

# **Charleston CPW Water Distribution Operation: First Public Utility to Acquire ISO 14001 Certification**

**By:**

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One of the most urgent missions this generation can undertake is the protection and improvement of the environment to reverse years of neglect, beginning at the dawn of the industrial revolution and continuing even today. Despite noteworthy attempts by many organizations to reverse the effects of pollution, the situation worsens. It is now time for industry to step forward, take responsibility and establish new methods to prevent pollution, and to improve our environment for present and future generations. The Water Distribution Department of the Commissioners of Public Works (CPW), Charleston, SC has taken that step, and on June 16<sup>th</sup>, 1999 became the first public utility in the nation to achieve ISO 14001 Environmental Certification by passing a third party registration audit with no deficiencies.

## **What is ISO?**

The International Standards Organization (ISO) is a federation of international standards for 120 member nations. It was founded in 1946 after World War II to provide consistency and continuity during the rebuilding processes of Europe. Later the organization expanded to include quality control and assurance, and has recently developed environmental standards to promote the prevention of pollution, continual environmental improvement, and good environmental stewardship.

Based in Geneva, Switzerland, ISO has promulgated more than 8,000 international standards for things as varied as paper sizes to automotive parts, and has set standards from quality assurance to business management. More than 120 countries belong to ISO as full voting members, with the United States as one of those members. Currently, more than 70,000 companies and firms have made ISO registration an important part of their business strategy.

Following in the footsteps of the internationally accepted ISO 9000 (Quality Management and Quality Assurance Standard), ISO introduced in 1996 the Environmental Management Systems (EMS) standard (ISO 14001). Development of the ISO 14000 series involved hundreds of technical committees, with representation from the American National Standards Institute (ANSI), the American Society of Quality Control (ASQC), and the Environmental Protection Agency (EPA).

ISO 14001 is a series of standards that establish voluntary environmental management standards and guidelines, and encourage improvement to the environment through a cyclical process of "plan, implement, check and review". Developed outside conventional regulatory channels ISO 14001 has the potential to revolutionize both the way industrial and other organizations manage their environmental affairs. Although primarily established for industry to incorporate environmental management into their business plan, the Charleston CPW has discovered this standard is tailor-made for municipal utility organizations.

## **Benefits:**

Application of the ISO 14001 environmental management principles increases cost effectiveness, environmental compliance, efficiency, reduces hazard liabilities, and promotes technological advances. Also, ISO 14001 certification demonstrates evidence to our customers, stakeholders and the community that we are committed to environmentally safe processes, environmental compliance, the prevention of pollution, and continual environmental improvement.

The goal of ISO 14001 is to make environmental management an integral part of an organizations overall management system, offering enhanced competitiveness in today's market. This structure provides continuity for implementing environmental policies, objectives, and targets, which can be coordinated with continuing efforts in other areas (e.g., operations, finance, quality, occupational health and safety).

Through the implementation of an EMS, enhanced protection to human health and the environment is provided from an organization's activities, products and services, and a reduction of operational costs is observed. This is accomplished through in-depth examination of operational processes, and through technological advances. A positive public image is gained, along with customers' environmental expectations being met. The use of irreplaceable natural resources is curtailed, liabilities associated with environmental concerns are thwarted, and overall management systems are improved.

**Getting started:**

A corporate *Steering Committee* was formed and an EMS Manager was chosen to evaluate the international standard and to develop level-one procedures for implementation of an environmental management system. The level-one procedures provided specific steps and instructions on building and structuring an EMS. These procedures were the driving force behind and the foundation of the EMS program development. From the start, a team effort was firmly incorporated into establishing an EMS. With this commitment comes education for the teams. The Steering Committee members, the EMS Manager and all those associated with development and implementation obtained extensive training in the appropriate methods required for implementation. Educational material was acquired, seminars were attended, and educators were brought in to train involved associates. Also, other organizations were visited to evaluate their methods and approach to EMS development and implementation.

The Water Distribution Department (WDD) was chosen as the pilot department for EMS implementation, and had recently completed a successful "Re-engineering" of the department through the "team" approach. Through Re-engineering, the processes, organization and structure of the department had been evaluated, rethought and restructured to improve performance and the overall organization. This process had already yielded a 75% increase in productivity. Therefore, the WDD had many of the key elements in place to ensure success with implementation of an EMS.

**Momentum and Teamwork:**

To successfully implement any project you have to generate excitement and "buy-in" from those affected. The project must be worthwhile and carry a prospective value, and a personal desire for its success must be shared by all involved. To accomplish this, we broadcasted management's commitment to the success of the project, and further showed their commitment through extensive EMS awareness training. This was done to generate urgency and excitement, and to endorse overall commitment by the organization to obtain ISO 14001 certification.

Associate "buy-in" can be further achieved through the teamwork concept. Several teams were created for accomplishing EMS implementation, to include: Water Distribution Steering Committee, Targets & Objectives Team, Standard Operating Procedure Team, Training Team, Document Control Team, and a Regulatory Assessment/EMS Progress Team. The objectives of the Steering Committee was to coordinate progress of the other teams, provide direction, and make decisions regarding the project. By including as many people as possible on the teams, and choosing those who are influential, experienced, knowledgeable, and prone to contribute, any project embarked on will attain success.

**Multi-tasking:**

This colossal project was broken-down into small, attainable goals as not to overwhelm the teams. By waiting for one team to complete their objectives before another agenda item is started will hinder the project's momentum; therefore, several teams were working simultaneously. The WDD had anywhere from two to three implementation teams concurrently functioning. This maintained project thrust, kept associates continually involved, and provided a means of swift implementation. The project coordinator was involved with all teams to ensure a smooth transition between goals, and to maintain communication between the teams. This will prevent duplication, and will promote continuity throughout the teams.

**Communication:**

To further improve internal and external communications, large bulletin boards were utilized to post progress of the implementation, and large progress charts were exhibited in many areas of the department informing our associated of the latest accomplishments. Web pages were created which provided associates and other departments with quick access to EMS implementation progress, legal requirements, manuals, reference materials, training schedules, presentations and reports. Also, web links to all departmental forms to ensure associates are using the most current versions of documents. An Internet Web Site is maintained to render outside interested parties a means of gaining information regarding all aspects of our operations and environmental programs. This information sharing has been advantageous to all CPW departments seeking ISO 14001 certification, as other departments don't have to "recreate the wheel".

Contractors and vendors used by CPW required notification of the new EMS policy; therefore, letters were issued describing details of the policy and benefits of adopting an EMS. When contractors are awarded a project, they are informed of our EMS through documentation, during a Pre-construction Conference, and through random construction inspections. Through expanded communication protection of the environment is further sustained.

**Environmental Aspects and Significant Impacts:**

*Environmental Aspects* are elements of an organization's operations, activities, products and/or services that can interact with the environment, and which can be adverse or beneficial. The WDD Steering Committee's approach to identifying our aspects involved breaking down each area of the environment individually to focus in on how the department's operations impacted that area of the environment, either positively or negatively.

To evaluate the significance of these aspects a grading method was devised to prioritize or rank the aspects. Criteria used included: environmental areas, occurrence frequency, regulatory requirements, existing policies, industry standards, contractor activities, previous incidents, recent research, hazard/risk liabilities, waste minimization potentials, and aesthetics. This grading exercise demonstrated which aspects had the most significant impact to the environment, and gave us an objective view of which items to target for environmental improvements. Once the department's *Significant Aspects* were identified, ISO 14001 requires that an organization control those aspects to prevent negative environmental impacts from occurring. *Control Methods* were identified or initiated which includes approved procedures, specific Improvement Programs, specific training sessions, manuals, etc.

**Legal Requirements:**

The WDD Steering Committee using its knowledge and experience evaluated existing regulations and other requirements that we subscribe to. Some requirements, originally thought to be applicable, were found to not apply to our organization. A master list was compiled to provide important details on each regulation. Contact persons and phone numbers were identified to assist with keeping the regulations up-to-date each year.

**Objectives and Targets:**

An *Objectives and Targets Team* was formed to evaluate the results of the *Significant Aspects Grading Worksheet* to decide on which items to target for future improvements. A point to be taken is that the grading results were *guidelines* for choosing improvement projects; budgetary constraints were also considered. Several main areas or categories were chosen for improvement projects, as follows: preventive maintenance (PM), utility locating, training, corrosion control, fire protection, pipe replacement, and leak surveying.

Out of these areas came several *Improvement Programs*, as follows: Unidirectional Flushing, Transmission Valve PM, Air Relief Valve Inspection, Hydrant PM, Utility Protection, EMS Training, Standard Operating Instruction (SOI) Training, Skills-based Training, Operator Certification, Corrosion Control, Valve Replacement, Hydrant Replacement, Insurance Service Office Survey (fire protection), Large Meter Replacement, Water Main Extension/Replacement and Repair, Deficiency Tracking, Watermain Rehabilitation, Leak Survey and Detection, and Unaccounted-for Water.

Each Improvement Program delineated the background and purpose of the project, the specific objectives of the project, and included targets for accomplishing the project. *Performance Indicators* were included, along with the allocation of resources to complete the project. A detailed action plan was included to "kick-start" each program. To monitor and ensure the success of each Improvement Program, details of each project were included in the department's *Water Distribution Monthly Report*, which is provided to senior management, and serves as a means of internal communication. Fortunately, this report was in place prior to EMS implementation.

**Standard Operating Instructions (SOI's):**

To prevent deviations from an organization's preferred operational methods and/or industry standards, well established, documented and approved procedures are needed on all activities or job responsibilities. To our benefit *Standard Operating Instructions (SOI's)* were in place on most activities under the department's responsibility. Required items to be included in SOI's are as follows: revision levels, effective dates, prepared by, approved by, corresponding documentation, purpose, scope, specific responsibilities, regulatory requirements, emergency start-up and shut-down details, and positive and negative impacts. An *SOI Team* was organized to evaluate the existing procedures for accuracy and EMS conformance, and to create additional activities as required.

**Training and Awareness:**

As previously noted training is an intrinsic part of establishing an EMS, so a Training Team was put in place. Training programs were established to include EMS training, SOI training, and Skills-based training. All schedules included due dates, identified associates required to attend, and names of trainers responsible for conducting training sessions. Training also included the benefits of following the approved the procedures, and the adverse environmental effects of deviation from them.

**Emergency Preparedness:**

Approved emergency plans are required to effectively and rapidly respond during an emergency. The WDD had many emergency procedures in place; however, others needed identification based on ISO 14001 requirements. Additionally, our existing procedures required the same augmentations as the SOI's. The addition of post-incident reviews was also essential to the EMS program, and to continual procedural improvements.

**Records Management:**

A *Document Control Team* was created to evaluate our existing system, alter our system to meet ISO requirements, and to initiate improvements. Flow charts were created for all tasks, which included how a record was generated, the paths which it followed, and finally to where it was filed. We were able to "streamline" certain processes, eliminate forms, and alter filing systems. A *Central Filing Area* was created to accommodate the administrative staff, and a file index was compiled to provide a means of locating documents and files in "short order". Also, a WDD Library was instituted to centralize documents and provide all associates access to legal and other requirements, manuals, reference materials, training and operational videos, industry magazines, etc. SOI's were produced and approved to further support these methods and new measures.

**Monitoring and Measurement:**

A strict regiment of when and how test equipment is checked, maintained and calibrated is required. SOI's were written for all of our test equipment to institute consistency and an approved method for calibration. Gauges were numbered, databases were created and schedules were formalized to ensure the program was maintained.

To ensure we are following legal and other requirements that we subscribe to, a *Regulatory Assessment Team/EMS Progress Team* was created to quarterly evaluate requirements. A bank of related questions was collated, and each question is assigned to a particular individual or group for the providing of supporting documentation. This accommodates the self-assessment requirements dictated by the EMS program. Therefore, we know and have documented evidence that we are following regulatory requirements.

**Internal and External Audits:**

It is required and also advantageous to perform internal audits through the use of trained internal audit teams. Non-conformances will be discovered internally rather than externally, providing an opportunity for correction prior to an external audit. To maintain objectivity, audit teams should not include auditors that are connected to the department being evaluated. Also, to accommodate this process a specific and detailed questionnaire was created to guide the auditors smoothly through the process.

To prepare for the ISO 14001 certification process, several registrars were interviewed, in search of a firm that was knowledgeable in the operations of a public utility, and specifically a water and wastewater company. Once a registrar was selected and the audit day approached, preparation began. All electronic information was checked and double-checked for accuracy. Meeting rooms were set up and equipped to accommodate the auditors. Hard-copy evidence of our EMS was provided in an orderly and structured fashion. This preparation put the auditors at ease, provided a comfortable area to work, and presented a professional atmosphere.

On June 14-16, auditors from Advanced Waste Management (AWM) performed a third party, registration audit of our EMS program to verify conformance to the ISO 14001 standard. All EMS documentation was thoroughly evaluated, interviews were conducted with associates at all levels of the organization, field sites and projects were assessed for conformance, and sampling occurred on a multitude of records throughout the organization.

The auditors were very pleased with the implementation of our EMS, and discovered NO negative observations, deficiencies or nonconformances with the EMS program. The auditors witnessed the commitment our associates, the department and management has to improving the environment, key to the success of becoming certified. Due to the contributions of associates throughout the organization the CPW Water Distribution Department became the first public utility in the nation to become *ISO 14001 Certified*.

**Conclusions:**

To establish an EMS, management commitment must be prevalent, goals must be established and conveyed, and teamwork must be utilized. Acceptance must be embraced by all associates, and excitement must be shared by all involved. Positive reinforcement must come from management and team members, and resources must be provided to accomplish your goals. It is now our turn to put the thumbprint of our generation on the map of environmental improvement. We have in our hands that opportunity, provided through a flexible, innovative and internationally accepted certification program, *International Standards Organization - 14001 Standard*.