not been established yet, Arnold said the TMDL now being proposed is a 42-ppb concentration in the plant's effluent. To meet this requirement, the city decided to pursue the P-Pilot Project.

"Lars [Hendron, principal engineer of wastewater management for the City of Spokane] created the pilot study to research all technologies that could produce this level of phosphorus removal," Arnold said. The city wanted to evaluate what problems or effects each technology could have on the plant prior to purchasing it and integrating it into the treatment process, he said.

Also, because there is intense interest from the local environmental advocacy community in the outcome of the TMDL, the city decided to have the project managed independently without city staff to ensure that the outcome was completely transparent, Esvelt explained. The city selected Esvelt's company to direct the project.

"Lars [still] manages the business aspects of the project and the interface of the project with other city functions, such as [the reclamation facility], a parallel pilot investigation of water reuse, and the city's financial department," Esvelt said.

An independent company, Water and Wastewater Services (Mount Vernon, Wash.) is providing certified operators for the pilot units. Anatek Labs Inc. (Moscow, Idaho) is conducting most of the laboratory analysis, though the reclamation facility's laboratory also is performing a limited amount of analysis assistance for quality assurance purposes, Esvelt said.

Two groups are providing project oversight: a peer-review group of individuals with expertise in advanced wastewater treatment and a local advisory group composed of city and regulatory agency representatives, environmental interests, and others, Esvelt said.

The pilot project includes six different technologies.

"There are three first-stage processes — sedimentation — and three second-stage processes — filtration," Hendron explained. "We figured out that we would need both processes to reduce phosphorus levels."

All sedimentation units receive fully treated effluent from the facility. All filtration units receive effluent from one of the sedimentation units.

"The intent of having six technologies was to determine how they work on their own and how they work together to produce the maximum results," Hendron said.

According to Esvelt, the technologies are

- two parallel conventional water-treatment sedimentation units, each with a design capacity of 2000 m^3/d (0.5 mgd);
- a sand-ballasted sedimentation unit with a design capacity of 2000 m^3/d (0.5 mgd);
- a magnetite-ballasted sedimentation unit with a design capacity of 2000 m^3/d (0.5 mgd);
- two parallel dual-media (sand and anthracite) filtration units, each with a design capacity of 1000 m^3/d (0.3 mgd)
- two parallel upflow, continuous-backwash sand-filtration units, each with a design capacity of 1000 m^3/d (0.3 mgd); and
- two parallel membrane-filtration units, each with a design capacity of 570 m^3/d (0.15 mgd).

Hendron said there are several things the reclamation facility is examining while it conducts its pilot project. "We aren't just concerned with how much phosphorus the technologies can remove but how reliably and steadily they can achieve those levels," Hendron said.

The facility managers also are considering the footprint of each unit because of the limited space within the facility. They are examining the costs of the equipment — both the initial and life-cycle costs, which include expenditures related to chemical use, power consumption, and the level of maintenance each piece of equipment requires. They also are examining each unit's operational ability, flow rates (including during wet weather events), and the technology's sustainability.

Hendron said that though the project's main focus is phosphorus removal, officials also are keeping in mind future regulations on the TMDL for PCBs, metals, and microconstituents.

"We would like to look at how these technologies deal with those, too," Hendron said. "We have the time and the budget."

Project testing will be conducted for 18 months, "but this is not certain as of now due to the extended period that it took to get the units on-line," Esvelt said.

Hendron said he expects Spokane's pilot project to influence other wastewater treatment plants that also face new nutrient-removal regulations.

"The data will be made public when it's [quality controlled]," Hendron said.

***—LaShell Stratton–Childers**, UE*

Inside–Out Leadership

A step-by-step approach to transform public water and wastewater utilities

Steven F. Schulze

Awhile back, I was watching a broadcast of *20/20*, during which Jack Welch, former chief executive officer of General Electric Co. (Fairfield, Conn.), commented, "I can change business, but I don't know how to change public sector–civil service organizations." Herein lies the problem.

Governments have long been viewed as the problem, rather than the solution. They are often labeled as huge, inefficient bureaucracies measured by money collected and consumed, rather than efficiency and quality; where politics, poor morale and autocratic, top-down management prevail. While public entities provide a valuable service, this is often overshadowed by taxpayers' and even water-

sector ratepayers' negative perceptions. Overcoming these perceptions (and albeit, in some cases, the truth), coupled with the current combined impacts of reduced revenues, sustainability, and worldwide environmental impacts, has produced "global responsibilities" at the local level (Rosen *et al.*, 2000). As such, local government organizations no longer can operate as they have in the past.

Increasing financial, regulatory, customer and work-force demands also have forced government and utility leaders to adopt different approaches to become "best-in-class" organizations. In the past, most public water utility change efforts have focused on closing financial gaps, making technological improvements, restructuring work practices, and flattening the organization to avoid privatization. While having some merit and producing short-term gains, many of these approaches take years to develop, cost millions of dollars, and often fail to produce lasting benefits. Traditional approaches to utility management of maintaining compliance and *status quo* operations are not enough. To meet these challenges, the future of water utility management will require leadership, collaboration, and transparency.

This article provides a road map for water and wastewater leaders seeking to transform their organizations internally. The principal objectives are to

- both teach and inspire leaders how to lead from within their organizations from the heart, as well as the head; and
- become "other-directed" and invest in the human capital of their employees through the building of authentic stakeholder relationships (Senge, 1990).

Described are current research findings of an ongoing 4-year study of Montgomery County Water Services (MCWS; Dayton, Ohio) as it undergoes a workplace culture transformation. Included is background history of the utility, results of the study, and some recommendations to show public leaders that internal transformation is possible.

Working through this process at MCWS has revealed positive glimpses of what the future holds for public utilities like MCWS. After years of doing business using autocratic, top-down policies and procedures, evidence of positive change is emerging in our communication, teamwork, employee decision-making, and information sharing, with a greater focus on service and the customer. To understand these changes, we need to look first at the department.

Background

Begun in 1920 with one employee, MCWS today maintains a staff of 251 full-time positions in eight divisions and is supported by revenues collected from water and wastewater bills with an annual budget of $80.2 million. The staff are responsible for maintaining two large wastewater treatment plants, one pretreatment facility, more than 1924 km (1196 mi) of sanitary sewer mains, 35 lift stations, 31,480 manholes, and three equalization basins, as well as treating more than 34 million m^3/yr (9 billion gal/yr) of wastewater. In the two drinking water systems, there are 2163 km (1344 mi) of water mains, more than 29,702 valves, 11,495 hydrants, 12 pumping stations, and 14 water-storage facilities providing more than 45 million m^3/yr (12 billion gal/yr) to approximately 250,000 people and 6000 businesses.

Prior to 2000, the structural department design was a hierarchy with seven layers top to bottom, including four layers of management. The department was divided into 10 divisions, each run by a division manager or superintendent under the guidance of two deputy directors and a director.

Between 1998 and 2004, experienced consulting firms were utilized to assess the efficiency of the operation. Overall, it was determined that the department was considered an efficient public utility but would have to reduce staff and close an annual controllable costs financial gap that was big enough to gain potential interest from a private company. (Basically, we were doing some things fairly well, while other areas needed considerable improvement.)

The alternative to privatization was to redesign the organization by simultaneously acting in three areas: technology, work practices, and organizational development. Also, crucial to our success was the importance of management developing an alliance with labor.

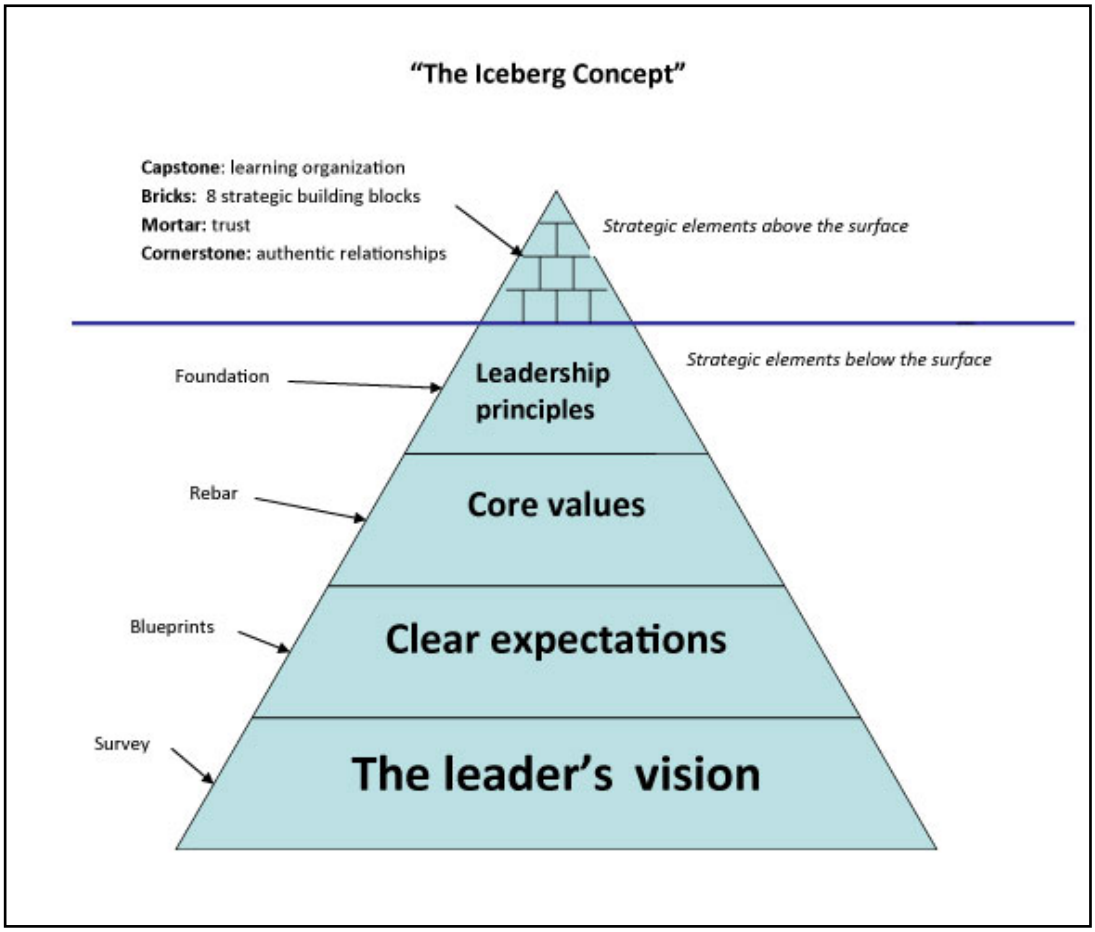
In 2001, as part of an overall strategic initiative to improve performance and service, develop leaders, and involve employees, Montgomery County leaders developed a "Vision, Mission and Philosophy" plan, along with a set of guiding principles. The philosophy was based on "three Ps": people, performance, and public service. This helped all county employees refocus efforts to deliver quality services, enhance the quality of life, strive for excellence, challenge old methods, and offer solutions. More importantly, we were encouraged to value the personal knowledge, commitment, and creativity of our employees.

In June 2005, following the consultant's work and some internal restructuring, I was offered the sole deputy director position at MCWS and asked to take over the change process as an internal consultant. At the time, I was the laboratory manager and in my third year of a doctoral program in strategic leadership. My final project dealt with the task of transforming the culture of our workplace. Thus, MCWS was used as a pilot study where the applications developed and lessons learned could be appropriated by any other organization seeking to improve operations.

The transition for me was made easier by the fact that I had achieved some success and had gained widespread support for this new approach while presenting and applying some concepts in my previous position.

Several times, experts in different areas were brought in to infuse new thinking and add credibility. This was done with the understanding that consultants are there to guide, not solve all of our problems. Though often learned the hard way, we should utilize consultants as needed and not become overly reliant on them. For the most part, your employees know what to do. With an average of 14 years of service, the MCWS work force brings extensive knowledge and skills, and this is our

Figure 1. Transforming Local Governments



greatest strength. Tapping the insight of these resources helps foster change — hence, the focus on leading and learning from the inside–out.

'The Iceberg Concept'

I developed "The Iceberg Concept" to illustrate a point about management. Basically, with an iceberg, what you see is deceiving. Typically, the higher the iceberg is above the surface, the deeper its base projects below. Thus, the majority of the ice lies hidden beneath the water.

This helps one visualize by proportion where the greatest management emphasis should be placed to achieve lasting organizational change. Unfortunately, most of these aspects often can be underdeveloped or overlooked at the expense of financial gaps. Organizational change starts from well below the surface and precedes the visible, tangible benefits. It begins with the "leader's vision" funneling upward through "clear expectations," "shared values," and "leadership principles" (see Figure 1, above). This gives rise to what emerges from the surface: "authentic relationships," the first key indicator of positive, visible change and the most important structural element.

Once relationships are established, trust begins to take hold, and the true learning organization takes shape. The strategic step process outlined here provides an ordered pattern that sets the course for constructing organizational change. Steps should be worked through in order, beginning with the vision. However, once the subsurface, foundational steps are in place, other pieces can be worked on simultaneously. For example, while working on relationships, one also can work on teams or strategic planning. As changes occur, leaders can go back, review, and revise steps to fine-tune the process as needed.

Using the analogy of a construction project, authentic relationships become the cornerstone of the building, the pivotal point for continuous improvement. To continue building correctly requires a bonding agent, the mortar of trust. Omitting or minimizing any of these essential foundational elements yields only short-term improvements or failed attempts to change organizations. These key steps are essential to successful empowerment of teams, strategic planning, operational systems, organizational structures, and performance measures. Once these steps are secured with trust, the final capstone emerges: a learning organization.

Methodology

Initially, employee surveys were conducted in March 2006 to assess the current workplace climate. The results indicated glaring problems relating to the lack of trust, respect, accountability, teamwork, and poor communication throughout the organization but particularly within management.

Numerous training presentations on topics that included brainstorming, team building, and creating a vision were conducted to educate and inform study participants. Handouts were provided to staff, auditing was conducted to measure team progress, and weekly one-on-one meetings were held with the director. A steering team was created, and meetings were held biweekly with assistance from human relations and learning and performance staff. Feedback also was gathered from residential and commercial customer surveys and focus groups conducted in 2006, 2007, and 2008.

With this information, we began to develop and apply the foundational concepts further. A follow-up survey of employees is intended for March 2010 to further gauge progress. Let's begin by examining the leader's vision and

briefly touch on other key elements.

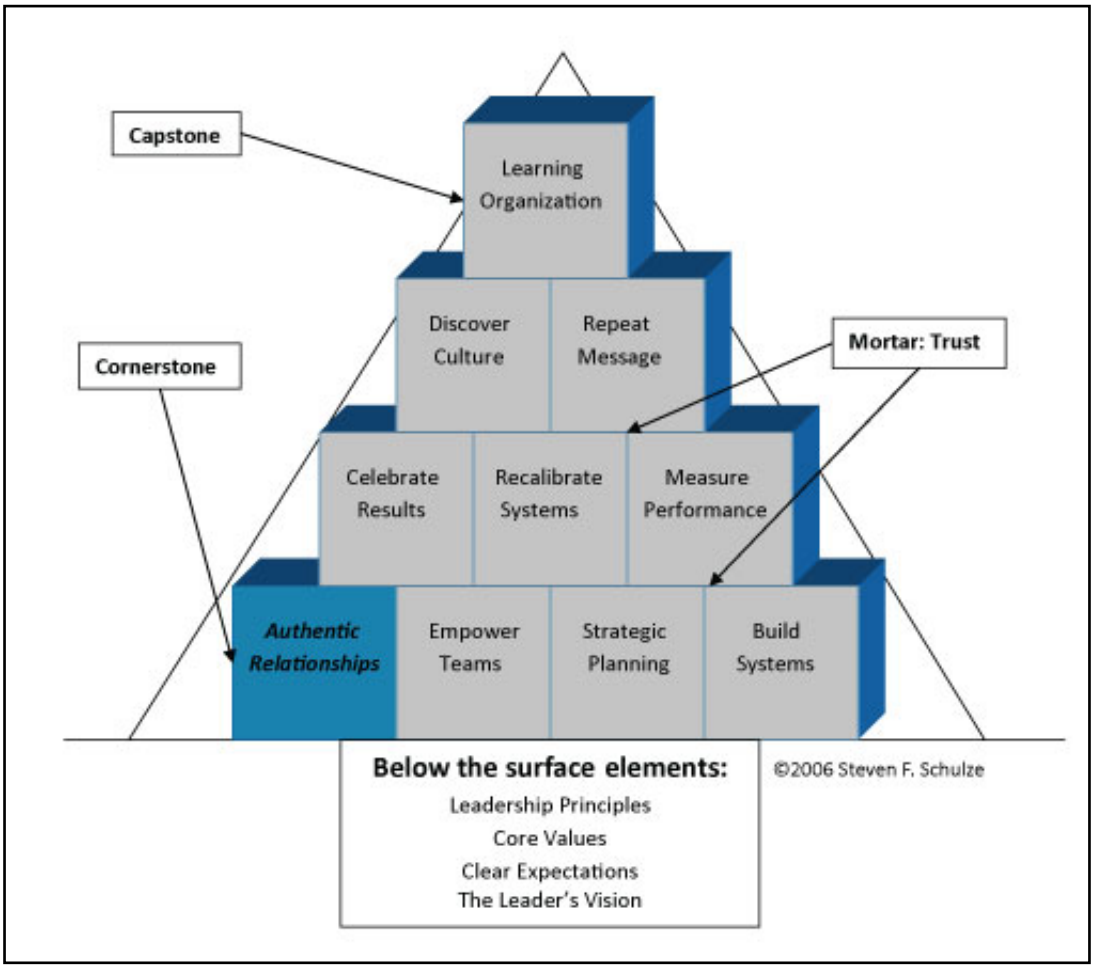
The vision (survey). Many organizations remain marginal or only exist because of no written, compelling vision. John Kotter (1996) states in his book *Leading Change* that, "change programs never work over the long run unless they are guided by vision that appeals to most of the people who have a stake in the enterprise." Developing a vision for the organization takes time, commitment, top leadership, and buy-in from staff. Our leadership at MCWS worked through a series of visioning exercises and presentations over several months to create our vision: a cohesive team that delivers exceptional water services through innovation and commitment to our community and the environment.

Strategic initiatives and objectives were further developed to define this vision and lay the groundwork for action planning. MCWS is achieving this vision through

- self-directed work teams,
- a more flexible work force,
- skill-based pay,
- planned–predictive maintenance,
- cross-training,
- a flatter structure,
- automation,
- standardized computer operations, and
- employee access to information.

Clear expectations (blueprints). The dialogue of openness, honesty, and commitment begins through the process of designing clear expectations: the blueprints or drawings that guide the contractors. These are written down, agreed to, and signed off on as an understanding between two parties. This is how two people find out what is important to each other. It enables the organization to move from a state of compliance and lack of commitment, one of the root causes of organizational failure. An exercise in how to create clear expectations was developed at MCWS and used to obtain the expectations of the director toward others, and vice versa. This process can be used by teams, as well as individuals, and applied throughout the organization to form a basis for accountabilities and performance evaluation standards.

Figure 2. Strategic Elements of Change Above the Surface



Core values (rebar). An organization's culture begins to take shape when the reinforcing iron of shared core values is put in place. Values are the single most important element in a culture, and they describe what an organization stands for. They are constant and the essential core to group cohesiveness. Firmly anchored to expectations and based on the leader's vision, values maintain the integrity of the structure by reinforcing the principles. They create pictures, which lead to emotions, followed by attitudes, behaviors, and actions.

An internal values assessment of water services leaders was conducted early in the project. What emerged were values of trust, diversity, flexibility, leadership, cooperation, accountability, communication, and shared decision-making. These supplemented the previously established countywide values of commitment, excellence, integrity, innovation, teamwork, and mutual respect.

Leadership principles (foundation). Leadership principles establish the solid foundation for an organization. They are ethical characteristics or behaviors that are desired of leadership. These principles help put shared values into action. It is this action that creates trust, the mortar that binds the organization. These principles or desired characteristics of leaders also aid in succession planning so the right

Figure 3. Billing Accuracy Complaints Per 10,000 Customers

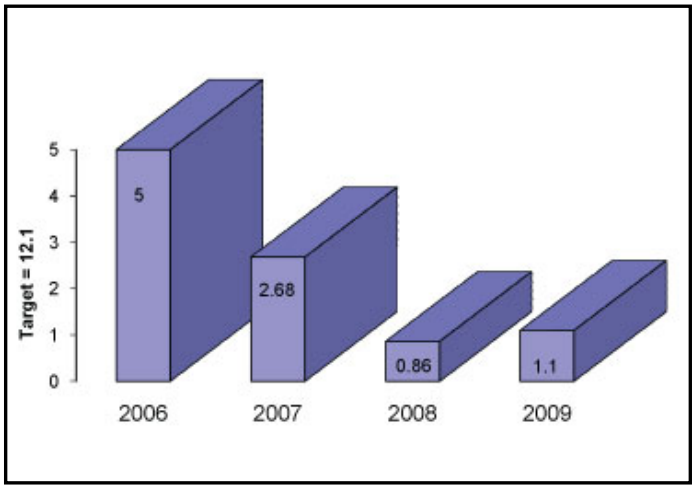
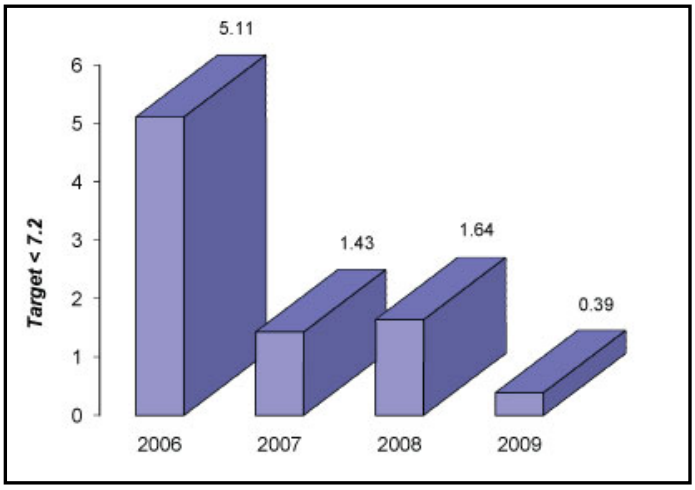


Figure 4. Technical Quality Complaints Per 1000 Customer Accounts



people are brought in and retained by an organization.

All of us live by principles. They are the fundamental rules of action, conduct, and behavior that enable the achievement of values. Some examples of principles that support the value of honesty are not cheating, stealing, or lying. I created a list of 10 principles that has been offered to MCWS as a guide. These form the acrostic LEADERSHIP: loving (showing brotherly care and concern), engaging, authentic, disciplined, ethical, renewed, strategic, hopeful, inspiring, and people-oriented.

Authentic relationships (cornerstone). Authentic relationships are the cornerstone, the primary building block that must be secured properly in position and aligned for the remaining structure to take shape. Creating authentic, open, caring relationships is achieved through agreed upon expectations, shared core values, leadership principles, and vision. It is the pivotal piece to making values become more than simply words on paper.

Authentic working relationships produce commitment that gives rise to positive change and a new work culture. Relationships are the basis upon which all other management skills are built (Rush, 1983). Authenticity means being real, honest, humble, and transparent. An authentic person is able to verbalize expectations, has no hidden motives, is not afraid to speak up, and is the same at work as at home. One must be authentic to get people to listen.

Strategic elements (bricks). Each of the remaining organizational bricks is essential and must be joined to create the new environment or work culture — the learning organization. The remaining bricks needed to reach the preferred organization are empowerment of teams, strategic planning, systems and structures, performance measures, recalibration processes, celebrating results, discovering the culture, and repeating the message (see Figure 2, p. 11). Some examples of these elements that MCWS implemented are described later.

Learning organization (capstone). The final building block enables the preferred future for an organization to take shape. Being a learning organization should be the overall goal of water utilities. In true learning organizations, people recognize that no one has arrived. They promote creative thinking, value continuous learning, build leaders, and help others get ahead.

Trust (mortar). Trust is the bonding material that strengthens the structural elements and permits the integrity of the continuous improvement process to last, thereby securing the relationships and the building blocks needed to meet the challenges of the future. Fundamentally, leadership is built on trust. It is central to human relationships and the basis of our society. It is also the foundation of all public service, and once broken, it is seldom restored.

If leaders distrust followers, they are less likely to share information, disclose problems, delegate authority, or ask followers to participate in decision-making. Instead, these types of leaders will revert to exercising greater control and supervision (Yukl, 2002). A lack of trust is the top reason why people resist change

Further Reading

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Yukl, G. (2002) *Leadership in Organizations;* Prentice-Hall; Upper Saddle River, New Jersey; 109.

Figure 5. Workers' Compensation Premium History (Shown in Dollars)

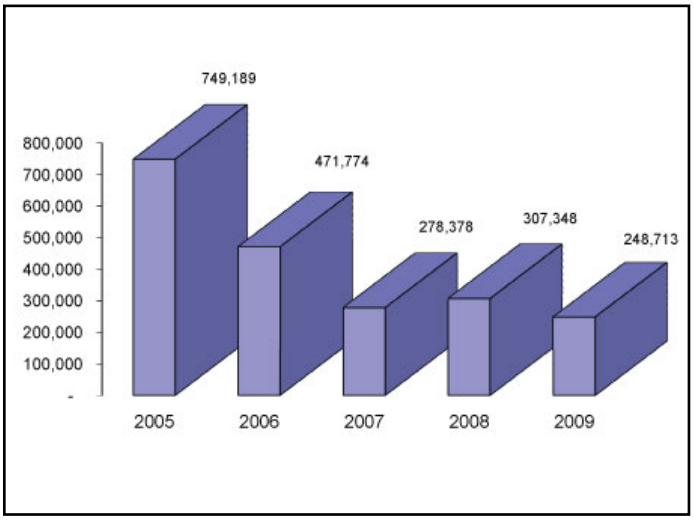
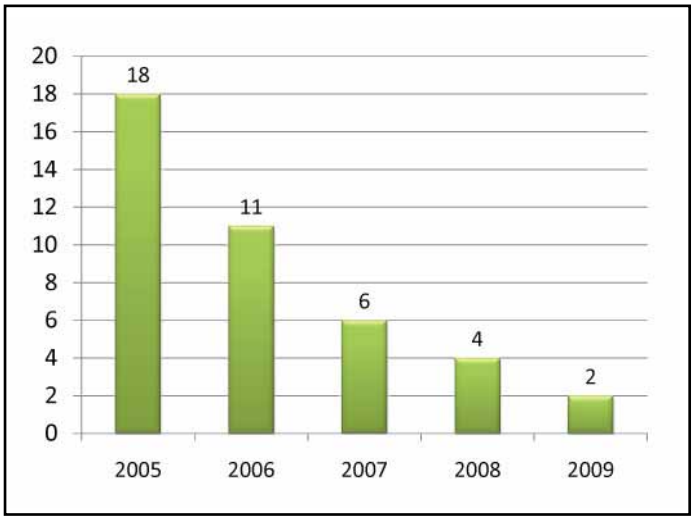


Figure 6. Number of Montgomery County Water Services Employee Grievances



(Conner, 1995). It is the most significant predictor of individual satisfaction in organizations. Without trust, you cannot lead or get extraordinary things done (Kouzes and Posner, 2002). It means being a good steward of what you have been entrusted with.

Results

During the past several years, MCWS leaders have been tracking our progress through the use of a balanced scorecard approach developed by Robert S. Kaplan and David P. Norton at Harvard University Business School (Cambridge, Mass.) to address operational deficiencies. Based on the American Water Works Association (Denver) QualServe program, major categories are tracked and measured against peers for continuous improvement. During 2008, MCWS met 13 of 22 measures.

Noticeable trends are seen that indicate positive efforts toward customer and employee relations. Billing accuracy and water quality concerns are all within targeted ranges of comparable utilities (see figures 3 and 4, p. 12). MCWS workers' compensation claims and employee grievances are not scorecard measures but reveal significant improvement indicative of internal changes toward safety and employee relations (see figures 5 and 6, above). Other measured areas using the balanced scorecard that show significant improvements include

- the annual affordability index,
- sewer overflows,
- operating ratio,
- debt-to-expense ratio,
- wastewater operation and maintenance costs per 4 million L (1 million gal),
- water-main breaks per 200 km (100 mi),
- auto accidents per year,
- lab on-time reports,
- cost per lab test,
- percentage of correct lab tests, and
- employee health and safety rating.

Other MCWS positive changes that have been developed and implemented include

- teams composed of both labor and management,
- a decision-making approval path for processing and completing projects,
- continuous improvement requests for employee ideas,
- improved hiring processes and employee assessments,
- a strategic plan showing goals and objectives for the department,
- employee coaching guidelines to improve performance and relationships,
- standard operating procedures,
- automatic meter reading,
- a lockbox billing system, and
- self-service account information, credit card payments, and interactive voice response.

Changes in the process of being developed include

- construction management training to clarify the owner–engineer relationship,
- a computerized maintenance management system,
- an asset management plan,
- revised accountability standards,
- new performance measures, and
- a management development plan.

Based on the results to date, if followed, it appears that this relational building process, along with the other positive changes that have been implemented, can provide long-term benefits and cost savings to achieve desired goals. The results indicate that improved, genuine, caring relationships and the building of trust do affect the bottom line and that these intangible benefits strengthen the organization to meet the future head-on. With some guidance and committed leadership, utility leaders can adopt these practices and create positive lasting change from inside their organizations. Continued measurement is needed to gauge further improvement, but, overall, MCWS is modeling the way for local government utility change efforts.

Steven F. Schulze *is deputy director of Montgomery County Water Services in Dayton, Ohio.*