Management Training: Past, Present, and the Future

by William W. Edgar

There is a method to our madness, I mean our, management. Management is a skill set that requires the use of theory and techniques, as well as, personal skill and commitment; to be successful. A good manager is concerned about commitment to carrying the keys of the organization or association. Good managers are concerned about efficiency in production, effluent quality, and/or their role in building and successfully improving the overall organizational structure and contents. Is the profitability – the report card? Maybe, partially, but it is hoped in this short discussion, we can lay out some fundamentals and concepts that a management trainer or potential trainer can utilize in day-to-day training.

The role of management and the manager is continually changing as the baby boomers and the experienced workforce are being replaced. Our society has adopted a social networking and animated culture for the new, young professional to work from. The younger generation is more interested in job titles and money. Where is the business world going? How can we address the challenges of today's' manufacturing and production efficiency? How are managers addressing the change from dedicated employees and workforce to a continual shift from one job to the next?

In order to begin our journey into management practices, I believe it is important to have a basic understanding of the historic background of management theories and techniques. For one simple example, it may minimize some experiencing that has already been tried or some techniques that have been successful for others. I would like to quote from Wikipedia the definition of management and a brief history related to management theory and techniques:

> Management in all business and organizational activities is the act of getting people together to accomplish desired goals and objectives using available resources efficiently and effectively. Management comprises planning, organizing, staffing, leading and directing, and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplishing a goal. Resourcing encompasses the deployment and manipulation of human resources, financial resources, technological resources, and natural resources.
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> At the beginning, one thinks of management functionally, as the action of measuring a quantity on a regular basis and of adjusting some initial plan; or as the actions taken to reach one's intended goal. This applies even in situations where planning does not take place. From this perspective, Henry Fayol (1841-1925) considers management to consist of six functions: forecasting, planning, organizing, commanding, coordinating, and controlling. He was one of the most influential contributors to modern concepts of management. Another way of thinking, Mary Parker Follett (1868-1933), who wrote on the topic in the early 20th century, defined management as "the art of getting things done through people". She described management as philosophy.

Some definitions of management are:

- Organization and coordination of the activities of an enterprise in accordance with certain policies and in achievement of clearly defined objectives. Management is often included as a factor of production along with machines, materials, and money. According to the management guru Peter Drucker (1909-2005), the basic task of a management is twofold: marketing and innovation.

- Directors and managers have the power and responsibility to make decisions to manage an enterprise when given the authority by the shareholders. As a discipline, management comprises the interlocking functions of formulating corporate policy and organizing, planning, controlling, and directing the firm's resources to achieve the policy's objectives. The size of management can range from one person in a small firm to hundreds or thousands of managers in multinational companies. In large firms the board of directors formulates the policy which is implemented by the Chief Executive Officer.

Difficulties arise in tracing the history of management. Some see it (by definition) as a late modern (in the sense of late modernity) conceptualization. On those terms it cannot have a pre-modern history, only harbingers (such as stewards). Others, however detect management-like-thought back to Sumerian traders and to the builders of the pyramids of ancient Egypt. Slave-owners through the centuries face the issues of management systemically. However, innovations such as spread of Arabic numerals (5^{th} to 15^{th} centuries) and the codification of double-entry book-keeping (1494) provided tools for management assessment, planning, and control.

Given the scale of most commercial operations and the lack of mechanized record-keeping and recording before the industrial revolution, it makes sense for most owners of enterprises in those times to carry out management functions by and for themselves. But with growing size and complexity of organizations, the split between owners (individuals, industrial dynasties or groups of shareholders) and day-to-day managers (independent specialists in planning and control) gradually became more common.

Some of the historical aspects of management included:

- **Sun Tzu's The Art of War**: written by Chinese general Sun Tzu in the 6^{th} century BC, "The Art of War" is a military strategy book that, for managerial purposes. Recommends being aware of and acting on strengths and weaknesses of both a manager's organization and a foe's.
- **Chanakya's Arthashastra**: Chanakya wrote the Arthashastra around 300 BC in which various strategies, techniques and management and theories were written gives an account on the management of empires, economy, and family. The work is often compared to the alter works of Machiavelli.

- **Niccolo Machiavelli's The Prince**: believing that people were motivated by self-interest, Niccolo Machiavelli wrote The Prince in 1513 as advice for the city of Florence, Italy. Machiavelli recommended that leaders use fear – but not hatred – to maintain control.
- **Adam Smith's The Wealth of Nations**: written in 1776 by Adam Smith, a Scottish moral philosopher, "The Wealth of Nations" aims for efficient organization of work through Specialization of labor. Smith described how changes in processes could boost productivity in the manufacture of pins. While individuals could produce 200 pins per day, Smith analyzed the steps involved in manufacture and, with 10 specialists, enabled production of 48,000 pins per day.
- **19th Century**: classical economists such as Adam Smith (1723-1790) and John Stuart Mill (1806-1873) provided a theoretical background to resource-allocation, production, and pricing issues. About the same time, innovators like Eli Whitney (1765-1825), James Watt (1736-1819), and Matthew Boulton (1728-1809) developed elements of technical production such as standardization, quality-control procedures, cost-accounting, interchangeability of parts, and work-planning. Many of these aspects of management existed in the pre-1861 slaved based section of the US economy. That environment saw 4 million people, as the contemporary usages had it, "managed" in profitable quasi-mass production. By the late 19th century, marginal economists Alfred Marshall (1842-1924), Leon Walras (1834-1910), and others introduced a new layer of complexity to the theoretical underpinnings of management.
- **20th Century**: by about 1900, one finds managers trying to place their theories on what they regarded as a thoroughly scientific basis. Examples include Henry R. Towne's Science of management in the 1890s, Frederick Winslow Taylor's The Principles of Scientific Management (1911), Frank and Lillian Gilbreth's Applied motion study (1917), and Henry L. Gantt's chart (1910s). J. Duncan wrote the first college management textbook in 1911. In 1912, Yoichi Ueno introduced Taylorism to Japan and became the first management consultant of the "Japanese-management style". His son, Ichiro Ueno pioneered Japanese quality assurance.

  The first comprehensive theories of management appeared around 1920. The Harvard Business School invented the Master of Business Administration degree (MBA) in 1921. People like Henri Fayol (1841-1925) and Alexander Church described the various branches of management and their inter-relationships. In the early 20th century, people like Ordway Tead (1891-1973), Walter Scott and J. Mooney applied the principles of psychology to management, while other writers, such as Elton Mayo (1880-1949), Mary Parker Follett (1868-1933), Chester Barnard (1886-1961), Max Weber (1864-1920), Rensis Likert (1903-1981), and Chris Argyris (1923-) approached the phenomenon of management from a sociological perspective.

  Peter Drucker (1909-2005) wrote one of the earliest books on applied management: Concept of the Corporation (published 1946). It resulted from Alfred Sloan (chairman of General Motors until 1956) commissioning a study of the organization. Drucker went on to write 39 books, many in the same vein.

H. Dodge, Ronald Fisher (1890-1962), and Thornton C. Fry introduced statistical techniques into management-studies. In the 1940's, Patrick Blackett combined these statistical theories with microeconomics theory and gave birth to the science of operations research. Operations research, sometimes known as "management science", (but distinct from Taylor's scientific management), attempts to take a scientific approach to solving management problems, particularly in the areas of logistics and operations.

As the general recognition of managers as a class solidified during the 20th century and gave perceived practitioners of the art/science of management a certain amount of prestige, so the way opened for popularized systems of management ideas to peddle their wares. In this context many management fads may have had more to do with pop psychology than with scientific theories of management.

Towards the end of the 20th century, business management came to consist of six separate branches, namely:

- Human resource management
- Operations management or production management
- Strategic management
- Marketing management
- Financial management
- Information technology management responsible for management information systems

- **21st Century**: in the 21st century observers find it increasingly difficult to subdivide management into functional categories in this way. More and more processes simultaneously involve several categories. Instead, one tends to think in terms of the various processes, tasks, and objects subject to management.

  Branches of management theory also exist relating to nonprofits and to government: such as public administration, public management, and educational management. Further, management programs related to civil-society organizations have also spawned programs in nonprofit management and social entrepreneurship. Note that many of the assumptions made by management have come under attack from business ethics viewpoints, critical management studies, and anti-corporate activism.

  As one consequence, workplace democracy has become both more common, and more advocated, in some places distributing all management functions among the workers, each of whom takes on a portion of the work. However, these models predate any current political issue, and may occur more naturally than does a

command hierarchy. All management, to some degree, embraces democratic principles in that in the long term workers must give majority support to management, otherwise they leave to find other work, or go on strike. Despite the move toward workplace democracy, command-and-control organization structures remain commonplace and the de facto organization structure. Indeed, the entrenched nature of command-and-control can be seen in the way that recent layoffs have been conducted with management ranks affected far less than employees at the lower levels of organizations. In some cases, management has even rewarded itself with bonuses when lower level employees have been laid off.

Basic Functions

Management operates through various functions, often classified as planning, organizing, staffing, leading/directing, controlling/monitoring and motivation.

- **Planning**: deciding what needs to happen in the future (today, next week, next month, next year, over the next 5 years, etc.) and generating plans for action.
- **Organizing**: (Implementation) making optimum use of the resources required to enable the successful carrying out of plans.
- **Staffing**: Job Analyzing, recruitment, and hiring individuals for appropriate jobs.
- **Leading/Directing**: determining what needs to be done in a situation and getting people to do it.
- **Controlling/Monitoring**: checking progress against plans.
- **Motivation**: motivation is also a kind of basic function of management, because without motivation, employees cannot work effectively. If motivation doesn't take place in an organization, then employees may not contribute to the other functions (which are usually set by top level management).

The above description is from Wikipedia and provides the foundation for management, historical background, and a descriptive summary of the past practices within management. I find it important, to summarize and provide this introduction, as we look into the current trends and procedures utilized by managers and management training of today.

The basic functions of management are very true today. Ask any manager and they should indicate some or all of the above aspects, as they relate to managing the operations, maintenance, regulations, commerce, City Hall, human relations – human resources, and accountability to the stockholders – residents – investors – owners of the organization or association.

Let's look at each basic function:

Planning is vital to any organizational chart or business plan. How do we going to get from step one to step two? We have many different procedures to pull resources from, however what is the main concept with planning – developing the blueprint to work from. Creating the model to see how it will flow, how it will light up, how it will operate....everything requires a plan. Planning should be based upon the basic beginning steps and continue through to a future milestone for growth and improvement. What is the daily plan? What is the weekly plan….what is the plan for five years from now? In developing the blueprint, we have somewhere to start.

Once the Blueprint or Plan has been developed, we need to organize – lay out each and every step. Who is coordinating, who is operating, who is supporting, and who is the go-to person? This area is organizing, laying out the blueprint into an organized matter to allow for each step to fit into place. Almost like putting the jig saw puzzle together, making sure every piece fits together. Is it tight, will it work, is there any space? These components of the blueprint provide a fall-back or testing mode for any plan.

Who's in Charge? Who is going to make sure each piece of the puzzle fits together, who will be the team players, who is accountable for making sure everything comes together….The Staffing function, now becomes important, to make sure the right quarterback is in place for the Super Bowl touchdown. Who is going to throw that touchdown pass?

The coach becomes an important component, in that, leadership and direction will provide great focus on putting the pieces together of the puzzle, providing staff with the right envision and proper focus to make everything fit. It requires great leadership and direction in observing the blueprint in action to make the right corrections to make everything fit. It is role of leadership and management to see the completion of the puzzle or blueprint, however sometimes frustration or problems develop. A good manager is "johnny on the spot" to provide the motivation – incentive – the leadership to make the final pieces of the blueprint – puzzle fit together. This brings together the "team action" for success.

Combining the historical and fundamental steps to management, we have a better understanding of the basic criteria to Becoming a Good Manager. How are these fundamentals incorporated into a training course, learning exercise, and process for shift operators overtaking the plant manager's position? Is there a requirement for management training by state agencies for mid-level operators being promoted to plant management? How important is this? Should we be concerned about management training?

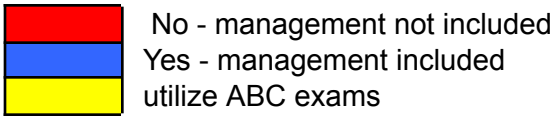
The primary basis for increasing management training and awareness of plant operators is the fact of that 40 to 60% of all operators are within retirement age or will reach retirement status within a few years. In surveying state agencies across the country, some have statistical data and operator age breakdowns which illustrate the current and forthcoming problem. However some state agencies do not have any estimates or breakdowns. For discussions, we can assume and understand the bulk of the operator community if over 45 years old, developed their retirement plan, and are counting the days until a "juicy retirement offer" comes along, or one of the local engineering firms needs some treatment plant operations expert on staff, or "enough is enough" of the furloughs and decreases in pay; so they jump. Who's onboard to take their place, who knows where the valves are located? Who knows the historical flow characteristics and industrial polluters? It is hoped the "ole plant manager" has been mentoring someone along to handle City Hall and keep the regulatory agencies – communities happy with the quality of the water product.

In assessing the knowledge base of mid-level operators ability to assume the role of plant manager or management within their divisions, some state agencies have management related training and certificate exam requirements geared to the upper level licenses. In many states, management related training manuals are included in the Need-to-Know criteria for the certification exams. ABC (Association of Boards of Certification) has management related questions in the certification exams utilized by many states across the country. These item bank questions involve the candidate demonstrating a clear understanding of management related functions with their employees, dealing with City Hall, and meeting the budget requirements of the operation. Here is a breakdown of states involved in management assessment:

State Agencies - Management required for Operators

	DW	WW	ABC exams
Arizona			
Arkansas			
California			
Connecticut			
Florida			
Georgia			
Idaho			
Illinois			
Kentucky			
Louisiana			
Maine			

Maryland			
Massachusetts			
Michigan			
Minnesota			
Mississippi			
Missouri			
Montana			
Nebraska			WW only
Nevada			
New York			WW only
North Carolina			
North Dakota			
Ohio			
Oklahoma			
Oregon			
Pennsylvania			
Rhode Island			
South Carolina			
Tennessee			
Utah			WW only
Virginia			
Wisconsin			
Wyoming			



disclaimer: some states are not listed, as they did not respond to the survey

As illustrated, the majority of state agencies require some type of management related training and assessment in order to become a upper level operator. It is difficult to judge the assessment of pass/fail ratios, since the statistics are not refined to include this area; as of now. It is increasing important to evaluate the assessment and resources available to increase this skill set for operator training. Why??? Because we are rapidly losing our knowledge base within the industry and increased accidents, equipment failures, and effluent quality are in jeopardy.

Should you visit the successes of plant operations and maintenance, start with the beginning of the program…….the establishment of the USEPA in 1970's and the development of the Clean Water Act. In short, millions of dollars were pumped into our economy to design, build, and operate water and wastewater treatment facilities to clean up our waterways, minimize pollution in industry, and make a better life for our population. In the beginning, with these investment dollars into the infrastructures, the questions of who would operate, who would maintain, and would they be staffed were the key elements. Thus, some of the first operator training manuals were established and included the managing and staffing of treatment plants. USEPA started the training manuals and sub-contracted with California State University and Dr. Ken Kerri to develop the original manual to address these fundamental and important issues. These manuals, also known as, Sacramento manuals still exist today and are routinely utilized as a resources for operator certification exams, nationwide.

In recent years, Dr. Kerri created a team with funding from the State of New York to publish a management manual – Manage for Success, which is receiving some increased usage, as a resource for the item bank questions related to plant management. One of the latest works by Dr. Kerri has been the development of the first management training and certification program in the country of Jordan.

In summarizing Dr. Kerri's work in Jordan, he has developed and implementing a training and certificate program for utility managers, with financial assistance from the USAID. The project team has identified Jordanian subject matter experts and stakeholders in the water and wastewater sectors. The experts were gathered together to facilitate a framework for a certification program to include the toughest challenges facing the utility manager and the lower level managers and supervisors. The framework or Need-to-Know criterion includes:

Managerial Training Subjects

- Leadership skills
- Customer relationships management
- Legislation and regulatory standards
- Human resources management and development
- Knowledge management
- Financial management
- Asset management
- Problem solving and decision making
- Time and meeting management

Behavioral Training Subjects

- Dealing with subordinates
- Self development
- Ethical fitness
- Communication skills
- Change management

Technical Training Subjects

- Internal control (prevention and corrective)
- Safety and security management
- Certification
- Water and wastewater functions
- Water distribution systems
- Wastewater collection systems

The goal of Dr. Kerri and his Jordanian team is to provide the Jordanian water and wastewater sectors with highly qualified managers. The managers will possess the managerial, behavioral and technical knowledge, skills and abilities to efficiently and effectively manage and administer their utilities. Jordan's utility infrastructure will be protected as well as the public health and the environment of the nation.

In comparison of the early years of operations within the USA, let's re-visit the Vietnam War Era. Many military personnel returned home to employment problems, adjusting to civilian life, and the need to find a lasting and permanent job. Many of Vietnam Vets entered the water and wastewater field, through grant program established by USEPA and Congress, recruitment by the local government, and private enterprises. These highly trained experts in mechanical and operational abilities were a true asset and blessing in meeting the needs of the new infrastructure being built through the Clean Water Act.

These individuals became the backbone to the early success of operating treatment plants, addressing and procuring solutions to emergency situations, to maintain and preventive maintenance of the process equipment and structure, and dealing with the workforce issues of the 1970's and 1980's. 30 years later, this highly qualified group is retiring – the baby boomers – the Vietnam Vets……..major drains are knowledge, major loss of work ethics, and tremendous loss of high morale with the workforce is rapidly going. We need to work fast, to "freeze dry" and capture this knowledge pool and pass it along to the new managers of today. How things were done, where the underground valve boxes are located, how to address the peak flow seasons, and how to deal with City Hall are all important areas which need to be addressed in training programs.

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It is my belief, many of these great public servants and stewards of our waterway protection have taken pride in the preservation and maintaining of utility infrastructures. They do not want to see, their blood and sweat lost, but rather to be maintained and improved upon in this rapidly technological world. The bridge between the young and experienced operators needs a major revisit to the mentoring days of yesterday in order to develop an increased appreciation of where protecting our waterways began and where we go. Management is the key to these issues and how plant managers of today and tomorrow create the incentives to improve upon, in lieu of decrease in effluent quality and performance.

Recently, I conducted a survey of operators, plant managers, and utility administrators to gauge their thoughts about a few topics and here are some of their replies:

What incentives do you use for plant operators to increase effluent quality and cut cost?

- We have an employee of the quarter program, plus a bonus program for those who save the City $$$ (they get 10% of the savings). Other than that we rely on the integrity of our operators
- We have tried to stress the importance of doing both and encouraging all plant staff to assist with this venture. At a very high level there has been some talk about pay for performance through evaluations; however that doesn't directly tie to effluent quality.
- We assure them that we will stop whipping them for at least an hour!...I had to say that. We actually don't have a particular incentive program aimed at plant performance. We DO try to maintain a positive work environment by offering good pay and benefits and by working hard to avoid things like furloughs and cutbacks.
- We are a union shop (3 separate unions) and there are incentives only for the supervisory union (foremen) and professional union (plant superintendent). There are no incentives as a component of the line employees, i.e. operators and mechanics. Fortunately enough for us, our guys pretty much come forward with their thoughts and ideas.
- During our last design we literally brought the entire staff into a group meeting (around a pizza lunch, if you feed them they will come) offering the chance for them to comment on what they felt was wrong with the then present design and to get their thoughts on how to make things better in the next design. The buy-in was huge and we got some great ideas from the staff.

How are you dealing with cutbacks and furloughs within your operation?

- Scheduled overtime has been greatly reduced if not eliminated and are encouraging and requesting operators give more advanced notice when taking time off so a replacement can be rescheduled instead of OT being paid. To date no furloughs have occurred within our utility.
- We are losing a position in the next fiscal year in distribution – this is our first cutback – and we'll have to do our best to make it work. (making it work, that's what utility folks do).

How are you dealing with cutbacks and furloughs within your operation? (continued)

- Seeing a significant impact on morale. Seeing Cities offer retirement packages and seeing experienced staff leave.
- At this point in time it is pretty much "a none" issue. We do have a collection system position open due to a retirement but we have intend to fill it.

How is management addressing workforce issues?

- Attempting to cross train and ask people to do more with less. Taking away all incentive programs or niceties – annual BBQs, attending training conferences, looking for less expensive ways to meet CEU requirements, etc.
- By advising our top management and commissioners of the potential impacts to the best of our ability. I foresee future troubles, especially with requirements for licensed distribution operators and the coming exodus of licensed treatment plant operators as they retire. I haven't received a lot of support from those above, seems we'll be crossing that bridge when we get to it. With the budget problems we are having, we have frozen salaries over the last several years and we are cutting benefits.
- Although vacancies are present within my area, I have been able to keep fully staffed in the operation area. We have had and continue to have a very strong trainee development program where trainees are able to obtain their licenses within the prescribed timeline and stay ahead of the curve when a licensed operator does retire. The cross training of mechanics to operators has lead to a few success stories and having this continues to help with workforce reduction when it occurs.
- We work with employees to identify methods to improve working conditions and to encourage people to continue to work here. We recruit and hire from within whenever possible. We ask senior personnel what their retirement plans are and if any are planning to do so we identify a succession plan.

Any comment in utility management roles in dealing with City Hall?

- Stressing the importance of what we as operators, mechanics, instrument technicians and lab technicians perform on a hourly basis and the vital role we play in public health here in the USA always help when budgets get tight. Reminding and engaging the folks that control the budget by bringing them to the facilities as part of tours is proven very valuable locally.
- Use any opportunity to educate those that make decisions regarding utility issues.
- Politically, I have seen reduction in WWTP staff (particularly management) even if funding from an Enterprise Fund because: "How can you lay off police officers (funded by the General Fund) and not lay off "high priced" management from the WWTP staff?"
- DO NOT SURPRISE CITY HALL

What programs or training are you utilizing for manager replacement (replacing the baby boomer plant managers) and recruitment?

- By having a strong employee and supervisory development program continues to prepare for future retirements of managers. The use of online training has continued to grow in our industry as a result of training and travel budgets being reduced or eliminated.
- First, establish a succession plan. Second, provide opportunity for training. Third, provide opportunity for replacement to shadow retiree.
- We used a national search firm to fill one key position. Not sure we'll go that route again. Utilizing coaches and mentors when possible.

Any comment or trends that you would like to share?

- Educating the public of what happens within the treatment facility is never a bad use or waste of time. When the general public sees, touch and smell what goes on 24/7 behind the fences, it is always a positive experience. Then they become our allies, which can prove invaluable during tough budget times.
- We have a lot of people that will be retiring in the next 5 – 10 years, aging infrastructure and as always, more stringent regulations to deal with. We have noticed a real problem with equipment and repair parts taking forever to obtain – makes having redundancy and spare parts more important.
- More stringent standards require a more professional and skilled workforce.
- Operators need to be more skilled in technology and use of electronic (computer) controls.
- Operators must have a thorough comprehension of process operation, mechanics, chemistry and biology. It won't be easy to fill the gaps.
- The bad economy has morphed out recruitment challenges. It has slowed the exodus of seasoned employees and has provided a pool of highly skilled job candidates to select from when an opening is made available. What we struggle with is maintaining internal equity in wages. The highly skilled journeymen and Engineers that apply for our jobs frequently earn in top quartile or greater of our wage range. To recruit such individuals we sometimes have to start them at a rate that is greater than a current employee that has been here 5-10 years.

It is hoped the above outline and comments provide some food for thought. It is a great example, why we need to enhance management training and resources to plant operations. Today, our pre-conference workshop is an enhanced overview of management training by operator trainers and regional training centers. It is a great opportunity for these subject matter experts to share with you the techniques and methods incorporated into their training programs. I hope, you leave this workshop with some renewed interest in increasing your management training portions of your program and some helpful tips from proven training programs.

I would like to extend appreciation to members of the WEF Professional Development Committee in their discussion related to this paper and topic, along with:

- Russ Martin, USEPA,
- Kenneth Kerri, CSU – Sacramento
- William P. Allman, retired Operator in Florida and instructor with CEU Plan
- Ronald McCulley, administrator of FDEP Operator Certification Program
- Jamie Hope, Gainesville Regional Utilities
- Patty Settles, Metro Denver Utilities
- Steve Swanback, Vice-Chair of WEF PDC and Carollo Engineers
- Tom Groves, Training Coordinator of NEIWPCC
- Sheena Kennedy, Training with Associations of Boards of Certification (ABC)
- Christine Radke, WEF staff
- Tom Walsh, NEIWPCC
- Donna Kaluzniak, Utility Director of Atlantic Beach
- Arnold Bevins, NEIWPCC
- Curtis Smalley, Veolia Water
- Ken Jacobs, Cobb County, GA Utilities