

## High performance ISO 14001 Environmental Management Systems

The ISO 14001 Environmental Management System (EMS) can be optimized by emphasizing resource efficiency and cleaner production. Advantages of building this high performance into your ISO 14001 system include reduced production costs, efficient use of materials and resources, and improved public image.

This guide sheet includes examples of high performance systems from a variety of ISO 14001 EMS certified organizations.



Lockheed Martin Aeronautics Company, developer of the F-22 Advanced Tactical Fighter, has had an environmental management system in place since 1992.

### What is ISO?

The International Organization for Standardization (ISO) has created more than 8,000 internationally recognized standards for everything from paper sizes to film speeds. ISO, which was founded in 1947 in Geneva, Switzerland, now has over 120 countries as members.

### What is the ISO 14001 standard?

The development of the ISO 14001 Environmental Management System (EMS) standard was initiated in 1992 after the need to promote a common, international approach to environmental management was recognized. Earlier successful implementation of the ISO 9000 quality standards paved the way for expansion into the creation of EMS standards.

ISO 14001 is a standardized environmental management system that has a number of requirements listed in clauses and subclauses. The EMS does not set requirements for environmental compliance or specific levels of pollution prevention. It does however, establish an EMS that includes all employees and builds in accountability, consistency, and continual improvement. The concept behind environmental management systems is based upon the plan-do-check-act model—environmental activities are planned (plan), they are carried out (do), progress is checked (check), then efforts are adjusted accordingly (act).

### Optimizing ISO 14001 EMS clauses

The ISO 14001 EMS standard contains four main sections, or clauses. The first three clauses contain a definition of the scope, space for normative references, and definitions. The fourth clause contains the environmental management system requirements and expectations of the standard.

Adoption of an EMS at an organization can yield varying levels of success depending upon how the system is initially established. The greatest opportunities for optimizing an EMS system can be found in the following five subclauses of the EMS requirements (clause 4): environmental policy; environmental aspects; planning objectives and targets; training, awareness and competence; and operational control. These subclauses identify and establish activities directly related to environmental performance.

Under each subclause, examples are given from companies that have moved beyond compliance to optimize the system by including:

- ▶ resource efficiency
- ▶ waste reduction
- ▶ cleaner production

## 4.2 Environmental Policy

According to ISO 140001 subclause 4.2, top management is the “definer of the environmental policy for the system.” The environmental policy must include a commitment to comply with regulations, and be available to the public in addition to other basic requirements. Examples of language used by successful EMS implementers in their policy statements to optimize their ISO 14001 systems are provided below.

**IBM Corporation.** The IBM Corporation in San Jose, California, includes the following statement in their policy, “Use development and manufacturing processes that do not adversely affect the environment, including developing and improving operations and technologies to minimize waste, prevent air, water, and other pollution, minimize health and safety risks, and dispose of waste safely and responsibly.”

This policy commitment to minimize waste has contributed to a number of environmental benefits. These benefits include an annual 73 percent reduction in solid waste and a 4 percent reduction in energy use per year in the facility.<sup>1</sup>

**Lockheed Martin Aeronautics Company.** A section of the policy for the ISO 14001 EMS at Lockheed Martin Aeronautics Company in Palmdale, California, states, “Prevent pollution, conserve resources, reduce waste, and recover or recycle resources where economically feasible.”

By implementing this policy, Lockheed Martin has been able to:

- ▶ eliminate ozone depleting compounds
- ▶ reduce emissions of volatile organic compounds (VOCs) by 80 percent
- ▶ reduce overall hazardous waste generation by 91 percent
- ▶ reduce toxic release inventory (TRI) chemicals by 91 percent

In addition to these environmental benefits, the company has also benefited financially. After implementing ISO 14001, the company’s hazardous waste disposal costs decreased from \$1,421,000 in 1991 to \$375,000 in 1998.<sup>1</sup>

**Lucent Technologies.** The ISO 14001 EMS policy at Lucent Technologies-Microelectronics Group in Allentown, Pennsylvania, includes a focus on pollution prevention. “Lucent has achieved significant environmental cost benefits through its EMS.”

Along with materials recycling, Lucent has been able to reduce waste by:

- ▶ eliminating 4,100 metric tons of greenhouse gas emissions annually
- ▶ avoiding the use of 155,000 gallons of water daily
- ▶ reducing energy use by 35,000 million BTUs annually

As a result of these efforts, Lucent has benefited from annual cost savings of \$800,000.<sup>2</sup>

### 4.3.1 Environmental Aspects (Planning)

This subclause requires an organization to identify aspects such as activities, products, or services that interact with the environment. Impacts on the environment that result from these aspects are then identified and ranked by significance. Determination of the company’s environmental aspects can lead to future potential cost savings by identifying wastes and inefficiencies beyond those associated with regulatory concerns.

**Lockheed Martin Aeronautics Company.** “At LM Aero-Palmdale (Lockheed Martin), in order to identify which of their aspects have a significant impact, aspects are evaluated in terms of environmental safety and health impacts as well as business impacts. The probability of an impact occurring and the environmental conse-

quence of that impact are ranked low, medium, or high. Business impacts are evaluated in terms of compliance, costs, and stakeholder interest/concern and are also ranked low, medium, or high. The two scores are combined on a risk/significance matrix which yields a significance. Through this analysis, LM Aero-Palmdale better understands the risk and significance of their environmental impacts and designs management responses accordingly. The capacity of an organization to know and understand the environmental impacts of their regulated and unregulated activities is another indicator of an improved system for public and environmental protection.”<sup>1</sup>

**Pfizer Inc.** Pfizer Inc., a pharmaceutical manufacturer in Lititz, Pennsylvania, has integrated pollution prevention into their environmental aspects and impacts evaluations. One of the significance rankings for consideration of an environmental impact is based upon the amount of pollution prevention opportunities associated with it. <sup>3</sup>

### 4.3.3 Objectives and Targets (Planning)

Environmental objectives are overall quantified goals that an organization sets for itself. Targets identify specific detailed actions that need to be set in order to achieve the objectives. The IBM-San Jose facility and the Artistic Plating plant offer examples of objectives and targets that go beyond legal requirements.

**IBM Corporation.** “IBM-San Jose’s EMS demonstrates the potential to drive environmental performance beyond regulatory requirements through aspect and impact identification and objective and target setting. All of IBM-San Jose’s objectives and targets achieve results that are not compliance related or compliance driven.”<sup>1</sup>

The following table lists the facility aspects/impacts and objectives/targets.

| Aspect/Impact                    | Objectives/Targets  |
|----------------------------------|---|
| Energy use                       | Conserve 4% electrical usage (kWh)  |
| Solid waste                      | Recycle 73% of solid waste<br>Recycle 90% of industrial waste               |
| Water use                        | Track site water use and trends   |
| Transportation (employee)        | Increase Eco Pass users by 10%, Commuter Check users by 25%                 |
| Products (environmental impacts) | Various objectives covered under Environmentally Conscious Product Strategy |
| Water discharge                  | Reduce wastewater discharge year to year indexed to production              |
| Chemical use                     | Establish chemical use reduction committee and set target                   |
| Hazardous waste discharges       | Reduce disposal amount year to year indexed to production                   |

*Taken from California EPA, Report to Legislature: Seventh Quarterly Update, Oct.-May 2001*

**Artistic Plating.** At the Artistic Plating plant in California, significant aspects were identified, targets were set, and the management system was established. As a result, the company was able to:

- ▶ eliminate the use of perchloroethylene
- ▶ reduce nitric acid use by 62 percent
- ▶ reduce the use of chrome, cyanide and liquid chrome by 50 percent

According to the company, “...several of the performance enhancements went beyond legal requirements, suggesting the reason for the achievement is the EMS, and the process it established.”<sup>1</sup>

### 4.4.2 Training, awareness, and competence (Implementation)

Appropriate training for employees in relation to their roles and responsibilities can generate environmental benefits for the organization. The emphasis and degree of this training determines how effective it will be.

**Anheuser-Busch.** The Anheuser-Busch plant in Fairfield, California, attributes its significant progress in water conservation to comprehensive training. Through the training program, employees become aware of the impact that their job assignments and duties have on the environment. This impact is recognized in the company's Standard Operating Procedures. "Better awareness by employees of the environmental impacts of their jobs and the environmental objectives articulated in their EMS appears to have resulted in the Anheuser-Busch Fairfield brewery being the lowest water user and wastewater discharger within Anheuser-Busch's 12 breweries."<sup>1</sup>

#### 4.4.6 Operational Control (Implementation)

Operational controls ensure that activities associated with significant environmental aspects are in line with the organization's environmental policy, objectives, and targets. This subclause ensures that procedures along with operating criteria are documented and maintained so that objectives and targets are met. Optimized operational controls such as those at Lockheed Martin Aero-Palmdale can lead to significant benefit.

**Lockheed Martin Aeronautics Company.** "At LM Aero-Palmdale, chemical management and disposal are significant aspects and require extensive control. The major subclauses of the chemical control program involve the Chemical Control Board (CCB) and the chemical control cribs. ... Their review includes an analysis of the EHS risk involved with the chemical, the need for the chemical, and a search for less toxic alternatives. The daily use of chemicals is tracked and managed through a system of chemical control cribs. ... Internally, the package-by-package tracking of chemical use provides operational control. ... The crib process also contributes to meeting pollution prevention goals. The accounting system reduces chemical usage and waste by ensuring that only necessary amounts of chemicals are provided to employees. This also has reduced the amount of chemicals that become waste due to shelf-life expiration."<sup>1</sup>

### Summary

An ISO 14001 EMS builds ready access to documentation, consistency, accountability, and continual improvement into facility operations. It also offers a significant opportunity to drive resource efficiency, cost savings, and improved public relations. The examples describe companies that built language into their EMS to take them beyond the minimal requirements to leverage this opportunity for resource efficiency and cleaner production. A common principle to all these companies was the establishment of clear, measurable objectives to drive performance improvements. ■

### References

1. <http://www.calepa.ca.gov/EMS/Publications/2001/7thQtr/>
2. <http://www.dep.state.pa.us/gov-awards/winners/19.htm>
3. <http://www.dep.state.pa.us/dep/deputate/pollprev/iso14001/pfizer/pfizer.htm>