

Environmental Management Systems (EMS) Development and Implementing ISO 14001 Standards for Water Distribution Operations

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Introduction:

Development and implementation of an Environmental Management Systems (EMS) based on the ISO 14001 Standard is a critical and necessary mission in present times due to the declining environment that we all share and depend on so heavily. Development requires firm commitment by senior management, front-line workers and everyone in between to the protection of the environment, to improvement of the environment, and to overall environmental stewardship. Development of the program may take one to three years, and will become an intricate part of an organization's operations; therefore, a long-term commitment to the success of the project must be present.

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. The initial purpose of the organization was to address technical and manufacturing processes for the production of goods and services. 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.

ISO 14001 is a series of standards that promote and establish voluntary environmental management standards and guidelines, and encourage improvement to the environment that we all share. The general purpose of this international standard is to provide guidance to organizations implementing or improving an Environmental Management System (EMS). It is consistent with the concept of sustainable development and is compatible with diverse cultural, social and organizational frameworks.

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 customers, stakeholders and the community that an organization is 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. ISO 14001 guidelines also offer significant improvements to an existing management system -- providing enhanced competitiveness in today's market. The design of an EMS is an ongoing and interactive process which structures responsibilities, practices, procedures, processes and resources. 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. A structured opportunity is given to maintain and improve the environment, and to reduce operational costs. This is accomplished through in-depth examination of operational processes, and through the pursuit of 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:

Key personnel must be chosen to "spearhead" the project. Those persons must be influential, must *lead by example*, and must be *self-starters*. Someone should be chosen (i.e., EMS Manager) to be the overall team leader and coordinator, and should receive three to five days of in-depth training from a qualified firm. This individual must have sincere and committed support from senior management, with management taking an active role in development and communication of EMS.

Organizational Steering Committee:

A steering committee or team should be established including associates whom have the same qualities as previously referenced. This committee will have ultimate authority in developing an EMS Policy, level-one procedures, and guiding the company, departments, sections, etc. through the implementation stages.

EMS Policy and Procedures:

The steering committee must now evaluate the ISO 14001 Standard, receive training on the standard and obtain reference material to continue the education process. There are many firms that will provide on-site training for team members. A one to three day

training session will be adequate for educating the team members based upon their determined roles. Also, other organizations may be visited to evaluate their EMS implementation methods, and their approach to maintaining the EMS.

The EMS Policy should state the primary functions of the organization with a commitment to environmental stewardship. The policy must relay a firm commitment to the protection of the environment, to continual environmental improvement, and to compliance with all applicable federal, state and local regulatory requirements. Also, the policy must reference environmental objectives and targets to actively pursue environmental protection and improvement to minimize or eliminate negative impacts on the environment. This policy should set the tone for the importance of the EMS program, and should serve as a springboard for all aspects of the program.

Company-wide procedures must now be formulated based on the ISO 14001 Standard and other reference material as obtained. These procedures, which may be referred to as "level-one" procedures, will become the driving force behind and the foundation of EMS program development.

Teamwork:

From the start, a team effort must be firmly incorporated into establishing an EMS. Ensure that those chosen are committed to the success of the project, and will be available for the full duration of the project, or throughout their prospective roles. It is imperative that the roles and responsibilities of all team members, teams, managers, etc. are explicitly defined.

Associate "buy-in" can be further achieved through the teamwork concept. 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. The team leader should ask questions, encourage "brainstorming", and listen intently to all associates' views and opinions. By following these suggestions, a more inclusive and complete picture will be drawn of the overall operations.

All meetings must have agendas and minutes as a means of tracking implementation progress. Action items, responsibilities, due dates should be included within the minutes for future reference and accountability.

Momentum:

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, management's commitment to the success of the project must be broadcasted throughout

the organization. Further, commitment can be shown through management's investment in EMS awareness training.

This colossal project should be broken down into small, attainable goals as not to overwhelm an organization's associates and those responsible for implementation. Bulletin boards and progress charts can be utilized as a mean of communication. These items should be strategically placed in highly visible, heavily traveled areas. Progress charts, schedules, approved documentation, etc. will display to the associates the development and accomplishments of the project, thus generating anticipation and excitement.

Multi-tasking:

Waiting for one team to complete their objectives before another agenda item is started will hinder the project's momentum. Several teams can and should be meeting simultaneously. An organization should have several implementation teams concurrently functioning. This will maintain project thrust, keep associates continually involved, and provided a means of swift implementation.

The overall project coordinator should be 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:

If an internal "web", LAN (Local area network) or WAN (Wide area network) system is available, an organization can further improve internal and external communication through the use of web pages dedicated to the EMS' ongoing progress. Associates and other team members can be kept up-to-date through the use of this media. Access can be expanded to include legal requirements, manuals, reference materials, training schedules, presentations, reports, etc. Also, links to departmental EMS forms can be included in the Web pages to ensure associates are using the most current versions. Further, an electronic filing system can be created to properly maintain a filing structure, and to provide other departments access to information, forms and EMS progress. To render outside interested parties a means of gaining information regarding all aspects of the EMS, an Internet Web Site should be created and maintained.

The ISO 14001 Standard requires that contractors and vendors used by an organization must be notified of the new EMS policy. Letters, memos, e-mail, etc. can be utilized to describe the details and benefits of adopting the policy. As an additional measure, all purchase orders can carry reference to the EMS policy. Further, as contractors are awarded projects, they may be informed of the EMS policy and specific procedures through documentation, during a pre-construction conference, and through random

construction inspections. By improving communication procedures, the importance of protecting 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 environment is defined as air, water, land, natural resources, flora, fauna and humans. One approach to identifying Environmental Aspects is to evaluate an organization's activities based on how each interacts with the environment. For example, if evaluating 'air', consider vehicle and equipment emissions, and if evaluating 'water', consider potable water contamination or flushing exercises. Another method of evaluating Environmental Aspects may be separating an organizations activities based on "processes", for example, if evaluating water treatment one process would be sedimentation, and another filtration. Evaluate each process as it may impact each area of the environment, either positively or negatively.

To evaluate the significance of these aspects a grading method must be devised to prioritize or rank the Aspects. Criteria to use could include: environmental areas effected, occurrence frequency, regulatory requirements, existing policies, industry standards, contractor activities, previous incidents, recent research, hazard/risk liabilities, waste minimization potentials, and aesthetics. One criteria item may often have more significance than another; therefore, items may carry a weighting factor or multiplier based on importance. The objective of this grading exercise is to conclude which aspects have the most significant impact on the environment, giving an objective view of what items to target for future environmental improvements. Also, any *Aspect* that has a regulatory requirement relating to it must be considered *significant*.

Once the organization's *Significant Aspects* are identified, ISO 14001 requires that one "control" those aspects to prevent negative environmental impacts from occurring. Control Methods are then identified or initiated to regulate the Significant Aspects, thus ensuring negative impacts are observed. Control Methods should be listed on a *Control Method Table*. Control methods may include approved procedures, specific Improvement Programs (to be discussed further), specific training sessions, manuals, etc.

Legal Requirements:

Does your staff know the laws and regulations that mandate your operations? Do they know the details and requirements of other industry standards that you subscribe to? Often "front-line" representatives of an organization haven't a clue as to what these regulations consist of.

The steering team or another designated team, with regulatory knowledge and experience, should thoroughly evaluate all existing regulations and other requirements that the organization subscribes to. One may find that certain regulations do not

necessarily apply to existing operations. Also, many states have public record statutes, so carefully research these areas for application.

Another tool for researching regulatory requirements is the Internet. The significance of this resource is that the information is assuredly the most up-to-date available. Once these areas are researched, a master list must be compiled to make available important information on each regulation.

Contact persons and phone numbers should be identified and listed to assist with keeping the regulations up-to-date each year, as ISO 14001 requires. A Regulatory Library should be established to house these documents in a central location, providing full and immediate access for all associates.

Objectives and Targets:

Now, all of the previous exercises will lead to this question: how can we do our part to improve the environment? A team should then be formed to evaluate the results of the *Significant Aspects* grading to decide on which items to target for future improvements. A point to be taken is that grading results are 'guidelines' for *choosing Objectives and Targets*; budgetary constraints must also be considered. An example of potential areas to consider are as follows: preventive maintenance (PM), utility locating, training, corrosion control, fire protection, pipe rehabilitation, pipe replacement, and leak surveying. Note that these are merely examples and an organization must use its Significant Aspects for establishing Environmental Objectives and Targets.

Once Objectives and Targets are formally established, Improvement Programs are then initiated. An Improvement Program is a formal write-up or document enfolded with the Objectives and Targets with supporting information, verbiage, details, etc. to successfully accomplish the environmental goals. Each Improvement Program delineates the background and purpose of the program or project, the specific objectives of the project, and included measurable targets for accomplishing the project. Performance indicators for tracking the progress of each project must be detailed in the project documentation, along with the allocation of resources to complete the project. A detailed action plan with designated responsible parties should be included to "kick-start" the project. And related documents must be identified and documented.

To monitor and ensure the success of each Improvement Program, details of each project should be included in a formal *Monthly Report*. The report provides senior management with critical information on the progress of our operations, and serves as a means of internal communication to educate our associates on the successes of the department. Also, it is the means for tracking the progress of each Improvement Program. Should a project get behind schedule, corrective measures must be implemented to get the project back on-track. Through the use of a monthly reporting structure, these Improvement Programs can be closely monitored to ensure success.

Standard Operating Instructions (SOI's):

Is there more than one way to skin a cat? Of course! Do you want your associates to perform an activity in a variety of ways? Of course not! To prevent deviations from an organization's preferred operational methods and/or industry standards, well established, documented and approved procedures or *Standard Operating Instructions (SOI's)* are needed. SOI's must be written for all activities or job responsibilities that could significantly impact the environment. As a means of consistency and good business practices, SOI's should be established for all activities, including administrative tasks. By establishing these procedures, initial and cross training becomes a much easier task, and additional supervisory controls are established.

A team or teams should be instituted to evaluate all operational activities and tasks. Flow charting exercises will tremendously assist in this evaluation. Brainstorming should then ensue to determine the best practices and methods to successfully accomplish the tasks. Experience and innovation should be incorporated into the SOI's, with specific steps to perform. The language should be written for all to understand for simplicity and comprehension, and for future cross-training and/or initial orientation training.

To conform to the ISO standard the following items must be included within the SOI's:

- ◆ Revision levels
- ◆ Effective dates
- ◆ Prepared by
- ◆ Approved by
- ◆ Corresponding documentation (ISO clauses, EMS procedures, related activities, forms, regulations, etc.)
- ◆ Purpose
- ◆ Scope
- ◆ Specific responsibilities
- ◆ Regulatory requirements
- ◆ Emergency start-up and shut-down details
- ◆ Positive and negative impacts

Training and Awareness:

One of the key issues in certification is evidence of an associate's awareness of and commitment to the EMS. This only seems logical, as almost all associates in an organization will be affected by implementation, and all associates are needed for an organization to achieve certification. Awareness comes from communication and training; without it, EMS implementation cannot succeed.

The first area of training needed is awareness. A formal EMS Awareness Training Schedule should be established and training administered. Training should include each area of the standard and all established EMS Procedures. All associates should have general awareness of the EMS scope, and benefits of implementation. The program has many benefits, for example:

- ◆ Prevention of pollution
- ◆ Protection of the environment
- ◆ Continual environmental improvement
- ◆ Productivity improvement

Each associate should also have a clear understanding of how their activities can impact the environment, both positively and negatively. Proper and thorough training will provide this.

Training must include Standard Operating Instruction (SOI) training if the activity or task has been determined to have a significant impact on the environment. Additional training should be included on any SOI which can have any environmental impact. To build a diverse work force, a Skills-based training program and schedule should be included in the training programs. All formal schedules should include due dates, should identify associates required to attend, and include names of trainers responsible for conducting each training session. All training should include the benefits of following the approved the procedures, work methods or directives, and the adverse environmental effects of deviation from them.

Emergency Preparedness:

Chemical spills, natural disasters and severe process interruptions are all considered emergencies; thus, emergency preparedness plans are imperative. With any emergency time is not a luxury. Approved plans are required to effectively and rapidly respond during an emergency, which could in turn impact many areas of the environment.

Emergency procedures must include the same criteria as the previously discussed SOI's, with the addition of *Post Incident Reviews*. These reviews provide a formal means of discussing "what went right", "what went wrong", and "what needs improvement". For continual environmental improvement, the Post Incident Review must take place. Upon conclusion of the review, corrective measures must be discussed, and must be executed and tracked through completion.

Records Management:

Is your filing system busting-out at the seams? And I'm sure you can find any document within 60 seconds, or a file that you needed 5 minutes ago for an important meeting. Many organizations need little convincing with respect to records management. Most

associates can envision the benefits to a structured filing system. It is important to create a Records Management Team to venture into this group of tasks. Flow charts should be created for all tasks, which begins with how a record is generated, the paths which it follows, and finally to where it is filed.

Through the use of these methods, many document control tasks can be “streamlined”, certain processes eliminated, forms discontinued, and filing systems altered. A Central Filing Area should be created to accommodate filing structures and the administrative staff. An easy-to-use file index should be established to provide a means of locating documents and files in "short order". Also, as previously mentioned, a Library should be instituted to centralize documents and provide associates access to legal and other requirements, manuals, reference materials, training and operational videos, industry magazines, etc.

Go into any organization and see how many versions are readily available of the same policy, procedure or form. Staff members are usually working out of these different versions trying to do the same tasks! This is the reasoning behind document control and records management. Revision levels and effective dates are needed on all EMS documents, SOI's, emergency plans, and especially forms.

Regarding Records Management, administrative SOI's should be produced and approved to further support these document control methods and ideas. Without teamwork and input from the entire administrative staff this process cannot succeed.

Corrective and Preventive Action Requests:

A mechanism is needed to provide associates an opportunity for expressing environmental concerns and improvement ideas. Suggestions should carry rewards as an incentive for innovative ideas and potential corrections to reverse negative environmental impacts. Two ideas for promoting these improvements are the Corrective Action Request (CAR) and the Preventive Action Request (PAR).

These requests can be initiated by associates, management, through internal audits, or through post incident reviews. Requests are tracked by an EMS Manager or designee to ensure completion, and senior management is kept abreast of the current status.

Monitoring and Measurement:

How many times have you wondered, "When's the last time this gauge was calibrated?" Well, test equipment, including gauges, are an intrinsic part of an EMS. A strict regiment of when and how test equipment is checked, maintained and calibrated is required. First, an organization must identify what equipment will require calibration and what methods are used to check or calibrate. Venders can be contacted to learn calibration and/or

inspection requirements. Only test equipment that can have a significant impact on the environment need be scheduled for testing.

Equipment testing and inspection SOI's should be written for all identified test equipment to institute consistency and an approved method for calibration. Gauges should be numbered, databases or formal logs should be established, and schedules formalized to ensure the program is maintained.

Regulatory Assessment:

To ensure all legal and other requirements that we subscribe to are followed, a Regulatory Assessment/EMS Progress Team should be created to evaluate the identified requirements on a quarterly basis. A bank of related questions should be collated, and each question 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, the organization knows and has documented evidence that regulatory requirements are followed.

Internal Audits:

A requirement of the ISO 14001 is self-assessments. It is required and also advantageous to perform internal audits, as objective views will be added to the implementation process and to program maintenance. Non-conformances will be discovered internally rather than externally, providing an opportunity for correction prior to an external audit.

Internal Auditors should be well trained and familiar with EMS implementation and maintenance. Audits should be conducted by designated audit teams to provide objectivity and conformance to audit guidelines. To maintain impartiality, audit teams should not include trained auditors that are connected to the area of the organization being audited. Also, to accommodate this process a specific and detailed questionnaire is beneficial to guide the auditors smoothly through the process.

External Audit:

To prepare for the ISO 14001 certification process, several audit firms should be interviewed to identify a firm that is knowledgeable in the operations of a public utility, and specifically a water and wastewater company.

In preparation for the audit, all electronic information should be checked and double-checked for accuracy. Separate meeting rooms should be set up and equipped to accommodate the auditors. Hard-copy evidence of EMS should be made available within the audit room, and should be organized in an orderly and structured fashion. This

preparation will put the auditors at ease, providing a comfortable area to work, and presenting a professional atmosphere.

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. Communication should be placed at the forefront of implementation. Positive reinforcement must come from management and team members, and resources must be provided to accomplish your goals.

It is now your turn to put the thumbprint of our generation on the map of environmental improvement. We now have in our hands that opportunity, provided through a flexible, innovative and internationally accepted certification program, *International Standards Organization - 14001 Standard*.

References:

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