# Development of a Draft ISO 14001 Environmental Management System for a Pulp Plant

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Abstract

During the Spring Semester of 1998, undergraduate and graduate students enrolled in *Environmental Management Systems-ISO 14000 for the Pulp Industry* worked closely with Georgia-Pacific's Leaf River Pulp Operations to prepare the documentation for a draft ISO 14001Environmental Management System (EMS) for the mill. The mill already has an extensive, detailed EMS due to the numerous regulations associated with their operation and has not yet decided to pursue registration to ISO 14001. The primary goal of this project was for students enrolled in the course to prepare a draft ISO 14001 EMS document for the mill, and by doing so gain practical experience related to ISO 14000, environmental management systems, mill environmental affairs and project management. Working with the students, mill management and environmental engineers learned about ISO 14000 and now have a framework for development of an ISO 14001 EMS for the mill should they elect to pursue registration. In developing the ISO 14001 EMS document, students referred to the mill's ISO 9000 Quality System, existing EMS, corporate environmental policy, ISO 14004, and other references. The ISO 14001 EMS document provides the commitment and framework for the mill's EMS, but is intentionally brief and undetailed as recommended by ISO 14004. The specifics for the system are provided by sixteen student-prepared Environmental Management System Procedures (EMSPs) appended to the ISO 14001 EMS document, and by other mill procedures and documents incorporated by reference.

## Introduction

Companies in the U.S. have become increasingly aware of the impact of their activities on the environment. This realization results from a sense of increased responsibility for the environment and to future generations, legislative pressure, permit requirements, market pressure, and a need to reduce costs. In many parts of the world, environmental responsibility has come to the forefront as companies and governments move towards the philosophy of sustainable development. Sustainable development is the concept that development by this generation should leave sufficient resources to permit future generations to continue appropriate levels of industrial and societal output and growth.

To support the movement towards increased environmental responsibility, a number of environmental managements systems have been created. An environmental management system (EMS) is the management structure for controlling the impact of an organization's activities, products and services on the environment. It allows a company to be proactive about environmental performance, including compliance with national and international requirements.

An effective EMS requires that an organization commit to environmental concerns as one of its highest priorities.[1, 2] EMS examples include the Chemical Manufacturer's Association's Responsible Care, USEPA's Common Sense Initiative and Environmental Leadership Program, British Standard 7750, the European Union's Eco-Management and Audit Regulation (EMAR) and Eco-Management and Audit Scheme (EMAS), and ISO 14000.[3]

In 1996, the International Organization for Standardization (ISO) issued its first five ISO 14000 documents.[4] Work continues on the remaining 14 documents with completion expected within a few years.[5, 6] ISO 14000 is an EMS composed of a series of standards and guidelines which establish the framework for a comprehensive EMS which is designed to promote voluntary organizational commitment to environmental protection and sound environmental management. Another purpose is to harmonize environmental management systems globally by helping to create an internationally accepted EMS to standardize EMS approaches and regulations among countries. ISO 14000 comes on the heels of the very successful ISO 9000 quality standards and has been well-received in the international community. As of January, 1999, nearly 8,000 companies worldwide have been registered/certified to ISO 14001, the compliance standard within ISO 14000.[7] European, Japanese and Korean companies are leading the way. U.S. companies have been somewhat slower to seek registration, with about 210 companies now certified. If the popularity of ISO 9000 is an indicator, many more companies will become certified/registered to ISO 14001. As of 1996, over 70,000 facilities were registered to ISO 9000.[8]

The importance of environmental stewardship and sustainability are becoming an important part of many engineering and engineering technology programs.[9] Students enrolled in *Environmental Management Systems-ISO 14000 for the Pulp Industry* at The University of Southern Mississippi (USM) learned first hand the importance of these concepts and the challenges associated with developing an ISO 14001 EMS for a U.S. pulp mill.

Host Facility

Georgia-Pacific's Leaf River Pulp Operations (LRPO) in New Augusta, Mississippi agreed to serve as the host facility for this project. The mill was brought on line in 1984 and was heralded as the most modern pulp mill in the world. It is a leading supplier of bleached kraft pulp capable of producing up to 540,000 tons per year.[10] Environmental stewardship is an important part of the mill's operational philosophy.[11] The mill has a dedicated environmental affairs department which is responsible for environmental issues ranging from air emissions monitoring to wastewater treatment.

Several important factors at the mill facilitated the success of this project. First, corporate and mill management philosophy regarding the environment is consistent with the ISO 14000 philosophy. Management commitment, continual improvement, and community involvement are important parts of ISO 14000. Second, the mill is ISO 9000 certified. This is important because of the consistent format and approach between ISO 9000 and ISO 14000. A company already certified to ISO 9000 can significantly reduce the work required to register to ISO

14000. Third, a comprehensive EMS with supporting documentation that meets many of the requirements of ISO 14000 is already in place at the mill.

The goal of this project was to prepare a draft version of an ISO 14001 EMS for the mill and provide students with extensive practical experience. Actual implementation of the ISO 14001 EMS and registration of the mill were not goals of the project. However, through this project, mill management and environmental engineers developed a better understanding of ISO 14000 and established a framework upon which to build should they decide to implement an ISO 14001 EMS.

Course Format

The project was completed in one semester as part of a three-hour course *Environmental Management Systems-ISO 14000 for the Pulp Industry*. Class enrollment was small, consisting of two graduate and four undergraduate students in their junior year. This mature group had worked together in previous courses. The students' maturity and familiarity with each other provided an excellent opportunity to change the instructional paradigm from a traditional classroom format to a project engineering/consulting firm format. An agreement reached early in the semester with the mill allowed students to function as environmental consultants. Students were assigned the task of developing a draft ISO 14001 EMS for the mill. The class was organized as a project team responsible for setting and meeting goals; developing meeting schedules, agendas, and minutes; holding staff meetings with rotating assignments for the positions of chairperson and secretary; scheduling weekly meetings at the mill with engineers in the environmental affairs department; interviewing mill personnel; keeping individual journals; and preparing weekly progress reports for the course instructor. The role of the instructor was to act as a project manager without directly interfering with group dynamics.

Under this project USM students 1) learned about the mill's operation as it relates to environment issues, aspects, impacts, and legal requirements; 2) studied the corporate and mill environmental philosophy; 3) examined the mill's EMS and ISO 9000 Quality Assurance Program (QAP); 4) studied the philosophy and objectives of the ISO 14000 EMS; 5) performed a gaps analysis; 6) generated a formal, draft ISO 14001 EMS document for the mill; and 7) formally presented the results on-campus and at LRPO to corporate and mill management.

At the end of the semester, the students completed a draft ISO 14001 compliance document similar to the plant's ISO 9000 Quality Assurance Manual. A presentation about the project and the draft EMS was made on campus to interested faculty, students and industry visitors. A formal presentation was also made by students at the mill for mill management, environmental affairs management and engineers, and corporate environmental affairs management. The project was lauded by both faculty and Georgia-Pacific mill and corporate management. Students gained valuable practical experience in mill environmental affairs, environmental and quality management systems, ISO 14000, project management, consulting, group dynamics, and formal presentations.

ISO 14001 Document

In developing the ISO 14001 EMS document, students referred to the mill's ISO 9000 Quality System, existing EMS, corporate environmental policy, ISO 14004, and other references. The body of the ISO 14001 EMS parallels the ISO 14001 standard and includes the following six sections:

1. General Requirements
2. Environmental Policy
3. Planning
4. Implementation and Operation
5. Checking and Corrective Action
6. Management Review.

Preliminary sections include:

- Table of Contents
- Introduction
- Definitions
- Acronyms

As with the mill's ISO 9000 Quality System, the body of the ISO 14001 EMS is general, with specifics for the system provided by sixteen Environmental Management System Procedures (EMSPs) appended to the ISO 14001 EMS, each referring to a specific subtopic of the ISO 14001 EMS. Formatting of the document was based directly upon the mill's ISO 9000 Quality Assurance Plan.

The main document is intentionally short, consisting of 17 pages. The purpose of the ISO 14001 document is to describe the EMS and to identify the location, responsible individuals, and nature of the supporting detailed material. It is not designed to be a single, stand-alone document covering all aspects of the ISO 14001 EMS.[4, 12] The mill has already developed many of the procedures, documents, and record-keeping strategies required by the ISO 14001 EMS, and additional supporting documentation and procedures are provided by the EMSPs. However, further documentation, document control, and procedures would need to be developed prior to the mill seeking registration. Within each EMSP the students offered suggestions in the form of a guide note designed to assist mill management identify additional activities required to complete the process.

The introduction describes the origins of the mill, product produced, production process used, and the commitment of Georgia-Pacific Corporation and employees of the Leaf River mill to environmental stewardship and a sound EMS.

The first section on *General Requirements* is designated Section 4.1 in keeping with the format of ISO 14001. It makes the commitment to an EMS based on the dynamic cyclical process of plan, implement, check and review. It also contains a commitment to maintaining the highest

environmental standards within the industry. It outlines the format of the EMS, noting the use of EMSPs and other documents identified by reference.

Section 4.2 on *Environmental Policy* is an important part of an ISO 14001 EMS because of the importance placed by the standard on management commitment. It is based directly upon the corporate environmental policy of Georgia-Pacific and contains separate paragraphs providing a summary of the corporation's vision, beliefs, goals, and guiding principles. The four main guiding principles are:

- Management Commitment
- Conservation and Sustainable Use of Resources
- Protection of Health and the Environment
- Promote Community Awareness

Each of these four main principles are supported by three to five detailed principles which specifically list the commitment of mill management and the steps to which mill management has committed to adhere to its principles. For example, under *Protection of Health and the Environment* one of the five detailed principles states, "LRPO's goal is to minimize adverse environmental impacts from its operations. The plant will utilize sound operating and maintenance practices, safety conscious design, employee training, routine audits, and incident investigations, with the goal of minimizing risks to its employees, the environment, and communities in which it operates. In addition, LRPO will work with individuals and organizations, including local, state and federal authorities, to address environmental damage, if any, caused by past practices. LRPO will be prepared to respond professionally, should an incident occur."

Section 4.3 covers *Planning*. It outlines the mill's commitment to maintaining procedures to identify environmental aspects of its activities and products, to determine associated environmental impacts, and to consider these when setting environmental objectives. It establishes the mill's commitment to establishing and documenting environmental objectives and targets for each relevant function within its operation. Finally, this section describes the mill's commitment to creating detailed environmental management programs which address its environmental objectives. It is supported by four EMSPs which provide details for implementing the planning function. The four EMSPs are based upon guidance given in ISO 14004:

- EMSP/03.1 Environmental Aspects
- EMSP/03.2 Legal and Other Requirements
- EMSP/03.3 Objectives and Targets
- EMSP/03.4 Environmental Management Program

The format used for the EMSPs is based on the format used in the mill's ISO 9000 Quality Assurance Procedures (QAPs). Each EMSP contains six sections. The first five sections correlate with sections in the QAPs. These sections are Purpose, Scope, References, Procedure and Documentation. The students added a sixth section, designated Guide Note, to provide additional information to mill management to assist with completion of the ISO 14001 EMS.

Section 4.4 is *Implementation and Operation*. It contains a commitment from LRPO to provide the resources necessary for achieving its environmental objectives and targets. It addresses individual responsibilities, training needs, internal and external communication, documentation, organizational control and emergency planning. It is supported by the following seven EMSPs based on recommendations found in ISO 14004:

- EMSP/04.1 Accountability and Responsibility
- EMSP/04.2.1 Environmental Awareness and Motivation
- EMSP/04.2.2 Knowledge, Skills, and Training
- EMSP/04.3 Communication and Reporting
- EMSP/04.4 Document Control
- EMSP/04.6 Operational Control
- EMSP/04.7 Emergency Preparedness and Response

Section 4.5 is *Checking and Corrective Action.* It outlines the methodology used by the mill to monitor its performance against its objectives and for evaluating its compliance with environmental regulations. It establishes a commitment to decisive handling of nonconformances and to timely corrective and preventative action. Finally, it commits to a periodic review process to maintain and improve environmental performance. The supporting EMSPs are:

- EMSP/05.1 Monitoring and Measurement
- EMSP/05.2 Nonconformance and Corrective and Preventative Action
- EMSP/05.3 EMS Records and Information Management
- EMSP/05.4 Environmental Management System Audit

Finally, Section 4.6 on *Management Review* commits top management to periodic review of the EMS to insure its adequacy and effectiveness. Continual improvement is a core component of an ISO 14001 EMS. Section 4.6 is supported by EMSP/06.1- Management Review and Continual Improvement.

Conclusion

ISO 14001 is a proactive approach to environmental management which requires serious commitment from management and places responsibility for environmental stewardship upon each employee. It is much more than simply a document. It is a philosophy for doing business which considers the impacts of the facility's activities on the environment and methods by which those impacts can be reduced. The document describing the facility's ISO 14001 EMS represents the facility's commitment to that philosophy prepared by management for its employees and for the public. Importantly, it is designed to be a living document which provides guidance for continual assessment, reevaluation and improvement throughout the facility. The document produced by the students involved in this project represents the first draft of an ISO 14001 EMS for Georgia-Pacific's Leaf River Pulp Operations, along with guidance for implementing the EMS. Considerable effort remains to actually implement the ISO 14000 EMS mill-wide, but an important first step has been accomplished during this project.

This one-semester project required serious dedication from a mature group of students and the complete cooperation of the host site in order to realize completion within one semester. Students gained practical industrial experience, especially related to establishing an ISO 14001 EMS. They learned about pulp mill operations and the associated environmental issues facing an operation of that magnitude. Equally important, the students gained practical experience in project management, teamwork, and working with an industrial client. Mill management and engineers also realized important benefits, including a crash course in ISO 14000 and a solid framework upon which to build should they decide to pursue registration.

Bibliography


1. Hemenway, C., *What is ISO 14000? Questions and Answers*, CEEM Information Services, Fairfax, Virginia (1995).
2. *ISO 14000 in Focus–A Business Perspective for Sound Environmental Management*, CEEM, Inc., Fairfax, Virginia (1995).
3. von Zharen, W.M., *ISO 14000 -Understanding the Environmental Standards*, Government Institutes, Inc., Rockville, Maryland (1995).
4. American Society for Testing & Materials, *ANSI/ISO 14000 Series–Environmental Management Systems and Environmental Auditing*, West Conshohocken, Pennsylvania (1996).
5. Morgan, K., *Checking the Pulse of ISO 14000*, ASTM Standardization News (September, 1997).
6. American National Standards Institute, http://web.ansi.org/public/iso14000 (February, 1999).
7. ISO World, http://www.eco.ogy.or.jp/isoworld/english.htm, contributed by Mr. Reinhard Peglau, with permission, (Jan. 1999).
8. Tibor, T., *ISO 14000 - A Guide to the New Environmental Management Standards*, Irwin Professional Publishing, Chicago, Illinois (1996).
9. Gibney, K., *Cleaning Up on Cleaning Up*, ASEE Prism, vol. 8, no. 5 (January, 1999).
10. *Georgia-Pacific in Mississippi*, Georgia-Pacific Corporation, 133 Peachtree Street, N.E., Atlanta, Georgia 30303 (1996).
11. *Georgia-Pacific Corporation Environmental and Safety Report 1998*, Georgia-Pacific Corporation, 133 Peachtree Street, N.E., Atlanta, Georgia 30303 (1998).
12. Kuhre, W.L., *ISO 14001 Certification–Environmental Management Systems*, Prentice-Hall (1995).



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