# The ISO 14001:2015 Implementation Handbook

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# The ISO 14001:2015 Implementation Handbook

## Using the Process Approach to Build an Environmental Management System

*Milton P. Dentch*

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# Preface

I started my professional career in the paper industry in the early 1960s. The company I worked for, Rice Barton of Worcester, Massachusetts, produced machinery that manufactured pulp and paper. In my early twenties, I visited paper mills all over the United States and Canada. On my first visit to a paper mill, when I commented to my traveling companion from Rice Barton regarding the pungent odor as we approached the paper mill in Madawaska, Maine, my colleague advised, "That's the smell of money, son—get used to it." On a similar trip a few years later to a paper mill in Alabama, I experienced the alleged improved odor of "sweet southern pine," and it actually was less offensive.

I loved my job at Rice Barton; paper mills and mill towns were an important part of Americana. The engineering work was exciting—and other than the smell from the pulp mill stacks, I wasn't really conscious of the impact the paper industry had on air and water quality for the areas adjacent to the mills. A turning point for the paper industry occurred in the late 1960s when the cover of *Life* magazine was an aerial photograph of Lake Erie showing the runoff from the pulp mill at the Hammermill Paper Company in Erie, Pennsylvania (see Figure P.1). The mill discharged the effluent directly into the lake. The waste material was lighter than water, so the foamy material would rise to the surface and float many



**Figure P.1**   Aerial view of pulp waste from the Hammermill Paper Company in Erie, Pennsylvania, as it drains into Lake Erie, 1968. (Photo by Alfred Eisenstaedt/the LIFE Picture Collection/Getty Images)

yards offshore, contained by truck tires or similar barriers. With some frequency, the mill would skim off the flotsam and deposit the waste in a landfill. The toxic chemicals would remain in the lake, damaging all sorts of fish and wildlife.

While there were many other factors involved, the graphic *Life* magazine photograph illustrating the almost arrogant pollution of our lakes and rivers by industry helped spawn the Environmental Protection Agency (EPA) in 1970. That year also saw the publication of Rachel Carson's *Silent Spring*, the immensely popular book describing how the indiscriminate use of pesticides was poisoning birds and wildlife. Americans at large became aware of the ecology.

In 1969, I left the paper industry to work for the film and camera company Polaroid. The chemicals and materials used to produce instant film were often toxic; the processes included considerable wastewater and discharge of volatile air compounds. While Polaroid was always a responsible company, the required environmental control technology was in its infancy and safety trumped environmental concerns. "The solution to pollution is dilution" was the mantra, meaning keep adding air to chemical discharges to alleviate the released odor of volatile chemicals; a similar mind-set existed with management of wastewater.

The wake-up call for Polaroid was a front-page photograph in a Boston, Massachusetts, newspaper of several drums of hazardous waste that had washed up on the city's Revere Beach. Polaroid had contracted a company to dispose of the waste chemicals. We obviously did not conduct due diligence for this firm. Its disposal process was quite simple: take the drums a few miles out in Boston Harbor and dump them overboard. The workers would shoot bullet holes in the drums to ensure the partially full drums sank to the bottom of the sea. On this particular Saturday evening, the marksmen were not so accurate, and a half-dozen drums with Polaroid Corporation labels quite evident found their way to shore. Needless to say, Polaroid developed immensely improved controls for contractors over the next several years, and the company became a leader over the next decades in protecting the environment.

I worked as an engineer and manager for Polaroid for 27 years, holding positions with environmental responsibilities in several areas. While the company continued to reduce its environmental impact during my time there, there was something about the way companies like Polaroid managed their environmental programs that seemed less than ideal. We strove to obey the EPA and Massachusetts regulations. We sponsored "Earth Days," encouraging employees to reduce their environmental impact both at work and at home. But the individuals who managed the environmental programs were outside the mainstream manufacturing or engineering groups. The corporate environmental leaders were tasked by company management to "police" the manufacturing groups to ensure compliance with environmental regulations was met.

The corporate environmental leaders had associates in the various divisions, but these individuals were seen as caretakers of the environmental programs in their divisions, assumed to be mostly responsible for the environmental issues in their plant. The environmental associates maintained all the permits and other records associated with air, water, and waste controls. The "ownership" by the folks who produced the pollution was absent. When an associate left the division, the replacement sometimes had to scramble to locate the pertinent files.

Several years after leaving Polaroid, I became certified to provide audits for the International Organization for Standardization (ISO), first as a quality auditor,

**Table P.1**    The difference between a program and a system.

| An environmental program: | An environmental management system requires: |
|---|---|
| • Can be dependent on individual knowledge | • Management oversight |
| • Can be reactive, with a compliance focus only | • A commitment to improve |
| • Can include inconsistent record keeping | • Formalized record keeping |
| • Can minimize employee involvement | • Employee involvement |
| • Can include a "silo" effect among managers | • Top management ownership and reviews |
| • Can be difficult to monitor | • Internal auditing |

then later as an environmental auditor and EMS internal auditor trainer and consultant. Since 2001, I have audited the environmental management systems (EMSs) of over 100 companies to the International Standard ISO 14001. Observing what allowed some companies to implement a very successful environmental program, I discovered they weren't managing an *environmental program*; rather, these companies had created an *environmental management system*. The differences between a management system and a program are illustrated in Table P.1.

One of the goals of this book is to explain how an organization can use a management system to both control and improve its environmental performance. I provide guidance in building the EMS in support of the organization's operations—linking the management system to the requirements of ISO 14001, to support third-party certification to ISO 14001:2015. Included in the text are best practices as well as common pitfalls and weaknesses I've observed in various organizations. For those organizations already certified to ISO 14001:2004, I highlight the changes required to upgrade to the new International Standard.

In addition, included on an accompanying CD are comprehensive check sheets to be used by internal auditors in auditing an EMS's conformance to ISO 14001:2015.

Note: The contents of ISO 14001:2015 have been paraphrased in this book. Paraphrased text by its very nature can introduce differences in understanding and interpretation. This book should be used in conjunction with ASQ/ANSI/ISO 14001:2015 *Environmental management systems—Requirements with guidance for use.*

# 1

# ISO 14001 History and Chronology

In 1968, the public outcry related to the contamination of Lake Erie by the discharge of waste from the pulp mill of the Hammermill Paper Company led to the eventual establishment of the United States Environmental Protection Agency (EPA) in 1970. On a worldwide basis, the leak of poisonous gas in 1984 from the pesticide plant in Bhopal, India, greatly amplified concerns on how chemical companies managed their environmental and safety operations, particularly in third-world countries. The discharge of the toxic gas, methyl isocyanate (MIC), from the Union Carbide India Limited (UCIL) plant in Bhopal, India, resulted in the deaths of thousands of employees and neighbors of the plant and caused serious injury to hundreds of thousands of others. Eventually, Union Carbide Corporation, parent company of UCIL, agreed to pay $470 million to the Indian government to be distributed to claimants as a settlement.

In response to the Bhopal tragedy, environmental management systems were established over the next several years:

- 1988: The American Chemistry Council (ACC) established Responsible Care to help member companies significantly improve their environmental performance and the health of the communities in which they operate

- 1992: The British Standards Institute (BSI) published the world's first environmental management systems standard: BS 7750, a standard for environmental control in the manufacturing and services sector

- 1993: The Eco-Management and Audit Scheme (EMAS) was established to allow industrial sector companies operating in the European Union to voluntarily participate in an environmental management scheme to demonstrate commitment to responsible environmental stewardship

- 1996: The International Organization for Standardization (ISO) created ISO 14001, a worldwide registration scheme that was compatible with BS 7750 and EMAS and consistent with the quality management system standard ISO 9001

ISO 14001 is a certifiable standard related to environmental management; it is similar to the quality management systems standard ISO 9001. The focus of ISO 14001 is to assist organizations in managing and improving their operations that affect the environment to comply with applicable laws and regulations. ISO 14001 is similar to ISO 9001 in that certification is performed by third-party organizations (registrars) rather than being awarded by ISO directly.

As of 2015, over 300,000 companies in 171 countries have been certified to ISO 14001. Since 1996, the "Big Three" automotive manufacturers—General Motors, Ford Motor Company, and Fiat Chrysler—along with their Japanese and German counterparts have mandated that their direct product suppliers (tier 1) achieve and maintain third-party certification to ISO 14001. The automotive manufacturers also require their assembly plants to maintain ISO 14001 certification. Additionally, many European and Japanese companies require their tier 1 suppliers to achieve ISO 14001 certification to demonstrate commitment to responsible environmental stewardship.

ISO has a goal to upgrade the management systems approximately every seven years. The first environmental standard, ISO 14001:1996 was reissued as ISO 14001:2004 in 2004 and had a delayed upgrade to ISO 14001:2015 due to the desire to harmonize the environmental standard with the quality management standard ISO 9001:2015.

# 2

# The Environmental Management System as a Process

The internationally recognized standard for environmental management, ISO 14001 is built on the plan-do-check-act (PDCA) approach (see Figure 2.1). This is the operating principle of all ISO management system standards, including ISO 9001.

Put in the context of environmental management, the PDCA approach works as follows:

*Plan:* Top management establishes the scope and environmental policy of the EMS with consideration of the context of the organization's business model and interested parties. Environmental aspects and impacts with related compliance obligations are determined and analyzed to determine the risks related to maintaining the organization's environmental performance. Objectives are established to improve the environmental performance of the organization.

*Do:* Controls are implemented to ensure compliance with obligations. Environmental objectives and programs are initiated and implemented to improve the organization's environmental performance.

*Check:* The EMS is monitored and audited to measure performance against the organization's objectives and compliance obligations. The performance and results of the EMS are reported.

*Act:* Actions are initiated to correct deficiencies and improve the environmental performance as indicated by the monitoring and measurement of the EMS results. Resources and employee training are provided as appropriate to ensure improvement of the EMS.

While establishing the plans and actions to support an EMS, it is helpful to look at the EMS as a *process* with two desired outputs: compliance with applicable environmental regulations and improvement of the EMS. The organization's management provides the inputs to the EMS process: scope of activities (business model), the environmental policy, and regulated environmental activities (aspects).

The chart shown in Figure 2.2 represents the core processes of an EMS and is the starting point for building the EMS. The next step is to define the business model for the organization with linkage to related ISO 14001:2015 requirements.

For organizations looking to certify to ISO 14001 for the first time, I recommend a review of what is already in place in the business related to the core EMS process before attempting to conform to the ISO requirements. Unfortunately, there is
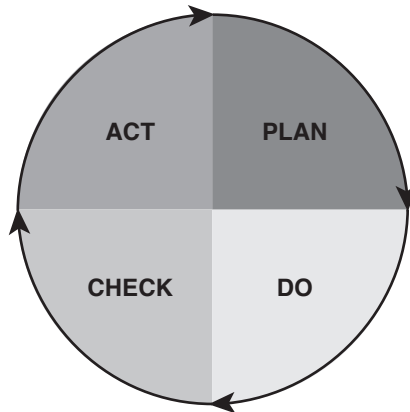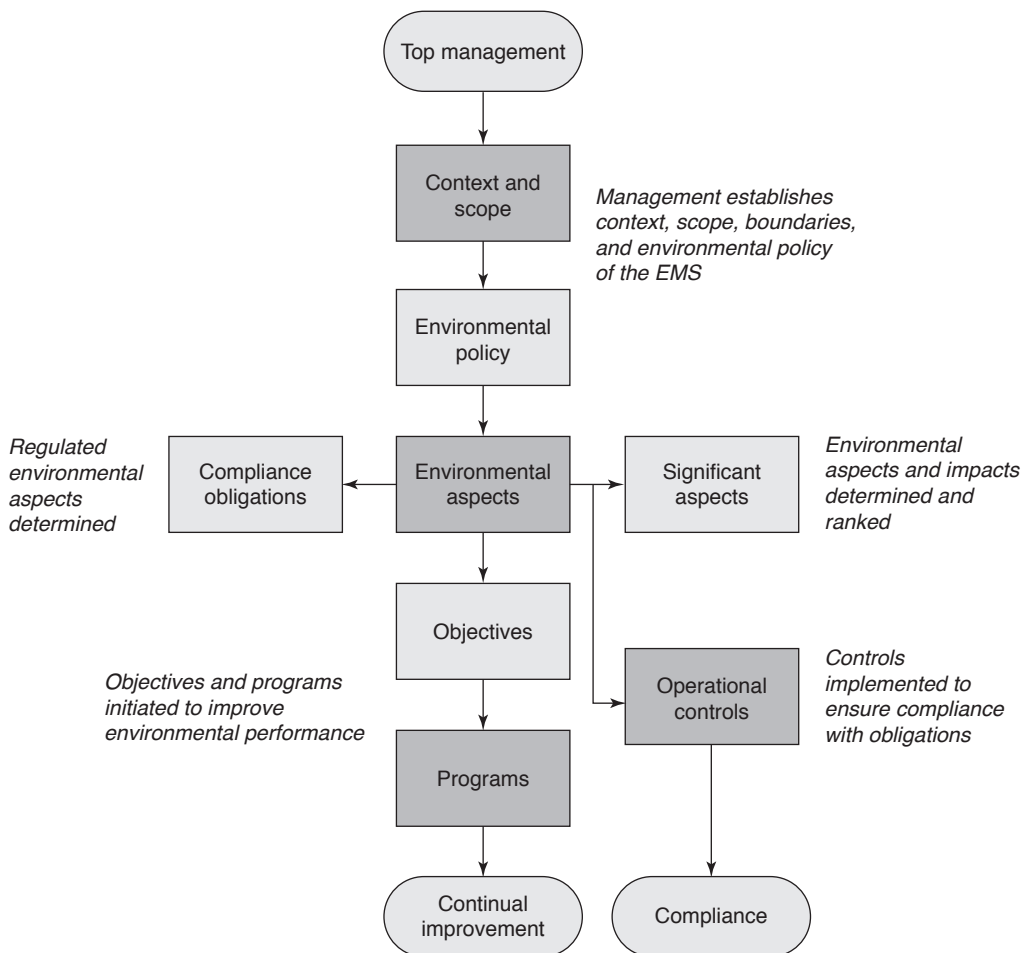
**Figure 2.1**   Plan-do-check-act cycle.



**Figure 2.2**   The core processes of an EMS.

quite a bit of "ISO-speak" in all International Standards, due to the need to cover organizations of various sizes and complexities, with a multitude of worldwide languages and interpretations. So, an organization with a high or low environmental impact can collect existing process controls and documentation in support of the EMS process model shown in Figure 2.2 before engaging in steps to conform to ISO 14001:2015. The goal should be to achieve and maintain compliance with the organization's environmental regulatory requirements, while improving its environmental performance. Becoming certified to ISO 14001 provides verification by a third party, certified by ISO.

For organizations currently certified to ISO 14001:2004, this book highlights and explains what's needed to satisfy ISO 14001:2015. The major changes from ISO 14001:2004 are summarized in the following section.

## CHANGES FROM ISO 14001:2004

Organizations currently certified to ISO 14001:2004 will need to address the new (or expanded) requirements of ISO 14001:2015 with the following general groupings:

- Understanding the context of the organization and expectations of interested parties
- Integration of the EMS requirements into the organization's business processes
- Actions to address risks and opportunities
- Expanded top management commitment
- Expanded definition of operational controls

### Context and Interested Parties

Past revisions of ISO 14001 required organizations to define the *scope*—the activities, processes, and buildings and property within their EMS. The organization's environmental policy included commitments to comply with applicable environmental regulations, reduce pollution, and continually improve its environmental performance. While many ISO 14001–certified organizations included initiatives such as replacement of toxic materials, recycle activities, and reduction of fossil fuel use, the majority of the environmental programs fostered by certified organizations were "reactive" in nature. The new clauses of ISO 14001:2015, Understanding the organization and its context and Understanding the needs and expectations of interested parties, challenge organizations to analyze their operations and environmental impact from a more holistic, proactive vantage point.

With regard to the context of the organization, depending on the organization's business model and environmental impact, there may be opportunities to have programs with a positive, proactive impact: air emissions related to climate change, improvement in soil quality of adjacent land or neighboring waterways, and supporting biodiversity (local flora-fauna) initiatives. The organization should be able to explain, within the context of its operations, what opportunities exist. A company producing machined parts or electronic components may have

limited options; a large chemical plant, oil refinery, or paper mill may have many opportunities.

In a similar fashion, in response to expectations of interested parties, the organization should analyze how its activities and products may have an environmental impact on its customers, community, and neighbors. Examples could be end-of-life product disposal, voluntary labeling on products, reduction of unregulated materials, sustainable resources, and commitments to maintain adjacent community land or waterways. A key focus of ISO 14001:2015 is "life-cycle thinking," considering each stage of a product or service, from development to end of life. Organizations producing consumer products may have many opportunities (but also challenges) to have an impact on product disposal, while manufacturers of components for sale to industry may be limited in this regard. Organizations providing components for sale to industry can demonstrate their commitment to life-cycle thinking by reducing or eliminating the use of environmentally challenged materials and maximizing recycle initiatives. Consumer product manufacturers can support life-cycle thinking by moving to "zero-landfill" disposal via waste-to-energy disposal options (waste is burned to produce electricity). Chapter 4 discusses these requirements in more detail.

## Integration of EMS Requirements into the Organization's Business Processes

Many ISO 14001–certified companies have integrated the EMS into their business planning and strategy. I have audited companies of all sizes where the environmental performance metrics are woven into the business plan; the key process indicators (KPIs) assigned to quality and business parameters include the environmental metrics of hazardous waste reduction, material recycle, and utility use. Quality-driven waste-reduction projects include improved environmental performance. Best-in-class organizations have established a business management system (BMS) incorporating their financial, quality, safety, and environmental systems into a cohesive operational model. I have also experienced ISO 14001–certified companies that operate with their EMS at arm's length from their business—just doing the minimum in environmental management to maintain certification. The ISO 14001:2015 standard requirements should nudge these companies into broadening their perspective on environmental performance. Chapter 9 discusses ways to integrate the EMS into the organization's business.

## Actions to Address Risks and Opportunities

From my perspective, the requirement to provide risk analysis in the EMS activities is the key difference between ISO 14001:2015 and previous revisions. An identified method to analyze risk associated with threats and opportunities related to the organization's significant environmental aspects, compliance obligations, or other issues is now required. Results of the analysis should be used in establishing objectives and planning to mitigate the risks. Utilization of failure mode effects analysis (FMEA) as a quality tool could be applied. While organizations with an effective EMS certainly understand risks related to noncompliance, the new requirements of ISO 14001:2015 may have a positive effect on many organizations by requiring a more formalized process and subjecting the risk evaluation

process to a third-party audit. Chapter 6 discusses this requirement in more detail with examples of application to environmental controls and legal obligations. It should be noted that ISO 14001:2015 does not have a requirement for "preventive action." The thought is that the entire EMS is *preventive* in nature and that the risk analysis approach is also preventive.

## Top Management Commitment

While the previous revisions to ISO 14001 included commitment from management to support the EMS, ISO 14001:2015 amplifies this commitment. The ISO 14001:2015 standard does not use the title "Management Representative" as previous versions did. The organization can continue to use "Management Representative" as the title having certain responsibilities, but the intent of ISO 14001:2015 is to emphasize top management's responsibilities as more than delegating. My past experience with a small group of organizations was that management had delegated the environmental management coordination too far down the organizational chart. This was evident by way of the environmental management representative not attending the management review meetings to present the status of the EMS. Not a good sign. Management would justify this by citing the need to discuss financial or sensitive issues at the meeting, and the environmental coordinator should not be privy to such information. ISO 14001:2015 requirements strive to prevent the over-delegation of the EMS support and coordination.

## Expanded Definition of Operational Controls

The intent of ISO 14001:2015 clause 8 closely matches the previous revisions of ISO 14001 related to operational controls; however, ISO 14001:2015 provides more specific requirements related to outsourced activities (contractors and suppliers), change control, design, and product life-cycle considerations.

When processes are provided by contractors and/or suppliers (outsourced), the environmental impacts need to be defined with appropriate controls established and implemented. Examples of outsourced processes include cleaning services, waste removal, landscaping, contracted maintenance, and construction.

The product design process should consider the impact of materials used in order to avoid environmentally challenged materials during use, delivery, and disposal at end of life. The design and life-cycle requirements of ISO 14001:2015 are mostly applicable to organizations manufacturing consumer products. Other organizations, such as discrete manufacturers, original equipment suppliers, and contract electronics manufacturers, are restricted by compliance obligations such as the RoHS (Restriction of Hazardous Substances) Directive and REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals).

The organization needs to ensure controls are in place when changes occur in processes, resources, and equipment. This requirement was *implied* in ISO 14001:2004 clause 4.4.6, Operational control (and clause 4.3.1, Environmental aspects); however, ISO 14001:2015 now *explicitly* requires the organization to evaluate and adjust operational controls when new processes or equipment is added to the operation.

Chapter 8 provides additional detail on the expanded requirements in clause 8 of ISO 14001:2015.

## Auditor Interpretations

The new or expanded ISO 14001:2015 requirements outlined here will be somewhat subjective for the third-party auditors to evaluate. When will an organization be judged nonconforming in addressing the context/interested parties, risk analysis, or top management commitment? If there are no examples of proactive initiatives related to reducing the organization's environmental impact, is that a nonconformance? My past experience in auditing to the ISO 14001 environmental standards (and ISO 9001 for quality) was that the auditor would not issue nonconformances when the organization did not meet its improvement objective or goal—provided the organization either documented the reason why the goal was missed or established actions to correct the situation. At a minimum, an organization is expected to have some form of "risk analysis" process related to the EMS. I would expect third-party auditors to follow this guideline when assessing performance against the new ISO 14001:2015 requirements. With regard to assessing top management commitment to the EMS, an experienced third-party auditor can detect when resources are not adequate to support the EMS—and will issue nonconformances as applicable.

Two other changes (but not new requirements) are the modification of the clause outlines and documentation formatting. These changes were made in ISO 14001:2015 to provide alignment with the formatting of ISO 9001:2015. Chapter 7 outlines these adjustments. Appendix A, "Correspondence: ISO 14001:2015 to ISO 14001:2004," provides clause-by-clause correspondence of the two standards.

## Transitional Period of ISO 14001:2015

ISO 14001:2015 was published on September 15, 2015. Companies that are certified to ISO 14001:2004 will have three years to bring their EMS up to date with ISO 14001:2015. Eventually all certificates in accordance with ISO 14001:2004 will become invalid and will be withdrawn as of September 15, 2018.

It is usually more efficient for both the organization and the ISO registrar to conduct the upgrade audit to ISO 14001:2015 during the organization's three-year recertification audit; however, the upgrade can occur during the annual surveillance audit.

# ISO 14001 BENEFITS

I have presented overviews of ISO 14001 to managers and executives at several large companies over the past several years. The agenda for the meetings typically included:

- Major elements of ISO 14001

- ISO 14001 common "gaps"

- ISO 14001 best practices

- Benefits of an EMS

- Role of senior management

- Steps toward third-party registration

- Questions and wrap-up

Note: Appendix B summarizes the key points from the presentation and may be useful for organizations looking to certify to ISO 14001:2015. A review of the benefits of ISO 14001 is included in this chapter before moving on to defining the requirements of ISO 14001:2015.

Most management teams want to understand the return on their investment in an EMS and why they should obtain third-party certification to ISO 14001. What are the benefits of an EMS? In many cases, the company is already "committed" to certifying to ISO 14001 by way of a requirement placed on them by customers, often from the automotive sector or firms from Europe or Asia. Depending on the organization's business model and environmental impact, potential benefits in certifying can be grouped into three categories: risk reduction, cost reduction, and enhanced competitive edge.

**Risk Reduction**

- Environmental legal liability

- Accidents and environmental damage

**Cost Reduction**

- Disposal costs

- Utility costs

- Permitting fees

**Competitive Edge**

- Improved corporate image

- Investment in long-term stability

- Improved relations with regulators

- Counter international market pressures

- Strategic investment now versus necessary expense later

- Demonstration of leadership

It can be difficult to place hard dollar amounts on the savings or cost avoidance in managing an organization's EMS. In relative terms, the cost of implementing an ISO 14001 system as a preventive action versus the cost of environmental noncompliance is illustrated in Table 2.1.

My "exponential" ranking may be soft in today's noncompliance penalties process, where regulatory fines can be in the hundreds of thousands of dollars. A local newspaper recently reported on a laboratory that was fined by the Massachusetts Department of Environmental Protection (MassDEP):

> An environmental testing company based in Marlborough will pay $100,000 to resolve allegations it failed to comply with hazardous waste laws, in violation of a previous court judgment.

**Table 2.1**   Relative costs of ISO 14001: prevention versus response to errors.

| Cost of ISO 14001 as a prevention tool | Cost of ISO 14001 as a discovery tool | Cost of internal environmental errors | Cost of external environmental errors |
|---|---|---|---|
| • Training<br>• Maintenance<br>• Process improvement<br>• New product design<br>• Communication | • Inspections<br>• Audits<br>• Monitoring<br>• Reporting<br>• Calibration | • Loss of materials<br>• Waste treatment and control<br>• Loss of productive space<br>• Loss of time | • Fines and plant closures<br>• Remediation<br>• Loss of customers<br>• Reaction to unfriendly community |
| $1 | $10 | $100 | $1000 |

The Massachusetts Attorney General's Office announced Thursday that Accutest Laboratories of New England, Inc. recently reached a settlement with the state after being accused of failing to make improvements at its facility as required by a previous court ruling.

State officials allege the company improperly stored hazardous waste for longer than permitted, did not properly label hazardous waste containers and violated other waste storage rules.

State environmental officials also allege the company's efforts to prevent emergencies at its analytical laboratory in Marlborough were inadequate, and that it should have provided more training for employees about handling hazardous waste.

"This company ignored the terms of a court judgment," Attorney General Maura Healey said in a prepared statement. "We expect defendants in all cases, including companies caught violating environmental laws that protect public health and natural resources, to take their compliance obligations seriously."

Accutest was ordered to pay a $350,000 fine in May 2014, settling prior allegations the company failed to obtain necessary permits to emit large quantities of hazardous pollutants into the air.

According to Healey's office, the company was accused of underreporting the level of hazardous waste it was generating to the state Department of Environmental Protection. It was ordered to apply for a new air permit and install emission control equipment to reduce emissions by 95 percent, according to Healey's office.

Inspectors from MassDEP visited Accutest's facility in Marlborough again in October 2014 and found that, while the company had taken "appropriate steps" to comply with air permitting requirements, the building still did not comply with hazardous waste laws, according to the state.

The company has since corrected the problems. It was also ordered to hire an environmental health and safety officer to ensure it is complying with environmental laws. The employee must remain on staff while the court order is in effect—a period of at least three years, according to Healey's office. (Haddadin 2015)

The irony of the citation is that the laboratory performed *environmental* testing services including organic and inorganic analysis of air, water, soil, and waste

**Table 2.2**   Environmental violations at laboratory as related to ISO 14001.

| ISO 14001 clause | Violation |
|---|---|
| Operational controls | Improper labeling of hazardous waste containers and violation of other waste storage rules |
| Training | Employees did not receive necessary amount of training for handling hazardous waste |
| Compliance obligations | Failed to obtain necessary permits to emit large quantities of hazardous pollutants into the air |
| | Underreported the level of hazardous waste it was generating to the state Department of Environmental Protection |
| Emergency planning | Plan to prevent emergencies at its analytical laboratory was inadequate |

characterization in support of federal and state environmental programs. The firm's website did not indicate certification to ISO 14001 (or ISO 9001).

The violations cited provide both an excellent segue to subsequent chapters of *The ISO 14001:2015 Implementation Handbook* and justification for becoming certified to ISO 14001. A properly implemented EMS requires controls and auditing for all the issues raised by MassDEP (see Table 2.2).

Additionally, an ISO 14001–certified company is required to perform internal and compliance-based self-audits. Either type of audit would have helped the laboratory address the issues before they became external violations. In similar cases, the EPA has mandated that the offending organization require certification by a third party, often a registrar providing ISO 14001 certification. I have audited several firms to ISO 14001 based on responses to violations cited by the EPA. Appendix D, "United States Environmental Protection Agency Enforcement Annual Results for Fiscal Year (FY) 2015," describes other notifications of violations raised during 2015.

## Cost Reductions and ISO 14001

In addition to avoiding the costs of environmental noncompliance, organizations that establish a formal EMS and become certified to ISO 14001 can benefit by reduced disposal costs, utility costs, and permitting fees. Some possibilities I have encountered at various organizations are listed in Table 2.3.

Many organizations without ISO 14001 certification are already achieving the cost savings outlined by exercising good business practices and environmental management. Well-managed companies, when seeking ISO 14001 certification (often due to customer decree), are challenged to demonstrate improvements in their environmental performance, as they have already harvested the low-hanging fruit. In my experience auditing many companies, there are always opportunities for improvements, particularly in large manufacturing plants. Reduction of utility costs, energy savings, material substitution, and recycling programs are an ongoing challenge for all in industry. For smaller firms with minimal environmental impact, an experienced third-party auditor will understand their challenge and review other facets of the organization's environmental performance to assess performance.

While auditing a small, low environmental impact machine shop that was forced into ISO 14001 by a customer, I was informed by the plant manager: "Well,

**Table 2.3**   Cost benefits of ISO 14001.

| Area | Possibilities |
|---|---|
| **Disposal costs** | • Maximize recycle of materials to both reduce landfill fees and reuse materials<br>• Optimize segregation of waste to increase value of recycled materials<br>• Invest in trash compactors<br>• Establish composting field to reduce landfill load<br>• Replace or reduce hazardous materials<br>• Distill water from liquid waste to reuse water and reduce disposal cost<br>• Partner with quality department to improve material yields to reduce landfill load<br>• Maximize design opportunities to use environmentally compatible materials |
| **Utility costs** | • Partner with electricity supplier to relamp factory<br>• Install motion detectors to reduce lighting<br>• Invest in high-efficiency motors to reduce electrical use<br>• Schedule production to leverage power factors in evening<br>• Upgrade insulation and door openings to save energy<br>• Monitor air compressor losses during non-production periods<br>• Recycle wash water<br>• Install water meter on cooling towers to lower cost of sewer charges from city<br>• Optimize start-up and shutdown of machines<br>• Establish employee energy savings team |
| **Permitting fees** | • Eliminate or reduce quantity of hazardous waste to lower waste category and fees<br>• Reduce air emissions of volatile organic compounds by material substitution to avoid permit requirement |

this ISO certification will cost us $10,000 this year. I told the guys—we better find some way to pay for it." And, they did. The shop put a push on separation of metal waste types. They found that by developing a process to remove the lubricating oil, the recycled material was more valuable to the recycling company. Also, by managing the quantity of recycled material to equal a full truckload, savings were generated in shipping. The savings continued into the next year as well.

# 3
# ISO 14001:2015 Requirements

In the 2015 revisions, ISO formatted the management systems in sections for both quality (ISO 9001:2015) and environmental (ISO 14001:2015):

1. Scope
2. Normative references
3. Terms and definitions
4. Context of the organization
5. Leadership
6. Planning
7. Support
8. Operation
9. Performance evaluation
10. Improvement

## 1 SCOPE

This International Standard specifies the requirements of an EMS for organizations seeking to establish, implement, maintain, and continually improve a framework with the aim of managing its environmental responsibilities in a manner that contributes to the "environmental pillar" of sustainability. The intended outcomes of an EMS provide value for the environment, the organization, and its interested parties. Consistent with the organization's environmental policy, the intended outcomes of an EMS include enhancement of environmental performance, conformance to compliance obligations, and fulfillment of environmental objectives. This International Standard is applicable to any organization regardless of size, type, or nature and applies to the environmental aspects that the organization determines it can either control or influence considering a life-cycle perspective. It does not state specific environmental performance criteria, nor does it increase or change an organization's legal obligations.

This International Standard can be used in whole or in part to improve environmental management, but all the requirements are intended to be incorporated

into an EMS and fulfilled, without exclusion, if an organization claims it complies with this International Standard.

## 2 NORMATIVE REFERENCES

No normative references are cited. This clause is included to maintain clause numbering alignment with other ISO management system standards.

## 3 TERMS AND DEFINITIONS

See Appendix C (refer to pp. 1–6 of ASQ/ANSI/ISO 14001:2015).

## 4 CLAUSES 4–10

Sections (clauses) 4–10 provide the requirements for certification to ISO 14001:2015.

Note: In the chapters following, the general requirements of each ISO 14001:2015 clause are paraphrased in the opening box. “Needs to” and “should” indicate requirements. Where requirements in ISO 14001:2015 have changed from ISO 14001:2004, the issue is highlighted in the text in **bold**.

# 4

# Clause 4: Context of the Organization

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**4.1 Understanding the organization and its context**

The organization needs to determine the external and internal issues that are relevant to its purpose and that affect its ability to achieve the intended outcomes of its environmental management system.

**4.2 Understanding the needs and expectations of interested parties**

The organization needs to define the interested parties and their needs and expectations relevant to its environmental management system, including its compliance (legal and regulatory) obligations.

**4.3 Determining the scope of the environmental management system**

The organization needs to determine the boundaries and applicability of the environmental management system to establish its scope: the activities, organizational units, functions, and physical boundaries included in the organization's environmental management system.

**4.4 Environmental management system**

The organization needs to establish, implement, maintain, and continually improve its environmental management system, in accordance with the requirements of this International Standard.

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In previous revisions of ISO 14001, the organization was required to define and document the scope of its EMS. There was some confusion as to what was meant by "scope." Could the organization exclude certain activities at the site? How about organizations that lease or rent the site? What was the leaseholder responsible for in environmental controls? In **ISO 14001:2015,** the context, scope, and boundaries of the organization's EMS need to be clearly defined to provide a baseline for control and monitoring. In general terms, the scope, boundaries, and context as related to an EMS can be explained as follows.

## SCOPE

The scope is what the organization does, the products or services the organization provides. For organizations with a quality management system (QMS), the scope is what the organization states on its ISO 9001 certificate and advertising media. For

example, a plastic manufacturer might have "Manufacturer of injection molded products" as its scope. This scope would apply for this organization's EMS, but more information is needed in the scope to describe the boundaries included in the organization's responsibilities and the context of its commitments.

## BOUNDARIES

The scope needs to define the spatial and organizational boundaries to which the EMS will apply, especially if the organization is part of a larger organization at a given location. How many sites (building addresses) are under the scope? Who owns the property? If the organization does not own the site(s) but leases the properties from a landlord (leaseholder), then the responsibilities for the organization and the landlord need to be defined. What are the boundaries? Are there manufacturing or service groups located on the organization's site that are not in the scope of the EMS? The organization needs to define and clarify environmental aspects and impacts under its control.

The boundaries and site ownership should not be considered a form of "exclusion" or "outsourcing." In the case where the organization leases the property, the organization has responsibility to ensure its processes or activities do not have an adverse environmental impact on the leaseholder's property. While the leaseholder may hold the storm water or wastewater permits for the site, there should be clear definition as to the organization's responsibilities. Likewise, if the organization rents out portions of the site to another firm, the organization has responsibility to ensure the renter does not have an adverse impact on the organization's environmental performance. A best practice in these situations is to have *documented information*, such as a matrix, describing environmental aspects and leaseholder (or renter) responsibilities versus the organization's responsibilities.

**ISO 14001:2015** defines documented information as "information required to be controlled and maintained by an organization and the medium on which it is contained." This change is described in Chapter 7.

## CONTEXT OF THE ORGANIZATION

**ISO 14001:2015** requires organizations to put a policy in place that promotes environmental protection specific to the context of their business. Previous versions of ISO 14001 placed environmental protection in a somewhat reactive mode, where proactive initiatives included recycle programs and pollution prevention directly related to the organization's manufacturing processes. With ISO 14001:2015, the organization is required to understand the important issues that can affect, either positively or negatively, the way it manages its environmental responsibilities.

Examples include:

- Reduction of air emissions related to climate change

- Use of sustainable resources

- Improvements in soil quality of adjacent land or neighboring waterways

- Support of biodiversity (local flora-fauna) initiatives

In addition to understanding the context of the organization, **ISO 14001:2015** requires the organization to understand the needs and expectations of interested parties. The organization needs to review who are the interested parties related to its environmental compliance obligations: customers, neighbors, and community. The organization can then consider establishing voluntary compliance requirements that could impact the environment. Once it "volunteers," the organization needs to live up to that commitment. Examples include life-cycle considerations related to product disposal, voluntary labeling on products, and environmental commitments to reduce unregulated materials (e.g., Styrofoam) or to maintain adjacent community land or waterways.

The context of the organization and expectations of interested parties will be more applicable to large, multisite organizations with transportation-related air releases—environmental impact or consumer products implication. Many organizations under ISO 14001:2004 considered greenhouse gases and climate change as part of their commitment to prevention of pollution. External factors—such as legacy issues (e.g., prior site ownership soil or water contamination responsibility)—should always be part of the organization's responsibility to ensure environmental controls are in place.

At a minimum, the organization needs to present documented evidence that the context of the organization and expectations of interested parties were considered when establishing its EMS. Some considerations for various types of organizations are listed in Table 4.1.

**Table 4.1**   Examples of the context and interested parties for various types of organizations.

| Type of organization | Context | Interested parties |
|---|---|---|
| Consumer products | Climate change—transportation $CO_2$ | Customers: life cycle—product disposal, voluntary labeling, eco-friendly materials |
| Multinational—contract manufacturer | Climate change—transportation $CO_2$ | Community: landfill reduction |
| Chemical/materials processing | Sustainable resources | Community outreach—emergency planning |
| Discrete manufacturer: machining, plastic forming, casting, stamping, etc. | Sustainable resources | Community: landfill reduction |

# 5
# Clause 5: Leadership

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**5.1 Leadership and commitment**

Top management needs to demonstrate leadership and commitment with respect to the environmental management system to ensure:

- The environmental policy and environmental objectives are established and compatible with the strategic direction and context of the organization
- The integration of the environmental management system requirements into the organization's business processes
- The resources needed for the environmental management system are available

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Clause 5 is the overarching statement of what is required of top management to support the organization's EMS. The organization's management notes and performance records should indicate how effectively top management is leading the EMS by way of providing resources, strategic direction, communications, and results.

What's changed from ISO 14001:2004? **ISO 14001:2015** emphasizes management's need to support the EMS and integrate it into the organization's business planning and strategy. Later chapters offer examples where the organization's management notes can provide evidence of the integration of the EMS with the business planning and strategy.

Demonstrating leadership and commitment with respect to the EMS is an example of an ISO requirement subject to interpretation. As a third-party lead auditor providing hundreds of ISO 14001 audits, I have experienced only one organization—a large manufacturing site—where I had to issue a nonconformance against the organization's leadership. During the first two days of the audit, several issues were raised: environmental management meetings were not held per the organization's procedure, waste materials were not being stored according to procedure, and environmental objectives were not established for the current period. Clearly, top management was not supporting the EMS.

## 5.2 ENVIRONMENTAL POLICY

> **5.2 Environmental policy**
>
> Top management needs to establish, implement, and maintain an environmental policy that is appropriate to the purpose and context of the organization and provides a framework for setting environmental objectives.
>      The environmental policy should include:
>
> • A commitment to the protection of the environment and prevention of pollution
>
> • A commitment to fulfill its compliance obligations
>
> • A commitment to continually improve its environmental management system
>
> "Protecting the environment" can include sustainable resource use, climate change mitigation and adaptation, and protection of biodiversity and ecosystems.
>      The environmental policy needs to be communicated within the organization and made available to interested parties.

The organization needs to establish a documented environmental policy that is communicated internally and externally. The policy should demonstrate the organization's commitment to prevention of pollution, improvement of environmental performance, and conformance to regulatory compliance. The organization's environmental policy should be part of the organization's documented information endorsed by top management. Documented information should describe how the environmental policy is communicated within the organization and to persons doing work under the organization's control and interested parties, such as the public.

**ISO 14001:2015** emphasizes the organization's commitment to include the protection of the environment, along with prevention of pollution. "Protecting the environment" can include sustainable resource use, climate change mitigation and adaptation, and protection of biodiversity and ecosystems (as appropriate).

An example of an environmental policy is shown in Figure 5.1. Note that the text "We will strive to reduce the company's carbon footprint" supports that the organization is promoting environmental protection specific to the context of its business and protection of the environment.

## 5.3 ORGANIZATIONAL ROLES, RESPONSIBILITIES AND AUTHORITIES

> **5.3 Organizational roles, responsibilities and authorities**
>
> Top management needs to ensure that the responsibilities and authorities for relevant roles are assigned and communicated within the organization.
>      Top management needs to assign the responsibility and authority for ensuring that the environmental management system conforms to the requirements of this International Standard, including the reporting on the performance of the environmental management system.

---

**Environmental Policy**

The *Company* will conduct our operations in a way that is protective of the environment. We will maintain an environmental management system that will serve as a framework to achieve the following goals:

<u>Regulatory Compliance</u>
We will identify, evaluate, and comply with all applicable federal, state, and local environmental laws and environmental requirements of our customers as well as industry standards as applicable.

<u>Prevention of Pollution</u>
We will seek, first, to cost-effectively avoid the creation of pollution and waste from our operations, and second, to manage remaining waste through safe and responsible methods. **We will strive to reduce the company's carbon footprint.**

<u>Conservation</u>
We will strive to diminish our consumption of natural resources, using sustainable resources where possible. We will strive to improve our environmental performance.

*Company President*                                    July 4, 2016

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**Figure 5.1**    Sample environmental policy.

Top management should assign responsibilities and authorities to ensure the EMS is maintained. The organization's documented information should define individual responsibility and authority for maintaining the EMS. Examples include responsibility for reporting the performance of the EMS, authority for communicating with regulatory bodies and the public, releasing hazardous waste manifests, and approving reports to regulatory bodies.

What's changed from ISO 14001:2004? **ISO 14001:2015** does not use the title "Management Representative" as previous ISO 14001 standards did. The organization can continue to use "Management Representative" as the title having certain responsibilities, but the intent of ISO 14001:2015 is to emphasize top management's responsibilities as more than delegating.

# Appendix A
## Correspondence: ISO 14001:2015 to ISO 14001:2004

| # | ISO 14001:2015 | # | ISO 14001:2004 |
|---|---|---|---|
| **4** | **Context of the organization** | **4** | **Environmental management system requirements** |
| 4.1 | Understanding the organization and its context | | NEW |
| 4.2 | Understanding the needs and expectations of interested parties | | NEW |
| 4.3 | Determining the scope of the environmental management system | 4.1 | General requirements |
| 4.4 | Environmental management system | 4.1 | General requirements |
| **5** | **Leadership** | | |
| 5.1 | Leadership and commitment | 4.4.1 | Resources, roles, responsibility and authority |
| 5.2 | Environmental policy | 4.2 | Environmental policy |
| 5.3 | Organizational roles, responsibilities and authorities | 4.4.1 | Resources, roles, responsibility and authority |
| **6** | **Planning** | | |
| 6.1 | Actions to address risks and opportunities | | |
| 6.1.1 | General | | |
| 6.1.2 | Environmental aspects | 4.3.1 | Environmental aspects |
| 6.1.3 | Compliance obligations | 4.3.2 | Legal and other requirements |
| 6.1.4 | Planning action | | NEW |
| 6.2 | Environmental objectives and planning to achieve them | 4.3.3 | Objectives, targets and programs |
| 6.2.1 | Environmental objectives | 4.3.3 | Objectives, targets and programs |
| 6.2.2 | Planning actions to achieve environmental objectives | 4.3.3 | Objectives, targets and programs |
| **7** | **Support** | | |
| 7.1 | Resources | 4.4.1 | Resources, roles, responsibility and authority |
| 7.2 | Competence | 4.4.2 | Competence, training and awareness |
| 7.3 | Awareness | 4.4.2 | Competence, training and awareness |
| 7.4 | Communication | 4.4.3 | Communication |
| 7.4.1 | General | 4.4.3 | Communication |

| # | ISO 14001:2015 | # | ISO 14001:2004 |
|---|---|---|---|
| 7.4.2 | Internal communication | 4.4.3 | Communication |
| 7.4.3 | External communication | 4.4.3 | Communication |
| 7.5 | Documented information | 4.4.4 | Documentation |
| 7.5.1 | General | 4.4.4 | Documentation |
| 7.5.2 | Creating and updating | 4.4.4 | Documentation |
| 7.5.3 | Control of documented information | 4.4.5 | Control of documents |
| | | 4.5.4 | Control of records |
| **8** | **Operation** | | |
| 8.1 | Operational planning and control | 4.4.6 | Operational control |
| 8.2 | Emergency preparedness and response | 4.4.7 | Emergency preparedness and response |
| **9** | **Performance evaluation** | **4.5** | **Checking monitoring and measurement** |
| 9.1 | Monitoring, measurement, analysis and evaluation | 4.5.1 | Monitoring and measuring |
| 9.1.1 | General | | |
| 9.1.2 | Evaluation of compliance | 4.5.2 | Evaluation of compliance |
| 9.2 | Internal audit | 4.5.5 | Internal audit |
| 9.2.2 | Internal audit program | 4.5.5 | Internal audit |
| 9.3 | Management review | 4.6 | Management review |
| **10** | **Improvement** | | |
| 10.2 | Nonconformity and corrective action | 4.5.3 | Nonconformity, corrective action and preventive action |
| 10.3 | Continual improvement | 4.1 | General requirements |

# Appendix B
## ISO 14001 Workshop for Managers and Employees

## OUTLINE

- ISO 14001 chronology
- Major elements of ISO 14001
- ISO 14001 as a process
- ISO 14001 clauses
- Role of senior management
- Common "gaps" in EMS
- Operational issues
- Best practices
- Benefits of an EMS
- Steps toward third-party registration

## ISO 14001 CHRONOLOGY

- Responsible Care Program—1988
- Companies started applying BS 5750—late 1980s
- BS 7750—March 1992
- Eco-Management and Audit Scheme (EMAS)—drafted in 1992, finalized in 1995
- ISO 14001—September 1996
- ISO 14001:2004—Updated 2004
- ISO 14001:2015—Updated September 2015 (ISO 14001:2004 certificates will be withdrawn in September 2018)

## ENVIRONMENTAL MANAGEMENT SYSTEM

- An EMS is that aspect of an organization's overall management structure that addresses the immediate and long-term impact of its products, services, and activities on the environment

- The goal of an EMS is to allow the organization to better understand environmental management
- It is a system, not a program

## EMS CLAUSES

- Environmental policy
- Environmental aspects/impacts
- Legal and other requirements
- Significant aspects
- Objectives and targets
- Programs
- Operational control
- Emergency planning

## ISO 14001: PROCESS
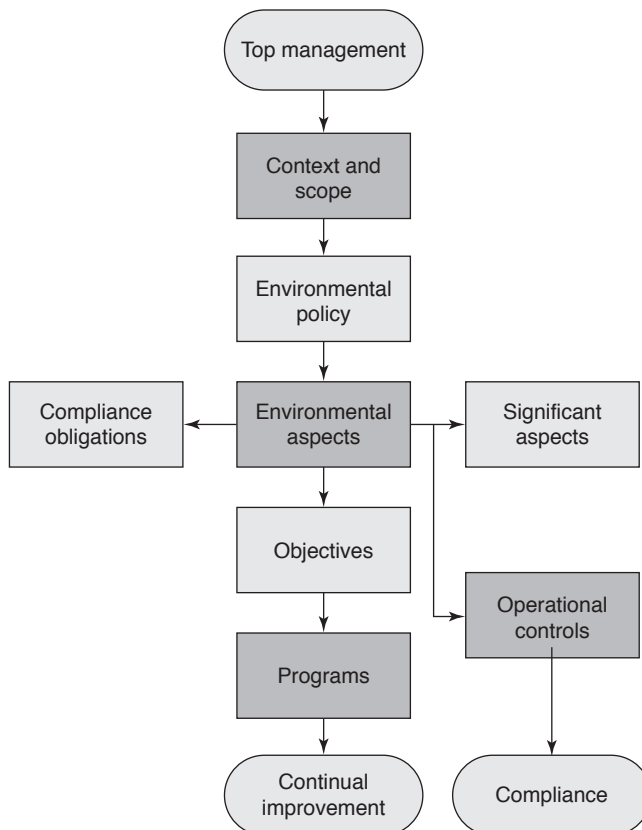
## SUPPORT PROCESSES

- Documentation
- Communication
- Corrective action
- Internal audit
- Management review
- Improvement
- Training
- Risk management

## ENVIRONMENTAL POLICY

- Includes a commitment to continual improvement and prevention of pollution
- Includes a commitment to comply with applicable legal requirements and with other requirements to which the organization subscribes that relate to its environmental aspects
- Is communicated to all persons working for or on behalf of the organization, and is available to the public

## ASPECTS—IMPACTS

- Environmental aspect: "Element of an organization's activities or products or services that can interact with the environment" (ASQ/ANSI/ISO 14001:2015)
- Environmental impact: "Any change to the environment whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects" (ASQ/ANSI/ISO 14001:2015)

## EXAMPLES OF ENVIRONMENTAL ASPECTS

- Storage of oil
- Unloading of chemicals
- Air discharge from oil-fired boiler
- Fertilizing of lawn
- Wastewater discharge from plating line
- Noise generated by trucks at loading dock
- Disposal of office waste

## SIGNIFICANT ENVIRONMENTAL ASPECTS

Key step—establishes need for improvement and controls. Best practice includes involvement of members from all functions to thoroughly review aspects/impacts. Institute a ranking system to establish aspects with the highest impact on a company's environmental impact; two common factors are severity and probability of occurrence.

## COMPLIANCE OBLIGATIONS

- Based on identified environmental aspects

- List of applicable regulations at federal or state level

- Develop process to maintain list as up to date

- Provide process to monitor compliance with applicable regulations

- Include requirements of other parties (corporate, industry, customer)

## EXAMPLE COMPLIANCE LIST

| Environmental aspect | Regulatory | Applicable regulation | Requirement | Permit/plan |
|---|---|---|---|---|
| Air discharges (paint booth, mix booth, aerosol cans) | MassDEP, 310 CMR 7.18<br><br>EPA, 40 CFR 60 and/or 63 | To prevent, control, abate and limit the emissions of toxic air pollutants into the ambient air | If >25 tons per year of VOCs, application of air pollution control equipment required | N/A: Maintain record of solvent use and report to MassDEP |
| Oil storage (boiler, maintenance) | EPA, 40 CFR 112<br><br>MassDEP (tanks), 527 CMR 9.00 | Potential environmental threat posed by petroleum and non-petroleum oils spills | If >1340 gallons above ground or 40,000 underground, SPCC required | SPCC dated 3/12/13 |

## OBJECTIVES, TARGETS, AND PROGRAMS

When establishing and reviewing its objectives and targets, an organization should take into account the legal requirements and other requirements to which it subscribes, and its significant environmental aspects. It shall also consider its technological options, its financial, operational, and business requirements, and the views of interested parties.

## EXAMPLE OF OBJECTIVES AND TARGETS

| Objective | Target |
|---|---|
| Develop recycling program to reduce waste material to landfill | Reduce recyclable materials in waste streams to landfill by 30% by December 2014 |
| Reduce electricity use | Reduce by 5% as percentage of units produced by December 1, 2014 |

## PROGRAM MANAGEMENT

The organization should establish, implement, and maintain programs for achieving its objectives and targets. Programs should include:

- Designation of responsibility for achieving objectives and targets at relevant functions and levels of the organization

- The means and time frame by which they are to be achieved

## OPERATIONAL CONTROL

The organization needs to identify and plan those operations that are associated with the identified significant environmental aspects consistent with its environmental policy, objectives, and targets, in order to ensure that they are carried out under specified conditions.

## EXAMPLE OF OPERATING CONTROLS

| Environmental aspect | Operational control |
|---|---|
| Discharge of air from the solvent paint booth | Work instructions for operation, maintenance, and calibration of paint booth |
| Disposal of waste paint | Hazardous waste work instruction |

## EMERGENCY PREPAREDNESS AND RESPONSE

- Have an emergency plan
- Identify potential situations
- Prevent or mitigate environmental impacts
- Review and revise
- Have periodic drills
- Include contingency plans for hazardous waste management as applicable

## EVALUATION OF COMPLIANCE

Consistent with its commitment to compliance, the organization shall establish, implement, and maintain a procedure of periodically evaluating compliance with applicable legal and other* requirements.

*Other: corporate, customer, industry

## CONFORMANCE VERSUS COMPLIANCE

- Third-party auditor assesses conformance to organization's EMS and ISO 14001

- Organization does not have to share compliance audit details with third-party auditor

- Organization is required to have process for compliance with applicable regulatory laws and regulations

- Nonconformances can be written against organization's procedures describing compliance controls

## CLAUSES CONSISTENT WITH QUALITY

ISO 14001 has support requirements similar to those of ISO 9001:

- Documentation/records

- Resources/responsibilities

- Training/competence

- Communications

- Corrective/preventive actions

- Internal audit

- Management review

## MANAGEMENT REVIEW

Input to management reviews should include:

- Results of internal audits and evaluations of compliance with legal requirements and with other requirements to which the organization subscribes

- Communication from external interested parties, including complaints

- The environmental performance of the organization

- The extent to which objectives and targets have been met

- Status of corrective and preventive actions

- Follow-up actions from previous management reviews

- Changing circumstances, including developments in legal and other requirements related to the organization's environmental aspects
- Recommendations for improvement

## ROLE OF SENIOR MANAGEMENT

- The successful implementation of an EMS calls for a commitment from all persons working for or on behalf of the organization.
- Environmental roles and responsibilities, therefore, should not be seen as confined to the environmental management function, but can also cover other areas of an organization, such as operational management or staff functions other than environmental.
- This commitment should begin at the highest levels of management. Accordingly, top management should establish the organization's environmental policy and ensure that the EMS is implemented.
- Management should also ensure that appropriate resources, such as organizational infrastructure, are provided to ensure that the EMS is established, implemented, and maintained. Examples of organizational infrastructure include buildings, communication lines, underground tanks, and drainage.

## TYPICAL "GAPS" IN EMS

- Control of and communication for "contractors"
- Objectives not measurable
- Using only SEAs to set objectives
- Too many SEAs without controls
- Controls/monitoring of SEAs not clear
- Emergency drill plan not defined
- Documentation does not match the organization's EMS

## COMMON OPERATIONAL ISSUES

- Open or unmarked chemical containers
- Universal waste improperly labeled
- Inadequate control of hazardous waste
- Not linking environmental incidents to corrective action
- Lack of focus on plant exterior
- Lack of employee awareness
- Programs not detailed

## BEST PRACTICES FOR EMS

- Senior management participates in EHS tours
- Contractor "sign-in" connected to SEAs
- Progress toward "zero landfill"
- Legal list is clear and connected to activities
- Compliance/activity calendar
- Trend charts for utilities/waste
- EMS programs driven by quality tools

## BENEFITS OF ISO 14001

- Risk reduction
  - Environmental legal liability
  - Accidents and environmental damage
- Cost reduction
  - Disposal costs
  - Utility costs
  - Permitting fees
- Competitive edge
  - Improved corporate image
  - Investment in long-term stability
  - Improved relations with regulators
  - Counter international market pressures
  - Strategic investment now versus necessary expense later

## SYSTEM VERSUS PROGRAM

**Program**
An environmental program:

- Can be dependent on individual knowledge
- Can be reactive, with a compliance focus only
- Can include inconsistent record keeping
- Can minimize employee involvement
- Can include a "silo" effect among managers
- Can be difficult to monitor

**System (EMS)**
An environmental system requires:

- Management oversight

- A commitment to improve

- Formalized record keeping

- Employee involvement

- Top management ownership and reviews

- Internal auditing

## STEPS TOWARD THIRD-PARTY CERTIFICATION

- Implement EMS
    - Train employees
    - EMS audit
    - Compliance audit
    - Management review
    - Select registrar
- Stage 1—Third-party audit
    - Eliminate "gaps"
- Stage 2—Third-party audit (certification)
    - Clear nonconformances
- Receive certificate

# Appendix C
## Definitions from ISO 14001:2015

| | |
|---|---|
| **Audit** | Systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled |
| **Competence** | Ability to apply knowledge and skills to achieve intended results |
| **Compliance obligation** | Requirement that an organization has to or chooses to comply with |
| **Conformity** | Fulfilment of a requirement |
| **Continual improvement** | Recurring activity to enhance performance |
| **Corrective action** | Action to eliminate the cause of a nonconformity and to prevent recurrence |
| **Documented information** | Information required to be controlled and maintained by an organization and the medium on which it is contained |
| **Effectiveness** | Extent to which planned activities are realized and planned results achieved |
| **Environment** | Surroundings in which an organization operates including air, water, land, natural resources, flora, fauna, humans and their interrelations |
| **Environmental aspect** | Element of an organization's activities or products or services that interacts or can interact with the environmental performance |
| **Environmental condition** | State or characteristic of the environment as determined at a certain point of time |
| **Environmental impact** | Change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects |
| **Environmental management system** | Part of the management system used to manage environmental aspects, conform to compliance obligations, and address risk associated with threats and opportunities |

| | |
|---|---|
| **Environmental objective** | Objective set by the organization consistent with the environmental policy |
| **Environmental performance** | Performance related to the management of environmental aspect |
| **Environmental policy** | Intentions and direction of an organization as formally expressed by its top management related to environmental performance |
| **Indicator** | Measurable representation of the condition or status of operations, management or conditions |
| **Interested party** | Person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity |
| **Life cycle** | Consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resource to end of life treatment |
| **Management system** | Set of interrelated or interacting elements of an organization to establish policies and objectives and process to achieve those objectives |
| **Measurement** | Process to determine a value |
| **Monitoring** | Determining the status of a system, a process or an activity |
| **Nonconformity** | Non-fulfilment of a requirement |
| **Objective** | Result to be achieved |
| **Organization** | Person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives |
| **Outsource (verb)** | Make an arrangement where an external organization performs part of an organization's function or process |
| **Performance** | Measurable result |
| **Prevention of pollution** | Use of practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts |
| **Procedure** | Specified way to carry out an activity or a process |
| **Process** | Set of interrelated or interacting activities which transforms inputs into outputs |
| **Requirement** | Need or expectation that is stated, generally implied or obligatory |
| **Risk** | Effect of uncertainty on objectives |
| **Top management** | Person or group of people who directs and controls an organization at the highest level |

# Appendix D

## United States Environmental Protection Agency Enforcement Annual Results for Fiscal Year (FY) 2015

EPA enforcement of the nation's environmental laws is focused on large cases that drive compliance across industries and that have a high impact on protecting public health and the environment.

Our enforcement accomplishments include:

- **$7 billion** in investments by companies in actions and equipment to control pollution and clean up contaminated sites

- **$404 million** in combined federal administrative, civil judicial penalties and criminal fines

- **$4 billion** in court-ordered environmental projects resulting from criminal prosecutions

- **129 combined years** of incarceration for sentenced defendants

- **$1.975 billion** in commitments from responsible parties to clean up Superfund sites

- **$39 million** for environmental mitigation projects that provide direct benefits to local communities across the country

### Enforcement Highlights

**Mosaic Fertilizer, LLC,** one of the world's largest fertilizer manufacturers, committed to ensuring the proper treatment, storage, and disposal of an estimated 60 billion pounds of hazardous waste at eight facilities across Florida and Louisiana, the largest amount of hazardous waste ever covered by a federal or state Resource Conservation and Recovery Act settlement.

A Clean Air Act settlement with **Hyundai-Kia** netted a $100 million fine, forfeiture of emissions credits and more than $50 million invested in compliance measures to help level the playing field for responsible companies and reduce greenhouse gas emissions fueling climate change.

**Noble Energy, Inc.,** a leading oil and gas producer, will use advanced monitoring technologies to detect air pollution problems in real-time, and ensure proper operation and maintenance of pollution control equipment at its facilities in Colorado.

EPA holds criminal violators accountable that threaten the health and safety of Americans. Three subsidiaries of **Duke Energy Corporation,** the largest utility in the United States, agreed to pay a $68 million criminal fine and spend $34 million on environmental projects and land conservation to benefit rivers and wetlands in North Carolina and Virginia. As part of the plea, two Duke subsidiaries will ensure they can meet legal obligations to remediate coal ash impoundments within North Carolina, which will cost an estimated $3.4 billion.

Settlements with **Interstate Power and Light, Duke Energy Corporation** and power companies in Arizona and New Mexico are cutting coal fired power plant emissions, requiring companies to control pollution and conduct innovative projects that promote renewable energy development and energy efficiency practices.

EPA is working closely with local governments and utilities in places like **Fort Smith, Ark., Delaware County, Pa.,** and across **Puerto Rico,** to cut discharges of raw sewage and contaminated stormwater through integrated planning, green infrastructure and other innovative approaches.

**Cal-Maine Foods,** one of the nation's largest egg producers, is implementing a series of measures to comply with laws that control pollutants, including nutrients and bacteria, from being discharged into waterways.

**XTO Energy, Inc.,** a subsidiary of ExxonMobil and the nation's largest holder of natural gas reserves, will restore eight sites in West Virginia damaged when streams and wetlands were filled to build roads, and implement a plan to comply with water protection laws.

Through settlements with three Nevada gold mining operations, **Newmont, Barrick and Veris,** EPA ensured that over 180 million pounds of mercury containing RCRA hazardous waste were treated, minimized, or properly disposed.

The largest bankruptcy-related cleanup settlement in American history, with **Anadarko and Kerr McGee,** will put more than $4.4 billion into toxic pollution cleanup, improving water quality and removing dangerous materials in tribal and overburdened communities.

EPA ensures federal agencies take responsibility and clean up toxic pollution. The Army addressed over 19 million cubic yards of contaminated groundwater at the **Anniston Army Depot** in Alabama, and the **U.S. Navy and Defense Logistics Agency** are required to implement at least $90 million in upgrades and improvements to prevent potential leaks at the Red Hill Bulk Storage Facility in Hawaii.

## Progress on Our National Enforcement Initiatives

- Reducing Air Pollution from the Largest Sources

- Cutting Hazardous Air Pollutants

- Ensuring Energy Extraction Activities Comply with Environmental Laws

- Reducing Pollution from Mineral Processing Operations

- Keeping Raw Sewage and Contaminated Stormwater Out of Our Nation's Waters

- Preventing Animal Waste from Contaminating Surface and Ground Water

# Appendix E
## EPA Regulations

The following US laws and regulations are available on the EPA website (http://www.epa.gov). The notes are current as of January 2015. Readers intending to use the information provided here should verify that it is still current.

## CLEAN AIR ACT

The Clean Air Act (CAA) 42 U.S.C. §7401 et seq. (1970) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes EPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants.

One of the goals of the Act was to set and achieve NAAQS in every state by 1975 in order to address the public health and welfare risks posed by certain widespread air pollutants. The setting of these pollutant standards was coupled with directing the states to develop state implementation plans (SIPs), applicable to appropriate industrial sources in the state, in order to achieve these standards. The Act was amended in 1977 and 1990 primarily to set new goals (dates) for achieving attainment of NAAQS since many areas of the country had failed to meet the deadlines.

Section 112 of the Clean Air Act addresses emissions of hazardous air pollutants. Prior to 1990, CAA established a risk-based program under which only a few standards were developed. The 1990 Clean Air Act Amendments revised Section 112 to first require issuance of technology-based standards for major sources and certain area sources. "Major sources" are defined as a stationary source or group of stationary sources that emit or have the potential to emit 10 tons per year or more of a hazardous air pollutant or 25 tons per year or more of a combination

Sources: Material is from the following web pages of the United States Environmental Protection Agency: "Summary of the Clean Air Act," http://www.epa.gov/laws-regulations/summary-clean-air-act; "Air Enforcement," http://www.epa.gov/enforcement/air-enforcement; "Water Enforcement," http://www.epa.gov/enforcement/water-enforcement; "Waste, Chemical, and Cleanup Enforcement," http://www.epa.gov/enforcement/waste-chemical-and-cleanup-enforcement; "What Is EPCRA?" http://www.epa.gov/epcra/what-epcra; "Oil Pollution Act Overview," http://archive.epa.gov/emergencies/content/lawsregs/web/html/opaover.html; "Oil Pollution Act (OPA) and Federal Facilities," http://www.epa.gov/enforcement/oil-pollution-act-opa-and-federal-facilities; "The Phase-out of Ozone-depleting Substances," http://www.epa.gov/ods-phaseout/what-phaseout-ozone-depleting-substances; and "Universal Wastes," http://www3.epa.gov/wastes/hazard/wastetypes/universal/index.htm.

of hazardous air pollutants. An "area source" is any stationary source that is not a major source.

For major sources, Section 112 requires that EPA establish emission standards that require the maximum degree of reduction in emissions of hazardous air pollutants. These emission standards are commonly referred to as "maximum achievable control technology" or "MACT" standards. Eight years after the technology-based MACT standards are issued for a source category, EPA is required to review those standards to determine whether any residual risk exists for that source category and, if necessary, revise the standards to address such risk.

## Stationary Sources

Stationary sources include facilities such as factories and chemical plants, which must install pollution control equipment and meet specific emission limits under the CAA.

**New Source Review (NSR) and Prevention of Significant Deterioration (PSD).** These requirements require certain large industrial facilities to install state-of-the-art air pollution controls when they build new facilities or make modifications to existing facilities. Failure to install controls results in emission of pollutants that can degrade air quality and harm public health.

Reducing air pollution from the largest source of emissions is one of EPA's national enforcement initiatives. EPA is taking action to eliminate or minimize emissions from coal-fired power, acid, glass and cement plants and petroleum refineries.

- **Coal-fired power plants.** There are approximately 1,100 coal-fired electric utility units in the United States with an overall capacity of 340,000 megawatts. This sector emits approximately two-thirds of the nation's emissions inventory of sulfur dioxide ($SO_2$) and approximately one-third of the nitrogen oxides ($NO_x$). Investigations of this sector have identified a high rate of noncompliance with NSR/PSD when old plants are renovated or upgraded.

- **Plants that manufacture sulfuric and nitric acid, which are used in fertilizer, chemical and explosive production.** Acid production plants emit many thousands of tons of nitrogen oxides, sulfur dioxide, and sulfuric acid mist each year. EPA investigations have found a high rate of non-compliance with NSR/PSD in connection with plant expansions and process changes.

- **Glass manufacturing plants.** There are approximately 125 large glass plants operating in the United States. These plants emit approximately 200,000 tons per year of $NO_x$, $SO_2$ and particulate matter (PM). Investigation of this sector has shown that there have been a significant number of plant expansions but few applications for the installation of pollution controls required under NSR/PSD.

- **Cement manufacturing plants.** Cement manufacturing plants are the third largest industrial source of air pollution, emitting more than 500,000 tons per year of $SO_2$, $NO_x$ and carbon monoxide. EPA determined that many cement manufacturers made changes to existing facilities without applying for and obtaining pre-construction permits. The pollution can contribute to respiratory illness and heart disease, the formation of acid rain, reduced visibility, and can be transported over long distances before falling on land or water.

- **Petroleum refineries.** Since 2000, EPA has engaged in an enforcement initiative specifically focused on addressing air emissions from petroleum refineries

and has reached innovative, multi-issue, multi-facility settlement negotiations with major petroleum refining companies. These settlements have resulted in significant emission reductions of $NO_x$, $SO_2$, benzene, volatile organic compounds and PM.

**Air Toxics.** National Emission Standard for Hazardous Air Pollutants (NESHAP): Leaks, flares, and excess emissions from refineries, chemical plants and other industries can contain hazardous air pollutants (HAPs) that are known or suspected to cause cancer, birth defects, and seriously impact the environment. Leaking equipment is the largest source of HAP emissions from petroleum refineries and chemical manufacturing facilities. Cutting emissions of air toxics is one of EPA's National Enforcement Initiatives.

**New Source Performance Standards (NSPS).** Newly constructed sources or those that are modified or reconstructed must follow these standards to control excess emissions of $NO_x$, $SO_2$, and particulate matter.

## Mobile Sources

Motor vehicle engines and off-road vehicles and engines must meet CAA emissions standards. These standards apply to cars, trucks, buses, recreational vehicles and engines, generators, farm and construction machines, lawn and garden equipment, marine engines and locomotives. In addition, the composition of fuels used to operate mobile sources, including gasoline, diesel, ethanol, biodiesel and blends of these fuels, are also regulated under the CAA.

**New vehicles and engines** must have an EPA-issued certificate of conformity before import or entry into the United States demonstrating that the engine or vehicle conforms to all applicable emissions requirements. The CAA also requires emissions labels for certified vehicles and engines.

- **Illegal imports.** Since 2008, there has been a steady flow of illegally imported uncertified motorcycles, equipment containing small gasoline-powered engines (e.g., generators, mowers, chainsaws, etc.), and recreational vehicles. Uncertified vehicles and engines can emit harmful air pollutants at 30% or more above allowable standards. EPA is working with U.S. Customs to stop illegal vehicles and engines at the ports and requiring exportation.

- **Defeat devices.** It is a violation of the CAA to manufacture, sell, or install a part for a motor vehicle that bypasses, defeats, or renders inoperative any emission control device. For example, computer software that alters diesel fuel injection timing is a defeat device. Defeat devices, which are often sold to enhance engine performance, work by disabling a vehicle's emission controls, causing air pollution. As a result of EPA enforcement, some of the largest manufacturers of defeat devices have agreed to pay penalties and stop the sale of defeat devices.

- **Tampering.** The CAA prohibits anyone from tampering with an emission control device on a motor vehicle by removing it or making it inoperable prior to or after the sale or delivery to the buyer. A vehicle's emission control system is designed to limit emissions of harmful pollutants from vehicles or engines. EPA works with manufacturers to ensure that they design their components with tamper-proofing, addresses trade groups to educate mechanics about the importance of maintaining the emission control systems, and prosecutes cases where significant or imminent harm is occurring.

**Fuels.** The CAA regulates fuel used in motor vehicles and non-road equipment. Clean fuels help reduce harmful emissions from a wide variety of motor vehicles, engines, and equipment.

- **Standards.** EPA regulations require that all fuel and fuel additives produced, imported and sold in the United States meet certain standards. EPA conducts targeted and random inspections to evaluate compliance with these standards, and brings enforcement actions against parties that violate these standards to reduce harmful emissions caused by fuel that does not meet the applicable standards.

- **Renewable Fuels.** Transportation fuel sold in the U.S. must contain a minimum volume of renewable fuel to reduce greenhouse gas emissions and the use of petroleum fuels. Renewable fuel producers and importers generate renewable identification number (RINs) for each gallon of renewable fuel. Refiners and importers must acquire RINs to show compliance with the standard. EPA investigates and pursues enforcement actions against anyone generating, transferring and using invalid RINs.

- **Fuel Waivers.** EPA, with the concurrence of the U.S. Department of Energy (DOE), has the authority to temporarily waive fuel or fuel additive requirements in emergency situations when the fuel supply suffers major disruptions. This helps ensure that an adequate supply of fuel is available, particularly for emergency vehicle needs. In such circumstances EPA works closely with state and other federal agencies to determine an appropriate response.

## CLEAN WATER ACT

**Wastewater Management.** Under the CWA's National Pollutant Discharge Elimination System (NPDES) program, EPA regulates discharges of pollutants from municipal and industrial wastewater treatment plants, sewer collection systems, and stormwater discharges from industrial facilities and municipalities. The Clean Water Action Plan targets enforcement to the most important water pollution problems.

- **Municipal Wastewater and Stormwater Management.** Overflows of raw sewage and inadequately controlled stormwater discharges from municipal sewer systems can end up in waterways or cause backups into city streets or basements of homes threatening water quality, human health and the environment. EPA is targeting large municipalities to reduce pollution and volume of stormwater runoff and to reduce unlawful discharges of raw sewage that degrade water quality in communities. Reducing raw sewage overflows and stormwater discharges is one of EPA's National Enforcement Initiatives.

  - **Pretreatment.** EPA enforces requirements to ensure that industries pretreat pollutants in their wastes in order to protect local sanitary sewers and wastewater treatment plants. Industrial discharges of metals, oil and grease, and other pollutants can interfere with the operation of local sanitary sewers and wastewater treatment plants, leading to the discharge of untreated or inadequately treated pollutants into local waterways.

- **Stormwater Pollution.** This occurs when debris, chemicals, sediment or other pollutants from urban areas and construction sites get washed into storm drains and flows directly into water bodies. Uncontrolled stormwater discharges can pose significant threats to public health and the environment. The CWA requires that industrial facilities, construction sites, and municipal separate storm sewer systems (MS4s) have measures in place to prevent pollution from being discharged with stormwater into nearby waterways. Reducing discharges of contaminated stormwater into our nation's rivers, streams and lakes waterways is one of EPA's National Enforcement Initiatives.

**Animal Waste and illegally discharging pollutants to water.** CAFOs that are not controlling their animal wastes and illegally discharging pollutants to water bodies are a serious threat to water quality and human health. Taking action to compel these operations to properly control their wastes and comply with the law is one of EPA's National Enforcement Initiatives.

**Spills—Oil and Hazardous Substances.** Oil spills can harm animal and plant life, contaminating food sources and nesting habitats. Petroleum oils can form tars that persist in the environment for years. The CWA prohibits oil or hazardous substance spills in quantities that may be harmful to human health and the environment and requires actions to prevent future spills.

**Wetlands—Discharges of Dredge and Fill Material.** EPA ensures that dredged or fill material is not discharged into wetlands and other waters of the United States except as authorized by a permit issued by the United States Army Corps of Engineers. EPA investigates and inspects those discharging dredge and fill material into wetlands and other waters of the United States without a permit and pursues appropriate enforcement to ensure compliance.

**Deepwater Horizon—BP Gulf of Mexico Oil Spill.** On April 20, 2010, the oil drilling rig, *Deepwater Horizon*, operating in the Macondo Prospect in the Gulf of Mexico, exploded and sank resulting in the death of 11 workers on the *Deepwater Horizon* and the largest spill of oil in the history of marine oil drilling operations.

## Clean Water Act Compliance Monitoring and Assistance

EPA works with its federal, state and tribal regulatory partners through a comprehensive Clean Water Act compliance monitoring program to protect human health and the environment by ensuring that the regulated community obeys environmental laws/regulations through on-site visits by qualified inspectors, and a review of the information EPA or a state/tribe requires to be submitted. The CWA compliance assistance program provides businesses, federal facilities, local governments and tribes with tools to help meet environmental regulatory requirements.

# SAFE DRINKING WATER ACT (SDWA)

**Drinking Water.** EPA safeguards human health by enforcing the requirements of the SDWA to ensure that the nation's public drinking water supply and its sources (rivers, lakes, reservoirs, springs, and ground water wells) are protected.

Public Drinking Water Systems. EPA ensures that public drinking water systems comply with health-based federal standards for contaminants, which includes performing regular monitoring and reporting.

- **Underground Injection Control.** Underground injection is the technology of placing fluids underground, in porous formations of rocks, through wells or other similar conveyance systems. EPA ensures that underground injection wells do not endanger any current and future underground or surface sources of drinking water. EPA investigates and inspects those injecting fluids underground in violation of the SDWA and pursues appropriate enforcement to ensure compliance.

- **Aircraft Drinking Water Rule.** EPA is responsible for ensuring the safety of drinking water on aircraft and is working with airlines to ensure drinking water quality to include making certain that the airlines are in compliance with the recently promulgated Aircraft Drinking Water Rule.

## Safe Drinking Water Act Compliance Monitoring and Assistance

EPA works with its federal, state and tribal regulatory partners through a comprehensive Safe Drinking Water Act compliance monitoring program to protect human health and the environment by ensuring that the regulated community obeys environmental laws/regulations through on-site visits by qualified inspectors, and a review of the information EPA or a state/tribe requires to be submitted. The SDWA compliance assistance program provides businesses, federal facilities, local governments and tribes with tools to help meet environmental regulatory requirements.

# WASTE, CHEMICAL, AND CLEANUP ENFORCEMENT

EPA enforces a variety of environmental requirements related to pollution by waste and chemicals.

## Waste Enforcement

**Mining and mineral processing.** EPA is taking action to protect communities and the environment from illegal or high risk hazardous waste operations at phosphoric acid and other high risk mineral processing facilities. Reducing pollution from mining and mineral processing operations is one of EPA's national initiatives.

**Hazardous wastes.** EPA enforces requirements under the Resource Conservation and Recovery Act regarding the safe handling, treatment, storage and disposal of hazardous wastes. EPA and the states verify RCRA compliance with these requirements through a comprehensive compliance monitoring program which includes inspecting facilities, reviewing records and taking enforcement action where necessary. The RCRA compliance assistance program provides businesses, federal facilities, local governments and tribes with tools to help meet environmental regulatory requirements.

**Underground Storage Tanks.** EPA enforces requirements under Subtitle I of the Resource Conservation and Recovery Act. These requirements focus on preventing, detecting, and cleaning up releases. These provisions are enforced by EPA

and by states that are authorized to operate their own program in lieu of the federal program.

**Lead-based paint.** EPA enforces requirements under the Residential Lead-Based Paint Hazard Reduction Act. Contractors and construction professionals who work in pre-1978 housing or child-occupied facilities must follow lead-safe work practice standards to reduce lead exposure. This includes providing owners, tenants, and child care facilities with lead-based paint information; and notifying them about the presence of lead. Owners and landlords of pre-1978 residential housing must give tenants a lead-based paint warning pamphlet and notify the tenants of known lead-based paint in the housing. Sellers are subject to similar requirements.

**Asbestos.** EPA enforces regulations under the Asbestos Hazard Emergency Response Act (AHERA) on how to respond to asbestos in schools. EPA also enforces worker protection standards for certain state and local government employees who are not protected by the asbestos standards of the Occupational Safety and Health Act.

**Accidental Releases.** EPA enforces requirements under Section 112(r) of the Clean Air Act to prevent chemical accidents and releases. Owners and operators of sources producing, processing and storing extremely hazardous substances must identify hazards associated with an accidental release, design and maintain a safe facility, prepare a Risk Management Plan (RMP) and minimize consequences of accidental releases that occur. EPA conducts inspections and reviews facility RMPs to verify compliance and ensure the quality of the overall preparedness, prevention and response.

## Chemical Enforcement

**Pesticides.** EPA enforces requirements under the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) that govern the distribution, sale and use of pesticides. EPA takes enforcement actions to address the distribution or sale of unregistered pesticides, registered pesticides whose composition differs from that submitted at registration, and registered pesticides that are misbranded or adulterated. EPA may also stop the sale or seize pesticide products which do not meet FIFRA requirements. One focus of EPA's FIFRA enforcement program is to ensure pesticides entering the United States meet FIFRA requirements.

EPA and the states verify FIFRA compliance through a comprehensive FIFRA compliance monitoring program which includes inspecting facilities, reviewing records and taking enforcement action where necessary. The FIFRA compliance assistance program provides businesses, federal facilities, local governments and tribes with tools to help meet environmental regulatory requirements.

**Toxic Chemicals.** EPA enforces requirements under the Toxic Substances Control Act (TSCA) which regulates the introduction of new or already existing chemicals. TSCA requirements for chemical manufacturers or importers include reporting, record-keeping and testing of the chemical substances.

EPA and the states verify TSCA compliance through a comprehensive TSCA compliance monitoring program which includes inspecting facilities, reviewing records and taking enforcement action where necessary. The TSCA compliance assistance program provides businesses, federal facilities, local governments and tribes with tools to help meet environmental regulatory requirements.

**PCBs.** EPA enforces regulations under TSCA. TSCA prohibits the manufacture of polychlorinated biphenyls (commonly known as PCBs), controls the phase-out of their existing uses, and sees to their safe disposal.

## Emergency Planning and Community Right to Know (EPCRA)

The Emergency Planning and Community Right-to-Know Act (EPCRA) was passed by Congress in response to concerns regarding the environmental and safety hazards posed by the storage and handling of toxic chemicals. These concerns were triggered by the 1984 disaster in Bhopal, India, caused by an accidental release of methyl isocyanate. The release killed or severely injured more than 2000 people. To reduce the likelihood of such a disaster in the United States, Congress imposed requirements for federal, state and local governments, tribes, and industry. These requirements covered emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment.

EPA enforces requirements under EPCRA to ensure that facilities are prepared for chemical emergencies and report any releases of hazardous and toxic chemicals. EPCRA requires that citizens be informed of toxic chemical releases in their area. Industrial facilities must annually report releases and transfers of certain toxic chemicals. This information is publicly available in the Toxics Release Inventory (TRI) database. EPA and the states verify EPCRA compliance through a comprehensive EPCRA compliance monitoring program which includes inspecting facilities, reviewing records and taking enforcement action where necessary. The EPCRA compliance assistance program provides businesses, federal facilities, local governments and tribes with tools to help meet environmental compliance.

## Cleanup Enforcement

EPA's cleanup enforcement program protects human health and the environment by getting those responsible for a hazardous waste site to either clean up or reimburse EPA for its cleanup. EPA uses a number of cleanup authorities independently and in combination to address specific cleanup situations.

- **Superfund.** Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly known as Superfund), EPA finds the companies or people responsible for contamination at a site, and negotiates with them to clean up the site themselves or to pay for another party to do the cleanup.

- **Corrective Action.** When solid or hazardous waste is not properly managed and contamination results at facilities regulated by the Resource Conservation and Recovery Act (RCRA), EPA and the states may step in to oversee the cleanup.

- **Leaking Underground Storage Tanks.** RCRA provides EPA with several enforcement authorities to ensure that releases from leaking underground storage tanks (USTs) are cleaned up and owners/operators comply with other RCRA requirements.

- **Brownfields and Land Revitalization.** The sustainable reuse of previously contaminated property is an important goal of EPA's hazardous waste cleanup programs.

# OIL POLLUTION ACT (OPA)

## Summary

The Oil Pollution Act (OPA) was signed into law in August 1990, largely in response to rising public concern following the Exxon Valdez incident. The OPA improved the nation's ability to prevent and respond to oil spills by establishing provisions that expand the federal government's ability, and provide the money and resources necessary, to respond to oil spills. The OPA also created the national Oil Spill Liability Trust Fund, which is available to provide up to one billion dollars per spill incident.

Originally published in 1973 under the authority of §311 of the Clean Water Act, the Oil Pollution Prevention regulation sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities. To prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil, the regulation requires these facilities to develop and implement Spill Prevention, Control, and Countermeasure (SPCC) Plans and establishes procedures, methods, and equipment requirements (Subparts A, B, and C).

In 1990, the Oil Pollution Act (OPA) amended the Clean Water Act to require some oil storage facilities to prepare Facility Response Plans (FRP). On July 1, 1994, EPA finalized the revisions that direct facility owners or operators to prepare and submit plans for responding to a worst-case discharge of oil (Subpart D).

## Federal Facility Responsibilities under the Oil Pollution Prevention Program

- Developing and updating the facility's oil spill emergency response plans

- Maintaining required records/documentation

- Testing emergency response equipment

- Periodically performing mock spill response drills

- Notifying federal, state, and local agencies in case of an incident

- Mitigating all spills and discharges

- Ensuring employees have required training

## Application of Oil Pollution Prevention Regulation to Federal Facilities

OPA requires EPA to amend the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to enhance and expand procedures for oil spill response. In addition, OPA requires certain facilities to develop response plans for responding to worst-case discharges of oil and hazardous substances. Federal facility activities subject to OPA requirements include:

- Storing or handling petroleum, fuel oil, sludge oil, and oil mixed with waste;

- Transferring oil by using motor vehicles or rolling stocks;

- Supporting maritime vessel activities or other water-related activities where fuels are used.

## EPA Enforcement

EPA's enforcement authorities for OPA violations reside in CWA §311(e) and §311(c). Typically, EPA will negotiate a compliance agreement with a federal agency in violation of OPA. The typical compliance agreement contains several provisions including schedules for achieving compliance and dispute resolution.

## Criminal Enforcement

**Individual:** Employees of federal facilities may have criminal sanctions brought against them for violations of OPA. Criminal fines may be imposed for violations of OPA under CWA §309.

**State Enforcement:** Section 1019 of OPA authorizes states to enforce, on the navigable waters of the state, the requirements for evidence of financial responsibility under OPA §1016.

**Tribal Enforcement:** OPA contains no Tribal enforcement provisions.

**Citizen Enforcement:** OPA contains no citizen enforcement provisions.

## EPA OPA Regulations

OPA regulations are set forth in:

- 40 CFR Parts 110, 112, and 300 subparts C, D, E

- 49 CFR Part 194

- 33 CFR Part 154

## THE PHASE-OUT OF OZONE-DEPLETING SUBSTANCES

EPA regulations issued under Sections 601–607 of the Clean Air Act phase out the production and import of ozone-depleting substances (ODS), consistent with the schedules developed under the Montreal Protocol. The U.S. phase-out has operated by reducing in stages the amount of ODS that may be legally produced or imported into the U.S. The Parties to the Montreal Protocol have changed the

phase-out schedule over time, through adjustments and amendments, and EPA has also accelerated the phase-out under its Clean Air Act authority. As the phase-down of virgin ODS continues, ODS uses will increasingly resort to reclaimed material or alternatives.

In the United States, ozone-depleting substances are regulated as Class I or Class II controlled substances. Class I substances have a higher ozone-depleting potential and have been completely phased out in the U.S., except for exemptions allowed under the Montreal Protocol. Class II substances are hydrochlorofluoro-carbons (HCFCs), which are transitional substitutes for many Class I substances and are being phased out now.

EPA has issued regulations under Section 608 of the Clean Air Act to minimize the emission of refrigerants by maximizing the recovery and recycling of such substances during the service, repair, or disposal of refrigeration and air-conditioning equipment (i.e., appliances).

Note: The handling and recycling of refrigerants used in motor vehicle air-conditioning systems are governed under Section 609 of the Clean Air Act.

## Refrigerant Leak Repair

The leak repair requirements, promulgated under Section 608 of the Clean Air Act, require that when an owner or operator of an appliance that normally contains a refrigerant charge of more than 50 pounds discovers that refrigerant is leaking at a rate that would exceed the applicable trigger rate during a 12-month period, the owner or operator must take corrective action.

## UNIVERSAL WASTES

EPA's universal waste regulations streamline hazardous waste management standards for federally designated "universal wastes," which include:

- batteries

- pesticides

- mercury-containing equipment and

- bulbs (lamps)

The regulations govern the collection and management of these widely generated wastes, thus facilitating environmentally sound collection and proper recycling or treatment.

These regulations also ease the regulatory burden on retail stores and others that wish to collect these wastes and encourage the development of municipal and commercial programs to reduce the quantity of these wastes going to municipal solid waste landfills or combustors. In addition, the regulations also ensure that the wastes subject to this system will go to appropriate treatment or recycling facilities pursuant to the full hazardous waste regulatory controls.

The federal universal waste regulations are set forth in 40 CFR part 273. States can modify the universal waste rule and add additional universal waste(s) in individual state regulations so check with your state for the exact regulations that apply.

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# About the Author

Milton Dentch was born and raised in the Worcester, Massachusetts, area. He has a BS in mechanical engineering from Worcester Polytechnic Institute and an MS in quality management systems from the National Graduate School of Quality Management (NGS). After college, he worked as an engineer in the paper industry for 5 years, then he worked as an engineer and manager at the Polaroid Corporation in Waltham, Massachusetts, for 27 years. He was plant manager for the Custom Coating and Laminating plant in Worcester for the Furon Corporation. Milt has over 40 years' experience in a wide variety of industries, including pulp and paper, chemical, plastic and rubber processing, battery manufacturing, converting, electronics assembly, and machine building.

Milt currently provides consulting, training, and auditing related to the International Organization for Standardization requirements for quality, environmental, and safety management systems. He has conducted over 500 audits worldwide for large and small companies. His clients have been as diverse as a floating oil rig in the Gulf of Mexico to an electronics manufacturer in the Ukraine with 4000 employees. Milt is an Exemplar Global qualified Lead Auditor for Quality and Environmental Management Systems and a Registrar approved OHSAS 18001 Lead Auditor.

In 2012, Milt wrote *Fall of an Icon—Polaroid after Edwin H. Land* (RiverHaven Books), an insider's history of the Polaroid Corporation.