An Introduction to ISO 14000 and Environmental Management Systems

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ABSTRACT

ISO 14000, a new series of voluntary environmental management standards, is becoming increasingly important in the global marketplace, particularly for companies that sell their products in Europe and Asia. This paper provides basic concepts to help managers in the jewelry-related industries understand what ISO 14000 may mean for their businesses. This paper addresses the following questions: 1) What is ISO 14000, and where did it come from? 2) What is an environmental management system? 3) What is ISO 14001 certification? 4) What are some important legal and economic issues to consider? 5) What is the current status and future of ISO 14000 in the U.S. and in the global marketplace? A short section is included at the end on Finding More Information.

KEY WORDS

ISO 14000, ISO 14001, ISO 9000, standard, environmental management system (EMS), certification, certification audit, EMS audit, registration, accreditation, international trade, environmental auditing, continual improvement, environmental policy, regulatory compliance, environmental performance, audit privilege, audit immunity.

BACKGROUND

In evaluating what ISO 14000 may mean for your business, it is important to understand where ISO 14000 came from. The background provided in this section will help clarify points made later in the paper. However, if you would like a shorter overview, you can skip to the next section, WHAT IS ISO 14000?

Two major international trends came together in the early 1990s to produce the ISO 14000 international series of voluntary environmental standards. These were: 1) an increasing concern over environmental problems, and 2) the adoption of quality management standards in manufacturing (i.e., ISO 9000). Both of these trends are discussed below.

Trends in Environmental Management

During the 1970s and 1980s, Congress passed a series of environmental laws that were intended to control the way manufacturers generate and manage waste. Examples include the Clean Air Act (1970), the Clean Water Act (1972), the Resource Conservation and Recovery Act (1976), and "Superfund" (1980). Although laws were needed to help control the growing level of pollution in the 1960s and 1970s, many of these laws have been applied inefficiently, both for the companies that comply with the laws and for the federal, state and local regulatory agencies that enforce them.

By the late 1980s, it was becoming clear to government agencies that new approaches were needed which encouraged companies to plan their own environmental improvements, rather than just react to government regulations. Today, every federal and state environmental agency has a staff devoted solely to developing and implementing voluntary programs. As will be discussed below, many of these programs now include initiatives to integrate ISO 14000 into existing regulatory frameworks.

Even before regulatory agencies began implementing voluntary programs, many U.S. companies were realizing that by planning their own environmental initiatives above and beyond those required by law, they were actually able to improve environmental performance profitably. Over the last five years, several companies, particularly those in the Fortune 500, have begun to manage their environmental affairs in a very formal way, by establishing corporate environmental policies, setting improvement goals "beyond compliance," measuring environmental performance and publishing environmental reports. An environmental management system has become the preferred framework, both in the U.S. and abroad, in which to implement these types of programs.

These U.S. trends were taking place amongst the backdrop of an international marketplace that was becoming increasingly concerned with environmental problems. The international community became aware that in many industrial areas of Asia, Eastern Europe, and Latin America, pollution was going almost unchecked. A scientific consensus emerged around the potential seriousness of global warming and ozone layer depletion. These international concerns led to the 1987 Montreal Protocol to phase out CFCs, the 1992 Earth Summit in Rio de Janeiro, and the 1997 Kyoto Conference on Global Warming.

Quality Management Standards

In 1987, the International Organization for Standardization (known as ISO), which is based in Geneva, published a series of international voluntary standards (know collectively as ISO 9000) to help companies implement quality management systems. The ISO 9000 series, which was developed through an international consensus process involving many countries, was created to standardize several national quality standards (e.g., BS 5750 in the United Kingdom). It was believed that this would create a "level playing field" in the international marketplace, and make it easier for multinational companies to implement quality management systems in all of their facilities based on a universally accepted standard.

The two most important standards, ISO 9001 and IS 9002, outline the key elements of a quality management system. If a company chooses, it can develop all these elements and become *certified* to either of the standards. This is accomplished by a neutral, third-party certification organization, which performs a certification audit to determine if the company is in conformance to the standard. ISO 9001 and 9002 are called specification standards, because they are designed to be used as auditable documents (as will be discussed later, ISO 14001 is the only specification document in the ISO 14000 series). There are several other documents in the ISO 9000 series, but they are guidelines only, not specification standards.

ISO 9001 and 9002 do not require that any level of quality be achieved; they only require that products are manufactured consistently, using procedures, statistical process control, extensive documentation, self-auditing, and corrective action. The hope of these standards is that a quality management system will lead to better actual quality. Since 1987, well over 100,000 manufacturing sites around the world have been certified to ISO 9001 or 9002. Most of these sites were certified over the last five years. Probably over 15,000 sites have been certified in the U.S.

The reviews of ISO 9000, at least in the U.S., have been mixed. Although many companies believe that an ISO 9000 system can enhance quality, the primary driver for implementing ISO 9000 quality systems has been international trade. For a significant percentage of companies, ISO 9000 certification has become a de facto requirement for selling their products in Europe. While many companies are very happy with their ISO 9000 system, others report that the system has had minimal benefit, either because it has done little to facilitate international sales as expected, or because it has not enhanced quality as hoped. Many companies that are now considering whether to pursue ISO 14001 are already ISO 9000 certified, and are relying in part on their experience (positive or negative) with ISO 9000.

The Marriage of ISO 9000 with
Environmental Management Concepts

In 1992, due to the successful adoption of ISO 9000 standards in the
international marketplace, and to increasing concerns about the
environment, the ISO determined the need for an international series of
environmental management standards, to be called ISO 14000. An
overview of the entire ISO 14000 series is provided in the next section.

WHAT IS ISO 14000?

ISO 14000 is series of voluntary international environmental management
standards. As with ISO 9000, the series was developed through an
international consensus processes with input from several countries. The
standards are broken down into five main categories. These are briefly
described below:

- **Environmental Management Systems (EMS)** - These standards
  provide guidance for companies on how to develop a comprehensive
  management system to proactively manage all environmental issues.
  This group includes the ISO 14001 standard.

- **Environmental Auditing** - These documents provide guidance on
  how companies should perform all types of environmental self-audits,
  including compliance audits and EMS audits (EMS audits are
  discussed in the next section of this paper).

- **Environmental Performance Evaluation** - This standard provides
  guidance on how companies can measure their environmental
  performance based on self-established policies and objectives.

- **Environmental Labeling** - These documents establish universally accepted environmental symbols (e.g., the recycle loop) and environmental claims (e.g., "this product is biodegradable").

- **Life-Cycle Assessment** - These documents establish universally accepted principles for conducting "cradle-to-grave" analyses of the environmental impacts of products and manufacturing processes.

The EMS standards and Environmental Auditing standards were completed in 1996; the other standards are still in draft form at the time of this writing. Although all the standards will be useful for industry, the remainder of this paper will focus on the ISO 14001 EMS standard because it is the most important of the ISO 14000 series.

WHAT IS AN ENVIRONMENTAL MANAGEMENT SYSTEM?

An EMS is a systematic approach to managing environmental affairs that attempts to integrate environmental programs and responsibilities into all areas and departments of the company. This section will first provide a general overview of the ISO 14001 EMS. Then it will discuss key requirements of ISO 14001 in more detail, and the potential benefits of an EMS.

Overview of an EMS

An EMS is based on the Total Quality Management (TQM) concept of continual improvement, namely the PLAN-D0-CHECK-ACT cycle. This basic concept is that activities are best approached through an on-going cycle of planning, implementation, self-checking and corrective action, and review. The ISO 14001 EMS standard directly reflects this approach.

The 17 elements of ISO 14001 are listed in Table I below. A comparison with ISO 9001/9002 is provided to illustrate the similarity of the standards. In brief, ISO 14001 requires that you develop an environmental policy; set objectives to meet the policy, and then develop programs and procedures to assure that the objectives are met. The standard also requires that you perform self-audits to assure that the system is functioning as intended, and that you hold reviews at management level to discuss audit findings and possible changes to the policy, objectives and programs.

Table I: The Elements of ISO 14001

TQM	ISO 14001 ELEMENT	IN ISO 9001/9002
PLAN	Environmental Policy	Yes (Quality Policy)
	Environmental Aspects	No
	Legal & Other Requirements	No
	Environmental Objectives & Targets	No
	Environmental Management Programs	No
DO	Structure & Responsibility	Yes
	Training, Awareness & Competence	Yes
	Communications	Yes
	EMS Documentation	Yes (QMS Doc.)
	Document Control	Yes
	Operational Control	Yes
	Emergency Preparedness & Response	No
CHECK	Monitoring & Measurement	Yes (e.g., SPC)
	Nonconformance and Corrective & Preventive Action	Yes
	Environmental Records	Yes (Quality Records)
	EMS Audit	Yes (QMS Audit)
ACT	Management Review	Yes

<u>Key Requirements of ISO 14001</u>

Environmental Policy

The standard requires that the company write its own environmental policy. The policy is a short (1-2 pages) environmental "mission statement" which guides the setting of environmental objectives and implementation of environmental programs. The policy must be made available to the public (the policy is the only part of the EMS that must be made available to the public). Available to the public does not mean you have to proactively distribute it; it only means that it has to be made available if requested.

At a minimum, the policy must contain three commitments:

> <u>Compliance with environmental laws and regulations</u>. The standard does not require that you actually be in compliance; only that you commit to being in compliance. This is analogous to ISO 9001/9002, which does not guarantee quality, only consistency of processes.

> <u>Continual improvement of the EMS</u>. The standard does not require that you commit to continual improvement of performance; only to continual improvement of the management system. The intent is that improvement of the system will lead to improvement in actual performance (i.e., less waste, fewer emissions, etc.).

> <u>Prevention of pollution</u>. This means that the company must consider process improvements and waste minimization practices in addition to managing waste after it is created. Many companies have found that by preventing the generation of waste in the first place, they have been able to save money on inputs and on waste management and disposal costs (including potential liability).

The environmental policy is a very important part of the system, because it guides the setting of environmental objectives, which in turn shape the rest of the system.

Environmental "Aspects" Identification

The standard requires that the company systematically identify all of its environmental impacts, including material, energy and water use, air emissions, and solid, liquid and hazardous wastes. The operations and activities which cause these impacts are referred to as "environmental aspects." Once all impacts are identified, the company must list all the corresponding environmental aspects. The company must then prioritize these aspects and choose which ones it is going to manage. The aspects list forms the basis for setting environmental objectives & targets.

Environmental Objectives & Targets, and Environmental Management Programs

The company must document goals for how it is going to manage its environmental aspects. These goals are expressed through objectives & targets. An objective is defined in ISO 14001 as a general goal, and a target is defined as a more specific goal that must be satisfied to meet the objective. For example, in your facility, you can set an objective to reduce the volume of hazardous waste generated; then, as part of this objective, you can set a target to reduce the volume of waste solvents by 10% over the coming year. The standard requires that objectives and targets be set at all "relevant functions and levels" of the company. This assures that environmental responsibilities are distributed throughout the company.

Not all objectives have to be improvement objectives. In fact, it is not practical to set too many improvement objectives at once. You can set control objectives (that is, objectives to continue doing what you have been doing), or you can set an objective to study something and decide on a course of action at a later date. The fact that you have committed to continual improvement in the policy means that you don't have to do

everything all at once; you just have to demonstrate over time that you are always looking for at least some improvement at the beginning of each business cycle.

Once objectives and targets are set, you must then document how they will be met, including such items as responsibilities, activities, and time-frames for completion. These are the Environmental Management Programs. At a minimum, in addition to improvement programs (or projects as they are often referred to) every company should have a core set of programs that focus on maintaining compliance with environmental laws and regulations.

Documented Procedures

The standard requires that the company develop two types of documented procedures: system procedures and operational control procedures. System procedures describe how you accomplish the requirements of an EMS. Examples of system procedures include: How to Identify Environmental Aspects; How to Conduct Environmental Training; or How to Conduct Environmental Audits. Operational control procedures are more technical, and describe how the company controls its processes to assure desired environmental performance. Examples of operational control procedures include: Operating the Wastewater Treatment System; Handling of Hazardous Waste; or Emergency Response Instructions. Both types of procedures need to be controlled within a formal document control system.

Environmental Training

ISO 14001 requires that all employees receive some king of environmental training. How much, and what type of training is determined by the role each employee plays in the EMS. At a minimum, all employees must receive general environmental awareness training, and they must be trained on environmental procedures that apply to their job.

Self-Audits, Corrective Action, and Management Review

Periodically (e.g., once or twice per year), the company must audit itself to assure that its EMS is functioning as intended. These "EMS audits" determine if procedures are being followed and if proper records are being kept. The company must also conduct "periodic evaluations" of its state of compliance with environmental laws and regulations. It is important to keep in mind that EMS audits and compliance evaluations are not the same thing. As will be discussed in the section on EMS certification, you can be out of compliance with regulatory requirements (at least to some extent) but at the same time be in conformance to ISO 14001. Findings from the EMS audits and compliance evaluations must be addressed through documented corrective actions.

The company must also conduct periodic management reviews of the EMS as a whole. Information that is reviewed includes progress towards meeting objectives and targets, the results of EMS audits and compliance evaluations, and changing business circumstances. The management review generates an environmental action plan for the next business cycle, which may include changes to the policy, objectives and targets, or other elements of the management system. This action plan completes the continual improvement cycle.

Potential Benefits of an EMS

The primary benefit of an EMS is that it helps to substantially reduce overall environmental risk.

In most manufacturing facilities, there are only a few people that have direct environmental responsibilities, and it is not uncommon that only one person really understands environmental requirements. This individual often spends much of his or her time responding to "fire drills" and informally training others to assure compliance with environmental regulations. If this person leaves the company, or goes on an extended

leave of absence, the facility will have to scramble to determine what its environmental requirements are. Often, in these cases, the facility will lapse into noncompliance, which creates further "fire drills" and makes the company legally vulnerable. Although this approach to environmental management seems inefficient and stressful, it is the way many companies manage environmental issues.

An EMS allows you to avoid the above problems by managing environmental issues more efficiently. Since requirements, programs, and responsibilities are all documented and distributed throughout the company, the system is not dependent upon the knowledge of one individual. In addition, the self-audit function, coupled with corrective action and management review, helps to assure that no stone goes unturned. Another benefit of an EMS is that its encourages companies, that wish to do so, to implement proactive programs that go beyond regulatory requirements.

An EMS is a significant undertaking to develop and maintain, so a company considering whether to implement one should ask itself the following questions:

- Is my company at risk for noncompliance or environmental liability? If so, an EMS is an excellent approach to minimize that risk.

- Is my company already committed to going "beyond compliance" with proactive approaches such as waste minimization? If so, an EMS is an excellent way to prioritize programs and stay on track for continual improvement.

- Does an ISO 14001 EMS fit the culture of my company? An organization that is not used to extensive documentation and procedures will not accept a full blown EMS right away. In this case, the company can implement some EMS elements right away, and wait

to implement the others. Companies that have quality management systems in place find it much easier to implement an EMS.

- Does my company have customers that may be requiring ISO 14001 certification? If so, you may decide to implement a nearly full system in the event that a customer does request certification.

WHAT IS ISO 14001 CERTIFICATION?

ISO 14001 is the only standard in the ISO 14000 series that is designed to be audited by certifiers. However, ISO 14001 is a **voluntary standard**; a company can choose whether or not to implement the standard, and whether or not to pursue certification.

Certification is the process whereby a non-biased, "third-party" organization determines if a company is conformance to a standard. This is accomplished through on-site audits, which include examination of documents and records, interviews, and observations of processes and activities. These certifiers are, in turn, certified by organizations called accreditors. In the U.S., the accreditor for ISO 14001 certification is the Registration Accreditation Board, which also accredits ISO 9000 certifiers. Most certifiers offer both ISO 9000 and ISO 14001 certification services. (Note: In the U.S., organizations that certify management systems, i.e., 9000/14001, are referred to as "registrars," and the certification is referred to as "registration.")

It is important to keep in mind that EMS self-audits and certification audits are entirely different things. The EMS self-audits required by the standard are part of the management system, and are carried out either by employees of the company or by consultants hired by the company. Certification audits are not required by the standard, but are utilized only if the company wishes to have the entire EMS certified by a "third-party." It is also important to understand the distinction between EMS conformance

and regulatory compliance. The intent of a management system is to make it easier to stay in compliance. If you do have incidents of noncompliance, a working EMS will be able to discover and correct these problems. A certifier cannot fail you on an EMS audit for noncompliance issues per se; you can fail only if there is evidence that the reason for the noncompliance is that the EMS is not functioning properly.

When selecting a registrar, it is important to find out if it is accredited, and by what accreditor. There are approximately 70 registrars in the U.S. that are accredited to perform ISO 9000 certification; however, the majority of these are still not accredited for ISO 14001 certification. A company does not have to select a certifier in its own country. For example, a U.S. company could choose the British Standards Institute (BSI) as its certifier.

Certifications are awarded to sites and facilities, not to companies as a whole. For example, Ford Motor Company is having all 160 of its manufacturing facilities certified, and each site is getting an individual certification. In some cases, a company with multiple facilities can negotiate with a certifier to only audit a percentage of its sites, and award certification to the entire company or to a particular division. For example, Baxter International had its entire Renal Division certified, but only about 1/2 of its facilities were actually audited.

A main point to keep in mind when choosing and using certifiers is that a company that hires a certifier has a great deal of influence on the services provided; this includes price, audit scope, and quality and experience of the auditors. If you are not satisfied with a certifier, you can find another one.

LEGAL AND ECONOMIC ISSUES TO CONSIDER

This section will discuss some key legal and economic issues related to ISO 14001.

ISO 14001 and Regulatory Enforcement

The U.S. EPA and state environmental agencies are very interested in the potential of an EMS to help companies maintain compliance. One of the requirements of ISO 14001 is that facilities maintain an updated list of all applicable federal, state local regulatory requirements. In addition, all activities and processes that in some way fall under regulatory requirements should be included a facility's environmental aspects list. These requirements, when combined with self-auditing and corrective action, make an EMS an ideal tool for meeting regulatory requirements.

However, as discussed above, there is no guarantee that a company with an EMS will also be in compliance. Agencies are currently studying ways in which companies can essentially prove that they are in compliance. One way to do this is to have a third-party compliance audit in addition to a third-party EMS audit (note: a consultant alone cannot perform such a review because he or she is not considered a non-biased third party). If these types of arrangements can be worked out, it may be possible in the future that companies with EMSs will be viewed as being in a "different tier;" that is, they will be low on agencies' concern lists.

Audit Privilege and Immunity

One of the most important elements of an EMS is self-auditing. However, a big obstacle to self-auditing is that documented results could potentially be used against a company in a lawsuit or enforcement action. This seems inherently unfair to many companies, because self-audit information is generated voluntarily, and because self-auditing is the best way to ensure

compliance. Up until recently, companies had few options to protect audit results. However, over the last three years, several states have passed environmental audit privilege and immunity laws which partially protect companies from having documented self-audit results used against them. Approximately 20 states have passed such laws, but their provisions vary significantly. In addition, the U.S. EPA has been critical of some of these laws. For example, the EPA forced Michigan to amend its environmental audit privilege law.

If you do environmental self-auditing, or would like to begin doing so, it is best to consult an environmental attorney in your state who can explain applicable state and federal laws.

Customer-Supplier Relationships

For many companies, the primary driver for certifying to ISO 90001 or 9002 has been that certain customers have required it. This has been particularly true for companies that sell their products in Europe and Asia. In the U.S., the "Big 3" developed a standard called QS-9000, which combines all the requirements of ISO 9001/9002 with several additional quality requirements. Both GM and Chrysler required all of their Tier I and Tier II suppliers (i.e., direct suppliers and the suppliers to the direct suppliers) to become QS-9000 certified by the end of 1997. Ford encouraged its suppliers to certify, but did require them to do so. The Big 3 have approximately 12,000 Tier I and II suppliers.

The customer-supplier relationship is much different for quality than it is for environmental issues. Whereas quality has a direct economic effect on the customer-supplier relationship, environmental performance has a very indirect effect. In Europe, however, environmental performance is a much more important factor in buying decisions than it is in the U.S. As a result, the concept of environmental management systems caught on early in Europe.

Many people believe that ISO 14001 may take on a different role than ISO 9000 in the marketplace. ISO 14001 certification may be used to communicate environmental responsibility directly to consumers. Whereas quality is something consumers can often see and touch in the products they buy, the environmental impacts of their production are impossible to see or touch. In the future, as environmental characteristics affect consumer choice more and more, ISO 14001 may become a powerful signal of environmental stewardship.

THE STATUS AND FUTURE OF ISO 14000

Current Market Situation

The ISO 14001 standard has been complete since September 1996. Since that time, well over 1,000 sites worldwide have registered to ISO 14001 or other similar EMS standards. Most of the facilities that have certified to ISO 14001 were already certified to ISO 9000.

The greatest level of activity has been in Europe and Asia. In Europe, the European Community passed a law in 1993 which established what is called the Eco-Management and Audit Scheme (EMAS). Since EMAS requires that certain types of manufacturing facilities in Europe develop and become certified to an EMS, Europe has seen the most certification activity.

In the U.S., there has been more resistance to certification because compliance programs already require so much effort (in many other countries, enforcement is much weaker). However, although most U.S. companies are taking a "wait and see" approach to certification, probably thousands of companies are currently developing systems. They are doing so because they believe it represents a best practices approach, and/or because it will prepare them in case a future decision is made to pursue certification. Nearly all major industries in the U.S. have taken an interest in ISO 14000, including automotive, electronics, chemicals, oil &

petroleum, pharmaceuticals, pulp & paper, utilities, and many others. The automotive and electronics industries have expressed the most interest in ISO 14001.

Future Directions

Internationally there has not been a major push yet by large customers to require ISO 14001 certification for their suppliers (although some suspect that the Big 3 will eventually require certain suppliers to obtain ISO 14001 certification). This may be because the Standard has been complete only since September 1996. Another reason, as discussed above, is that the economic customer-supplier relationship is not as strong for ISO 14001 as it is for ISO 9000.

In the U.S., there was great initial resistance to ISO 9000, but by about 1993 the rate of certifications began to grow exponentially. A similar pattern could develop for ISO 14001 over the next few years. Several factors will determine how fast U.S. companies will adopt ISO 14001. The major factors include: 1) the extent to which European and Asian customers require certification; and 2) the direction the U.S. EPA and the states take in integrating ISO 14001 into the existing regulatory framework.

Other forces may play a role. For example, the insurance industry is becoming interested in how an EMS can reduce environmental risk. Once actuarial data become available, insurers may lower premiums for those facilities that have an EMS.

Even if these market forces develop slowly, the use of environmental management systems may become standard practice in industry both in the U.S. and abroad. Environmental issues are going to become increasingly economically relevant in the coming decades, and ISO 14001 may prove to be the best overall approach for improving environmental performance over time.

FINDING MORE INFORMATION

There are several manuals and books that provide information on ISO 14000. For example, the American Society for Quality sells several books on ISO 14001 (Tel: 800-248-1946). NSF International also has several useful publications available (Tel: 800-673-6275). Copies of the ISO 14000 standards can be obtained by contacting these organizations.

Many organizations offer a variety of training courses. A company called CEEM Information Services (Tel: 800-745-5565) provides books, newsletters, and training courses on ISO 14000. There are also a few sites on the worldwide web that provide information and updates on ISO 14000.