

# ISO 14000: Regulatory Reform and Environmental Management Systems

by

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B.Eng., Civil and Environmental Engineering, McGill University, 1995

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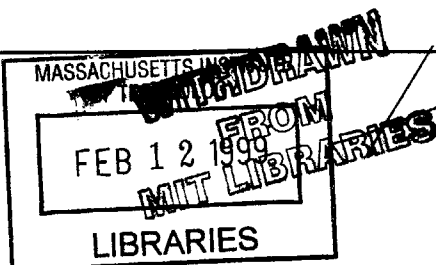
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by Jason Switzer

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## Abstract

ISO 14001 is an environmental management system design standard. Accredited private auditors (registrars) may be hired to periodically verify that a firm's management system conforms to the standard's requirements. Many influential companies, such as IBM, Ford and Toyota, are voluntarily implementing third-party verified management systems that conform to this standard, and encouraging their suppliers to follow suit. Thus, ISO 14001 may become a competitive requirement.

Depending on the nature of registered facilities, the impact of adoption on management objectives, and the credibility of third party oversight, ISO 14001 may have a positive impact on environmental performance. As a result, state and federal environmental agencies are debating the use of ISO 14001 registration as a qualifier for regulatory flexibility. However, the standard lacks performance requirements. Firms are not even required to be in compliance with environmental law as a condition of registration. This study therefore asks: What is the appropriate regulatory response to ISO 14001 in the US ?

A statistical evaluation of adopter-facility characteristics shows that registered sites are more likely to be large, foreign-owned, registered to ISO 9000, and to operate in comparatively heavily-regulated, emission-intensive industry sectors. A survey of registered organizations shows that ISO 14001 will likely have a positive impact on environmental performance, by stimulating firms to develop more specific and achievable performance goals, with greater management commitment. A survey of registrars, however, concludes that third party auditors may be susceptible to conflicts of interest.

This study concludes that ISO 14001 registration alone is insufficient justification for granting regulatory flexibility to facilities. It offers suggestions, therefore, for revising the standard, for enhancing the accountability of registered firms, and for making use of the standard in regulatory reform initiatives.

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**All errors are, of course, entirely my own.**

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## Introduction

“Competitive pressures in Europe now dictate that automotive companies must become ISO 14001-certified to sell vehicles.”

-- Ford Motor Company webpage, September 1998

“Governments can use environmental management system standards to reduce enforcement difficulties or [to grant] regulatory relief.”

-- Dr. Mary McKiel, Director, EPA Voluntary Standards Network<sup>1</sup>

“The establishment and operation of an environmental management system will not, in itself, necessarily result in an immediate reduction of adverse environmental impact.”

-- ISO 14001 Specifications, Annex A

The environmental management system standard known as ISO 14001 is rapidly becoming an international market condition. A non-governmental code of management practices, the private sector in the US is voluntarily adopting the standard, presumably to realize competitive benefits. Only two years old as this study is completed, worldwide there are now over 6,000 registered sites, 200 of which are in the US (Peglau, 1998). Many are owned by highly influential multinational corporations, such as Ford and IBM.

ISO 14001 offers an uncertain promise: “Improvements in [an organization’s] environmental management system are intended to result in...improvements in environmental performance” (ISO 14001, A.1). Advocates see the management systems approach as a powerful means for focusing management attention on environmental issues. Critics point out that ISO 14001 does not require regulatory compliance as a condition of registration, and that there is no guarantee of a link between adoption of the standard and improved environmental performance.

Nonetheless, regulators in the US are considering granting some forms of regulatory relief to organizations that adopt ISO 14001. While literally hundreds of papers and books have been written on the standard, few in-depth studies have been performed to better understand the structure of the management system, its impacts on internal management decisions, and the ability of third-party auditors to verify that changes in management practice are occurring. Given its potential to impact a broad cross-section of American industry, ISO 14001 is an important area for public policy study.

Based on the extensive debate underway as to the proper role of ISO 14001 in regulatory strategy in the US, this study will attempt to answer:

- What is ISO 14001 and how does it work ?
- Who is implementing it and why ? What are the common characteristics of those firms that have adopted it so far ?
- How is it affecting adopters’ internal management decisions in ways that are important to regulators ?
- Is private third-party registration auditing a credible oversight mechanism ?

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<sup>1</sup> McKiel, M. US Remarks for UNIDO Expert Group Meeting on the Implications of International Standards of Quality and Environmental Management Systems for Developing Countries. Unpublished draft. USEPA, 1998:2.

- Based on the answers to these questions, what are the appropriate regulatory responses to ISO 14001 ? What is the standard's role in environmental regulation ? Should the standard itself be modified, and if so, how ?

The body of this report will concern itself with resolving those questions, and identifying a best course of action for US regulators, as illustrated in Figure 1, below. In chapter 2, the history and structure of ISO 14001 is briefly summarized, along with the major critiques against it. Analysis of empirical data from registered companies, in chapter 3, suggests why some companies find value in registration, with implications for the diffusion and implementation of the standard. Drawing on the theoretical understanding of the standard developed earlier in the report, chapter 4 underscores the importance of goal-setting, and illustrates the impact of adoption on environmental management goals, through interviews with senior environmental managers from registered organizations. Chapter 5 explores the ability of third-party registrars to act as a credible oversight mechanism, ensuring that goals are met, through interviews with accredited US registrars. Chapter 6 probes the range of regulatory flexibilities legally and implicitly available to environmental regulators in the US, and summarizes stakeholder interests with respect to use of ISO 14001 in regulatory reform efforts. Chapter 7 summarizes the preceding analyses and advances recommendations for preventing misuse of the standard, as well as for deploying it in regulatory reform efforts.

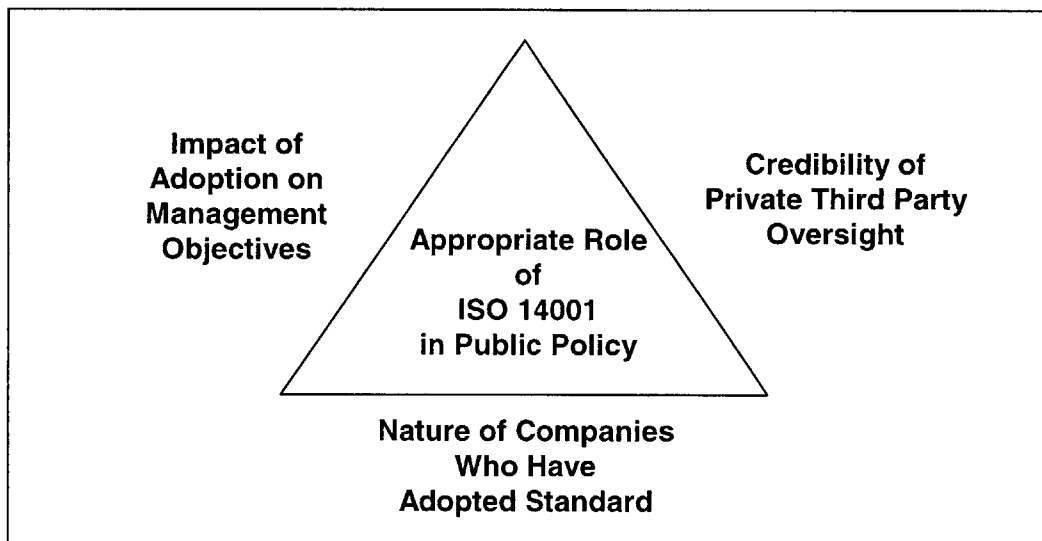


Figure 1. Appropriate Response of the Environmental Regulator to ISO 14001 Depends on:

- The Nature of Registered Companies
- The Impact of Registration on Internal Management Decisions
- The Ability of Private Auditors to Ensure Accountability

## Chapter 1: Regulation and ISO 14001

This chapter will answer, for the purposes of this study, the questions:

- What is regulation ?
- How can different regulatory strategies be evaluated ?
- Based on those metrics, how successful is the prevailing regulatory strategy ?
- What is ISO 14001 and how does it fit into regulatory strategy ?

### 1.1 Business and the Environment: A Need for Regulation

“Fear, not greed, has driven most corporate environmental policies.”

- Frances Cairncross, Author and Economist

A growing chorus of academics, policy makers and private citizens have come to the conclusion that the current course of human development is unsustainable (Meadows et. al., 1992<sup>2</sup>; Holdren et. al., 1995<sup>3</sup>; WCED, 1987). They point to frightening trends such as the explosive growth of human population, the widespread deforestation of the tropics, mass species extinction, the accumulation of anthropogenic chemicals in air, water, soil and food, and the mounting evidence of global climate change (Suzuki and Gordon, 1990)<sup>4</sup>. The role of industrial activity in that degradation, and in the correction of that course, is pivotal: According to the World Commission on Environment and Development, “Industry extracts materials from the natural resource base and inserts both products and pollution into the human environment. It has the power to enhance or degrade the environment; it invariably does both”(WCED, 1992)<sup>5</sup>.

According to the World Business Council for Sustainable Development, “The old and still prevailing view of the links between business and the environment is that environmental protection and profitability are natural opposites.”(Schmidheiny, 1992:83). Regulatory compliance has been regarded as a burden on economic performance. As a result, environmental efforts by firms have been “designed to meet regulatory requirements and appease communities, largely as a reactive effort” (Cordeiro and Sarkis, 1997:105<sup>6</sup>). This relationship may be evolving, as many managers claim to see the potential for competitive advantage from environmental proactivism, (Schmidheiny, 1992:86) through:

- more efficient processes.
- lower costs of compliance.
- higher employee morale.
- public acceptance of corporate activity.
- improved productivity.
- new strategic market opportunities.
- Better access to capital.
- Lower-cost self-regulation

<sup>2</sup> Meadows, D. H., Meadows, D. L., and Randers, J. Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future. Vermont: Chelsea Green Publishing, 1992.

<sup>3</sup> Holdren, J.P., Daily, G.C. and Ehrlich, P.R. The Meaning of Sustainability: Bio-Geophysical Aspects. In Munasinghe and Shearer, eds. Defining and Measuring Sustainability: The Biogeophysical Foundations. Washington, DC:World Bank, 1995.

<sup>4</sup> Suzuki, D. And Gordon, A. It's A Matter of Survival. Cambridge: Harvard University Press, 1990:2.

<sup>5</sup> World Commission on Environment and Development. Our Common Future. New York: Oxford University Press, 1987:4.

<sup>6</sup> Cordeiro, J.J., and Sarkis, J. “Environmental Proactivism and Firm Performance: Evidence From Security Analyst Earnings Forecasts” in Business Strategy and the Environment, Vol. 6, 104-114, 1997.

Environmental proactivism has led to the emergence of business concepts such as design-for-environment, eco-efficiency and product-takeback, and the adoption of codes of management practice such as Responsible Care, the CERES principles and ISO 14001 (Nash and Ehrenfeld, 1997)<sup>7</sup>. Major manufacturers such as 3M, Sonoco and Electrolux claim to have reaped substantial benefits from products developed to be 'environmentally-friendly' (Arnst, 1997)<sup>8</sup>. Firms who market themselves as environmentally-conscious, such as The Body Shop and Ben & Jerry's Ice Cream, have enjoyed considerable financial success. Proactivism may even have a beneficial impact on stock prices and insurance rates: there is some indication that analysts in the banking and insurance industries are beginning to take into account firms' "compliance costs, accident history and potential liability" when making investment decisions (Gentry and Fernandez, 1997:1<sup>9</sup>; see also Leggett, 1996<sup>10</sup> ).

In spite of these encouraging signs, many question whether market forces and public opinion are sufficient inducement for firms to adopt environmentally-preferable practices. While much environmental rhetoric from industry sources touts corporate responsibility, a 1994 study by KPMG Canada, "reported that 95% of firms cited 'compliance with regulations' as one of the top five factors motivating environmental improvements. The next most frequently cited factor at 69% was directors' liability, while factors such as cost savings, customer requirements and public pressure were cited by less than half of respondents"(cited in Harrison, 1998:33)<sup>11</sup>. Without the intervention of regulation in the market to bring impacts that were previously 'external' onto a firm's bottom line, the pursuit of short-term profits would likely be incompatible with long-run sustainability.

In short, the relationship between business and the environment is a complex one, and it is unclear to what extent managers would modify or rethink practices that impact the environment without the constraints on action imposed by regulation.

## **1.2 Regulation: Coordination of Interests Towards Broad Social Values**

What is regulation, and why is it used ? Regulation is an intervention in the market transactions between private actors, in order to advance the public 'good'. Paraphrasing Bregman and Jacobson, the purpose of regulation is to "[co-ordinate] the mutual adjustment of individual [interests] through economic and legal institutions" (Bregman and Jacobson, 1994)<sup>12</sup>. Thus, a democratic society such as the United States imposes regulation upon itself in order coordinate actors' behavior towards maximizing certain values. A list of such commonly-held values might include social welfare, equity and dignity, democracy, and sustainability (Weimer and Vining, 1992:77-102).

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<sup>7</sup> Nash, J and Ehrenfeld, J. Codes of Environmental Management Practice: Assessing Their Potential as a Tool For Change. *Annu. Rev. Energy Environ.* 1997. 22:487-535.

<sup>8</sup> Arnst, C. "When Green Begets Green" in *Businessweek*. 98-103, Nov. 10, 1997.

<sup>9</sup> Gentry, B. And Fernandez, L. Valuing the Environment: How Fortune 500 CFOs and Analysts Measure Corporate Performance. Yale center for Environmental Law and Policy, 1997.

<sup>10</sup> Leggett, J. Ed. *Climate change and the Financial Sector...The Emerging Threat*. Munich:Gerling Akademie Verlag, 1996.

<sup>11</sup> Harrison, K. *Talking with the Donkey: Cooperative Approaches to Environmental Protection*. Unpublished draft, May 1998.

<sup>12</sup> Bregman, E., and Jacobson, A. *Environmental Performance Review: Self-Regulation in environmental Law*. In Teubner, G., farmer, L. And Murphy, D. Eds. *Environmental Law and Ecological Responsibility: The concept and Practice of Ecological Self-Organization*. 207-236, John Wiley & Sons Ltd. 1994.

### **1.3 Getting From Values to Actions: Evaluative Criteria for Regulatory Strategies**

How can regulatory strategies be evaluated ? In order to operationalize social values such as welfare, equity, democracy and sustainability, regulation constrains behavior through a variety of policy tools: economic, legal or social. Those constraints should be as efficient as possible in meeting their goals, be transparent to and perceived as legitimate by key stakeholders, be adaptable to changing conditions, and above all be effective, in order to advance the public good they claim to serve (Similar evaluative criteria for regulation are presented in Harrison, 1998; Laws, 1998<sup>13</sup>; Bohm and Russell, 1985<sup>14</sup>; and Kleindorfer and Orts, 1995<sup>15</sup>).

**Effectiveness:** The capacity of a regulation to achieve its stated purpose (i.e. improving air quality). This involves thinking not only of the immediate performance of the regulated actors, but also the impact of the regulation on the internal values, structures and procedures of those actors, which may have implications for long-term effectiveness.

**Efficiency:** The degree to which a regulation operates “at least resource cost” to society, or maximizes total welfare (Bohm and Russell, 1985:399). A regulation has four phases which can be evaluated in terms of efficiency: development, implementation, monitoring and enforcement.

**Transparency:** The clarity of the regulations’ requirements, both to regulatees and to other observers. This is the degree to which regulators, regulatees and interested stakeholders may effectively understand and monitor compliance with the regulation, and progress towards its underlying goals.

**Legitimacy:** Regulation “that is not viewed as legitimate is unlikely to be effective, at least in the long run” because it will be challenged or evaded (Laws, 1998:9). Legitimacy is derived from the degree to which a regulation is developed and operates consistent with the principles of democratic accountability, with the Constitution and with the other fundamental laws of the land (procedural, or ‘systemic’ legitimacy; see Kleindorfer and Orts, 1995). Important, too, is the perceived ‘fairness’ of outcomes resulting from the regulation, which reflect its impact on the distribution of ‘goods’ and ‘bads’ (perceived, or ‘empirical’ legitimacy, as developed by Kleindorfer and Orts, 1995).

**Adaptability:** This is a regulation’s appropriateness to a variety of environmental, economic, social and technological conditions, and the ease by which it can be adjusted to meet changes in those conditions (Bohm and Russell, 1985:400).

In order to attain regulatory objectives, two sub-criteria suggest themselves – **compliance assurance**, and **comprehensiveness**. Ideally, there should be no opportunity for firms to ‘cheat’. Likewise, improved performance in one (regulated) area should not be invalidated by greater impacts in other (unregulated) areas.

<sup>13</sup> Laws, D. Regulatory Design for Sustainability. Unpublished Research Proposal, 1998.

<sup>14</sup> Bohm, P., and Russell, C. “Comparative Analysis of Alternative Policy Instruments” in Kneese, A.V., and Sweeney, J.L. eds. Handbook of Natural Resource and energy Economics, vol. I. Elsevier Publishers, 1985.

<sup>15</sup> Kleindorfer, P. And Orts, E. Informational Regulation of Environmental Risks. Wharton Impact Conference, Philadelphia: Wharton School, October 1995.

The next two sections will explore the prevailing US regulatory strategy, discuss its perceived weaknesses with respect to the evaluative criteria presented above, and offer a range of alternative policy tools.

### **1.4 Evaluating The Prevailing US Regulatory Strategy**

“Because damage costs are externalities but control costs are not, what is cheapest for a firm is not always cheapest for society as a whole...Firms which attempt unilaterally to control their pollution are placed at a competitive disadvantage...The unimpeded market fails to generate the efficient level of pollution control...Hence, the case for some sort of government intervention is particularly strong for pollution control.”

-Tom Tietenberg, Economist<sup>16</sup>.

From an economics-based perspective, because the costs of polluting are not necessarily borne by the sources of that pollution, there is a strong need for pollution control regulation.

#### **How is regulation designed ?**

A generic regulation may be thought of as having four components:

1. A performance standard, or goal.
2. A means for achieving that standard, explaining what needs to be done.
3. A set of information requirements that the regulatee must divulge for monitoring purposes.
4. An enforcement incentive for complying with the above components, to be carried out by an enforcer.

Thus, a range of regulatory approaches can be devised, based on differences in:

- Who sets the performance standard (e.g. private actors, the government, or some combination, perhaps including a broader community of interests), and what benchmarks are used to establish the standard (e.g. health-based, risk-based, technology-based, or consensus-based)
- The means for achieving the standard (e.g. approved technologies and actions required by the regulatee, or policy mechanisms such as emissions taxes or tradable permits that alter the regulatees' economic incentives).
- The types of information required to be divulged (e.g. means used, confirmation of compliance, performance data, internal policy statements, or management plans) and to whom that information is made available (e.g. the government, an external auditor or industry organization, an environmental advocacy organization, or the public-at-large)
- The set of enforcement incentives (economic, criminal, civil, public shaming, boycotts, etc.), and the identity of the enforcer (the market, the government, private third parties, or the public).

In each case, regulation seeks to modify behavior through impacts on what Kleindorfer and Orts call the firm's economic, regulatory and social franchises. “If a firm fails to

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<sup>16</sup> Tietenberg, T. Environmental and Natural Resource Economics, 4th ed. New York: HarperCollins College Publishers, 1996.



satisfy its economic *raison d'être*, it loses its economic franchise and falls into bankruptcy or dissolution...A business firm, composed of people, not just balance sheets, must [also] legitimate itself as a legal and moral entity if it is to continue to enjoy its social franchise without undue interference from its employees, customers and neighbors” (Kleindorfer and Orts, 1995:13-4). As Shell International advised incoming employees in the wake of the Brent Spar incident, “In the face of increasing competition and social awareness, we must earn our ‘license to operate’ each day - understanding the needs not only of our customers, staff and shareholders, but also the communities with whom we work.”<sup>17</sup>

The prevailing US environmental regulatory strategy is based on command and control rulemaking by the EPA and state environmental agencies. This system is widely criticized for failing to adequately fulfill the evaluative criteria of efficiency, transparency, legitimacy, adaptability and effectiveness, in terms of advancing the public good.

### The Regulatory System: A Government-Centered Approach

“‘Command and Control’ refers to a public policy approach that relies on centralized regulatory commands to implement environmental goals. Governments issue detailed requirements and follow up with inspections, enforcement and punishment. Command and control has been the dominant public policy with respect to the environment in the United States and Europe since the 1970s, when most environmental statutes were enacted. Command and Control approaches generally take two forms. First, governments may establish environmental **performance standards** for companies, usually enforced through a permit system. Firms that have been issued a permit are allowed to pollute within limits determined by health-based standards for the ambient environment. The second approach is to require **technology-based controls**. Regulations promulgated under the Clean Water Act, for example, establish industry-uniform ‘best-available technology standards. To obtain an environmental permit, facilities must have in place the technology defined as the ‘best’ for their industry under the law. Violations of performance or technology-based standards may result in civil, and increasingly, criminal penalties” (Nash and Ehrenfeld, 1987:487-8).

The bulk of US regulation has taken the form of technology-based, rather than performance-based standards (Steinzor, 1998:114)<sup>18</sup>. This is attributed to a lack of fundamental information: “The reason Congress and EPA are compelled to apply technology-based standards is that there is so little reliable information available to evaluate, much less quantify, environmental risks”(Steinzor, 1998:114).

Critics agree that **technology-based controls have been effective** and that “the [US] environment is generally better in 1997 than it was in 1970”, (Davies and Mazurek, 1997:14)<sup>19</sup>. However, critics argue that such standards are **inefficient**, in that they may cause sources to install equipment even where costs exceed benefits and the same results could be achieved more cheaply by other sources or methods (Steinzor, 1998:114). Second, critics allege that such standards are unnecessarily contentious, **lacking perceived legitimacy**. In this view, regulations are frequently challenged

<sup>17</sup> Royal Dutch/Shell Group of Companies. Visions: Recruitment Pamphlet. 1997.

<sup>18</sup> Steinzor, R. Reinventing Environmental Regulation: The Dangerous Journey from command to Self-Control. In Harvard Environmental Law Review, vol. 22, 1998:103-202.

<sup>19</sup> Davies, J.C. and Mazurek, J. Regulating Pollution: Does the US System Work ? Internet Edition. Resources for the Future, April 1997.

because they do not adequately involve stakeholders in the rule-making process, thus failing to secure broad consensus. “Limiting the role of non-agency participants to adversarial challenges has been an ineffective means of building support for the policy choices agencies have had to make”(Susskind and McMahon, 1985:136)<sup>20</sup>. Third, critics allege a **lack of transparency and enforceability**. Rules are “complex, contradictory and essentially unenforceable due to their sheer volume and dense, technical language...Companies [believe] that compliance is impossible and regulators [are] incapable of undertaking minimal enforcement”(Steinzor, 1998:117). Fourth, critics allege that command-and-control is **inflexible and fragmented**, because it regulates on a medium-by-medium, technology-specific basis (Heaton and Banks, 1997:24)<sup>21</sup>. Therefore, it does not prevent the shifting of pollution from one medium to another, and does not address many sources of pollution (ibid.). It favors existing technologies over innovative ones, and does not provide adequate incentives for environmental proactivism and pollution prevention (ibid.). As a result of these failures, it has largely failed to prevent the emergence of cross-media and transnational problems, such as global climate change and mass species extinction (Nash and Ehrenfeld, 1997:489). Thus, while successful in reducing many pollution-related threats to human health and the environment, technology-based standards over-regulate in some areas while under-regulating in others.

As a result of reliance on technology-based standards by the EPA, the door has been left open to an unprecedented attack on the nature and application of environmental regulation. Partly, this attack has been theoretical, arguing that policymakers are imperfect. “As policy analysts, we should exercise caution in advocating public intervention into private affairs. Some market failures are too costly to correct; some distributional goals are too costly to achieve. More fundamentally, we just do not know how government intervention will work out...Enthusiasm for perfecting society through public intervention, therefore, should be tempered by an awareness that unintended consequences will often arise”(Weimer and Vining, 1992:113). Partly, this attack is ideological: “In the words of best-selling author Phillip Howard, government regulation represents ‘the death of common sense’. [These] critics have complained that the rules intrude too deeply into the lives of citizens, [in addition to]...imposing excessive costs both on the regulated and the regulator...The widespread disdain of government rulemaking has [thus] fueled a wholesale assault on government regulation”(Kettl, 1997)<sup>22</sup>.

By “picking up on early critiques of traditional rules articulated by the academic community, industry representatives and commentators sympathetic to their point of view [have] increasingly challenged the fundamental premises of command-and-control as a regulatory strategy. These groups argued that there were far more efficient and effective ways that were the foundation of EPA’s original mission”(Steinzor, 1998). The Republican ‘Contract with America’ and the ‘Reinvention of Government’ effort led by Vice President Gore are a response to these pressures to reform government and reduce regulatory inefficiencies (See especially Gore, 1993<sup>23</sup>; also Breger, 1996<sup>24</sup>;

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<sup>20</sup> Susskind, L. and McMahon, G. The Theory and Practice of Negotiated Rulemaking. In Yale Journal on Regulation, Vol. 3, 1985:133-165.

<sup>21</sup> Heaton, G. and Banks, D. Towards a New Generation of Environmental Technology: The Need for Legislative Reform. In Journal of Industrial Ecology, Vol. 1, No. 2, 1997.

<sup>22</sup> Kettl, D. Regulatory Reform and Public Management: ISO 14000, Collaborative Governance, and the States. (Kettl@lafollette.wisc.edu), September 1996.

<sup>23</sup> Gore, Vice President Al. Report of the National Performance Review: Creating a Government that Works Better and Costs Less. 1993.

Steinzor, 1998<sup>25</sup>). The next section will describe some regulatory strategies that have been presented as alternatives to technology-based command and control rules.

### **1.5 Alternative Regulatory Strategies**

“The world which we have created today as a result of our thinking thus far has problems which cannot be solved by thinking the way we thought when we created them.”

- Albert Einstein<sup>26</sup>

Command-and-control regulation is based on the concept that private behavior needs to be constrained towards socially-optimal goals by clear rules and strong coercive mechanisms, implemented by government. Given the limitations of this approach, several alternative policy tools are being developed and tested.

According to Kleindorfer and Orts, environmental regulation can take four basic approaches:

- **Person-centered**, such as the legal system, which establishes property rights and relies on private actors to enforce them.
- **Government-centered**, such as command-and-control regulation, in which government agencies legislate performance or design requirements for private actors, and levy financial (civil) and criminal penalties on those who fail to comply.
- **Market-centered**, such as emission taxes, in which direct economic pressures are employed to achieve the same ends as legislated requirements.
- **Institution-centered**, such as Right-to-Know laws, which provides third parties with information on private actors' operations. Such an approach relies to some extent on social mechanisms such as shame, or fear of future legislation, to induce desired behavior. This approach can also enhance both person, market and government-centered approaches.

Two examples of institution-centered regulation are government-private sector voluntary programs, and privately-developed communitarian regulations.

#### **Voluntary Programs**

“Governments can seek to persuade individuals or firms to change their behavior in a variety of ways...[that] are nominally voluntary [but] vary in degree of coerciveness”(Harrison, 1998:10). The first generation of such approaches include the performance-based and strongly-sanctioned ‘negotiated covenants’ (popular in Canada and the Netherlands), ‘voluntary performance challenge programs’ such as the EPA’s 33/50 and Canada’s ARET programs, and education/information dissemination programs (Harrison, 1998; Nash and Ehrenfeld, 1997). “A second generation of [US] ‘voluntary’ programs...focuses directly on ‘reinventing environmental regulation’ through such efforts as the Common Sense Initiative, Project XL, and the Environmental Leadership Program. Each seeks to move environmental regulation beyond single

<sup>24</sup> Breger, M. “The Fiftieth anniversary of the administrative Procedure Act: Past and Prologue - Regulatory Flexibility and the administrative State” in Tulsa Law Journal, winter 1996.

<sup>25</sup> Steinzor, R. Reinventing Environmental Regulation: The Dangerous Journey from Command to Self-control in Harvard Environmental Law review, 1998.

<sup>26</sup> Schmidheiny, S. Changing Course: A Global Business Perspective on Environment and Development. Cambridge: MIT Press, 1992: 82.

media approaches towards industry sector- or firm-specific cross-media alternatives. Each would grant some measure of regulatory or compliance flexibility to companies that commit to superior environmental performance. One criterion for participation in some of these programs is for firms to have in place “environmental management systems that establish performance objectives, require continuous improvement, and integrate environmental concerns into product design and production”(Nash and Ehrenfeld, 1997:491). An environmental management system standard that is frequently identified as compatible with this criterion is one based around ISO 14001 (EPA, 1998<sup>27</sup>).

### **Communitarian Regulation**

A different regulatory concept again is the emergence of privately-developed codes of environmental management practice, absent government involvement. “In contrast to both the litigation model of person-centered law and government-centered hierarchical standard-setting, an institution-centered approach may recommend that standards derive from professional organizations or evolve in terms of ‘best practice’ standards within business groups” (Kleindorfer and Orts, 1995:39). Efforts at ‘communitarian regulation’ are best exemplified by the Chemical Manufacturers Association’s Responsible Care, the Board of American Forest and Paper Association’s Sustainable Forestry Initiative, and by the ISO 14000 series (Nash and Ehrenfeld, 1997).

“In communitarian regulation, a group of individuals or companies join together to regulate their collective action and thereby solve a commons problem”(King, et. al., 1998:1-2)<sup>28</sup>. In the field of environmental management, such groups seek to limit ‘races-to-the-bottom’ for environmental cost advantages: “[A firm] can attempt to create private regulatory institutions that develop explicit or tacit agreements not to compete along environmental lines, thus binding its rivals’ hands”(Reinhardt, 1998:3)<sup>29</sup>. Through non-legal sanctioning mechanisms, such as moral suasion (shame, for example), or threats of loss of privileges (such as expulsion from an industry organization, as in the Chemical Manufacturing Association’s Responsible Care program), groups may be able to enforce sufficient discipline that members comply with their own regulation, and in so doing, improve collective action and reputation (King et. Al, 1998:7).

From a regulatory standpoint, there may be significant benefits to self-regulation. “By changing values, diffusing information and facilitating negotiation, self regulation can help coordinate action among member firms and improve collective behavior”(King et. al., 1998:3). In terms of efficiency and adaptability, it can be argued that since communitarian regulations are not subject to the procedural requirements of government debate, and are designed by industry to be compatible with business interests, they will be easier to modify, and less burdensome than traditional regulation. By the same token, their effectiveness and therefore their legitimacy may be questionable: Since “they provide firms with discretionary power in target setting and/or in monitoring and compliance...they give room for strategic behavior by industry...In the absence of enforcement mechanisms, a firm will try to capture the benefits of making a voluntary commitment without bearing the corresponding abatement

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<sup>27</sup> EPA Position Statement on Environmental Management Systems and ISO 14001/DOCID:fr12mr98-64, 1998.

<sup>28</sup> King, A., Lenox, M., and Ehrenfeld, J. Communitarian Environmental Regulation: A Study of Responsible Care and the Chemical Industry. Unpublished draft, 1998.

<sup>29</sup> Reinhardt, F. Environmental Product Differentiation: Implications for Corporate Strategy in California Management Review,(ABI-Inform web-based version) 40(4):43-73, 1998.

costs”(Leveque,1997:5,8)<sup>30</sup>. “Without strong coercive mechanisms, communitarian regulation will fall victim to adverse selection and moral hazard, ” as bad actors join to disguise their poor performance, adopting the form of the standard but shirking the real effort required (King et. al., 1998:3).

In order to limit strategic behavior, typical prescriptions are (Leveque, 1997:8):

- “involvement of third parties in the process of setting environmental targets.
- a monitoring and reporting system guaranteed by an independent party.
- a credible mechanism of sanction for non-compliance”.

Opportunism may also be limited by members’ self-interest: “Unfulfilled commitments may accrue more costs to industry in terms of loss of consumer reputation and of imposition of onerous regulations, than no commitments. Moreover, it is not in a firm’s interest to enter a voluntary agreement that is not credible to public opinion and the public authorities, for it then runs the risk of incurring costs associated with the agreement without gaining any benefits”(Leveque, 1997:8). Thus, in spite of what might be regarded as weak coercive mechanisms, communitarian regulation offers a potentially valuable tool in the advancement of the public good.

## ***1.6 ISO 14001: Communitarian Regulation with Public Policy Potential***

### **1.6.1 What is ISO 14001 ?**

The emergence of ISO 14001 may be viewed as an international, multi-industry effort at communitarian environmental regulation, and may have an important role to play in the US EPA’s effort at reinventing its own regulatory programs. The following sections will explore these two assertions.

“The ISO 14000 series of standards extends the [quality] management systems approach first pioneered in the International Organization for Standardization’s ISO 9000 series to the field of environmental management”(Roht-Arriaza, 1997). In particular, the ISO 14001 standard provides firms in all fields with a common framework for establishing an independently-verifiable environmental management system, or EMS. This framework is based on the notion of quality management, a concept which will be discussed in greater detail in chapter 2. In brief, quality management recognizes that it is competitively beneficial for an organization to minimize waste and defects, and deliver as nearly as possible exactly to the customer’s specifications. Since improving quality requires efforts at all levels of the organization, quality management requires a comprehensive, or ‘systems’ approach, where all efforts are directed towards continually improving not only the products themselves, but the processes through which the products are developed, made, serviced and disposed. An efficiency-oriented ‘systems’ approach like this clearly has subsidiary environmental benefits. For example, waste minimization and pollution prevention are overlapping, though not completely parallel, concepts.

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<sup>30</sup> Leveque, F. Voluntary Approaches for the Improvement of Environmental Performance. Prepublication draft in Convery, F. And Ekins, P. The policy research services on market based instruments for sustainable development. Edward Elgars Pub., 1997.

By placing an explicit focus on environmental management, ISO 14001 seeks to raise consideration of environmental issues in all aspects of an organization's operation. The ISO 14001 standard requires organizations to establish a rational procedure for setting environmental policy goals and implement plans for achieving them. To do so, the organization must commit to comply with relevant regulations, to prevention of pollution and to continually improving the management system itself, which includes both demonstrating progress towards the underlying policy goals, and ensuring that those goals are appropriate to changing business conditions. Thus, an organization must commit to periodic revision of the system in order to improve its information gathering, its evaluation of the information's significance, its goals, and the means to achieving those goals. Independent registration audits, by ISO-accredited registrars, ensure to outsiders that an organization has a systematic management structure for managing its environmental impacts, and is following through on internal environmental commitments.

An important issue is whether ISO 14001 will become widely used. In the 1970's, the ISO developed and promulgated its quality management standards, ISO 9000, which have since been adopted by over 130,000 organizations worldwide (Symonds, 1996<sup>31</sup>). Today, these standards are a de facto business requirement in several industries internationally, including automobile manufacture and microelectronics. ISO 14001 was published in 1996, and has since been adopted by over 6,000 firms worldwide, over 200 of which are in the United States (Peglau, 1998)<sup>32</sup>. Should ISO 14001 take the same course to widespread diffusion as ISO 9000, it may have a dramatic impact on corporate environmental practices. Indeed, one study by the Global Environmental Technology Foundation asserts that "at least 150,000 firms will be registered" by 2002, based on current market trends, representing implementation expenditures on the order of US\$20 billion (GETF, 1997)<sup>33</sup>. Presumably, non-registered firms would be at a competitive disadvantage for failing to have their 'environmental affairs' in order, similar to the experience of non-ISO 9000 firms in the early 1990's, who found their industrial customers requiring certification as a condition of further business (Rabbitt and Bergh, 1994:37)<sup>34</sup>.

In the US, "companies have been quick to embrace the concept of environmental management systems...but they have been slow to take the final steps to registration"(Sissell, 1998:43)<sup>35</sup>. However, there is credible evidence that, in the chemical, microelectronics and automobile manufacturing industries at least, ISO 14001 is becoming very common, and may someday become a supplier requirement. For example, "the number of chemical companies in the UK, France, Italy, Germany and the Netherlands registered to...ISO 14000 is forecast to increase from 156 to more than 600 within the next three years, according to the respective chemical associations (CWA, 1998<sup>36</sup>). IBM, GM and Honda are all encouraging their suppliers to seek ISO 14001 registration (see figure 1.61, below).

While both ISO 14001 and ISO 9000 seek to benefit an adopter-firm's financial bottom line, there are two key distinctions between the standards. One is a difference in **scope**:

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<sup>31</sup> Symonds, J. Mobil Survey of ISO 9000-registered Firms. TQM-Mobil Europe, Tel. +44 171 412 4897, December, 1995.

<sup>32</sup> Peglau, R. The Number of ISO 14001/EMAS Certification of the world. ISOworld website: [www.ecology.or.jp/isoworld/english/analy14.gif](http://www.ecology.or.jp/isoworld/english/analy14.gif). 31 March, 1998.

<sup>33</sup> GETF. ISO 14000 Market Summary. GlobeNet webpage [www.getf.org](http://www.getf.org). Nov 1997.

<sup>34</sup> Rabbitt, J. And Bergh, P. The ISO 9000 Book, 2d ed. New York: Quality Resources, 1994.

<sup>35</sup> Sissell, K. Behind the Scenes, US Companies Prepare for Certification. Chemical Week. 160(13), April 8, 1998:43.

<sup>36</sup> Chemical Week Associates. Strong Forecast for ISO 14000. In Chemical Week, September 23, 1998:6.

while quality management focuses its attention on the interests of the customer, environmental management broadens the scope to include interested private third parties, environmental regulators, and potentially, ecosystems. As a result, **measuring benefits** is different between standards: the impact of quality management on customer satisfaction in a private two-party transaction can more clearly be measured than the impact of environmental management, since 'the environmental customer' includes not only the direct purchaser, but also a diffuse group of environmentalists, community members and government employees. Thus, it may be possible for a company to determine the 'optimal' level of quality for its needs, but it may not be possible for it to achieve similar certainty in the environmental context. Companies would therefore like to know how they can capture value from implementing ISO 14001. Similarly, regulators would like to know if there will be a link between the diffusion of this standard and broad-based improvements in industrial environmental performance. The next sections will explore these issues.

# Global Procurement

## ***ISO 14001***

April 13, 1998

Dear Supplier:

IBM has had a long standing commitment to environmental leadership around the world, and its record demonstrates this commitment. For over 25 years, the company's environmental affairs policy has provided the framework for its Environmental Management System (EMS). Central to implementation of IBM's EMS are its environmental policy, programs, and performance. These are discussed in our annual environmental report, which can be found on IBM's internet site at <http://www.ibm.com/ibm/environment>. Recently, IBM earned a single worldwide registration under the new international standard for environmental management systems, ISO 14001.

ISO 14001 is a voluntary standard that identifies the elements of an EMS necessary for an organization to effectively manage its impact on the environment. The ultimate objective of the standard is to integrate EMS with an organization's overall business processes and systems so that environmental considerations are a routine factor in business decisions, recognizing that good environmental management makes good business sense.

**IBM's commitment to environmental leadership includes doing business with environmentally responsible suppliers**, and its contracts require that you comply with all applicable laws and regulations in the work you do for IBM. The company is investigating opportunities to further integrate sound environmental management throughout its supply chain.

**IBM encourages you to align your EMS with the requirements of ISO 14001 and to pursue registration under this international standard.** This message comes in light of the increasing worldwide interest in environmental affairs and as part of IBM's overall ISO 14001 strategy. We are interested in doing business with environmentally responsible suppliers, and also believe that such registration can be of benefit to you.

Should you have any questions regarding IBM and ISO 14001, please direct them to your procurement representative or Tracy Harwin at (914) 766-2698 or e-mail: [harwin@us.ibm.com](mailto:harwin@us.ibm.com).

Sincerely,

Javier Urioste

Director of Policy, Strategy and International Operations  
IBM Global Procurement

Figure 1.6.1 IBM Letter to Suppliers, Encouraging ISO 14001 Adoption  
(emphasis added)



### 1.6.2 Why are Companies Interested in ISO 14001 ?

“International standards covering environmental management are intended to provide organizations with the elements of an effective environmental management system which can be integrated with other management requirements, to assist organizations to achieve environmental and economic goals...A system of this kind enables an organization to establish, and assess the effectiveness of, procedures to set an environmental policy and objectives, achieve conformance with them, and demonstrates such conformance to others”

-- ISO 14001, Introduction

“Instead of asking whether it pays to be green, we ought to be asking about the circumstances under which it might pay.”

--Forest Reinhardt, Harvard Business School

According to the International Institute of Sustainable Development, “ISO 14001 can fill two requirements in an organization. The first is the internal need for a system that will help the organization address all of the legal, commercial and other challenges related to the environment that face it today. The second is the need to be able to assure to those outside the company that the company is meeting its stated environmental policies”(IISD, 1996:5<sup>37</sup>).

What rationale do firms use to justify their adoption of ISO 14001 ? A recent UK survey of more than 500 companies in France, Germany the Netherlands and the UK, “indicated that external concerns - such as compliance with legislation, improved market share, customer recognition and public recognition - were most responsible for convincing these companies to implement such EMS standards as ISO 14001 and EMAS” (cited by OECD, 1998:17). A similar study by the Japan Accreditation Board of ISO 14001-registered companies indicates a focus towards external benefits as well (see below).

Reasons Given: 230 respondents / 391 surveyed	Rate (%)
Improved company image	82.0
Social responsibility	76.3
Improved competitiveness	50.7
Instructed to obtain certification by holding or parent company	32.7
Reduced costs	14.4
Improved market position or greater market share	13.3
As link to eco-business	9.4
Urging of industrial association	6.8

Source:(JNC, 1998:3)<sup>38</sup>

Table 1.6.2 Japanese Accreditation Board Survey of ISO 14001-Registered Firms Suggests that Improved Reputation is the Primary Driver of Adoption.

<sup>37</sup> IISD. Global Green Standards. Web-based version, 1997:5.

<sup>38</sup> Japanese National Committee for ISO/TC 207/SC1 (JNC). Implementation of ISO 14001: Japanese Experience and Expectation. 1998

In summary, it appears that while there a wide variety of rationales that could be guiding firms' adoption of ISO 14001, the leading causes are related to reputational benefits from third-party registration.

### **1.6.3 Why is the Regulator Interested in ISO 14001 ?**

When evaluating ISO 14001 as a possible instrument of public policy, the regulator is seeking improvements in regulatory performance, as measured against the prevailing system of command-and-control regulation.

Several groups, including both the Aspen Institute and the National Environmental Policy Institute, have proposed creating an alternative track to the command-and-control regime, for firms who demonstrate a commitment to superior environmental performance (Feldman, 1997:15; Aspen, 1997). Non-qualifying firms would still be required to meet all command-and-control requirements. By contrast, qualifying firms would be granted a degree of compliance enforcement flexibility, reduced inspections, expedited permits, and other benefits. Some proponents argue that ISO 14001 might provide the basic qualification for participation in the 'alternative path' (Feldman, 1997:14<sup>39</sup>; Kettl, 1996:7<sup>40</sup>). Thus, in exchange for regulatory incentives, firms would be required to implement an EMS conforming to ISO 14001, undergo periodic third party registration audits, and potentially disclose certain measures of environmental performance.

Creating an alternative regulatory track with ISO 14001 as its keystone has the potential to reduce regulatory burden on industry and use limited regulatory resources more effectively, relative to command and control. First, assuming that independent third-party registration proves to be a credible oversight mechanism, it may be possible for regulators to reduce their monitoring and oversight of registered firms (MacArthur and Bellen, 1998:5<sup>41</sup>). "Environmental management system provided information [may] prompt government to do less, saving public dollars, and to require less - wasted work and reporting - of the firm, improving efficiency"(Meyer, 1997:84). This may also free up regulatory resources that may be devoted towards monitoring environmental laggards and assisting small-to-medium size enterprises (SMEs), who lack the resources to implement a systematic EMS (Feldman, 1997:12<sup>42</sup>).

Regulatory experience with the ISO 14001 standard is limited, but a concerted effort is underway to better understand its implementation and potential impacts. The EPA and the Multi-State Working Group, a collection of state regulators, environmental advocacy organizations and universities, are collaborating with several companies on over 100 pilot projects in 10 states (Meyer, 1997:85)<sup>43</sup>. The Group will collect data from all sites in an attempt to determine the impact of ISO 14001 certification on environmental

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<sup>39</sup> Feldman, I. ISO 14000 can Underpin a New Dual Track Regulatory System in *Environmental Business Journal*, January 1997:11-15.

<sup>40</sup> Kettl, D. *Regulatory Reform and Public Management: ISO 14000, Collaborative Governance, and the States*, Working Paper, Brookings Institution, 1996.

<sup>41</sup> MacArthur, J. And Bellen, G. "ISO 14001 in State Regulatory Offices: A survey of Activities" web-based summary available at [www.nsf-isr.org](http://www.nsf-isr.org), 1998.

<sup>42</sup> Feldman, I. "ISO 14000 Can Underpin a New 'Dual-Track' Regulatory System" in *Environmental Business Journal*, 11-15, January 1997.

<sup>43</sup> Meyer, G. Adam Smith, the States, and the Financial Eco-Metric Imperative. In *Environmental Quality Management*, Winter 1997:81-91.

performance. The EPA has also played a lead role at the ISO meetings, in the development of many of the standards (McKiel, 1998).

Abroad, the Japanese and South Korean governments have required registration of many companies (Daugherty, 1998<sup>44</sup>; Auerbach, 1998<sup>45</sup>; Howe, 1998<sup>46</sup>). According to Eric Turner, an EHS director at Arthur D. Little in Brussels, "Demand for ISO 14000 has skyrocketed in Asia as a way of lending credence to a company's environmental performance in a region perceived to have lax environmental laws"(Sissell, 1998:43).

Industrial pilot projects are underway in nations as diverse as Singapore, Korea, China, and Brazil (UNCTAD, 1997). In Canada, a Provincial Judge ordered an out-of-compliance electronics manufacturer to obtain ISO 14001 certification as part of his ruling (Cutter, October 1998:3<sup>47</sup>). In Germany, some regulatory flexibility has been authorized for firms demonstrating ISO 14001 certification and who additionally publish detailed performance data (Cutter, September 1998:2)<sup>48</sup>. Finally, many federal agencies in the US and other OECD countries are experimenting with implementing the standard in their own facilities (Taylor and Lusser, 1998)<sup>49</sup>.

### ***1.7 Policy Question: What Is The Proper Role Of ISO 14001 In US Regulatory Strategy ?***

The preceding analysis has defined regulation, offered criteria for evaluating regulatory strategies, and explored briefly the range of strategies available. ISO 14001 has been presented as a form of communitarian regulation, being adopted by private actors for a variety of reasons. Regulators are interested in the standard because it presents an opportunity to advance environmental protection through an alternative approach to command and control regulation. The remainder of this study will attempt to respond to the following policy question: **What is the proper response from regulators to ISO 14001?**

### ***1.8 Research Questions and Structure of Report***

In order to resolve the policy question posed in the preceding section, several issues must be addressed. First, should ISO 14001 even be part of regulatory strategy ?

- What is ISO 14001 and how does it work ?
- Who is implementing it and why ? What does that tell us about the likely diffusion of the standard ? What about likely impacts on the environment ?
- How are companies implementing the standards ? What impact does it have on internal management decisions ?
- What is the role and value of third-party registration to the regulator ?

<sup>44</sup> Daugherty, R. Director of Business development, BVQI. Interview, Oct. 7, 1998.

<sup>45</sup> Auerbach, B. KEMA. Interview, Oct. 9, 1998.

<sup>46</sup> Howe, R. DNV. Interview, Nov 1, 1998.

<sup>47</sup> Cutter Corporation. "Canadian Court Orders Cortec to Implement ISO 14001" in Business and the Environment's ISO 14000 Update. October, 1998.

<sup>48</sup> Cutter Corporation. "German Agreement Offers Regulatory Relief for EMAS Participants" in Business and the Environment's ISO 14000 Update. September, 1998.

<sup>49</sup> Taylor, D. And Lusser, H. OECD Workshop on Environmental Management Systems for Government Agencies: Issues Paper. Stockholm, Sweden, January 1998.

Second, assuming there is a role to be played by ISO 14001 in regulatory strategy, what types of regulatory flexibility can the EPA actually give ? How can regulatory strategies be crafted around ISO 14001, given legal requirements and stakeholder demands ?

This study will focus on indirect methods of evaluating ISO 14001. There are two primary reasons for this research strategy. Because this standard is so new, there is insufficient data to adequately test the impact of registration on environmental performance. Next, the focus of this standard is on a systems approach to environmental management. Environmental performance improvements are a hoped-for **derivative benefit** of improving the management system itself. It is therefore difficult to define how to measure environmental performance in a convincing way that does justice to the systems approach.

The structure of this report is as follows: Chapter 1 defined a set of criteria for evaluating regulatory strategies, and introduced ISO 14001 as a communitarian regulation, with a potentially high value to US environmental regulators. In chapter 2, the history and structure of ISO 14001 is briefly summarized, along with the major critiques against it. Analysis of empirical data from registered companies, in chapter 3, suggests why some companies find value in registration, with implications for the diffusion and implementation of the standard. Drawing on the theoretical understanding of the standard developed earlier in the report, chapter 4 underscores the importance of goal-setting, and illustrates the impact of adoption on environmental management goals, through interviews with senior environmental managers from registered organizations. Chapter 5 explores the ability of third-party registrars to act as a credible oversight mechanism, ensuring that goals are met, through interviews with accredited US registrars. Chapter 6 probes the range of regulatory flexibilities legally and implicitly available to environmental regulators in the US, and summarizes stakeholder interests with respect to use of ISO 14001 in regulatory reform efforts. Chapter 7 summarizes the preceding analyses and advances recommendations for preventing misuse of the standard, as well as for deploying it in regulatory reform efforts.

## Chapter 2: What is ISO 14001 and How Does It Work ?

This chapter will explain the importance and development of international standards, and explore the international standardization of independently verifiable quality management systems. It will then describe the development of ISO 14001, which was officially promulgated in September of 1996. The roles of the key players and the structure of the ISO environmental management system will be described. The chapter will conclude with the major procedural and substantive critiques that have been levied against ISO 14001, and an indication of likely changes to the standard in years to come.

### 2.1 *A History of International Standards and Quality Management*

International standards play an important role in ensuring product compatibility and facilitating international trade. The International Organization for Standardization is the key actor in the development of these standards. The following section will describe the formation and evolution of international standards, from product-focused to process-focused, culminating in standardized management systems.

#### 2.1.1 International Standards: Facilitating International Trade

“The International Organization for Standardization (ISO) is a worldwide federation founded in 1947 to promote the development of international manufacturing, trade and communication standards. ISO is composed of national standards bodies from 118 countries”(Cascio, 1996:4<sup>50</sup>). Decisions are taken on a ‘consensus’ basis, in which no party strongly objects to the proposed standard (Hauselmann, 1997). During the standard development process, the ISO receives input from government, industry and other interested parties. “All standards are voluntary; no legal requirements compel countries to adopt them. However, governments and industries do often adopt the standards as business requirements, thereby making them virtually mandatory”(Cascio, 5, CEEM).

“Standards play an essential role in supporting economic activity. They convey structured information to both producers and purchasers concerning the characteristics they may expect of a product, system, material, methodology or production process...Not only do standards play a key role in facilitating transactions on the market place since they reduce transaction costs, but they are also key in ensuring technical compatibility amongst products”(OECD, 1998:7). International-level standards have the additional goal of facilitating international trade by harmonizing national standards. This enables a producer to achieve greater economies of scale by manufacturing a product that can be sold in a variety of national markets. It follows that the key problems posed by standardization are their potential to limit competition, to prevent market access to non-standardized competitors, and thus to stifle innovation (OECD, 1998:9).

Because of the dangers of technological lock-in and reduced competition, standards have evolved away from design and performance standards, towards system-wide, or ‘generic’, standards. Underlying generic standards is the belief that “the quality of an economic output is closely linked to the quality of the economic organization providing

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<sup>50</sup> Cascio, J. CEEM, 1996.

the good...[Thus] generic standards...determine the process an organization should develop and follow, to achieve a certain qualitative performance”(OECD, 1998:9).

Generic standards have three common features (Uzumeri and Tabor, 1997:5):

1. An ‘abstract’ approach: rules for designing the system, but not specific requirements.
2. A ‘paper trail: rules for documenting procedures and performance.
3. Option of third-party audits.

Returning to the history of the ISO, then, until the 1970’s, its work was largely technical, focussing on product specifications for such things as credit cards and screws. In 1979, the ISO began to focus on underlying management systems, culminating in the publication of the ISO 9000 series of standards regarding quality management and quality assurance. The following section will present quality management, and explain how the ISO 9000 quality management standard became an international business requirement, based on third-party registration.

### **2.1.2 Quality Management: Improving Process to Improve Performance**

“Listen to me, and in five years you will be competing with the West. Keep listening, and soon the West will be demanding protection from you.”

-- W. Edwards Deming, speaking to 45 key Japanese industrialists at a seminar in 1950<sup>51</sup>

“Constantly and forever improve the system”

-- Deming’s Fourteen Principles<sup>52</sup>

A firm has a ‘competitive advantage’ when a customer views that firm’s product as having higher value than that of its competitors (Flynn and Flynn, 1996:365). Competitive strategy theory argues that firms seek competitive advantages for their product relative to their competitors through two avenues, price and differentiation. “The lower costs advantage is defined as the ability to more efficiently design, manufacture and distribute a comparable product than the competition. Products with unique and superior value - in terms of quality, features and after-sales service - are examples of the differentiation competitive advantage” (Flynn and Flynn, 1996:361)<sup>53</sup>.

The notion of quality is thus of key interest to firms seeking competitive advantage. Attaining quality is defined as maximizing “the fitness of use” of the product or service to its customer (Juran and Gyrna, 1988:1)<sup>54</sup>. Proponents believe that greater quality - in the form of fewer defects, faster delivery time, and reduced operation, maintenance and disposal costs to the customer - leads to lower costs to the producer and greater customer satisfaction, and therefore increased perceived value. It follows that the

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<sup>51</sup> Rabbit, J And Bergh, P. The ISO 9000 Book: A Global Competitor’s Guide To Compliance And Certification, 2d Ed. New York: Quality Resources, 1994:5.

<sup>52</sup> Scherkenbach, W. The Deming Route To Quality And Productivity: Road Maps And Road Blocks. Rockville: Mercury Press, 1982.

<sup>53</sup> Flynn, E And Flynn, B. “Achieving Simultaneous Cost And Differentiation Competitive Advantages Through Continuous Improvement: World Class Manufacturing As A Competitive Strategy In Journal Of Managerial Issues, Vol. 3, No. 3, Fall 1996:360-379.

<sup>54</sup> Juran, J. And Gyrna, F. Quality Planning And Analysis: From Product Development Through Use, 2d Ed. New York: McGraw-Hill, 1987.

purpose of quality management is to achieve 'zero defects', and in so doing, eliminate all costs extraneous to producing and delivering exactly what the customer wants.

Managers traditionally have concentrated their efforts on the products and activities within factory walls. Improving quality, by contrast, is a multi-stage process, from conception and design, through manufacture, sales and service. Achieving greater quality therefore requires a 'systems' approach to the entire operation, including the employees, customers and suppliers. Central to the systems approach is the notion of continual improvement. This means that the product, the process whereby it is produced, and the servicing of that product, must be continuously monitored and improved upon. Quality organizations operate according to the 'Deming Cycle': Plan - Do - Check - Act. Under a quality management framework, a business must continuously "ensure good control of critical business activities according to plan, check whether the predetermined requirements are being met and, where necessary, make corrections"(Hortensius and Barthel, 1997:32)<sup>55</sup>. Key to control is the specification of a policy by top management, training at all levels, documentation of procedures, and continual monitoring of progress towards goals (Juran and Gyrna, 1988).

American quality pioneers Deming and Juran were unsuccessful at diffusing this notion of quality management to US manufacturers. Quality did however find a ready ear in Japan, in companies such as Toyota and Honda (Rabbitt and Bergh, 1994). Moving from 'cheap clocks and radios' to dominate many high technology and manufacturing markets, Japanese firms were extraordinarily successful in the 1970s and '80's. Their products have become widely respected for their performance. Firms that were initially reluctant to adopt quality management practices saw diminished market shares. Producers came to require quality management of their suppliers, as a logical extension of their own quality focus. A tremendous demand for quality management implementation know-how therefore rapidly developed worldwide.

The US automobile industry provides an illustrative example of the diffusion of quality management: "In 1979, the Ford Motor Company recalled more cars than it produced"(Rabbitt and Bergh, 1994:5). Soon afterward, Ford executives called on Dr. Deming, and by 1985, Ford had dramatically reduced defects, and surpassed far-larger General Motors in earnings (Rabbitt and Bergh, 1994:6). Today, Ford advertises that "Quality is Job #1". In fact, all of the US Big Three - GM, Chrysler and Ford - have adopted quality management systems, and require them (QS-9000) of their suppliers as well (ULI,1997:20)<sup>56</sup>.

Many standards for quality management emerged in the early 1980s. In order to assist manufacturers in more readily identifying consistent quality programs in suppliers, the national standards body of the United Kingdom developed a national, independently verifiable quality management standard. Many other nations rapidly followed suit. In order to prevent conflict and market barriers arising from these standards, in 1979 the ISO formed Technical Committee 176 (TC 176) to develop global standards for quality management (Tibor and Feldman, 1997:17). The ISO 9000 standards were formally published in 1987, and have since become de facto market requirements in several

<sup>55</sup> Hortensius, D. And Barthel, M. "Beyond 14001: An Introduction To The ISO 14000 Series", In Sheldon, C., Ed. ISO 14001 And Beyond: Environmental Management Systems In The Real World. Sheffield: Greenleaf Publishing, 19-44, 1997.

<sup>56</sup> Underwriter's Laboratories Inc. (ULi), Ul's Global Services. Promotional Pamphlet, 1997.

sectors, including the automobile and microelectronics industries, with over 130,000 registered facilities worldwide (Tibor and Feldman, 1997:18; Symonds, 1996<sup>57</sup>). But what does 'registration' really mean, in the context of management systems ?

### 2.1.3 Independent Registration: Proof of Quality ?

"Quality is not fixed: it may change over time either with changes in the level of human capital or the amount of input effort. Because the quality of services may vary over time, providing reliable information about their quality directly may be impractical...A common policy approach is to license or certify providers who meet some standards of skill, training, or experience"(Weimer and Vining, 1992:176)<sup>58</sup>

"ISO 9000 is proof of your commitment to quality in the form of independent assessment and registration...Registration will provide your customers with the assurance that products and services delivered meet or exceed their expectations."  
- SGS Intentional Certification Services, 1998<sup>59</sup>

A significant advantage of ISO 9000 over 'homegrown' quality management systems is that it allows independent verification of an organization's claim to operate according to internationally-accepted practices. The independent registration (or 'certification', in the European terminology) audit demonstrates to customers and other interests that the ISO standards are being implemented consistently. "Certification services 'guarantee' minimum quality standards in processes or products...[For example], the Better Business Bureau requires members to adhere to a code of 'fair business practices'. Underwriters Laboratory tests products against minimum fire safety standards before giving its seal of approval. When such services establish their own credibility, they help producers distinguish their goods satisfying the minimum standards from goods that do not" (Weimer and Vining, 1992:74). Registration saves a manufacturer the cost of verifying for itself that suppliers have proper management practices in place, disadvantaging non-registered suppliers. "If a European manufacturer has four equivalent suppliers, three in Europe certified to ISO 9000 and one non-certified location in the US, do you think it would spend \$5,000 to send a review team to the US just to maintain another supplier?"(Rabbitt and Bergh,1994:36)

What is the registration process ? Registrars, accredited according to guidelines set by the national standards organizations of each participating country, will periodically review documents, interview personnel, and inspect the registered sites, to determine whether the organization's management system conforms to the requirements spelled out in the ISO 9000 standards. If so, they may allow firms to display their endorsement, or 'mark of conformity'. "A mark of conformity is an indication that the item is in conformance with a specific standard, and its use is granted exclusively as a result of the certification process...In its most basic sense, conformity assessment is simply confirmation that something does what it is supposed to do"(Urman, CEEM:347, 346)<sup>60</sup>.

Registration of a management system to international quality standards plays an important role in international trade, by providing some measure of evidence that a firm

<sup>57</sup> Symonds, J. Mobil Survey Of ISO 9000-Registered Firms. Tqm-Mobil Europe, Tel. +44 171 412 4897, December, 1995.

<sup>58</sup> Weimer, D. And Vining, A. Policy Analysis: Concepts And Practice, 2d Ed., 1992.

<sup>59</sup> Sgs Ics. ISO 9000 - The Sign Of Good Business. Promotional Material, 1998.

<sup>60</sup> Urman, J. "Conformity Assessment" In CEEM.



is sincere about improving the quality of its products. The following section will explore the application of quality management and international standards to the field of environmental management.

## **2.2 The ISO and Environmental Management**

“While quality management systems deal with customer needs, environmental management systems address the needs of a broad range of interested parties and the evolving needs of society for environmental protection.”

-- ISO 14001, Introduction

ISO 14000 was conceived to address public policy concerns relative to the environment. In preparation for the United Nations Conference on Environment and Development, Swiss industrialist Stephan Schmidheiny had been asked to prepare business advice for the summit. His organization, the World Business Council for Sustainable Development approached the ISO and the IEC (International Electrotechnical Commission) “because of their well-known consensus process in developing [management system] standards...asking to see what they were doing in the area of environmental management” (Cascio, 12, CEEM). “In August 1991, ISO and IEC established the Strategic Advisory Group on the Environment (SAGE) to make recommendations regarding international standards for the environment”(Cascio, 12, CEEM).

SAGE considered three issues:

1. Developing a “common approach” to environmental management similar to quality management.
2. Measuring environmental performance.
3. Using international standards to facilitate trade and remove trade barriers.

SAGE was explicitly told not to consider performance criteria such as pollutant or risk levels, technology specifications, or product/process criteria.

SAGE’s work produced a series of recommendations for environmental management that were incorporated into Agenda 21 and the Rio Declaration. SAGE also recommended that the ISO continue with the development of a “uniform international environmental management system standard”(Cascio, CEEM, 12) that “would extend the Quality Management Systems approach to include environmental management...and help settle international trade disputes centered around environmental concerns”(OECD,1998:12,13).

In January, 1993, Technical Committee 207 was given the task of “standardizing the field of environmental management tools and systems”(Cascio, 13, CEEM). This work became very important as numerous national and international standards had already been promulgated or would be shortly, such as the British Standards Organization’s BS 7750 EMS and the European Commission’s Eco-Management and Audit Scheme (EMAS), among others. An ISO-based EMS standard would prevent duplicative, competitive and trade-distorting corporate and government programs, and perhaps create a means “to garner objective validation of industry commitment to effective environmental management”(Cascio, 13, CEEM) through independent registration.

The ISO 14000 series comprises about 20 documents, ranging from specification standards (auditable requirements) and guidance documents (descriptive guidelines on

how to implement and coordinate the specifications) to more general guides and technical reports (summarizing best practices, such as ISO Guide 64 -- Guide for the inclusion of Environmental Aspects in Product Standards). Conformance of a firm's Environmental Management System (EMS) to the ISO 14001 standard is the only part of the series that can be independently audited. ISO 14004 offers greater detail and guidance to implementing ISO 14001, but is not an auditable requirement. ISO 14010, ISO 14011 and ISO 14012 are guides to auditing and auditing management systems in particular. Other components of the standard include Life Cycle Assessment (ISO 14040, published in August 1997), Environmental Performance Evaluation, Environmental Labeling, and Environmental Aspects of Product Standards (all still under debate).

On September of 1996, the Environmental Management System (EMS) portions of the ISO 14000 standard were published. Even before the standards were finalized, many organizations were self-declaring their conformance (Roht-Arriaza, 1997:7). On January 3, 1996, SGS-Thompson Microelectronics in Rancho Bernardo, California, became the first ISO 14001-registered US manufacturer. Today, there are over 200 registered sites in the US, and almost 6,000 worldwide (Peglau, 1998).

Process Oriented Standards	Product-Oriented Standards
Environmental Management System* (ISO 14001)	Life Cycle Assessment
Environmental Performance Evaluation**	Environmental Labeling**
Environmental Auditing	Environmental Aspects in Product Standards**
<i>Used to implement, measure and revise management system</i>	<i>Used to analyze and characterize product attributes</i>

\* Auditable components.

\*\* Unpublished, still under debate.

(adapted from Cascio, CEEM:16)

Figure 2.2 The ISO 14000 Standards: Only EMS May Be Independently Audited

## 2.3 How Does ISO 14001 Work ?

### 2.3.1 Overview

“Using ISO 14001...requires the creation of a system, a management programme, with appropriate resources, to deliver the commitments and policy, objectives and targets set by the organization...Assuming third-party certification of the organization, there will be an independent check that what has been agreed and planned has been implemented, is audited and problems identified and remedied”

- O.A. Dodds, Chairman of ISO/TC 207 SC1, Environmental Management Systems<sup>61</sup>

“An EMS is only the casing: The real issue is whether what is inside is real or is just paper effort.”

-Naomi Roht-Arriaza, Hastings College of Law, University of California

ISO 14001 presents a framework for an environmental management system, or EMS. In brief, it is a structure for an organization to set and achieve environmental goals - meeting regulatory requirements, reducing liabilities, or reducing environmental impacts - within the context of other business management systems (e.g. financial management, human resources management, or quality management). “International Standards covering environmental management are intended to provide organizations with the elements of an effective EMS which can be integrated with other management requirements, to assist organizations to achieve environmental and economic goals” (ISO/DIS 14001.2, v).

Based on a firm’s goals, the EMS allocates responsibility and resources, establishes procedures, performance metrics and timetables, and specifies the collection and flow of internal and external information. Organizations have the option of self-declaring their conformance to the standard, or seeking third-party registration. Before giving their approval of the management system, registrars audit to ensure that each element is in place, is linked to the achievement of the organization’s goals and conforms to the standard. The standard does not set performance requirements, or make judgements as to the appropriateness or preferability of some types of action over others (Ehrenfeld, 1995:3)<sup>62</sup>.

The design of ISO 14001 reflects four objectives (Cascio, CEEM):

1. To manage the environmental aspects of business operation reliably and consistently, using a quality framework.
2. To integrate environmental consideration into all activities of the enterprise.
3. To create a means for objective validation of corporate commitment to effective environmental management.
4. To be applicable to the full range of industrial sectors and regulatory requirements.

<sup>61</sup> Dodds, O.A. “Voluntary Standards And Regulations, A Standardization Perspective” In ISO Bulletin, ISO Central Secretariat, January 1997.

<sup>62</sup> Ehrenfeld, J. ISO 14000 And Responsible Care: What Kind Of Change Agents Are They ? Presented At ISO 14000:Preparing For Change Conference, September 27, 1995.

## ISO 14001: BASIC MODEL

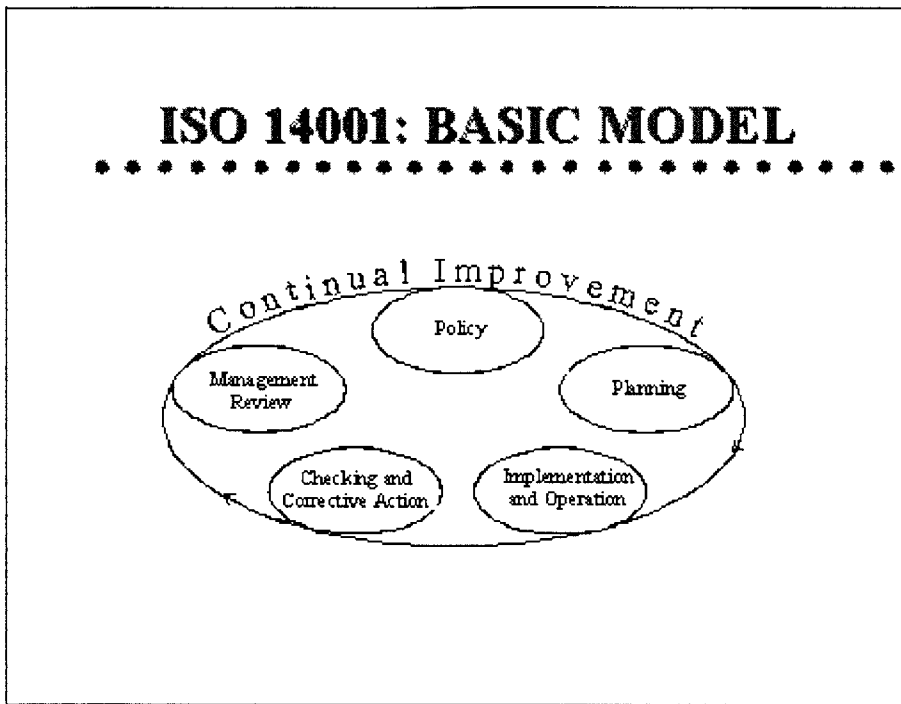


Figure 2.3.1 ISO 14001: Key Elements of the EMS

ISO 14001 provides a list of elements that an organization needs to have in place to achieve these ends (see figure 2.3.1, above). The following sections will describe the roles of all key actors, and the individual components of the standard, in greater detail. There will also be a brief discussion of Registration, and of the registrar's response to detection of a non-conformance.

### 2.3.2 ISO 14001: Who are the Players, and What are Their Roles ?

The following is a brief discussion of the roles and responsibilities of the organizations seeking registration, their consultants, the registrars, the national accreditation boards, and the ISO itself (adapted from: AWMS, 1998; CEEM; 1998)<sup>63</sup>.

- **The Organization Seeking Registration:** This may be a facility site, portion of a site, or group of similar sites. "In order to become registered the organization must create its own EMS and operate it for sufficient time to...generate a record of its operations... It [then] seeks a registration audit by an accredited ISO 14000 registrar..."(AWMS, 1998).
- **The Consultant:** Because of the complexities involved in establishing and maintaining an EMS, organizations typically employ outside consultants to train their staff and assist them in developing their system (AWMS, 1998).
- **The Registrar:** "Evaluates an environmental management system of [an organization]...for conformity to ISO 14001. The evaluation will include an examination of the company's environmental policy, environmental management system and its documentation, EMS auditing program and procedures and environmental record (document review). It will [also] include a thorough on-site audit to determine conformance"(CEEM, 1998). In the US, there are currently 12 accredited registrars, with two others seeking accreditation as this study is completed. "After a detailed inspection, the registrar will either register the organization as conforming to ISO 14001, or will list the areas of non-conformance

<sup>63</sup> CEEM "Frequently Asked Questions About ISO 14000", Homepage, 1998.

and agree upon a deadline for their correction, at which time the registration will be granted...In some cases [the registrar] will deny registration...Upon registration, the registrar will add the organization's name to a list of registered organizations and will grant the organization the right to use the registrar's conformance mark in prescribed ways"(AWMS, 1998).

- **The Registrar Accreditation Board (RAB):** Each ISO-member country must establish an accreditation board, which may or may not be linked to the government of that country. In the US, the American National Standards Institute (ANSI) and the RAB, linked together, act as the sole provider, and are non-governmental organizations. "Accreditation is the initial evaluation and periodic monitoring of a registrar's competence"(Tibor and Feldman, 1997:330). Registrars achieve their accreditation through a process similar to that of an organization seeking registration: document review, interviews, a formal assessment and periodic surveillance audits, all by the RAB (Munn, CEEM:366<sup>64</sup>). For ISO 9000, each registrar is accredited to conduct registrations only within a limited scope of industrial classifications, so that it may leverage its knowledge and understanding of specific industries. For ISO 14001, on the other hand, the RAB decided that industry-specific knowledge was not as relevant, since environmental impacts may not be common across an industry sector. Thus, each registrar may conduct registrations in any industrial sector (Hansa, 1998<sup>65</sup>).
- **National Governments: Recognizing the Competence of the Accreditors:** "In most countries, this is the task of the government...In the United States, the National Institute of Standards and Technology (NIST) has recognized ANSI/RAB...Both UKAS in the United Kingdom and Raad Voor Accreditatie (RvA) in The Netherlands have similar agreements with their respective governments"(Tibor and Feldman, 1997:332). Governments therefore determine whether to recognize the accreditation of foreign bodies. The European accreditation bodies established the European Accreditation of Certification, a harmonized interpretation standard, to facilitate mutual recognition through consistent application of accreditation (Tibor and Feldman, 1997:332).
- **International Organization for Standardization/TC 201:** The ISO periodically will review and revise the standard based on the feedback of its constituents, who are representatives of its member countries. The first such review is scheduled for 1999, and must be completed by 2001.

### 2.3.3 Environmental Policy

"To conform, [senior] company management must first define the organization's **environmental policy** and ensure that it is appropriate to the nature, scale and environmental impacts of the organization's activities. Each organization must commit to **continual improvement**, to **compliance** with relevant laws and other requirements, and to **prevention of pollution**, [as defined by the standard]. The environmental policy must be publicly available and must contain a documented framework for setting and reviewing environmental objectives and targets; assessments of environmental impacts need not be published (ISO 14001: 4.2, 4.3)"(Roht-Arriaza, 1997:3).

<sup>64</sup> Munn, S. Certification Body (Registrar) Perspective In CEEM, 1997:365-368.

<sup>65</sup> Hansa, G. Sgs-Ics Environmental Certification Manager. Personal Interview, Nov, 1998.

‘Continual improvement’ is defined by the standard as an ongoing process of “enhancing the environmental management system to achieve improvements in overall environmental performance” (3.1). In practice this may reflect progress towards objectives, including reducing management costs, or it may refer to increasing the appropriateness of the system itself to the organization and its context. ‘Prevention of pollution’ is defined in the standard to include not only the avoidance of pollution and reduction of toxicity, but also end-of-pipe control (3.13). ‘Compliance with relevant regulations’ does not require that an organization be in compliance when obtaining registration. Instead, it is intended to provide “assurance that the obligation to comply is being managed” (IISD, 1996:51). In combination with continual improvement of the management system, it is intended that this will lead to reduced incidences and severity of non-compliance (Riedel, 1997:375).

### 2.3.4 Planning

Next, the organization must identify and evaluate the **significance** of all the environmental **aspects** of its operation over which it might reasonably be expected to have some control (4.3.1). Environmental aspects are defined by the standard as “elements of an organization’s activities, products, services, or physical resources that may have potentially beneficial or harmful effects on the environment”(ISO 3.3; Martin, 22). Once its aspects have been identified, the organization must establish an environmental management **plan**. The organization must set environmental objectives, and targets, timetables and means for achieving those objectives, based on its significant aspects, its legal requirements, its technological options, the views of interested parties, and its business requirements (4.3.3). Important to the registrar here is that the process used to identify aspects and rate their significance be consistent, justifiable, and documented, without willfully ignoring significant issues (IISD, 1997:43)<sup>66</sup>.

Significant Aspect	Solid Waste Generation
Impact	Waste of materials
Objective	Reduce waste from materials used in manufacturing
Target and	By 9/1/99, reduce scrap waste by 15% per unit
Measurement	production, from 1995 base year.
Action Plan	Identify and market valuable waste
Responsibility	Facility manager
Documentation	Quarterly Report
Budget	\$1,200 per year until 9/1/99.

Table 2.3.4 Example of Significant Aspect and Related Plan

The standard does not specify whether an organization needs to specify objectives and targets for all its potential or actual significant environmental impacts. “At a minimum, your compliance management system needs to include objectives and targets for meeting legal requirements...that are currently not in compliance”(Knight and Ferrone, CEEM:124). Environmental consultants suggest that “it makes good sense to select a smaller number [of objectives]...you are confident your facility...can manage to a successful conclusion”, as successes will reinforce the use of the EMS (Knight and Ferrone, CEEM:126). However, the firm must be able to demonstrate to auditors that it has not overlooked important aspects in the setting of smaller, achievable targets (Knight and Ferrone, CEEM:126).

<sup>66</sup> International Institute For Sustainable Development (IISD), Global Green Standards (Web-Based Edition), 1997.

### 2.3.5 Implementation

“Once objectives, targets and timetables are in place, management must designate **responsibility** for achieving targets, provide necessary resources (4.4.1), **train** appropriate personnel (4.4.2), and prepare an emergency response plan (4.4.7)” (Roht-Arriaza, 1997:3). The organization must also establish procedures for internal and external **communication**, and “consider processes for external communication on its significant environmental aspects”(4.4.3). It is under no compulsion to report anything, beyond its policy, to the public. It should be noted here that training must connect each worker’s roles and responsibilities with “the significant environmental impacts...of their work activities” (4.4.2). It must include “all personnel whose work may create a significant impact on the environment”, including on-site contractors in environmentally-significant roles (4.4.2; A.4.2).

### 2.3.6 Checking and Corrective Action

“[The above-described] activities must be periodically **monitored** and **corrective action** taken in cases of non-conformance (4.5). Periodic environmental audits, whether internal or external, are required (4.7). Certification bodies may audit the firm to help verify conformance with the EMS “(Roht-Arriaza, 1997:3). Corrective action should address the **root cause** of non-conformances: “to mitigate any impacts”(4.5.2) and lead to “implementing or modifying controls necessary to avoid repetition of the nonconformance”(A.5.2).

Corrective action and regulatory compliance are intrinsically linked by the standard, according to some advocates of the standard: “Corrective action must be initiated when any non-conformance is detected”(Bell, 1997:78). Since regulatory compliance must be a goal in the environmental policy, non-compliance is a non-conformance, and controls may need to be implemented to prevent recurrence, depending on how the standard is interpreted in practice. “If the registrar finds a non-compliance to regulation, she wants to know, ‘Is there a system in place to identify, react and attack the root cause ?’ If your system does not adequately address how to handle the non-compliance, this is a systemic failure”(Ross, 1998).

### 2.3.7 Management Review

In addition, periodic **management reviews** are to evaluate the system’s continuing effectiveness (4.6), The existence of an adequate system may be self-certified, or a firm may seek third party verification to certify that it conforms to the standard (Introduction, v-vi)”(Roht-Arriaza, 1997:3).

### 2.3.8 External Registration Audits

To maintain registration, an organization must submit to a comprehensive audit of all aspects of its environmental management system, repeated every three years (ISO 14010, 14011, 14012). “ISO 14010 defines the principles common to all environmental audits; ISO 14011 defines the procedures for an EMS audit; and ISO 14012 defines the qualification criteria for an environmental auditor”(IISD, 1996:47-8). Auditors must undergo formal auditing training, demonstrate discretion and objectivity, possess a minimum of twenty days of on-site experience auditing management systems within the last three years, and have substantive knowledge of environmental science, facility operations, and applicable legal requirements (IISD, 1996:50). Conformity to the

standard requires an organization to demonstrate to audits through records and on-site inspections and interviews that all key elements are in place, and function as intended.

Registration audits may be either 'surveillance-style' or comprehensive. A surveillance-style auditing program will evaluate pieces of the management system every 6 months. Each audit will focus on different aspects of the system, with the goal of covering all aspects of the system at least once in each three-year cycle. Alternatively, an organization can elect to undergo comprehensive audits every three years, covering all aspects of the management system (Daugherty, 1998; Abarca, 1998). Once a firm has been approved, the registrar places it on its internal list of registered firms. Currently, there is no centralized, publicly available list of registered facilities.

**Non-Conformances:** Should an organization fail to demonstrate conformance to the standard, this is considered a non-conformance, and the registrar may either grant conditional approval, with the understanding that the non-conformance will be corrected by a designated date, or deny registration. If improvements are not forthcoming over time, the resources or scope of EMS are insufficient or inappropriate, and the registrar will want to see them modified. Non-conformances are allowed if they stem from an absence of effective technology, or 'force majeure' (a major accident) (Ellis, AWMS, 98). The registrar may suspend registration in the case of a pattern of such non-conformances, indicating a failure of the EMS itself.

Firms may use several strategies for correcting non-conformances. One means is to correct the 'root cause' of the non-conformance, such that the non-conformance occurs less frequently, or is eliminated (Abarca, ABS, 1998). A second would be to reduce the stringency of objectives, on the grounds that previous goals were 'inappropriate' (Ellis, AWMS, 1998). Third, goals could be set low to begin with, or worded such that growth in production - waste increases overwhelming gains from efficiency - does not lead to non-conformance (Abarca, ABS, 1998).

In short, the ISO 14001 standard requires organizations to establish a coherent, justifiable, and consistently-applied procedure for setting environmental policy goals. A method for achieving those goals must be chosen and resources allocated. The organization must commit to continually improving the management system itself, which may include demonstrating progress towards the underlying policy goals, and ensuring that those goals are appropriate to its business operation. Finally, an organization must commit to periodic revision of the system in order to improve the identification of environmental aspects, the evaluation of their significance, the goals, and the means to achieving those goals. Independent registration aims to ensure to outsiders that an organization is actually following through on its internal environmental commitments.

The previous discussion has focused on the standard as it is today. However, it is coming up for review in the summer of 1999. What is likely to change in the standard? To get a sense of what the future holds for ISO 14001, the following section will review some of the procedural and substantive critiques of the standard.

## **2.4 Critiques of ISO 14001**

Some parties declare ISO 14001 to be a revolution in environmental management: "The ISO 14000 environmental standards will mean innumerable marketplace advantages



and unlimited benefits”(CH2M, 1997)<sup>67</sup>. Others are less euphoric: “ISO 14001...is neither international nor standard, and drops the floor on innovative models for corporate environmental management” (Gleckman, 1996:1)<sup>68</sup>. Critics from the full range of stakeholders, including industry, have lodged several important grievances against both the process by which ISO 14001 was developed, and the effectiveness of the product itself, which are important from a public policy perspective. (For a review of these criticisms, see especially Gleckman and Krut, 1997:45-59; Krut and Gleckman, 1998<sup>69</sup>). Most importantly, many of these grievances are being responded to by the ISO. As a result, many of these criticisms will have important implications for the future structure of the standard, as it comes up for revision in 1999.

### 2.4.1 Procedural Critiques

**The ISO May Be an Inappropriate Venue to Consider Issues of Public Policy:** The ISO is a private agency, a Non-Governmental Organization, and therefore provides little democratic accountability to interested non-members. For example, Krut and Gleckman (1998:44) allege that the ISO is inherently biased, since only 50 of 141 developing countries that are members of the UN are voting members in the ISO, versus all 24 of the most-economically-developed countries. They cite a statement submitted to the OECD on February 19, 1996, in which “a broad coalition of environmental organizations...called on developed country governments to halt the creation of any new international industry-based standards until the full democratic implications of these developments have been studied and evaluated”(Krut and Gleckman, 1998:41).

**Inadequate Representation of Environmental and Developing Country Interests in EMS Development:** Participants in the TC207 meetings included representatives from 71 member countries, including both industrialized and developing economies, though most commentators agree that the process was dominated by members from the developed world (Gleckman and Krut, 1997<sup>70</sup> ; IISD, 1997:21). Non-governmental ‘liaisons’ were present, representing environmental advocacy organizations - including the Environmental Defense Fund, the Sierra Club, the Friends of the Earth and the World Wildlife Fund, international organizations - the UNEP and the European Environmental Bureau, and consumer advocacy groups (IISD, 1997). However, “the participation of developing nations and environmental NGOs in the development and drafting work of the ISO 14000 series has not been very substantive”(OECD,1998:17).

The major environmental organizations withdrew early in the process before the EMS standard was completed, for two major reasons. First, they did not want to implicitly endorse an EMS standard that did not adequately address their concerns (Seifert, 1998)<sup>71</sup>. Second, the costs of overseeing the many standards under development, and the high cost of attending the many exotically-located conferences, for 18 separate working groups - made it beyond their financial capacity to meaningfully participate (Hauselmann, 1997:10). The structure of the ISO is such that “those who normally participate are those who can afford the time, expertise and money to

<sup>67</sup> Smith, W. And Patchak, R (Ch2m) “So Long! Command And Control....Hello! ISO 14000” Ch2m Homepage, 1997.

<sup>68</sup> Gleckman, H. “Promising Much But Delivering Little: ISO 14001 Should Not Be Part Of Government Regulations Or Procurement” In Business And The Environment’s ISO 14000 Update, Cutter Information Corp, 1-6, April 1996.

<sup>69</sup> Gleckman, H. And Krut, R. ISO 14001: A Missed Opportunity For Sustainable Global Industrial Development, London: Earthscan Publications, 1998.

<sup>70</sup> Gleckman, H. And Krut, R. Neither International Nor Standard: The Limits Of ISO 14001 As An Instrument Of Global Corporate Environmental Management In Sheldon, C. Ed. ISO 14001 And Beyond: Environmental Management Systems In The Real World. Sheffield: Greenleaf Publishing, 1997:45-59.

<sup>71</sup> Seifert, Deborah. ISO 14000 NGO Working Group Coordinator, Community Nutrition Institute. Interview, Oct 28, 1998.

participate”(OECD, 1998:16)<sup>72</sup>. The high cost of participation similarly excluded representatives from many developing countries who are otherwise voting members (ICF, 1998).

Because of the exclusion of interest groups and developing countries, some critics allege that industry representatives dominated the EMS standards development process (Hauselmann, 1997; ICF, 1997<sup>73</sup>). In fact, a few believe that the ISO 14001 standards are a strategic move by industrial actors, who were alarmed at the emergence of stringent, performance-based EMS codes such as EMAS. “Although ISO 14001 started out with a broad mandate, it ended up being written by a small group of business executives”(Krut and Gleckman, 1998:27). Industry representatives regard those fears as irrational: “Given the cautious attitude of most industry to ISO 14001, the implication that industry somehow initiated the standards-writing process as a conscious strategy to undercut other international initiatives is quite remarkable”(Bell, 1997:80).

In response to these procedural criticisms, in San Francisco in June of 1998, “a global coalition of environmental groups and ISO Technical Committee 207 reached an agreement...to improve participation by citizen groups and developing countries...[A] task force will recommend processes, procedures and policies that will enable non-governmental organizations and developing countries to participate in TC 207”(CEEM, 1998:12<sup>74</sup>). The potential for greater participation from NGOs and developing countries may have substantial impacts on the ISO 14000 standards in the future.

#### 2.4.2 Substantive Critiques

**Small-to-Medium Sized Enterprises (SMEs) are Disadvantaged by High Relative Cost of Implementing Formalized Management Systems:** Formalized management systems tend to favor large organizations, in that typically they already have clearly-delineated structures, often have ISO 9000 registration, and are accustomed to establishing training programs and documenting procedures. “Lack of financial resources and qualified personnel, difficult access to information, resistance to change, and the related costs of setting up the system and [obtaining registration] are major constraints for SMEs”(UNCTAD, 1997:13). Other EMS-related initiatives have recognized the special difficulties of SMEs: “Under EMAS, [for example]...SMEs in the European Union benefit from special assistance to facilitate their participation...[including] information, training and technical support...So far, ISO has not recognized a need to develop a special EMS standard for SMEs”(UNCTAD, 1997:12).

**Lack of Accreditation Infrastructure May Create Trade Barrier to Developing Country-based Firms:** Many developing countries have raised a concern not adequately addressed by the standard, should it become a business requirement: A trade barrier could arise if firms in developing countries - lacking internationally-recognized national accreditation bodies - must obtain registration to ISO 14001 from comparatively high-cost foreign registrars in order to sell products internationally (UNCTAD, 1997:7) . As a result, they are seeking assistance to develop training

<sup>72</sup> OECD. Review Of The Development Of International Environmental Management Standards - ISO 14000 Standards Series. Env/Epoc/Ppc(98)6, 1998.

<sup>73</sup> ICF Inc. The Role Of National Standards Bodies And Key Stakeholder Groups In The ISO/Tc 207 Environmental Management Systems Standards Development Activity. Us EPA/Oppt, September, 1997.

<sup>74</sup> CEEM. Expert Task Force To Advise ISO TC 207 On Future NGO Involvement” In International Environmental Systems Update, Vol. 5, No. 7, 1998.

programs and establish internationally recognized local registrars (Nyati, 1997<sup>75</sup>; Bratasida, 1997<sup>76</sup>).

**Lack of Performance Requirements May Render the Standard Meaningless as an Indicator of Environmental Commitment:** “ISO 14001 is not a performance standard. Although there are detailed requirements concerning environmental policies, programmes, management systems and environmental auditing, the specific environmental criteria to be fulfilled depend on the regulatory requirements relevant to the site or country and the company’s environmental policy or targets” (UNCTAD, 1997:5). Thus, a company may not yet be in compliance with regulations, yet still be registered under the standard. EMAS, the European Eco-Management and Audit Scheme, explicitly requires both compliance with regulations and continual improvement of environmental *performance* as pre-conditions of registration, in contrast to ISO 14001, which requires only continual improvement of the system itself (Nash and Ehrenfeld, 1997:494).

**Lack of Normative Requirements Means Standard Does Not Advance Environmentally-Preferable Activities:** ISO 14001 requires commitments to establish a system conforming to the standard, to continual improvement of that system, to compliance with regulation and other environmental commitments made by the firm, and to prevention of pollution. None of these commitments say anything about the desirability of one action, service or product over another, except that uniformity of practice is important (Ehrenfeld, 1995:3). For example, the potential for the commitment to ‘prevention of pollution’ to lead to meaningful rethinking of processes and products is largely eliminated under the current standard, which includes end-of-pipe treatment in the definition, and provides no hierarchy of preference. Some groups have proposed revising this definition to establish such a hierarchy, emphasizing prevention over treatment (MSWG, 1998:3.13)<sup>77</sup>.

**Lack of Information-Sharing Requirements Make Public Oversight Difficult:** Much policy research effort focuses on the role of stakeholder pressures in modifying firm behavior (Maltby, 1997<sup>78</sup>; Lober et. al, 1997<sup>79</sup>; Kleindorfer and Orts, 1995; Wheeler et. al.; 1996<sup>80</sup>). For example, a recent study by the US-Asia Environmental Partnership, a program of USAID, asserts that “the less the public knows, the more industry is likely to pollute”(Wheeler et. al., 1996). Given the standard’s goal of “assur[ing] interested parties that an appropriate environmental management system is in place” (ISO 14001:Introduction), it is inconsistent that there is no central list of registered facilities, and thus no means for interested third parties to identify facilities that have lost registration. Many parties join James Horne, of the EPA, in asserting that “some minimal

<sup>75</sup> Nyati, K.P. Environmental Management Systems (ISO 14001) Needs Of India, Confederation Of Indian Industry, Presentation To Expert Meeting On Trade And Investment Impacts Of Environmental Standards, Particularly The ISO 14000 On Developing Countries, UNCTAD, October 1997.

<sup>76</sup> Bratasida, L. Facts And Figures On The Implementation Of ISO 14000 In Indonesia. Presentation To Expert Meeting On Trade And Investment Impacts Of Environmental Standards, Particularly The ISO 14000 On Developing Countries, UNCTAD, October 1997.

<sup>77</sup> MSWG. Language To Clarify ISO 14001 From The Multi-State Working Group On Environmental Management Systems: Pollution Prevention. In Background Materials For Us Tag And Tc 207 Issues, October 11, 1998.

<sup>78</sup> Maltby, J. Setting Its Own Standards And Meeting Those Standards: Voluntarism Versus Regulation In Environmental Reporting. In Business Strategy And The Environment Vol 6, 83-92, 1997.

<sup>79</sup> Lober, D., Bynum, D., Campbell, E. And Jacques, M. The 100 Plus Corporate Environmental Report Study: A Survey Of An Evolving Environmental Management Tool In Business Strategy And The Environment, Vol 6, 57-73, 1997.

<sup>80</sup> Wheeler, D., Afsah, S. And Laplante, B. The Role Of Local Communities And Markets In Pollution Control. United States-Asia Environmental Partnership, Homepage, 1997.

level of communication about the EMS, some core level of information that facilities would be asked to provide, is reasonable...[ISO 14001] is not really embedded in the public consciousness yet as...perhaps an improvement over command and control. It never will be until there is some degree of public communication”(James Horne, US EPA in BATE, Sept 1998:1-2)<sup>81</sup>. Unlike ISO 14001, EMAS requires specific performance-related disclosures from each registered facility (Nash and Ehrenfeld, 1997:496).

Central to stakeholder oversight of ISO-registered firms is the disclosure of environmental performance information. The ISO 14001 standards require only that a firm “consider processes for external communication...and record its decision”(ISO 14001:4.4.3). Many participants in the ISO EMS formulation process consider this inadequate. “Leslie Carothers, vice president for environmental health and safety at United Technologies Corporation, endorsed efforts to develop common measures that can be used to compare factories, companies and even entire industry sectors worldwide”(BATE, Sept 1998:1). By contrast, according to the Coalition on ISO 14000 Implementation (CI2), an industry group representing American automakers, forest and paper products, steel, petroleum, power generation and microelectronics, “legitimate interest in environmental performance cannot be equated with a right to involvement with the internal deliberations of a company” (CI2, 1998:6)<sup>82</sup>. In spite of opposition to greater public accountability, both a Japanese NGO and the US MSWG have presented proposals to the TC207 for incorporating environmental reporting in the standard (EARG, 1998<sup>83</sup>; MSWG, October 1998:3.10).

**The Standard Does Not Reflect the State-of-the-Art in EMS Design and May Freeze Innovation:** Some critics believe that “ISO’s low-level approach will tend to freeze experimentation on environmental management. Firms that were willing to figure out new administrative management systems, even those starting to grapple with sustainable development management systems, might be tempted to reduce their efforts if other companies can get ISO certification for far less effort - and with far less benefit for environmental protection”(Gleckman, BATE, April 1996:3). “Environmental groups in Europe have lobbied European governments to reject the ISO 14001 standard, arguing that it represents ‘a step backwards from EMAS’”(Nash and Ehrenfeld, 1997:509).

**Misuse of the Mark of Conformity Leads to Public Confusion of Registration with Improved Environmental Performance:** The concern of many environmental groups is that public knowledge of ISO 14001 is based on company advertisements, and that image may be manipulated, so that a company may gain reputational benefits without doing anything substantive to improve their environmental performance (Seifert, 1998<sup>84</sup>). For example, Japanese electronics manufacturer NEC took out an advertisement in the March 1997 edition of the Smithsonian, in which it alleged “ISO 14001...environmental standards written in mother nature’s own hand...These comprehensive guidelines bring a global focus to environmental management issues and allow organizations to compare

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<sup>81</sup> Business And The Environment (Bate) ISO Tc 207 Meeting Hears Call For Standardized Reporting In Bate’s ISO 14000 Update, Vol 4, No. 9, September 1998.

<sup>82</sup> Coalition On ISO 14000 Implementation (Ci2) Position Statement On The ISO 14001 Environmental Management Systems Standard, 1997.

<sup>83</sup> Environmental Auditing Research Group, Standardization Of Environmental Reports Is Needed, Presented At ISO Tc207, Email:Aikawa2missionco.Jp, June 1998.

<sup>84</sup> Seifert, D. Community Nutrition Institute, ISO 14000 Project Manager, Ngo Initiative, Personal Interview, Oct 28, 1998.

their efforts against internationally accepted criteria...ISO 14000 spells good news for the environment"(cited in Krut and Gleckman, 1998:28). In 1997, the World Wildlife Fund urged the ISO to "urgently develop a system for controlling the use of logos and certification marks, with sanctions to punish abuse"(Hauselmann, 1997:2).

**Registrars May Lack the Expertise and Consistency to Perform as Credible Oversight Mechanism:**

Some industry representatives feel that registrars may be "hung up" on the quality approach, lack sufficient understanding of environmental issues, and therefore lack the necessary perspective to fairly evaluate conformance to ISO 14001 (Aurichio, 1998). Secondly, registration may not guarantee consistency of application. In principle, "An ISO 14001 audit provides two key pieces of information to stakeholders: the structure of the EMS implemented in the company, and the fact that...a qualified third party has audited this company's operations and found that the company's operations comport with the structure of its asserted management system"(Kleindorfer, 1996:3). Ultimately then, the interpretation of the standard's requirements, and the credibility of the mark of conformity as a signal of environmental commitment, will rely on the credibility and consistency of the registration process. ISO 14001 is what the registrars say it is. Therefore, regulators and other interested parties must monitor "auditor qualification and licensing procedures as well as quality...of the audits performed by these auditors. If these procedures are too lax, a 'lemons market' for auditors will result, and the credibility of the entire process will be impaired"(Kleindorfer, 1996:26).

**Implementing ISO 14001 Increases Liability:** By improving their information-gathering systems, and exposing themselves to an outside party's careful auditing of their procedures and documents, a company actually increases its liability exposure. Since the audit must evaluate how well a company is performing at achieving a stated goal, and one goal must be compliance with applicable regulation, the audit will identify documented instances of non-compliance (Freeman, CEEM:378)<sup>85</sup>. While the registrar is required to maintain confidentiality as part of its accreditation, the audit results would not be protected from outside knowledge, should the company be sued, and would be subject to plaintiff review under legal 'discovery' (ibid.). As a result, some companies have elected to contract the registration audits through their attorney, to guard the results under attorney-client privilege (Freeman, CEEM:380).

**Combining ISO 9000 and ISO 14000 Would Reduce Costs but May Distract Focus:**

According to BVQI, a leading registrar, "If a company already has ISO 9001 in place, they already have about 70% of the implementation know-how of ISO 14001"(Kleindorfer, 1996:11). It is natural that some have proposed combining the implementation and auditing of the two standards, to reduce costs to organizations seeking to adopt both. This in fact will be one of the major issues in the upcoming revision debates (Charm, 1998)<sup>86</sup>. This could divert attention from environmental effort, the purpose of the EMS standard.

The issues raised in the above list, both procedural and substantive, will likely play a key role in the ongoing debate over ISO 14001 and its appropriateness in public regulatory strategies.

<sup>85</sup> Freeman, D. Legal Issues: Principle Considerations. In CEEM, 1997: 375-386.

<sup>86</sup> Charm, J. Chairman, Us Subtag 1, Personal Interview, Oct 23, 1998.

## **2.5 Summary and Conclusions**

The analysis of the history and structure of ISO 14001 reveals several important issues. First, ISO 14001 registration requires the adoption of a standardized quality systems approach to environmental management, for establishing, attaining and revising management goals. This may enable firms to improve their environmental performance, to reduce the cost of their environmental management, or both. Second, the ISO EMS has the potential, driven largely by market pressures, to modify environmental management practices in a significant portion of US industry, and may become a market condition, similar to ISO 9000. Third, independent registration auditing, if credible, offers a tool for privatizing some aspects of environmental oversight.

Fourth, critiques of the existing standard cast some doubt on the legitimacy of ISO 14001 as a tool for improving environmental performance. The standard is criticized for its failure to adequately involve and respond to the interests of environmental advocates and developing countries, and for disadvantaging small-to-medium size enterprises. It is also criticized for not setting performance requirements: a company may be registered in conformance to ISO14001 without being in regulatory compliance. As a result, many believe that organizations may use adoption of the standard to falsely represent their environmental commitment.

The next chapter will examine the nature of US-based organizations that have adopted ISO 14001.

## Chapter 3: Who is Adopting ISO 14001 in the US ?<sup>87</sup>

### 3.1 Introduction

The chapter briefly tests some hypotheses about the types of companies who are early adopters of ISO 14001, and attempts to draw conclusions about the future of the standard, and its impact on the environmental performance of facilities, all with a view to informing public policy decisions. Briefly, it is learned that the facilities that are early adopters of the standard in the US are more likely to be large and to produce more effluent per employee than their respective industry averages. Further, it is shown that most have already adopted ISO 9000, are international in character, and compete in highly regulated, emission-intensive industrial sectors.

If true, these findings support several conclusions regarding the diffusion of ISO 14001. First, it is likely that the standard will become widely adopted, perhaps even a supplier requirement, in Europe and Asia. Second, it seems likely that smaller companies are disfavored by the large cost associated with adopting the standard, and will be less likely to obtain registration than larger firms. Third, and contrary to expectations, the standard is apparently being adopted by facilities that generate greater-than-average effluent per worker, and may benefit most from the implementation of a systematic environmental management system.

### 3.2 Early ISO 14001 Adoption in the US: Some Hypotheses

Communitarian regulation, such as ISO 14001, has the potential both to assist firms in becoming better environmental performers, and in obscuring the poor performance of some members under the cloak of membership (King and Lenox, 1998). It may become widely diffused, driven by firms seeking to improve their environmental management using a quality framework, by others seeking to boost their reputation, or by premonitions that the standard may become an international trade requirement, like ISO 9000. Given data about early adopter companies in the United States as of November 1998, what hypotheses about these issues can be advanced and empirically tested ?

Three main forces will likely push firms to become early adopters of ISO 14001. Assuming firms are aware of the standard, and consciously weigh the quantitative and qualitative benefits and costs of its adoption, those for whom benefits exceed costs will adopt the standard. As of yet, the benefits of the standard are far from proven. It follows that firms capable of achieving registration at **lower cost than others** are likely to dominate the early membership. In a similar vein, those for whom ISO 14001 seems to most **directly offer reputational benefits** will likely seek registration earlier than other firms. Finally, firms who are being **required by customers or regulators** to adopt ISO 14001 are more likely to do so than firms who are not similarly being constrained.

**Relatively-low adoption costs drive early registration:** Developing an environmental management system from scratch is a costly affair. Understanding environmental issues, allocating resources, training personnel and documenting procedures create the need for a large up-front investment with little guarantee of payback. It follows, then, that a firm cleaner than the norm in its industry will incur low additional costs in adopting ISO

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<sup>87</sup> The author would like to thank Mike Lenox for making this analysis possible.

14001 because it is probably already doing much, also required by the standard, to manage its environmental impacts. Second, a firm that already has ISO 9000 has many of the required elements already in place, and would incur low additional costs in adding an EMS. "BVQI, a leading [registrar], asserts that 'if a company has ISO 9001 in place, they already have about 70% of the implementation know-how of ISO 14001'"(Kleindorfer, 1996:11). Third, formal management systems favor large organizations, in that typically they have clearly-delineated structures, training programs and are accustomed to documenting procedures. "Most studies confirm that SMEs face specific problems in establishing EMS...[particularly] difficulties with the comprehension and interpretation of ISO 14001, with the identification of environmental legislation, and with the identification of environmental aspects and impacts of their activities"(UNCTAD, 1997:13). Thus, early adopters are likely to be large - rather than small-to-medium sized - enterprises.

- Hypothesis 1:** Firms with lower levels of pollution relative to their industries will more often obtain registration to ISO 14001.
- Hypothesis 2:** Firms that have already adopted ISO 9000 are more likely to adopt ISO 14001.
- Hypothesis 3:** Larger firms are more likely to become early adopters of ISO 14001 than smaller firms.

**Reputational benefits spur adoption among the 'dirtiest' actors:** If a firm operates in an industry which is considered 'emission intensive', it will likely be under greater regulatory scrutiny, and face more-frequent legal challenges (King and Lenox, 1998:13). It would thus derive greater benefits from objective validation of its environmental efforts than a firm in another, less regulated, industry. "Even if there is little evidence that it includes the best firms, the standard [studied in this paper, Responsible Care,] provides some evidence [to regulators and prosecutors] that companies' actions are not wantonly negligent"(King and Lenox, 1998:12). Similarly, a firm that has a history of non-compliance with regulation is likely to seek registration to ISO 14001 in order to demonstrate that it has reformed its management of environmental impacts.

- Hypothesis 4:** Firms that operate in industry sectors with higher average levels of pollution will more often obtain registration to ISO 14001.
- Hypothesis 5:** Firms in more-heavily regulated industry sectors are more likely to obtain registration to ISO 14001.
- Hypothesis 6:** Firms with a record of environmental regulatory non-compliance will more often obtain registration.

**Foreign market demands spur domestic adoption:** US companies have been slow to adopt the ISO 14001 standard relative to European and Japanese companies, adopting a 'wait-and-see' attitude to determine whether the standard will become a competitive requirement (McKiel, 1998:7; UNCTAD, 1997:11). In Japan, diffusion has been driven both by local governments such as the Kanagawa prefecture, which grants regulatory incentives to registered firms (OECD, 1998:22), and by private industry organizations, such as the Keidanren, which represents over 1000 corporations from many industrial sectors, and urges members to "utilize the [ISO 14001] standards as an effective means of environmental improvement" (as cited in OECD, 1998:18). As a result, Japan is the nation with the greatest number of registered organizations. In Europe, firms in both the United Kingdom and Germany are rapidly adopting ISO 14001, followed closely by



Swedish and Dutch firms. This suggests that US sites most likely to adopt the standards are those which are subsidiaries of Asian or European companies, or organizations engaging in trade in those areas.

**Hypothesis 7:** Early-adopter sites are more likely to be foreign-owned subsidiaries of European and Asian firms than of US firms.

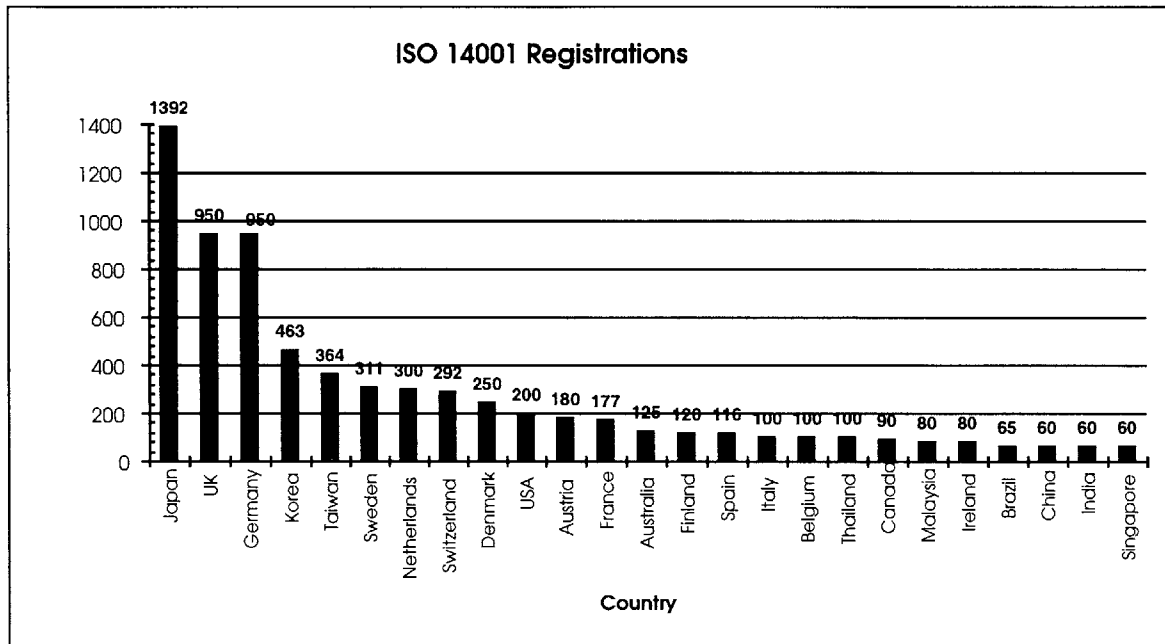


Figure 3.2 Worldwide ISO 14001 Registrations, Showing Asian and European Lead Source (Peglau, 1998<sup>88</sup>)

### 3.3 Data, Measures and Methods

#### Data

To test the hypotheses presented in the previous section, data was brought together from a variety of sources. The Technology, Business and Environment program at MIT has developed a database linking the EPA's Toxic Release Inventory (TRI), its CERCLA Information System (CERCLIS), Site Enforcement Tracking System (SETS), RCRA Information System (RCRIS), Water Permit Compliance System (PCS) and legal action data (DOCKET), with McGraw-Hill's ISO 9000 certification database, and the Dun & Bradstreet \$1M Database (DUNS). (The discussion of data sources below is derived from Lenox, 1998<sup>89</sup>). ISO 14001 registration information for the US was collected by contacting the various US registrars (see chapter 5), and from the Global Environmental Technology Foundation's website ([www.getf.org](http://www.getf.org)). This list has been supplemented by inclusion of all the US facilities belonging to Ford Motor Company<sup>90</sup>, IBM<sup>91</sup> and Toyota<sup>92</sup>.

<sup>88</sup> Peglau, R. ISO 14001 and EMAS Registrations Worldwide. <http://www.isoworld.com>, Dec 8, 1998.

<sup>89</sup> Lenox, M. Environmental Performance Indicator Database Summary, TBE internal document, 1998.

<sup>90</sup> Ford. Education & global Action: ISO 14001: a globally consistent management approach to environmental issues. <http://www.ford.com/corporate-info/environment/EGA/iso14001.htm>, 1998.

These firms have declared that they will register all their sites by no later than 2001, but had not completed adoption at the time this study was ended.

**TRI:** “Since 1987, the EPA has collected facility-level reports of the emissions of over two hundred toxic chemicals for a large percentage of US manufacturing firms...Facilities must complete TRI reports if they manufacture or process 25,000 lb., or use more than 10,000 lb., of any listed chemical during a calendar year, and employ ten or more full-time people”(King and Lenox, 1998:17). The data set at TBE includes TRI data from 1987-1996, covering over 38,000 individual facilities.

**CERCLIS, SETS & RCRIS:** The EPA also collects and logs under CERCLIS all sites listed under the National Priority List for Superfund cleanup, from 1987 to present (including 5,746 TRI-submitting facilities). On the SETS database is a list of all Potentially-Responsible Parties identified under CERCLA regulation (covering over 5,000 company-level responsible parties). On RCRIS is a listing of the permits and amount of the fines levied against permit violators, operating under RCRA waste management permits (covering over 1,500 TRI facilities).

**PCS:** The EPA's water permit compliance system logs the National Pollutant Discharge Elimination System (NPDES) permits given to facilities under the Clean Water Act, as well as the number of permit violations by permit holders, and the amounts of penalties levied against them (covering over 10,000 TRI facilities).

**DOCKET:** EPA's legal action data lists all lawsuits filed and concluded against facilities in the US (covering over 3,000 TRI facilities).

**ISO 9000:** McGraw-Hill's ISO 9000 registration database is a listing of all facilities registered to the quality management system standard by accredited registrars (covering 6,527 TRI facilities).

**Measures** (variables are presented in **bold type**, in parentheses)

**Facilities with lower levels of pollution relative to their industries:** In order to test the amount of ‘pollution’ generated by a facility, relative to the rest of its industry, we must define both the meaning of ‘pollution’ and ‘the rest of its industry’ (The following discussion relies on King and Lenox, 1998:18). The TRI database incorporates 246 chemicals, of a range of relative toxicities. To correct for these differences, each chemical was weighted for its toxicity, using the ‘reportable quantities’ scale established in the CERCLA statute. Each facility that filed a TRI statement was identified through its TRI ID number, assigned by the EPA. “Aggregate releases for a given facility in [base year 1996] were constructed by summing the weighted releases of the 246 chemicals.”(ibid., 18). A production function (**m\_Irrel**) was then estimated for industrial facilities, yielding a facility's weighted emissions as a function of size of facility (number of employees) and of industry sector (4-digit SIC code). “The environmental performance of a facility (**pollute**) is then given by the residual, or deviation, between observed and predicted emissions, given the facility's size and industry. Thus, if a facility emits more than it ‘should’, given its size and SIC code, it will have a positive residual

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<sup>91</sup> Urioste, J. Global Procurement: ISO 14001 - Letter to Suppliers. IBM, <http://www.ibm.com/IBM/procurement/html/supplier.htm>, april 13, 1998.

<sup>92</sup> Toyota. “Toyota Adopts Environmental Standards for North American Manufacturing Operations”. <http://www.toyota.com/times/manu/docs/iso14001.htm>., May 22, 1997.

and a positive score for environmental impact...[This measures] a facility's performance relative to its sector"(King and Lenox, 1998:19). ISO 14001-registered facilities who did not report TRI data were assigned a pollute value of 'zero', the average for their industry sector and size. Thus, 'pollute' is a measure of a facility's effluent per worker, relative to the average of other facilities in the same SIC code. In this chapter, it is equivalent to 'emission intensity'.

**Emission intensity of Industry:** Using the emissions production function, based on employees and industry sector, it was possible to determine emissions per employee in each sector, and then rank the sectors in terms of 'emission intensity' (**m\_lrrel**).

**ISO 9000 Registration & Foreign Ownership:** ISO 9000 registration (**iso9000**) and foreign ownership (**foreign**) are coded as binary variables for each facility, based on the ISO 9000 and DUNS databases, respectively.

**Heavily Regulated Sectors:** Permitting requirements under both RCRA and the NPDES are taken as proxies for substantial regulatory oversight. The more permits a facility holds, the greater its regulatory burden (**permits = rcra + npdes**). The average cost of compliance in an industry sector is also an important determinant of regulatory stringency. These costs were taken from a recent study of compliance costs, by the Council of Economic Priorities, or CEP (**t\_comply**).

**History of Regulatory Non-compliance:** There are many different ways of evaluating historical compliance. This study looked at:

- RCRIS site identifications linked to a facility's parent company (**discover**),
- RCRIS fines for RCRA permit violations (**rcra\_pen**),
- DOCKET lawsuits against that facility concluded (**conclud**),
- DOCKET fines from lawsuits (**penalty**),
- PCS (permit compliance system) violations against the facility (**pcs\_cviol**),

**Facility size:** This was measured using the log of total employees at each facility, from DUNS.

Hypothesis: More likely to obtain registration if....	Independent Variables (data source)	Represents
1. Facilities with lower levels of pollution relative to their industries.	Pollute (TRI and DUNS)	Toxicity and employee-weighted aggregate facility emissions relative to industry average. ISO14k-facilities lacking TRI data are assigned their industry-avg.
2. Facilities that have already adopted ISO 9000.	Iso9000 (ISO 9000)	Facility registration to ISO 9000.
3. Larger facilities are more likely than smaller facilities.	lemploy (DUNS)	Total employees in facility.
4. Facilities that operate in industry sectors with higher average levels of pollution.	m_lrrrel (TRI and DUNS)	Average weighted emissions per employee, for each 'industry sector', as defined by 4-digit SIC, relative to overall average.
5. Facilities in more-heavily regulated industry sectors.	permits (RCRIS, PCS) t_comply (CEP)	Facility-specific sum of RCRA and NPDES permits. Average facility compliance cost within SIC-based industry sector.
6. Facilities with a record of environmental regulatory non-compliance.	discover, conclude, penalty, pcs_vio, rcra_pen (PCS, DOCKET, RCRIS)	Legal actions and fines for non-compliance levied against facility by EPA.
7. Foreign-owned subsidiaries of European and Asian firms.	Foreign (DUNS)	Facility owned by non-US based parent company.

**Table 3.3 Summary of Hypotheses and Related Variables**

**Method of Analysis:** To test the hypotheses posed in section 5.2, we used a probit model. The probit probability model can be represented in the following form (Pindyck and Rubinfeld, 1991:254):

$$P_i = F(a + b X_i) = F(Z_i)$$

Thus:

$$Z_i = a + b X_i$$

Our probit model assumes that, in this case, a facility obtains ISO 14001 registration if  $Z_i$  exceeds some value  $Z_i^*$ . The probit model assumes that  $Z_i^*$  is a normally distributed random variable, so that the probability that  $Z_i^*$  is less than or equal to  $Z_i$  can be computed from the cumulative normal probability function:

$$P_i = F(Z_i) = (2\pi)^{-0.5} \int_{-\infty}^{Z_i} e^{-s^2/2} ds$$

where  $s$  is a random variable, normally distributed with mean =0 and a variance =1.  $P_i$  will thus lie in the interval (0,1).  $P_i$  represents an estimate of the conditional probability that  $Z_i$  will exceed  $Z_i^*$ , given some value of  $X_i$ . It is thus the conditional probability that the facility will adopt ISO 14001, given, for example, that it already has ISO 9000 registration ( $X_{\text{iso 9000}}=1$ ).

The independent variables affecting ISO 14001 registration likelihood are listed above, in table 3.3. The total data set tested included all TRI-listed facilities, from which the ISO 14001 registered facilities were identified. The probit model then determined the importance of each variable - the coefficient and the significance ( $P>|z|$  score) - in explaining facility-level ISO 14001 registration. Because the data underlying the variables themselves range considerably in their orders of magnitude (table 3.4c), examining the relative magnitudes of their coefficients will not demonstrate their relative significance. It is therefore the independent variables with the lowest  $P>|z|$  that are most significant. Values of  $P>|z|$  range from 0 to 1. We have assumed in constructing this dataset that all US facilities owned by Ford, IBM and Toyota will be registered to ISO 14001. We have made similar assumptions for Akzo Nobel and SGS Thompson, who encourage, but do not require, ISO 14001 registration at their facilities. If a facility is owned by any of these companies, for example, it will have a  $P>|z| = 0$ , indicating it is a strong predictor of ISO 14001 registration. This can be seen below in table 3.4a.

### **3.4 Results: Early ISO 14001 Registration in the US**

The probit results support several of the hypotheses. In brief, the bulk of registered facilities are larger, more-regulated and dirtier than industry averages. They are more likely to obtain registration if they are foreign-owned, or have ISO 9000 already. Contrary to theory, however, it is firms that generate more effluent per employee within their industries that are obtaining registration. These results will be explored in greater detail below.

**Relatively-low adoption costs drive early registration:** It comes as no surprise that larger firms, that already have well-structured management systems, are more likely to adopt ISO 14001 than smaller, non-ISO 9000 ones. As shown in table 3.4a, below, we found based on 1996 performance data that of TRI-reporting facilities, facilities with larger numbers of employees obtained registration disproportionately often to ISO 14001 (H2, lmployee), as did those with ISO 9000 (H3, iso9000).

**Reputational benefits spur adoption among the most emission-intensive industries and among those who are most heavily regulated and monitored:** Our data suggests that facilities operating in industry sectors with higher average levels of effluent per employee are more likely to obtain ISO 14001 registration (H4, m\_lrrrel). Also, more-heavily regulated facilities, as demonstrated by the number of permits they hold, are more likely to obtain registration to ISO 14001 (H5, permits). It is not clear whether a history of non-compliance is also a contributor to the registration decision (H6, discover, conclud, penalty, pcs\_cvio, rcra\_pen).

**Foreign market demands spur domestic adoption:** It is readily apparent that foreign ownership is a key determinant of ISO 14001 registration. This confirms the

broadly-held sentiment that US firms are playing a 'wait-and-see' game, to determine whether the standard will become a competitive requirement, or yield substantial economic benefits (Krut and Gleckman, 1998:22; Thayer, 1996:11<sup>93</sup>).

**Facilities that are emission intensive relative to their industry averages are adopting ISO 14001:** It was hypothesized that facilities that emit lower levels of pollution per employee relative to their industries would more often obtain registration to ISO 14001. This has not been supported by the data. In fact, it is more emission-intensive facilities (**pollute**) that are most likely to obtain registration. It may be that these facilities have lacked formal EMS in past, and are now adopting ISO 14001 in order to improve their management practices.

Probit Estimates						Number of obs = 32399	
Log Likelihood = -683.13625						chi2(17) = 715.81	
						Prob > chi2 = 0.0000	
						Pseudo R2 = 0.3438	
iso14K	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]		
<b>iso9000</b>	.3953783	.0853589	4.632	<b>0.000</b>	.2280779	.5626788	
<b>pollute</b>	.090093	.0449668	2.004	<b>0.045</b>	.0019598	.1782263	
<b>lemploy</b>	.0897384	.0223486	4.015	<b>0.000</b>	.045936	.1335408	
<b>m_lrrel</b>	.0183591	.0173994	1.055	<b>0.291</b>	-.0157431	.0524614	
discover	.0286033	.086991	0.329	0.742	-.141896	.1991025	
conclud	.3958918	.4428879	0.894	0.371	-.4721526	1.263936	
penalty	-.0002346	.0003801	-0.617	0.537	-.0009796	.0005104	
pcs_cvio	.0699746	.0713577	0.981	0.327	-.069884	.2098332	
rcra_pen	-5.38e-06	8.88e-06	-0.605	0.545	-.0000228	.000012	
<b>permits</b>	.1199759	.0595794	2.014	<b>0.044</b>	.0032024	.2367494	
<b>foreign</b>	.3962022	.1136217	3.487	<b>0.000</b>	.1735077	.6188968	
ibm	1.726878	.3635688	4.750	0.000	1.014296	2.439459	
toyota	2.393667	.6727111	3.558	0.000	1.075178	3.712157	
akzo	1.08016	.2674904	4.038	0.000	.5558886	1.604432	
ford	4.706795	.4156092	11.325	0.000	3.892216	5.521374	
sgs	2.267347	.7510996	3.019	0.003	.7952191	3.739475	
t_comply	-3.34e-06	.0000877	-0.038	0.970	-.0001752	.0001686	
_cons	-3.351104	.1228675	-27.274	0.000	-3.59192	-3.110289	

Note: 126 failures and 0 successes completely determined.  
Results generated using Stata Software Package, Release 5 (1997)

Table 3.4 a Probit Estimates of Coefficients and Relative Significance of Independent Variables in Predicting ISO 14001 Registration, Among TRI-Reporting Facilities

<sup>93</sup> Thayer, A. Chemical Companies Take a Wait-And-See Stance Toward ISO 14000 Standards in Chemical and Environmental News, April 1, 1996:11-14.

isol4K	iso9000	pollute	lemploy	m_lrrel	discover	conclud		
isol4K	1.0000							
iso9000	0.0261	1.0000						
pollute	0.0193	0.0116	1.0000					
lemploy	0.0546	0.0646	0.0069	1.0000				
m_lrrel	0.0197	-0.0070	0.0039	0.0987	1.0000			
discover	0.0336	0.0605	0.0721	0.0480	0.0670	1.0000		
conclud	0.0032	0.0064	0.0171	0.0229	0.0530	0.0543	1.0000	
penalty	-0.0037	0.0075	0.0140	0.0239	0.0391	0.0392	0.7246	
pcs_cvio	0.0094	0.0328	0.0307	0.0169	0.0707	0.0846	0.0790	
rcra_pen	0.0042	0.0112	0.0112	0.0085	0.0250	0.0589	0.0516	
permits	0.0344	0.0853	0.0794	0.0962	0.0998	0.2395	0.0640	
foreign	0.0242	0.0416	0.0097	0.0394	0.0086	0.0469	0.0129	
ibm	0.0788	0.0421	-0.0013	0.0319	-0.0141	0.0229	-0.0019	
toyota	0.0770	0.0072	-0.0065	0.0095	0.0049	-0.0047	-0.0010	
akzo	0.0364	-0.0074	0.0086	-0.0154	0.0091	0.0308	-0.0038	
ford	0.5588	-0.0090	0.0127	0.0542	0.0195	0.0355	0.0047	
sgs	0.0442	-0.0028	0.0033	0.0051	-0.0007	0.0138	-0.0008	
t_comply	0.0163	0.0314	-0.0002	0.0086	0.3507	0.1709	0.1308	
permits	0.0344	0.0853	0.0794	0.0962	0.0998	0.2395	0.0640	
		penalty	pcs_cvio	rcra_pen	permits	foreign	ibm	toyota
penalty		1.0000						
pcs_cvio		0.0502	1.0000					
rcra_pen		0.0350	0.0062	1.0000				
permits		0.0529	0.0934	0.0892	1.0000			
foreign		0.0173	0.0098	0.0042	0.0645	1.0000		
ibm		-0.0013	-0.0018	-0.0007	0.0077	-0.0041	1.0000	
toyota		-0.0007	-0.0009	-0.0004	0.0101	0.0282	-0.0002	1.0000
akzo		-0.0026	-0.0037	-0.0013	0.0102	0.1074	-0.0009	-0.0005
ford		-0.0014	-0.0035	0.0091	0.0231	-0.0077	-0.0009	-0.0005
sgs		-0.0006	-0.0008	-0.0003	0.0072	-0.0018	-0.0002	-0.0001
t_comply		0.1006	0.1674	0.0452	0.1698	0.0491	-0.0049	-0.0010
permits		0.0529	0.0934	0.0892	1.0000	0.0645	0.0077	0.0101
			akzo	ford	sgs	t_comply	permits	
akzo			1.0000					
ford			-0.0018	1.0000				
sgs			-0.0004	-0.0004	1.0000			
t_comply			0.0335	0.0145	0.0008	1.0000		
permits			0.0102	0.0231	0.0072	0.1698	1.0000	

Table 3.4b Correlations between Independent Variables Influencing ISO 14001 Registration Likelihood

Variable	Obs	Mean	Std. Dev.	Min	Max
iso14K	38586	.0047945	.0690769	0	1
iso9000	38586	.0740683	.2618854	0	1
pollute	38586	-.0020298	.7072939	-7.122009	13.0384
lemploy	38586	4.605158	1.87515	-9.21034	10.16585
m_lrrel	37488	1.737847	2.08792	-7.824046	10.58983
discover	38586	.1467372	.3538483	0	1
conclud	38586	.0072306	.0877316	0	3
penalty	38586	165.5981	2878.868	0	145000
pcs_cvio	38586	.0232727	.275899	0	12
rcra_pen	38586	562.9238	18999.9	0	1821000
permits	38586	.2757477	.5093411	0	4
foreign	38586	.034287	.1819679	0	1
ibm	38586	.0004406	.0209855	0	1
toyota	38586	.0001037	.0101812	0	1
akzo	38586	.0017364	.0416343	0	1
ford	38586	.0015031	.0387416	0	1
sgs	38586	.0000777	.0088173	0	1
t_comply	32785	149.3705	370.8451	1.2	4887.9
permits	38586	.2757477	.5093411	0	4

Table 3.4c Characteristics of Data Underlying Probit Analysis of ISO 14001 Registration Likelihood

### 3.5 Conclusions

What implications do these results have for public policymakers ? The first implication is that strong regulatory oversight appears to motivate ISO 14001 adoption. ISO 14001-registered sites tend to generate more pollutants-per-employee than the average, or operate in a more-polluting industry sector. Thus, those who adopt ISO 14001 do so either to improve their environmental management or to disguise poor performance.

In terms of prevalence of ISO 14001 adoption in the US, by industry, our data suggests that facilities who consider themselves in Transportation (SIC 37), Electricity, Gas and Sanitary Services (SIC 49) or in Electronics, Industrial and Commercial Machinery and Computers (SIC 36 and 35), are most likely to seek ISO 14001 registration. Because registration is being led by large, influential firms such as Ford, Toyota and IBM, it is reasonable to conclude that ISO 14001 registration may become a competitive requirement within those industry sectors, like ISO 9000. Furthermore, many of those firms are predominantly non-US based. This confirms the belief that the motivation to adopt ISO 14001 is stronger in Europe and Asia than in the US, and that firms who wish to compete in those locations may need to adopt the standard.

The empirical analysis performed in this chapter helps indicate why firms might obtain registration to ISO 14001. However, it leaves unanswered the most important policy-related question: What impact does ISO 14001 registration have on internal management decisions that are relevant to environmental performance ? The following chapter will explore the manner in which registered facilities have adopted ISO 14001, by examining the impact of registration on management goals.



## Chapter 4: ISO 14001 Registration - Impact on Goal Setting<sup>94</sup>

### 4.1 Introduction

“Using ISO 14001...requires the creation of a system, a management programme, with appropriate resources, to deliver the commitments and policy, objectives and targets set by the organization.”

-- O.A. Dodds, Chairman of the ISO TC207 (cited in ISO, January 1997<sup>95</sup>)

“What gets measured gets managed and what gets managed gets done.”

-- Les Grey's Management Rules-of-Thumb<sup>96</sup>

The purpose of this chapter is to evaluate the impact of ISO 14001 registration on internal management decisions, specifically on the designation of environmental management goals. This chapter will show that, while ISO 14001 does not require specific environmental performance commitments, it does require a systematic process for developing and meeting management goals. The structure of ISO 14001 is such that, assuming that third party oversight is adequate (an assumption that will be challenged in detail in chapter 5), it should guarantee that organizations live up to the goals they set for themselves. Links between ISO 14001 requirements and organizational goal theory results suggest that goals established under ISO 14001 will lead to meaningful action. The likely impact of ISO 14001 on environmental performance is thus largely dependent on the nature of the resulting management goals, and the process by which they are set.

Interviews with nine ISO-registered organizations suggest that organizational goals established under ISO 14001 will be equivalent to, or less stringent, than prior to ISO 14001 adoption. However, the goals that are established will be more likely to lead to attainment because they reflect greater specificity of roles and measures, greater management commitment, broader participation in goal-setting, and greater understanding of the organization's environmental and economic conditions. While firms are no more likely to disclose substantive information regarding their performance objectives, the implication of these results is that ISO 14001 implementation will likely lead to a firm to improve its environmental performance and regulatory compliance.

### 4.2 Theory Shows ISO 14001 Management Goals Will Lead to Action

#### 4.2.1 Goals Are Key to ISO 14001 Function

The most straightforward way to evaluate the impact of ISO 14001 on environmental performance would be to measure it directly. Researchers cannot do that yet, for two reasons. First, the standard, only two years old, may not have fully penetrated the

<sup>94</sup> The author is once again indebted, this time to Vicki Milledge, for suggesting this means of analysis, and to Sandra Rothenberg for generously assisting in its formulation

<sup>95</sup> International Organization for Standardization (ISO). ISO Bulletin. (Tel+41 22 749 01 11).January 1997.

<sup>96</sup> Grey, L. Developing a Technology-Based Business (Project Management Notes). Cambridge: MIT, 1997.

management systems of newly-registered organizations, who represent the majority of registered sites. Thus, the changes that will occur, as plans are implemented and corrective action is taken, have yet to materialize. Second, there is no requirement in ISO 14001 that performance data must be divulged. The Multi-State Working Group, a US-based effort between state and federal agencies, NGOs and several manufacturing facilities, imposes a detailed reporting requirement on participating ISO 14001-registered organizations, in exchange for guarding their anonymity (MSWG, 1998<sup>97</sup>). While this will no doubt provide valuable performance and other information on the impact of the standard on participating facilities, it is an open question whether firms will divulge such detailed information. It follows that, in analyzing the impact of the standard on environmental performance, we may need to look at other, more readily-accessible indicators.

What indicators might be used ? After a careful study of ISO 14001's requirements, Naomi Roht-Arriaza concluded that, "to strengthen the standard's usefulness [to regulators and interested members of the public], those interested in performance and disclosure should differentiate among ISO 14001-compliant firms based on the quality and content of their stated policies, especially the specificity and stringency of their goals and their willingness to disclose adequate information [for oversight purposes]"(Roht-Arriaza, 1996:6).

How does she reach this conclusion ? The following sections will suggest that the nature of goals (content) established by an ISO 14001-compliant organization, as well as the process by which they are set and communicated, will have important implications for an organization's environmental performance.

#### 4.2.2 Review of Aspects Identification and Goal-Setting Process

The structure of ISO 14001 is such that, assuming that third party oversight is adequate, it should guarantee that organizations live up to the goals they set for themselves. The following section provides a brief review of the goal-setting, implementation and oversight activities within the ISO 14001 EMS standard. Readers should refer to chapter 2 for a more complete discussion of the standard's structure.

Management goals, or objectives, form the heart of ISO 14001, as depicted in figure 4.2.2a, below. The registered organization must identify and evaluate the significance of all the environmental **aspects** of its operation over which it might reasonably be expected to have some control, based on definitions laid out in its environmental **policy** (ISO 14001, 4.3.1). Environmental aspects are defined by the standard as "elements of an organization's activities, products, services, or physical resources that may have potentially beneficial or harmful effects on the environment"(ISO 14001, 3.3; Martin, 1997:22<sup>98</sup>). Once its aspects have been identified, the organization must establish an environmental management plan. The organization must set environmental **objectives**, and **targets, timetables** and means for achieving those objectives, based on its significant aspects, its legal requirements, its technological options, the views of

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<sup>97</sup> Multi-State Working Group. Environmental Management Systems Voluntary Project Evaluation Guidance. NIST (NISTIR 6120), 1998.

<sup>98</sup> Martin, R. ISO 14001 Guidance Manual. Oak Ridge National Laboratory: National Center for Environmental Decision-making Research, (Technical Report NCEDR/8-06), 1998.

interested parties, and its business requirements (4.3.3). Important to the registrar here is that the process used to identify aspects and rate their significance be consistent, justifiable, and documented, without willfully ignoring significant issues (IISD, 1997:43)<sup>99</sup>.

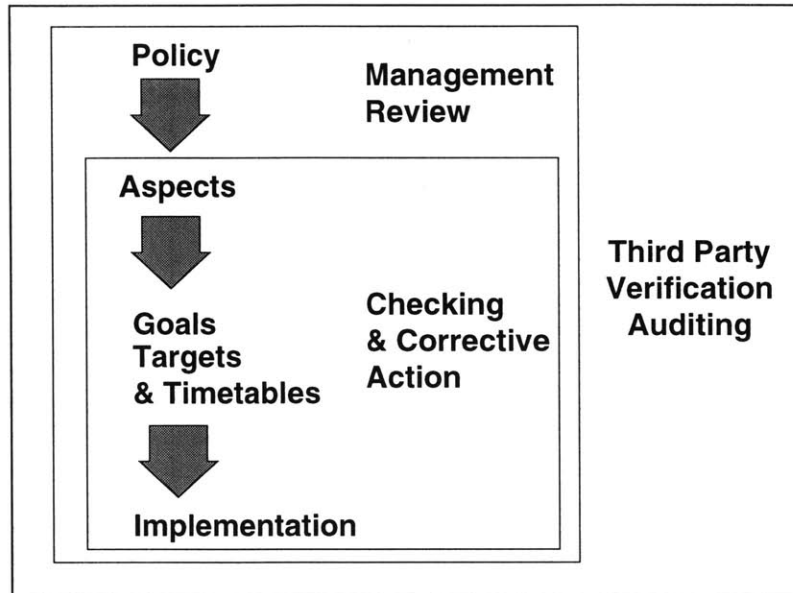


Figure 4.2.2a ISO 14001 Management System Structure, Showing Centrality of Goals to System Outcomes

Significant Aspect	Solid Waste Generation
Impact	Waste of materials
Objective	Reduce waste from materials used in manufacturing
Target and Measurement	By 9/1/99, reduce scrap waste by 15% per unit production, from 1995 base year.
Action Plan	Identify and market valuable waste
Responsibility	Facility manager
Documentation	Quarterly Report
Budget	\$1,200 per year until 9/1/99.

Table 4.2.2b Example of Significant Aspect and Related Objective and Plan

The standard does not specify whether an organization needs to specify objectives and targets for all its potential or actual significant environmental impacts. “At a minimum, your compliance management system needs to include objectives and targets for meeting legal requirements...that are currently not in compliance”(Knight and Ferrone, CEEM:124). Environmental consultants suggest that “it makes good sense to select a smaller number [of objectives]...you are confident your facility...can manage to a successful conclusion”, as successes will reinforce the use of the EMS (Knight and Ferrone, CEEM:126). However, the firm must be able to demonstrate to auditors that it

<sup>99</sup> International Institute For Sustainable Development (IISD). Global Green Standards (Web-Based Edition). 1997.

has not overlooked important aspects in the setting of smaller, achievable targets (Knight and Ferrone, CEEM:126).

“Once objectives, targets and timetables are in place, management must designate responsibility for achieving targets, [and] provide necessary resources (4.4.1)”(Roht-Arriaza, 1997:3). “[The above-described] activities must be periodically **monitored** and **corrective action** taken in cases of non-conformance [with targets and timetables] (4.5)”(Roht-Arriaza, 1997:3). Corrective action should address the root cause of non-conformances: “to mitigate any impacts”(4.5.2) and lead to “implementing or modifying controls necessary to avoid repetition of the nonconformance”(A.5.2). In addition, periodic **management reviews** are to evaluate the system’s continuing effectiveness (4.6). The existence of an adequate system may be self-certified, or a firm may seek **third party verification** to certify that it conforms to the standard (Introduction, v-vi)”(Roht-Arriaza, 1997:3). Third-party registration audits will ensure that all elements specified by the standard are in place, employees are aware of their roles and responsibilities, and the system is directed towards achieving the goals the organization has specified for itself in its policy and objectives.

In summary, the identification and achievement of appropriate management goals is the purpose of the ISO 14001 standard for EMS design. While not explicitly performance-oriented, “it is intended that the implementation of an environmental management system described by the specification will result in improved environmental performance”(ISO 14001, A.1). The following section will identify potential links between the system standard, goal selection, and performance outcomes.

### 4.2.3 ISO 14001 Helps Distinguish Between Official and Operative Goals

Management objectives may be characterized as either ‘official’ or ‘operative’ (Perrow, cited in Milledge, 1995:11). “Official goals are those that are publicly stated by the organization and are often vague or quite general. Their purpose is often symbolic and provide the basis for the organization’s ability to acquire legitimacy, allies, resources and personnel”(Milledge, 1995:11). For example, Alex Trotman, CEO of Ford Motor Company, affirmed in a 1996 publication that “it is Ford’s policy that its operations, products and services accomplish their functions in a manner that provides responsibly for protection of health and the environment”(Trotman, 1996)<sup>100</sup>. From this statement, we can infer a goal: Ford’s operations, products and services should function in a way that is protective of health and of the environment. This goal is ‘vague’ in that it does not define ‘protectiveness’ in a way that provides clear direction.

“Operative goals are specific enough to direct the behavior of organizational members. They provide cognitive guidance and the basis for operating decisions at lower level of the organization”(Milledge, 1995:11). Returning to the Ford example, “With respect to health and environmental concerns, regulatory compliance represents a minimum” (Trotman, 1996:5). Here, the goal is clear and may be used as a decision criterion: Ford’s operations, products and services should, at minimum, meet all applicable health and environmental regulations.

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<sup>100</sup> Trotman, J. Policy Letter No. 17: Protecting Health and the Environment. In Ford’s Environmental System Pocket Guide, 1996:5-6.

In terms of operative goals, Bird distinguishes three types, to which I add a fourth (Bird, 1997:275-6):

- **Monitoring objectives:** These goals relate to the gathering and analyzing of data, including such things as improving performance monitoring, or identifying input substitutes. For example, IBM commit itself to “conduct rigorous audits and self-assessments of [its] compliance with [its environmental] policy, measure progress of [its] environmental affairs performance, and report periodically to the board of directors”(IBM, 1998:32).
- **Management objectives:** These goals seek to increase the consistency of environmental management. For example, IBM commits itself to “ensure that personnel are properly trained and have appropriate safety and emergency equipment”(IBM, 1998:32).
- **Improvement objectives:** These goals are oriented towards quantifiable input or pollution reductions, though activities such as decreasing energy or materials use in production, or decreasing hazardous emissions. For example, “IBM’s corporate conservation goal is to achieve annual energy conservation savings equivalent to 4 percent of IBM’s yearly electricity and fuel use”(IBM, 1998:19)<sup>101</sup>
- **Participation objectives:** These goals seek to increase an organization’s contribution to social capacity and understanding of environmental issues, through such means as support of local environmental initiatives, sponsorship of environment days, encouragement of volunteer work or providing environmental awareness training to the broader community. For example, IBM commits itself to “participate in efforts to improve environmental protection and understanding around the world and share appropriate pollution prevention technology, knowledge and methods”(IBM, 1998:32).

According to Milledge, “some organizational theorists doubt that goals affect organizational behavior in ways that are direct enough for the effects to be observed in any meaningful way (e.g. Hannan & Freeman, 1977). Others argue that...in fact, organizational goals determine what the organization is and must be taken into account (Scott, 1987; Hall, 1991)...A major difficulty in organizational level studies of the relationships between goals and performance is in determining the operative goals of the organization. Statements of specific operative goals are difficult to discover”(Milledge, 1995:11).

ISO 14001 facilitates the analysis of the impact of goals on performance. The standard demands that firms’ “objectives should be specific and targets should be measurable wherever practicable”(ISO 14001, A.3.3). Implementation plans must include “designation of responsibility for achieving objectives and targets at each function and level of the organization”(4.3.4). These “roles, responsibilities and authorities shall be defined, documented and communicated”(4.4.1). In fact, ISO 14001 registered organizations are required to document these goals in their environmental management manuals, so that they can prove to registrars that they have such goals in place (Bellen, 1998).

Based on this analysis, it is reasonable to conclude that ISO 14001-based objectives statements will be documented and readily available. Second, these goals will include designation of responsibilities, resources, metrics and timetables - making many of them

<sup>101</sup> IBM. Environment & Well-Being: Progress Report. <http://www.ibm.com/ibm/environment>, 1998.

operative in nature. Third, ISO 14001-registered organizations will seek to achieve the goals they specify for themselves in their policy and objectives statements, in order to meet the requirement of continual improvement (see chapter 2 and section 4.2.2). Assuming some firms are willing to make their goal statements available to outsiders, these statements will therefore represent a valuable point of departure for research of ISO 14001 impacts on environmental performance.

The following section will present the research methodology employed in this study.

### 4.3 Data, Method, and Limitations

#### 4.3.1 Data and Method

Fourteen corporate and facility-level environmental managers in nine ISO 14001-registered organizations were contacted and interviewed, as detailed in table 4.3.1, below. For the sake of a balanced perspective, the owner of a small ISO 9000-registered manufacturing company that had considered but then elected not to obtain ISO 14001 registration, was also interviewed. Each telephone interview was approximately 45 minutes long, and covered a range of questions related to goal changes that will be detailed in section 4.4 (See appendix 1 for full list of questions and interview summaries). In addition to examining the changes in goals subsequent to ISO 14001 registration, the aspects identification process, the rationale for ISO 14001 registration, the use of ISO 14000 tools other than the EMS, and supply chain management issues were probed. Each interviewee agreed to participate under the condition that the information be presented in generic format.

Co.	Pseudonym	Corporate Manager	Facility Manager	Description
A	Akoshi	A1	---	Asian Automaker
B	Bendix	B1	B2	European Chemical Manuf.
C	Chips	C1	---	American Aviation Co.
D	Data	---	D2	Asian Microelectronics Manuf.
E	Eurotech	---	E2, E3	European Microelect. Manuf.
F	Fanta	---	F2	Asian Microelectronics Manuf.
G	Giant	G1	G2, G3, G4	US Microelectronics Manuf.
H	High	---	H2	US Power Generator
I	Impact	I1	---	Small US Parts Manuf.*
J	Jumbo	J2	---	US Telecommunications Co.

\* Considered obtaining registration to ISO 14001, but elected not to pursue it.

Table 4.3.1 Interviews with Corporate and Facility Level Managers

#### 4.3.2 Limitations of Study

Evaluating the effectiveness of a management system standard in modifying internal management decisions is a challenging research problem. It is difficult to establish a causal relationship between adoption of ISO 14001, for example, and changes in organizational objectives. In a recent paper, Harrison offers three helpful means for evaluating the effects of an environmental regulation (Harrison, 1998:12):

- **Comparison to a Reference Point:** This involves comparing observed behavior with behavior in a 'base year' preceding the regulatory intervention. What changes coincide with the implementation of the regulation ?
- **Comparison of Effects:** This involves determining the extent to which the regulation leads to change. To what degree are the observed changes the result of the program in question, and not the result from some other coincident regulatory, social or economic force ?
- **Comparison to Other Strategies:** This involves determining what would have happened if other interventions had occurred. Is the regulatory strategy in question the 'best' (most preferable or most effective) means for achieving the desired changes ?

This study will limit itself to comparing goals following ISO 14001 registration to those existing previously (comparison to a reference point). In some cases, where comparison was impossible due to lack of data, it will simply note the existence of a given characteristic. The data gathered did not necessarily provide a clear sense of the goals exsistant prior to ISO 14001 registration. Often, past goal statements had been erased, were confidential, or personnel had changed. Furthermore, due to the small sample size, it is clear that any conclusions drawn by this study cannot be considered compelling verdicts. Much of the following discussion relies on managers' subjective opinions, and thus can only provide indications of the likely impact of ISO 14001 registration on organizational goals.

#### **4.4 Survey Results: ISO 14001 Impact on Management Goals**

##### **4.4.1 Stringency: No Change**

"Which nation has more integrity: one that refuses...signature of a treaty, aware that it may not be able to live up to its obligations; or the one that signs on with no intention of enforcing a single word ?"

-Astrida Neimanis, letter to the London Economist, December 19, 1998<sup>102</sup>

Will organizations take on greater environmental responsibility following ISO 14001 registration ? One measure of an organization's commitment to environmental management is the stringency of its management objectives. According to Ashford, an environmental regulation is 'stringent' "either because compliance requires a significant reduction in [emissions], because compliance using existing technology is costly, or because compliance requires a significant technological change" (Ashford, 1996:7-8; referring to regulation)<sup>103</sup>. This theoretical definition of stringency is valid for internally-established performance objectives (goals) no less than for those imposed on organizations by external actors (e.g. regulators). Therefore, we can ask: are the goals established by an ISO 14001-registered organization more stringent than those it had prior to registration ?

<sup>102</sup> Neimanis, A. Letters in The Economist, Vol. 349, No. 8099, Dec. 19, 1998.

<sup>103</sup> Ashford, N. The Influence of Information-Based Initiatives and Negotiated Environmental Agreements on Technological Change. Presented at the International Conference on the Economics and Law of Voluntary Approaches in Environmental Policy, November, 1996.

This study did not seek to measure stringency using the theoretical definition presented above. Instead, it relied on the subjective opinions of managers, who were asked:

Q: How are [the goals established following registration] different from what you had in place prior to registration? Do you think these goals will be difficult to achieve? (Appendix 2).

The results, presented in table 4.4.1a, below, show that the (perceived) stringency of goals has not significantly changed in the organizations that were studied. Some goals were made more difficult, others less so. Still others were eliminated or replaced with new objectives. One interpretation of these results is that an organization may use ISO 14001 to shield itself from pressure to raise its environmental standards. "Once a firm's nature is effectively disguised [by membership in a communitarian agreement, such as Responsible Care] and it has insured itself against future liability, each company has a smaller incentive to reduce pollution"(King and Lenox, 1998:11).

Such a conclusion (that registration to ISO 14001 is allowing firms to avoid making more substantive commitments to the environment) ignores important issues, relating both to the content of the goals, and the process by which they are established. A deeper reading of this result, incorporating real-world economic, technical and organizational dynamics suggests that **registered firms modify their goals in ways that will have important positive environmental benefits.**

ISO 14001 requires that organizations go through a careful process of identifying significant aspects, and establishing objectives, targets and timetables 'appropriate' to organizational needs, both economic and social. As better data is gathered and linked to quality and financial management systems within the organization, it may be that organizations actually identify areas where they are over-spending on environmental issues, where previously-established goals are simply unattainable given technological or budgetary constraints, or where other issues have greater salience than those targeted by existing goals.

According to one registrar, a US automaker, while improving its information tracking system as a requirement for ISO 14001 registration, identified a location where it was operating a redundant water treatment plant. The primary source of the pollutants in that waste stream had been closed some time earlier. It realized significant financial benefits by reducing the treatment level (Bellen, 1998)<sup>104</sup>. Similarly, a manager at Eurotech noted that the number of goals at her site had actually *been diminished* following registration, from 29 in 1996, to 13 in 1997 (following registration), to 9 in 1998 (E2). "We needed to reduce the number of objectives so that we could properly manage them using available resources"(E2). The same manager noted that many of the corporate environmental goals are very stringent. For example, Eurotech required each facility to use 50% recycled water by the end of 1997. "This has been very hard. We have not met it yet because...it is a bit ahead of existing technology. [It will take an investment of] \$2 million to make it happen...and we are installing the first phase in 1999"(E2). This was echoed by a manager at another Eurotech facility: "Three or four of the [corporate environmental goals] are difficult for facilities to achieve"(E3).

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<sup>104</sup> Bellen, G. NSF Strategic Registrations. Personal Interview, Oct. 14, 1998.



The stringency of management goals is also limited by internal organizational dynamics. "It is one thing...to determine what must, should and could be done within an organization in terms of environmental improvement, but quite another to determine whether or not it would be possible to implement the changes in the context of the organization's overall dynamics"(Bird, 1997:372)<sup>105</sup>. Environmental managers must sell the goals within organization. "If objectives are the acid test of the sincerity of the policy, it is crucial that they are implementable...Objectives do need to be both practical and achievable if they are to act as an incentive for action"(Bird, 1997:372). For example, at a Fanta electronics facility, goals have not changed in terms of stringency because: "We don't want to set ourselves up for failure: If we can't meet our targets, we don't want to be penalized"(F2).

Firms may have traditionally employed less-thorough methodologies for identifying appropriate environmental goals. The systematic process of environmental goal-setting called for by the ISO 14001 standard may lead organizations to hold goal stringency constant, or even reduce it. On the surface, this may seem to indicate no net gain in environmental commitment. However, increased understanding of technical, economic and organizational constraints arising from the ISO process may help a firm more realistically assess its capabilities. This study reveals, therefore, that 'no net change' or even a reduction in goal stringency may signify an increased commitment to goal attainment.

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<sup>105</sup> Bird, A. Establishing Workable Environmental Objectives in Sheldon, C. (Ed.) ISO 14001 and Beyond. Sheffield: Greenleaf Publishing, 1997:371-384.

Firm	More Stringent ?	Evidence
A	Y	"[Akoshi] will establish...emissions standards more stringent than those set by law, and will achieve them in all vehicles: 1. By 1998 - Surpass standards for diesel-powered light trucks. 2. By 1999 - Surpass standards for all gasoline-powered vehicles..."
B	NC	No fundamental change: already have detailed management system based on Responsible Care (B2). However, are finding lots of small to medium significance aspects, where procedures are unclear or not fully implemented. We then correct those nuisances (B1).
C	---	Seeking to be "ahead of the curve". Benchmark not against regulatory requirements, but against performance of competitors.
D	---	---
E	NC	The corporate environmental goal statement requires each facility to use 50% recycled water by the end of 1997, vs. Q4 of 1996. "This has been hard. We have not met it yet because...it is a bit ahead of technology. \$2M to make it happen...and we are installing the first phase in 1999"(E2). "Three or four of the [corporate environmental goals] are difficult for facilities to achieve"(E3).
F	NC	Goals have not changed (no change in stringency). "We don't want to set ourselves up for failure: if we can't meet our targets, we don't want to be penalized".
G	NC	"No fundamental change in goals set before and after ISO 14001 registration. Giant had a well-developed EMS in place already"(G1). "Goals are a stretch, but not difficult to achieve. We have not made it to some goals, and have revised them since. We have adapted the system to reflect our growing knowledge"(G2).
H	NC	Goals largely focus on regulatory compliance.
I	---	---
J	---	---

Y = Interviewees stated that goal stringency increased following registration.

NC = Interviewees stated that 'no substantial changes' were observed in their environmental management goals following registration.

--- = Insufficient data.

Table 4.4.1a Impact of ISO 14001 Registration on Goal Stringency

#### 4.4.2 Characteristics of Environmental Management Goals

Given that changes in stringency alone are insufficient to determine the change in organizational commitment to management goal attainment following ISO registration, what other characteristics are relevant metrics? How may changes in commitment to environmental management objectives be measured?

First, one could look at changes in the content of the goals themselves. Second, one could look for changes in the process by which those goals are established. The characteristics evaluated in this study are listed below in table 4.4.2. Each will be defined and discussed in greater length below.

Content-Related Goal Characteristics	Process-Related Goal Characteristics
Commitment to Regulatory Compliance	Top-level Management Commitment
Comprehensiveness	Participation in Goal-Setting
Specificity	Transparency of Goals
Measurability	
Pollution Prevention	
Supply chain encouragement	
Use of other ISO/EMS tools	

Table 4.4.2 Characteristics of Environmental Management Goals

#### 4.4.3 Content-Related Characteristics

**Greater Commitment to Compliance:** Adoption of ISO 14001 by an organization may signify a greater commitment towards ensuring compliance with regulations. ISO 14001 requires that an organization's environmental policy "includes a commitment to comply with relevant environmental legislation and regulations"(ISO 14001, 4.3c). Monitoring and corrective action, management review, and independent registration audits are intended to assist organizations in identifying and correcting the cause of non-conformances, including non-compliance with regulations. "By correcting the fundamental cause of the non-compliance, companies gain greater assurance of future compliance"(Tucker and Kasper, 1998:8)<sup>106</sup>. EPA lawyer Brian Riedel emphasizes this point: "While the ISO 14001 certification will not provide a 'talisman for compliance', the ISO framework - setting objectives, procedures, measures and reviewing and improving the framework - should better position [an organization] to meet or exceed regulatory requirements. You are more likely to detect and correct violations if your company has a workable system for doing so"(Riedel, CEEM:391). **Through implementation of ISO 14001, firms simply may become more capable of assuring that they comply with environmental regulation, and of doing so at lower cost to themselves.**

This commitment to compliance is reflected in ISO 14001-registered firms' management goal statements. Fujifilm management commit the firm to "assure that all company facilities and operations consistently meet or exceed all applicable environmental regulations"(Fujifilm environmental management commitment, cited in

<sup>106</sup> Tucker, R. And Kasper, J. Pressures for Change in Environmental Auditing and in the role of the Internal Auditor (ABI/INFORM edition). In Journal of Managerial Issues. 10(3), Fall, 1998:340-354.

US-AEP, 1997:5). Through its interviews, this study found similar evidence of compliance commitment. For example, Akoshi dedicates itself to “closely adhering to environmental legislation” and establishing and achieving “emissions standards more stringent than those set by law”. It also found that Bendix committed itself to “reduce incidents of reportable non-compliance” and “have zero notices of violations from [regulatory] inspections”. One Eurotech facility found, during ISO 14001 implementation, that its monitoring of a regulated pollutant stream was only on a once-per-month basis. If an accident led to a discharge in excess of regulatory requirements at any time other than during that monitoring test, the facility would not detect it. In order to meet its 100% compliance goal, therefore, the facility will implement a continuous monitoring system (E2). These results support a conclusion that firms are using ISO 14001 to help improve their compliance assurance.

Firm	Compliance Assurance	Evidence
A	Y	"[Akoshi] will establish...emissions standards more stringent than those set by law, and will achieve them in all vehicles: 1. By 1998 - Surpass standards for diesel-powered light trucks. 2. By 1999 - Surpass standards for all gasoline-powered vehicles..."
B	Y	Example of goals: "Reduce incidents of reportable non-compliance. Have zero notices of violations from inspections". "Previous to ISO, we had the potential to modify our processes, and leave our environmental managers 'out of the loop'. Permit violation would have resulted. Now, [the environmental management team] know what information we need to know, and where to get it"(B2).
C	Y	Example goal: Take actions to limit to 0 the non-conformances to RCRA waste drum regulations (see figure 4.4.3a)
D	---	Went from a 'compliance' focus to a proactive one. Now, we set our own requirements and see if we can achieve them.
E	Y	Corporate environmental goal statement commits Eurotech to "meet the most stringent regulations of any country in which we operate, at all of our locations, worldwide." During ISO 14001 implementation, E2 discovered that its monitoring of VOCs was on monthly basis. If an accident led to a slug discharge in excess of regulatory requirements, the existing monitoring system would not detect it. In order to meet its 100% compliance goal, it will expand controls.
F	Y	"We do not have goals relevant to compliance because we are in compliance all the time. It is a pre-requisite for being in business". (100% compliance goal)
G	Y	"[Giant facility G3] develops specific programs (Air, Hazardous Waste, Groundwater, Solid waste, Unplanned Releases, etc.) designed to meet or exceed all applicable regulatory standards as well as corporate standards or...other local, non-regulatory initiatives, where applicable"(Handbook G3).
H	Y	Many goals focus on compliance assurance: "No permit non-compliance findings during 75% of in-house inspections"(Manual).
I	Y	Monitoring systems are now calibrated and used.
J	---	---

Table 4.4.3a Goals of ISO 14001-Registered Organizations Show Emphasis on Compliance Assurance.

**Increased Goal Specificity and Measurability:** “The central tenet of individual level goal setting and task performance theory is that specific, difficult goals result in higher performance on a task than if the individual had no goal or a general goal”(Milledge, 1995:4)<sup>107</sup>. Therefore, an important question is whether ISO 14001 encourages firms to set more specific, measurable goals than they might otherwise choose.

Q: How specific and measurable are your goals in terms of responsibilities, timetables and performance metrics ? (Appendix 2)

ISO 14001 requires that “objectives should be specific and targets should be measurable wherever practicable”(ISO 14001, A.3.3). It is therefore likely that **management goals set in the process of ISO 14001 registration will establish more-specific responsibilities, timetables, targets and performance metrics than existed prior to registration.**

Interview results support this conclusion (see table 4.4.3b, below). For example, all of the organizations contacted had established performance-oriented, quantitative targets, with **clear designation of responsible personnel** (see figure 4.3.3b, following tables below) . Eurotech, for example, modified its goals to reflect greater measurability. “A previous goal was to ‘reduce H<sub>2</sub>SO<sub>4</sub> consumption’(E2,1996). Following ISO registration, we committed to ‘recycle more than 30% of the H<sub>2</sub>SO<sub>4</sub> consumed in the manufacturing process in 1998”(E2, 1998). Giant noted a similar change: Each objective establishes a target, timeframe, an ‘owner’ and a list of projects to be completed. Prior to ISO 14001, objectives looked like: “let’s reduce water consumption”. Now: “we will reduce water consumption, and here are the timetable, metrics and resources to do so. [Goal statements are] more structured now so that objective evidence is in place to demonstrate to [our] registrar that progress is occurring”(G1).

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<sup>107</sup> Milledge, V. Goal Setting and Task Performance at the Organizational Level: Studies of Emissions Reductions Goals and Performance. Unpublished Doctoral Dissertation, University of California, Berkeley, 1995.

Firm	Goal Measurability	Evidence
A	Y	Design team ISO 14001 goals establish quantified targets and timetables. For example, "By 2000, new volume production models...will use half or less the amount of lead...than that now being used (1997)".
B	Y	Example of goal: "achieve 30% reduction in hazardous waste generation by 1997 relative to 1996"
C	Y	Example of goal: 80% reduction in hazardous waste generation versus 1988 baseline.
D	Y	"15% reduction of all chemical use at this site during 1998".
E	Y	Goals are largely quantitative at both sites, and referenced to previous years' performance. For example, "a previous goal was to 'reduce H <sub>2</sub> SO <sub>4</sub> consumption'(E2,1996). Following ISO registration, we committed to 'recycle more than 30% of the H <sub>2</sub> SO <sub>4</sub> consumed in the manufacturing process in 1998"(E2, 1998).
F	Y	Example goal: Reduce use of solvents in audio speaker production plant by 10% in 1998.
G	Y	Example goals: G1, G2, G3, G4 - Reduce energy consumption by 4% per year. G3 - Recycle 50% by weight of all non-hazardous waste.
H	Y	Highly quantified goals: "<150 ug/m <sup>3</sup> (24 hr.avg.) PM <sub>10</sub> air emissions"(Manual).
I	---	---
J	---	---

Table 4.4.3b Part 1: ISO 14001 Registration Increases Measurability of Environmental Goals

Firm	More Specific Roles	Evidence
A	Y	Responsibilities are spelled out in organizational structure: "Six persons, under the jurisdiction of the head of environmental matters, will be placed in charge of the six areas of concern".
B	Y	"Training let everyone know of policy, objectives, their individual responsibilities, and the consequences if they do something wrong. Goals are posted where people can see them"(B1).
C	Y	Each site sets site-specific goals and objectives, with the responsible parties, completion dates and review dates spelled out (see figure 4.4.3b, below).
D	Y	Responsibilities are very specific - Personnel are allocated to each project.
E	Y	"It is <u>every employee's responsibility</u> to ensure compliance with operating specifications and procedures in order for the site to maintain compliance with regulatory and permit limitations"(E3: publicly available EMAS environmental statement).
F	Y	"Timetables and responsibilities are more specific now."
G	Y	Each objective establishes a target, timeframe, an 'owner' and a list of projects to be completed. Prior to ISO 14001, objectives looked like: "let's reduce water consumption". Now: "we will reduce water consumption, and here are the timetable, metrics and resources to do so. More structured now so that objective evidence is in place to demonstrate to registrar that progress is occurring"(G1).
H	Y	Compliance responsibility clearly indicated: "Equipment operators, Operations, Lab Techs..."(Manual).
I	Y	We train our employees, get alignment on purpose, document procedures. "If you don't have a record it doesn't exist".
J	---	---

Table 4.4.3b Part 2: ISO 14001 Registration Increases Specificity of Roles and Responsibilities in Goal Statements



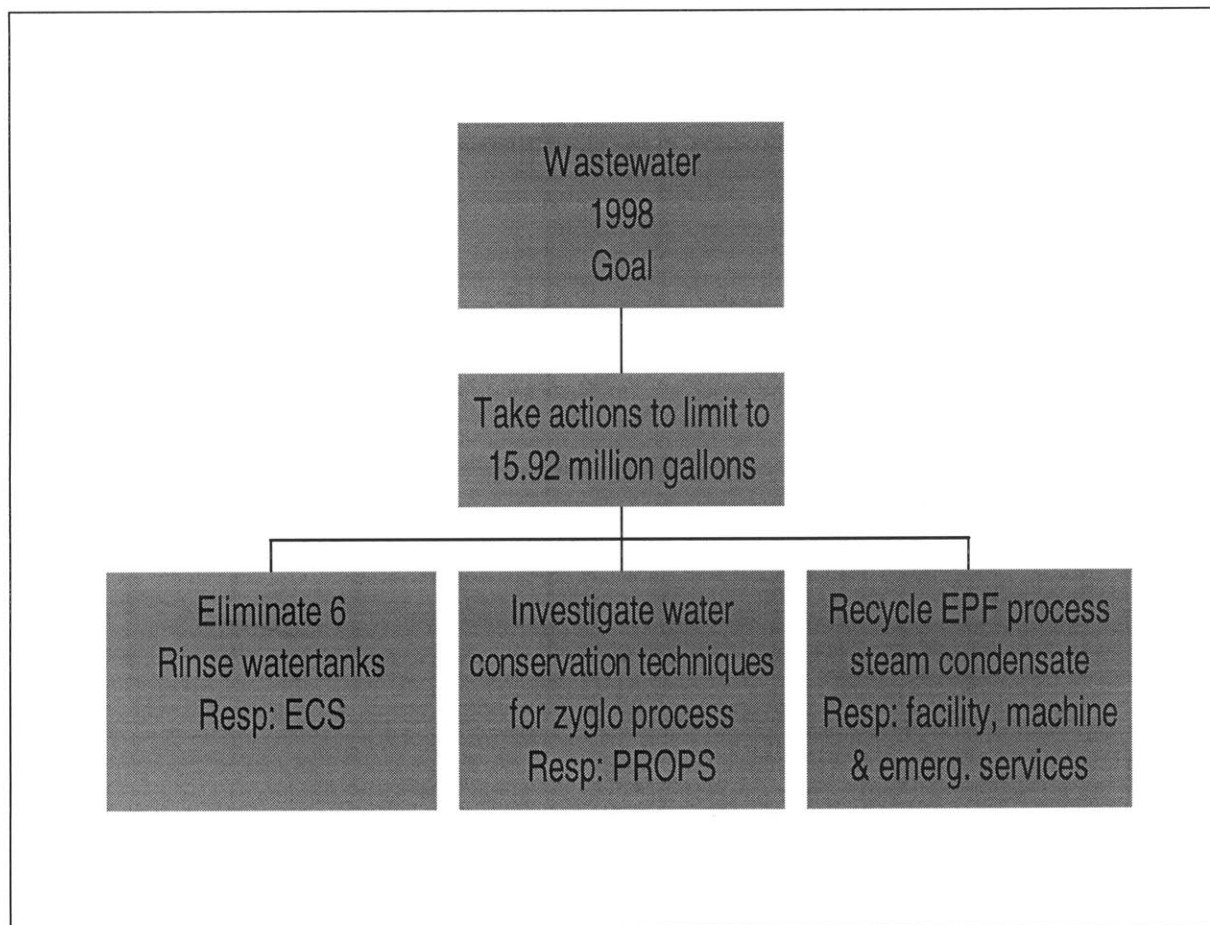


Figure 4.4.3b Goal Statements Show Specific Objectives, Targets, Projects and Responsibilities (from Chips Unlimited Facility EMS Goal Tree).

**More Comprehensive Goals:** An organization's environmental goals define its perceived scope of responsibility. An important question, therefore, is whether ISO 14001 registration leads the organization to broaden its notion of environmental responsibility, to include both regulated and unregulated environmental issues.

Q: Are you setting goals for regulated and unregulated aspects ?

ISO 14001-registered organizations must consider both regulated and unregulated aspects in setting management goals. "When establishing and reviewing its objectives, an organization shall consider its legal and other requirements, its significant environmental aspects...and the views of interested parties"(ISO 14001, 4.3.3). Based on a series of workshops between European environmental managers, held by the UK-based Institute of Environmental Management, a consensus emerged that "if a stakeholder believes that an impact is important, then it is significant"(Bird, 1997:373)<sup>108</sup>.

Interview results suggest that **through the aspects identification and goal-selection process mandated by ISO 14001, organizations will take responsibility for a broader array of environmental impacts than that required of them by regulation.** For example, Akoshi managers are grappling with previously unmanaged' areas: "the ISO program requires a factory to produce formal rules and procedures for dealing specifically with environmental issues...Do you turn lights off when you leave the office on Friday afternoon ? Does somebody check the compressed air hoses for leaks when they're not in use?" Giant has found that, in addition to setting goals for its regulated aspects, and common unregulated aspects (e.g. energy consumption, solid waste), facilities are targeting specific local issues. For example, "water consumption is a big issue in California" so a California-based facility has set a water use reduction goal (G2). Eurotech has also found that different sites have different priorities (see figure 4.4.3c, below). In all cases, each firm is tackling a broader array of impacts than those specified by regulation.

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<sup>108</sup> Bird, A. Establishing Workable Environmental Objectives in Sheldon, C. ISO 14001 and Beyond. Sheffield: Geenleaf Publishing, 1997:371-384.

Firm	More Comprehensive Goals ?	Evidence
A	Y	Set goals for municipal waste and energy use reduction. "The ISO program requires a factory to produce formal rules and procedures for dealing specifically with environmental issues...Do you turn lights off when you leave the office on Friday afternoon ? Does somebody check the compressed air hoses for leaks when they're not in use?...More involved plans deal with reducing steel scrap."
B	---	---
C	Y	"The [ISO 14001 registration] process has caused our main site to look at issues such as energy...Non-regulated impacts are being considered".
D	---	---
E	Y	Sites have non-regulatory noise, energy, paper use , and water use goals arising from pre-ISO management system.
F	Y	Goals include energy consumption, materials use, paper consumption, and recycling of batteries.
G	Y	In addition to regulated aspects, as well as unregulated aspects (energy consumption, solid waste), facilities target specific local issues. "Water consumption is a big issue in California" so G2 has set a water use reduction goal (G2).
H	Y	Have identified some non-regulatory issues that are subject to objectives. "Employee interest" led to objective of "100% recycling of used oil"(Manual).
I	Y	A goal that arose from stakeholder concerns translated into savings: neighbors and employees complained about oil on shoes. As a result, we realized we were losing \$20,000 of oil a year. Installation of improved centrifuge recovers \$5,000 worth of oil. New plant has been designed to reduce losses.
J	---	---

Table 4.4.3c ISO 14001 Registration Stimulates Comprehensive Management Goals

<b>Phoenix Facility</b>	<b>California Facility</b>
<ul style="list-style-type: none"> <li>• Reduce energy use 5% vs. 97</li> <li>• Reduce water use 30% vs. 97</li> <li>• Reduce VOCs by 90% vs 97</li> <li>• Reduce paper use 10%</li> <li>• Recycle &gt;30% of sulfuric acid</li> <li>• Reduce non-hazardous landfilled waste by 10% vs. 97</li> <li>• Reduce landfilled hazardous waste by 10% vs. 97</li> <li>• Maintain noise levels at site perimeter to 60 db(A)</li> <li>• Verify that site's acid scrubbers are operating at 95% efficiency through tests</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce energy use 5% vs. '97</li> <li>• Reduce water use 10% vs. '97</li> <li>• Recycle water 60%</li> <li>• Reduce paper use 10 %</li> <li>• Recycle/reuse chemicals 30%</li> <li>• Increase solid waste recycling 75% vs. '97</li> <li>• Reduce hazardous waste generation 5% vs. '97</li> <li>• Reduce noise levels at site perimeter to 60 db(A)</li> <li>• Decrease reportable accidents to &lt;1/100 employees</li> </ul>

Figure 4.4.3c Comparison of Public Goal Statements from Eurotech Sites E2 and E3, Showing Different Prioritization of Efforts.

**More-Formalized Pollution Prevention Efforts:** Pollution prevention, as defined by the EPA, places an emphasis on reducing pollution at the source, and on recycling waste that cannot be prevented. “Disposal or other release into the environment should be employed only as a last resort... Pollution prevention is potentially the most effective method for reducing risks to human health and the environment...[and] the most cost effective method of environmental protection”(EPA, 1997:1-2)<sup>109</sup>. This notion of pollution prevention is advanced in the belief that “preventing pollution, rather than controlling it or cleaning it up, could provide both environmental and economic benefits”(ibid.:1). A question, therefore, is whether ISO 14001 acts as a catalyst for the promotion of pollution prevention activities.

Q: To what extent are you focusing on pollution prevention ? Are you rethinking manufacturing processes, or changing products, as a result of ISO registration ?

Registration to ISO 14001 compels an organization to commit to ‘prevention of pollution’. As defined in the standard, this is “use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution”(ISO 14001, 3.13). *This definition does not emphasize prevention over end-of-pipe control.* However, it may stimulate a self-examination of production processes, inputs and products that leads to greater preventative efforts than existed prior to registration, or the formalization of existing efforts. Formalization of efforts may reflect a greater organizational commitment to prevention.

Interview results suggests that the emphasis on documentation and on prevention of pollution do compel firms to formalize and place greater emphasis on pollution prevention activities. For example, at High Power, the environmental engineer has been granted the authority to shut the plant down if he believes that people, equipment or environmental safety is compromised. According to the facility manager, such authority “was unheard-of prior to [ISO 14001 registration]”. Giant had Pollution Prevention efforts prior to ISO 14001. According to one facility’s environmental manager, they are now better integrated with the management system (G3; see fig. 4.4.3d, below). **While it does not appear that new pollution prevention efforts have emerged subsequent to ISO 14001 registration, those efforts that were underway prior to registration have been formalized and granted greater encouragement.**

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<sup>109</sup> EPA, Pollution Prevention 1997: A National Progress Report - Executive Summary. Washington: Office of Pollution Prevention and Toxics, 1997.

Firm	Pollution Prevention	Evidence
A	Y	"The recyclability of vehicles will be raised gradually until it reaches 90% by 2000".
B	Y	"Had 97% emissions reductions since 1989. Not much left to gain through efficiency. Therefore, must change process. New emissions-free storage tanks are being installed (\$11M capital investment)".
C	Formalize	"Beginning to incorporate 'Design for Environment & Safety' into our thinking through pilot projects. ISO 14001 helped us formalize efforts that were underway, and emphasize them...increasing dialogue between engineering and environmental management".
D	Y	Forcing our suppliers to develop chemicals that etch our semiconductors in a cleaner way. A cleaner input will give us a cleaner product, both in terms of the environment and in terms of quality. If it is cleaner, it will be easier to clean off, therefore saving us money and time.
E	Y	E2 subject to state regulatory requirement to file a pollution prevention plan. E3 "is striving to recycle 80% of our byproducts. We also use recyclable or reusable packing material when possible"(E3 EMAS statement).
F	Y	We have not changed any products, but are beginning to rethink our processes. For example, the speaker plant reworked its process to reduce adhesive use, and thus hazardous waste.
G	Formalize	"Achieve pollution prevention through the reduction, recycle, reuse or elimination of chemicals used by focusing on those projects with the greatest potential for results. State results with reference to production index...[by] July 1999"(Handbook G3). Had Pollution Prevention efforts prior to ISO 14001, but now better integrated with management system.
H	Y	Environmental engineer now has authority to shut the plant down if s/he feels people, equipment or environmental safety is compromised. "That was unheard-of prior to [ISO 14001 registration]." Installation of solventless parts washer in order to reduce solvent use by 25% by 1999.
I	---	---
J	---	---

Table 4.4.3d ISO 14001 Registration Leads to Formalization and Encouragement of Pollution Prevention Programs

**Objective 1      Pollution Prevention - Hazardous Waste Generation**

**Target** Achieve continuous improvement in the reduction of hazardous waste generated from Giant's manufacturing processes relative to production volumes.

**Owner** R. Kohli / B. MacBrien

**Time** calendar year 1998 relative to calendar year 1997

**Means**

- Identification of projects that have potential for reduction, recycle, reuse or elimination of focus chemicals.
- Establish appropriate teams
- Determine technical feasibility
- Determination of cost-effectiveness
- Implementation strategy (budget, management approval, etc.)

**Objective 2      Waste Management - Non-Hazardous Waste**

**Target** Recycle 50% by weight of non-hazardous waste generated

**Owner** B. MacBrien

**Time** calendar year 1998

**Means** etc.

Figure 4.4.3d Pollution Prevention Goals at Giant G3, Showing Specific Roles and Responsibilities (Handbook G3)

**Supply Chain Encouragement, but not Requirement:** A heatedly-contested issue among ISO 14001 proponents and critics has been the question of supply-chain management. It is well-known, as in the case of quality management, that “supplier relations and supply-chain management can affect industrial and environmental performance in different ways. On the one hand, manufacturers have at times used their suppliers as a vehicle for improving their own environmental records by out-sourcing toxic elements of their production processes, essentially pushing waste and toxins down the supply chain. On the other hand, new models of supplier relationships...create opportunities for joint approaches to improve productivity and prevent pollution. For example, the emphasis on just-in-time delivery seeks to reduce both inventory and waste...Increasing co-involvement in product development...provides opportunities for the design of new products and processes that are both more efficient and environmentally benign”(Florida, 1996:9)<sup>110</sup>.

Q: Will you require your suppliers to adopt ISO 14001 ?

ISO 9001 explicitly requires firms to use only similarly-registered suppliers (Krut and Gleckman, 1998:7). By contrast, ISO 14001 requires only that an organization take into account those environmental aspects over which it can be expected to exert some control (ISO 14001, 4.3.1), which may include placing requirements on suppliers “only as far as the supplier’s performance is likely to have an impact on the firm’s ability to comply with its stated target and goals”(UNCTAD, 1997:11). It seems, therefore, that ISO-compliant organizations will require their suppliers to pay more attention to environmental issues, perhaps **encouraging the adoption of an EMS conforming to ISO 14001 specifications, but without requiring registration.**

Interview results support this conclusion. For example, at Bendix Chemicals, ISO 14001 is “no supplier requirement, but [they] are encouraging it. As part of [their] ISO registration, [they] identified suppliers/contractors that are critical to [their] environmental safety, and [must now] ensure they have the appropriate level of competence”(B1). According to the corporate environmental manager, “We must show our registrar documented evidence that the contractors know what they are doing”(B1). At Data Microelectronics, the “corporation is asking suppliers to move towards registration. [Data] will even help them develop their program, if necessary. Each year, we send evaluations to our suppliers telling them what the quality and environmental parameters are that we want to see them focus on”. Eurotech has sent letters to its key suppliers, requiring them to obtain either EMAS or ISO 14001. Suppliers with an EMS in place will receive “preferential treatment”, one factor among many supplier evaluation criteria.

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<sup>110</sup> Florida, R. Lean and Green: The Move to Environmentally-Conscious Manufacturing (ABI/INFORM version). In California Management Review, 39(1), 1996:80-105.



Firm	Supplier Req't ?	Evidence
A	N	May be a possibility in the future, but not requiring registration now. Some plans underway include "working with a supplier to alter the chemical composition of a raw material".
B	Encourage	"No supplier requirement, but we are encouraging it. As part of ISO registration, we have to identify suppliers/contractors that are critical to environmental safety, and ensure they have the appropriate level of competence. We must show our registrar documented evidence that the contractors know what they are doing"(B1).
C	N	Have not required it yet, but would if their customers start to require it. Rumor that NASA is considering adoption of ISO 14001, in which case registration offers a competitive edge (C1, C2).
D	Encourage	Corporation is asking suppliers to move towards registration. [Data] will even help them develop their program, if necessary. Each year, we send evaluations to our suppliers telling them what the quality and environmental parameters are that we want to seem them focus on.
E	Y	According to internal documents, Eurotech has sent letters to 86 key material suppliers in June '97 indicating that it will continue to use them only if they are either EMAS or ISO 14001 validated not later than the end of 1998. In response to that letter, 74 suppliers commenced ISO 14001 registration process and 24 initiated EMAS efforts. It has sent a similar letter to equipment suppliers, of whom 17 have initiated registration processes, to one or the other standard. Facilities "plan to give preference to suppliers and vendors who are registered, beginning 1999"(E2).
F	---	---
G	Encourage	"As part of its environmental leadership, [Giant] is also encouraging its suppliers to align their EMS's to ISO 14001 and pursue registration under it. The company believes this will...assist it in selecting environmentally responsible suppliers"(Giant ISO 14001 promotional pamphlet). Company sent out a letter to 100 suppliers encouraging ISO 14001 adoption.
H	N	Coal mines are suppliers. They have asked manager about intentions, but he has not yet decided.
I	---	---
J	---	---

Table 4.4.3e ISO 14001 Registration Leads to Supply-Chain Encouragement

**Organizations are not yet Employing Other ISO/EMS Tools:** The ISO 14000 series is intended to include a range of environmental management tools complementary to the EMS standard, including standards for Lifecycle Assessment, Environmental Performance Evaluation, and Eco-labeling. Are EMS-registered firms using these other tools, as well ?

Q: What other tools from the ISO 14000 series are you employing or plan to employ ?

The interview results suggest that, at least among those firms surveyed, firms are not using the other ISO 14000 tools (see table 4.4.3f).

Firm	Other ISO 14k Tools ?	Evidence
A	N	None.
B	N	None.
C	Y	Beginning to explore Lifecycle Analysis (LCA).
D	N	None.
E	N	None. Looked at Environmental Performance Evaluation, and is studying the Lifecycle Assessment standard, but no current plans to use either standard.
F	N	Not yet, but probably will in the future.
G	N	None.
H	N	None.
I	N	None.
J	N	None.

Table 4.4.3f Registration Does Not Necessarily Lead to Use of Other ISO 14000-series Environmental Management Tools

#### 4.4.4 Process-Related Characteristics

**Top level management commitment:** Commitment from top management to environmental goals is essential to their attainment. According to a meta-analysis of 70 studies, performed by Rodgers and Hunter in 1991, “when top management commitment [to organizational goals] was high, the average gain in productivity was 56%, but when commitment was low, the average gain was only 6%”(as cited in Milledge, 1995:17).

Q: Is an ISO 14001-registered organization’s environmental policy endorsed by the CEO or other senior-level manager ?

ISO 14001 requires evidence of top-level management commitment: According to the standard, “the environmental policy is the driver for implementing and improving the organization’s environmental management system so that it can maintain and potentially improve its environmental performance. The policy should therefore reflect the commitment of top management to compliance with applicable laws and continual improvement. The policy forms the basis upon which the organization sets its objectives and targets...The organization’s top management should define and document its environmental policy...”(ISO 14001, A.2). **Environmental goals will therefore likely reflect top-level management commitment, following ISO 14001 registration.**

Examples of high-level corporate commitment to environmental goal attainment in ISO 14001-registered firms are widespread. For example, as cited earlier, Alex Trotman, CEO of Ford, personally signed the firm’s environmental policy statement. Trotman attests that “with respect to health and environmental concerns, regulatory compliance represents a minimum...The issue of cost alone does not preclude consideration of possible alternatives...Company products, services, processes and facilities are planned and operated to incorporate objectives and targets which are periodically reviewed so as to minimize to the extent practical the creation of waste, pollution and any adverse impact on health or the environment”(Trotman, 1998:5). At Bendix Chemicals, the “top level commitment to the environment [is] communicated to all employees”, according to the corporate environmental manager (B1). At Fanta and at High Power, senior managers were actively involved in the goal-setting processes. These examples indicate a more active commitment towards environmental management from senior personnel.

Firm	Management Commitment	Evidence
A	Y	Corporate decision to obtain registration at all North American sites by 2001.
B	Y	"Top level commitment to the environment, communicated to all employees"(B1).
C	Y	Corporate goal is to become an environmental leader. CEO and corporate EHS staff established corporate -level goals. Each operating unit must establish goals and objectives to achieve the corporate goals.
D	Y	Demonstrated through corporate-wide ISO registration decision, and through supplier assistance program.
E	Y	According to its corporate environmental goal statement, "[Eurotech] believes firmly that it is mandatory for a TQM driven corporation to be at the forefront of ecological commitment, not only for ethical and social reasons, but also for financial return, and the ability to attract the most responsible and performant people".
F	Y	Senior management involved in goal-setting.
G	Y	"[Giant environmental] policy is a company-wide statement that governs actions within [Giant]. [Giant] policies are issued only by [Giant's] Chief Executive Officer"(Handbook).
H	Y	Plant manager drove process because he believed it would reduce his potential to end up in jail.
I	Y	"We agree that management commitment is a prerequisite to EMS implementation"(Presentation).
J	---	---

Table 4.4.4a Impact of ISO 14001 Registration on Management Commitment

**Broader Participation in Goal-Setting but no Gain in Goal Transparency:** ISO 14001 was created with stakeholders in mind, “to assure interested parties that an appropriate environmental management system is in place”(ISO 14001, Introduction, vi). Managers perceive the ISO structure, particularly the independent audits, as adding legitimacy to their environmental efforts to external stakeholders. According to Giant, “benefits of ISO 14001 include more structure, harmonization of systems, and objective third party audits”(G1). A manager at Data “wanted [the] independent audit, in order to assure customers and the public of our environmental effort”(D2). The corporate environmental manager at Bendix believes that “third party verification offers advantages over Responsible Care, which is not as credible to external stakeholders because it lacks third-party verification”(B1). Important questions to ask, therefore, are whether ISO 14001 catalyzes external participation in goal-setting, and yields goals that are made transparent to external stakeholders.

Q: Were any outside stakeholders involved in goal-setting ? Do you make any of your goals public ?

ISO 14001 does not require that organizations consult their stakeholders directly in establishing goals (external participation), nor that they make those goals public (transparency). By going the additional step of publicizing its objectives, or involving outsiders in its decision process, an organization facilitates external oversight, and creates additional pressure on itself to ‘deliver on its promises’. Social psychologists have acknowledged the power of public commitments to drive performance: “Whenever one takes a stand that is visible to others, there arises a drive to maintain that stand in order to look consistent....For appearances sake, then, the more public a stand, the more reluctant we will be to change it”(Cialdini, 1993:82<sup>111</sup>). It is understandable, then, if firms are reluctant to involve external stakeholders in goal-setting, or disclose their goals to them. The Coalition on ISO 14000 Implementation (CI2) is an industry group representing the automotive, steel, petroleum and paper manufacturers associations, whose views can be taken as representative of the major American industrial organizations. In a recent statement, the CI2 noted that while “interested parties do...have an interest in the environmental performance of an organization. However, that legitimate interest...cannot be equated with a right to involvement in the internal deliberations of a company”(CI2, 1998:6<sup>112</sup>).

While ISO 14001 requires that an organization “consider processes for external communication on its significant environmental aspects”(ISO 14001, 4.4.3), it is not required to make substantive public commitments. **Interviews indicate that firms are not disclosing greater amounts of goal, or performance-related information to their publics following ISO 14001 registration** (see table 4.4.4b, Part I, below). Of those firms that were interviewed for this study, only EMAS-registered Eurotech publicized its facility-level goals.

While it must establish a means for incorporating the views of interested parties in its goal-setting process, the ISO 14001-registered organization is not required to formally invite them to participate. “When establishing and reviewing its objectives, an

<sup>111</sup> Cialdini, R. *Influence: The Psychology of Persuasion* (Rev. Ed.). New York: Quill, 1993.

<sup>112</sup> Coalition on ISO 14000 Implementation (CI2). Position Statement on the ISO 14001 EMS Standard. (Available through Sidley & Austin, 202-736-8118), June 23, 1997.

organization shall consider the legal and other requirements...and the views of interested parties”(ISO 14001, 4.3.3). Interview evidence indicates that **firms are not likely to involve outside stakeholders in the goal-setting process, unless they were already doing so prior to registration** (see table 4.4.4b, Part I, below). Data, for example, involved representatives from state and local environmental commissions in its goal-setting processes only because such cooperation had occurred prior to ISO registration.

**Firms do seem to be involving a broader group of participants within the organization in the aspects identification and goal-setting processes** (see table 4.4.4b, Part II, below). Almost all sites made use of cross-functional team efforts to identify aspects and establish goals. As one manager at Giant put it, ISO “gets environmental management out of the hands of the half-dozen environmental professionals and out to the people who really affect the environment”(G2). This was echoed by the facility manager at High Power, who noted “If the environmental engineer got run over by a car six months ago, we would have been dead. Not anymore. Now, we know who is responsible for each action. [Now, we have a] greater emphasis on procedure, and less on [the] person”(H1). The net effect of this broader participation may be incorporation of many community interests in goal statements (since employees are also community members), identification and reduction of previously unrecognized waste streams, and perhaps a natural trend towards external participation, in the future.

Firm	External Participation ?	Evidence
A	N	None.
B	N	Independent of ISO, perform Responsible Care audits. Audit team composed of competitors, consultants, & community members (B1). Have Community Advisory Panel, but they were not involved in registration decision (B2).
C	N	None.
D	Y	Both the state environmental commission and the municipal environmental commission (with representatives from community groups, other businesses, and regulators) were involved in the goal-setting process.
E	N	None.
F	N	None.
G	N	None. Goals are set by internal teams.
H	N	None.
I	---	---
J	---	---

Firm	Greater Transparency?	Evidence
A	N	Environmental policy is publicly available. Was published in local newspaper, at one site. Goals and other information not made public.
B	N	Publish annual community environmental update.
C	Corp.	Corporate-level goals are available on homepage.
D	N	Goals are not publicized outside of the company, but were communicated to the state and municipal environmental commissions (including regulators and community representatives).
E	Y	Both corporate and facility-level goals and performance data are available to the public.
F	Y	Our policy is public. Our goals are not public, but we will tell you, if you ask.
G	Corp.	Policy is public. Corporate environmental goals and performance is available on-line. Some facilities may make goals public in "not-so-distant future"(G2).
H	N	Policy is public.
I	---	---
J	---	---

Table 4.4.1b Part I: Impact of ISO 14001 Registration on Participation, and Transparency of Resulting Goals to External Stakeholders, Showing No Additional External Stakeholder Participation, and No Additional Transparency of Goals.



Firm	Aspects Identification Process Used
A	Cross-functional team brainstormed each process, assembly line, permit requirement, community complaint. Aspects ranked based on volume of waste, toxicity, regulated requirements, probability of accident.
B	Cross-functional team from operations, maintenance, research and waste water treatment met and brainstormed potential impacts based on 15-page checklist. Ranked them in a matrix based on magnitude of harm, probability, reportable permit violations, community concerns, management cost (B1, B2).
C	Outside consultant helped internal cross-functional team to identify ten aspects within each activity, and rank them based on regulatory requirements, noise, air emissions, waste water, potential for accidental release, recycling, energy use, solid waste, esthetics.
D	Cross functional teams looked at inputs and products. Determined significance based on corporate environmental goals, state and municipal environmental commissions' input, benefit vs. cost.
E	Varied between sites. At E2, cross-functional team looked at each environmental medium, all waste streams, and assigned a risk score (probability x severity) for each impact, using corporate environmental goal statement as a guideline (see fig. 4.3e). At E3, did not use a ranking system. Instead, performed a qualitative review of operations and environmental aspects. An aspect was considered significant if the facility represented one of the top five waste generators or resource users in the area, if it violated permit requirements, if it posed an offsite health risk, or if it exceeded the guidelines established in the corporate environmental goal statement(E3) .
F	F2 looked at inputs and outputs, raw materials, products and wastes. They held general meetings with line employees, managers and supervisors to brainstorm aspects and obtain group buy-in. Used 'modified failure mode analysis' to rank priorities, based on regulatory requirements, long term toxicity, hazardous vs. Non-hazardous wastes, likelihood and magnitude of impact, and cost of control. Selected top 3-5 aspects to develop objectives and targets.
G	Differed between facilities. G2 environmental staff looked at operations and brainstormed potential impacts from activities and services. Used professional judgment of assembled staff to determine significance of aspects. If corporation felt it was significant, G2 did too. G3 cross-functional team developed a matrix (probability x magnitude of aspect) to rank aspects. Also, regulatory requirements, corporate significance. G4 cross-functional team followed similar process to G3.
H	Cross-functional team, with help of consultant, were trained and tasked to develop aspects list based on all processes and activities. Ranked significance based on personal judgments about impacts to air, water, land, flora, fauna, and human health.
I	A cross-functional team....brainstormed environmental aspects from several perspectives: listed purchases..., tried to identify all waste streams, interviewed stakeholders.
J	Corporate office developed a Management Information Systems tool to facilitate aspect selection and significance evaluation, dependent on risk, cost, severity, EH&S concerns.

Table 4.4.1b Part II: ISO 14001 Aspects Identification and Goal-setting Process, Showing Cross-Disciplinary Employee Participation, and Consideration of Broad Range of Environmental Impacts.



#### **4.5 Summary of Results and Conclusions: Positive Impact on Goals**

This chapter has presented an assessment of the impact of ISO 14001 registration on the content of, and process by which, environmental management goals are established. Table 4.5 (below) summarizes the results (interview questions may be found in Appendix 2). While the firms interviewed did not change the stringency of their goals, they appeared to be increasing their commitment to goal attainment, as demonstrated by increased senior management commitment, more measurable goals and more specific designation of roles and responsibilities. Almost all of the firms surveyed established compliance assurance-related goals, and indicated that improving their compliance record was an important driver for registration. While firms typically had environmental management goals that went beyond regulated substances, and included aspects such as water use and energy, they were also setting goals that indicated sensitivity to local environmental conditions and community interests. Interview results showed that firms are encouraging their suppliers to conform to ISO 14001, without necessarily requiring registration. Firms did not increase the availability of their environmental goals and performance information to outsiders, in the wake of registration. Firms likewise did not increase outside stakeholder involvement in their goal-setting processes, but did broaden employee participation. Interviews indicated that pollution prevention efforts were formalized and given greater encouragement, subsequent to ISO registration.

In conclusion, ISO 14001 registration does strengthen firms' environmental commitments, by helping them prioritize and set more-attainable goals, over a broader range of environmental impacts, and involve a broader constituency of employees in the goal-setting process, with greater institutional support. The study presented in this chapter indicates that ISO 14001 positively impacts organizations' environmental goals, both in terms of their content, the process by which they are derived, and the likelihood of their attainment. Assuming the third-party oversight mechanism is credible, these results suggest ISO 14001 will have environmental benefits.

The following chapter will examine the credibility of the registration mechanism.

Firm	Characteristic										
	More Stringent	Sr. Level Commit	Supplier Req't	Increase Measurability	More Specific Roles	Greater Compliance Assurance	More Comprehensive	Pollution Prev.	More Transparent	Ext. Participation	Other ISO 14k Tools
A	Y	Y	N	Y	Y	Y	Y	Y	N	N	N
B	NC	Y	Encourage	Y	Y	Y	---	Y	N	N	N
C	---	Y	N	Y	Y	Y	Y	Formalize	Corp.	N	Y
D	---	Y	Encourage	Y	Y	---	---	Y	N	Y	N
E	NC	Y	Y	Y	Y	Y	Y	Y	Y	N	N
F	NC	Y	---	Y	Y	Y	Y	Y	Y	N	N
G	NC	Y	Encourage	Y	Y	Y	Y	Formalize	Corp.	N	N
H	NC	Y	N	Y	Y	Y	Y	Y	N	N	N
I	---	Y	---	---	Y	Y	Y	---	---	---	N
J	---	---	---	---	---	---	---	---	---	---	N

Y = Yes. Interview comments or related documentation suggest greater presence of this characteristic than prior to registration.

N = No

Encourage = Encourage suppliers to adopt EMS, which may include ISO 14001, without requiring registration.

NC = No Change

Formalize = Incorporate employee-initiated or informal pollution prevention efforts into management structure (objectives, resources, documentation, etc.)

Corp = Corporate goals are publicly available, but facility-level goals are not.

Table 4.5 Summary of Interview Results: ISO 14001 Registration Impact on Goals

## Chapter 5: Registration: Credible Oversight Mechanism ?

### 5.1 Introduction: ISO 14001 Is What the Registrars Say It Is

“If audits were effective and recognized as such both by regulators and by the public, reduced regulatory oversight would clearly be appropriate, with resulting reduced regulatory transaction costs.”

-- Paul Kleindorfer, Wharton School at University of Pennsylvania

The purpose of the following chapter is to describe the framework for third party registration of ISO 14001 conformance, and evaluate its credibility, based on interviews with US registrars. The design of ISO 14001 is such that, assuming that third-party oversight is adequate, it should guarantee that registered organizations live up to the goals they set for themselves (see chapter 2). While organizations are responsible for determining their policy and objectives, the ultimate responsibility for interpreting and enforcing the requirements of the standard fall to the registrars. The meaning of registration to observers is thus largely dependent on the credibility of the third party registration auditing mechanism.

**Method:** For the purposes of this study, credibility will be evaluated based on the process whereby auditors gain accreditation to grant registration, the registration auditing protocol, the required competencies of the registrars, their ability to sanction non-conformances, and their consistency in interpreting the requirements of the standard and applying sanctions for non-conformance. As profit-seeking private actors, registrars may have incentives to monitor at less-than-optimal levels, in spite of the accreditation process. The information presented in this chapter, except where otherwise noted, is derived from interviews with representatives from seven of the twelve US-accredited registrars, as well as from the Registrar Accreditation Board. Through examples developed in the course of those interviews, this chapter will offer anecdotal evidence demonstrating that the current third-party auditing structure may not operate as a credible oversight mechanism.

**Why Self-Declaration Was Not An Explicit Focus of This Study:** This study did not examine the impacts of self-declaration. It may be that organizations who adopt ISO 14001 without the additional step of external registration modify their internal management decisions to a similar extent as those who do undergo third-party evaluations. However, without third-party verification of a firm’s management system, or some other form of objective data disclosure, the regulator gains no greater assurance of environmental benefits than through existing regulatory structures. There is thus no justification for granting regulatory incentives.

A 1996 EPA-funded study by the National Science Foundation (NSF) looked at self-assessments and EMS registration audits of ISO 14001 implementation in 18 US organizations. The results showed, not surprisingly, that “there were significant differences in how the organizations and independent auditors evaluated [their implementation of ] the requirements of ISO 14001...Since 24% of all the requirements were evaluated lower by the independent assessors, and only 6% were evaluated

higher, these findings suggest that (p. 4) ...**[self-declaring] organizations might have the tendency to evaluate their systems higher than would independent [registration] auditors** (p. 8)”(Diamond, 1996)<sup>113</sup>. Thus, it is not necessary, for the purposes of this study, to consider in depth the impact of self-declaration of ISO 14001 conformance on goal-setting.

**Ominous Parallels with Ship Classification:** A key issue in evaluating any regulatory mechanism is the question: ‘compared to what’ ? This section presents a brief illustration of the marine vessel classification industry. Over a century old, this industry is the source from which much of the structure of the independent verification audit employed in ISO 14001 is derived, and is illustrative of the potential for conflicts of interest to undermine the credibility of third party verification (from Furger, 1997:462-464)<sup>114</sup>.

Marine classification societies, such as Bureau Veritas and Det Norske Veritas, “rely on income generated by services provided to shipowners”(Furger, 1997:462). There are many classification societies competing with each other for shipowner clients. “Competitive practices introduce the possibility that, at times...may produce [two types of] failures. The first type refers to inadequate practices by a small number of intermediary organizations...The second type, institutional failure...can be characterized by a sharp decline in the credibility of a certain institution, for example, the entire classification industry”(Furger, 1997:462).

“Over the last twenty years, several factors have shaken the credibility of the classification industry. The marine industry is characterized by a multiplicity of classification societies, none of which has a monopolistic power...Many shipbuilders responded to the challenge [posed by economic recession in the early 1980’s]...by drastically reducing operational expenses. Often, such reductions were possible only by avoiding classification requirements. This could be achieved simply by changing classification society, if the current one was perceived as too strict. This practice was so common that it became known in the industry as ‘class hopping’. In fact, marginal classification societies exist for the sole purpose of selling an international certificate of compliance...Lax survey standards and questionable structural design decisions undermined not just the credibility of some classification societies, but the viability of the classification system as a whole. At the end of the 1980’s, the classification system was facing a serious institutional crisis. Suspicious insurers [initiated]...a series of unscheduled surveys...Many of the ships surveyed were found to be substandard, and often in very poor technical condition. Nevertheless, they were carrying certificates of full compliance and were registered with leading or major classification societies”.

The loss of classification credibility has led to several responses in the 1990s. In 1996, the International Association of Certification Societies made mandatory of its members: ISO 9000 certification, the establishment of a database for substandard vessels, and the commitment to require from shipowners “the fulfillment of outstanding classification requirements before entering a new classification society”(Furger, 1997:466). It remains

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<sup>113</sup> Diamond, C. Environmental Management System Demonstration Project - Final Report. (Available online at <http://www.nsf-isr.org>). Ann Arbor: NSF International, 1996.

<sup>114</sup> Furger, F. Accountability and Systems of Self-Governance: The Case of the Maritime Industry” In Law & Policy Vol. 19, No. 4, October 1997.

to be seen whether such measures will result in the restoration of insurers' confidence in the classification system.

As this chapter will demonstrate, the ISO 14001 verification structure shares many parallels with the ship classification system. ISO 14001 registration is a competitive industry, among many of the same actors as in the classification industry, and creates some of the same incentives for competing on the basis of reduced oversight.

## **5.2 ISO 14001 Registration: Signal of What ?**

### **History of Environmental Audits -- from Compliance Audits to 'System' Audits:**

Environmental audits have traditionally been aimed at assuring regulatory compliance. Auditing ISO 14001 implementation represents a change in focus, towards management system audits. A recent Price Waterhouse survey found "that 90% of the corporations responding [to the survey] conducted audits for the purpose of detecting violations before they could be detected by government inspectors. Only 65% of the companies used environmental audits to assess environmental management systems"(as cited in Tucker and Kasper, 1998:8)<sup>115</sup>.

Compliance audits have traditionally been performed by experts with environmental science or engineering backgrounds, and provided only a 'snapshot' of regulatory performance at the time of the audit (Tucker and Kasper, 1998:8). Management systems auditors, by contrast, most frequently come from an accounting background. According to system audit proponents, in comparing an EMS audit to a compliance audit, "verification of compliance with laws and regulations is borne by the system which is in place throughout the year, as opposed to being borne by the audit...EMS audits seek to discover...why the non-compliance is occurring. By correcting the fundamental cause of the non-compliance, companies gain greater assurance of future compliance; whereas, correcting one violation yields less assurance of preventing a future recurrence" (Tucker and Kasper, 1998:8).

Environmental regulators worldwide have become interested in the EMS and external systems audit approach for two primary reasons (Tucker and Kasper, 1998:5). First, periodic audits of a management system may improve the compliance stance of the organization, by generating more complete and consistent information about regulatory requirements and environmental performance, and by signaling to employees a top management commitment to addressing environmental issues. Second, it may help regulators make more efficient use of scarce resources. Auditors may take on some of the oversight responsibilities and thus reduce an agency's monitoring expenses, as well as identify 'better performers'. Likewise, implementation of a common system may help a regulator better track an organization's performance over time, and compare it against other, similarly-managed organizations.

The regulatory interest in such approaches has been expressed in several forms. In Europe, the European Union promulgated its Eco-Management and Audit Scheme (EMAS), "a voluntary system whereby companies determine their baseline

<sup>115</sup> Tucker, R. And Kasper, J. Pressures for Change in Environmental Auditing and in the Role of the Internal Auditor (ABI/INFORM edition). In Journal of Managerial Issues. 10(3), Fall, 1998:340-354.

environmental impacts for specific industrial sites, establish an environmental policy, goals and timeline, and institute a management system to continuously improve environmental performance...[including] an environmental effects statement they release to the public after verification by a certified third party”(Nash and Ehrenfeld, 1998:492). Firms participating in EMAS may receive regulatory benefits. For example, in the German state of Saxony, the government and industry associations have signed an agreement “that will simplify rules for permits and regulatory procedures for industrial sites that participate in EMAS” (Cutter, September ,1998:2)<sup>116</sup>.

In the US, the EPA has begun to examine how auditing can be used to complement and perhaps in some cases, replace, regulatory requirements. In 1986, the EPA promulgated an auditing policy in which neither the confidentiality of the audit results was guaranteed, nor were firms assured that the EPA would not pursue an enforcement action against those who voluntarily disclosed regulatory violations (Tucker and Kasper, 1998:6). Recognizing the potential chilling effect on public disclosure such a policy might have, in 1995, EPA announced “Incentives for Self-Policing”. Under this policy, according to EPA lawyer Brian Riedel, the agency agreed to “greatly reduce civil penalties and limit liability for criminal prosecution for regulated entities...for violations that are discovered through a compliance management system or environmental audit, and that are promptly disclosed and expeditiously corrected, provided other...safeguards are met...The policy does not apply to violations that result in serious actual harm or may present an imminent and substantial endangerment to human health or the environment”(Riedel, 1997: 377).

“In addition to participating in drafting ISO 14000,...the EPA has embarked on several initiatives where they encourage companies to use environmental auditing, such as the Environmental Leadership Program (ELP) and Project XL”(Tucker and Kasper, 1998:5). Among the goals of the ELP program were “advancing the design of EMSs...[and] providing performance assurance through third-party certification”(Reiley, 1997:563)<sup>117</sup>. For example, EPA Region 1’s ELP Startrack program “involves third-party certification of a company’s environmental performance focusing on EMSs, compliance audit programs and pollution prevention...in exchange for benefits such as fewer inspections, reduced reporting, expedited permitting and reduced penalties”(Riedel, 1997:386). Two of the twelve Project XL proposals received by EPA in 1996 involved ISO 14001 (Lucent’s proposal, which was approved; and Anheuser-Busch’s, which was not) , as were two of the ELP proposals (Gillette and Salt River) (Freeman, CEEM:382; Riedel, CEEM:401). From a public policy viewpoint, then, it is important to understand what kind of information an ISO 14001 registration audit provides.

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<sup>116</sup> Cutter. German Agreement Offers Regulatory Relief for EMAS participants. In BATE’s ISO 14000 Update, September 1998:2.

<sup>117</sup> Reiley, R.A. Environmental Law and Business in the 21st century: The New Paradigms - ISO 14000 and its Place in Regulatory Reform in Iowa Journal of corporate Law, Spring, 1997: 535-569.

### Purpose of ISO 14001 Registration Audits

“Demonstration of successful implementation of this international standard can be used by an organization to demonstrate to interested parties that an appropriate environmental management system is in place”

-- Introduction, ISO 14001

Third party registration to ISO 14001 aims to provide objective confirmation to interested outsiders that a firm has in place an EMS “appropriate” to its needs. As Patrick Aurrichio, ISO 14001 Program Manager for Corporate Environmental Affairs at IBM, explained in a recent interview, in reference to a firm’s EMS, “You can tell people, ‘We have a beautiful baby’, but it doesn’t really mean anything until someone else agrees”(Aurrichio, 1998<sup>118</sup> ). Similarly, according to a recent interview, Scott Martin, president of custom manufacturer Quality Chemical, believes “the value of ISO 14000 surpasses that of Responsible Care: ‘ISO is third-party certified, Responsible Care is not’”(as cited in Sissell, September, 1998:46)

A second purpose of third-party registration audits is to provide external, non-regulatory, oversight of environmental management. For example, Mark Mansfield, plant manager for a Pacificorp power generation plant in Wyoming, wanted registration because he liked the concept of the formal external audit. In the US, power plant managers are criminally-liable for undisclosed regulatory non-compliances, justifying beyond-compliance precautions, such as external audits. “The audits help sustain attention”, which is important in ensuring consistent monitoring of environmental performance, and keeping Mansfield out of jail. This is echoed by a recent statement by Brian Steelman, EHS director for Ciba Specialty Chemicals. “I didn’t start out as an ISO 14000 cheerleader, but what I’ve found is that people tend to let these management systems drift unless someone kicks you in the tail - that motivation by internal and external audits tends to keep the system current”(as cited in Sissell, September 1998:46)<sup>119</sup>.

**Credibility of ISO 14001 Registration Depends on Registrars’ Application of the Standard:** It would seem that the implementation of ISO 14001 depends on the registrar’s interpretation of the standard’s requirements, and its ability to enforce conformance to that interpretation. Following this reasoning, establishing ISO 14001 as a credible signal of environmental commitment on the part of companies is dependent on the credibility of the third-party oversight mechanism. To external stakeholders, registrars must be **consistent** in the interpretation of the standard and have meaningful **sanctioning power**. **Conflicts of interest** must be contained by oversight mechanisms. More specifically, in order to evaluate the meaning of registration, stakeholders would want to see:

- An objective process for accrediting registrars, specifying minimal auditing requirements, required auditor expertise and standards of professional practice.
- Consistent interpretation of the standard’s requirements, including ‘compliance’ and ‘continual improvement’.

<sup>118</sup> Aurrichio, P. ISO 14001 Program Manager, Corporate Environmental Affairs, IBM, Personal Interview, October xx, 1998.

<sup>119</sup> Sissell, K. “Certification: An Essential Element” in Chemical Week. 160(36):46, September 30, 1998.

- The existence of punishments that are substantial enough to force ‘cheaters’ to conform to the standard or lose registration.
- Consistent application of those sanctions to punish cheats.

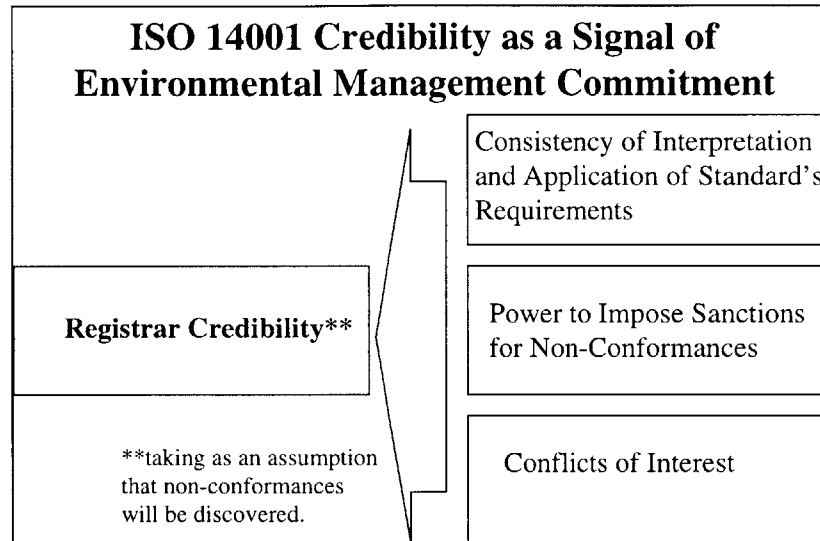


Figure 5.2 Credibility of ISO 14001 Registration Depends on Registrar Consistency, Sanctioning Power, and Conflicts of Interest.

The remainder of this chapter will explore each of these aspects, to determine whether ISO 14001 registration offers a credible oversight mechanism for ensuring that registered firms are ‘doing what they claim’.

### **5.3 Who are the Registrars and What is Registration ?**

As described in chapter 2, each ISO-member country must establish an accreditation board, which may or may not be linked to the government of that country. In the US, the National Institute of Standards and Technology (NIST) - affiliated with the Department of Commerce - has recognized the American National Standards Institute (ANSI) and the Registrar Accreditation Board (RAB), jointly, as the sole accreditation body. “Both UKAS in the United Kingdom and Raad Voor Accreditatie (RvA) in The Netherlands have similar agreements with their respective governments”(Tibor and Feldman, 1997:332). Internationally, accreditors largely determine whether to recognize the accreditation of foreign registrars. The national accreditation bodies jointly established the European Accreditation of Certification, a harmonized interpretation standard, to facilitate mutual recognition through consistent application of accreditation (Tibor and Feldman, 1997:332). As of yet, there is no internationally-accepted standard for mutual international recognition of registrations (Krut and Gleckman, 1998:59).

**Who are the accreditation bodies in the US ?** The ANSI is the “administrator and coordinator of the US private sector voluntary standardization system...Founded in 1918 by five engineering societies and three government agencies, the Institute [is] a private, non-profit membership organization...The Institute represents the interests of its nearly



1,400 company, organization, government agency, institutional and international members through its headquarters in New York City and...Washington, DC. ANSI does not itself develop American National Standards; rather it facilitates development by establishing consensus among qualified groups....ANSI was a founding member of the ISO and...is one of five permanent members to the governing ISO Council...As part of its responsibilities...ANSI accredits US Technical Advisory Groups (TAGs)...The US TAGs' primary purpose is to develop and transmit, via ANSI, US positions on activities and ballots of the international technical committee....Since the work of international technical committees is carried out by volunteers from industry and government, not ANSI staff, the success of these efforts often is dependent upon the willingness of US industry and the US government to commit the resources required to ensure strong US technical participation in the international standards process.”(ANSI, 1998)<sup>120</sup>.

The RAB, based in Milwaukee, WI, is the organization directly responsible for operation of the accreditation programs. Founded in 1989 as an “affiliate of the American Society for Quality Control...it is a not-for-profit that derives its income from accreditation and certification operations”(Foster, 1997:135)<sup>121</sup>. The RAB board of directors is made up of representatives from industry (corporate EH&S representatives from Ford, Monsanto, Lucent, Louisiana Pacific and Texas Instruments) and government (including a representative from the Office of Enforcement and Compliance Assurance of the EPA) (Quality, January 1997)<sup>122</sup>.

In the US, the National Accreditation Program (NAP), operated jointly by ANSI and RAB, is an expansion of a similar program the two have offered jointly for ISO 9000. The NAP's direct responsibilities are (ANSI, 1997)<sup>123</sup>:

- Accreditation of organizations to register to the ISO 14001 standards
- Accreditation of ISO 14001 auditor training course providers.
- Processing of registrar applications and formation of accreditation audit teams.

**What is the accreditation process ?** “Accreditation is the initial evaluation and periodic monitoring of a registrar's competence”(Tibor and Feldman, 1997:330). Registrars achieve their accreditation through a process similar to that of an organization seeking registration: document review, interviews, a formal assessment and periodic surveillance audits, all by auditors from ANSI/RAB (Munn, CEEM:366 ). First, a lead auditor is designated to review a prospective registrar's application. As described by Mike Ross, President of the EMS group at the RAB, there are about 30 pages of detailed questions to be answered in the initial application. Questions cover the structure of the applicant's organization, its internal auditing process, its procedures for subcontracting, ensuring confidentiality, appeals, claims and disputes, and the expertise of its personnel.

<sup>120</sup> ANSI. An Introduction to ANSI. <http://web.ansi.org>, 1998.

<sup>121</sup> Foster, S. “Registrars, Accreditation and ISO 14001” in Marcus, P. And Willig, J. Moving Ahead With ISO 14000. New York: John Wiley and Sons, 1997:125-143.

<sup>122</sup> Quality. RAB revamps Board to include EMS representation. In Quality. 36(1):18, January, 1997.

<sup>123</sup> ANSI. ANSI/RAB National Accreditation Program (NAP) EMS Council. <http://web.ansi.org>, 1997.

Applicants must comply with the requirements spelled out in the ISO standards: "ISO 14010 defines the principles common to all environmental audits; ISO 14011 defines the procedures for an EMS audit; and ISO 14012 defines the qualification criteria for an environmental auditor"(IISD, 1996:47-8). Auditors must undergo formal auditing training, demonstrate discretion and objectivity, possess a minimum of twenty days of on-site experience auditing management systems within the last three years, and have substantive knowledge of environmental science, facility operations, and applicable legal requirements (IISD, 1996:50). "At anytime in this process, non-conformances [with the ISO standards as well as the national standards developed by ANSI/RAB] will be noted and sent to the applicant for correction"(Ross, 1998).

Within ANSI/RAB is an EMS council, made up of representatives from government agencies (EPA, DOE, NIST), industry (Caterpillar, Westinghouse and Lockheed-Martin), NGOs (the Environmental Law Institute, and the Community Nutrition Institute) and accredited registrars. This council reviews audit reports, looks at non-conformances and corrective actions, then votes on whether to grant accreditation to the registrar (Ross, 1998). Once granted accreditation, registrars are audited once or twice a year to ensure consistency. Full reaccreditation is required every four years (Ross, 1998).

For ISO 9000, each registrar is accredited to conduct registrations only within a limited scope of industrial classifications, so that it may leverage its knowledge and understanding of specific industries, within a range bounded by the first four digits of the SIC code. For ISO 14001, on the other hand, ANSI/RAB decided that industry-specific knowledge was not as relevant, since environmental impacts may not be common across an industry sector. Thus, each registrar may conduct registrations provided it has auditors whose substantive industry knowledge shares the first two digits of its SIC code with that of the organizations being audited (Hansa, 1998 ).

**Who are the Registrars, and what is Registration ?** The history of independent verification auditing has two origins. The first dates back to the emergence of the naval classification field, in the late nineteenth century. "Classification societies were created in the eighteenth century by the London insurance market as a means to assess marine risk"(Furger, 1997:459). The early ship inspection services, such as those offered by Det Norske Veritas (DNV), Lloyd's Registry, Bureau Veritas, TUV and ABS, offered investors independent verification of ship design, construction and maintenance practices, according to the classification society's rules (Furger, 1997:456). The second origin of independent verification audits emerged from the international accounting firms, such as KPMG, and Arthur Anderson, who developed attestation services for financial disclosure statements. "The auditor's opinion does not say that the financial statements are more accurate than those of competing companies, only that they reflect basic accounting principles and are likely to be reliable enough for their intended purpose of informing third parties as to the company's financial performance"(Uzumeri and Mustafa, 1997:5). These two streams have gradually merged, as a firm's product, and the process by which it is produced, have become more closely linked through quality management systems. Thus, public accounting firms, such as KPMG, have begun offering quality management systems audits (Uzumeri and Mustafa, 1997:5). Likewise, auditors whose services have more traditionally focused on tangible products have begun auditing management systems. For example, Bureau Veritas established its

ISO 9000 registration division (BVQI) in 1988 (ibid.). With the development of ISO 14000, many of the same organizations that offered ISO 9000 registration have moved rapidly to develop EMS auditing capabilities.

Currently, there are twelve US-accredited ISO 14001 registrars. Ten more are in the application process, and ANSI/RAB is still receiving applications (Ross, RAB, 1998). Registrars range widely in terms of character, size and experience. For example, DNV, whose US ISO 14001 registration service is based in Houston, was established in 1864 in Norway, as a maritime ship classification society. Today it has over 300 offices in 100 countries, with over 4,000 employees, and its services include setting rules for ship construction, as well as safety and quality assurance (DNV, 1998)<sup>124</sup>. By contrast, Advanced Waste Management Systems, based in Tennessee, is an environmental and engineering services company, specializing in such areas as expert testimony, and compliance assurance auditing (AWM, 1998)<sup>125</sup>. It is thus far the only environmental and engineering services firm to participate in the US National Accreditation Program.

#### ANSI/RAB Accredited ISO 14001 Registrars

American Bureau of Shipping Quality Evaluations Inc. (ABS)
Advanced Waste Management Systems (AWMS)
Bureau Veritas Quality International (BVQI)
Det Norske Veritas Certification Inc. (DNV)
International Approval Services, Inc. (IAS)
KEMA-Registered Quality, Inc.
Lloyd's Register Quality Assurance (LRQA)
National Science Foundation International Strategic Registrations, (NSF)
SGS International Certification Services Inc. (SGS)
TUV Management Service (TUVM)
TUV Rheinland of North America, Inc. (TUVR)
Underwriters Laboratories, Inc. (ULI)

Table 5.3a US Accredited Registrars as of September 1998

The purpose of the registration audit is to determine whether an organization's EMS "is designed and implemented to satisfy its policy commitments and the various ISO 14001 criteria" (Potts, CEEM: 331). During a registration audit, the registrar audit team reviews documents, interviews personnel, and inspects the registered sites, to determine whether the organization's management system conforms to the requirements spelled out in the ISO 14001 standards. ISO 9000 audits typically take several days, depending on the number of employees, and it is estimated that ISO 14001 audits will follow the same format (see table 5.3b, below). Conformity to the standard requires an organization to demonstrate to auditors through records and on-site inspections and interviews that all key elements are in place, and function as intended. Non-conformances will be noted by the registrar. Following any audit, the registrar has three options: to confirm, to conditionally confirm, or to deny registration. The initial registration process takes approximately seven months, from initial application through final approval, to allow time for corrections to be made and confirmed (Bellen, 1998).

<sup>124</sup> DNV. Webpage. [Http://www.dnvda.com](http://www.dnvda.com), 1998.

<sup>125</sup> AWM. Webpage. [Http://www.awm.net](http://www.awm.net), 1998.

No. Of Employees	Registration Audit (onsite days)	Surveillance Audit (onsite days)
1-15	2	1
6-30	4	1
31-60	5	1.5
61-100	6	1.5
101+	8	2

Table 5.3b Estimated Onsite Time Requirements to Complete An ISO 9000 Registration or Surveillance Audit (Bellen, 1998).

Registration audits may be either 'surveillance-style' or comprehensive. A surveillance-style auditing program will evaluate pieces of the management system every 6 months. Each audit will focus on different aspects of the system, with the goal of covering all aspects of the system at least once in each three-year cycle. Alternatively, an organization can elect to undergo comprehensive audits every three years, covering all aspects of the management system (Daugherty, 1998; Abarca, 1998).

Once a firm has been approved, the registrar places it on a list of registered firms. Currently, there is no centralized, publicly-available list of registered facilities; Each registrar has its own list, with variation in the types and quality of the information presented (mailing addresses, contact numbers, SIC codes, and product descriptions are often provided). Some lists are available online on the World Wide Web. Others must be requested directly from the registrars themselves. The Global Environmental Technology Foundation (GETF) offers the most-complete publicly-accessible list covering the majority of US registered facilities. This list, however, does not provide contact information, nor does it describe the scope of the management system registration, the date of registration, or the identity of the registrar. All of this information, as well as the firms' environmental policies, should – according to the standard – be publicly available.

Upon granting registration, the registrar will also allow the firm to display its endorsement, or 'mark of conformity', in advertisements and publications (see figure 5.3b, below). "A mark of conformity is an indication that the item is in conformance with a specific standard, and its use is granted exclusively as a result of the certification process...In its most basic sense, conformity assessment is simply confirmation that something does what it is supposed to do"(Urman, CEEM:347, 346) .



Figure 5.3b Registration and Accreditation Marks of Conformity From AWMS, 1998

**What Registrars Look for in EMS Audit:** As outlined in chapter 2, the ISO 14001 standard requires a firm to have in place a policy and management goals, to implement a plan for achieving those goals, to monitor its effectiveness and correct the root causes of deviations, and to periodically review the policy and goals to ensure their continuing appropriateness. It requires three policy commitments: to compliance with applicable regulatory and 'other' obligations, to 'prevention of pollution' and to 'continual improvement' of the management system. The standard does not require that a firm be 'in compliance' with legal requirements when it achieves registration. "Non-compliance with applicable law will not defeat certification to the standard, so long as the non-compliance was registered by the management system and proper procedures are followed to abate the problem"(Roht-Arriaza, 1996:5; see also Bell, 1997:78). Likewise, the standard does not require a firm to place a preference on source reduction over end-of-pipe treatment in 'preventing pollution'.

'Continual Improvement' is arguably the 'heart' of the standard. Depending on how it is defined by registrars, it may drive performance improvements. In the standard, Continual Improvement is defined as "the process of enhancing the EMS to achieve improvements in overall environmental performance, in line with the organization's environmental policy"(ISO 14001, 3.1). This process may be "either achieving objectives, broadening the scope of the management system, or reducing the cost of environmental management"(Abarca, ABS, 1998). One registrar explained: "We look for a definition by the company of 'continual improvement'. In audits, we look for a clear indication of a process of actions aimed to meet targets, implementation of those actions and monitoring of the results, suggesting the target will likely be met."(Howe, DNV, 1998). A firm that fails to demonstrate continual improvement is out of conformance with the standard.

Some examples of continual improvement are (Auerbach, KEMA, 1998) adding environmental content to employee training; hiring a consultant to help better understand environmental impacts; having the environmental manager now report directly to the CEO, where before s/he did not; better record keeping or measurement systems; systems changes, such as utilizing more environmentally-sound materials in the production process. It is not, at least according to the same registrar, waste reduction resulting from the elimination of a product line for financial reasons (Auerbach, KEMA, 1998).

**Detecting and Correcting Non-conformances:** In general, should an organization fail to demonstrate conformance to the standard, this is considered a non-conformance, and the registrar may either grant conditional approval, with the understanding that the non-conformance will be corrected by a designated date, or deny registration. If the problem repeats itself over time, the procedures, resources or scope of EMS are insufficient or inappropriate, and the registrar will want to see them modified. While non-conformances are allowed if they stem from an absence of effective technology, or 'force majeure' (a major accident) (Ellis, AWMS, 98), the registrar may suspend registration in the case of a pattern of such non-conformances, indicating a failure of the EMS itself.

Corrective action and regulatory compliance are intrinsically linked by the standard, according to some advocates of the standard: "Corrective action must be initiated when any non-conformance is detected"(Bell, 1997:78). Since regulatory compliance must be a goal in the environmental policy, non-compliance is a non-conformance, and controls may need to be implemented to prevent recurrence, depending on how the standard is interpreted in practice. "If the registrar finds a non-compliance to regulation, she wants to know, 'Is there a system in place to identify, react and attack the root cause ?' If your system does not adequately address how to handle the non-compliance, this is a systemic failure"(Ross, 1998). It should be noted that registrars are required to report non-conformances to firms, but are required to keep confidential to outsiders any discovered incidences of regulatory non-compliance (Ross, 1998).

Firms may use several strategies for correcting non-conformances. One means is to correct the 'root cause' of the non-conformance, such that the non-conformance occurs less frequently, or is eliminated (Abarca, ABS, 1998). A second would be to reduce the stringency of objectives, on the grounds that previous goals were 'inappropriate' (Ellis, AWMS, 1998). "Easier-to-achieve goals, objectives and targets are an acceptable way to bring yourself back into conformance"(Daugherty, BVQI, 1998). Third, goals could be set low to begin with, or worded such that growth in production - waste increases overwhelming gains from efficiency - does not lead to non-conformance (Abarca, ABS, 1998).

In summary, interviews indicate the potential for differences in interpretation between registrars of requirements such as 'continual improvement' and 'corrective action'. If variation in interpretation of such central concepts does occur, it would have profound impacts on the implementation of the standard, and hence the credibility of ISO 14001 registration.

**Casting Doubt on Consistency - The Audit Confidentiality Problem:** The issues surrounding audit confidentiality provide an illustrative case study, showing that interpretation of the standard may vary among registrars. The confidentiality of audit results has been a contentious issue throughout the development of the standard, and is far from settled. "Audits often turn up shortcomings or reveal other information that companies prefer not to have disclosed to government agencies, competitors, or the public. Many European countries pushed for a requirement that companies be externally audited with reports of those audits provided to the public, as required under EMAS. Companies from the United States, on the other hand, argued that the standards should not require disclosure of audit results. [They] feared that a required disclosure could be used against them within the more aggressive US legal and regulatory system. [They] argued that if they could not protect against disclosure, they may be forced to abandon implementation of ISO 14000 altogether rather than risk opening up their environmental shortcomings to outsiders' scrutiny. [This] position has technically prevailed...Unless otherwise required by law, audit information and documents need not be disclosed"(Mullett, 1997:395)<sup>126</sup>.

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<sup>126</sup> Mullett, G. ISO 14000: Harmonizing Environmental Standards and Certification Procedures Worldwide in Minnesota Journal of Global Trade, Winter 1997:379-396.

While ISO 14001 registrars are not compliance auditors, they know the applicable regulations, and will likely become aware of non-compliances during registration audits. Registrars seek data to confirm that adequate monitoring is occurring, and that the management system is updating itself periodically. Compliance auditors seek only to determine if the facility is in compliance at the time of the audit. Registrars will therefore seek notation of incidences of non-compliance, and expect to see corrective action where such incidences do occur. Failure to initiate corrective action following non-compliance represents a non-conformance (Hansa, SGS, 1998).

Registrars are required to report the audit results to the company, but to keep them confidential otherwise. In spite of the registrars' confidentiality rules, audit results can be subpoenaed as evidence in legal proceedings. Some companies have hired registrars through their legal counsel, in order to guard results under attorney-client privilege, and thus render them 'attorney work products', with greater legal protection. However, auditors need to see 'objective evidence' that appropriate procedures are in place (Hansa, SGS, 1998). Some companies have suggested offering 'affirmative statements' signed by lawyers and executives, in lieu of data or documents, stating that appropriate procedures are in place. One registrar, at least, believes this is acceptable: "Executives are signing responses to the [registration] auditor in lieu of showing papers. We feel we can still maintain the quality of the registration process"(confidential 1, 1998). Another registrar offers a different perspective: "[Registration] auditors must see information - not affirmative statements that say [companies] have evaluated their compliance and taken appropriate corrective action. We need to see objective evidence that a system is in place. Otherwise, the organization is not entitled to registration"(confidential 2, 1998). ANSI/RAB have left interpretation of this issue to the registrar and the client organization (Ross, RAB, 1998).

Using an executive's attestation in lieu of 'objective evidence' of corrective action is open to abuse. Registrars seem to have conflicting resolutions of the confidentiality versus 'objective evidence' requirements of the ISO 14001 standard. This result suggests the presence of significant conflicts-of-interest inherent in the registration auditing process, with disturbing implication for the consistency of interpretation in other areas of the standard.

#### **5.4 Sanctions for Non-Conformance, Conflicts of Interest and Constraints on Registrars**

"The auditor will always find something."

- Gordon Bellen, Environmental Management Systems, NSF

"Authority matters; for beneath all the industry's intramural debates over the details....simmers a much more fundamental challenge -- striking the right balance between communitarian values and individualistic ones, between...collective authority and freedom of choice" - Joseph Rees (1997:49)<sup>127</sup>.

<sup>127</sup> Rees, J. The Development of Communitarian Regulation in the Chemical Industry. Unpublished Draft, 1997.

**Sanctions:** Because of the possibility that bad actors will adopt ISO 14001 to disguise their poor performance, shirking the required efforts, some form of sanctioning mechanism must be in place to penalize non-conformance. “Without strong coercive mechanisms, communitarian regulation will fall victim to adverse selection and moral hazard” (King et. Al., 1998:3). This section will explore the range of sanctions available to ISO 14001 registrars, and the presence of conflicts-of-interest, which may preclude their use.

ISO 14001 registrars have described five specific sanctions used in practice. They are:

- **Denial of initial registration.** The firm is required to meet all elements of the standard in order to qualify for initial registration. According to the RAB, “accredited registrars have refused initial registration in some circumstances”(Ross, 1998).
- **Notification of minor non-conformances.** The registered firm is required to submit a written plan describing how it has corrected the root cause of a minor non-conformance and implemented procedures to prevent recurrence (Bellen, 1998). Its implementation will be verified during the next routine surveillance audit.
- **Major Non-conformance Re-audit.** The detection of a major non-conformance requires an additional audit in one month’s time to determine if the root cause is being addressed. Because of the high cost in terms of resources and manpower in undergoing an audit, a firm will likely take the steps necessary to correct the non-conformance, to avoid costly repeated audits.
- **Suspension of Registration.** A pattern of major non-conformances suggests a systemic flaw in the EMS or in its implementation. In either case, the registrar may suspend registration until such time as the root causes of these non-conformances are addressed.
- **Withdrawal of Registration.** Continual major non-conformance is grounds for loss of registration. It appears that while ISO 9000 firms have lost registration in the past, the situation has not yet arisen among ISO 14001 companies (Ross, 1998; Bellen, 1998).

**Conflicts of Interest:** There are several factors that may contribute to an uneven application of the standard’s requirements and sanctions for non-conformance. These stem from the close relationship between the registrars and their clients, the lack of public accountability in the sanctioning process, the incentive on registrars to offer consulting services to clients, and their incentive to reduce oversight stringency, either as a means to lower costs, or to attract clients.

Most registrars see themselves as ‘facilitators’ and ‘partners’ with their clients (Bellen, NSF, 1998; Auerbach, KEMA, 1998). As one registrar put it, “We need to guard against a ‘police’ mentality”(Bellen, NSF, 1998). This cooperative spirit may make companies more receptive to opening their books, but may also discourage the registrars from imposing sanctions to control non-conformances.



In terms of public accountability, none of the above sanctions, including suspension or withdrawal, are required to be publicized. Each registrar gives out certificate registration numbers sequentially, enabling interested stakeholders to determine the identities of suspended facilities by comparing past and current lists of registered sites. However, there is no easily-accessible and complete list of past and present registered facilities, even in the US. Oversight is further complicated by the level of accessibility and quantity of information provided by registrars as to their client organizations. For example, some registrars place all of their registration information, including contact names and telephone numbers, SIC codes and scope of registration, online. Others provide only the name of the facility, and the list must be requested directly from the registrar.

Registrars are private companies in business to make a profit. Short of accepting bribes for looking the other way (a possibility raised in Gleckman and Krut, 1998:60), the registrars face three important conflicts-of-interest.

- **Incentives to offer Value-added Consulting Services:** Registrars have knowledge of industry best-practices, accumulated from monitoring the implementation of the ISO 14001 EMS in a variety of organizations. That information is valuable to firms in seeking to conform to the EMS requirements at least-cost, or in finding means to realize financial gains from environmental programs (Kleindorfer, 1996:14) . In the US, however, registrars are precluded from disclosing that information to firms for which they act as third-party overseers - e.g. consulting (Ross, 1998). Interpretation of this rule varies somewhat. For example, one registrar “does not consult, in any way, shape or form” but does identify real or potential weaknesses in the system (Hansa, 1998). By contrast, another will provide firms with contacts at other clients (Howe, 1998). IBM has found a way to partially defuse the ‘no-consulting’ rule by registering all of its sites, worldwide, through a single registrar. Under this arrangement, the registrar can help “point out areas that are useful”(Cibulsky, IBM, 1998). By offering consulting services to some clients, a registrar may compromise its impartiality.
- **Incentives to be less stringent than competitors:** By revoking its registration of a non-conforming business, a registrar may jeopardize future business, both with that firm, and with other firms who prefer to shop around for the least-stringent monitor. “It is evident that, without effective control by the accreditation bodies, registration could be easier to achieve by choosing one registrar over another”(Sunderland, 1997:134). In the past, when ISO 9000 registration has been denied to companies, they frequently do seek a different registrar, rather than revise their system (Bellen, NSF, 1998). However, according to one registrar, “there is enough business that we can afford to let the bad ones go”(Auerbach, KEMA, 1998).

Is there evidence of registrars lowering standards in order to attract clients ? The confidentiality issue, explored above, may be an example of just such a conflict of interest being played out. In that case, if one registrar takes companies at their word – through an executive’s attestation of conformity – it offers enhanced confidentiality relative to other registrars.

- **Incentives to reduce cost, by monitoring less than competitors:** In striving to provide the lowest-priced service, a registrar may see a financial advantage in performing a minimal - perhaps insufficient - amount of oversight.

**Constraints on Registrars:** Offsetting these ethical hazards, a registrar is subject to four constraints that seek to prevent rubber-stamping. First, a registrar is audited by the accreditation board of its home country, through the process described earlier in this chapter (Ross, RAB, 1998). Second, the registrar is required to establish an independent internal supervisory board, with representatives from various interest groups - including government agents, registered firms, and other registrars, to act as an appeal panel in the case of disputes between registrar and client (Ross, 1998; AWMS, 1998). Third, the registrar must develop and use an in-house guidance document, detailing its interpretation of the standard's requirements (Ross, 1998). Finally, the registrar is precluded from registering substandard systems by its need to maintain its reputation. If word got out that it was the registrar of choice for firms whose environmental performance was continually sub-par, and constantly facing public and regulatory actions, purchasers would refuse to buy from suppliers carrying that mark of conformity. This would jeopardize the registrar's future stream of revenues: "Denying registration is a concern for future business, but it is not as important as our reputation of integrity. If that is ever compromised, the desirability for our registration is severely diminished"(Hansa, SGS, 1998).

In summary, while registrars have several sanctioning tools at their disposal, such tools may not be employed, due to the cooperative nature of the registrars' relationship with clients, a lack of public accountability, and an incentive to monitor less than ones' competitors.

### **5.5 Credibility: Analysis and Conclusions**

Environmental regulators in the US are considering privatizing some aspects of regulatory oversight. The motivation for this 'devolution of accountability' is to make more effective use of regulatory resources to target the worst performers. If it were possible to use private third parties to monitor the better performers, regulators would go a long way towards overcoming many of their resource constraints. "While [private third-party audits] cannot and should not remove the responsibility for environmental compliance and enforcement activities from public agencies charged with such activities, it can provide increased resources to accomplish these activities efficiently through the market"(Kleindorfer, 1996:3).

However, because "they have a legal mandate to assure compliance with applicable laws and regulations, [regulators] cannot simply relinquish enforcement responsibilities to the market"(Kleindorfer, 1996:25). In order for such a system to succeed it must be seen as credible, meaning both capable of sanctioning cheats, and consistent in its oversight and application of those sanctions. "Voluntary approaches must be carefully designed to limit free-riding and strategic behavior by firms and to generate public credibility and support. This requires that...they include credible independent mechanisms for monitoring and enforcement, and provisions for sanctions in the event of non-compliance"(Leveque, 1997:2).

The purpose of this chapter has been to explain in detail the accreditation and registration processes, and highlight the areas of greatest tension between private interests and public ends. In short, it looked at the accreditation process, the consistency of application of the standard's requirements by registrars and the nature of sanctions available for the enforcement of those requirements. Private system audits do offer organizations stimulation to follow through on internal commitments, without the

adversarial threat of legal enforcement sanctions. Based on brief interviews with a range of US registrars, it appears that there is an objective process for accreditation, requiring registrars to demonstrate a minimum level of expertise and experience, oversight, and significant organizational commitment. The heart of the accreditation system – each registrar looking over their peer’s shoulder, and each depending on their own reputation to draw in new business – does offer substantial protection from ‘races to the bottom’.

On the other hand, the consistency of interpretation of the standards between registrars is called into question by the anecdotal evidence of a variation by registrars in their treatment of ‘affirmative statements’. Second, while there is a wide array of sanctions available to registrars, ranging from cooperative (notifications) to punitive (withdrawal of registration), the consistency of application of these sanctions is an open question. No registered firm has yet been suspended for failing to conform to the ISO 14001 standard.

What is clear is that public accountability could be significantly be bolstered without changing the fundamental structure of the standard.

- There is little accountability of the accreditation boards and registrars to the public. There is no readily-accessible public database of past and present registered companies and their registrars, and no means provided for public actors to ensure consistent application of the standard’s requirements, other than NGO and EPA participation in the accreditation board’s registrar review process.
- There are substantial incentives for registrars to lower their standards or consult in order to win greater market share. Some anecdotal evidence suggests that firms do have different interpretations of key components of the standard.

Third party environmental management system audits may be a powerful tool for steering private interests towards socially-preferable ends. The first party (the company) hires a third party (the registrar) to guarantee its performance to a second party (the regulator, the public, or another company). The audit may powerfully complement the efforts of public regulatory agencies, helping them to better monitor companies at reduced costs. However, this ‘devolution of accountability’ needs to be carefully managed and designed, to prevent organizations from disguising their true performance under the veil of an independent endorsement of their management system.

The following chapter will explore in greater detail the notion of privatizing some of the EPA’s oversight responsibilities, and stakeholder responses. Are there precedents for this type of privatization ? Under what conditions is it legal ? What sorts of incentives have regulators offered in the past ? What proposals have been advanced for incorporating ISO 14001 in regulatory reform schemes ?

## Chapter 6: Regulatory Reform and Stakeholder Perspectives

### 6.1 Introduction

“The United States can shift its basis of environmental protection from clean-up and control to anticipation and avoidance...To move beyond our existing command-and-control system, we will need a system which is built on performance, fairness, accountability and partnership. The ISO 14000 standards appear to have these characteristics...ISO 14000 resonates with the philosophy of the Clinton/Gore administration.”

--John Gibbons, Director, White House Office of Science and Technology Policy<sup>128</sup>

The purpose of this chapter is to describe regulatory reform initiatives based on the granting of regulatory flexibility, the risks to participating firms and regulators, and stakeholder perspectives on the use of ISO 14001 in such initiatives. Various strategies may be used for identifying organizations that warrant reduced governmental oversight. ISO 14001 may represent one such indicator, if it leads organizations to make meaningful environmental commitments (chapter 4) and if third-party registration acts as a credible oversight mechanism for holding the organizations accountable for delivery on those commitments (chapter 5). Regulatory strategies incorporating ISO 14001 will need to be structured such that they meet stakeholder concerns about legitimacy and accountability. Likewise, they will need to be sensitive to industry's desire for flexibility, fairness, and voluntarism.

### 6.2 An Alternative Path for Better Performers ?

“A synoptic approach to regulatory reform would begin by asking what the problems are, which are the most serious, which can be addressed most easily, and then would target limited reform resources in those areas which would yield the most productive change.”

-- Cary Coglianese, Harvard University, 1998.

“For three years, EPA has pursued an unprecedented agenda for consistently delivering cleaner, cheaper, smarter results from environmental and public health programs.”

-- EPA Spring 1998 Regulatory Preamble<sup>129</sup>

In chapter one, this study defined command-and-control regulation, and developed a list of its most commonly-cited critiques. These include:

- Inefficiency
- Contentiousness
- Unenforceability
- Lack of Transparency
- Inflexibility
- Balkanization and Fragmentation

Regulatory reformers in the current administration have sought to address the criticisms levied above through several means. According to its 1998 regulatory agenda preamble, the EPA is seeking to bring about improvements in several areas including greater public access to information, more flexibility to obtain better results, stronger

<sup>128</sup> Gibbons, J. ISO 14000: Environmental Standards for Change. ANSI ([http://web.ansi.org/public/iso14000/new/gibbons\\_13.htm](http://web.ansi.org/public/iso14000/new/gibbons_13.htm)). Dec 14, 1995.

<sup>129</sup> EPA. Regulatory Agenda Preamble. (<http://www.epa.gov/epahome/agenda98.htm>). spring, 1998.

partnerships with diverse stakeholders, more compliance assistance, and 'less paperwork and red tape'(EPA, 1998:2). Table 6.2, below, shows the link between 'regulatory reinvention' efforts at the EPA, and the critiques of command-and-control regulation specified above.

<b>Critiques of Technology-Based Standards</b>	<b>'Regulatory Reinvention' Efforts at EPA, 1997</b>
Efficiency	Eliminated unnecessary requirements (1,300 pages of regulation, representing 20M hours of regulatory burden); "Increased Efficiency Through Electronic Reporting"
Transparency	'Plain English' Regulations; Expanded TRI Reporting
Legitimacy	"Conditioning [flexibility] on a record of proven performance and accountability"; Pharmaceutical industry air toxics rulemaking in "partnership with affected stakeholders"
Adaptability	Multimedia rule (issued for pulp and paper industry) "allows companies to delay compliance...if they commit to installing more advanced technologies"
Compliance Assurance	Establishing compliance assistance centers; "Reducing penalties for companies that show good faith towards finding, publicly disclosing and correcting environmental problems"
Comprehensiveness	"Voluntary partnership programs...represent an attractive opportunity to address a broad range of environmental issues...that may not be amenable to traditional regulatory approaches"

Source: EPA Annual Report on Reinvention, 1997<sup>130</sup>

Table 6.2 EPA Reinvention Efforts Address Critiques of Traditional Technology-Based Regulatory Controls

Many parties have initiated efforts to fundamentally reconceptualize regulation in light of these criticisms. They begin with the premise that 'better' performers deserve 'better' treatment. In 1995, the National Academy of Public Administration was directed by Congress to review EPA's regulations. "This congressional mandate resulted in the report 'Setting Priorities, Getting Results' [which]...concludes that...Congress should pass legislation encouraging firms to exceed compliance requirements in exchange for more leniency in how to meet regulatory standards, and the environmental control effort should be integrated with, rather than based upon, the current single media approach"(Reiley, 1997:565).

Similarly, the National Environmental Policy Institute, in a 1995 report, "recommended the creation of an alternative regulatory track based on 'environmental excellence'. The report states, 'Regulated entities that commit to environmental excellence principles, implement comprehensive management systems and strive to continuously improve their performance should be able to opt out of the command-and-control system into a more flexible, consistent regulatory scheme'"(as cited in Feldman, 1997:12<sup>131</sup>). In 1996, the Aspen Institute convened "a series of conferences among diverse stakeholder representatives" from industry and the environmental advocacy community, culminating in their recommendation of an "Alternative Path...allowing more flexible and efficient compliance methods in return for achieving superior environmental performance and

<sup>130</sup> EPA. Annual Report on Reinvention. (<http://www.epa.gov/reinvent/annual97/incent.htm>), 1997.

<sup>131</sup> Feldman, I. "ISO 14000 Can Underpin a New 'Dual Track' Regulatory System" in Environmental Business Journal, January 1997:11-15.

involving stakeholders more directly in the information sharing and decision making process”(Aspen, 1996<sup>132</sup>).

After reviewing these and other reform recommendations, Reiley (1997) reports: “A consensus has emerged...The federal government should continue to set minimum standards to maintain a level playing field. Permits should be facility wide, and in some cases, industry wide...Technology-based standards should be replaced, wherever possible, with performance-based standards...Pollution prevention should be a part of any company’s long-range planning...Finally, incentives should be enhanced for companies with good performance records”(Reiley, 1997:567)<sup>133</sup>.

Many efforts are underway to reform environmental regulation. However, the link between the ‘solutions’ posed and the underlying problems being addressed is not always explicit. A framework is needed to understand and categorize regulatory reform proposals, and link them to the problems they seek to ameliorate.

### 6.3 Regulatory Flexibility: Goals, Means and Enforcement

In ‘Alternative Path’ proposals, regulatory flexibility would be given to better performers. What is regulatory flexibility ?

A regulation typically prescribes a performance goal and a means for attaining that goal. Regulatory Flexibility allows qualifying actors to receive variances either in the performance ‘goal’ they must achieve, or in the ‘means’ which they must employ to achieve that goal. The premise supporting the granting of regulatory flexibility, in the words of President Clinton, is that “in many cases, companies know their business a whole lot better than the government does”(referring to Project XL, as cited in Steinzor, 1998:111). Vice President Gore expands this definition of Project XL: “We enter into a bargain with businesses. When they say ‘We’ll exceed the standards’, we say, ‘Give the EPA a way to measure the progress and then throw away the rule book altogether’”(as cited in Steinzor, 1998:111). **Through flexibility, it is argued, firms will be able either to achieve the same performance results at lower cost, or achieve better performance than before at the same cost.**

<i>Increasing Means Flexibility</i>	II      Performance Standard (fixed goals, open means)	IV      Covenant (open goals, open means)
	I      Technology Standard (fixed goals, fixed means)	III      Procedural Standard (open goals, fixed means)
	<i>Increasing Goal Flexibility</i>	

Figure 6.4 Matrix of Regulatory Goal and Means Flexibility Options, Relative to Technology Standards

Goal flexibility refers to the allowable deviation from a mandated performance level. Means flexibility refers to the method used to achieve that performance goal. In the 2x2 matrix of ‘regulatory flexibility’ presented above (figure 6.4), quadrant I represents

<sup>132</sup> Aspen Institute. The Alternative Path: A Cleaner, Cheaper Way to Protect and Enhance the Environment. (Web-based edition), 1996.

<sup>133</sup> Reiley, R. Environmental Law and Business in the 21st century: The New Paradigm - ISO 14000 and its Place in regulatory Reform. In Iowa Journal of Corporate Law, Vol. 22, Spring, 1997.

regulation that permits neither goal nor means flexibility. For example, by requiring lead-free gasoline, the EPA allowed industry no flexibility in the determination lead emission goals, nor in how they would achieve those goals.

Quadrant II encompasses regulation allowing flexibility in the means to achieve the designated emission goal. One example is a cap-and-trade permit scheme, such as the interrefinery lead phase-down credit trading system established by the EPA in order to “allow gasoline refiners greater flexibility during a period when the amount of lead in gasoline was being significantly reduced”(Hahn, 1989:101)<sup>134</sup>. This scheme allowed refiners to trade lead content credits (calculated against their base year production level), amongst themselves in order to achieve the overall lead production target. In this case, participants are not limited to using a specific technology to achieve the performance goal, and may ‘pay their neighbors’ to reduce lead content, rather than perform the reduction themselves, allowing them to achieve the performance result at reduced cost.

Goal flexibility, represented in quadrant III, covers efforts to prescribe a methodology without requiring firms to meet a specific performance level. This study found no such examples.

Quadrant IV represents regulatory approaches utilizing both goal and means flexibility to drive pollution reduction. An example of this approach is the Dutch environmental covenant model (Glachant, 1994:43-45), in which an industry group and its regulators negotiate an overall emissions target, and allocate resulting responsibilities among member firms. Implicit in this model is the threat of direct regulation, should the covenant signatories’ overall performance be insufficient to meet the environmental quality objectives of the regulators.

The scope of the regulatory flexibility to be granted is bounded by the definitions of the regulatory objective, the responsible party, and the time during which the flexibility is valid. Thus, flexibility may be granted on a pollutant-by-pollutant vs. multi-pollutant, and single medium vs. multi-media basis. The opportunity to participate may be granted to a specific site, a range of sites within a region, an industry sector, or to all industrial sources in the country. The waiver granted may be given for a limited time span and be non-renewable, or have a longer time horizon and the opportunity for renewal.

Under current US law, compliance with regulation is non-negotiable. Firms are legally required to comply with regulation, regardless of whether the same results may be more-efficiently achieved through other means. According to a recent communique by Carole Browner, Administrator of the EPA, “Our first obligation is to fulfill the statutory responsibilities we have been given by Congress. That generally means developing environmental standards through regulation, and ensuring compliance through a series of permits, inspections, and enforcement actions”(Browner, 1993:4)<sup>135</sup>. For that reason, goal flexibility may legally exist only where firms agree to go above and beyond performance levels established statutory minimums.

<sup>134</sup> Hahn, R. Economic Prescriptions for Environmental Problems: How the Patient Followed the Doctor’s Orders. In *Journal of Econ. Perspectives*, vol. 3, no. 2, Spring 1989:95-114.

<sup>135</sup> Browner, C. Pollution Prevention Policy Statement: New Directions for Environmental Protection, to All EPA Employees. EPA, June 15, 1993.

Means flexibility is allowed under US law. It is frequently codified in statutes through Innovation Waivers (Ashford et. Al., 1985). “Generally, the waivers extend deadlines by which industry must install pollution control equipment to meet emission permit limitations. Development of an innovative idea that is not an operational reality often requires trial periods and substantial time, during which a firm can incur penalties from violations of emissions or effluent standards. The innovation waiver exempts industry from penalties during trial periods and offers it the prospect of cost savings derived from a superior technology”(Ashford et. Al., 1985:444)<sup>136</sup>. Innovation waiver provisions exist under the Clean Air Act, the Clean Water Act, and RCRA. However, the administration of such waivers by the EPA may be inconsistent due to ambiguity of definitions, misplacement of authority, and a lack of attractive incentives for innovation (see Ashford et. Al., 1985:451, 457).

The EPA also has the ability to grant some enforcement flexibility. It has a certain degree of discretion as to whom it chooses to cite for non-compliance, how far it will go to prosecute them, and what level of penalties it will pursue. In the case of Heckler v. Chaney (470 U.S. 821, 837-38, 1985), for example, the court made “a distinction between agency action, which is reviewable, and inaction, which is not. As Chaney states, agency non-enforcement decisions are ‘generally unsuitable for judicial review’...[unless] an agency has ‘consciously and expressly adopted a general policy’ that is [shown to] amount to an abdication of its statutory responsibilities”(Breger, 1998:349).

The EPA’s enforcement discretion is offset, to some extent, by public right-of-action laws, allowing private interests to bring a violator to trial if the EPA has not responded to non-compliance. The Clean Air Act, the Solid Waste Disposal Act, the Safe Drinking Water Act and other statutes each codify ‘citizen suit provisions’ (Breger, 1998:344). Thus, many flexibility initiatives are not protected from citizen suits, even if they are approved by EPA. For example, “unless legislation is enacted authorizing Project XL, site specific agreements that contain exemptions from existing requirements are vulnerable to challenge in citizen suits”(Steinzor, 1998:140). As an unidentified EPA staff member opined in an internal newsletter, “If it isn’t illegal, it isn’t XL”(‘What’s up with Project XL:3/11/96’, EPA, as cited in Steinzor, 1998:147).

In summary, regulators may offer regulatory flexibility in the form of variances in goals, means, or enforcement. In the US, this flexibility is limited by the EPA’s mandate: to ensure regulatory compliance. Thus, many regulatory flexibility initiatives are vulnerable to citizen suit challenges.

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<sup>136</sup> Ashford, N., Ayers, C. and Stone, R. Using Regulation to Change the Market for Innovation. In Harvard Environmental Law Review, vol. 9, 1985:419-466.



## 6.4 Corporate Participation in Regulatory Reform: Added Risk, Additional Incentives

“Incentives for participation in [reinvention] programs...need to be tangible and significant. At minimum they should offer reduced transaction costs...To be more attractive, programs will provide direct economics incentives which mitigate the future costs of pollution control.”

--Dan Beardsley, Global Environmental Management Initiative<sup>137</sup>

Regulatory flexibility may offer firms an opportunity to meet or exceed social obligations, at reduced cost. However, participating firms take on additional risks. In addition to the opportunity cost of the capital and manpower needed to participate, industry faces greater regulatory uncertainty, more stakeholder scrutiny, more-invasive reporting requirements, and sometimes, increased liability exposure. In addition to goal, means, and enforcement flexibility, therefore, the EPA may need to offer other incentives to attract participants and offset their risks.

According to Steinzor, “incentives can...either save -- or produce extra -- money, or achieve some other tangible benefit for the participating firm or group. If companies are able to save money on production or compliance costs, or to obtain a tax benefit or government subsidy, [avoid] liability for cleanup costs or private damages, escap[e] enforcement actions, and [keep]...a company’s public image..[un]tarnished”, then they have incentives to participate (Steinzor, 1998:154-5).

A 1996 GEMI survey of three state reinvention initiatives yielded the following (incomplete, but representative) list of incentives for industry participation (Beardsley, 1996), in addition regulatory flexibility:

- **Fast-Track and Lower-Cost Permitting:** accelerated permit consideration; consolidated (multi-media) permit applications; longer term permits; replacement of permit applications with self-certification of compliance; reduction of permit fees.
- **Reduction in Site Inspections, and Reporting Burdens:** simplified reporting requirements; integrated inspections programs and reduced frequency of inspection.
- **Investment Incentives and Reduced Fees:** credits for use in emission trading; tax credits for pollution prevention investment; credits for investments that can be banked against future charges by agency (for payment of penalties, permit charges, etc.); % reduction of emission fees; technical assistance (including financial support for hiring of consultants).
- **Enhanced Relationships and Reputation:** public recognition by agency; improved relationship with regulator.
- **Reduced Liability Exposure:** enhanced audit privilege. In Minnesota’s Environmental Auditing Program, for example, “while Department staff can obtain access to audit results, persons other than the government cannot use audits in legal proceedings if the company complies with the corrective action schedule”(Beardsley, 1996:15).

<sup>137</sup> Beardsley, D. Industry Incentives for Environmental Improvement: Evaluation of US Federal Initiatives. Global Environmental Management Initiative (GEMI), 1996.

Some of these incentives, where they reduce transaction costs, increase operational flexibility, and improve image, are considered quite significant by participating firms (Beardsley, 1996:25). For example, “substituting one permit for the existing system is dramatic [in New Jersey]. In one case 100 air permits have been consolidated [into one]; in another, 75 permits for all media are now combined...Facilities expect to see major efficiencies in the amount of time spent on permit preparation in the future”(Beardsley, 1996:12).

These incentives may be insufficient to stimulate adequate participation. Concerning the Common Sense Initiative and Project XL, one study found that “incentives for program involvement are weak to begin with, and the risks of [citizen suit] litigation and other failures are high...Companies are increasingly discouraged by unexpectedly high transaction costs of participation. Investment of staff time can be enormous. There is frustration over the length of the review process and confusion over the role of stakeholders...Costs of participation, in other words, are beginning to outweigh incentives”(Beardsley, 1996:3). This may explain why, though the EPA expected between 100 and 500 proposals when it launched Project XL in 1995, it had only received 46 applications by June 1997, of which 12 were rejected because they demanded inappropriate performance (goal) flexibility (Steinzor, 1998:126).

Many critics point to the incentives listed above as examples of how the existing system should be corrected, and argue that they should not be limited to a subset of firms. “For example, it would be inappropriate to limit reductions in unnecessary reporting or monitoring to ISO 14000 organizations. No organization should be subject to unnecessary requirements”(CI2, 1997:3). When designing regulatory flexibility strategies, therefore, the designer may need to distinguish between true ‘incentives’ (those that offer justifiable benefits to participants in exchange for ‘superior performance’, for example), and those aspects, such as consolidated permitting, that might improve the efficiency of the underlying regulatory scheme.

### ***6.5 Regulatory Participation in Reform: More Risk for ‘Better’ Results***

The intention of a two-tier regulatory scheme is to provide incentives for firms to become environmentally proactive through granting regulatory flexibility to better actors. In granting regulatory flexibility to a firm, **the regulator risks two undesirable outcomes**. First, the regulators’ ability to assure compliance with traditional command-and-control regulations through monitoring and sanctioning is necessarily finite. However, technology-based control regulations may be directly observed during inspections, facilitating oversight. The addition of regulatory flexibility therefore complicates the oversight process. Thus, the regulator risks **reduced environmental performance, because the participating firm exploits diminished oversight in order to reduce its compliance costs**.

Second, it may be that the firm cooperates to the fullest of its ability, yet the resulting **environmental performance improvements or cost-savings** are insignificant, thus **failing to justify the flexibilities granted** and agency resources invested in the initiative.

How can the regulator minimize the risk of undesired outcomes ? In other words, **how can 'better performers' be identified ?** "To justify the investment of resources in developing an Alternative Path agreement, candidates will be screened..."(Aspen, 1996). The Alternative Path group recommended the following criteria for identifying organizations that merit entry to a more flexible regulatory framework: "Commitment and ability to manage for environmental excellence...[demonstrated by] pursuit of a proactive corporate environmental policy; a strong public record of environmental leadership, innovation and achievement; responsiveness to community and worker health concerns; and incorporating pollution prevention, life-cycle product stewardship, and design-for-environment applications into core business practices"(Aspen, 1996).

In practice, regulators have utilized criteria such as those listed below (Beardsley, 1996):

- Absence of recent enforcement or compliance problems.
- Documented proof of in-place internal environmental management systems and pollution prevention programs.
- Participation and compliance with other voluntary environmental programs, such as EPA's 33/50 Program or Green Lights Initiative.
- Commitment by the top facility official that s/he intends to achieve the goals set forth in the plan.
- Internal compliance auditing programs.
- Demonstration of "historical environmental leadership"(Project XL participation criterion, cited in Steinzor, 1998:134).

Enhancing compliance assurance during the actual operation of such schemes is vital. Firms may be required to justify their regulatory flexibility entitlements through greater performance disclosure, third party verification of claims, or other means. For example, in order to qualify for Project XL, "a company must propose alternatives that (a) produce environmental performance superior to that which would be achieved under current regulations; (b) be 'transparent' and accountable, so that citizens and regulators can examine assumptions and track progress; (c) not create worker safety problems or result in environmental injustice; (d) enjoy the support of the surrounding community; and (e) be binding and enforceable"(Freedman and Caffee, as cited in Breger, 1996:332).

At last, we see where ISO 14001 fits in regulatory reform initiatives: the presence of a third-party verifiable EMS, in which top management commits to compliance, prevention of pollution, and continual improvement, may constitute evidence of 'environmental leadership', and thus grounds for the granting of regulatory flexibility and other incentives. For example, the NEPI report on regulatory reform "specifically mentions the ISO 14000 standards as one of the environmental excellence criteria to be used in the development of an alternative regulatory track"(Reiley, 1997:566). The next section will explore the argument for using ISO 14001 as a criterion for participation in reform initiatives.

## **6.6 ISO 14001 and its Role in Regulatory Reform**

Registration to ISO 14001 may represent an indicator of environmentally proactive management, if it leads organizations to make meaningful environmental commitments (chapter 4) and if third-party registration acts as a credible oversight mechanism for holding the organizations accountable for delivery on those commitments (chapter 5).

According to a recent Department of Energy study, the relationship between adopting an EMS and regulatory compliance has been characterized in three ways: “Advocates claim an EMS encourages more consistent compliance and improved environmental performance. . [They] believe that an EMS can essentially replace key elements of regulatory oversight, such as inspections or permits. The more cautious view holds that an EMS harmonizes and complements oversight...[The most cautious] view holds that no change in the regulatory oversight approach is appropriate [because]...eliminating the conditions that are regulated will lead to a reduction in oversight” (DOE, 1998:7)<sup>138</sup>.

Among those in the first and second camps, ISO 14001 is seen to offer a unique opportunity. Because it was designed mainly by industry representatives (chapter 2), and follows the model of the widely-adopted ISO 9000 standards, it has greater legitimacy in the business community than many other, similar EMS initiatives. It is internationally accepted, partly because it makes no performance requirements. Therefore, a multinational may implement it in a similar manner, though with varied performance targets, in all of its locations, achieving consistency and economies of scale in its management practices. Lastly, in spite of considerable criticism alleging bias in its development process, the standard has had input from many regulatory and environmental advocacy groups, and that input is expanding in its upcoming revision phase (chapter 2). Finally, third party registration auditing may increase the standard’s legitimacy to external stakeholders above that of other, similar initiatives, such as Responsible Care (see chapter 5).

Among the most vocal proponents of ISO 14001 use in ‘Alternative Path’-style regulatory schemes is Ira Feldman, a vice-chair of the US Sub-TAG to ISO, and past director of the Environmental Leadership Program, a regulatory flexibility initiative, at EPA. Feldman argues that (1997:12): “Although ISO 14001 registration is not evidence of environmental excellence, in combination with other corporate environmental commitments, such as auditing, benchmarking, monitoring, and external voluntary reporting, an excellence program begins to take shape. ISO 14001...encourages companies to take a holistic approach to environmental management. The documentation...requirements...could provide a basis for integrated monitoring...[and] a consolidated reporting mechanism. A commitment to ISO 14001 also comes with a requirement to aim for pollution prevention,...a commitment to compliance and to document conformance with voluntary obligations [e.g. goals]... Finally, third party verification will provide a comfort level to stakeholders, and could form the basis for privatizing inspections for a subset of the regulated community”.

Other analysts have drawn similar conclusions: “Market-based implementation of a management system standard, as embodied in ISO 14000, might provide considerable

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<sup>138</sup> Department of Energy (DOE). EMS frameworks for the Federal Sector in the US. Interagency working Group on ISO 14000, 1998.

leverage in efficiently...assuring compliance with regulatory or industry best-practice standards for environmental performance (p.10)... If the EMS objectives and policies clearly state the company's plans for compliance with a set of regulations, then an audit of the EMS under ISO 14001 will yield valuable information to both the public and the regulator on the company's compliance with these regulations (p.19)"(Kleindorfer, 1996).

The EPA is cautiously evaluating the utility of ISO 14001, among other EMS schemes, for regulatory reform. According to a recent policy statement, "the EPA encourages the use of EMSs that focus on improved environmental performance and compliance, as well as source reduction (pollution prevention) and system performance.... Through initiatives such as Project XL and the Environmental Leadership Program, EPA is encouraging the testing of EMSs to achieve superior environmental performance.... EPA is working in partnership with a number of states [through the Multi-State working Group, or MSWG] to explore the utility of EMSs, especially those based substantially on ISO 14001, in public policy innovation"(Hansen, 1998)<sup>139</sup>. The Multi-State Working Group has invested much effort in seeking revision of the EMS standard to better respond to stakeholder and regulatory desires for greater accountability, environmental performance minimums, and an emphasis on pollution prevention over pollution control.

Others seek to build onto ISO 14001 additional controls, creating a form of 'ISO-Plus'. In EPA Region 1, "[The Startrack program is] a groundbreaking experiment to privatize compliance assurance for leading companies. Built on the ISO 14000 model, the region will be empowering third parties to certify three basic components 1) an environmental management system modeled on ISO 14001; 2) facility environmental compliance and pollution prevention audits; and 3) a commitment to correct certain violations within an established timeframe"(EPA, 1997:2-9).

At the State level, numerous pilot projects are underway with similar intent. For example (EPA, 1997)<sup>140</sup>:

- **Colorado:** "The Department of Public Health and Environment has included ISO 14000 as a possible criterion in a proposal that would reduce government oversight and provide financial incentives to companies who excel in environmental performance"(4-1).
- **Kentucky:** "[The state] is facilitating ISO 14000 training through... workshops,... teleconferences,... conferences and lecture series statewide"(4-4).
- **Minnesota:** The Office of Attorney General is sponsoring statewide EMS training initiatives, one for larger businesses, the other for smaller ones. It is also making "an effort to identify the risk reduction and competitiveness advantages of good EMSs and to inform bankers, insurers and investors of these advantages. ISO 14001 registration and implementation could conceivably be used as a tool in measuring likely improved performance"(4-6).
- **New Mexico:** "The Green Zia program will recognize [organizations]...that have met specific criteria for achieving environmental excellence....The criteria for receiving recognition will be developed with input from regulators and industry representatives, and will include ISO 14001 conformance"(4-8).

<sup>139</sup> Hansen, F. EPA Position Statement on EMS and ISO 14001, and a Request for Comments on the Nature of the Data to be Collected from EMS/ISO 14001 Pilots. (<http://www.epa.gov/reivent/ems/emsfr1.htm>). Federal Register, Vol. 63, No. 48, March 12, 1998.

<sup>140</sup> EPA. ISO 14000 Resource Directory. EPA/625/R-97/003, October 1997.

In summary, there are several arguments for why ISO 14001 might be a useful tool for use in developing an alternative regulatory track for better performers. As a result, regulators are rapidly developing regulatory flexibility pilot initiatives that take ISO conformance as a keystone for participation. Some are also seeking revision of the standard itself. An important question in the race to develop programs such as these is their implementability. Who supports these initiatives? What are the perspectives of the key stakeholders with respect to use of ISO 14001 in regulatory reform efforts? Should the existing EMS standard be reformed as well?

### **6.7 Stakeholder Analysis: Defining Appropriate Policy Responses to ISO 14001**

“Defining a regulatory regime as a specific mindset, [that regime] represents a particular way of understanding or conceiving of environmental problems and the subsequent choice of regulatory goals, instruments and institutional settings. In this new emerging regime, environmental problems...are not simple externalities that are easily internalized, but an integrated part of the workings of the economic system...Without the active cooperation of the affected parties - business as well as other actors - it will be impossible to realistically define long-term policy goals.”

Susse Georg, Copenhagen Business School

The intent of this section is to lay out the areas of consensus and controversy with respect to the use of ISO 14001 in regulatory reform efforts. Specifically, what constitutes a legitimate, desirable use of ISO 14001 in conjunction with regulatory flexibility for key stakeholders? The viewpoints of industry, environmental advocacy and community organizations, regulators at the federal and state levels, of consultants and registrars, and of the ISO, will all be briefly summarized.

#### **Industry**

The bulk of industry stakeholders are, in principle, supportive of the combination of regulatory flexibility and ISO 14001. Most believe that the current regulatory system is unnecessarily burdensome and adversarial. “Not surprising is the business preference for self-policing....[which one executive thinks], ‘philosophically is a better system...I think a society which operates through a combination of self-policing with appropriate performance standards and periodic audits...is the most cost-effective system...Fundamentally [though] it depends on the honesty of [industrial sources]”(cited in DiMento, 1986:82).

That said, most industry actors are concerned about fair treatment, and do not want to be penalized for environmentally-proactive initiatives, such as comprehensive audits. “Organizations that voluntarily implement an EMS such as ISO 14001 are potentially subjecting themselves to increased liability in the existing US legal system...Governments should respect privilege/disclosure statutes and policies that protect companies”(CI2, 1997:3). They want “tangible and significant” incentives for participation in such programs (Beardsley, 1996:1), primarily reduction in transaction costs, and potentially, regulatory exemptions (Steinzor, 1998:138). They also believe that ISO 14001 should remain voluntary, and organizations should not be penalized for failing to implement it (CI2, 1997:1). Even if they do implement it, firms feel entitled to

seek to reduce environmental costs, rather than to seek a higher standard of performance: “It is perfectly legitimate for an EMS to focus solely on compliance”(CI2, 1997:4).

Transparency and public participation are sensitive issues as well. While stakeholders should be involved in regulatory reform efforts, “EPA should be careful to separate the role of interested parties in the development and implementation of public policy and the role of interested parties in...the internal deliberations of private companies...An EMS...should not be found wanting because it did not meet some preconceived notion of the appropriate level of interested party involvement or public communication”(CI2, 1996:6). Following this reasoning, “some corporate participants are pressuring EPA to curtail sharply the influence of multi-stakeholder negotiations, arguing in the context of Project XL, for example, that public interest representatives should be confined to an advisory role”(Steinzor, 1998:170).

In terms of revising the standard, “ISO 14001 was adopted with broad international...consensus. [Because it is still new] conclusions can [not yet] be drawn about its potential strengths [or] weaknesses...Governments should not unilaterally revise, add to, or provide detailed guidance on ISO 14001”(CI2, 1997:2,4).

The industry position on these issues is summed up best by Larry Slimak, chairman of the American automobile Manufacturers Association. “The US has the most open public reporting requirements of any nation in the world. Why build more reporting into the standard ? Also, Ford [for example] has decided to go to ISO 14001 as a voluntary business decision...[It is] intended primarily for voluntary internal improvement of environmental management”(Slimak, 1998<sup>141</sup>). Industry believes that it should have the opportunity to determine whether ISO 14001 makes business sense before being forced to adopt it by government regulation, or see it change from a potentially-beneficial management tool to a less-competitive tool for correcting shortcomings of existing environmental policy.

### **Community and Environmental Advocates**

There are two major constituencies whose views would be significant in any regulatory regime centered around ISO 14001. First is the professional national environmental advocacy organizations (EAOs). Second is the volunteer citizen activist groups in the community surrounding any facility being considered for regulatory flexibility. Each would bring slightly different interests and concerns to the table.

“First, **national environmentalists** have the same interests as prospective industry participants in a transparent set of standards that allow them to evaluate precisely how they could benefit [from regulatory flexibility initiatives]...[Second], the environmentalists’ interest in significantly superior environmental performance [as a precondition of participation] often conflicts with industry’s interest in reducing compliance costs by achieving regulatory exceptions”(Steinzor, 1998:178). However, some EAOs have shown themselves open to reducing regulatory burden: Recently, the president of the NRDC collaborated in that manner: “If there were truly redundant reporting requirements that were burdening industry while not creating any new information or any environmental gains, NRDC...challenged industry to point them out and then supported their elimination”(Adams, NRDC, 1997).

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<sup>141</sup> Slimak, L. Chairman, CI2; American Automobile Manufacturers Association. Personal Interview, Oct. 21, 1998.

This raises an important issue with regards to 'flexibility'. Environmentalists are concerned that regulatory reforms will weaken the current system. They want assurance that, in acting as the facilitator between EAOs and industry groups, EPA will not abdicate its role as guardian of the public trust. For example, a recent statement by the president of the NRDC illustrates this perception: "We [NRDC participants] were disappointed that regulatory strengthening was not championed by the EPA during the early Common Sense Initiative discussions as a crucial tool for pollution prevention. Anti-regulatory views set the tone...In this atmosphere we...[attempted] to wring the most environmental benefit possible out of non-regulatory alternatives and various streamlining and reform proposals. Our point is not that these latter proposals are meritless, but rather that the lack of support for [stringent] regulatory approaches unduly constrained the available policy options"(Adams, NRDC, 1997).

In terms of the reform of ISO 14001, environmentalists are mostly united. From their perspective, ISO 14001 represents an inappropriate departure by the ISO, from the realm of private transactions into the realm of public safety (Seifert, 1998). Furthermore, the ISO 14001 development process largely excluded environmentalists, due to the high cost of participation (see chapter 2). Therefore, environmentalists mistrust the legitimacy of the standard, and want meaningful participation in the ISO process, as well as in any regulatory flexibility program structured around the standard. "The environmental community in the US...[has] no official position yet. However, in Europe....the European Environmental Bureau, which represents the bulk of the environmental community there, has come out against ISO 14000. It sees it as an industry-dominated effort to displace stricter EU regulations (McCloskey, 1996<sup>142</sup>). Second, the environmentalists are concerned that the public, confused by corporate advertising claims, will equate ISO 14001 registration with environmental preferability, and want to see controls enacted to limit this behavior (See chapter 2 critiques; Seifert, 1998<sup>143</sup>; Hauselmann, 1997).

In the context of both ISO 14001 use and regulatory reform with the EMS at its heart, EAOs are unable to fully play the role of public interest watchdog. They lack the resources necessary to negotiate flexibilities on a site-by-site basis, should flexibility applications became widespread. Therefore, they seek to negotiate at an industry-sector level, or to obtain assistance and financial aid, in order to participate meaningfully in negotiations (Steinzor, 1998:179).

**Community activists** have different priorities which are far more personal than professional environmental advocates (Steinzor, 1998:180-3). Activists are under even greater resource constraints than national organizations, and as individuals are constrained by other commitments, including family demands and the need to work for a living. They lack the technical expertise of the environmental professionals. Furthermore, they are members of the community in which a given site is being considered for flexibility, and therefore have great personal stakes in the outcomes of local flexibility negotiations. This includes both assuring protection of health (theirs, their family and friends), and in not unduly constraining the company upon which many of their neighbors may depend for occupations. The activist interest coincides with the professional environmentalist, in that they both mistrust the legitimacy of the ISO 14001

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<sup>142</sup> McCloskey, Michael. ISO 14000: An Environmentalist's Perspective. Chairman, Sierra Club. (<http://www.ecologia.org/iso14000/opcom/sierra.htm>). April 26, 1996.

<sup>143</sup> Seifert, D. NGO Working Group on ISO 14000. Personal Interview, Oct. 28, 1998.



standards, and need funding and technical assistance to participate meaningfully in negotiations. In order to judge for themselves the efficacy of any regulatory agreement, “local activists place a high value on...gaining access to information about emissions or health effects”(Steinzor, 1998:183). They would largely be uninterested in the debate over reform of the ISO standard, unless it was shown that registration was being misused by local industrial firms. Most important from their perspective is to ensure the regulator does not abdicate responsibility as the final decision maker.

### **State and Federal Regulators**

The various states and the EPA have drawn different conclusions with regard to the following issues. First, they disagree over whether flexibility should be granted for ‘compliance at lower cost’ versus ‘superior environmental performance’. For example, the Federal level is more cautious than the States about the appropriate role of ISO 14001. “At this time, EPA is not basing any regulatory incentives solely on the use of EMSs, or certification to ISO 14001” emphasizing a commitment to superior environmental performance as a prerequisite for XL and other flexibility initiatives (Hansen, 1998). On the other hand, the State/EPA agreement on EMS pilot projects allows the States to relax that requirement: “A commitment to achieve a higher level of performance is not necessary but may be a component of some pilots”(EPA, 1998: s.2)<sup>144</sup>.

Second, regulators have enacted different policies regarding audit confidentiality privilege. At the Federal level, EPA allows no ‘privilege’, but reduces or eliminates gravity-based penalties for non-compliances that are disclosed and promptly corrected (Riedel, CEEM:392). States, by contrast, have allowed audits varying degrees of confidentiality (e.g. Minnesota example, above). In either case, both are supportive of regulatory reform efforts with ISO 14001 as a criterion for participation.

In terms of advocating changes in the standard, regulators are of two minds. On the one hand, they want to see widespread diffusion of the standard because of its potential to ‘raise all boats’. At the same time, they recognize the inherent flaws in the standard (lack of performance minimums, no guarantee of regulatory compliance, no preference for pollution prevention). Many of the Multi-State Working Group proposals are aimed at redressing these perceived flaws. However, they appear conscious of the potential to ‘chill’ diffusion of the standard through placement of too many constraints.

### **Consultants and Registrars**

For this constituency, the possibility of increased registration and devolution of regulatory oversight represent a major potential source of income. For that reason, it is not surprising that consultants and registrars are enthusiastic cheerleaders for incorporation of ISO 14001 in regulation. In fact, one consultant who specializes in assisting firms with ISO 14000 implementation titled a recent paper “So Long! Command and Control...Hello ISO 1400! !!!”(Smith and Patchak, 1997<sup>145</sup>).

<sup>144</sup> EPA. EPA and State Regulatory Framework for EMS Pilot Projects. May 14, 1998.

<sup>145</sup> Smith, W. and Patchak, R. (CH2M) So Long! Command and Control...Hello! ISO 14000. CH2M homepage, 1997.

## **6.8 Chapter Summary**

Registration to ISO 14001 may represent an indicator of environmentally proactive management, if it leads organizations to make meaningful environmental commitments (chapter 4) and if third-party registration acts as a credible oversight mechanism for holding the organizations accountable for delivery on those commitments (chapter 5).

As a result, regulators are rapidly developing regulatory reform initiatives that take ISO conformance as a keystone for granting regulatory flexibility. Flexibility may be given to help sites achieve the same performance results at lower cost, or achieve better performance than before at the same cost. In granting flexibility, the regulator takes on additional risk that the regulated actor will reduce its environmental performance, or that the performance benefits will not justify the flexibilities given. Many flexibility initiatives are illegal under existing laws, and could be challenged under citizen suit provisions. Regulatory strategies incorporating ISO 14001 will therefore need to be structured such that they meet stakeholder concerns about legitimacy and accountability. Likewise, they will need to be sensitive to industry's desire for flexibility, fairness, and voluntarism.

## Chapter 7 Summary and Policy Recommendations

This chapter summarizes the preceding analyses and makes policy recommendations for the revision of the ISO 14001 standard, and for its use in US regulatory strategy.

### 7.1 Summary

ISO 14001 is:

- A management system that organizations may use to control their environmental performance using a 'quality' approach.
- An internationally recognized standard whose implementation may be verified by private third party registrars.
- Not a guarantee of environmental preferability. A firm may be registered to the standard without being in regulatory compliance.

ISO 14001 is, however, likely to become a market entry requirement in many industries. Only two years old as this study is completed, globally, there are now over 6,000 registered sites, more than 200 of which are in the US (Peglau, 1998). Many sites are owned by highly influential corporations such as Ford and IBM. Its 'sister' standard, ISO 9000, has become an international market condition, with over 130,000 registered sites worldwide.

Depending on the nature of registered facilities, the impact of adoption on management objectives, and the credibility of third party oversight, ISO 14001 may have a positive impact on environmental performance. As a result, state and federal environmental agencies are debating the use of ISO 14001 registration as a qualifier for regulatory flexibility. This report concerns itself with identifying a best course of action for US regulators for achieving the greatest environmental benefit from this emerging management tool, as illustrated in Figure 7.1, below.

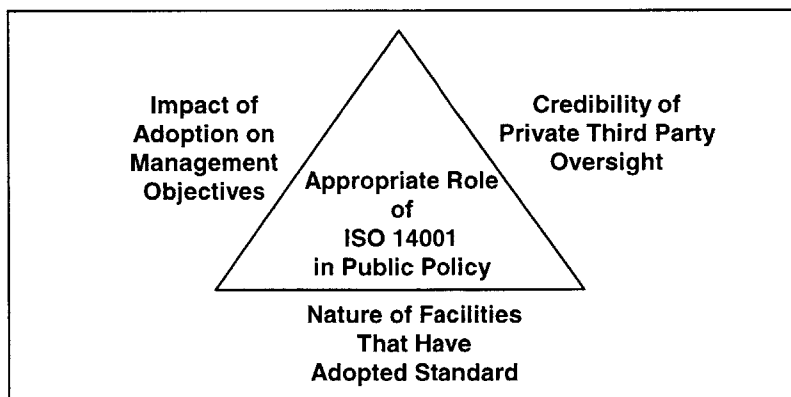


Figure 7.1 Appropriate Response of the Environmental Regulator to ISO 14001 Depends on:

- The Nature of the Registered Facilities
- The Impact of Registration on Internal Management Decisions
- The Ability of Registrars to Ensure Accountability

### **Nature of Early Adopters: Big, Foreign, ISO 9000-Registered and Highly-Regulated**

In chapter 3, a statistical analysis of TRI and other data from over 30,000 US manufacturing facilities was used to identify the common characteristics of those organizations who have obtained registration in the US. A probit analysis revealed that facilities are more likely to obtain registration if they are :

- Larger facilities, owned by companies such as Ford, IBM and Toyota.
- Under Asian or European ownership.
- Registered to ISO 9000 (quality management system).
- Generators of more effluent per employee (are 'dirtier') than their respective industry averages.
- Highly regulated (operate under one or more permits), and compete in industrial sectors that generate a higher amount of effluent per employee.

These findings support several conclusions:

1. Strong regulatory oversight appears to motivate adoption.
2. ISO 14001 adoption will be driven by Asian and European pressure.
3. Small facilities are less likely to adopt the standard than larger facilities.

### **Structure of ISO 14001: Setting, Attaining and Revising Management Goals**

In chapter 2, the history and structure of ISO 14001 was briefly summarized, along with the major critiques against it. The International Organization for Standardization, a federation of the world's national standards-setting bodies, developed the ISO 14001 EMS standards in order to prevent the emergence of trade-distorting national and private alternatives. Critics of the standard maintain that the process by which it was developed excluded environmental advocacy organizations and developing country representatives from having input. Furthermore:

- A lack of performance requirements may make the standard meaningless as an indicator of environmental commitment.
- Firms may therefore misuse third-party registration to signal to the public that their products are 'environmentally preferable'.

The ISO 14001 standard is designed to enable organizations to systematically establish, attain, and revise environmental management objectives (see figure 7.2, below).

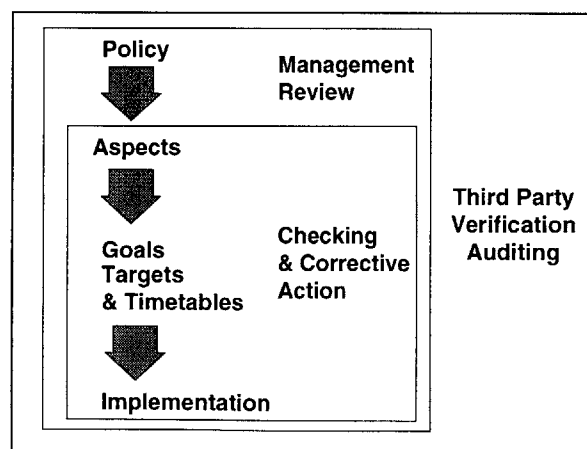


Figure 7.2 ISO 14001 Management System Structure, Showing Centrality of Goals to System Outcomes

### **Registration and Goal-Setting: Likely to Have Positive Impact on Performance**

In chapter 4, ten case studies based on interviews with senior environmental managers demonstrated that ISO 14001 registration is likely to improve environmental performance through its impact on management objectives.

The stringency of goals before and after registration remained roughly equivalent. However, it was observed that **registration strengthened firms' environmental commitments, by helping them prioritize and set more-attainable goals, over a broader range of environmental impacts, and involve a broader constituency of employees in the goal-setting process, with more institutional support for goal attainment.**

In spite of these positive indications, however, organizations did not increase their disclosure of environmental performance-related information following ISO registration. Nor were they more likely to involve external stakeholders in the goal-setting process.

### **Private Third-Party Registration Auditing: Credibility Could Be Enhanced**

If audits were effective and recognized as such both by regulators and by the public, reduced regulatory oversight might be appropriate, allowing regulators to concentrate limited resources on weaker actors, and ISO 14001-conforming facilities to save some of the cost of demonstrating regulatory compliance.

ISO 14001 allows firms to self-audit their conformity to the standard's requirements, rather than employ a registrar. This self-declaration, however, would not be sufficient justification for regulatory flexibility. A 1996 EPA-funded study by the NSF indicated that "24% of all the [ISO 14001] requirements were evaluated lower and only 6% were evaluated higher [by independent auditors]. These findings suggest that...[self-declaring] organizations might have a tendency to evaluate their systems higher than would independent [registration] auditors". Thus, self-declaring organizations lack sufficient credibility to justify reduced regulatory oversight.

Third party registration has greater credibility because it may be more objective than self-declaration. The meaning of registration to observers is largely dependent on the credibility of the third party registration auditing mechanism. In order to be **credible** to external stakeholders, registrars must be **consistent** in their interpretation of the standard and have meaningful **sanctioning power**. **Conflicts of interest** must be contained by oversight mechanisms (see figure 7.3, below). In chapter 5, interviews with seven accredited US registrars indicated that **the credibility of registrars is weakened by the potential for inconsistent interpretation and for conflict of interest.**

Registered organizations are required to demonstrate to their registrar, through records and on-site inspections and interviews, that all key elements in the standard specification are in place, and function as intended. Any non-conformances to the standard will be noted, and the organization's management will be notified. Subsequent inspections will ensure not only that the non-conformance has been corrected, but that the root cause has been addressed so that repeat of that non-conformance is less likely.

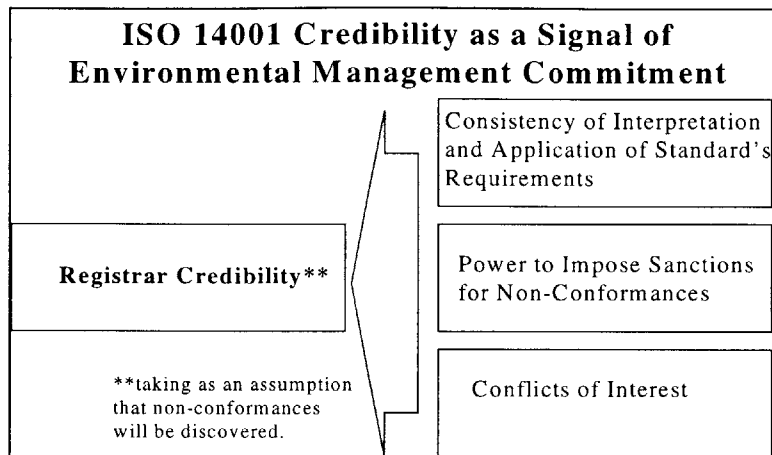


Figure 7.3 Credibility of ISO 14001 Registration Depends on Registrar Consistency, Sanctioning Power, and Conflicts of Interest.

Once the registrar approves a firm's EMS as conforming to the ISO 14001 standard, it places that organization on its list of registered facilities. Registration is valid for three years, after which it must be renewed. Currently, there is no centralized, up-to-date, publicly-available list of registered organizations.

Registrars have at least five **sanctions** available, though this study found that only the first three have been used. Use of the sanctions is not publicized.

- Denial of initial registration
- Notification of non-conformance
- Major non-conformance re-audit
- Suspension of registration
- Withdrawal of registration

As private companies in business to make a profit, registrars face three **conflicts of interest** that may prevent them from applying sanctions:

- Incentive to offer value-added consulting services to clients, which is not allowed in the US, but may be done in other countries.
- Incentive to be less stringent than competitors, thereby appealing to those organizations seeking the least stringent application of the standard's requirements in order to minimize their costs.
- Incentive to minimize costs, by monitoring less than competitors.

This study found that, in spite of possible conflicts-of-interest, the accreditation process offers a strong mechanism for the registrars to maintain **mutual accountability** for the consistency of their registration approach.

- The **accreditation board**, a council made up of representatives from industry, government, and other accredited registrars, assures consistent registration through audits and periodic surveillance of in-field registration practices.
- Each registrar is required to establish an **internal supervisory board**, with representatives from various interest groups – including government agencies, registered firms, and other registrars. They also produce an **internal interpretation document**, clarifying their understanding of the standard's requirements.
- Each registrar is dependent on its **reputation** of integrity for continued business. If it became known that a registrar consistently registered sub-standard systems, it would damage its reputation and that of its clients.

**Registrars interpret some components of the standard differently:** For example, the registrar is required to keep confidential, to all except its client, the results of audits. However, during the course of registration audits, registrars are likely to discover regulatory non-compliances, if these have occurred. Under federal law, they are required to furnish this knowledge to regulators, when subpoenaed.

Some registered organizations have hired registrars through their attorneys, in order to guard audit results under attorney-client privilege. Others have offered 'affirmative statements' to their registration auditors, stating that appropriate procedures are in place, without supplying further data or documents. At least one registrar believes this is sufficient evidence. Other registrars do not.

### **Regulatory Flexibility: ISO 14001 Alone Does Not Offer Sufficient Assurance**

Chapter 6 probed the range of regulatory flexibilities legally and implicitly available for use in regulatory reform initiatives in the US, and summarized stakeholder interests with respect to use of ISO 14001.

In regulatory reform initiatives, goal flexibility refers to the allowable deviation from the mandated regulatory performance standard. Means flexibility refers to the variance allowed in the method used to achieve that performance standard. Enforcement flexibility refers to EPA's allowable discretion in choosing not to sanction non-compliant actors, limited by citizen-suit provisions in many statutes.

In 'Alternative Path' regulatory reform proposals, regulatory flexibility would be given to better performers, in exchange for a commitment to 'superior environmental performance', relative to the existing regulatory scheme. Such flexibility might also be given to those who commit to achieving equivalent performance at lower cost.

Regardless of whether equivalent performance may be obtained more efficiently through other means, under current US law, firms are legally required to comply with regulation. Thus, many regulatory reform initiatives may be illegal and open to citizen suit challenge.

Firms that participate in regulatory reform initiatives often take on new capital costs, increase regulatory uncertainty, and may increase their liability exposure. To offset these risks and secure their participation in reform initiatives, regulators offer firms additional incentives, such as:

- Fast-track, lower-cost permitting
- Reduced site inspections and reporting burdens
- Investment incentives, financial subsidies, and reduced fees
- Enhanced relationships and public recognition
- Reduced liability through enhanced audit confidentiality protection

Likewise, the regulator exchanges some of its ability to monitor compliance, in exchange for a commitment to 'better' performance. The regulator therefore risks two undesirable outcomes:

- Reduced environmental performance, because the firm exploits reduced oversight in order to reduce its cost of compliance.
- Less-than-anticipated improvements, either in cost savings or environmental performance gains, that do not justify the provision of the flexibilities and incentives granted.

In order to assure that only 'better performers' obtain regulatory flexibility, and reduce risk of undesirable outcomes, regulators have used the following screening criteria:

- Absence of recent enforcement or compliance problems
- Presence of an environmental management system, such as ISO 14001
- Participation in other EPA voluntary initiatives, such as 'Green Lights'
- Commitment by top management towards goal attainment
- Internal compliance auditing program
- Demonstration of historical environmental leadership

EPA and the states are cautiously weighing the utility of ISO 14001 as a criterion for regulatory flexibility qualification. The EPA Region 1 Startrack program, the Multi-State Working Group, initiatives in Colorado, New Mexico, Minnesota and New Mexico, all indicate that regulators believe:

- ISO 14001 registration alone is insufficient grounds for granting regulatory flexibility to a facility.
- The standard could be used as the basis of a structure with sufficient protection, if coupled with a strong compliance record, a disclosure requirement and a commitment to 'superior environmental performance'.

### **Stakeholder Perspectives on ISO 14001 Revision and Use in Regulatory Reform**

**Industry** does not want a revision to ISO 14001 that will affect its ability to choose performance and information disclosure levels. They are concerned about taking on additional liability by adopting the standard and therefore want audit confidentiality privileges. They do not want to be penalized for failing to implement the standard. They support regulatory reform, but do not feel that 'superior performance' should be a requirement for participation.

**Environmental Advocacy Organizations** would like the ISO 14001 standard, and the process by which it is designed, to be revised. They want minimum performance requirements, controls placed on its use in advertising, and greater public accountability and disclosure. Incentives for EAOs to participate in regulatory reform initiatives are: superior environmental performance commitments, greater access to performance data, and economic assistance.

**Community Activists** also favor greater disclosure, mistrust ISO 14001, and need financial and technical help in order to participate meaningfully in regulatory reform negotiations.

**Regulators** at the EPA are more conservative than those at the State level regarding the use of ISO 14001. They do not grant audit privilege to registered organizations, whereas some states have granted such privileges. The EPA wants commitments of 'superior environmental performance' in exchange for participation in regulatory flexibility initiatives, whereas some regulators at state level have not made this a requirement. Both, however, are committed to regulatory reform and see ISO 14001 as a useful tool in that respect.



## **7.2 Policy Recommendations and Questions for Further Research**

This study began by asking: what is the appropriate regulatory response to ISO 14001 in the US ?

On the one hand, it was demonstrated that:

- ISO 14001 is likely to be broadly adopted, driven by Asian and European demand.
- Firms that adopt the standard are likely to improve their environmental performance. Those that are out of compliance are more likely to be aware of their non-compliance.
- Private third-party registration auditing has the potential to play a very useful role in regulatory reform, allowing limited government resources to more efficiently be deployed.

On the other, it was learned that:

- ISO 14001 registration is not a guarantee of regulatory compliance.
- Third party auditing is susceptible to conflicts of interest.

This study therefore concludes:

**ISO 14001 registration, alone, is inadequate justification  
for granting regulatory flexibility to a firm.**

However, diffusion of the standard may have numerous benefits. In order to make more effective use of the existing ISO 14001 standard to promote environmental protection, it is recommended that regulators:

### **A.1. Enhance the Accountability of Registered Facilities**

- **Establish a centralized, publicly-accessible database** to facilitate the monitoring of registered companies. While registrars are required to disclose their registered-firm lists, and firms are required to disclose their environmental policies, this information must currently be requested directly from individual firms. The information is thus scattered, and inconsistent in presentation and content. It is therefore difficult to identify firms that have been suspended or lost registration due to non-conformances<sup>146</sup>.
- **Enact advertising standards**, to prevent firms from representing their registration as a sign that their products and services are environmentally preferable.
- **Survey stakeholder interests, and provide results to registered firms.** During the aspects identification process, firms are required to take stakeholder interests into account. EPA could host regional stakeholder dialogues to define the environmental aspects of greatest salience in a given area, and pass the results on to registered firms in the area, in order to promote preventative efforts directed towards the most relevant aspects.

<sup>146</sup> Basic information should include the following: firm, facility name, scope and date of registration, registrar, SIC code, contact information and environmental policy.

### **A.2. Encourage the Diffusion of the Standard**

- **Offer small businesses, and firms that compete in Asia and Europe, financial and other incentives to adopt the standard**, such as low interest loans, technical assistance and mentoring from larger registered firms.
- **Work with insurers, investors and lenders to promote registration** and to study financial benefits and costs of adoption.

Industry representatives allege that attempts to modify ISO 14001 to include performance requirements (such as regulatory compliance) might lessen the standard's desirability. If so, regulators must balance competing interests: between broader diffusion of a 'weaker' standard, and more-limited diffusion of a more stringent one. In order to **avoid chilling** the adoption of the standard, regulators should **not seek substantial revisions to ISO 14001**, except in the following areas:

### **B.1. Support Stakeholder Participation in Standard Development**

- **Environmental advocates should be more meaningfully represented** in the ISO 14001 development process. EPA may need to offer funds to support their involvement, or encourage foundations to do so. This will enhance its ultimate public legitimacy.

### **B.2. Continue to Play a Leading Role in Standard Development**

- **EPA should continue to play a leading role in the standard development process**, so that it remains informed of, and participates in, any substantial modifications to the standard.

**In addition to ISO 14001 registration**, complementary controls need to be placed on a firm to justify granting it some regulatory flexibility. Regulators interested in employing ISO 14001 in regulatory reform initiatives should therefore do all of the above, as well as:

### **C.1. Establish Minimum Performance and Transparency Requirements**

- **Commitment to 'Superior Environmental Performance'** is a necessary pre-requisite for participation.
- **Participating firms should be required to disclose goals and performance-related data**, to facilitate monitoring and oversight.
- **Participating firms should have a record of historical environmental leadership and compliance.**
- **Stakeholders and regulators should be participants in the aspects identification and goal-setting processes.**

### **C.2. Give Firms Substantial Incentives to Participate in Reform Initiatives**

- **Grant audit confidentiality protection to participating firms**, so that regulators may obtain access to audit results, but others may not use those results in legal proceedings, unless the company fails to comply with its corrective action schedule.
- **Grant participants additional regulatory incentives**, such as fast-track permitting, reduced site inspections and reporting burdens, investment incentives, reduced fees, and public recognition.

### **C.3. Enhance Registrar Accountability**

- **Prevent firms from 'shopping around' to find the least-stringent registrar** by requiring them to correct all non-conformances identified by the current registrar before switching to a new one.
- **Require publication of the registrars' internal, interpretive documents**, so that interpretations can be compared between registrars.
- **Encourage registrars to invite an environmental advocate onto their internal, supervisory boards.**
- **Reject the use of 'affirmative statements'** as a substitute for 'objective evidence' of conformity.
- **Consider giving registrars partial liability for a registered client's failure to correct a non-conformance** that leads to substantial endangerment of human health and the environment. This will create an incentive for registrars to sanction their clients in order to prevent repeated non-conformances.

There are many avenues of research on ISO 14001 that should be further explored:

- Do organizations 'shop around' for the least-stringent registrar ? This could be studied by examining the experience of ISO 9000 firms and registrars.
- Is there a link between registration, goal-setting, and environmental performance ?
- What aspects of the standard are most challenging for firms to implement ?
- What conditions do registrars use for suspending or withdrawing registration ?
- Under what conditions could a registrar lose its accreditation ?



## References

- ANSI. An Introduction to ANSI. [Http://web.ansi.org](http://web.ansi.org), 1998.
- ANSI. ANSI/RAB National Accreditation Program (NAP) EMS Council. <http://web.ansi.org>.
- Arnst, C. "When Green Begets Green" in *Businessweek*. 98-103, Nov. 10, 1997.
- Ashford, N. The Influence of Information-Based Initiatives and Negotiated Environmental Agreements on Technological Change. Presented at the International Conference on the Economics and Law of Voluntary Approaches in Environmental Policy, November, 1996.
- Ashford, N., Ayers, C. and Stone, R. Using Regulation to Change the Market for Innovation. In *Harvard Environmental Law Review*, vol. 9, 1985:419-466.
- Aspen Institute. *The Alternative Path: A Cleaner, Cheaper Way to Protect and Enhance the Environment*. (Web-based edition), 1996.
- Auerbach, B. KEMA Personal Interview, October 1995.
- Aurricchio, P. ISO 14001 Program Manager, Corporate Environmental Affairs, IBM, Personal Interview, October, 1998.
- AWM. Webpage. [Http://www.awm.net](http://www.awm.net), 1998.
- Beardsley, D. Industry Incentives for Environmental Improvement: Evaluation of US Federal Initiatives. *Global Environmental Management Initiative (GEMI)*, 1996.
- Becker, M., Geiser, K. And Keenan, C. Massachusetts Tries to Cut Toxic Chemical Use in *Environmental Science and Technology*, Vol. 31, No. 12, 1997:564A-567A.
- Bellen, G. NSF Strategic Registrations. Personal Interview, Oct. 14, 1998.
- Bird, A. Establishing Workable Environmental Objectives in Sheldon, C. (Ed.) *ISO 14001 and Beyond*. Sheffield: Greenleaf Publishing, 1997:371-384.
- Bohm, P., and Russell, C. "Comparative Analysis of Alternative Policy Instruments" in Kneese, A.V., and Sweeney, J.L. eds. *Handbook of Natural Resource and energy Economics*, vol. I. Elsevier Publishers, 1985.
- Bratasida, L. Facts And Figures On The Implementation Of ISO 14000 In Indonesia. Presentation To Expert Meeting On Trade And Investment Impacts Of Environmental Standards, Particularly The ISO 14000 On Developing Countries, UNCTAD, October 1997.
- Breger, M. "The Fiftieth anniversary of the administrative Procedure Act: Past and Prologue - Regulatory Flexibility and the administrative State" in *Tulsa Law Journal*, winter 1996.
- Bregman, E., and Jacobson, A. Environmental Performance Review: Self-Regulation in environmental Law. In Teubner, G., farmer, L. And Murphy, D. Eds. *Environmental Law and Ecological Responsibility: The concept and Practice of Ecological Self-Organization*. 207-236, John Wiley & Sons Ltd. 1994.
- Browner, C. Pollution Prevention Policy Statement: New Directions for Environmental Protection, to All EPA Employees. EPA, June 15, 1993.
- Business And The Environment (BATE) ISO TC 207 Meeting Hears Call For Standardized Reporting In BATE's ISO 14000 Update, Vol. 4, No. 9, September 1998.
- Cascio, J. ed. (CEEM) *The ISO 14000 Handbook*. CEEM Information Services, 1996.
- CEEM "Frequently Asked Questions About ISO 14000", Homepage, 1998.
- CEEM. Expert Task Force To Advise ISO TC 207 On Future NGO Involvement" In *International Environmental Systems Update*, Vol. 5, No. 7, 1998.
- Charm, J. Chairman, Us SubTAG 1, Personal Interview, Oct 23, 1998.
- Chemical Week Associates. Strong Forecast for ISO 14000. In *Chemical Week*, September 23, 1998:6.
- Cialdini, R. *Influence: The Psychology of Persuasion* (Rev. Ed.). New York: Quill, 1993.
- Coalition On ISO 14000 Implementation (Ci2) Position Statement On The ISO 14001 Environmental Management Systems Standard, 1997.
- Coalition on ISO 14000 Implementation (CI2). Position Statement on the ISO 14001 EMS Standard. (Available through Sidley & Austin, 202-736-8118), June 23, 1997.
- Coglianesse, C. Muddling through Regulatory Reform: Observations on Regulatory Analysis and the Policy Process. Preliminary Draft, Harvard University (cary\_coglianesse@harvard.edu), 1998.
- Cordeiro, J.J., and Sarkis, J. "Environmental Proactivism and Firm Performance: Evidence From Security Analyst Earnings Forecasts" in *Business Strategy and the Environment*, Vol. 6, 104-114, 1997.

Cutter Corporation. "Canadian Court Orders Cortec to Implement ISO 14001" in *Business and the Environment's ISO 14000 Update*. October, 1998.

Cutter Corporation. "German Agreement Offers Regulatory Relief for EMAS Participants" in *Business and the Environment's ISO 14000 Update*. September, 1998.

Cutter Corporation. "US State Regulators Seek ISO 14001 Revision to Address Key Issues" in *Business and the Environment's ISO 14000 Update*, Vol. 4, No. 5, May 1998.

Daugherty, R. Director of Business Development, BVQI. Interview, Oct. 7, 1998.

Davies, J.C. and Mazurek, J. *Regulating Pollution: Does the US System Work ?* Internet Edition. Resources for the Future, April 1997.

Department of Energy (DOE). EMS frameworks for the Federal Sector in the US. Interagency working Group on ISO 14000, 1998.

Diamond, C. Environmental Management System Demonstration Project - Final Report. (Available online at <http://www.nsf-isr.org>). Ann Arbor: NSF International, 1996.

DiMento, J. "They Treated Me Like a Criminal": Sanctions, Enforcement, Characteristics and Compliance" in *Environmental Law and American Business: Dilemmas of Compliance*. Plenum Press, 1986.

DNV. Webpage. [Http://www.dnvda.com](http://www.dnvda.com), 1998.

Dodds, O.A. "Voluntary Standards And Regulations, A Standardization Perspective" In *ISO Bulletin*, ISO Central Secretariat, January 1997.

Ehrenfeld, J. ISO 14000 And Responsible Care: What Kind Of Change Agents Are They ? Presented At ISO 14000:Preparing For Change Conference, September 27, 1995.

Ellis, R. AWMS Personal Interview, Oct 7, 1998.

Environmental Auditing Research Group, Standardization Of Environmental Reports Is Needed, Presented At ISO Tc207, Email:Aikawa2missionco.Jp, June 1998.

EPA Position Statement on Environmental Management Systems and ISO 14001/DOCID:fr12mr98-64, 1998.

EPA. Annual Report on Reinvention. (<http://www.epa.gov/reinvent/annual97/incent.htm>), 1997.

EPA. EPA and State Regulatory Framework for EMS Pilot Projects. May 14, 1998.

EPA. ISO 14000 Resource Directory. EPA/625/R-97/003, October 1997.

EPA. Pollution Prevention 1997: A National Progress Report - Executive Summary. Washington: Office of Pollution Prevention and Toxics, 1997.

EPA. Regulatory Agenda Preamble. (<http://www.epa.gov/epahome/agenda98.htm>). spring, 1998.

Feldman, I. "ISO 14000 Can Underpin a New 'Dual Track' Regulatory System" in *Environmental Business Journal*, January 1997:11-15.

Florida, R. Lean and Green: The Move to Environmentally-Conscious Manufacturing (ABI/INFORM version). In *California Management Review*, 39(1), 1996:80-105.

Flynn, E And Flynn, B. "Achieving Simultaneous Cost And Differentiation Competitive Advantages Through Continuous Improvement: World Class Manufacturing As A Competitive Strategy In Journal Of Managerial Issues, Vol. 3, No. 3, Fall 1996:360-379.

Ford. Education & global Action: ISO 14001: a globally consistent management approach to environmental issues. <http://www.ford.com/corporate-info/environment/EGA/iso14001.htm>, 1998.

Foster, S. "Registrars, Accreditation and ISO 14001" in Marcus, P. And Willig, J. *Moving Ahead With ISO 14000*. New York: John Wiley and Sons, 1997:125-143.

Freeman, D. Legal Issues: Principle Considerations. In *CEEM*, 199?: 375-386.

Furger, F. Accountability and Systems of Self-Governance: The Case of the Maritime Industry" In *Law & Policy* Vol. 19, No. 4, October 1997.

Gentry, B. And Fernandez, L. Valuing the Environment: How Fortune 500 CFOs and Analysts Measure Corporate Performance. Yale center for Environmental Law and Policy, 1997.

GETF. ISO 14000 Market Summary. GlobeNet webpage [www.getf.org](http://www.getf.org). Nov 1997.

Gibbons, J. ISO 14000: Environmental Standards for Change. ANSI ([http://web.ansi.org/public/iso14000/new/gibbons\\_13.htm](http://web.ansi.org/public/iso14000/new/gibbons_13.htm)). Dec 14, 1995.

Gleckman, H. "Promising Much But Delivering Little: ISO 14001 Should Not Be Part Of Government Regulations Or Procurement" In *Business And The Environment's ISO 14000 Update*, Cutter Information Corp, 1-6, April 1996.

- Gleckman, H. And Krut, R. ISO 14001: A Missed Opportunity For Sustainable Global Industrial Development, London: Earthscan Publications, 1998.
- Gleckman, H. And Krut, R. Neither International Nor Standard: The Limits Of ISO 14001 As An Instrument Of Global Corporate Environmental Management In Sheldon, C. Ed. ISO 14001 And Beyond: Environmental Management Systems In The Real World. Sheffield: Greenleaf Publishing, 1997:45-59.
- Gore, Vice President Al. Report of the National Performance Review: Creating a Government that Works Better and Costs Less. 1993.
- Grey, L. Developing a Technology-Based Business (Project Management Notes). Cambridge: MIT, 1997.
- Hahn, R. Economic Prescriptions for Environmental Problems: How the Patient Followed the Doctor's Orders. In Journal of Econ. Perspectives, vol. 3, no. 2, Spring 1989:95-114.
- Hansa, G. SGS-ICS Environmental Certification Manager. Personal Interview, Nov, 1998.
- Hansen, F. EPA Position Statement on EMS and ISO 14001, and a Request for Comments on the Nature of the Data to be Collected from EMS/ISO 14001 Pilots. (<http://www.epa.gov/reivent/ems/emsfr1.htm>). Federal Register, Vol. 63, No. 48, March 12, 1998.
- Harrison, K. Talking with the Donkey: Cooperative Approaches to Environmental Protection. Unpublished draft, May 1998.
- Heaton, G. and Banks, D. Towards a New Generation of Environmental Technology: The Need for Legislative Reform. in Journal of Industrial Ecology, Vol. 1, No. 2, 1997.
- Holdren, J.P., Daily, G.C. and Ehrlich, P.R. The Meaning of Sustainability: Bio-Geophysical Aspects. In Munasinghe and Shearer, eds. Defining and Measuring Sustainability: The Biogeophysical Foundations. Washington, DC: World Bank, 1995.
- Hortensius, D. And Barthel, M. "Beyond 14001: An Introduction To The ISO 14000 Series", In Sheldon, C., Ed. ISO 14001 And Beyond: Environmental Management Systems In The Real World. Sheffield: Greenleaf Publishing, 19-44, 1997.
- Howe, R. DNV. Interview, Nov 1, 1998.
- IBM. Environment & Well-Being: Progress Report. <http://ww.ibm.com/ibm/environment>, 1998.
- ICF Inc. The Role Of National Standards Bodies And Key Stakeholder Groups In The ISO/TC 207 Environmental Management Systems Standards Development Activity. US EPA/OPPT, September, 1997.
- International Institute for Sustainable Development (IISD). Global Green Standards (Web-Based Edition). 1997.
- International Organization for Standardization (ISO). ISO Bulletin. (Tel+41 22 749 01 11).January 1997.
- Japanese National Committee for ISO/TC 207/SC1 (JNC). Implementation of ISO 14001: Japanese Experience and Expectation. 1998
- Juran, J. And Gyra, F. Quality Planning And Analysis: From Product Development Through Use, 2d Ed. New York: McGraw-Hill, 1987.
- Kettl, D. Regulatory Reform and Public Management: ISO 14000, Collaborative Governance, and the States. (Kettl@lafollette.wisc.edu), September 1996.
- King, A., Lenox, M., and Ehrenfeld, J. Communitarian Environmental Regulation: A Study of Responsible Care and the Chemical Industry. Unpublished draft, 1998.
- Kleindorfer, P. And Orts, E. Informational Regulation of Environmental Risks. Wharton Impact Conference, Philadelphia: Wharton School, October 1995.
- Lanou, S. Production and Organizational Learning: Towards a New Orientation for Environmental Policy. Unpublished Master's Thesis. Department of Urban Studies and Planning, MIT, 1998.
- Laws, D. Regulatory Design for Sustainability. Unpublished Research Proposal, 1998.
- Leggett, J. Ed. Climate Change and the Financial Sector...The Emerging Threat. Munich:Gerling Akademie Verlag, 1996.
- Lenox, M. Environmental Performance Indicator Database Summary, TBE internal document, 1998.
- Leveque, F. Voluntary Approaches for the Improvement of Environmental Performance. Prepublication draft in Convery, F. And Ekins, P. The policy research services on market based instruments for sustainable development. Edward Elgars Pub., 1997.
- Lober, D., Bynum, D., Campbell, E. And Jacques, M. The 100 Plus Corporate Environmental Report Study: A Survey Of An Evolving Environmental Management Tool In Business Strategy And The Environment, Vol. 6, 57-73, 1997.
- MacArthur, J. And Bellen, G. "ISO 14001 in State Regulatory Offices: A survey of Activities" web-based summary available at [www.nsf-isr.org](http://www.nsf-isr.org), 1998.

- Maltby, J. Setting Its Own Standards And Meeting Those Standards: Voluntarism Versus Regulation In Environmental Reporting. In *Business Strategy And The Environment* Vol. 6, 83-92, 1997.
- Martin, R. ISO 14001 Guidance Manual. Oak Ridge National Laboratory: National Center for Environmental Decision-making Research, (Technical Report NCEDR/8-06), 1998.
- McCloskey, Michael. ISO 14000: An Environmentalist's Perspective. Chairman, Sierra Club. (<http://www.ecologia.org/iso14000/opcom/sierra.htm>). April 26, 1996.
- McKiel, M. US Remarks for UNIDO Expert Group Meeting on the Implications of International Standards of Quality and Environmental Management Systems for Developing Countries. Unpublished draft. USEPA, 1998:2.
- Meadows, D. H., Meadows, D. L., and Randers, J. *Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future*. Vermont: Chelsea Green Publishing, 1992.
- Meyer, G. Adam Smith, the States, and the Financial Eco-Metric Imperative. In *Environmental Quality Management*, Winter 1997:81-91.
- Milledge, V. Goal Setting and Task Performance at the Organizational Level: Studies of Emissions Reductions Goals and Performance. Unpublished Doctoral Dissertation, University of California, Berkeley, 1995.
- MSWG. Language To Clarify ISO 14001 From The Multi-State Working Group On Environmental Management Systems: Pollution Prevention. In *Background Materials For Us Tag And TC 207 Issues*, October 11, 1998.
- Mullett, G. ISO 14000: Harmonizing Environmental Standards and Certification Procedures Worldwide in *Minnesota Journal of Global Trade*, Winter 1997:379-396.
- Multi-State Working Group. *Environmental Management Systems Voluntary Project Evaluation Guidance*. NIST (NISTIR 6120), 1998.
- Munn, S. Certification Body (Registrar) Perspective In *CEEM*, 1997:365-368.
- Nash, J and Ehrenfeld, J. Codes of Environmental Management Practice: Assessing Their Potential as a Tool For Change. *Annu. Rev. Energy Environ.* 1997. 22:487-535.
- Neimanis, A. Letters in *The Economist*, Vol. 349, No. 8099, Dec. 19, 1998.
- Nyati, K.P. Environmental Management Systems (ISO 14001) Needs Of India, Confederation Of Indian Industry, Presentation To Expert Meeting On Trade And Investment Impacts Of Environmental Standards, Particularly The ISO 14000 On Developing Countries, UNCTAD, October 1997.
- OECD. Review Of The Development Of International Environmental Management Standards - ISO 14000 Standards Series. *Env/Epoc/Ppc(98)6*, 1998.
- Peglau, R. The Number of ISO 14001/EMAS Certification of the world. ISOworld website: [www.ecology.or.jp/isoworld/english/analy14.gif](http://www.ecology.or.jp/isoworld/english/analy14.gif). December, 1998.
- Quality. RAB revamps Board to include EMS representation. In *Quality*. 36(1):18, January, 1997.
- Rabbit, J And Bergh, P. *The ISO 9000 Book: A Global Competitor's Guide To Compliance And Certification*, 2d Ed. New York: Quality Resources, 1994:5.
- Rees, J. The Development of Communitarian Regulation in the Chemical Industry. Unpublished Draft, 1997.
- Reiley, R.A. Environmental Law and Business in the 21st century: The New Paradigms - ISO 14000 and its Place in Regulatory Reform in *Iowa Journal of Corporate Law*, Spring, 1997: 535-569.
- Reinhardt, F. Environmental Product Differentiation: Implications for Corporate Strategy in *California Management Review*, (ABI-Inform web-based version) 40(4):43-73, 1998.
- Royal Dutch/Shell Group of Companies. *Visions: Recruitment Pamphlet*. 1997.
- Scherkenbach, W. *The Deming Route To Quality And Productivity: Road Maps And Road Blocks*. Rockville: Mercury Press, 1982.
- Schmidheiny, S. *Changing Course: A Global Business Perspective on Environment and Development*. Cambridge: MIT Press, 1992: 82.
- Seifert, D. NGO Working Group on ISO 14000. Personal Interview, Oct. 28, 1998.
- SGS ICS. *ISO 9000 - The Sign Of Good Business*. Promotional Material, 1998.
- Sissell, K. "Certification: An Essential Element" in *Chemical Week*. 160(36):46, September 30, 1998.
- Sissell, K. Behind the Scenes, US Companies Prepare for Certification. *Chemical Week*. 160(13), April 8, 1998:43.
- Slimak, L. Chairman, CI2; American Automobile Manufacturers Association. Personal Interview, Oct. 21, 1998.



- Smith, W. and Patchak, R. (CH2M) So Long! Command and Control...Hello! ISO 14000. CH2M homepage, 1997.
- Solow, R. "Sustainability: An Economist's Perspective" In National Geographic Research and Exploration. National Geographic Society, vol. 8 (1), 3-6, 1992.
- Steinzor, R. Reinventing Environmental Regulation: The Dangerous Journey from Command to Self-Control. In Harvard Environmental Law Review, vol. 22, 1998:103-202.
- Susskind, L. and McMahon, G. The Theory and Practice of Negotiated Rulemaking. In Yale Journal on Regulation, Vol. 3, 1985:133-165.
- Suzuki, D. And Gordon, A. It's A Matter of Survival. Cambridge: Harvard University Press, 1990:2.
- Symonds, J. Mobil Survey of ISO 9000-registered Firms. TQM-Mobil Europe, Tel. +44 171 412 4897, December, 1995.
- Taylor, D. And Lusser, H. OECD Workshop on Environmental Management Systems for Government Agencies: Issues Paper. Stockholm, Sweden, January 1998.
- Thayer, A. Chemical Companies Take a Wait-And-See Stance Toward ISO 14000 Standards in Chemical and Environmental News, April 1, 1996:11-14.
- Tietenberg, T. Environmental and Natural Resource Economics, 4th ed. New York: HarperCollins College Publishers, 1996.
- Toyota. "Toyota Adopts Environmental Standards for North American Manufacturing Operations". <http://www.toyota.com/times/manu/docs/iso14001.htm>, May 22, 1997.
- Trotman, J. Policy Letter No. 17: Protecting Health and the Environment. In Ford's Environmental System Pocket Guide, 1996:5-6.
- Tucker, R. And Kasper, J. Pressures for Change in Environmental Auditing and in the role of the Internal Auditor (ABI/INFORM edition). In Journal of Managerial Issues. 10(3), Fall, 1998:340-354.
- Underwriter's Laboratories Inc. (ULI), ULI's Global Services. Promotional Pamphlet, 1997.
- United States-Asia Environmental Partnership. Global Environmental Management: candid Views of Fortune 500 Companies. Available on-line at [www.usaep.org](http://www.usaep.org), 1997.
- Urioste, J. Global Procurement: ISO 14001 - Letter to Suppliers. IBM, <http://www.ibm.com/IBM/procurement/html/supplier.htm>, April 13, 1998.
- Urman, J. "Conformity Assessment" In CEEM.
- Weimer, D., and Vining, A. Policy Analysis: concepts and Practices, 2d ed. New Jersey: Prentice Hall, 1992.
- Wheeler, D., Afsah, S. And Laplante, B. The Role Of Local Communities And Markets In Pollution Control. United States-Asia Environmental Partnership, Homepage, 1997.
- World Commission on Environment and Development. Our Common Future. New York: Oxford University Press, 1987:4.

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## Appendix 1: ISO 14001 Registered Companies Database

Company	Facility name	City	State	Zip Code	Telephone	Contact Name	TRI ID#
3M	3M	Aberdeen	South Dakota				
3M	3M Dental Products Division (Irvine)	Irvine	California				92713MSRGC17132
ABB	ABB Power T&D Co., Inc.	Florence	South Carolina	29501	803 665-4144	Debbie Watson	29501BBPWR195ME
Acushnet Rubber	Acushnet Rubber Company, Inc.	New Bedford	Massachusetts		508-998-4000	Richard Bowic	02742CSHNT744BE
Akzo Nobel	Akzo Nobel	Edison	New Jersey	8817	732-985-6262	Dianne Krilly	08817KZCHMMEADO
Akzo Nobel	Akzo Nobel	Axis	alabama	36505	334-675-1310	kay higby	36505KZCHMUSHIG
Akzo Nobel	Akzo Nobel	Pasadena	Texas	77507	281-474-0301	Martin Wuensche	77507KZCHM13000
Akzo Nobel	Akzo Nobel	Deer Park	Texas	77536	281-479-8411x223	Hank Staniscewski	77536TXSLK730BA
Akzo Nobel	Akzo Nobel	LeMoyne	alabama	35234?	334-675-1310	Kay Higby	
Allied Signal	Allied Signal (DoE facility)	Kansas City	Missouri	64131	816-997-7304	David Huyett	64131SDPTF2000E
Alumax	Alumax (Goose Creek facility)	Goose Creek	South Carolina		803-572-5342	Andy Ducan	29445LMXFSHIGHW
Analog Devices, Inc.	Analog Devices, Inc. (Wilmington Manufacturing facility)	Wilmington	Massachusetts				01887BLGDV804W0
Apple Computer	Apple Computer's Sacramento Operations Center		California				
ASMO North Carolina Inc.	ASMO North Carolina Inc. (Statesville facility)	Statesville	North Carolina	28625-8504	704 878-6663	Bruce Stevens	28677SMNRT1804C
Becton Dickinson & Company	Becton Dickinson & Company	Sandy	Utah				84070DSRTM9450S
Becton Dickinson & Company	Becton Dickinson & Company	Franklin Lakes	New Jersey	07417-1880	201 847-6844	Matthew Bigley	
BF Goodrich Aerospace CSD	BF Goodrich Aerospace CSD		Florida				33122CLVLN6445N
BOC Gases	BOC Gases	Murray Hill	New Jersey		207.475.3102	Jim Merriam	?08846RCGSS172BA
BOC Gases	BOC Gases	Kittery	Maine	3904			
Borg-Warner	Borg-Warner Automotive, Air/Fluid Systems Corporation	Dixon	Illinois	61021			
Branson Ultrasonics Corporation	Branson Ultrasonics Corporation	Danbury	Connecticut	06813-1961	203 796-2274	Peter Feisthamel	06813BRNSN41EAG
Brent America, Inc.	Brent America, Inc.	Lake Bluff	Illinois	60044	847 295-1660	Robert Siegel	60044CHMCL901SH
Brent America, Inc.	Brent America, Inc.	La Mirada	California	90638	714 739-2821		90638RDRCGSS172BA
Brewer and Associates	Brewer and Associates	Grand Prairie	Texas	75050	214-641-8020	Laurie Miller	

Company	Facility name	City	State	Zip Code	Telephone	Contact Name	TRI ID#
<b>Camoplast Rockland Ltd.</b> (Plattsburgh facility)	Camoplast Rockland Ltd. (Plattsburgh facility)	Plattsburgh	New York	12901			
<b>Cannon Business Machines, Inc.</b>	Cannon Business Machines, Inc.	Newport News	Virginia				23606CNNVR12000
<b>Cannon Business Machines, Inc.</b>	Cannon Business Machines, Inc.	Costa Mesa	California				92626CNNBS3191R
<b>Carrier Transicold (Athens facility)</b>	Carrier Transicold (Athens facility)	Athens	Georgia		706-357-7225		30601CRRRT700OL
<b>Ciba Speciality Chemicals</b>	Ciba Speciality Chemicals, pigment	Wilmington	Delaware				19804CBGGYJAMES
<b>Ciba Speciality Chemicals</b>	Ciba Speciality Chemicals , pigment		Massachusetts				
<b>Clairol</b>	Clairol	Stamford	Connecticut				06922CLRLN1BLAC
<b>Color and Composite Technologies Inc.</b> (Sidney facility)	Color and Composite Technologies Inc. (Sidney facility)	Sidney	Ohio	45365			
<b>Compaq</b>	Americas' Materials Recovery Operation (Digital Equipment Corporation)		New Hampshire				
<b>Comtech (Waupun facility)</b>	Comtech (Waupun facility)	Waupun	Wisconsin				53963CMTCH401IN
<b>Condea Vista Company</b> (Baltimore facility)	Condea Vista Company (Baltimore facility)	Baltimore	Maryland	21226	410-355-6200	David Mahler	21226VSTCH3441F
<b>Cooper Industries (Melrose Park facility)</b>	Cooper Industries (Melrose Park facility)	Melrose Park	Illinois				
<b>Cortec Corporation</b>	Cortec Corporation	St Paul	Minnesota	55110	612-429-1100x116	Art Ahlbrecht	
<b>Crystal Bottle Water Company</b> (Phoenix)	Crystal Bottle Water Company (Phoenix)	Phoenix	arizona				85017CRYST3302W
<b>Daikin America, Inc.</b>	Daikin America, Inc.	Decatur	alabama		205-306-5000		35601DKNMRSTATE
<b>Dana</b>	Dana Corporation	Vinita	Oklahoma				
<b>Denso Manufacturing</b>	Denso Manufacturing	Maryville	Tennessee		423) 981-5228	W. Wayne Brown	37801NPPND1720R
<b>Denso Manufacturing</b>	Denso Manufacturing	Battle Creek	Michigan	49015	616 965-3322	Michael Myszka	49015NPPNDONEDE
<b>Denso Manufacturing</b>	Denso Manufacturing	Athens	Tennessee	37303	423-981-5228	W. Wayne Brown	

Company	Facility name	City	State	Zip Code	Telephone	Contact Name	TRI ID#
Digital Audio Disc Corporation (Terre Haute facility)	Digital Audio Disc Corporation (Terre Haute facility)	Terre Haute	Indiana	47804	812-462-8100	Gary Garrahan	47804DGTLD1800N
Duracell North Atlantic Group	Duracell North Atlantic Group		Connecticut				
Eaton Corporation	Eaton Corporation	Kearney	Nevada	68848	308 233-5470		68847TNCRP4200E
EG&G Optoelectronics (Salem facility)	EG&G Optoelectronics (Salem facility)	Salem	Massachusetts				01970GGNC35CON
Elf Atochem (Carrollton facility)	Elf Atochem (Carrollton facility)	Carrollton	Kentucky	41008	502 732-4411	Elizabeth Gillespie	41008MTCHM2316H
Epson Portland Inc. (Hillsboro facility)	Epson Portland Inc. (Hillsboro facility)	Hillsboro	Oregon				97124PSNPR3950N
First Environment, Inc.	First Environment, Inc.	riverdale	New Jersey	7457	201.616.9700	Reeva Schiffman	
Ford Motor Co.	Ford electronics and refrigeration						19446FRDLC2750M
Ford Motor Co.	Ford electronics and refrigeration						19446FRDLCCHURC
Ford Motor Co.	Ford electronics and refrigeration						47331FRDLCSTATE
Ford Motor Co.	Ford electronics and refrigeration						47421FRDLC3120W
Ford Motor Co.	Ford Motor Co.						07601FRDFS110SN
Ford Motor Co.	Ford Motor Co.						07074FRDLB77MOO
Ford Motor Co.	Ford Motor Co.						46992THFRD775MA
Ford Motor Co.	Ford Motor Co.						48046FRDMT26090
Ford Motor Co.	Ford Motor Co.						30354FRDMT340HE
Ford Motor Co.	Ford Motor Co.						45103FRDMT1981F
Ford Motor Co.	Ford Motor Co.						14219FRDMT53663
Ford Motor Co.	Ford Motor Co.						60633FRDMT12600
Ford Motor Co.	Ford Motor Co.						60411FRDMT1000E
Ford Motor Co.	Ford Motor Co.						44142FRDMT5600H
Ford Motor Co.	Ford Motor Co.						44142FRDMT17601
Ford Motor Co.	Ford Motor Co.						44142FRDMT1760A
Ford Motor Co.	Ford Motor Co.						48121FRDM23001M
Ford Motor Co.	Ford Motor Co.						48121FRDM33001M
Ford Motor Co.	Ford Motor Co.						48121DRBRN3001M
Ford Motor Co.	Ford Motor Co.						48121FRDMT3001M
Ford Motor Co.	Ford Motor Co.						48121FRDM13001M

Company	Facility name	City	State	Zip Code	Telephone	Contact Name	TRI ID#
Ford Motor Co.	Ford Motor Co.						48121FRDM43001M
Ford Motor Co.	Ford Motor Co.						08818FRDMT939US
Ford Motor Co.	Ford Motor Co.						48121FRDMTTHEAM
Ford Motor Co.	Ford Motor Co.						48146FRDMT25500
Ford Motor Co.	Ford Motor Co.						12183FRDMT75TIB
Ford Motor Co.	Ford Motor Co.						64119FRDMTHWY69
Ford Motor Co.	Ford Motor Co.						40222FRDMT3001C
Ford Motor Co.	Ford Motor Co.						45801FRDMT1155B
Ford Motor Co.	Ford Motor Co.						48150FRDMT36200
Ford Motor Co.	Ford Motor Co.						44053FRDMT5401B
Ford Motor Co.	Ford Motor Co.						40213FRDMTFERNV
Ford Motor Co.	Ford Motor Co.						48184FRDMT38303
Ford Motor Co.	Ford Motor Co.						48160MLNPL800CO
Ford Motor Co.	Ford Motor Co.						48161MNRST3200E
Ford Motor Co.	Ford Motor Co.						37209FRDMTCENTE
Ford Motor Co.	Ford Motor Co.						23523FRDMT2424S
Ford Motor Co.	Ford Motor Co.						44012FRDMT650MI
Ford Motor Co.	Ford Motor Co.						48101FRDMT17000
Ford Motor Co.	Ford Motor Co.						48121FRDMT20000
Ford Motor Co.	Ford Motor Co.						48065FRDNW701E3
Ford Motor Co.	Ford Motor Co.						48176SLNNS7700M
Ford Motor Co.	Ford Motor Co.						44870FRDMT3020T
Ford Motor Co.	Ford Motor Co.						45241FRDMT3000S
Ford Motor Co.	Ford Motor Co.						48170FRDMT14425
Ford Motor Co.	Ford Motor Co.						63042FRDMT6250N
Ford Motor Co.	Ford Motor Co.						48310FRDMT39000
Ford Motor Co.	Ford Motor Co.						74121FRDMT5555S
Ford Motor Co.	Ford Motor Co.						55116FRDMT966SM
Ford Motor Co.	Ford Motor Co.						48087FRDMT50500
Ford Motor Co.	Ford Motor Co.						48078FRDMT41111
Ford Motor Co.	Ford Motor Co.						48121FRDMT3900W
Ford Motor Co.	Ford Motor Co.						44146WLTNH7845N

Company	Facility name	City	State	Zip Code	Telephone	Contact Name	TRI ID#
Ford Motor Co.	Ford Motor Co.						48184FRDMT37625
Ford Motor Co.	Ford Motor Co.						48184FRDMT37500
Ford Motor Co.	Ford Motor Co.						48183FRDMT20900
Ford Motor Co.	Ford Motor Co.						48183FRDMT24189
Ford Motor Co.	Ford Motor Co.						48197FRDMT128FA
Ford Motor Co.	Ford Motor Co.						17554FRDNWCOMME
Ford Motor Co.	Ford Motor Co.						48121FRDRG3001M
Ford Motor Co.	Ford Motor Co.						48096FRDMT50000
Ford Motor Co.	Ford Motor Co.						48198BCWLL2625T
Ford Motor Co.	Ford Motor Co.						08863HTCCRKINGG
Ford Motor Co.	Ford Motor Co.						48043MTCLM151LA
Ford Motor Co.	Ford Motor Co.						17557FRDNW300DI
Ford Motor Co.	Ford Motor Co.						48121RGSTL3001M
Ford Motor Co.	Ford Motor Co.						46219FRDMT6900E
Ford Motor Co.	Ford Motor Co.						35125THFRD3929M
Ford Motor Co.	Ford Motor Co.	Indianapolis	Indiana	46219	317-352-4301	Tom Kolbus	246219FRDMT6900E
Ford Motor Co.	Ford Motor Co.	Landsdale	Pennsylvania		313.390.9646	John Phelps	19446FRDLCCHURC
Ford Motor Co.	Ford Motor Co.	Lima	Ohio				45801FRDMT1155B
Ford Motor Co.	Ford Motor Co.	Romeo	Michigan	48065	313.752.8087	Staci Swatzenbarg	48065FRDNW701E3
Ford Motor Co.	Ford Motor Co.	Van dyke	Michigan				48078FRDMT41111
Ford Motor Co.	Ford Motor Co.	North Penn	Pennsylvania				
Formosa Plastics Corp.	Formosa Plastics Corp.	Delaware City	Delaware				19706FRMSPSCHOO
Formosa Plastics Corp.	Formosa Plastics Corp.	Baton Rouge	Louisiana				70805FRMSPGULFS
Formosa Plastics Corp.	Formosa Plastics Corp.	Point Comfort	Texas				77978FRMSPPOBOX
Foster Wheeler Environmental Corporation	Foster Wheeler Environmental Corporation	Livingston	New Jersey	7039	201-597-7000	Don Rogers, Vice President & CEO	
Fuji Hunt	Fuji Hunt Photographic Chemicals Inc.		Illinois				60008LNHNT900CA
Hamilton Standard	Hamilton Standard	Farmington	Connecticut				06032HMLTN1HAMI
Hamilton Standard	Hamilton Standard	Windsor Locks	Connecticut				06096HMLTN1HAMI

<b>Hitachi Semiconductor (America), Inc.</b>	Hitachi Semiconductor (America), Inc.	Irving	Texas	75016-7928	972 756-3374		75016HTCHS1505W
<b>Honda Transmission Manufacturing of America, Inc.</b>	Honda Transmission Manufacturing of America, Inc.	Russells Point	Ohio		937-843-5555	Lee Sanders	43348BLLMR6964S
<b>H-R Industries, Inc.</b>	H-R Industries, Inc.	Richardson	Texas	75081	214-301-6620	Gary Roper	75081HRNDS1302E
<b>IBM</b>	<b>IBM</b>				ESSEX		05452BM 1000R
<b>IBM</b>	<b>IBM</b>			JUNCTION, VT 05452			11205BM 585DE
<b>IBM</b>	<b>IBM</b>			BROOKLYN, NY 11205			12401NTRNTNEIGH
<b>IBM</b>	<b>IBM</b>			KINGSTON, NY 12401			12401NTRNTNEIGH
<b>IBM</b>	<b>IBM</b>			KINGSTON, NY 12401			12533BM EASTF
<b>IBM</b>	<b>IBM</b>			JUNCTION, NY	HOPEWELL		12533BM EASTF
<b>IBM</b>	<b>IBM</b>			JUNCTION, NY 125330999	HOPEWELL		12602BMCRRPSOUTH
<b>IBM</b>	<b>IBM</b>			POUGHKEEPSIE, NY 126015400			12602BMCRRPSOUTH
<b>IBM</b>	<b>IBM</b>			126015400	POUGHKEEPSIE, NY		13760BM 1701N
<b>IBM</b>	<b>IBM</b>			ENDICOTT, NY 13760			13760BM 1701N
<b>IBM</b>	<b>IBM</b>			ENDICOTT, NY 13760			33431NTRNT1000N
<b>IBM</b>	<b>IBM</b>			RATON, FL 33431	BOCA		78758BM 11400
<b>IBM</b>	<b>IBM</b>			AUSTIN, TX 787583494			78758BM 11400
<b>IBM</b>	<b>IBM</b>			AUSTIN, TX 787583494			80301BM 6300D
<b>IBM</b>	<b>IBM</b>			BOULDER, CO 80301			80301BM 6300D
<b>IBM</b>	<b>IBM</b>			BOULDER, CO 80301			85744BM 9000S
<b>IBM</b>	<b>IBM</b>			TUCSON, AZ 85744			95193BM 5600C
<b>IBM</b>	<b>IBM</b>			SAN JOSE, CA 95193			95193BM 5600C
<b>IBM</b>	<b>IBM</b>			SAN JOSE, CA 95193			



IBM	IBM				RESEARCH			27709BM 3039C
IBM	IBM		TRIANGLE PARK, NC					
IBM	IBM		NC 28262		CHARLOTTE,			28257BM 1001W
IBM	IBM							95112BM 2020S
IBM	IBM		SAN JOSE, CA 95112					17055BM 180KO
IBM	IBM		180 KOST RD.					95120BMRSR650HA
IBM	IBM		650 HARRY RD.		ROCHESTER,			55901BM HWY52
IBM	IBM		MN 55901					10598NTLBSRTE13
IBM	IBM		RTE. 134					40511NTRNT740NE
IBM	IBM		LEXINGTON, KY 40511					
IBM	IBM	San Jose	California	95193	408-256-8965	Ray Wynn		?95193BM5600C
IBM	IBM	Endicott	New York					13760BM1701N
IBM	IBM	Rochester	Minnesota					55901BMHWY52
IBM	IBM	Tucson	arizona		408-256-8965	Ray Wynn		85744BM9000S
IBM	IBM	Austin	Texas	78757	512-823-7536	Pat Rurney		
IBM	IBM	Somers	New York	10589	914-756-2725	Patrick Aurichio		
Intalco Aluminum Corporation (Ferndale, WA)	Intalco Aluminum Corporation (Ferndale, WA)	Ferndale	Washington	98248	360-384-7600	Gary Duling		98248NTLCL4050M
International Paper - Easter Region Land & Timber	International Paper - Easter Region Land & Timber	Georgetown	South Carolina	29440	843-546-2573	Donna Perison		29442NTRNTKAMIN
ITT McDonnell & Miller (Chicago facility)	ITT McDonnell & Miller (Chicago facility)	Chicago	Illinois	60618	312-267-1600	Richard Falck		60618TTMCD3500N
Kerr-McGee Chemical, LLC	Kerr-McGee Chemical, LLC	Texarkana	Texas	75501	903 794-5169	John Getz		75503KRRMC155BU
Komatsu America	Komatsu America International Company (Chattanooga Manufacturing facility)	chattanooga	Tennessee	37405	(423) 757-0333	Gerald Street		?44833DRSSR1MILE
Kyocera, America	Kyocera, America		California					92123KYCRM8611B
Kyocera, America	Kyocera, America	Vancouver	Washington					98661KYCRN5701E
Lockheed	Lockheed Martin Control Systems	Johnson City	New York	13790	(607) 770-2696	Doug Garner		13790GNRLL600MA
Lockheed	Lockheed Martin Control Systems	Fort wayne	Indiana		219) 434-5398	Rick Barry		
Lockheed	Lockheed Martin Electronics and Missiles		alabama					?35802SCMNF4000S

<b>Lockheed</b>	Lockheed Martin Electronics and Missiles (Orlando site)	Orlando	Florida				32855MRTNM4600S
<b>Lockheed</b>	Lockheed Martin Electronics and Missiles (Troy facility)	Troy	arizona				?85338LRLDF1300S
<b>Lockheed</b>	Lockheed Martin Federal Systems	Owego	New York		607-751-2285	hal ehrhardt	13827BMSYSROUTE
<b>Lockheed</b>	Lockheed Martin Federal Systems		Virginia				22110NTRNT9500G
<b>Lockheed</b>	Lockheed Martin Government Electronic Systems (Moorestown facility)	Moorestown	New Jersey				08057GRSPCBORTO
<b>Lockheed</b>	Lockheed Martin Infrared Imaging Systems	Lexington	Massachusetts	2421	781-863-3989	Rick Vincent	
<b>Lockheed</b>	Lockheed Martin Ocean, Radar and Sensor Systems	Syracuse	New York		(315) 456-6976	Brian Kent	13221GNRLELECT
<b>Lockheed</b>	Lockheed Martin Tactical Defense Systems	Akron	Ohio		(330) 796-4573	Alan Shuluga	44315LRLCR1210M
<b>Lockheed</b>	Lockheed Martin Tactical Defense Systems (Archbald facility)	Archbald	Pennsylvania		(717) 876-1500x 425	Jim Wildenstein	18403DVFFRJFKEN
<b>Lockheed</b>	Lockheed Martin Tactical Defense Systems (Oldsmar facility)	Oldsmar	Florida	34677			
<b>Lockheed</b>	Lockheed Martin Vought Systems	camden	arkansas		972) 603-1742	Art Kaikkonen	71701LTVRSPOBOX
<b>Lockheed</b>	Lockheed Martin Vought Systems ( El Paso, Grand Prairie, and Lufkin)	Grand Prairie	Texas		(972) 603-1742	Art Kaikkonen	75051LTVRS1701W
<b>Lockheed</b>	Lockheed Martin Vought Systems ( El Paso, Grand Prairie, and Lufkin)	El Paso	Texas	79906	(972) 603-1742	Art Kaikkonen	
<b>Lockheed</b>	Lockheed Martin Vought Systems ( El Paso, Grand Prairie, and Lufkin)	Lufkin	Texas	75904	(972) 603-1742	Art Kaikkonen	
<b>Lockheed</b>	Sanders, (Lockheed Martin Company)	Nashua	New Hampshire		(603) 885-6678	Margo Seddon	?03061SNDRSDWHWY
<b>Lockheed</b>	Sanders, (Lockheed Martin Company)	Hudson	New Hampshire		(603) 885-6678	Margo Seddon	03051CLCMP65R1V
<b>Lockheed</b>	Sanders, (Lockheed Martin Company)	Merrimack	New Hampshire		(603) 885-6678	Margo Seddon	03054SNDRSDWHIG
<b>Lockheed</b>	Sanders, (Lockheed Martin Company)	Manchester	New Hampshire		(603) 885-6678	Margo Seddon	03108LCKHD5PERI
<b>Lockheed</b>	Sanders, (Lockheed Martin Company)	Chelmsford	Massachusetts		(603) 885-6678	Margo Seddon	
<b>Lucent</b>	Cirent Semiconductor (Joint Venture of Lucent Technologies/Cirrus Logic)	Orlando	Florida	32819	407.645.6514	Doug Wagner	32819TTMCR9333S
<b>Lucent Technologies</b>	Lucent Technologies	Breinigsville	Pennsylvania	18031	613.391.2167	David McCleary	18031PTLCT9999H

<b>Lucent Technologies</b>	Lucent Technologies	Mt. Olive	New Jersey	7828	973 426-1348	Peter Grant	
<b>Lucent Technologies</b>	Lucent Technologies (Allentown facility)	allentown	Pennsylvania		610.715.5659	Bill Knolle	18103TTMCR555UN
<b>Lucent Technologies</b>	Lucent Technologies (Berkeley Heights facility)	Berkeley Heights	New Jersey	7922	908.508.8156	Ted Polokowski	
<b>Lucent Technologies</b>	Lucent Technologies (Berkeley Heights facility)	Berkeley Heights	Pennsylvania				
<b>Lucent Technologies</b>	Lucent Technologies (Reading facility)	Reading	Pennsylvania	19612	610.939.7857	Andy Straka	19612TTMCR2525N
<b>Lucent Technologies</b>	Lucent Technologies Inc Microelectronics Group Power Systems	Mesquite	Texas	19612	610.939.7857	Andy Straka	75149TTMCR3000S
<b>March Coatings, Inc. (Brighton facility)</b>	March Coatings, Inc. (Brighton facility)	Brighton	Michigan				48116MRCHC160SU
<b>Mark IV Automotive</b>	Mark IV Automotive	Easley	South Carolina	29641	864-855-2025	Steve Louthan	29641NCHRSWY93
<b>Mark IV Automotive</b>	Mark IV Automotive	Big Rapids	Michigan	49307	616-796-2691	Joe Forrest	49307FTZSM600DE
<b>Mark IV Automotive</b>	Mark IV Automotive	Walterboro	South Carolina	29488	843-538-5941x254	Russell Revell	
<b>Matsushita</b>	Matsushita Compressor Corp. of America (Mooresville facility)	Mooresville	North Carolina	28115	704-664-8140	stan faires	28115MTSSHONEPA
<b>Matsushita</b>	Matsushita Electronic Components Corporation of America (Knoxville facility)	Knoxville	Tennessee		(423) 673-0700	mark Holt	37914MTSSH5105S
<b>Matsushita</b>	Matsushita Refrigeration Company of America (Vonore facility)	Vonore	Tennessee		423-884-1379	Steve Alvanas	37885MTSSH56EXC
<b>Matsushita</b>	Matsushita Semiconductor	Puyallup	Washington				98373NTNLS11113
<b>McDonald Technologies International Inc.</b>	McDonald Technologies International Inc.	Bonham	Texas	75418	972-243-6767	Thomas Varchese	
<b>Micro Industries (Westerville facility)</b>	Micro Industries (Westerville facility)	westerville	Ohio	43081			
<b>Micron</b>	Micron Electronics, Inc. (Boise facility)	Boise	Idaho				83706MCRNT2805E
<b>Micron</b>	Micron Electronics, Inc. (Nampa facility)	Nampa	Idaho	83687			
<b>Micron</b>	Micron Technology Inc.	Boise	Idaho				83704MCRNT8455W
<b>Minolta advance Technology</b>	Minolta advance Technology	Goshen	New York	10924	914-294-8400	Terry Syrek	
<b>Mitsubishi Silicon America (Salem)</b>	Mitsubishi Silicon America (Salem facility)	Salem	Oregon	97303	503-371-0041	Mary Milbrath	FacID OR0001947217

facility)							
<b>Molycorp, Inc. (Mountain Pass)</b>	Molycorp, Inc. (Mountain Pass)	Mountain Pass	California				92366MLYCRI15AN
<b>Montenay Energy</b>	Montenay Energy Resources of Montgomery County, Inc. (Conshohocken)	conshohocken	Pennsylvania		610-940-6000	Jay Lehr	
<b>NCR Corporation</b>	NCR Corporation (Peachtree City facility)	Peachtree City	Georgia	30269	770-487-7043	Steve Barker	
<b>NEC</b>	NEC Technologies Inc. (McDonough facility)	McDonough	Georgia	30253			
<b>Nellcor Puritan Bennett Inc.</b>	Nellcor Puritan Bennett Inc./Hospital Manufacturing Division (Carlsbad facility)	carlsbad	California	92008	760-603-5976	kelly O'Brian	
<b>New Breed Leasing Company</b>	New Breed Leasing Company		North Carolina	27410			
<b>Niagara Mohawk</b>	Niagara Mohawk Power Corporation (Nine Mile Point Nuclear Generating Station, Units 1 & 2)	Scriba	New York		315-428-6962	Chris Kolarz	
<b>Niagara Mohawk</b>	Niagara Mohawk Power Corporation (Nine Mile Point Nuclear Generating Station, Units 1 & 2)	Tonawanda	New York		(315) 428-6962	Chris Kolarz	
<b>Niagara Mohawk</b>	Niagara Mohawk Power Corporation Albany Steam Station	Albany	New York		315) 428-6962	Chris Kolarz	
<b>Niagara Mohawk</b>	Niagara Mohawk Power Corporation Dunkirk Steam Station	Dunkirk	New York		(315) 428-6962	Chris Kolarz	
<b>Niagara Mohawk</b>	Niagara Mohawk Power Corporation Huntley Steam Station	Tonawanda	New York		315 -428-6962	Chris Kolarz	
<b>Niagara Mohawk</b>	Niagara Mohawk Power Corporation Oswego Steam Station	Oswego	New York		(315) 428-6962	Chris Kolarz	
<b>Niagara Mohawk</b>	Niagara Mohawk Power Corporation Oswego Steam Station	Scriba	New York		(315) 428-6962	Chris Kolarz	
<b>NIPSCO</b>	NIPSCO Angola Local Operating Area	Angola	Indiana		219-647-5247	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Central Stores/Service Center	Valparaiso	Indiana		219-647-5247	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Crown Point Local Operating Area	Crown Point	Indiana		219-647-5247	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Fort Wayne Local Operating Area	Fort wayne	Indiana		219-647-5248	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Gary Local Operating Area	Gary	Indiana		219-647-5249	Jack Watkins	

<b>NIPSCO</b>	NIPSCO Goshen Local Operating Area	Goshen	Indiana		219-647-5250	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Hammond Local Operating Area	Hammond	Indiana		219-647-5251	Jack Watkins	
<b>NIPSCO</b>	NIPSCO La Porte Local Operating Area	La Porte	Indiana		219-647-5252	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Michigan City Generating Station	Michigan City	Indiana		219-647-5253	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Monticello Local Operating Area	Monticello	Indiana		219-647-5254	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Peru Local Operating Area	Peru	Indiana		219-647-5255	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Plymouth Local Operating Area	Plymouth	Indiana		219-647-5256	Jack Watkins	
<b>NIPSCO</b>	NIPSCO South Bend Local Operating Area	South Bend	Indiana		219-647-5257	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Valparaiso Local Operating Area	Valparaiso	Indiana		219-647-5258	Jack Watkins	
<b>NIPSCO</b>	NIPSCO Warsaw Local Operating Area	Warsaw	Indiana		219-647-5259	Jack Watkins	
<b>NIPSCO</b>	NIPSCO-Bailly Generating Station	Chesterton	Indiana		219-647-5260	Jack Watkins	
<b>NIPSCO</b>	NIPSCO-Liquified Natural Gas Operations	Rolling Prairie	Indiana		219-647-5261	Jack Watkins	
<b>NIPSCO</b>	NIPSCO-R. M. Schahfer Generating Station	Wheatfield	Indiana		219-647-5262	Jack Watkins	
<b>NIPSCO</b>	NIPSCO-Royal Center Underground Gas Storage	Royal Center	Indiana		219-647-5263	Jack Watkins	
<b>Northrup Grumman</b>	NORTHROP CORP B2 DIV						90660NRTHR8900E
<b>Northrup Grumman</b>	Northrup Grumman Corporation, Saint Augustine Site	Saint Augustine	Florida		(904) 825-3543	Roger Payne	
<b>Novus International Inc. (Alvin facility)</b>	Novus International Inc. (Alvin facility)	Alvin	Texas				77511NVSNTFM291
<b>OKI Semiconductor Manufacturing</b>	OKI Semiconductor Manufacturing		Oregon				
<b>Osram Sylvania</b>	Osram Sylvania Products Inc.	Versailles	Kentucky	40383	606-873-7351	John Young	
<b>Osram Sylvania</b>	Osram Sylvania Products Inc. (Wellsboro facility)	wellsboro	Pennsylvania	16901	717-724-8200	Tom Lang	16901GTPRD1JACK
<b>P.H. Glatfelter Comapny</b>	P.H. Glatfelter Comapny	Spring Grove	Pennsylvania	17382	717-225-4711	Neal Carter	40383GTPRD900TY
<b>Pacific Bell</b>	Pacific Bell	San Ramon	California	94583	415 331-0924	Nancy Clancy	
<b>Pacific Bell</b>	Pacific Bell Corporate Realestate (San Ramon)	San Ramon	California	94583			
<b>PacifiCorp</b>	PacifiCorp (Naughton Plant)	Kemmerer	Wyoming		307/828-4211	Mark Mansfield	

<b>(Naughton Plant)</b>							
<b>Parke-Davis Research Ann Arbor facility</b>	Parke-Davis Research Ann Arbor facility	Ann Arbor	Michigan				48105PRKDV2800P
<b>Performance Solutions International Ltd. Philips</b>	Performance Solutions International Ltd.	west Bloomfield	Michigan	48322	810-661-4520		
<b>Philips</b>	Philips Consumer Electronics Company (Greeneville facility)	Greeneville	Tennessee				37744PHLPSSNAPA
<b>Philips</b>	Philips Semiconductors (Albuquerque facility)	Albuquerque	New Mexico		(505) 822-7678	James Cochran	87113SGNTC9201P
<b>Philips</b>	Philips Semiconductors (Sunnyvale Facility)	Sunnyvale	California		(408) 991-4129	Glen Tsukamoto	94086SGNTC811EA
<b>Plasticolors, Inc. (Ashtabula facility)</b>	Plasticolors, Inc. (Ashtabula facility)	Ashtabula	Ohio		216-997-5137		44004PLSTC2600M
<b>QualComm Personal Electronics (San Diego facility)</b>	QualComm Personal Electronics (San Diego facility)	San diego	California	92121	619-657-2527		
<b>Quality Chemicals, Inc.</b>	Quality Chemicals, Inc.	Tyrone	Pennsylvania	16686	814-684-4310	Diane Gormelly	16686QLTYCINDUS
<b>Quality Chemicals, Inc.</b>	Quality Chemicals, Inc.	Schaumburg	Illinois				
<b>Raychem Corporation, Polyswitch (Menlo Park)</b>	Raychem Corporation, Polyswitch (Menlo Park)	Menlo Park	California	94025	415-361-4046	Chuck Culley	94025RYCHM980HA
<b>Reichhold Chemicals, Inc.</b>	Reichhold Chemicals, Inc.	Bridgeville	Pennsylvania		412-257-5700		15217KPPRSMILLE
<b>Republic Metals Corporation (Opa-Locka facility)</b>	Republic Metals Corporation (Opa-Locka facility)	Opa-Locka	Florida		305-685-8505	Richard rubin	33054RPBLC12900
<b>Ricoh</b>	Ricoh Electronics (Tustin)	Tustin	California				92705RCHLC23002
<b>Ricoh</b>	Ricoh Electronics Inc. (Fountain Valley facility)	Fountain Valley	California				
<b>Ricoh</b>	Ricoh Electronics Inc. (Irvine facility)	Irvine	California				92714RCHLC17482
<b>Rockwell Automation</b>	Rockwell Automation	Duluth	Georgia	30095	414 382-3640	Majo Thurman	30136RCKWL1800S
<b>Rockwell Automation</b>	Rockwell Automation	Milwaukee	Wisconsin	53204	414 382-3640	Majo Thurman	53204LLNBR1201S
<b>Rockwell Automation</b>	Rockwell Automation	Dublin	Georgia	51021	414 382-3640	Majo Thurman	
<b>Rockwell</b>	Rockwell Automation	Highland	Indiana	46322	414 382-3640	Majo Thurman	

<b>Automation</b>								
<b>Rockwell Automation</b>	Rockwell Automation	Sumner	Iowa		414 382-3640	Majo Thurman		
<b>Rockwell Automation</b>	Rockwell Automation	Mayfield Heights	Ohio	44124	414 382-3640	Majo Thurman		
<b>Rockwell Automation</b>	Rockwell Automation	Mayfield Village	Ohio	44124	414 382-3640	Majo Thurman		
<b>Rockwell Automation</b>	Rockwell Automation	Twinsburg	Ohio	44087	414 382-3640	Majo Thurman		
<b>Rockwell Automation</b>	Rockwell Automation	Eau Claire	Wisconsin	54703	414 382-3640	Majo Thurman		
<b>Rockwell Automation</b>	Rockwell Automation	Mequon	Wisconsin	53092	414 382-3640	Majo Thurman		
<b>Rockwell Automation</b>	Rockwell Automation Allen Bradley Co. Inc.	Dublin	Georgia	31021				
<b>Rockwell Automation</b>	Rockwell Automation Allen Bradley Company Inc. (Eau Claire facility)	Eau Claire	Wisconsin	54703				
<b>Rockwell Automation</b>	Rockwell Automation, Allen-Bradley Company, Inc.	Highland Heights	Ohio	44087				
<b>Sanyo</b>	Sanyo E&E Corp. (San Diego facility)	San Diego	California					92173SNYCR2001S
<b>Sanyo</b>	Sanyo Energy Corp. (San Diego facility)	San diego	California					
<b>Sanyo</b>	Sanyo Manufacturing Corporation (Forrest City facility)	Forrest city	arkansas	72335	870.633.5030	Stephen Sestina		
<b>Schneider</b>	Square D Company (Oxford facility)	Oxford	Ohio					45056SQRDC5735C
<b>Schneider</b>	Square D Pacifico	San Leandro	California					94577SQRD1998R
<b>SERMAcoat, L.L.C. (Brighton facility)</b>	SERMAcoat, L.L.C. (Brighton facility)	Brighton	Michigan	48116				
<b>SGS-Thomson</b>	SGS - Thomson Microelectronics	San Diego	California	92127	619-592-8939	Pat Hoy		92127NRTHR16350
<b>SGS-Thomson</b>	SGS-Thomson MicroElectronics (Phoenix)	Phoenix	arizona	85022	602-485-6328	Peg Goodrich		85022SGSTH1000E
<b>SGS-Thomson</b>	SGS-Thomson Microelectronics, Inc. (Carrollton facility)	Carrollton	Texas	75006	972-466-6023	Rick Coleman		75006SGSTH1310E
<b>Sharp</b>	Sharp Electronics Corporation	Camas	Washington	98055				
<b>Sharp</b>	Sharp Laboratories of America Inc.		Washington					
<b>Sharp</b>	Sharp Manufacturing Company of America		Texas					
<b>Sharp</b>	Sharp Manufacturing Company of America (Memphis facility)	Memphis	Tennessee	38115				
<b>Sharp</b>	Sharp Microelectronics		Washington	98607				

	Technology Inc.						
<b>Solutia, Inc.</b>	Solutia, Inc.	Alvin	Texas	77512-9888	281 228-4000	Phil Winget	77511HNTSMFM291
<b>Sony</b>	Sony De Mexicali (Calexico facility)	Calexico	California				
<b>Sony</b>	Sony Disc Manufacturing (Springfield facility)	Springfield	Oregon				
<b>Sony</b>	Sony Magnetic Products of America (Dothan facility)	Dothan	alabama	36305			36301SNYMGHWY84
<b>Sony</b>	Sony Music (Pittman facility)	Pittman	New Jersey				08071SNYMS400NW
<b>Sony</b>	Sony Music Entertainment Inc. (Carrollton facility)	Carrollton	Georgia				30117CBSRC5152C
<b>Sony</b>	Sony Professional Products Company (Boca Raton facility)	Boca Raton	Florida	33487	(561) 998-6810	Shelly Greenstein	
<b>Sony</b>	Sony Semiconductor Company of America (San Antonio facility)	San Antonio	Texas	78245	210-647-6918	Ron Beauvais	78245DVNCD8611M
<b>Sony</b>	Sony Technology Center (San Diego facility)	San diego	California				92127SNYMN16450
<b>Sony</b>	Sony Trans Com, Inc. (Irvine facility)	Irvine	California		714-252-6762		92718SNYTR40PAR
<b>Sony</b>	Sony Video Corporation (Baja facility)	Baja	California				
<b>SouthTech</b>	SouthTech Inc. (Tappahannock facility)	Tappahannock	Virginia				22560STHTCAIRPO
<b>Synair Corporation (Chattanooga facility)</b>	Synair Corporation (Chattanooga facility)	chattanooga	Tennessee		(423) 697-0419	Jeff Gornberg	37406SYNRC2003A
<b>Synthetic Industries (Chickamauga facility)</b>	Synthetic Industries (Chickamauga facility)	Chickamauga	Georgia	30707			
<b>Tivoly Inc. (Derby Line facility)</b>	Tivoly Inc. (Derby Line facility)	Derby Line	Vermont	5830	802-873-3106	Michael Gaudreau	05830NNBTTBAXTE
<b>Toshiba</b>	Toshiba America	Sunnyvale	California				
<b>Toshiba Display Devices Inc.</b>	Toshiba Display Devices Inc.	Horseheads	New York	14845	607 796-3500	Steve Castellana	14845TSHBWWEST1
<b>Toyota</b>	TABC INC.				LONG		90805TBCNC6375P
<b>Toyota</b>	TOYOTA INDL. EQUIPMENT MFG. INC.		BEACH, CA 90805				47202TYTND5555I
<b>Toyota</b>	TOYOTA MOTOR MFG. KENTUCKY INC.		COLUMBUS, IN 47201				40324TYTMT1001C
<b>Toyota</b>	Toyota -- TABC, Incorporated	Long Beach	California	90805	562 984-3319	Dan Monette	90805TBCN6375P
<b>Tytex Inc</b>	Tytex Inc	Woonsocket	Rhode Island	2895	401-762-4100	Richard Lutman	
<b>Ultra Additives Inc.</b>	Ultra Additives Inc. (Paterson	Paterson	New Jersey				07543LTRDD460ST



(Paterson facility)	facility)							
<b>United Paradyne Corporation (Vandenberg Air Force Base)</b>	United Paradyne Corporation (Vandenberg Air Force Base)	Vandenberg Air force Base	California	93437	805.734.2750	John Sipos		
<b>United Waste Water Services, Inc. (Cincinnati)</b>	United Waste Water Services, Inc. (Cincinnati)	Cincinnati	Ohio	45241	513-733-4666	David Weber		
<b>US Steel</b>	US Steel	Clairton	Pennsylvania	15025	412-233-1015	Coleen Davis	15025SSCLR400ST	
<b>Vectron International</b>	Vectron International	Hudson	New Hampshire	3051	603-577-6724	Joe Dufresne		
<b>Viking Pump Inc. (Cedar Falls facility)</b>	Viking Pump Inc. (Cedar Falls facility)	Cedar Falls	Iowa	50613			50613VKNGL7THBL	
<b>Warner-Lambert Co.</b>	Warner-Lambert Co.	Lititz	Pennsylvania	17543	717.627.9539	Charles Souders	17543WRNRL400WL	
<b>Westinghouse</b>	Westinghouse Savannah River Company (DOE site)	Aiken	South Carolina				29802SVNNH5CHIG	
<b>Westinghouse</b>	Westinghouse Waste Isolation Division (DoE)	Carlsbad	New Mexico	88220	(505) 234-8332	Steven C. Kouba	88220GRGRY1502G	
<b>World Resources Company (Pottsville facility)</b>	World Resources Company (Pottsville facility)	Pottsville	Pennsylvania		717-622-4747		17901WRLDRWALNU	
<b>Xerox</b>	Xerox Corporation (El Segundo facility)	El Segundo	California				90245XRXCRCR701SO	
<b>Xerox</b>	Xerox Webster Manufacturing Operations (Webster facility)	Webster	New York				14580XRXCRCR800PH	
<b>Xerox</b>	Xerox X-link (Cincinnati facility)	Cincinnati	Ohio	45242				
<b>Xerox</b>	Xerox X-link (Pittsburgh facility)	Pittsburgh	Pennsylvania	15220				

## Appendix 2: Company Interview Protocol

Good \_\_\_\_\_

My name is Jason Switzer. My research group at MIT, the Technology Business and Environment group, is performing a study of ISO 14001 and its implementation in the US. We would very much like your participation.

I have a few questions I would like to ask you. It will take about 30 minutes, perhaps less. Is this a good time to talk, or should I call you at another time. When would you prefer, morning or afternoon ?

1. Who is your registrar, and when were you first registered ? How frequent is recertification ?
2. Why did you choose to adopt ISO 14001 ? Why undertake the additional effort of obtaining certification ? Supplier requirement ?  
*Foreign owner ? Customer Requirement ? ISO 9000 ? Leader Recognition ? Laggard Reqt? Intl market access ? Other ? Improve EP ?*
3. What process did you undertake to determine what aspects of your operations are 'significant' ?
4. Do you make any of your goals public ? What goals have you set for your management system ?
  - a. Transparency: How are you publicising your goals/use of standard ? How are they communicated to your employees ? Were any outside stakeholders involved in goal-setting ?
  - b. Comprehensiveness and Stringency: How are they different to what you had in place prior to certification ? Are you setting goals for regulated and unregulated aspects ? Do you think these goals will be difficult to achieve ?
  - c. Sustainable: To what extent are you focusing on prevention of pollution/pollution prevention ? Are you rethinking manufacturing processes, changing products, etc. as a result ?
  - d. Measurable: How specific are your goals in terms of timetables and performance metrics ?
5. What other tools from the ISO 14000 series are you employing or plan to employ? (EPE, LCA...)
6. What is CI ? What metrics do you use to demonstrate continual improvement ? (Is CI equivalent to making progress towards your goals, or is it something different )?
7. What happens if you fail to show Continual Improvement ?

## Appendix 3: Registrar Interview Protocol

Good \_\_\_\_\_

My name is Jason Switzer, from MIT. The Technology, Business and Environment group is beginning a project to understand the impact of ISO 14000 on firms' environmental efforts. We would like your participation.

Is this a good time to talk ? This will not take more than 20 minutes. Would you prefer that I call you tomorrow morning or afternoon ?

### Question:

1. Who have you registered and when ?
2. \*How do you get accreditation ?
3. Why are firms adopting ISO 14001 ? Are customers requiring it ?
4. How frequently must firms be recertified ?
5. \*Explain the certification process ? Who is involved ? Who signs the form at the end ?
6. What does it mean 'to demonstrate continual improvement'? Does that mean 'improvement of the management system (i.e. more training, better data collection, more thorough analysis of aspects) or progress towards goals established by the firm ?
7. What happens if a firm fails to show 'continual improvement' ? Can a firm be suspended ? Would you suspend a client for non-conformances?
8. What kind of goals are being established ? Performance ? Management ? who is involved in process ?
- \*9. Some state regulators are considering offering regulatory flexibility to certified firms. What do you think of the idea ? How would that change your role ?