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Making a Case Study for the Real Business Value of ISO 14001 Implementation in the Automotive Industry, Chemical Industry and Small Business

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Abstract

This graduate thesis, *Making a Case Study for the Real Business Value of ISO 14001 Implementation in the Automotive Industry, the Chemical Industry, and Small Business,* demonstrates how companies within the automotive industry, the chemical industry, and small business are experiencing business value post ISO 14001 Environmental Management System implementation. This paper analyzes the benefits and pitfalls of ISO 14001 post implementation as well as customer and supplier requirements and the business value the companies studied are experiencing.

The ISO 14001 standard was published in 1996. The program was more widely adopted in Europe and Asia, but in North America, it was the larger automotive manufacturers who were to grasp the system and to implement it throughout their organizations. Those automotive manufacturers then started to require their suppliers to become certified by certain dates. This prompted many companies to have to implement this system out of a requirement to continue business, not out of an actual desire to implement by the company for simple environmental benefits. This has lead to the examination of just how much value is being brought to these businesses from the implementation of the ISO 14001 EMS.

Key Words: ISO 14001 EMS, automotive industry, chemical industry, small business, business value

1.0 Introduction

1.1 Topic

The topic to be investigated in this thesis is the Environmental Management Systems (EMSs) that have been implemented within the automotive manufacturing industry, the chemical manufacturing industry, and small business enterprise. ISO 14001 will be examined in particular. The goal of this thesis will be to create a case study to determine if the ISO 14001 environmental management systems are providing real business value to several different companies within automotive manufacturing, chemical manufacturing, and small business who have chosen to implement this EMS. It will also address any trends and issues that have developed with through implementation. Companies studied will include major automotive manufacturers such as Honda and General Motors, automotive suppliers such as The Gleason Works, chemical manufacturers including Arch Chemicals and BP Amoco Chemicals, and the small business of Jasco Heat Treating, Inc. Case studies are a detailed review of specific item or program that captures the background, process, outcomes, successes, failures and lessons learned. A case study may include both quantitative and qualitative data. The case study provides an opportunity to explore a single program in depth, but places the burden on the investigator to provide clarity, organization and introspective to the investigation. The information necessary to create this case study will be ascertained from company websites, interviews with key personnel, environmental reports, and any related articles available.

This topic is significant and worthy of study for the Environmental Health and Safety field for numerous reasons. Many companies are turning to environmental management systems as a way to manage their environmental health and safety activities efficiently and strategically. The companies are looking to keep their facilities in compliance, to save money and resources, and to consolidate their EHS programs. Environmental management systems and certifications such as ISO 14001 are starting to be viewed by many automotive companies as a necessary part of their business. ISO 14001 is also being seen as a route to move away from the traditional "command and control" regulatory format that is typical of companies without the ISO 14001 EMS (MacLean Part 2, 1). Auditors have started to question how much business value environmental management systems (EMS) are providing to the companies who tout them. This was a main focus of the Auditing Roundtable keynote speaker's speech at a recent meeting (MacLean Part 1, 1).

1.2 Research Questions

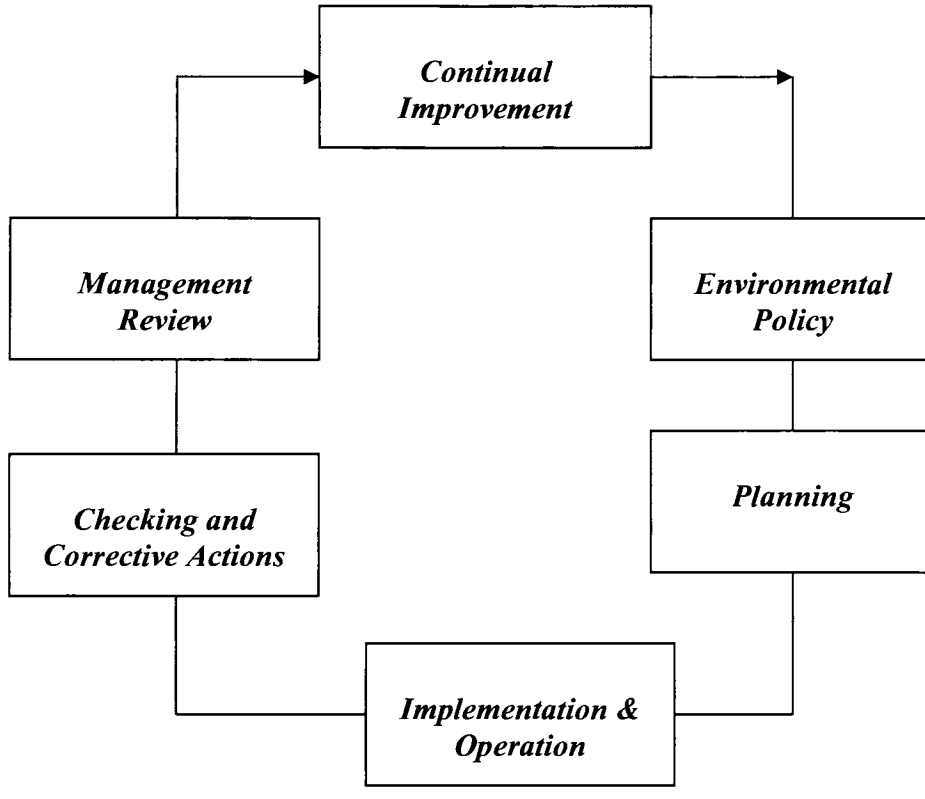
1.2.1 Primary Research Question

Is the ISO 14001 Environmental Management System providing business value to the selected case study companies within the automotive manufacturing industry, the chemical manufacturing industry, and small business enterprise that have implemented the standard?

1.2.2 Secondary Research Question

Has the implementation of ISO 14001 provided the benefits that motivated the initial effort?

Figure 1.1Environmental Management System Model



*This figure is adapted from Jackson, Suzan L. "ISO 14001: Things You Should Know." *Automotive Manufacturing & Production.* October 1997. Pages 78-79.

1.3 Definitions

This thesis employs the use of several different terms. Those terms are identified below.

- Business value: the tangible benefits a company sees from implementing the ISO 14001 Environmental Management System (i.e. economic, regulatory, environmental performance, public relations).
- Certification and registration: These are used interchangeably when referring to ISO 14001 statuses at a facility. Certification is used more in Europe and registration more in the United States due to legal liabilities.
- Environmental Management System (EMS): a set of management procedures and processes created to allow organizations the ability to analyze, control, and reduce the environmental impact of its operations and services.
- Environmental performance: the measurable results of the environmental management system as related to its organizations control over its identified environmental aspects.
- ISO 14001: is used to speak specifically about the International Organization for Standardization's voluntary environmental management system. It is meant to meet the needs of both the private sector and government organization as well as to monitor their environmental performance and impacts on finite and natural resources such as air, water, soil, and raw materials. ISO 14001 and EMS are both are used to describe process-driven systems.
- Responsible Care®: the chemical industry's code of conduct that covers health, safety, product stewardship, and community relations.

- RC®-14001: the combination of the chemical industry's Responsible Care® program and ISO 14001; this allows companies to certified for both at the same time.
- Voluntary standards: which are standards that are not required that a company follow. They are meant to be recommendations that are not legally binding.

2.0 Background

An environmental management system is a set of management procedures and processes created to allow organizations the ability to analyze, control, and reduce the environmental impact of its operations and services. The EMS can be used as a tool to help an organization achieve cost savings, streamline regulatory compliance, and achieve greater overall oversight and efficiency. ISO 14001 is a voluntary international environmental standard created by the International Organization for Standardization meant to meet the needs of both the private sector and government organization as well as to monitor their environmental performance and impacts on finite and natural resources such as air, water, soil, and raw materials.

In 1996, ISO 14001 was adopted as an International Standard for guidance in the development of environmental management systems. It was developed by the TC 207 committee of the International Organization for Standardization intended to persuade organizations to systematically address the environmental impacts of their activities (EEM, Inc., 1).

ISO 14001 is just one model of an EMS, but it is able to thoroughly integrate environmental awareness and thinking on all levels and in all processes of an organization. It has enabled environmental performance to become an essential part of a company's overall performance (Pawar & Risseto, 10- 11). ISO 14001 has based its model on the EMS model of Plan-Do-Check-Act.

3.0 Literature Review

3.1 Background Literature

3.1.1 Brief History of the ISO 14001 Environmental Management System

Firms worldwide have adopted Environmental Management Systems (EMS). Increasingly, those same firms and others have been taking the extra step to have their systems certified under the ISO 14001 standard (Jiang & Bansal, 1047). Due to ISO 14001 being a process and not a performance standard, it can be successfully applied to any type of business (Hayes & Ritchie, 19). The ISO 14001 EMS encourages a proactive instead of a reactive approach to environmental management at manufacturing facilities (Haugan, S4).

According to the literature, the word ISO is derived from the Greek word isos, which means equal (EEM, Inc., 1). Throughout the literature, the ISO 14001 EMS is referred to as having the ability to level the playing field on an international level since it is a standard that can be used in Europe, Asia, North America, Canada, etc.

Environmental management systems seem to be looked at in one of two ways: (1) as being just another "stove pipe" approach to environmental management and (2) an EMS is a" value-added, performance –driven system that is easily integrated into a company's core business" (Pojasek, 81). Some companies have looked at the standard and said "We have always done it this way," while others say that "This standard brings little or no value added benefit to our organization. We do not affect the environment", to yet others who say "This standard is the best thing since sliced bread" (McDonald, Mors & Phillips, 67). Even with these comments, companies all over the globe are considering ISO 14001 and what it means for them. As of June 2002, more than 40,000 ISO 14001 certifications existed internationally and of those 40,000 certifications, 2,040 resided within the United States (McDonald, Mors & Phillips, 67).

3.1.2 ISO 14001 and the Automotive Industry

The automobile industry currently is a leader in the United States for the number of organizations that are ISO 14001 certified and this has in turn created a wealth of information for the smaller companies who have yet to try their hand at certification (Thornton, 2). There are several reasons that have pushed the automotive industry to achieve their certifications. One is that Toyota's influence has been heavy as they are usually ahead of industry with their environmental commitment. This could come from limited space in Japan, or environmental problems related to their manufacturing. Retention of present market shares (including the auto industry's increasing globalization), and brand protection are also reasons the automotive industry has pushed

forward (Thornton, 3). Either way, they seem to set precedence for the rest of the industry. Retaining market share is key due to the competitiveness of the automotive industry, so environmental perceptions must be kept positive. Also, due to such an increase in globalization, parts can be made and then assembled in totally different places, so the ISO 14001 standard creates a more uniform environmental program across the boards (Thornton, 2-4). Due to competition in the global marketplace with Asia and Europe (who have more ISO 14001 registered companies than the US), ISO 14001 was chosen to be adopted rather than create their own standard (Sissell {Melding}, 35). The market share is also increased and the power wielded by the large automotive companies requiring their suppliers to adopt ISO 14001's environmental standards (Schaarsmith, 12). Brand protection is necessary to keep positive public perception as well. The SUV issue has been felt by automakers, so they want to make sure conscious efforts are made environmental-wise. This issue largely involves consumer concern over gas usage and vehicle emissions in the larger vehicles made by the automakers that just seem to continue to grow larger every year. Consumers want to drive them, but they also want to know that the manufacturers are doing their part to make them more environmentally friendly (Thornton, 2-4).

3.1.3 ISO 14001 and the Chemical Industry

Much like parts suppliers to the major automotive manufacturing companies, many chemical companies found themselves being pressured to adopt ISO 14001 or lose the business of those manufacturers as well. The chemical industry's Responsible Care®

and Management Systems Verification (MSV) process were not to be considered equivalent to the ISO 14001 registration (Gilbertsen & Kowalski, 3). The chemical industry had a grasp on health and safety with the Responsible Care® program, but ISO 14001 certification would give them a grasp on the environmental end as well (Sissell {debut}, 52). It also helps to build more credibility with customers and the community due to outside auditors becoming part of the certification process.

3.1.4 ISO 14001 and Small Business

Small businesses are very much a large part of the national economy, so they should be able to reach ISO 14001 certification as well. In many instances, they are trying, but do not make it as far as actual certification or registration due to the costs of doing so. Options, such as software to aid with audits, are available to help companies with items such as this. Just because the business is small does not mean that it does not have the potential to create environmental impacts (Johannson, 52- 54). Sustainability is a concern not just for the large companies, but also for the small businesses and ISO 14001 helps to address this for them. The small business is not just there to be a bump in your process, but it is there to act as part of the global market as much as the next big company is, so reaching ISO 14001 needs to be part of the agenda all around, even if conformance to the standard is all many small businesses can meet or afford at this point (Detweiler & Sedlak, 15-16).

3.1.5 Motivations for Adopting an EMS/ISO 14001

Moreover, company managers will agree that environmental management has become a part of their business operations (Jiang & Bansal, 1053). In Jiang and Bansal's research, three main motivations were found for adopting an EMS: (1) market demand; (2) institutional pressure and (3) management control (1055). Environmental management has moved to a "customer-driven thing." The customers are asking more and more questions about the companies environmental performance and programs. Company reputations are at stake and the social pressure is on to perform. Adopting an EMS will show good management practices and will serve as a way to encompass all aspects of the company under a management plan that also is working for the environment. It is managements' way of being able to proactively manage regulatory changes, community relations, and public opinions, as well as having their environmental management be more consistent. It is being seen as a management system that will weave environmental management into the "organizational fabric" (Jiang & Bansal, 1055-57). With market pressure being such a strong motivator, being certified for ISO 14001, a competitive advantage can be achieved over those companies who have not yet come aboard (Hayes & Ritchie, 7-8). It will increase pressure on those companies to become certified in much the same way certification for ISO's quality standard, ISO 9000, did.

3.1.6 Benefits of EMS/ISO 14001 Implementation

The ISO 14001 EMS brings benefits in three forms: environmental, social and business (EMM, Inc., 4). The literature shows that business benefits will be the largest seller for management buy-in. Those benefits include improved access to permits and authorizations, due diligence, eco-efficiency and cost savings, competitiveness, satisfy customer requirements, ensure legislative compliance on a continuous basis, improve insurance rates and monetary lending and the optimization of existing management systems (EMM, Inc., 4-7).

Glenn Hourahan believes that ISO 14001 brings more pros than cons to the table (1). Global competitiveness, reduced liability claims, lower compliance costs, lower operating costs, and public relations are just a few of the pros that Hourahan sees for the implementation of ISO 14001 (2). Darnall, Gallagher, Andrews and Amral agree with Hourahan when they say that facilities who adopt an EMS "are able to reduce their environmental impacts beyond regulatory standards may also lessen their environmental reporting burdens and the costs associated with them" (2). Jiang and Bansal see ISO 14001 certification as the potential to attract new customers that might not have been attracted if not for the certification. This certainly seems to be working with Ford and General Motors, as they require their major suppliers to become ISO 14001 certified (Jiang & Bansal, 1049).

The University of North Carolina spearheaded a study on environmental management systems. It was found that advocates of an EMS will argue that facilities who have an EMS in place have more reliable performance and compliance, reporting

requirements are documented more efficiently thus allowing for more timely inspections, and their procedures are more consistent in the reduction of spills, accidents, and other environmentally damaging occurrences (UNC, ES-1). The UNC study also found that "some environmental agencies also have granted increased regulatory flexibility...based in part on EMS implementation" (ES-2).

Hayes and Ritchie will point out that by implementing ISO 14001, it is showing evidence to stakeholders that the company is serious about environmental management (7). The two authors go on to say that there are tangible benefits that include the maintenance of good public and government relationships, image enhancement of the company, and an increase in market share (Hayes & Ritchie, 7). The playing field is being leveled for those who play in the global market as well. ISO 14001 is widely used, especially in Europe, so there is less competitive disadvantage for companies who are competing globally or for those who have global counterparts, they are able to be on the same page (Hayes & Ritchie, 9). Environmental International agrees on the global marketplace as they see the potential for foreign firms to require U.S. companies to be ISO 14001 registered as a prerequisite for doing business with them (4). Many are finding that by implementing ISO 14001, higher profits, a positive public image, and a cleaner, pollution-free world are just some of the benefits of such an undertaking (Fielding, 27). Companies are also finding that by using their certification and the ISO 14001 guidelines to support compliance with legal and company regulations, certification becomes well worth it. Environmental risks can be reduced and environmental performance is not only improved, but also streamlining in how water, energy and natural resource consumption occurs (Ceniceros, 5).

3.1.7 Pitfalls of EMS/ISO 14001 Implementation

Cons include paper trail, documentation, unachieved goals, certificate status, and program costs (Hourahan 71-72). The paper trail can be used to show a company is not truly serious about their ISO 14001 program while documentation can become heavier than what they previously had to deal with. ISO 14001 is a process standard, so that does not necessarily mean environmental improvement goals will be met. Certification might not always be a need or recognized, and cost will be a large factor in getting the program started and running (Hourahan, 71-71).

Hayes and Ritchie will also point out that there are pitfalls to ISO 14001. In the United States, there is concern over the confidentiality of the data that is collected through certification audits. Even though the EPA has long since made it a practice to not request voluntary audit reports so as to trigger enforcement actions, they have also made it clear that those audits do not shield a company from regulatory actions (Hayes & Ritchie, 11). Hayes and Ritchie agree with Hourahan on one of the largest pitfalls that have the potential to occur being that improved environmental performance will not come out of the ISO 14001 certification (11). Ceniceros will agree as well due to some companies obtaining certification and then doing little else with their program (3). All of these authors have hit the mark with actual improved environmental performance being the company's biggest concern. They do not want to spend all of the time and resources on ISO 14001 to have it turn around and prove to not be a help to their company and to show some type of positive return.

The literature also explores the most common pitfalls to implementing ISO 14001. Wilson states the following ten items are the most common pitfalls to implementation in any organization: (1) failure to obtain commitment of senior management; (2) failure to secure employee buy-in; (3) failure to conduct a gap analysis; (4) failure to define realistic commitments; (5) failure to identify all environmental aspects; (6) failure to prioritize improvements; (7) failure to control documents; (8) failure to integrate EMS requirements into business plans; (9) failure to validate corrective/preventive actions and (10) failure to involve interested parties (43-45). If these items are considered and carefully made part of the implementation process, success is more likely than failure.

3.1.8 Environmental Protection Agency's Position on EMS/ISO 14001

The Environmental Protection Agency (EPA) sees having an EMS as a valuable tool for company operations and environmental management. The EPA issued an updated statement in May 2002 on their overall policy and guiding principles. The "EPA's overall policy on Environmental Management Systems, like the EMS itself, will be guided by the principles of continual improvement and learning, flexibility, and collaboration" (EPA Statement of Principles). The EPA takes a forward step by saying that they will lead by example and implement an EMS at appropriate EPA facilities. In a 1999 report the EPA committed "...will encourage organizations to use EMSs that improve compliance, pollution prevention, and other measures of environmental performance. We'll continue evaluation efforts to learn more about which EMS elements

and applications are most effective, and we'll determine how these systems might be used to strengthen environmental programs and policies" (EPA Position Statement).

3.1.9 Success Stories

Implementing the ISO 14001 EMS is not an easy feat by any means. There is a substantial amount involved before a company can go up for certification. Items to be accomplished can include creating procedures, setting objectives and targets, identifying environmental aspects, and employee training and awareness. However, success does not just come in the form of certification, but also in the transformation that can occur at that facility or the company overall.

Gabriele Crognale, a contributor to the May 2002 edition of *Pollution Engineering,* asked a colleague at General Motors what value he saw from having implemented an EMS at his facility, prerequisite to becoming ISO 14001 certified (34). His colleague responded by saying that a communization process was set up so that every plant could have the same format for procedures, allowing for less time creating and more time to assimilate (Crognale, 34). The greatest value of ISO 14001for GM has come out of employee awareness. Before the system, an employee on the floor might have a great idea, but it would never reach the right person. With the system, those people are being reached, new ideas implemented, and a difference being made (Crognale, 34). Worker interest and input seems to be a key value obtained by ISO 14001 EMS that should spark more companies to look at their operations.

In early 1999, Ford Motor Company became the first and only company within the automotive industry to achieve ISO 14001 certification at all seventy-three of its North American plants (Odubela, 68). In order to accomplish this, projects were launched that would help to reduce disposable packaging by 163 million pounds, energy costs were cut due to light bulb replacement from a fluorescent bulb to a metal halide light bulb. The management philosophies as well as employee knowledge and responsibility all changed along with the program to become more proactive towards environmental compliance (Odubela, 69).

3.2 Current Issues and Trends

3.2.1 Beyond ISO 14001 for the Automotive Manufacturer's

The ISO 14001 Environmental Management System is not the only standard that the largest companies in automotive manufacturing subscribe to. Honda has created an internal program called Green Factory that works to reduce energy and emissions, reuse raw materials, and recycle manufacturing materials, paper and plastic. This is one of the reasons that Honda has been able to continuously reduce chemical emissions, even as production has increased (Honda, Greener Factories). Toyota and General Motors are part of a joint venture called New United Motor Manufacturing Incorporated (NUMMI Inc.) that was started in 1984 in California, with production starting in 1986. The goal was to reduce and reuse the solvents that are used in the manufacturing and painting processes (Toyota, environment). General Motors subscribes to the GRI Guidelines as

well as the World Business Council for Sustainable Development (WBCSD) as part of the many global environment partnerships that GM has created and maintained (GM, environment). Even though each has different guidelines or programs in place, they all strive for sustainability through those as well as to keep up the expectations and programs that their ISO 14001 EMS certification has set forth.

3.2.2 RC®-14001: The Combination of ISO 14001and Responsible Care®

Due to increased pressure on chemical companies who already subscribed to Responsible Care® to get ISO 14001 certified as well, the chemical industry was unsure as to the ultimate fate of the Responsible Care® program. On one hand, Responsible Care® had a broad aim by picking up health, safety, customers, community, and communications, while on the other, ISO 14001 focused more narrowly on environmental management and emphasized rigor in certification. Solution: bring the two standards together to create RC®-14001 (Gilbertsen & Kowalski, 3-5). This will help Responsible Care® stay out front and not get lost with all of the other standards there are to choose from and at the same time, give the automobile manufacturers the independent third party audit verification they desire of their suppliers (Sissell {Melding}, 34-35). By having the third party audit, it is lending more credibility to Responsible Care® for those who may have been skeptical about the level of compliance maintained with the program (Sissell {debut}, 51). This "crisis" reared its head at the right time; it gave the chemical industry a way to improve Responsible Care® in a way they had been looking for; the third party audit (Boswell, 6). In a pilot study with BASF Elastocell in Wyandotte, MI, it

was found that the combination of ISO 14001 and Responsible Care® really does work (Boswell, 6). RC®-14001 becomes stronger than either ISO 14001 or Responsible Care® on their own. It adds health, safety, emergency response, product stewardship and the environmental improvements under 14001 all under one expanded program (Sissell {fine-tune}, 49). The American Chemistry Council (ACC), is making is a requirement of member firms to have their company headquarters complete third-party verification of a Responsible Care® Management System (RCMS) or obtain certification for RC®-14001 by 2005 year-end (Sissell {RC}, 21). Since a lot of work will go into this system, ,most business professionals want to know what financial benefits will come from the time and money spent. Most will not see this until years down the road due to the companies putting a system in place that requires continuous improvement. This will allow industry to improve year to year and that will be tracked through ACC's performance data website. This plus credibility resulting from third-party certification will help to improve the industry's standing with NGO's, customers, the community and regulators (Sissell {RC}, 21).

3.2.3 Small and Medium-Sized Enterprises – Will ISO 14001 Work?

Small and Medium-Sized Enterprises (SME's) are the backbone of many national economies, yet to date, the adoption of the ISO 14001 EMS has been with mostly large national and multinational companies (Johannson, 51). An EMS is made for any size company, but SME's seem to have more barriers than large enterprises for implementation. Those barriers include lack of awareness, cost of certification, lack of

time and human resources, the perception of more paperwork to deal with, lack of perceived benefit, and lack of internal commitment and regulation (Johannson, 51-53). Many small businesses are not required to apply for permits and government usually does not have the resources to enforce the regulations that are in place for them. Given that SME's have the potential to have significant environmental impact, there is much interest in the possible role of EMS's in small companies. Due to the initial cost and resources needed to implement ISO 14001, many small and medium-sized businesses are just not able to take on the task. With market pressures, this can pose the potential for a trade barrier to these companies (Hayes & Ritchie, 11).

3.2.4 ISO 14001 and International Trade

When ISO 14001 was first introduced, it was expected to

> "...Diminish barriers to trade and make it easier to do business across borders, both for importing and exporting companies and for multinationals that operate worldwide. The standardized system also promises to make it easier for companies to gauge their environmental performance and make useful comparisons of facilities in different countries" (Begley, 51).

One of the goals of ISO 14001 is to create a level playing field through the facilitation of trade and minimization of trade barriers. Due to it being a voluntary standard, it has potential to do just the opposite. If a country were to require all those businesses within its borders to be ISO 14001 certified, it could create a trader barrier to those companies outside that country who do not have the certification. This hurts trade in the way that those companies within the required country may not be allowed to do business with any business that does not have the certification (Hayes & Ritchie, 11).

Market driven or mandated ISO 14001 certification could pose significant barriers to developing nation companies. They are more than likely not going to have the money or resources to become certified. ISO 14001 has the potential to create technical trade barriers for small companies as well due to the limited knowledge and resources that are necessary (Ganesan, 223).

On the other hand, ISO 14001 gives the management processes of companies in any country a way to be able to compare against another company in a different country. It can be used when deciding on a supplier or when looking for a competitive edge within an industry (Ganesan, 221). ISO 14001 offers a common approach for all companies all around the world. ISO 9000/2 was able to work through trade barriers, so 14001 should be able to do the same (Goodman & Veritas, 2).

3.2.5 Integration of Quality, Environmental and Occupational Health and Safety Management Systems

ISO 14001 does not require integration of safety and health management systems. The standard runs more parallel to the ISO 9000 standard, but by integrating safety and health where economically viable and appropriate, it creates a stronger, more streamlined system (Hayes & Ritchie, 12). Due to being parallel with ISO 9000, many of the documents and requirements of ISO 14001 will already be in place in a company that has 9000. This makes an easier build of the ISO 14001 system within that company. A successful Total Quality Management system in place can lead to a successful and value-added EMS for the company.

By integrating safety and health management into the ISO 14001 EMS, the bar can be raised for safety and health within a facility as well. This can prove to be a prudent move for facility continual improvement and audit goals (Baird, 28-29). Baird goes on to state that there will be places where the two systems will meld into one another, but in other instances, their respective colors will show through the integration process (30).

McDonald, Mors and Phillips state that they are often asked why this integration should be done since there might be a different person or group running each. Their answer is to give the benefits that integration brings to an organization. Those benefits include the similarities between the three systems, creating more simplified systems, the chance for conflicting documents between the systems is reduced, resources are optimized, organizational performance is improved, integration into the company business strategy becomes easier, and the framework is laid for continual improvement of all three systems at once (68-69). They also respond with the limitations, so they are made aware. Limitations to integration can include the tendency to develop a process that is over documented and bureaucratic, "turf" battles could occur if a Quality Management System (QMS) is already in place, and the degree of integration is limited by compatibility (more with the QMS vs. the EMS and OHS) (McDonald, Mors & Phillips, 70).

Whether integration is right for the company or not, the company needs to understand that an EMS poses a cultural change for an organization. It will take time for things to sink in and become a part of the company's business and culture (McManus, 27). A company might even be so bold as to turn to its stakeholders and integrate them

into their systems and to invest in external communications with them so that they better understand the company systems and the value being brought to both (Delmas, 347). Those industries who have achieved integration success include medical products, pulp and paper, steel, service, automotive, technology and chemical. Not only have they seen significant returns in the form of reduced operating costs, management system complexity, and the time that is required to manage their processes, but also in employee satisfaction once the integration process reaches them (McDonald, Mors & Phillips, 68-69).

3.2.6 Customer Requirement / Supplier Certification

Many large multinational companies have indicated that they will make it their intention for their suppliers to become ISO 14001 certified (Kloepfer, 47). The "Big Three" auto manufacturers are expecting that their Tier 1 suppliers will have an EMS in place and companies like GM and Ford have issued deadlines for their suppliers to meet. Those deadlines have come and gone at this point as they were set for the end of 2002 and 2003. Defense, aerospace, high tech/computers, chemicals, and utilities are also implementing ISO 14001, and individual companies within these sectors are also requiring their suppliers to implement ISO 14001. The auto sector has the strongest trend of requiring supplier implementation. Automakers feel that extending their own commitment to suppliers is not just good for the environment, but good for the business as well. Auto customers are progressively concerned about the environmental effects of vehicle use, thus making environmental issues a key competitive issue. An effective EMS

also encourages companies to use their resources more efficiently and reduce waste, both crucial in helping to control costs (Bell, Boxerman & Connaughton, 1). Graff states, "According to one corporate manager of environmental affairs, the supplier who inappropriately manages its environmental aspects or ignores opportunities for pollution prevention may pass significant environmental liability and a negative image on to its customer" (21). In the end, implementing an EMS is not just an effective means for suppliers to meet and manage environmental compliance obligations, but it is quickly becoming an essential for doing business and remaining competitive within industry (Bell, Boxerman & Connaughton, 1). It is also an opportunity for the suppliers – regulators can see their commitment to the environment and to continual improvement and this in turn could lead to less time for permits and possibly some regulatory relief (Seelig, 3).

3.2.7 Environmental Management Systems Effectiveness and Value

Depending on your company, industry, regulations, and geographic location, the importance of ISO 14001 as a management tool market credential, or public and regulatory relations will vary (Kloepfer, 45). Integrating environmental aspects into business management is essential for manufacturing in the 21st century and ISO 14001 has been widely used to help with this necessity (Graff, 79).

In a survey conducted by Jiang and Bansal of the wood and pulp industry, they found respondents who indicated, "the structure of an EMS or ISO 14001 could bring rigour and consistency to environmental management" (1057). They also found that by

implementing an EMS, it helped to maintain the continuity in environmental management procedures and practices when going through employee turnover. It enabled them to not have to "reinvent the wheel every time" (Jiang and Bansal 1057).

MacLean states "Systems alone will not save the day" (Part 1, 3). He goes on to say that Enron and Arthur Anderson had many systems in place, but that still did not save them. MacLean also goes on to state that "an EMS can provide tremendous real business value, but only if focused on key business processes" (Part 1, 3). All companies have an EMS in place in order to operate, but the challenge is to align it with the company's business objectives and to make it more efficient (MacLean, Part 2, 1-2). They system needs to be reviewed not just for continual improvement based on the minimal goals the company creates, but also to see if the right EMS was implemented for the company, if their strategy is taking the right direction, and if the system is moving at the right pace (MacLean Part 2, 3). MacLean feels there are ten components of an EMS that are most often the ones that need a closer look and some improvement. Those components include:

- "A clear vision of future direction, developed with the intimate involvement of top officer and directors
- A real strategic plan, not just the usual project list
- A robust set of metrics, not just those usually reported and benchmarked within the industry sector
- A robust reporting system, particularly with respect to the officers and directors
- A competency development program for EHS staff members
- An organizational and staffing review that examines potential dysfunctional behavior among groups and/or individuals
- A management system that is conceptually simple: both executives and front-line employees understand what their role is, each step along the way
- A governance system that attacks the real issues and includes hard mechanisms (e.g., signoffs) for certain key business transactions by appropriate EHS professional
- A core risk analysis process that examines past, present and future risks rigorously
- Transparency and outreach programs that build good community and agency relationships" (MacLean Part 2, 4).

Crognale supports a lot of what MacLean states about the value of ISO 14001 and environmental management systems overall. He asks if there is value or a return on investment for those who have these systems implemented. His answer is "The answer

may depend upon whether an EMS was properly designed and whether the individuals keeping it going have the right tools and management support to realize tangible positive gains" (Crognale, 35). One more question to ask when checking for the value of an EMS might be about the company's TQM system. If the company has focused on what things happen and why they happen, the EMS is going to produce much greater value than just putting a system in place and hoping for the best (EPA EMS Concepts, 1).

3.3 Conclusions

The literature has gone from proclaiming the ISO 14001 environmental management system as "the best thing since sliced bread" to "illustrating one of the worst trends in environmental management" (MacLean, 2 and McDonald, Mors & Phillips, 1) The literature has also shown that there are many ways to manipulate environmental management systems to work for the company, but many seem to be turning to ISO 14001 time and time again. This could prove to turn into a trend that helps to turn businesses onto being more conscious of their manufacturing process and the effects those processes have not only on the business, but on the world outside of the facility boundaries.

4.0 Methodology

4.1 Tasks and Objectives

4.1.1 Reviewed ISO 14001 Elements

This served as a refresher to prepare for the company interviews.

4.1.2 Identified Companies to Interview

The following companies were selected based on each of them having the ISO 14001 certification in place in their facilities as well as some also having supplier requirements for ISO 14001. The original intent was to examine only companies within the automotive industry. Unfortunately, this did not work as planned, so the scope was then expanded to include automotive suppliers, the chemical industry and small business. This expansion provided contacts and information more readily than just examining the automotive industry.

Table 1. Automotive Manufacturing Companies with ISO 14001 Environmental Management Systems

Automobile Manufacturers & Suppliers	
Company	**Personnel Interviewed**
Honda Manufacturing, Inc. Marysville, OH	Environmental Manager
General Motors Pittsburgh, PA	Environmental Engineer
General Motors Mansfield, OH	Environmental Engineer
ABC Automotive Supplier, Inc. Rochester, NY	General Supervisor of Environmental Activities
Gleason Works Rochester, NY	EHS Manager and/or EHS employee

Table 2. Chemical Manufacturing Companies with ISO 14001/ RC®-14001 Environmental Management Systems

Chemical Manufacturers	
Company	**Personnel Interviewed**
BP Amoco Chemicals, Inc. Lima, OH	EHS Technical Specialist
Arch Chemicals Rochester, NY	Environmental Coordinator

Table 3. Small Business Enterprises with ISO 14001 Environmental Management Systems – Conformance Based, Not Certified/Registered

Small Business Enterprise (SME)	
Company	**Personnel to be Interviewed**
Jasco Heat Treating, Inc. Fairport, NY	VP of Quality / HSE
Arch Chemicals Rochester, NY	Environmental Coordinator (For comparison purposes)

4.1.2.1 Reviewed Company Websites and Related Information

This step allowed for review of any certifications or other standards the company may subscribe to before they were interviewed.

4.1.3 Contacted Companies

Companies were contacted via phone or e-mail to inquire about speaking with a contact about the thesis topic. At this point, it was necessary to change the scope of companies to be interviewed due to not being able to speak to those necessary to get the information that was being sought. The new companies were chosen due to experience with several of the companies and more readily available contacts at the others.

4.1.4 Performed Interviews

The interviews were performed via phone whenever possible, but e-mail was the best mode of communication for most of the personnel interviewed. The interview questions are located in Appendix 1.

4.1.5 Identified Issues and Trends with Company EMSs

This identified motivations for the company implementing the ISO 14001 EMS (i.e. corporate driven, customer driven). It identified if the companies felt that there was anything lacking with the EMS systems implemented, if there were items that were hard to implement or upkeep, and if trade had been affected (if multi-national). It also identified if the company had realized items such as tangible benefits, including economic, regulatory, and social.

4.1.6 Adding Value

This identified if, how, where and why there had been value added to the business by the implementation of the ISO 14001 Environmental Management System.

5.0 Results

5.1 Background

This thesis had one major result: to determine the real business value of ISO 14001 implementation in the automotive industry, the chemical industry and for small business. This result was accomplished through interviews with key personnel at sites that encompassed these industries. After a collection of information through the interviews, comparisons were made on the companies in their respective industries. They were compared according to the yes/no answers given in the interview as well as on any additional information that was given.

5.2 Automotive Manufacturers

5.2.1 Honda of America Manufacturing Inc. – Marysville, OH

Honda is a very proactive automotive manufacturing company environmental-wise. It was at the leading edge of ISO 14001 certification by its East Liberty Auto Plant (East Liberty, OH) becoming the first automotive manufacturing plant in the United States to become certified in 1998. This set the stage for high expectations on their feedback to the interview questions. The author was able to speak with Chris Heminger, the Environmental Manager who oversees the ISO 14001 program at all four facilities located in Ohio; Marysville (2 auto and motorcycle), East Liberty, and Anna. These

facilities have approximately 14,000 employees. Mr. Heminger is located at the Marysville Auto Plant. This plant was certified in 1998 along with the others. Honda had decided in 1996, the first year the ISO 14001 standard was published, that this program was something to which Honda wanted to subscribe. Honda did not feel pressure from within the automotive industry to implement ISO 14001, nor did they feel pressure from outside of their industry. They served more as an example in the United States for the automotive industry.

Mr. Heminger did mention that the auditors sometimes get more wrapped up in document control than in actually auditing the program and their continual improvement programs. This is seen as more of an audit drawback than one for the program overall. The greatest challenge for the Marysville plant in implementation was determining the significant aspects and the appropriate level of procedures. After implementation, their greatest challenge in system upkeep is time spent on conducting their internal audits and keeping those audits fresh and effective. It is one thing for them to just use a cookie cutter audit for their facility, but it helps the program in identifying continual improvement opportunities by being able to change up the audits. When asked about any improvements that the ISO committee might be able to make to help the program, more clarity on when written procedures are expected was the answer.

In speaking about some of the more tangible benefits and pitfalls, it was found that economic benefits were difficult to measure since Honda was already a very progressive company in regards to the environment. So, they have seen economic benefits overall, but not necessarily ones that can be tracked besides the usual fines, inspection frequency, and money spent for miscellaneous environmental activities related

to the facility. The same type of situation holds true for any tangible regulatory benefits. It has been difficult due to the regard the facility holds for the environment and the effects their operations have. The Marysville plant has not seen any social or public relations benefits from their implementation of ISO 14001. Their operations are located farther away from residential areas than many other facilities are that might see more in this area after implementation. Surprisingly, environmental performance benefits are not being seen, either, but with being a more proactive company as far as Honda's environmental activities go, this is not as surprising as it might be if speaking with a company who is not as proactive. Trade has not been affected from their ISO 14001 implementation, either. This is due in part to their overseas operations needing to be ISO 14001 certified as well.

Negatives have not been created for the Marysville plant, but as a positive from certification, they have experienced a little different treatment from regulatory agencies, especially the Ohio EPA. The Ohio EPA has began to understand the ISO 14001 EMS and the benefits of implementation much more now than many more companies in the state have selected to have their facility certified. Honda has found this makes it easier to deal with them on the facility level.

Honda is one of the companies that does have supplier requirements in place for ISO 14001. The require all of their vested suppliers to achieve the ISO 14001 registration. Honda has about thirty suppliers that this requirement applies to. They seek out companies with this certification to do business with as well. Honda especially seeks companies in regards to their waste handling and recycling and parts suppliers.

In addition to the above, Mr. Heminger said that ISO 14001 has provided a foundation for the Honda companies. Honda previously used the Total Quality Management (TQM) principles as their base, but ISO 14001 has helped with procedures and with giving them a more formal approach to environmental management.

5.2.2 General Motors – MFD Mansfield Plant

The General Motors facility in Mansfield, Ohio does metal stamping and has approximately 2,500 salaried and hourly employees. Their facility has had ISO 14001 certification since 2001. They made the decision in 2000 that the ISO 14001 certification was something that would benefit their facility. GM felt pressure from both the automotive industry and from outside of the automotive industry to put ISO 14001 in place.

In speaking with Tameria Warren, an Environmental Engineer at this General Motors facility, she felt that there were two items that the ISO 14001 program was lacking that could have helped with implementation or with the overall program usage. The first item is creation and usage of common procedures among facilities. As different facilities and plants received their certifications, they were given the freedom to develop their own procedures, forms, worksheets, etc. as GM did not receive certification as one organization. Having something in the standard that required facilities within the same company to have uniform procedures, forms, worksheets, etc., could have helped overall. Now, the corporation is in the midst of having all of the facilities and plants convert their individual documents to common corporate and divisional ones. It has proven to be a

long task for the Mansfield facility, and there is always the possibility of forms or controlled numbers getting missed. Since those items are auditable by the standard, it could prove to create problems during audits. The second item is that the environmental/EMS aspects should have been implemented into the core business plans of the production facilities instead of just within the environmental services group. It would have made the plants and their parent divisions more responsible to the system. The ISO 14001standard does not really involve advise on this issue and would be beneficial to include some direction for those implementing the standard.

As far as the Mansfield facility's greatest challenge when implementing ISO 14001, getting the different manufacturing divisions (i.e. assembly, stamping, engines, etc.) to buy off on it. It meant that the manufacturing divisions would have to follow more procedures and many of the plants had or were in the process of implementing quality systems. It meant a definite cultural change for the facilities and that is not typically well received. The Mansfield facility's greatest challenge in the upkeep of the system has been getting top management support from within the plant. Many of Mansfield's production managers still hold the belief that the ISO 14001 system belongs to the environmental engineers, so they do not participate as the system necessitates. Many have yet to fully embrace the fact that the system belongs to the whole plant and not just one department. Ms. Warren feels that the standard itself works just fine and does not have any suggestions when asked. This was not really expected after her answers to their challenges, but at the same time, it was due to those answers dealing more with items that seem to be internal for their facility.

In asking about benefits and pitfalls, as expected for this facility, the benefits outweighed their pitfalls or items that they might not be seeing a tangible benefit from. Mansfield is seeing tangible economic benefit from recycling and waste reduction. Both of these items have helped to save the facility money. The facility has experienced regulatory benefits from being able to properly control their hazardous waste better. As far as social/public relations' benefits, Mansfield has found that the people are more aware of operations and effects after ISO 14001 implementation. As far as environmental performance benefits, people are more engaged in activities such as recycling and waste reduction. The facility has not had trade affected for them or for any of their companies outside of the United States. The Mansfield facility has not experienced negatives created from their ISO 14001implementation, nor have they experienced any different treatment from regulatory agencies. The latter is not a surprise since Honda is just starting to see the Ohio EPA understand ISO 14001 better and not see any different treatment from them, so it makes sense with GM being in the same state, the same most likely would apply to them. Overall, Ms. Warren felt that the ISO 14001 system has been effective for their operations.

The Mansfield facility's certification does not affect their customers, as the GM assembly plants are ISO 14001 certified as well. Many of their suppliers (i.e. chemical providers) have become certified, although the facility as an individual does not require this of its suppliers. GM overall does require many Tier 1 suppliers to become certified.

Additional comments by Ms. Warren included that in any organization that has multiple divisions and groups, it is so very important that they buy off and support the implementation of the ISO 14001 system because it makes for a smoother and easier

transition for the future. If top management provides support and holds it divisions responsible for the ISO 14001 systems' success, everyone will be working from the same page. This will help to make it a viable program for the facility and corporation overall.

5.2.3 General Motors – Pittsburgh, PA Plant

The General Motors plant in Pittsburgh, Pennsylvania has a facility of 648 employees and performs metal stamping. They decided to implement ISO 14001 in 1999 and were successful in getting certification later that year. In speaking with Karen Keys, Environmental Engineer, the author learned that the facility felt pressure from outside of their industry to gain ISO 14001 implementation in order to remain competitive globally. They were pressured from within the automotive industry as well to utilize ISO 14001 as a system to aid in maintaining both conformance and compliance. In speaking with Ms. Keys, the author expected to find some similar answers to her questions as the author did in speaking with Ms. Warren of the Mansfield, OH facility since their operations are the same.

After asking about the ISO 14001 program lacking anything that would have helped with implementation and overall usage, it once again came up that GM should have developed common procedures, forms, etc. from the onset and then proceeded to implement the ISO 14001 EMS. The greatest challenge while implementing the system was in getting all of the procedures, forms, and Standardized Worksheets developed in addition to training all of the people in the plant on both the above stated items and on ISO Awareness in general. After implementation, the greatest challenge in upkeep came

from maintaining upper management support and keeping up enthusiasm among the employees. Ms. Keys did not have any recommendations at this point for the ISO committee either.

In looking at benefits and pitfalls, there was a more even distribution than at the Mansfield facility as far as tangible benefits. The Pittsburgh facility was realizing tangible economic benefits through a reduction in waste volumes and the cost of disposal. They are not seeing regulatory benefits at this particular plant, though. Pittsburgh is also not seeing much in the way social/public relations' tangible benefits at this facility, either. Ms. Keys stated that at her previous facility there seemed to be fewer negative newspaper articles and comments from the local public. Ms. Keys tends to think that the general public tends to think that industry is not supportive of environmental initiatives, but ISO does often eliminate some of this distrust. ISO does this by reductions in wastes, cleaner air, water, and etc. that are more often then visible to the public. Ms. Keys has seen environmental performance benefits in the form of the reduction in waste and an increase in recycling efforts. The Environmental Engineer also thinks there is more support for energy conservation initiatives that were being previously ignored. Trade has not been seen as affected locally or with their company locations outside of the United States. The single tangible negative that has come out of their ISO 14001 implementation has been that there can be too much effort and emphasis placed on conformance to the ISO system without regard to compliance. At this facility, regulatory agencies have not treated them any differently as opposed to the facility that Ms. Keys came from. There, more agency inspections were performed right after implementation. The results were favorable and gave the agencies more confidence in the facility

operations and lead to a lesser frequency in inspections in the future. Ms. Keys sees the system as effective, but acknowledges that there are limitations. Most of those limitations are related to the time and expenses necessary to support the ISO objectives and targets over the long term. Due to fluctuations in the economy, funding from year to year often adversely affects meeting some of those targets.

The ISO 14001 certification at the Pittsburgh location has an impact on both customers and suppliers. The facility requires more service and commitment to conformance from their suppliers. The overall effect on customers should be evident and in the long run, help to reduce the unit cost of the products. Their facility personally does not require suppliers to be ISO 14001 certified. Pittsburgh does look for companies with the certification to do business with, though. They do not exclude those who do not have the certification, but having the certification makes it easier to deal with them.

Additionally, Ms. Keys had a few further insights to share. She stated that the initial intents was to limit business dealings to those suppliers with ISO 14001 certification, however, she feels that any corporation has to take into consideration the existent business environment; economic and political. At the beginning of ISO 14001 implementation, objectives and targets could be met more easily with less cost, but as the system matures and improves, it becomes more difficult and more costly to grow the program. Along with the time and maturity of the ISO program, a lot of the support wanes from both upper management and the employees. Ultimately, if ISO is to continually improve and strengthen, there has to be a commitment to the program both internally from a company's employees including management and externally from a company's customers and suppliers.

5.3 Automotive Suppliers

5.3.1 ABC Automotive Supplier, Inc., Rochester, NY

ABC Automotive Supplier, Inc. (the name has been changed by request of the company that their real name not be published) in Rochester, New York is an automotive parts manufacturer that has about 1800 employees. The company was ISO 14001 registered in 2002. The corporation (parent company to ABC) decided in 1999/2001 that the manufacturing facilities would be registered. The General Supervisor of Environmental Activities stated that this was due to their customers making it a requirement of their suppliers; if no registration or certification, then business would no longer be done with the company. Therefore, this also answers the questions of influence and pressure. There was definite pressure from outside the industry and from within due to customer requirements.

When asked if the program was lacking anything that might have helped in implementation or in overall usage, the General Supervisor said that there really wasn't anything in particular. The Supervisor did say that the program has the flexibility to be able to be molded into the way the facility works. ABC's greatest challenge in implementing ISO 14001 was to be able to efficiently implement the program. When they first started, no one had worked with the program before, so they were not sure of what they were doing and if they were going about the process the right way. ABC then brought someone on board who had worked with the program at several other companies and it helped them to successfully implement ISO 14001. The facility's greatest

challenges in the system upkeep were in just overall upkeep of the system requirements and remembering all of the little things. The facility made reference documents in order to help them remember everything that needed to be done. The other challenge was to keep the system simple and focused, not layers like others had been that she had seen. The Supervisor had seen systems that had so much built off of them that they were just more confusing and more work than worth. When asked if she had any recommendations for the ISO committee for improvements or changes, the Supervisor said that there needs to be a more defined separation between health, safety and environmental items. She felt there is a lot of overlap when auditors come through; they tend to get more focused on the health and safety things within the facility (i.e. fire extinguisher tags, compressed gas chained properly, etc.). Those items are important, but they are covered elsewhere. They are too easy to see and that can make the auditors become sidetracked. They are also not looking at the regulatory requirements in the depth expected of them.

In speaking of the pitfalls and benefits and value that the system is adding to ABC, the Supervisor did not feel there was a lot being added since ABC has a strong environmental program to begin with. She has not really seen tangible economic benefits, except that having the registration may keep the playing field more level within the industry. It was felt there had not been any tangible regulatory or social/public relations' benefits realized. As far as tangible environmental performance benefits, they were and were not realized. Those benefits more likely came from environmental expectations pointing everyone towards doing a better job of graphing and comparing than ISO 14001 itself. It helped more to put everything into one place by forcing them into a better record organization. The Supervisor says this as a byproduct of ISO 14001,

not as a direct result. Trade has not been affected to her knowledge either. The major negative that jumps out is that a certain amount of extra labor is now required, so this translates into extra cost for labor and personnel time as it now takes almost a whole fulltime person just to keep up with the paperwork. Another negative is that another audit cost is added on to others already performed. They have not seen any regulatory agency treatment difference since receiving their ISO 14001 registration. They believe that their system has been effective in that it has helped to make little changes come about easier. It has worked almost like a threat mechanism to get people to change due to the fact that someone from the outside will be upset of the change does not occur; it is no longer just the Supervisor asking for that change to happen.

There has not been an impact on customers since they are the ones who made the certification necessary, but they will ask if ABC has the certification when they do business. ABC does not require their suppliers to be ISO 14001 certified, nor do they look for companies with the certification to do business with.

As far as additional comments, the Supervisor said that ISO 14001 became a bookkeeping system for them. It has not really helped them to get farther ahead environmentally as they were already very active in action plans and in their program overall. They also have a quality certification and have tried to figure out ways to make the auditing process part of this. This would help to alleviate all of the time people have to spend preparing and going though audits. It has been too difficult when the audits are combined into one, so something more efficient needs to be formed.

5.3.2 The Gleason Works – Rochester, NY

The Gleason Works is a machine tool builder located in Rochester, New York with approximately 900 employees. They became ISO 14001 registered in February of 2004. Gleason's decided to implement the ISO 14001 system in 2000 due to it being passed down as an automotive customer requirement in order to be able to continue doing business with that customer. They did not experience any pressures from within their industry itself.

In speaking with Herb Allen, the Environmental Coordinator for Gleason, he stated that it would have been easier if the standard was more specific like ISO 9000 when asked if the ISO 14001 program may be lacking anything that could have aided in implementation or in the program usage overall. Mr. Allen said that their greatest challenge in implementing the system was that there was no clear communication of top management support. It was just something that they had to do, not something that they had chosen to do. Their greatest challenge in the upkeep of the system is apathy. It makes the upkeep that much more difficult when there is indifference to the program; it makes getting people to work on it that much harder. Mr. Allen does not have any recommendations for the ISO committee at this time.

The Gleason Works is experiencing tangible benefits. Some of their continual improvement projects have been showing success for them and this in turn has been a positive financially. Gleason has not yet experienced regulatory, social/public relations, or environmental performance benefits in a tangible form. They have seen trade for their facility affected in the way that they have now met a customer requirement so that

business is allowed to continue. Gleason has not seen any different treatment from the regulatory agencies since their ISO 14001 implementation, either. Mr. Allen does feel that their system has been effective thus far. He stated that there was still plenty of room for improvement.

Because The Gleason Works needed to reach certification due to customer requirements, their certification impacted their customers by way of continued business. With certification complete, Gleason would be kept on their customer list. There has not been an impact on Gleason suppliers since they are not requiring their suppliers to be certified. Gleason is also not actively seeking companies with the certification to do business with.

5.4 Chemical Manufacturing Industry

5.4.1 BP Amoco Chemical Company - Lima, OH

BP Amoco Chemical Company is a chemical manufacturing company located in Lima, Ohio with 456 employees. In speaking with Robert Maloney, the author learned that the company decided to implement ISO 14001 in 1999. There was not pressure felt from within the chemical industry to push forward on this, but there was from outside of the chemical industry. Implementing ISO 14001 was part of a deal made with the Environmental Protection Agency over a fine that the location had previously received.

When asked what the ISO 14001 program may be lacking or what could have helped with implementation, Mr. Maloney responded by saying that if the program had

been built more off of ISO 9000, it would have made implementation easier since BP already had that particular program in place. His greatest challenge in implementing ISO 14001 was getting buy in from a staff and work force that was already busy enough with day to day items and the other programs in place (they have ISO 9000 and Responsible Care® at the facility). The greatest challenge in the upkeep of the system is in having the time to spend on the program and keeping the site management involved. Mr. Maloney did not have any other recommendations for the ISO committee besides the one of basing the standard more on ISO 9000.

In speaking about benefits and pitfalls, BP finds itself on the positive end. They have not seen a whole lot of economic benefit, but due to having ISO 9000 in place, it did make implementation of 14001 easier and less expensive. They have seen regulatory benefits by way of having more procedures developed and a lot more of who does what. There have been social/public relations' benefits as it gives them another program to advertise to the community that they subscribe to. Being located in a place that has several other high profile companies (i.e. two more chemical companies, an oil refinery, and steel works), the community is pretty involved when meetings are held. Trade has not been affected and Mr. Maloney is not aware of any negatives that have cropped up since ISO 14001 was implemented. They have not seen much difference in treatment from regulatory agencies, but they feel that the system has been effective. It has helped to make environmental issues a higher priority with operations, working on the "we have to do it, if it's for ISO," along with helping to meet regulatory requirements more effectively.

As far as having any impact on customers or suppliers, Mr. Maloney is not aware of any impact as of this point. They did not implement ISO 14001 out of pressure from customers and they are not looking to have their suppliers become certified.

To add to his above comments, Mr. Maloney stated that their internal audit program, when combined with ISO 9001:2000 and the Process Safety Management requirements has helped to keep the plant focused on meeting the ISO standard. He also said that the ISO 14000 standard is positive as it helps people deal with the environmental issues where in the past they would be pushed aside if it interfered with "business."

5.4.2 Arch Chemicals, Inc. – Rochester, NY

Arch Chemicals, Inc. is a chemical manufacturer located in Rochester, New York with 141 employees. In speaking with Ronald Skipp, the Environmental Coordinator, I learned that their facility was a pilot facility for the chemical industry's newest standard RC®-14001, a combination of Responsible Care® and ISO 14001. They were certified at the end of 2003 for this standard. This was a corporate driven implementation with regards to Arch's policy and strong stance on Responsible Care®, also to be innovative and a leader in the area of Responsible Care® with regards to the new standard. There was not pressure felt from outside of the company, but there was some pressure from within the industry to secure RC principles. Arch did not have any difficulty in getting top management to sign on to the program implementation. There was already an EMS in place, so they were able to build from what existed.

When asked about what might be lacking from the standard or what might be able to help overall program usage, Mr. Skipp said that more clearly defined principles would have been helpful. He said that a lot is left up to the discretion of the facility and that can make things difficult and leaves more room for gray areas. The policy is still in its infantile stages and is somewhat cumbersome, but they are improving as the standard improves over time.

Arch's greatest challenge in implanting RC®-14001 was working through the aspects and impacts of such a diverse facility. Their greatest challenge in the upkeep of the system requirements was in making sure the procedures are properly followed and implemented. Mr. Skipp said that having procedures and systems in place are great, but if they are not fully functional, then they do not support your goals within the RC®-14001 certification. He has no recommendations for the ISO committee at this time.

In talking about the benefits and potential pitfalls to the system, Arch comes out on top with many more benefits than pitfalls. In fact, one of the only categories not realizing a benefit was trade, but that was not really affected as Mr. Skipp said that ISO 9001/2000 is more likely to hurt a company than to trade with more environmentally conservative firms. The other category was economic tangible benefits, but their program is still young and there is plenty of time to see that pick up. Arch is however, experiencing regulatory, social/public relations, environmental performance and regulatory agency tangible benefits. In regards to regulatory, the certification aids when being audited by regulatory agencies to show commitment beyond that of just meeting the regulations of environmental or health and safety. Social/public relations are benefits in that the community feels that the certification is part of Arch's commitment to being a

"friendly neighbor" and working for the community and not just for themselves. Mr. Skipp stated that Arch has always had very good public relations due to the involvement of the community with a Community Action Panel (CAP). However, the RC®-14001 certification helps to emphasize Arch's commitment to the community and surrounding areas by involving them in the Responsible Care® program a little more. After all, the employees at the facility live in the surrounding area, and the economics and safety of the employees, the community, and the environment are a concern to all of the parties privy to the standard. Environmental performance benefits are seen in that it helps when dealing with regulatory agencies and gains more support for environmental policies from plant personnel (for things like taking readings, reporting incidents, etc.). Regulatory agencies seem to be more apt to work with the company than against them as they already have placed a commitment to staying on top of their regulations.

Arch did see one negative to the implementation of RC®-14001. That negative was in maintenance of the system. A lot of attention and extra input above and beyond the employees daily functions is required. Overall, Arch does feel that their system is effective, but it is also still an area of growth for them and the program is still taking shape. The quality of the system is increasingly getting better, but it takes time to tweak the system to fit the individual facility.

The customers and suppliers that Arch deals with are very supportive of their goals with RC®. Arch does not yet require their suppliers to be certified, but it is something that they are heavily looking into. Ach is always looking for companies to do business with that carry the same certification and have the same respect for the principles of Responsible Care®.

Mr. Skipp said that the regulatory and legal requirements were difficult to deal with in order to reach certification. The requirements are very strict and require a lot of time and energy to keep it functioning. Arch did utilize a couple of different outside contract firms to aid in their process towards certification. Arch feels that despite difficulties and time, the RC®-14001 certification has added value to their business by truly demonstrating their business commitment to Responsible Care®.

5.5 Small Business Enterprise

5.5.1 Jasco Heat Treating, Inc. – Fairport, NY

Jasco Heat Treating, Inc. is a small heat-treating business that supplies heat-treating services for automotive, aerospace and commercial customers, located in Fairport, New York. In speaking with Jim Carpenter, the author learned that they have 70 employees and have implemented the ISO 14001 EMS for compliance, but not certification or registration. This means that they have the systems in place, but have chosen to not be audited for certification or registration by a third party auditor. They chose to move forward and implement the ISO 14001 EMS in 2002 when EPA money became available through MSCEMI and Rochester Institute of Technology.

Mr. Carpenter said that there was no pressure felt from either outside of the industry nor from within the industry to implement ISO 14001. The biggest motivator for Jasco was cost as they are always looking for ways to use their environmental practices to reduce operating costs for the business.

When asked about what might be lacking in the ISO 14001 standard or if there was anything that would have helped overall program usage, Mr. Carpenter stated that the program does not measure actual improvement and results. It calls for continual improvement, but it does not give specific measurements. Audits can show if the facility is in compliance, but they cannot say the facility reduced this waste stream or that cost; those need to be something the facility puts in place, so guidance in the standard would be helpful.

The greatest challenge to implementing the ISO 14001 EMS was time and cost. These are large factors for many small businesses, so this was not a surprise. Jasco's greatest challenge for the upkeep of the program is ease of maintenance. It does take extra time and effort for employees who are busy to begin with. When asked for any recommendations to the ISO committee, it was much like what was found with BP in that making it easier to coordinate with ISO 9001:2000 was desired.

In discussing benefits and potential pitfalls to the system, Jasco seems to be seeing the most on the regulatory side of things. They are seeing both regulatory and regulatory agency tangible benefits. They are able to more efficiently meet the regulations of the different agencies and that helps put them on better terms and shows a commitment on the part of Jasco. Jasco is not yet seeing economic tangible benefits and since their environmental practices are built around reducing costs as a profitable business, this is seen as a negative to their system. Mr. Carpenter said that they are seeing the system as effective, but the facility feels it is more due to their own goals and objectives rather than just those of ISO 14001.

Jasco does not require its customers or suppliers to be ISO 14001 certified. They do not specifically seek out business with those who are. Therefore, by Jasco subscribing to the ISO 14001 EMS for compliance, there is no impact on their customers or suppliers thus far.

As far as getting top management to buy into the ISO 14001 program, the cost savings that can be realized made it a fairly easy sell, especially since money spent for it was coming from the EPA and not Jasco itself. They did not previously have an environmental management system in place at the facility, so it was an opportunity to get a system implemented that would help the small business in an area where their resources were lacking. Outside help was used as well in the implementation of the EMS. Students from Rochester Institute of Technology worked on the grant that provided the money to help small businesses achieve ISO 14001 EMS's at their facilities.

6.0 Analysis and Discussion

6.1 Automotive Manufacturers

Table 4. Comparison of Automotive Manufacturer Interview Answers

	Honda	General Motors Mansfield, OH	General Motors Pittsburgh, PA
Motivators			
Was your company influenced by pressure outside of your industry to obtain certification?	N	Y	Y
Did you feel pressure from within your industry to implement ISO 14001?	N	Y	Y
Benefits & Pitfalls			
Have you seen economic tangible benefits from ISO 14001 implementation?	Y	Y	y
Have you seen regulatory tangible benefits from ISO 14001 implementation?	Y	Y	N
Have you seen social/public relations' tangible benefits from ISO 14001 implementation?	N	Y	N
Have you seen environmental performance tangible benefits from ISO 14001 implementation?	Y	Y	Y
Has trade been affected at all for your facility?	N	N	N
Has trade been affected for any of your outside (of the USA) companies?	N	N	N/A
Have any negatives been created for your company through implementation of ISO 14001?	N	N/A	Y
Have you seen any different treatment from regulatory agencies since implementation?	Y	N	N
Do you believe your system has been effective?	Y	Y	Y
Customer/Supplier Relations			
Do you require any of your suppliers to be certified as well?	Y	Y	N
Do you look for companies with the certification in place to do business with?	Y	N/A	Y

In comparing these three companies, the date of certification or registration was considered as well since that can have an impact on the value a company may feel it is receiving from having the ISO 14001 EMS implemented at their facility. Honda was certified in 1998, General Motor's Mansfield facility was certified in 2001, and GM's Pittsburgh facility was certified in 1999. Even though it was the last of the three to be certified, GM's Mansfield facility looks to be getting the most value out of their certification. They are seeing tangible benefits in economics, regulatory, social/public relations, and in environmental performance. The Pittsburgh facility is seeing benefits in two of those four categories (economic and environmental performance), while Honda sees benefits from three of the four categories (economic, regulatory, and environmental performance). Honda had the advantage of not feeling pressure from outside nor within their industry, but both GM facilities felt pressure from each source to become certified. Honda's motivators were to keep their operations ahead in the environmental realm of auto manufacturing and GM's were more to keep themselves competitive with those who were implementing the system and looking at them to pick up certification as well.

Trade has not played an integral part in any affects nor added business value at any of the facilities from their responses. Since ISO 14001 is widely used overseas where it is more heavily accepted, this could play a role. It is benefiting the North American facilities to have the system in place to help keep the playing field level on a more global scale and that keeps the affects minimal, if any.

Honda was the only facility reporting different treatment from regulatory agencies. This stems in part because they are located in a state that has its own environmental protection agency that has been working to understand ISO 14001 better.

With having ISO 14001 at their facility for the past six years, it has given the Ohio EPA time to see the system in place and what it does for Honda. The fact that Honda is and has been very committed to environmental protection, could serve as the little extra it needs to get a little different treatment than the other facilities that might not have had such a strong commitment in the past. GM's Mansfield facility is located in Ohio as well and may very well see a change in their response when asked if they have experienced different treatment from regulatory agencies. Their program is only three years old, so the Ohio EPA and other regulatory agencies may still be learning with them.

All three facilities feel that their systems are effective and that is very important when one looks at the time and effort initially put into implementing ISO 14001 and then at the time and effort it will continually take to upkeep the system. If a facility feels that their system is effective, it is more likely to get continual buy in and support from management and staff, thus powering the system forward.

Honda and the Mansfield GM facility both require suppliers to be ISO 14001 certified while Honda and the Pittsburgh GM facility look for companies who have the certification in place to do business with. Both of these items are good business practices with ISO 14001 that are going to bring more value to the facility's operations. By requiring suppliers and seeking companies who have the certification in place to do business with, the facility will be able know the kind of commitment to the environment and quality that a supplier has. That can be very important because the products being supplied can be of greater quality and could have been produced through methods that reduced waste, emissions, and used more environmentally sound manufacturing processes. When one company such as Honda works to be very forward thinking with

their environmental protection, this is important with respect to whom they will be willing to do business with. It is not a requirement of the standard, but it does not hurt any of those involved.

Out of the three automotive manufacturing facilities, Honda is getting the most business value from their ISO 14001 EMS. It seems to look like the longer the certification has been in place; the more the benefits are realized. At the same time, it is still up the facility itself as to how much value their EMS is going to bring to their business.

6.2 Automotive Suppliers

Table 5. Comparison of Automotive Supplier Interview Answers

	ABC Automotive	Gleason Works
Motivators		
Was your company influenced by pressure outside of your industry to obtain certification?	Y	Y
Did you feel pressure from within your industry to implement ISO 14001?	Y	N
Benefits & Pitfalls		
Have you seen economic tangible benefits from ISO 14001 implementation?	N	Y
Have you seen regulatory tangible benefits from ISO 14001 implementation?	N	N
Have you seen social/public relations' tangible benefits from ISO 14001 implementation?	N	N
Have you seen environmental performance tangible benefits from ISO 14001 implementation?	Y and N	N
Has trade been affected at all for your facility?	N	Y
Has trade been affected for any of your outside (of the USA) companies?	N	N
Have any negatives been created for your company through implementation of ISO 14001?	Y	N
Have you seen any different treatment from regulatory agencies since implementation?	N	N
Do you believe your system has been effective?	Y	Y
Customer/Supplier Relations		
Do you require any of your suppliers to be certified as well?	N	N
Do you look for companies with the certification in place to do business with?	N	N

Unlike ABC, The Gleason Works did not feel pressure from within their industry to implement ISO 14001. This could be due to the differences in the type of products produced and the customers. Both do have customers in the automotive industry, but

Gleason works more on the machine building side and ABC is more of the parts and tooling.

The next major difference between these two suppliers is that The Gleason Works is seeing tangible economic benefits while ABC is not. Gleason identified continual improvement projects as a factor that has been helping their facility realize this benefit. ABC already had an aggressive environmental program in place, so their continual improvement projects are most likely not of the same magnitude that Gleason's are. From speaking with Mr. Allen, their projects have been larger ones that were not as much of a priority before the ISO 14001 implementation.

Neither company is experiencing tangible benefits in the areas of social/public relations and regulatory. This could be due to the programs that these companies had already and to their involvement in groups outside of the workplace such as the Industrial Issues Committee. This results in exposure outside of the workplace and that carries outside of their group as well. Only Gleason saw an affect on trade, but that same affect could apply to ABC in the way that both companies needed to implement the ISO 14001 system in order to continue business with their customers. Negatives were not created for Gleason, yet they were for ABC. ABC sees the paperwork as a large burden in upkeep of the system while Gleason did not even mention that as a problem. Gleason's existing system required a substantial amount of documentation to begin with, so they may have just been better equipped to deal with that and better anticipated it than ABC. Both companies feel that their system has been effective thus far. ABC is able to push new changes through better and Gleason is keeping their eye out for improvement opportunities.

Gleason's and ABC do not require that their suppliers be ISO 14001 certified and are not looking to explore that avenue at this point. They do not look to do business with companies who have the certification in place, either.

6.3 Chemical Manufacturers

Table 6. Comparison of Chemical Manufacturers Interview Answers

	BP Amoco Chemicals	Arch Chemicals
Motivators		
Was your company influenced by pressure outside of your industry to obtain certification?	Y	N
Did you feel pressure from within your industry to implement ISO 14001?	N	Y
Benefits & Pitfalls		
Have you seen economic tangible benefits from ISO 14001 implementation?	N	N
Have you seen regulatory tangible benefits from ISO 14001 implementation?	Y	Y
Have you seen social/public relations' tangible benefits from ISO 14001 implementation?	Y	Y
Have you seen environmental performance tangible benefits from ISO 14001 implementation?	Y	Y
Has trade been affected at all for your facility?	N	N/A
Has trade been affected for any of your outside (of the USA) companies?	N	N/A
Have any negatives been created for your company through implementation of ISO 14001?	N	Y
Have you seen any different treatment from regulatory agencies since implementation?	N	Y
Do you believe your system has been effective?	Y	Y
Customer/Supplier Relations		
Do you require any of your suppliers to be certified as well?	N	N
Do you look for companies with the certification in place to do business with?	N	Y

BP Amoco Chemicals was ISO 14001 registered in 1999 while Arch Chemicals was RC®-14001 registered in 2003. Both companies are experiencing very similar benefits and levels of value from their registrations. BP felt outside pressure due to a previous fine while Arch felt pressure from with their industry. For BP, the choice to implement ISO 14001 was not really a choice made out of what kind of business value it would bring to the organization, but one made more out of necessity.

Neither company is reaping any economic benefits that the ISO 14001 registration is thought to bring. This could be due in part to the nature of the chemical industry itself. With so much manufacturing being downsized or sent elsewhere, no matter what programs a company puts in place, it may end up costing the same, if not more, than without the system. However, both are seeing social/public relations, regulatory, and regulatory agency benefits from having the system in place. These are all key elements to a chemical manufacturer. Community relations are always important so that people understand that the company really does have a commitment to environmental protection and is moving forward with programs such as this. Seeing improvements with regulators is huge as it means the company is doing its job by meeting and/or exceeding regulations and expectations set forth by those agencies. ISO 14001 has helped these companies push forward by getting management and staff buy in.

There is however a difference in the way each of these companies goes about ISO 14001. BP subscribes to the principles of Responsible Care® and is ISO 14001 registered separately, while Arch is registered to a combination of those principles and ISO 14001. Arch was part of a pilot study to implement RC®-14001. This combined standard came from the auto industry not accepting Responsible Care® as it did not involve a third party

audit and that is what the auto manufacturers wanted their suppliers to be experiencing at their facilities. For BP, it has given them an edge with their surrounding community, as they are able to show them their commitment to environmental protection. For Arch, it has helped to create a commitment to not only their employees while on site, but also to them off site since they are the surrounding community. It has also shown their commitment to the principles of Responsible Care®. ISO 14001 has delivered on its business value to these chemical companies. Not only does it help to show their commitment, but also it helps them in the areas that are important to the business and the bottom line.

There is one more major difference between these two chemical companies: Arch is also considered a small business since it only has one hundred forty one employees. A small business might encounter much more opposition than what Arch did to implement RC®-14001. They are proving that as a small business, they are achieving the same, if not slightly more, than what the large BP facility is achieving through having the ISO 14001 registration and a commitment to the Responsible Care® principles separately. Arch may even be a step ahead by subscribing to the combined standard. They are already starting to see the value that they had hoped the system would bring them and since their registration is still in its infantile stages, there could be more benefits to be realized and experienced. BP does not have that advantage and due to their programs being separate, they have much more to deal with in upkeep, audits, documentation, training, etc. that might not allow them to realize their maximum business value.

6.4 Small Business Enterprise

Table 7. Table of Small Business Interview Answers

	Jasco Heat Treating, Inc.	Arch Chemicals
Motivators		
Was your company influenced by pressure outside of your industry to obtain certification?	N	N
Did you feel pressure from within your industry to implement ISO 14001?	N	Y
Benefits & Pitfalls		
Have you seen economic tangible benefits from ISO 14001 implementation?	N	N
Have you seen regulatory tangible benefits from ISO 14001 implementation?	Y	Y
Have you seen social/public relations' tangible benefits from ISO 14001 implementation?	N	Y
Have you seen environmental performance tangible benefits from ISO 14001 implementation?	N	Y
Has trade been affected at all for your facility?	N	N/A
Has trade been affected for any of your outside (of the USA) companies?	N	N/A
Have any negatives been created for your company through implementation of ISO 14001?	N	Y
Have you seen any different treatment from regulatory agencies since implementation?	Y	Y
Do you believe your system has been effective?	Y	Y
Customer/Supplier Relations		
Do you require any of your suppliers to be certified as well?	N	N
Do you look for companies with the certification in place to do business with?	N	Y
Small Business		
Was getting top management sign off difficult?	N	N
Was there any type of EMS already in place for the facility?	N	Y
Has the regulatory and legal requirements been difficult to deal with in order to reach certification?	N/A	Y and N
Was outside help necessary in order to get programs in place for implementation and certification?	Y	Y

Being a small business makes Jasco Heat Treating, Inc. special with respect to the ISO 14001 EMS. This is due to the fact that they are not registered or certified, but they have chosen to implement the system and audit for compliance purposes. It brought to the facility an EMS, something they did not previously have in place. They are not reaping in all of the business value that a larger company may see, but they are meeting regulatory obligations much better and that is going to show its business value by helping them to reduce their chances of fines and money spent to pay for those fines. It gives them a uniform system for environmental practices and since they base their environmental practices around reducing costs to help them be more profitable, that uniformity will show its value in the long-term future of the company.

Jasco believes that their system has been effective due to their own goals and objectives, but at the same time, without this system in place, some of those goals and objectives might not have ever come to light.

Jasco used outside help to get their EMS in place and this was a bonus for them since they did not have an existing EMS. This enabled fresh eyes to see their operations and to bring up items that might not have been recognized by existing employees as well as it helping the one-person Quality/Environmental Health and Safety department learn from those more familiar with the EMS. This helps to set the program up for more success than by just on person trying to rally everyone together.

Even though Arch Chemicals is part of the chemical industry, it also qualifies as a small business. Unlike Jasco, Arch felt pressure from within the chemical industry to implement RC® 14001. Additionally, Arch already had an EMS in place, so they were able to work on building their program off that. The program that has been implemented

by Arch needed to be certified and has been more difficult to work with on the regulatory and legal requirements due to the strictness the standard brings with it. Jasco does not have that kind of difficulty with this since they are not certified or registered and do not have the third party scrutinizing quite as heavily. Arch also has more resources in place to be able to handle having the certification and the upkeep that goes along with it. Jasco is half the size of Arch, so their resources are going to be much more limited with more people wearing more than one hat. The differences between Arch and Jasco show just how much manpower can mean to ISO 14001 implementation and upkeep.

7.0 Conclusions

7.1 Importance

After performing the interviews, it was interesting to note just how similar and yet how varied the results were of the different facilities within the same industries. It is important to realize just how much time and effort goes into not just the implementation stages of ISO 14001, but then also in the upkeep of the system and in motivating the employees of the facility to stay interested. It is not just a one person job to implement and upkeep the system; the whole organization needs to be vested in the system for it to work effectively and to keep up the support for it and its programs.

The most important result from this study was finding out that the economic benefits that ISO 14001 says are going to be realized are not realized to the extent that was expected. There are too many other factors, including benefits, that play into the system

once implemented to start seeing cost savings right away. It could take many years to realize the benefits and there are too many variables to accurately predict just what the benefits will actually come out to be. If a facility already has other programs in place such as ISO 9000:2000 or Responsible Care®, it might be realizing its economic value from those and the ISO 14001 program might not be given the chance to show its true value.

The work on this thesis was unique because the true business value of ISO 14001 to an organization has started to be really questioned over the last year or so. Companies do not want to put their resources into something that is just going to end up costing more resources than they originally were using if they are not going to experience the benefits it is supposed to offer. Auditors have questioned its value and effectiveness as well. This in turn leads to the companies who may be thinking about implementation or who are forced to implement the system or loose customers to think twice about how they implement and use the environmental management system within their company.

7.2 Accomplishment of Initial Questions

The results of this thesis accomplish the initial questions and objectives by showing what value several companies from different industries are actually experiencing from their post implementation stages of ISO 14001. The responses to the interview questions give an overview of how the Environmental Managers (engineers, specialists, etc.) feel about how the system is working in their particular facility. Given that those interviewed are the ones who work most closely with their systems, it proves to serve as a decent

picture of where they are at this point post implementation. Some have more to offer since they have had their certification or registration longer, but that does not mean that those who have had less time have any less insight. It is at this point that the variable factors for a site play a role.

7. 3 Limitations

There were several limitations that came up during this thesis process. Those limitations included communication problems, limited responses, and a limited scope. The communication problems stemmed from not being able to make contact with personnel at the larger automotive companies. This was one of the factors that made an expansion in the scope of industry type a necessity. Limited responses came about from only being able to speak with one person per facility interviewed. The author was only able to speak with the personnel most intimate with the ISO 14001 system at their facility. It would have proved beneficial to be able to speak with other personnel to get their feedback on post ISO 14001 implementation as well. The scope limited the author in what information she was able to gather. The questions were geared more towards the automotive industry since that had been the original intent. Also, the breadth of other areas to explore that deal with post ISO 14001 implementation make it difficult to capture more than just a very small snapshot of the company at that time. Items such as how the companies tracked the different tangible items and those that are not as easily tangible like the social/public relation's benefits would have given a better idea of how the companies were able to define the value being realized from those areas. Having a

baseline of the same information from pre-implementation would have been useful. Then, when asking the questions post implementation, it could be better determined what the companies existing systems were doing for them and what the ISO 14001 system has really brought to their company.

If these limitations had not existed, the author may have been able to create a more robust product and would have had a basis to really do a check on how much of the benefits and value the companies are receiving actually came from their ISO 14001 implementation as opposed to what their existing systems were doing for them. One industry could have been studied in more depth as opposed to working with more than one and expanding the scope in that respect. With being able to talk to more than just the Environmental Managers, a better perspective would have been given to the author in respect to how the system was working and how it was received and used by the rest of the employees in the company. It would have provided a larger snapshot of the company.

7.4 Expected Results

The results do not really contradict the initial hypothesis nor were they really that unexpected. Due to the author having experience with each industry studied, and with having ISO 14001 experience, the author had hoped to find more value coming from the systems post implementation, but the author did see it coming from those who have been registered longer or who have other programs in place, as expected. The author did not expect to see as much value from those who already had other types of systems (quality,

another safety or environmental system) in place, as value from them would already be realized.

7.5 Substantiated Results

The University of North Carolina at Chapel Hill performed a major study that is similar to the goal of this thesis, through funding provided by the Office of Water and Office of Policy, Economics and Innovation at the Environmental Protection Agency. In using data for the past five years, their study was to look at companies who have implemented formal environmental management systems. This study was designed to determine if EMS's do in fact improve environmental performance. For this study, baseline information, information on EMS design, and performance information was collected over several years (EPA-NC, ES-1). The study encompassed companies that have EMS's in place as well. This study stated, "The environmental performance changes of the facilities that were certifying their EMS to ISO 14001 and utilizing third-party auditors were not statistically different from others." (EPA-NC, ES-5-6). This was gathered from the fifty-nine percent of companies studied who went for the certification. Therefore, this study was looking at more information than this particular thesis was involved in, but its results were similar to the ones found through the research for this thesis. Five of the eight companies studied for this thesis found that their environmental performance was improved. One company answered yes to that particular question, but they attributed their change in performance more to their own goals than to the ISO 14001 certification.

7.6 Existing Theory

As far as existing theory on this subject, the results are similar to what has been hypothesized. It really does depend on what industry, the pressures felt, what was already in place, how much support the program has, etc. Infantile systems are going to show benefits in some areas upfront while other areas will not be seen until maybe several years later. Companies who also subscribe to other standard whether voluntary or not, may see their programs as another public awareness advertisement for the community to show them their commitment, but those companies might not experience much else depending on what else is in place and the benefits that may be experienced from those.

7.7 Recommendations

After speaking with the people who are responsible for the ISO 14001 EMS's at their facilities, some recommendations could include such things as working out a way to better consolidate audits for the different programs a company may have in place or subscribe to so that there are fewer audits for a facility. This could prove to have the potential to save time (for audit preparation and the audit itself), and money (to have the actual audit and for internal employee audits – labor). The standard itself seems to need more clarification and direction for facility implementation as well, according to those interviewed. There are changes that have been made to the 14001 standard itself that have been issued in 2004, so this may prove to be helpful to some facilities in the aspects

that they are looking for help in. If they do not, those companies may want to consider working on getting those changes that could be helpful worked on for a future revision of the standard.

7.8 Implications of the Research

The implications of the research are that the ISO 14001 Environmental Management System is not for everyone. At the same time, ISO 14001 can be used by anyone to fit their facility in the way they feel is best. Certification and/or registration do not necessarily need to happen as seen in the case of Jasco. It makes a great system to verify compliance and to keep up with what seems like ever changing regulations. Just putting the system in place shows initiative by companies as well. If a company has not had the best environmental performance record, and puts the ISO 14001 EMS in place for better compliance, it may help a company with regulators and in better meeting the regulations themselves.

7.9 Questions

Some questions that came up as this thesis was worked on included:

- How does time affect the benefits and value of the ISO 14001 EMS?
- How can implementation as a requirement of continued business be made into a positive (make the company feel it is worthwhile instead of a must do)?

These were the two questions that kept coming to mind as the interviews were done. It seems that each one created its own pattern. The longer a system was in place, it seemed more benefits and values were being shown. The second question more depends on the facility and how they view the ISO 14001 implementation. If it is a customer requirement, it is not going to be looked upon as favorably or have the necessary support it needs as it may have if the company was implementing it on their own accord and desire.

7.10 Opportunities for ISO 14001

North American companies need a little more convincing, just like when the ISO 9000 Quality Standard first came out. The automotive industry has really seized ISO 14001 for use in their industry, but for the chemical industry, many subscribe to Responsible Care® and Voluntary Protection Programs, so one more program might not make such a difference to their facilities unless it means more business or the threat of lost business without the certification.

A study on the third-party auditors might be a consideration as well since some companies feel that they do not focus as much on the standard and the environmental issues, but on the health and safety issues that are more in plain view and some of their implications. This might help to give companies more confidence in their auditors and could help to improve the audit program overall.

The implementation of RC®-14001 within the chemical industry could spark a study to see if having the joint standard is more effective than subscribing to them separately.

This could be looked at among those chemical manufacturers who are not ACC members due to their new requirements for third-party audits or RC®-14001 implementation.

Appendix 1

Company Interview Questions

General Information

Company Name	
Location	
Contact Person (name & title) and Contact Information (e-mail & phone number)	
Type of Manufacturing	
Size of Business/# of employees	
ISO 14001 Certified/Registered	

Motivators

When did your company decide to implement ISO 14001 EMS?

				Rating					
	Yes	No	N/A	1	2	3	4	5	Comments/Discussion
Question									
Motivators									
Was your company influenced by pressure outside of your industry to obtain certification?									
Did you feel pressure from within your industry to implement ISO 14001?									

Benefits, Pitfalls, Challenges and Improvements

If anything, do you feel the ISO 14001 program is lacking in anything that would have helped your implementation or overall program usage?

What was your company's greatest challenge when implementing ISO 14001?

What are your greatest challenges in up keeping the system requirements?

Are they any recommendations you would have for the ISO committee for improvements, changes, etc of the standard?

				Rating					
	Yes	No	N/A	1	2	3	4	5	Comments/Discussion
Question									
Benefits & Pitfalls									
Have you seen economic tangible benefits from ISO 14001 implementation?									
Have you seen regulatory tangible benefits from ISO 14001 implementation?									
Have you seen social/public relations' tangible benefits from ISO 14001 implementation?									
Have you seen environmental performance tangible benefits from ISO 14001 implementation?									
Has trade been affected at all for your facility?									
Has trade been affected for any of your outside (of the USA) companies?									
Have any negatives been created for your company through implementation of ISO 14001?									
Have you seen any different treatment from regulatory agencies since implementation?									
Do you believe your system has been effective?									

Customer/Supplier Relations

Does your certification have an impact on your customers? Suppliers? How?

				Rating					
	Yes	No	N/A	1	2	3	4	5	Comments/Discussion
Question									
Customer/Supplier Relations									
Do you require any of your suppliers to be certified as well?									
Do you look for companies with the certification in place to do business with?									

Small Business Enterprises

				Rating					
	Yes	No	N/A	1	2	3	4	5	Comments
Question									
Small Business									
Was getting top management sign off difficult?									
Was there any type of EMS already in place for the facility?									
Has the regulatory and legal requirements been difficult to deal with in order to reach certification?									
Was outside help necessary in order to get programs in place for implementation and certification?									

Additional Comments/Discussions

Please add any additional information that you may think to be helpful to this thesis. Post implementation thoughts are very important to this, so anything that has not been covered in the previous questions, please add in here.

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