ILI, Real Losses / Length of Main / Day, Consistent Decrease in Data Validity Score:



Real Loss = 56% decrease (2011 – 2017)



DV = 18% increase (2011 – 2017)

Review Process

EPD's review to determine whether a permittee has demonstrated progress toward improving water efficiency consists of three steps:

- 1) Evaluation of data trends and comments available from past Water Audits
- 2) If results from water audit review are unclear, request for narrative explaining variability and programs or measures implemented to reduce water loss.
- 3) Verification that the permittee has a Water Loss Control Program drafted and implemented which incorporates the results of its Annual Water Audits. This includes the establishment of goals toward improving water supply efficiency and feasible timelines for the implementation of any intermediate steps toward this end.

The incorporation of this information in the permitting process depends on the results generated by these first two steps. Review of these materials will focus on two main questions: 1) How well has the applicant demonstrated progress in improving water efficiency, and 2) To what extent would additional improvements in water efficiency offset the need for the added increase in permitted capacity being requested by the applicant?

More specifically, EPD will consider the information provided in the context of the following questions:

- 1) Has a water loss control program been developed and implemented that conforms to the Georgia Water System Audits and Water Loss Control Manual?
- 2) What actions have been taken to implement recommendations from each year's audit?
- 3) Has a TILI been developed, if appropriate?
- 4) Has an ELOL been established?
- 5) If the answer to #4 is yes, has the ELOL been achieved and maintained?
- 6) If the answer to #4 is no, have there been overall trends of improvement in Data Validity (DV) scores and Operating Basic Apparent Losses and Operating Basic Real Losses as shown in audit data?
- 7) If the answer to #6 is no, can the applicant provide an explanation for variability in the data or the lack of clear progress according to the data from past Water Audits?
- 8) What barriers or obstacles are limiting the applicant's ability to achieve their stated goals or see improvement in DV scores and Operating Basic Apparent Losses and Operating Basic Real Losses, and what actions are being taken to eliminate or mitigate them?
- 9) Has the applicant achieved and maintained a data validity score of at least 50?
- 10) In the case of a request to increase water withdrawal, to what extent can the applicant's request be met by meeting and maintaining their ELOL and/or TILI?

- 11) Is the applicant using alternative performance measures to demonstrate progress? If so, what was the rationale for selecting these alternative measures and has the applicant demonstrated that these alternative measures are at least as effective as the measures specified in the rule?

- 12) Has the applicant established alternative ultimate goals other than or in addition to TILI or ELOL? If so, what was the rationale for selecting these goals and has the applicant demonstrated that these alternative goals are appropriate? Would these alternative goals allow the system to arrive at water efficiencies that are at least as stringent as goals that would be established using the ELOL and TILI, if appropriate?

Summary

Permit applicants successfully implementing water loss control programs in accordance with the Rules for Water Efficiency, the Georgia Water System Audits and Water Loss Control Manual, and following this guidance should have little difficulty in demonstrating their progress in improving water efficiency. For more information regarding the permit application submittal and review process, applicants may contact EPD at 404-463-1511.