Commission Certification of Small Water Utilities: The Role of Performance Standards

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Executive Summary

A basic responsibility of state regulatory commissions is to establish and regulate levels of utility performance. State commissions must ensure that the utilities they regulate perform at levels that are in the public interest.

Many small water utilities struggle to achieve reasonable economies of scale, financial security, effective management, customer service, technical proficiency, and reliable infrastructure. Such utilities' financial, management, and technical deficiencies make it difficult for commissions to elicit effective, efficient operations, reasonable rates, and high standards of customer service.

Effective organizations achieve high-quality performance by establishing performance standards, tracking achievement of or toward those standards, and making adjustments when standards are not achieved. Performance standards and performance indicators allow managers, regulators, and other stakeholders to track performance against a utility's established standards to determine performance status, progress, and trends.

State commissions should establish comprehensive performance standards and indicators for small water utilities. Commissions should incorporate such standards and indicators into certification requirements to elicit high-quality performance from small water utilities.

Performance standards that apply only when utilities obtain their initial operating certificates, however, do not fully address the challenges commissions face with small water utilities. The performance of a once well-managed and well-operated system can deteriorate over time. A poorly performing utility, moreover, may have obtained its certificate before a commission established comprehensive performance standards. To be effective, performance standards should apply to small utilities on a continuous basis. This can be accomplished through a certification renewal process or as part of a commission's ongoing review process.

Financial, managerial, operational, and infrastructure challenges are not exclusive to small water utilities. There are many small utilities that maintain efficient, effective operations. Many of the principles presented in this report are drawn from successful large water utilities and current water industry standards and practices. State commissions can apply these concepts to utilities of any size to resolve operational and managerial difficulties. This report specifically addresses the problems facing small utilities, however, since regulatory commissions report the greatest challenges with those entities.

Once performance standards and indicators are established, a commission needs effective enforcement authority to ensure compliance with the standards. Regulatory commissions are generally provided broad statutory powers to regulate utilities serving their states in the public interest, including the authority to establish standards of performance. Commissions are granted authority to issue rules and orders necessary to carry out their responsibilities. A commission

proposing to establish and enforce specific performance standards on utilities through rules and orders should review its statutory authorities and confer with counsel to confirm existing authority or develop allowable and effective enforcement provisions.

This report (1) discusses why commissions should address performance standards for small water utilities through certification requirements, (2) discusses rules and rule language commissions can adopt to establish and maintain performance standards, and (3) describes performance standards and performance indicators commissions should establish for small water utilities.

This report is available electronically at:
http://nrri.org/pubs/water/NRRI_sml_wtr_perf_stds_dec08-13.pdf

Table of Contents

Commission Certification of Small Water Utilities: The Role of Performance Standards

I. Why should commissions address performance standards for small water utilities through certification?

A. Commission responsibilities and challenges

A basic responsibility of state regulatory commissions is to establish and enforce expectations for utility performance. State commissions must ensure that the utilities they regulate perform at levels that promote the public interest.

Many small water utilities[1] struggle to achieve reasonable economies of scale, financial security, effective management, customer service, technical proficiency, and reliable infrastructure. Small systems accounted for 90% of all systems in 2000 that violated one or more national primary drinking water standards in three calendar quarters within a three-year period.[2] Such utilities' financial, managerial, and technical deficiencies make it difficult for commissions to elicit effective, efficient operations, reasonable rates, and high standards of customer service. The challenges for small water utilities and commissions that regulate them will become even more acute as utilities face the need to replace aging infrastructure and comply with more stringent federal regulations.

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[1] The U.S. Environmental Protection Agency (EPA) classifies water systems according to the number of people they serve. (See David Denig-Chakroff, *The Water Industry at a Glance*, National Regulatory Research Institute, April 2008, available at: http://nrri.org/pubs/water/Water_industry_at_a_glance.pdf) Classified as *very small* are systems that serve between 25 and 500 people; *small*, between 501 and 3,300 people; *medium*, between 3,301 and 10,000 people; *large*, between 10,001 and 100,000 people; and *very large*,100,001 or more people. When we refer to *small water utilities* in this report, we mean utilities that serve between 25 and 3,300 people.

[2] Office of the Inspector General, *Impact of EPA and State Drinking Water Capacity Development Efforts Uncertain,* Report No. 2003-P-00018, September 30, 2003.

The EPA addresses small water utility technical, financial, and managerial performance requirements through its Capacity Development Program.[3] This federal program is linked to the EPA Drinking Water State Revolving Fund (DWSRF) overseen by state primacy agencies.[4] To receive the full allotment of funds to which they are entitled under the DWSRF, state primacy agencies must develop (1) a "program to ensure that all new . . . water systems . . . demonstrate sufficient technical, managerial and financial capacity to comply with national primary drinking water regulations"; and (2) "a strategy to assist existing [water systems] in acquiring and maintaining technical, managerial and financial capacity to comply with SDWA requirements."[5] State commissions should work closely with the primacy agencies in their states to develop appropriate standards for the technical, financial and managerial performance of small water systems. Regardless of whether the primacy agency in a state develops a federal capacity development program, however, the state commission should address utility technical, financial, and managerial performance standards in the public interest.

Financial, managerial, operational, and infrastructure challenges are not exclusive to small water utilities. There are many small utilities that maintain efficient, effective operations. Many of the principles presented in this report are drawn from successful large water utilities and current water industry standards and practices. State commissions can apply these concepts to utilities of any size to resolve operational and managerial difficulties. This report specifically addresses the problems facing small utilities, however, since regulatory commissions report the greatest challenges with those entities.

In a February 2008 report on small water systems,[6] NRRI identified certification requirements as one approach state commissions could use to improve conditions at small water

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[3] *Capacity development* provisions were established by the Safe Drinking Water Act (SDWA) amendments of 1996 (Pub. L. 104-182; 42 U.S.C. § 119 et seq. August 6, 1996).

[4] A *primacy agency* is a state agency responsible for implementing and enforcing a federal statute or program. In this case, state primacy agencies responsible for implementing and enforcing the provisions of the SDWA are typically the natural resources, health, or environmental enforcement agencies in a state.

[5] U.S. EPA, *Handbook for Capacity Development: Developing Water System Capacity Under the Safe Drinking Water Act as Amended in 1996*, EPA 816-R-99-012, July 1999. Available at: http://www.epa.gov/safewater/smallsystems/pdfs/regcoor.pdf

[6] Stanford, Melissa J., *Small Water Systems: Challenges and Recommendations*, National Regulatory Research Institute, Report. No. 08-02, February 7, 2008.

utilities. In April 2008, NRRI sponsored a web-based meeting on small water system issues[7] attended by about 60 people representing 13 state regulatory commissions and other organizations. Meeting participants prioritized issues for which they thought additional research would be beneficial to regulatory commissions. Establishing standards and expectations through certification requirements for small water systems emerged as a priority. A July 2008 NRRI paper[8] presented the issues and challenges faced by regulatory commissions in establishing performance standards and incorporating them into certification requirements.

Certifying new utilities is a function of state commissions. Certification is the tool through which commissions can establish expectations for small water utility performance. To enforce such expectations, a commission needs a process for periodic review to ensure that the utility is maintaining the performance standards the commission has established. A commission needs the ability to recertify small water utilities on a periodic basis or to de-certify a utility that does not meet commission performance standards over time.

The present report discusses why commissions should address performance standards for small water utilities through certification requirements (Part I), discusses rules and rule language commissions can adopt to establish and maintain performance standards (Part II), and describes performance standards and performance indicators commissions should establish for small water utilities (Part III).

B. The need to apply performance standards and performance indicators

Effective organizations achieve high-quality performance by establishing performance standards, tracking achievement of or toward those standards, and making adjustments when standards are not achieved. Ineffective organizations (1) do not establish standards, (2) do not establish appropriate standards, (3) do not track their performance against established standards, or (4) do not act to improve upon failing to achieve an established standard.

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[7] A summary of the meeting is available at: http://nrri.org/pubs/water/Small_Water_Systems_Research_Priorities.pdf

[8] Denig-Chakroff, David, *Certification Requirements As a Path to Improve Small Water Utility Operations: The Issues Facing Regulatory Commissions*, National Regulatory Research Institute, Report No. 08-09, July 8, 2008. Available at: http://nrri.org/pubs/water/small_util_cert_issues_jul08-09.pdf.

Tracking performance is the key to effective utility management. Performance tracking may be *internal* or *external*. Internal tracking analyzes a utility's achievement of or progress toward its established standards. External tracking, often referred to as *benchmarking*, is the comparison of the same or similar standards of performance across different organizations. Commissions can, for example, use benchmarking to compare the performance of (1) all water utilities under their jurisdiction, (2) water utilities within a certain size class (e.g., small utilities), or (3) different types of utilities (e.g., water utilities and electric utilities). Benchmarking helps utilities or regulators identify optimum utility practices and appropriate standards and improvement objectives.

For either internal or external tracking, objective *performance indicators*[9] should be developed. The indicators should be designed to show where a utility stands in relation to the achievement of established performance standards. The indicators should be tailored to the needs and perceived deficiencies of the utility whose performance is being evaluated. They should address specific areas where the utility or regulators seek improvement.

Part III of this report contains performance standards and performance indicators we recommend commissions establish for small water utilities under their jurisdiction. The standards and indicators cover six topics critical to effective utility management and operation:

1. Operational efficiency and technical proficiency
2. Reliable infrastructure
3. Water quality and sustainability
4. Financial security
5. Customer satisfaction and community relations
6. Leadership and employee development

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[9] The terms *performance indicator* and *performance measure* are often used interchangeably in writings and discussions about organizational management. We prefer the term *performance indicator* and use that term in this report. A *measure* implies a level of precision that usually does not exist when tracking progress toward or achievement of a performance standard. Properly designed *performance indicators*, however, are useful in gauging progress toward or achievement of a performance standard.

The standards and indicators in Part III are by no means the only standards and indicators available to state commissions. We recommend them as a basis for eliciting high-quality performance from small water utilities. Commissions should review the recommended standards and indicators carefully. They should consider additional standards based on the particular issues they face with small water utilities. Once a commission establishes its standards, it should develop indicators to track achievement of or progress toward each standard. To develop effective indicators, commissions should use the following ten performance indicator (the term *measure* is used in the quoted reference) guidelines, which were developed for utilities by the EPA and six water and wastewater professional organizations:[10]

1. Select measures that support the organization's strategic objectives, mission, and vision.

2. Select the right number, level, and type of measures for your organization. Consider how measures can be integrated as a cohesive group (e.g., start with a small set of measures across broad categories and increase number and specificity over time as needed), and consider measures that can be used by different audiences within the organization.

3. Measuring performance will not necessarily require additional staff, but will require resources. Allocate adequate resources to get the effort off to a good start, and fine tune over time to balance the level of measurement effort with the benefit to the organization.

4. Develop clear, consistent definitions for each measure. Identify who is responsible for collecting the data, and how the data will be tracked and reported.

5. Engage the organization at all levels in developing, tracking, and reporting measures, but also assign someone in the organization the role of championing and coordinating the effort.

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[10] U.S. Environmental Protection Agency, Association of Metropolitan Water Agencies, American Public Works Association, American Water Works Association, National Association of Clean Water Agencies, National Association of Water Companies, and Water Environment Federation, *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, pp. 16-17. Available at: http://www.watereum.org/.

6. Set targets rationally, based on criteria such as customer expectations, improvement over previous years, industry performance, or other appropriate comparisons.

7. Select and use measures in a positive way to improve decision making, clarify expectations, and focus attention, not just to monitor, report, and control.

8. When selecting measures, consider how they relate to one another. Look for cause-and-effect relationships; for example, how improvements in product quality could result in increased customer satisfaction.

9. Develop an effective process to evaluate and respond to results. Identify how, when, and to whom you will communicate results.

10. Incorporate the "Plan-Do-Check-Act" cycle[11] approach into evaluating both the specific measures and the system as a whole. Regularly review the performance measurement system for opportunities to improve.

II. What rules and rule language should commissions adopt?

Rules and orders are the primary tools commissions have to elicit high-quality performance from small water utilities. Commissions typically issue rules governing water service and require water utilities they regulate to obtain certificates of public convenience and necessity to initially establish service and to construct new facilities or infrastructure. Commissions issue rules requiring utilities to file annual reports and specifying the content of those reports. Commission rules can be used to (1) establish performance standards for water utilities, (2) require utilities to report on their level of performance on a periodic basis, and (3) stipulate compliance with established performance standards. A newly formed utility must receive a clear message about regulatory expectations.

Performance standards that apply only when utilities obtain their initial operating certificates, however, do not fully address the challenges commissions face with small water

[11] The *Plan-Do-Check-Act cycle* is a common organizational management tool that provides a framework for continual improvement. It was made popular by Dr. W. Edwards Deming, *Out of the Crisis*, MIT Center for Advanced Engineering Study, 1986.

utilities. The performance of a once well-managed and well-operated system can deteriorate over time. A poorly performing utility, moreover, may have obtained its certification before a commission established comprehensive performance standards. To be effective, performance standards should apply to small utilities on a continuous basis. This can be accomplished through a certification renewal process or as part of a commission's ongoing annual review process.

Once performance standards and indicators are established, a commission needs effective enforcement authority to ensure compliance with the standards. Commissions should use rules to impose and enforce performance standards and indicators they deem necessary to elicit high-quality performance in the public interest.

Regulatory commissions are generally provided broad statutory powers to regulate utilities serving their states in the public interest, including the authority to establish standards of performance. Commissions are granted authority to issue rules and orders necessary to carry out their responsibilities. A commission proposing to establish and enforce specific performance standards on utilities through rules and orders should review its statutory authorities and confer with counsel to confirm existing authority or develop allowable and effective enforcement provisions.[12]

This Part provides examples of rules and recommendations for rule language (*in italics*) that could be incorporated into rules addressing water utility certification. We are not proposing comprehensive rule language. Every commission has its own formats and standards for rules. We provide here general concepts and specific elements that should be addressed in the broader context of rules dealing with utility certification.

A. Purpose statement

The purpose statement of a rule addressing small water utility issues should make clear its intent to align utility management and operations with the *public interest*, as the commission defines it. It should make clear the commission's intent to establish and enforce performance standards.

> *The purpose of this rule is to achieve the public interest by ensuring that public water utilities are financially secure and provide effective management, efficient*

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[12] An NRRI report due out in April 2009 will discuss the extent to which state commissions can specify management activities for utilities under their jurisdiction.

operations, reliable infrastructure, sustainable resources and high standards of water quality and customer service. The Commission's intent is to establish and assure minimum standards for financial, managerial, technical, and infrastructure aspects of utility operations.

B. Initial certification requirements

A commission rule for addressing small water utility issues should require a new small utility to show it has the financial, technical, and managerial capability to operate effectively and efficiently and to provide high quality service. It should require proof of financial security and evidence of the experience of proposed utility managers and staff.

An applicant for a certificate to establish a new water utility shall provide the Commission with information it requests in a format it specifies relating to (1) the customers proposed to be served, (2) the finances of the proposed utility, (3) the organization of the proposed utility, (4) the experience of proposed management personnel, (5) the experience of proposed operational personnel, (6) position descriptions and minimum qualifications of future proposed personnel, (7) existing and proposed facilities and infrastructure of the proposed utility, and (8) any other information the Commission deems relevant to the effective management and operation of the utility in the public interest.

Economies of scale are critical to a utility's ability to operate efficiently and effectively. Commissions should require small water utilities to show that there are no other utilities or entities (either individually or in combination) in the immediate vicinity of the customers proposed to be served that can provide service more effectively or at lower cost.

An applicant for a certificate to establish a new water utility proposed to serve a population under 3,500 shall demonstrate to the Commission that there is no other established water utility or utilities in the area able to provide the proposed service at the same or a higher level of quality or at the same or lower cost.

C. Requirements for periodic recertification

Commissions should require small water utilities to undergo recertification on a periodic basis to ensure continued high quality performance. The recertification period should be determined on the basis of past performance. If, for example, a small utility has a history of providing high-quality performance, a commission should require recertification once every five years. A commission should require a poorly performing utility to recertify every year.

Any water utility serving a population under 3,500 shall undergo review by the Commission for recertification on a timetable determined by the Commission. A water utility undergoing recertification review shall provide the Commission with

information it requests in a format it specifies relating to the matters required for initial certification of a water utility. [See Part II.B.] *The Commission's decision regarding recertification shall be based on (1) the information it receives from the utility, (2) the annual report of performance indicators, (3) the utility's achievement of or progress toward performance standards, and (4) any other information the Commission deems relevant to the effective management and operation of the utility in the public interest.*

D. Performance standards

Commission rules should require performance standards for the water utilities it regulates. For some performance issues (e.g., water quality), another federal or state agency regulates the utility. In these cases, a commission should at least recognize and affirm the established performance requirements by referencing them in its standards. (See Part III.C.1.a of this report for an example.) If a commission feels that a utility performance standard established by a federal or another state agency is inadequate, it should work with that agency to develop performance standards all parties can agree on. A commission should specify the standards it establishes in a policy statement or guideline to facilitate modification over time as conditions warrant. We recommend the standards contained in Part III of this report.

The Commission will establish and publish water utility performance standards in the areas of (1) utility operations, (2) utility infrastructure, (3) water quality and sustainability, (4) financial security, (5) customer service, (6) utility management, and (7) any other areas the Commission deems relevant to the effective management and operation of the utility in the public interest. Any water utility seeking initial certification or recertification shall demonstrate to the Commission that it meets the performance standards established by the Commission.

E. Performance indicators

Rules should mandate that utility performance be evaluated on the basis of specific performance indicators. Commissions should specify the indicators in a policy statement or guideline to facilitate modification over time as conditions warrant. We recommend the indicators contained in Part III of this report.

The Commission will establish and publish water utility performance indicators in the areas of (1) utility operations, (2) utility infrastructure, (3) water quality and sustainability, (4) financial security, (5) customer service, (6) utility management, and (7) any other areas the Commission deems relevant to the effective management and operation of the utility in the public interest. Water utilities shall report annually to the Commission in a format it specifies on each performance indicator established by the Commission.

F. Enforcement provisions

Enforcement provisions for performance standards should go beyond charging a non-complying utility with rule violation. Commissions should issue rules that specify the consequence of noncompliance, a consequence that will result in high-quality performance and utility service in the future.

> *The Commission will approve an initial certificate of operation if it finds that the proposed water utility is able to meet the performance standards the Commission has established. If the Commission finds that the proposed utility would not meet the Commission's performance standards, it will specify the deficiencies the applicant must correct to gain approval. If there is more than one applicant proposing to serve the same customers, the Commission will approve a certificate for the applicant it finds is best able to meet the performance standards the Commission has established.*
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> *If, upon recertification review, the Commission finds that a water utility serving a population under 3,500 does not meet the performance standards established by the Commission, the Commission will (1) place the utility on probation for a period it deems appropriate or (2) deny recertification of the utility. In the event that a utility is placed on probation under this rule, the Commission will specify (a) deficiencies in performance standards the utility must correct, (b) the timetable for correcting those deficiencies, (c) reports the utility must submit to the Commission, and (d) reporting schedules with which the utility must comply during the probationary period. In the event that the Commission denies recertification of a utility or a utility does not meet required performance standards within a probationary period granted by the Commission, the Commission will take action it deems necessary to ensure provision of water service to the utility's customers in the public interest.*[13]

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[13] Preferably, a commission should specify what actions it intends to take, consistent with its statutory authority. Options might include providing for a receivership, merger, or acquisition of the utility by another utility or entity that the Commission finds capable of meeting its performance standards. An analysis of such enforcement options will be the subject of an NRRI report due in May 2009.

III. What performance standards and indicators should commissions establish?

A commission should use plans, policy statements, and guidelines to describe the performance standards and indicators it establishes. Expressing specific standards and indicators in policies and guidelines provides a commission with flexibility to both design an appropriate set of standards and indicators and make changes to the standards and indicators as conditions warrant, without going through a formal rule-making process.

A commission should both tailor objective standards and indicators to each regulated utility and specify common standards and indicators for all regulated water utilities or for utilities of similar size. Tailored standards and indicators should target specific areas where a utility needs improvement. Common standards and indicators should be used as benchmarks to compare the performance of all regulated utilities or utilities in common size-classes.

Commissions should use performance indicators to analyze where a utility stands in relation to achievement of established performance standards. Progress toward each standard could be rated on a progressive numerical scale (e.g., 1 to 5) by the utility and by commission staff for commission review. Performance standards could be weighted in the analysis based on commission priorities. An example of a rating form for analyzing performance standards is contained in Appendix A.

This part discusses water utility performance standards and indicators for six topics: (A) operational efficiency and technical proficiency, (B) reliable infrastructure, (C) water quality and sustainability, (D) financial security, (E) customer satisfaction and community relations, and (F) leadership and employee development. Discussion of each topic is subdivided into (1) performance standards and (2) performance indicators. There is not a direct correlation between each standard and a specific indicator. Some indicators may apply to multiple standards. The compilation of indicators under each topic provides a means of gauging a utility's progress toward or achievement of the specified performance standards.

Each indicator, posed in the form of an *italicized* question, is either qualitative or quantitative. The questions for qualitative indicators elicit a "yes" or "no" response. The questions for quantitative indicators include a formula for calculating an answer.

A. Operational efficiency and technical proficiency

1. Performance standards

Utilities must be technically proficient to operate effectively and efficiently. They must implement appropriate new technologies into all aspects of their operations. To achieve technical proficiency, utilities should satisfy the following performance standards.

a. Maintain staff with technical proficiency in all utility functions and operations

A utility must have qualified, skilled, experienced system operators, maintenance staff, and field crews to achieve a smooth, efficient operation. It must have or have access to well-qualified water system engineers and water quality specialists. It must have qualified accounting and support staff.

b. Use appropriate automated technology for office, business, and engineering functions

Smooth business operations require efficient and effective systems and programs for accounting, billing, finance, data processing, and general office functions. Engineering functions, whether conducted in-house or contracted out, should be carried out with specialized software programs for system design and distribution system hydraulic modeling.

c. Use appropriate practices, technology, and equipment for system and field operations

Efficient operation of a water system requires adherence to many industry standards and "best practices." A utility should maintain comprehensive, written, standard operating procedures for all of its operating functions. It should stay current on effective industry practices and the availability of new technology and equipment. It should evaluate their potential applicability to its system and incorporate those that increase efficiency and effectiveness.

d. Maintain an effective metering program

Accurate metering of water, from source of supply withdrawal to delivery to all customers, is crucial to a utility's efficiency. It determines a utility's ability to measure water loss in its system and ensures that the utility receives the revenues it is due. Many technological alternatives are available for meter reading, including a variety of automatic meter reading systems. An effective meter maintenance and meter replacement program is also important. A utility should maintain and continually evaluate its metering program to ensure that it is cost-effectively providing complete and accurate information.

2. Performance indicators

a. Employee efficiency

What is the ratio of customer accounts to number of employees? Calculation: Number of customer accounts during the year ÷ number of full-time equivalents (FTE).[14] (FTE = total hours allocated for all employees during the year ÷ 2,080 hours). This indicator can also be subdivided into a ratio of customer accounts to the number of employees in specific categories (e.g., office employees, field employees, billing employees).

What is the ratio of volume of water delivered to number of employees? Calculation: Annual average volume of water delivered per day (typically million gallons per day or MGD) ÷ FTE.[15]

b. Energy use

What is the ratio of energy use to volume of water delivered? Calculation: Annual amount of energy used by utility (typically kilowatt-hours or kWh) ÷ volume of water delivered during the year (typically million gallons or MG).[16] Amount spent on energy could be substituted for energy used.

What is the ratio of energy use to size of collection and distribution systems? Calculation: Annual amount of energy used by utility (kWh) ÷ miles of pipe in the distribution system.[17]

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[14] This is one of 22 Performance Indicators from the QualServe program, a voluntary quality improvement program designed for water and wastewater utilities. Awwa Research Foundation and American Water Works Association, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 40, 2004. Awwa Research Foundation holds copyrights to this material.

[15] Ibid., p. 40.

[16] U.S. Environmental Protection Agency, et al., *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, p. 31.

[17] Ibid., p. 31.

c. Operation and maintenance costs

What is the ratio of operation and maintenance (O&M) cost to volume of water delivered? Calculation: Annual O&M cost ($) ÷ volume of water delivered during the year (MG).[18]

What is the ratio of O&M cost to size of the collection and distribution system? Calculation: Annual O&M cost ÷ miles of pipe in the distribution system.[19]

What is the ratio of O&M cost to number of customers? Calculation: Annual O&M cost ÷ number of active customer accounts.[20]

d. Distribution and delivery

What percentage of water is lost during distribution and delivery? Calculation: (Volume of water delivered – (volume of water billed + volume of authorized unbilled water use) ÷ total volume of water delivered) × 100.[21]

What percentage of meters is functioning properly? Calculation: ((Total number of billable meters – number of stopped or malfunctioning meters) ÷ total number of billable meters) × 100.[22]

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[18] Ibid., p. 31.

[19] Ibid., p. 31.

[20] Awwa Research Foundation and American Water Works Association, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities,* 2004, p. 63. Note: This is a QualServe indicator. Awwa Research Foundation holds copyrights to this material.

[21] Ibid., p. 59.

[22] U.S. Environmental Protection Agency, et al., *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, p. 32.

B. Reliable infrastructure

1. Performance standards

Sound, reliable infrastructure is imperative to the productive, efficient operation of water systems. To maintain reliable infrastructure, utilities should achieve the following performance standards.

a. Maintain an effective preventative maintenance program

Reliability depends on a well-maintained system. A utility cannot provide reliable service if it does not continually conduct preventative maintenance and have in place a comprehensive preventative maintenance program.

b. Maintain a capital improvements plan

A capital improvements plan (CIP) evaluates new infrastructure needs and costs based on projected future growth and demands on a water system. A CIP should have both short-term (e.g., 3-to-5 year) and long-term (e.g., 10-to-20 year) components. The CIP should be used to develop the utility's capital budget (Part III.D.1.f. of this report).

c. Maintain an asset management plan

An asset management plan (sometimes referred to as an *infrastructure improvement plan*) evaluates *existing* infrastructure. Such plans generally consist of a complete assessment of utility facilities and assets, including a determination of the condition and remaining useful life of each component of the system, right down to each segment of buried pipe. The goal of these plans is to determine a reinvestment timeline that will allow continued operation of critical infrastructure throughout its useful life, but will ensure replacement before it fails and before maintenance costs increase dramatically. The results of the plan feed into both a utility's operating and capital budgets (Part III.D.1.f. of this report).

d. Maintain a facilities security plan

A reliable water system requires that its facilities are secure from outside breach or attack (from vandals or terrorists). A comprehensive security plan is needed for all facilities.

2. Performance indicators

a. Critical-asset inventory[23]

A utility should conduct a full inventory of those assets it considers critical to its operation. For each asset, the inventory should include:[24]

1. Age and location
2. Size or capacity
3. Valuation (e.g., original and replacement cost)
4. Installation date and expected service life
5. Maintenance and service history
6. Construction materials and recommended maintenance practices

The condition of each critical asset should be rated using a graduated scale (e.g., excellent, good, adequate, needing improvement, unacceptable).

What percentage of critical assets has been inventoried? Calculation: (Number of critical assets inventoried ÷ total number of critical assets) × 100.

What percentage of critical-asset condition has been rated? Calculation: (Number of critical assets with condition rated ÷ total number of critical assets) × 100.

b. Critical asset improvement and replacement

What percentage of critical-asset improvement and replacement needs has been met during the year? Calculation: (Annual expenditure for critical-asset improvement and

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[23] U.S. Environmental Protection Agency, et al., *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, pp. 34-35.

[24] From U.S. General Accounting Office, *Water Infrastructure: Comprehensive Asset Management Has Potential to Help Utilities Better Identify Needs and Plan Future Investments*, GAO-04-461, March 2004. Available at http://www.gao.gov/new.items/d04461.pdf.

replacement ÷ present value of identified critical-asset improvement and replacement needs) × 100.[25]

c. Distribution system condition

What is the ratio of water main breaks and leaks to the size of the utility's distribution system? Calculation: (Annual number of water main breaks + annual number of water main leaks) ÷ miles of distribution system pipe in service.[26]

d. Planned infrastructure maintenance[27]

Planned maintenance includes both preventative maintenance (i.e., performed according to a predetermined schedule) and predictive maintenance (i.e., performed when symptoms indicate maintenance is needed). It does not include corrective maintenance conducted in response to a system failure.

Does the utility have an effective preventative maintenance program in place?

What percentage of the time the utility spends on all infrastructure maintenance activities is spent conducting planned maintenance? Calculation: (Annual hours of planned maintenance ÷ (annual hours of planned maintenance + annual hours of corrective maintenance)) × 100.[28]

What percentage of utility expenditures for all infrastructure maintenance activities is spent on planned maintenance? Calculation: (Annual cost of planned maintenance ÷ (annual cost of planned maintenance + annual cost of corrective maintenance)) × 100.[29]

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[25] Awwa Research Foundation and American Water Works Association, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities,* p. 53, 2004. Note: This is a QualServe indicator. Awwa Research Foundation holds copyrights to this material.

[26] Ibid., p. 61.

[27] Ibid., p. 65.

[28] Ibid., p. 66.

[29] Ibid., p. 66.

C. Water quality and sustainability

1. Performance standards

a. Comply with federal and state regulations

A water utility should have a history of compliance with all federal and state regulations. That history should include meeting federal and state deadlines for water quality monitoring and reporting and for distributing annual water quality (*consumer confidence*) reports[30] to customers.

b. Maintain effective water quality monitoring and reporting systems

Water quality sampling and monitoring equipment and protocols should meet high technical and professional standards. Water quality testing results must be accurate and reliable.

c. Maintain a water supply plan or integrated resource management plan

A water supply plan, like a capital improvements plan, projects future growth and demand to determine future water needs to meet that demand. It then evaluates the costs and benefits of water supply alternatives. An integrated resource management plan evaluates a combination of new water supply, conservation, and efficiency measures to manage and meet future water demand.

2. Performance indicators

a. Water quality compliance

What percentage of time is the utility in compliance with all water quality regulatory requirements? Calculation: (Number of days in full compliance for the calendar year ÷ 365 days) × 100.[31]

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[30] The federal Consumer Confidence Report Rule (40 CFR, Part 141, Subpart O) requires every water utility that serves the public to prepare and distribute to its customers a brief annual water quality report summarizing information regarding its water source, any detected contaminants, compliance history, and educational information.

What percentage of the time did the utility nearly miss a water quality regulatory requirement?[32] This indicator requires the utility or commission to establish a parameter or definition for a *near miss* (e.g., a contaminant level that is 90% of the allowable level). Tracking such *near misses* brings potential problems to light before an actual violation occurs. Calculation: (Number of days the utility experienced a *near miss* during the year ÷ 365 days) × 100.

What percentage of the time did the utility meet self-imposed water quality targets or other targets not associated with federal or state regulatory compliance? Some utilities and local (i.e., substate) jurisdictions establish water quality targets that are more stringent than federal and state standards. A common example is a utility that establishes a target that exceeds a federal *secondary* drinking water quality standard. While federal primary drinking water quality standards apply to constituents in water that pose a health risk, secondary standards apply to constituents that can cause aesthetic annoyance like unpleasant appearance, taste, and odor, such as iron and manganese. Utilities or local jurisdictions may establish such targets to increase public confidence in the drinking water system. Calculation: (Number of days meeting all targets for the calendar year ÷ 365 days) × 100.[33]

b. Water sustainability

Does the utility maintain and periodically update an effective water supply plan or integrated resource management plan?

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[31] Awwa Research Foundation and American Water Works Association, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities,* p. 57, 2004. Note: This is a QualServe indicator. Awwa Research Foundation holds copyrights to this material.

[32] U.S. Environmental Protection Agency, et al., *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, p. 25.

[33] Ibid., p. 26.

D. Financial security

1. Performance standards

Utilities must be financially secure to provide safe, high-quality drinking water and excellent customer service reliably, at a reasonable price. To achieve financial security, they should satisfy the following performance standards.

a. Display a full understanding of and control over financial matters

Utility management should have a complete understanding of the financial matters of the utility, including the full life-cycle cost of utility assets. It should maintain a rational balance between operational and maintenance expenses, operating revenues, asset values, and long-term debt.

b. Maintain adequate and reasonable rates commensurate with similarly situated utilities

A water utility's rates should be sufficient to recover costs, provide for adequate reserves, and plan and invest for future needs. The rates should be comparable to those of other water utilities in the same geographic area with water systems of similar design, size, and age.[34] If the rate requests for a water utility are substantially different than those of similarly situated utilities, the utility with dissimilar requests should explain the differences.

c. Have access to financial resources

In addition to sufficient revenue from rates to cover operating expenses and debt service, a utility should have (1) creditworthiness, (2) access to financial markets or other assured sources of funding for capital expenses, and (3) adequate insurance through either an insurance policy or reserves.

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[34] There may be disparity, for example, between the rates of a ground water utility and a neighboring surface water utility due to the differences in the processes each use to produce safe drinking water. The rates of a large utility are likely to be lower than those of an otherwise comparable small utility, because of the greater economies of scale enjoyed by the larger utility. Rates can vary with vintage of facilities and with infrastructure improvement efforts.

d. Maintain complete and accurate financial records and effective financial controls

A utility should undergo annual financial audits conducted by a qualified independent auditor to ensure that financial statements are accurate and complete and that sufficient financial controls are in place.

e. Submit rate filings at a frequency that avoids large rate increases

A utility should have a history of rate filings that keeps pace with rising costs. It should avoid long periods between rate cases followed by a large spike in rates. A utility should have a good understanding and projection of rising costs and plan for such increases.

f. Maintain operating and capital budgets with multi-year projections

Financial security requires planning. A utility should prepare annual operating and capital budgets. Those budgets should also show 3-to-5-year budget projections. Capital budgets should be used to project the need for capital improvement financing (e.g., bond issue). Operating budgets should be used to project the need for a rate filing.

g. Negotiate cost-effective commodity and service purchase agreements and consulting contracts

A utility should have effective and open public bidding processes in place to purchase frequently needed services (e.g. telephone, janitorial, grounds maintenance) and commodities (e.g. fuel, pipe, hydrants, chemicals, vehicles, business supplies). It should also have an effective, competitive process for hiring consulting services (e.g., engineering, architectural, auditing).

2. Performance indicators

a. Financial management[35]

Does the utility have effective financial accounting policies and procedures?

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[35] U.S. Environmental Protection Agency, et al., *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, p. 33.

Does a qualified, independent auditor audit finances and internal controls on an annual basis?

Has the utility reduced any control deficiencies and material weaknesses identified in previous audits?

b. Financial performance

What is the utility's ratio of revenues to expenditures? Calculation: Total revenues ÷ total expenditures.[36]

What percentage of expenditures is spent on O&M cost? Calculation: (O&M expenditures ÷ total operating budget) × 100.[37]

What percentage of expenditures is spent on capital cost? Calculation: (Capital expenditures ÷ total capital budget) × 100.[38]

What is the utility's debt ratio? Calculation: Total liabilities ÷ total assets.[39]

What is the utility's operating ratio? Calculation: Gross revenue ÷ total expenses.[40]

What is the utility's depreciation ratio? Calculation: Depreciation expense ÷ gross plant.[41]

What is the utility's revenue to debt ratio? Calculation: Gross revenue ÷ debt.[42]

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[36] Ibid., p. 32.

[37] Ibid., p. 32.

[38] Ibid., p. 32.

[39] Awwa Research Foundation and American Water Works Association, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities,* p. 51, 2004. Note: This is a QualServe indicator. Awwa Research Foundation holds copyrights to this material.

[40] Ibid.

[41] Ibid.

What is the utility's debt service coverage ratio? Calculation: (Gross revenue – operating and maintenance expenses) ÷ (debt service principal + interest + reserve account payments).[43]

c. Bond rating and access to financing

What is the utility's bond rating? A utility's bond rating depends on many factors, including type of ownership and size of the utility. Some factors, such as market forces, will be outside the utility's control. Thus, commissions should use bond rating as a general indicator of a utility's financial health in conjunction with other performance standards. Some very small utilities may be unable to achieve a bond rating, in which case this indicator cannot be used. In such cases the indicator should be: *To what financial resources does the utility have access for funding capital expenses?*

Has there been a recent change in the utility's bond rating and, if so, why?[44]

d. Rates

Does the utility request rate increases on a periodic basis sufficient to maintain financial security?

How do changes in the utility's rates compare over time with the Consumer Price Index (CPI)?[45] Rate increases falling below the CPI for long periods may indicate that the utility is unable to keep up with rising operational costs.

Are the utility's rates based on the full life-cycle cost of service and capital funding needs?[46] If rate requests are not based on full life-cycle cost, a utility should explain the basis of the request and justify the adequacy of the request.

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[42] Ibid.

[43] Ibid.

[44] U.S. Environmental Protection Agency, et al., *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, p. 33.

[45] Ibid., p. 34.

[46] Ibid., p. 33.

E. Customer satisfaction and community relations

1. Performance standards

a. Provide excellent customer service

A utility should have a history of providing high-quality, reliable service at a reasonable price. It should respond quickly to resolve customer complaints. A utility should have a process for continual feedback from customers that provides an understanding of customer expectations for water quality, reliability, responsiveness, and rates.

b. Display good public relations

A utility should have a reputation of working cooperatively with the community it serves. It should provide timely, accurate information about service outages, water quality issues, watering restrictions, street closures, parking restrictions, and other matters that affect the community. It must maintain good working relationships and frequent communications with local media, local government officials, neighborhood associations, regulatory agencies, and other appropriate stakeholders.

2. Performance indicators

a. Water pressure and flow

What percentage of customers has experienced water pressure and flow within pre-established, acceptable parameters? Drinking water flow rates (measured in gallons per minute or gpm) and pressure (measured in pounds per square inch or psi) may be established within an acceptable range by the utility or a regulatory agency. Calculation: (Number of customers with flow and pressure consistently within pre-established ranges over the reporting year ÷ total number of customers) × 100.[47]

b. Service interruptions

What percentage of customers has experienced continual uninterrupted service? Interruptions of water service are either planned by the utility (e.g., routine maintenance) or unplanned (e.g., water main break). A utility should track both planned and unplanned interruptions of service to best understand its operations and service. Calculation: (Number of

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[47] Ibid., p. 26.

customers with no service interruptions exceeding one hour for the reporting year ÷ total number of customers) × 100.[48]

c. Customer complaints

What percentage of customers has filed complaints? While some customers may file multiple complaints, this indicator looks only at the number of customers who have filed one or more complaints during the year to factor out the impact of "chronic" complainants. Utilities should also analyze the category of complaints to determine if there is a particular deficiency that needs correction. Calculation: (Number of customers who filed complaints during the calendar year ÷ total number of customers) × 100.

d. Service delivery

What percentage of the time are customers receiving acceptable service? This indicator requires that a set of service standards be established by the utility or the commission. Any such standards should be developed with customer input. The utility should collect data for each service delivery standard established. The data should be analyzed separately and averaged across all standards to determine how well the utility meets service delivery expectations. The following calculations are examples of service delivery standards.[49]

1. Service call responsiveness: (Number of service calls responded to within X hours ÷ total number of calls during the year) × 100. In this example, "X" may vary depending on the type of service call being tracked. For water main breaks, it should reflect a quick response (e.g., ½ hour), regardless of the time of day or day of week. For less critical matters (e.g., "a repair crew left ruts in my lawn") it should reflect reasonable response (e.g., 8 workday hours).

2. Service start and stop responsiveness: (Number of start or stop service orders processed within X days of receipt ÷ total number of start and stop service orders during the year) × 100.

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[48] Ibid., p. 26.

[49] Ibid., p. 28.

3. First-call resolution: (Number of customer calls for which a question is answered or a problem is resolved or scheduled for service by the end of the initial call ÷ total number of such calls during the year) × 100.

F. Leadership and employee development

1. Performance standards

Utilities need effective management to run efficient organizations. To achieve effective management, they should satisfy the following performance standards.

a. Attract and retain qualified personnel

A utility should be able to attract and retain well-qualified personnel. It should provide competitive salary and benefits packages. Managers should create a productive, respectful work environment with effective communication throughout the organization.

b. Provide effective employee training and continuing education programs

Employees should be well trained for the skills they are asked to perform. They should also have the opportunity to train for higher-level positions in the organization to be qualified for advancement. Efforts should be made to retain and advance institutional knowledge. All employees must have frequent and regular safety training for the positions they hold.

c. Maintain an effective emergency response plan

A utility must have a complete and effective emergency response plan, updated annually. Frequent training, exercises and drills should be conducted so employees are prepared when an emergency occurs. A utility should also develop mutual aid and assistance partners and networks with other utilities, local public works agencies, or other appropriate organizations.

d. Create and carry out a comprehensive strategic business plan

A utility should create and carry out a strategic business plan designed to (1) assess existing conditions, strengths, and weaknesses of the utility; (2) identify causes and effects of existing conditions; (3) develop utility goals and objectives for improvement; and (4) identify strategies and timelines for achieving the goals and objectives. The strategic plan should assess the utility's performance and make recommendations for improvement in areas such as:

1. core business practices and services

2. optional services that may be provided

3. service quality
4. workforce flexibility
5. employee training and continuous improvement programs
6. operational efficiency
7. succession planning and management
8. community outreach and communication
9. performance tracking and benchmarking
10. customer satisfaction

2. Performance indicators

a. Employee job satisfaction[50]

What percentage of employees is satisfied with their job? This question can best be answered with a periodic employee survey covering topics that affect employee satisfaction and retention. Such topics include:

1. Compensation and benefits
2. Management
3. Professional development and long-term advancement opportunities
4. Work and teamwork
5. Workplace procedures
6. Fairness and respect
7. Communication

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[50] Ibid., p. 29.

Calculation: (Number of employees with positive job satisfaction level ÷ total number of employees) × 100.

What is the percentage turn-over rate of employees? Calculation: (Number of employee departures during the year ÷ total number of authorized position for the year) × 100. This indicator can be divided into categories such as *voluntary turnover* and *retirement turnover*.

b. Employee training and development

Does the utility have a job description for each employee? Does the utility have a process for evaluating employee performance and providing opportunities for improvement?

What is the ratio of training hours to the number of employees during the year? Calculation: Number of hours all employees spent in formal training during the year ÷ number of full-time equivalents (FTE).[51] (FTE = total hours allocated for all employees during the year ÷ 2,080 hours).

c. Employee health and safety

What percentage of time was lost during the year due to work-related injury? Calculation: (number of hours away from work by all employees due to work related injury ÷ number of FTE.[52]

d. Succession planning

Has the utility implemented an effective succession plan to ensure retention of critical skills and institutional knowledge?

e. Emergency response preparedness

Does the utility have an emergency response plan (ERP)?[53]

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[51] Awwa Research Foundation and American Water Works Association, *Selection and Definition of Performance Indicators for Water and Wastewater Utilities*, p. 38, 2004. Note: This is a QualServe indicator. Awwa Research Foundation holds copyrights to this material.

[52] Ibid.

Was the utility's ERP reviewed and updated in the past year?[54]

What percentage of employees participates in ERP training during the year? Calculation: (number of employees who participated in annual ERP training ÷ total number of employees) × 100.[55]

What percentage of employees participates in an emergency response exercise during the year? Calculation: (number of employees who participated in an annual emergency response exercise ÷ total number of employees) × 100.[56]

Does the utility have mutual aid and assistance agreements in place? These agreements should be with appropriate partners (e.g., other utilities and public works agencies) to provide a network of partners that can respond effectively in the event of an emergency.

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[53] U.S. Environmental Protection Agency, et al., *Effective Utility Management: A Primer for Water and Wastewater Utilities*, June 2008, p. 38.

[54] Ibid., p. 38.

[55] Ibid., p. 38.

[56] Ibid., p. 38.

Appendix

The following table provides an example of a scoring mechanism to analyze a utility's progress toward specific performance standards. The performance standards are those recommended in this report and are designated by their section number in Part III of the report. Each performance standard should be weighted (on a scale of 1 to 3, where 1=*low*, 2=*medium*, and 3=*high*) on its importance or priority as a performance standard. Each performance standard should then be rated on a scale of 1 to 5, where:

1 = performance well below commission expectations

2 = performance somewhat below commission expectations

3 = performance barely meeting commission expectations

4 = performance meeting commission expectations

5 = performance above commission expectations

Performance ratings should be based on a thorough review of the performance indicators established by the commission. Analysts can calculate a score for each performance standard by multiplying the weight by the rating (15 points possible for each standard). They can also sum the performance scores for each performance category for a category score and total all the scores for an overall performance score.

Utility Performance Scoring Form

Performance Standard	**Weight** (1 – 3)	**Rating** (1 – 5)	**Score** (wt. × rating)
A.1.a. Maintains staff with technical proficiency in all utility functions and operations.			
A.1. b. Uses appropriate automated technology for office, business, and engineering functions.			
A.1.c. Uses appropriate practices, technology, and equipment for system and field operations.			
A.1.d. Maintains an effective metering program.			
Operational efficiency and technical proficiency score (out of 60 possible)			
B.1.a. Maintains an effective preventative maintenance program.			
B.1.b. Maintains a capital improvements plan.			
B.1.c. Maintains an asset management plan.			
B.1.d. Maintains a facilities security plan.			
Reliable infrastructure score (out of 60 possible)			

C.1.a. Complies with federal and state regulations.			
C.1.b. Maintains effective water quality monitoring and reporting systems.			
C.1.c. Maintains a water supply plan or integrated resource management plan.			
Water quality and sustainability score (out of 45 possible)			
D.1.a. Displays a full understanding of and control over financial matters.			
D.1.b. Maintains adequate and reasonable rates commensurate with similarly situated utilities.			
D.1.c. Has access to financial resources.			
D.1.d. Maintains complete and accurate financial records and effective financial controls.			
D.1.e. Submits rate filings at a frequency that avoids large rate increases.			
D.1.f. Maintains operating and capital budgets with multi-year projections.			

D.1.g. Negotiates cost-effective commodity and service purchase agreements and consulting contracts.			
Financial security score (out of 105 possible)			
E.1.a. Provides excellent customer service.			
E.1.b. Displays good public relations.			
Customer satisfaction and community relations score (out of 30 possible)			
F.1.a. Attracts and retains qualified personnel			
F.1.b Provides effective employee training and continuing education programs.			
F.1.c. Maintains an effective emergency response plan.			
F.1.d. Creates and carries out a comprehensive strategic business plan.			
Leadership and employee development score (out of 60 possible)			
TOTAL performance score (out of 360)			