IS THERE REAL VALUE IN CORPORATE ENVIRONMENTAL MANAGEMENT SYSTEMS A CASE STUDY

by
Gary A. Abrams

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Duke Environmental Leadership Master of Environmental Management Program

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Abstract

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Swiss Re, the largest property & casualty and life & health global reinsurance company has long been an advocate for environmental sustainability. According to the corporate sustainability mission statement "*A company's sustainability practice and its reputational value are increasingly perceived as important drivers of business success. Swiss Re has firmly integrated sustainability practice into its corporate framework, thus creating economic value by improving its environmental and social performance beyond mere compliance with laws and regulations"*

To achieve the goals of the mission statement Swiss Re focuses on effectively and efficiently managing its own internal operations with respect to the environment. This master projects examines the resources required to implement an ISO 14001 certified environmental management system (EMS)in the North American headquarters of Swiss Re, and assesses the system's environmental performance.

The headquarters is located 25 miles north of New York City in Armonk, NY and consists of a 400,000 sq. ft office building and an 850 car parking garage situated on 127 acres of property. The EMS was certified to the ISO 14001 standard in February 2006. The costs and benefits of the system's implementation including those incurred in achieving corporate environmental performance goals and recognition for the effort were reviewed and documented as a case study.

Date:_____

Approved:

_____
Dr. Deborah Rigling Gallagher, Primary Advisor

PURPOSE:

The purpose of this masters project is to determine if there is real value in corporate environmental management systems (EMS). This masters project is based on a case study of the EMS that was developed, implemented, and certified to the ISO 14001 standard in 2006 at Swiss Re's North American headquarters in Armonk, NY.

Three methods are used to measure value. They are cost/benefit analysis, success in meeting corporate environmental objectives, and the level of recognition achieved for the EMS effort. This case study includes background information for the company, background information for the facility where the EMS was implemented, the specific process and requirements of implementing an ISO 14001 certified EMS, and the results achieved which include reduced utility consumption and the corresponding reduction in operating expenses.

COMPANY BACKGROUND:

With over thirty billion dollars in annual premium revenue and eleven thousand employees, Swiss Re is the largest Property & Casualty and Life & Health reinsurer globally. Based in Zurich, Switzerland its operations span twenty five countries. The North American headquarters is located approximately twenty five miles north of New York City in Armonk, NY.

Environmental sustainability has been a part of Swiss Re culture for over twenty years. In 1998 a department within the Logistics operation known as Internal Environmental Management (IEM) was established to oversee all energy consumption, water consumption, supply/equipment purchasing, and waste management for every Swiss Re facility with a minimum full time equivalent staff of 50 employees. Swiss Re's approach to sustainability can best be summed up in the following statement which appears on the corporate website, "*A company's sustainability practice and its reputational value are increasingly perceived as important drivers of business success. Swiss Re has firmly*

integrated sustainability practice into its corporate framework, thus creating economic value by improving its environmental and social performance beyond mere compliance with laws and regulations"

To go beyond mere compliance with laws and regulations and to meet corporate environmental objectives Swiss Re made the decision to implement an ISO 14001 certified Environmental Management System (EMS) in its North American headquarters.

FACILITY BACKGROUND:

In 1996 Swiss Re executive management made the decision to relocate the corporate headquarters from New York City, where it had operated from since 1910, to Armonk, NY. At that time 127 acres of land were purchased from three private estates. One year later construction on the main building began. The new facility was completed in 1999 and 600 employees were then relocated from New York City to the new building in Armonk. In 2003, Swiss Re broke ground for a new 60,000 square foot addition which was completed in 2004. The building was designed by Swiss architect Dolph Schnebli. Key features of Schnebli's design included a prepatinated copper exterior, a natural light flooded interior and an open floor plan designed to minimize personal space and maximize shared space. Given the new site's close proximity to the Kensico Reservoir, which serves as New York City's major drinking water supply, some environmental challenges had to be addressed during the buildings construction. As a result, storm water controls, detention basin construction, wetlands preservation, erosion controls and turf management practices were incorporated into the design. Current and ongoing environmental considerations include utility consumption, landscaping and lawn maintenance, waste generation and removal, snow removal and contaminated water runoff.

The Swiss Re Armonk campus now consists of a 400,000 square foot office building, an 850 car parking garage, two outdoor tennis courts, one outdoor basketball court and several roadways for

daily commuting employees as well as emergency service vehicle access. Over 1,000 employees, consultants, and outsourced staff occupy the building on a daily basis. On-site amenities include a 300 seat cafeteria, a fitness center, two data centers, a sundry shop, a training center, numerous conference rooms, copy machine rooms, and employee pantries. The building's engineering plant includes back-up generators, oil storage, water treatment operations, waste management and facility control systems. They are located on the basement level and managed by an outsourced engineering staff of eight employees. ISO 14001 certification was granted in February 2006. The scope of the certification includes the Logistics functions of managing the building, property/grounds and internal services.

WHAT IS ISO 14001?

The purpose of any management system is to incorporate specific practices into the organizations daily operating procedures to insure that appropriate controls, management review and compliance reporting are in place. These practices apply to many management systems such as ISO 9000[1] for quality management, OHSAS 18001[2] for health and safety management and ISO 14001[3] for environmental management. ISO 14001 provides the framework from which an organization must adopt various procedures and practices related specifically for the management of its environmental activities. ISO 14001 was developed by the International Organization for Standardization and was originally released in 1996. Most standards require periodic revisions. Several factors combine to render a standard out of date: technological evolution, new methods and materials, new quality and safety requirements. To take account of these factors, the International Organization for Standardization has established the general rule that all ISO standards should be reviewed at intervals of not more than five years[4]. The Swiss Re facility was certified to the most recent version of ISO 14001 that was released in 2004.

Swiss Re opted for ISO 14001 EMS certification rather than implementing a self developed environmental management system because of ISO 14001's rigorous requirements, international recognition and the uniform applicability of the standard to its building, facilities and corporate services functions. In Swiss Re these functions are known as 'Logistics'. Swiss Re locations that had previously received ISO 14001 certification of their EMS's include the Zurich and Rome offices. Common characteristics in all U.S. Swiss Re Logistics functions governed by an EMS include environmental aspects and impacts, federal environmental legal and regulatory codes and global corporate goals and objectives specifically related to carbon neutrality. According to the ISO 14001 guidelines, "in addition to improved environmental performance, the potential benefits associated with an effective environmental management system include; assuring customers of commitment to demonstrable environmental management, maintaining good public/community relations, satisfying investor criteria and improving access to capital, obtaining insurance at reasonable cost, enhancing image and market share, improving cost control, reducing incidents that result in liability, conserving input materials and energy, facilitating the attainment of permits and authorizations and meeting their requirements, promoting environmental awareness among suppliers, contractors and all persons working for or on the behalf of the organization, fostering development and sharing of solutions to environmental problems, and improving industry-government relations."[5]

METHODS:

To evaluate the value and effectiveness of the EMS implemented in Swiss Re's North American headquarters, a cost/benefit analysis of the system was undertaken and all relevant before and after implementation data for each Key Environmental Performance Indicator (KEPI) were analyzed. The Key Environmental Performance Indicators listed below are the relevant environmental factors whose improvement was measured to determine if the EMS was effective. Effectiveness was

measured by both the level of improvement and the rate at which they improved. KEPI's serve as a guide as to whether or not the company was meeting its environmental targets, goals, and objectives. The change in KEPI data was measured against actual baseline statistics for each KEPI that were reported prior to the EMS implementation.

The Key Environmental Performance Indicators as well as the unit of measure, frequency and source of the data are as follows:

Description	**Unit of Measure**	**Frequency**	**Source**
Electrical energy consumption	Kilowatt hours	Monthly	Meter reading
Natural gas consumption	Therms	Monthly	Meter reading
Water consumption	Gallons	Monthly	Meter reading
Cleaning products	lbs./Gallons	Monthly	Contractor Invoice
Landscaping herbicides/pesticides	lbs./Gallons	Monthly	Contractor invoice
Paper consumption	Tons	Monthly	Vendor invoice

Listed below are the ISO 14001 procedural elements designed to guide an organization and assist them in meeting required environmental policy objectives that include preventing pollution, complying with all environmental laws and regulations and striving for continual improvement in environmental performance.

The procedural ISO 14001 elements are;

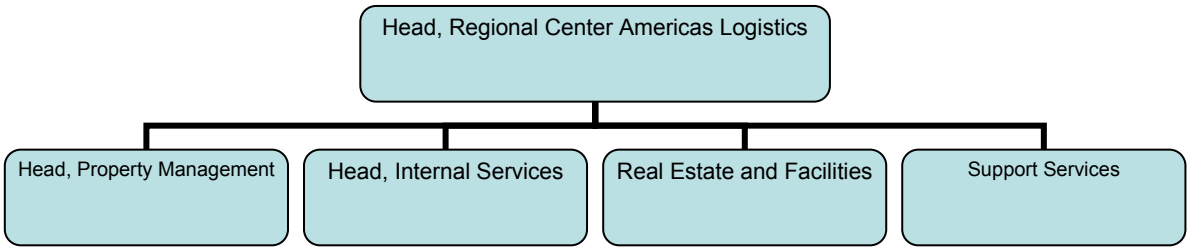
- An environmental policy which demonstrates management's commitment to the environmental management system process within the organization
- Compliance evaluations to demonstrate that the organization has taken all necessary steps to insure it is meeting all environmental laws and regulations

- An identification and evaluation of environmental aspects and impacts to determine what organizational activities have an effect on the environment and the associated environmental impacts of those actions
- An identification and evaluation of 'significant' environmental aspects and impacts to determine which environmental aspects and impacts will be subject to operational controls, improvement plans, monitoring and measurement, and legal and regulatory reviews
- Operational controls, monitoring tools and measurement methods are in place to determine how the organization will monitor those aspects and impacts that it has deemed to be significant
- An identification and evaluation of environmental targets, goals and objectives to review and plan for environmental improvement and that they are used to set goals and targets for the organization to achieve
- Management reviews to ensure that senior management is committed to and is involved in the EMS process
- Internal audits to insure that the organization is meeting its internal management and ISO requirements
- A method to address non-conformities and the appropriate corrective and preventative actions for resolving those incidents that do not comply with the standards requirements and/or internal procedures
- Environmental management system audits to ensure that the process to achieve and maintain ISO 14001 certification is in place
- EMS training and awareness programs to ensure that all department and contracted individuals understand that they have EMS responsibilities

- Environmental communications management to control the flow of information into and out of Logistics operations regarding any environmental related query from internal staff or external sources

Swiss Re Logistics Organization Chart

Swiss Re's Logistics Group is responsible for the company's internal environmental management programs and initiatives. The EMS implementation was managed by the Head, Internal Services and Head, Property Management. Management review is performed by the Head, Regional Center Americas Logistics. The organization chart below shows the Logistics Group management structure and briefly describes key responsibilities within the department.



Head, Regional Center Americas Logistics: Responsible for Property Management, Internal Services, Real Estate/Facilities, and Support Services for Armonk as well as all North and South America operations.

Head, Property Management: Responsible for Building Engineering, Landscaping, Cleaning, Security and Business Continuity Management.

Head, Internal Services: Responsible for Mailroom, Copy Center, Travel Services, Purchasing, Records Administration and Internal Environmental Management.

Real Estate and Facilities: Responsible for workstation and office layouts, signage, rental property payments and staff moves.

Support Services: Responsible for the Receptionist/Switchboard operations, Food Services, Fitness Center operations, and special projects as assigned.

THE PROCESS:

Implementing the Environmental Management System

This case study evaluates the value of Swiss Re Armonk's EMS in terms of cost/benefit, effectiveness of achieving corporate environmental objectives and appropriate recognition for the effort. The

following describe in detail the necessary steps and the activities performed to complete the EMS implementation and achieve ISO 14001 certification.

1. Environmental Policy Requirements

To obtain ISO 14001 certification an organization is required to establish an environmental policy that at a minimum must state:

- The organization will comply with all environmental laws and regulations
- The organization will prevent pollution
- The organization will strive to continually improve its environmental performance

ISO 14001 requires that the policy be signed by a senior member of the organization. In the case of Swiss Re the individual with this authority is the Head, Regional Center Americas Logistics. This policy is referenced in Appendix I.

With these three environmental policy requirements established, the methods the organization used to meet them is described in the ISO EMS procedures below.

2. Compliance Evaluations

Compliance with all environmental laws and regulations is required per the environmental policy. To insure that this requirement is met Swiss Re engages an independent third party to conduct a complete environmental compliance audit every five years. Quarterly compliance reviews are also required to be performed by in-house staff. These quarterly in-house reviews are conducted using websites for the U.S. Environmental Protection Agency[6], the New York State Department of Environmental Conservation[7], and the New York City Department of Environmental Protection[8]. These websites are reviewed to determine if there have been any changes made to environmental laws or regulations that may pertain to and/or impact Swiss Re's operations. Additionally information is obtained from professional organizations such as the 'Building Owners and Managers Association'[9] (BOMA) to help determine if any relevant changes in environmental law have occurred.

Some of the key environmental regulations that could impact the Armonk facility include, emergency generator fuel oil storage, HVAC (heating ventilating and air conditioning) system refrigerant use, universal waste handling procedures, spill prevention control and countermeasure planning, employee and community 'right to know' reporting, and various licensing and permit issue requirements. Swiss Re's compliance reporting, known as Tier II inventory reporting, is a federal requirement that is reported to the state and local government. The Tier II inventory report must be completed and filed annually. It contains emergency contact information for the facility and the quantities of hazardous chemicals that are on-site i.e. diesel fuel oil and UPS battery sulfuric acid. In the event of a major catastrophe emergency respondents will know, based on the inventory that was filed in the report, what hazardous or extremely hazardous chemicals they can expect to encounter at Swiss Re's Armonk facility.

3. Identification and Evaluation of Environmental Aspects and Impacts

The next step in implementing the EMS was to identify all the possible environmental aspects and impacts. The definition of an environmental aspect is 'any activity that has an effect on the environment'. The definition of an environmental impact is 'what effect to the environment does an aspect have'. An impact can be classified as either positive or negative. An example of a negative impact is the result of burning fuel oil. Air and noise pollution are created, natural resources are consumed and there is an increase in CO2 emissions. An example of a positive impact is the result from composting kitchen waste. The waste is reused, there is a landfill reduction, and usable soil is created that can be used in gardening. It is as equally important to identify *potential* environmental impacts as it is *actual* ones. For example, fuel oil storage tanks have virtually no environmental impact when they function properly. Should the tanks fail and leak fuel oil, then there is the potential for a major negative environmental impact.

The list of environmental aspects and impacts is referred to as the aspects and impacts register. Developing the aspects and impacts register required a thorough review of the entire facility's operations including building engineering, cleaning, landscaping and property and grounds maintenance.

4. Identification and Evaluation of 'Significant' Environmental Aspects and Impacts

Once all of the environmental aspects and impacts have been defined developing a method to determine 'significant' environmental aspects and impacts is the next step. Given the numerous environmental aspects and impacts that can be accounted for in a facility of this size narrowing the focus to only those aspects and impacts that Swiss Re considers significant is crucial. This process requires that a quantitative method be used to determine significance. Quantifying aspects and impacts to determine significance will minimize the potential for bias in the selection process. If the decision to include aspects and impacts is left solely to qualitative factors or management opinion this could lead to potentially eliminating some accidentally or intentionally to avoid inclusion in the management process.

This facility uses a three part scoring system to determine significant aspects and impacts. They are as follows:

- **Does the aspect or impact fall under any environmental laws or regulations?** If it does not, it gets one point, it does it gets two points.
- **What is the community effect of the aspect or impact?** Community effect begins with the immediate effect to building staff which includes employees, consultants, auditors and outsourced staff and moves outward to include the surrounding flora and fauna. The score is based on a rating from one to ten. The more immediate and less intense the effect the lower the score, the further away and more intense the effect, the higher the score. An example of a low score is for the potential for contaminated water runoff due to a 'green' cleaning agent

spill. Both the immediate effect to employees and other building staff is quite limited. In contrast contaminated water runoff due to a fuel oil spill would have a much larger impact to the employees and other building staff and extend beyond the building's parameters and into the surrounding area. The score for the former is a '4'. The score for the latter is a '9'.

- **How much influence does the company have on this aspect or impact?** Every aspect and impact is rated on a scale from one to ten based on how much influence the company has on it. For example, in the Armonk facility, 60% of the energy consumed is required just to make the building habitable. The assumption would be that there is complete control over energy consumption and the score should be a ten. This is not the case. As we need 60% for base building operations the remaining 40% is what can be influenced by the system.

The three scores for each aspect and impact are multiplied together to get a final total. The lowest score possible would be a one which indicates that there is no environmental legal and/or regulatory requirement associated with it, it has no community effect, and it cannot be influenced by the organization. The highest score would be 200 i.e. there is an environmental legal and/or regulatory requirement, there is a large community effect, and it can be completely controlled by the organization. Any aspect or impact with a total score of 50 or more is considered 'significant'. A score of 50 was chosen as the threshold because it captures approximately 75% of all aspects and impacts.

ISO 14001 requires that once the significant aspects and impacts have been determined operational controls, monitoring and measurement, legal and regulatory requirements, training and awareness, and targets goals and objectives be implemented for each of them. A complete list of all 'significant' environmental aspects and impacts with their corresponding ISO 14001 requirements can be found in Appendix II. This list shows how each significant aspect and impact is managed and controlled via its corresponding ISO 14001 requirement.

It is important that the selection process for all of the aspects and impacts consider the receipt, storage, use and disposal of an item. In the case of the aspect of electrical energy consumption the associated impact is both natural resource consumption and CO2 emissions. The same applies to natural gas and fuel oil use but fuel oil also includes the potential impact of fuel spills due to the storage process. Water consumption lists the consumption of natural resources and contaminated water runoff from wastewater. Contaminated water runoff can also be due to pesticide/herbicide/non-organic fertilizer use, road cleaning salts/chemicals, paint/varnish spills, oil and lubricant spills and the potential of cleaning agent and water treatment chemical spills. Other aspects and impacts include the consumption of copier paper from the consumption of natural resources when made to landfill waste when used.

5. Operational Controls/Monitoring and Measurement

The purpose of operational controls and monitoring and measurement is to insure that significant environmental aspects and impacts have appropriate methods in place to prevent them from becoming 'out of control' and subsequently causing pollution, contamination, or any other negative environmental impact that could otherwise have been prevented. Forms of operational controls can vary greatly. They could be as simple and straightforward as a warning sign, a dedicated storage cabinet, or a locked door to limit access to authorized staff to more complex controls in the form of alarm systems, electronic notifications via management system alerts or in the case of fuel and chemical storage secondary containment of storage tanks. Operational controls in Armonk focus on fuel oil delivery and storage, uninterrupted power supply (UPS) battery access, refrigerant leakage and chemical spills. Monitoring and measurement play a large role in insuring operational controls are working. Daily inspections of critical areas are carried out by the engineering staff and automated devices are used to alert them, emergency services and management staff in case of emergencies. Emergencies include rapid reduction in fuel oil storage tanks, ODS refrigerant leakage as well as the

detection of smoke or fire. By implementing operational controls and maintaining monitoring systems, incidents related to environmental impacts can be eliminated. Should they occur, which is always a possibility, early detection can keep potential damage to a minimum. Examples of operational controls in the Armonk facility are in Appendix III.

6. Identification and Evaluation of Targets, Goals and Objectives

The environmental policy requires that the organization strives for continual improvement. To address this issue the organization must develop targets, goals and objectives that will be employed to improve performance of those aspects and impacts that are considered significant. The Swiss Re targets, goals and objectives procedure require that improvement plans state what the aspect and impact is, who is responsible for it, the amount of improvement, what the actions are that will be taken to improve them and follow up records that demonstrate if the goals are being met in the timeframe that was set. Key aspects and impacts that were identified for improvement in Armonk include reductions in electrical energy consumption, natural gas consumption, water consumption, paper consumption, herbicide & pesticide use, non-organic fertilizer use and non-green cleaning agent use. A complete accounting of the targets, goals and objectives are listed in Appendix IV. Corporate environmental objectives call for a reduction in electrical energy, natural gas, water and paper consumption. One of the measures of providing value by the EMS is its role in the success of meeting these targets.

7. Management Reviews

To insure that senior management is actively involved with the principles and management of the environmental management system ISO 14001 requires that management reviews be conducted by a member of senior management. For this facility the Head, Regional Center Americas Logistics conducts management reviews on an annual basis. A major objective of the management review is to provide feedback that will contribute to one of ISO 14001's main principles of striving for continual

improvement. The management review provides the venue for senior management to analyze how the system is working, suggest improvements to be made, and offer insight as to future plans of the organization and how any changes may affect the EMS.

Points to be covered and key deliverables of the management review include non-conformity of EMS requirements such as failures to meet procedural requirements, accurate record keeping or document management as well as the corrective actions that will be taken for those non-conformity's. Other elements of the management review include an analysis of the results of internal and external audits and/or inspections, training and development needs and reviewing outstanding issues related to targets, goals and objectives project status. The management review also provides senior management an opportunity to note additional or changing priorities within the organization, recognize achievement and provide additional resources such as additional staff, budget or access to training resources if warranted.

8. Internal Audits

Internal audits are a requirement of the ISO certified EMS to insure that the organization is familiar with and maintains the standards requirements. Swiss Re's internal audit procedure requires that an internal audit be conducted at least once annually. An audit schedule must be maintained and include the dates, the auditor and what elements of the standard are to be covered. The audits should be planned in advance and follow accepted auditing practices. To gain this knowledge Swiss Re invested in ISO 14001 Lead Auditor training for the ISO EMS process manager. Auditor training was a vital investment as it is the ISO process managers responsibility to oversee the program. Having been trained to view the system from an auditors perspective provides a more efficient means of judging the EMS based on the standards requirements. To assist with the Armonk site audits, expertise is also called upon from other locations in the Swiss Re group that have achieved ISO 14001 certification. Once internal audits have been completed an 'Audit Report' is submitted to the process manager and

all non-conformities must be addressed through the non-conformity/corrective action procedures. This includes a completed corrective action form highlighting where any failures in the system are, identifying the root cause to avoid repeating the same failure, an action plan noting the specific steps that will be taken to correct the failure and a final review and notation that provides evidence that the correction was effective.

9. Non-Conformity, Corrective and Preventive Actions

Addressing non-conformities and the subsequent corrective or preventive actions is one of the most crucial elements of ISO 14001. It is this component that addresses the policy requirement of striving to achieve continual improvement. Non-conformities can be discovered through the internal audit process or one of the several external auditing processes. These include Stage 1 and Stage 2 certification audits, annual surveillance audits, recertification audits and compliance reviews. Non-conformities are classified into three categories: observations, minor non-conformities and major nonconformities. Observations are notes where the auditor may highlight a condition that isn't necessarily outside of the requirements of ISO, the EMS manual or individual procedures but should formally be brought to the attention of the ISO process manager. This is noted on the audit report and the organization is left to its own discretion whether or not to address them. A minor non-conformity is when an internal requirement has not been met or there is a procedural lapse. Examples of minor non-conformities include gaps in maintenance logs, training schedules or minor document maintenance requirements. Major non-conformities result from not meeting an element of the ISO 14001 standard. An example of a major non-conformity would be when a required procedure has not been documented, or if it has been documented it hasn't been implemented. The organization can have an unlimited number of observations or minor non-conformities and still obtain and retain certification. One major non-conformity will prevent the organization from achieving certification.

Once non-conformities have been identified the organization must have a corrective action process in place that will remedy the non-conformity and even more importantly identify the root cause to prevent it from happening again. It is this cycle of identifying, correcting and preventing non-conformities that lead to the improvement cycle.

10. Environmental Management System Audits

Environmental management system audits are required for the organization to achieve and maintain ISO certification. Initial steps for earning certification require that a certifying body perform two audits known as the Stage 1 and Stage 2 audits. The Stage 1 audit gives the certifying auditor an initial view into the organizations EMS. The auditor reviews all of the elements of the EMS including the environmental policy, manual and individual procedures. Management system audits also address and follow up on all non-conformities that resulted from internal audits or compliance evaluations. Reviews of corrective actions that were taken are conducted. More importantly, corrective action effectiveness is evaluated. Upon completion of the Stage 1 audit a formal audit report is issued to the ISO process manager. All non-conformities noted must be fully addressed and have corresponding corrective actions issued. The auditor will also determine if the Stage 2 certification audit is warranted at that time. If there are too many non-conformities with the standards requirements the auditor can decide to postpone the Stage 2 certification audit until such time that he feels is necessary for the organization to have completed all the necessary requirements of the standard. It is at the successful completion of the Stage 2 audit that the organization is awarded certification.

11. Training and Awareness

To insure that all Logistics staff are familiar with the entire environmental management system training is provided to all internal and external staff that have any role in managing environmental aspects and impacts. Training includes a complete review by the ISO process manager of the environmental policy, manual and procedures. In addition, all relevant processes that specifically

relate to a particular function in the department are reviewed with the staff. The goal of all EMS training is to teach the staff how the EMS effects them and what specific role they play in insuring its success. In many cases existing operating procedures such as those in the engineering, cleaning and security departments have been modified to include EMS requirements. Thus training serves as a supplemental source of information. This is especially true of the engineering staff that has the highest risk exposure to environmental aspects and impacts. Given the legal and regulatory requirements for spill prevention, clean up and incident reporting training on the EMS was particularly crucial in this area.

12. Environmental Communications Management

All communications into or out of any international organization is usually managed and controlled by a communications department staffed by communications professionals. This is especially true for Swiss Re given its global role in the reinsurance industry and its relatively high profile environmental position. The company provides a link on its corporate website to the Corporate Social Responsibility report for general information regarding all environmentally related issues. Specific questions related to the environmental management of the site are directed to the ISO 14001 process manager for response should they arise. To date there have been no external inquiries regarding site management or legal requirements by the public or any local, state or federal environmental agencies. Swiss Re participated in a study conducted by an environmental engineering firm commissioned by the New York City Department of Environmental Conservation to review corporate practices by facilities around the Kensico Reservoir watershed. The selection of Swiss Re was made after recent local publicity resulting from an environmental landscaping award was given to Swiss Re. Having an established ISO 14001 certified EMS contributed to the reports favorable conclusions regarding general environmental awareness and responsible environmental management.

CONCLUSIONS:

So What's The Bottom Line…Is There Real Value In Corporate Environmental Management Systems?

Value for this case study is determined by the results of the cost/benefit, effectiveness of achieving corporate environmental objectives and recognition for the implementation effort.

Cost/Benefit:

The cost vs. benefit analysis is provided below and outlines in detail all costs associated with implementing the EMS and achieving ISO 14001 certification. From a purely financial standpoint implementing and achieving ISO 14001 certification has provided value for the company. The total implementation cost was $24,000.00 and the savings from the first 2 years has been just under $250,000.00. With savings 10 times greater than implementation cost the structure and methods inherent to the EMS has been extremely beneficial and has provided value.

In addition to cost savings other benefits include:

- Assurance that all environmental legal and regulatory compliance requirements have been met thus avoiding potential fines
- Reduced potential for reputational damage related to legal or regulatory violations
- Assurance of full environmental and operational training of staff and outside consultants
- Reduced risk of environmental incidents

Achieving Corporate Objectives:

1. Improving the facility's environmental performance:

The cost/benefit analysis demonstrated a reduction in actual expenses directly related to a decrease in consumption of utilities and supplies. This decrease directly relates to the environmental performance of the facility.

In the first 12 months of the projects implementation:

- Electrical energy consumption was reduced by 706,268 Kwh which is equal to a savings of 7.3%. This is the equivalent of an emissions savings of 470 tons of CO2.
- Natural gas consumption was reduced by 48,137 therms which is equal to a savings of 11.5%. This is the equivalent of an emissions savings of 940 tons of CO2.
- Water consumption was reduced by 5,060,600 gallons which is equal to a 36.7% reduction
- Paper consumption was reduced by 6.18 tons which is equal to a 13.5% reduction
- Cleaning chemical quantity did not change but were converted to 100% environmentally friendly products
- Landscaping products such as non-organic fertilizer use was reduced by 100%, herbicide use was reduced by 100%, and pesticide use was reduced by 100%. This resulted in completely eliminating contaminated water runoff from these sources.

The consumption reductions provide cost savings. Both the consumption reductions and the savings are considered benefits of having an EMS.

2. Reduced operating expenses:

Reducing and maintaining lowered operating expenses is an ongoing challenge and having an EMS significantly helps to contribute to that effort. As shown in the cost/benefit analysis total operating expenses were reduced by $124,722 in the first year post ISO 14001 implementation and is expected to be maintained at least at this level going forward. This reduction was realized without having to make any investments in the facility's infrastructure, equipment or services. They were achieved

solely by focusing on the 'low hanging fruit' of the facility's environmental aspects and impacts. As the EMS matures and more aggressive targets are set it is expected that additional reductions in operating expenses will be realized. As energy expenses comprise approximately 20% of the entire facility's operating budget they will continue to be a prime focus for reduction targets.

Global recognition for the effort:

As stated earlier in this case study, one of the main reasons Swiss Re opted for ISO 14001 certification over developing its own management system is because of ISO's international recognition. Achieving certification clearly demonstrates to all stakeholders Swiss Re's commitment to its environmental initiatives, management abilities and future planning processes.

To further demonstrate commitment to the environmental initiatives Swiss Re has obtained 4 additional site certifications to the ISO 14001 standard. These include the 100,000 sq. ft. North American Specialty headquarters in Manchester, NH, the 300,000 sq. ft. Commercial Insurance operations center in Overland Park, KS and the 100,000 sq. ft, Property and Casualty and Life and Health operation in Paris, France. This achievement has been cited in the corporate social responsibility report[10] and has provided Swiss Re with a credible position within the environmental management community.

In summary, achieving ISO 14001 for this facility has met all of the tests to measure value for the organization and *"thus creating economic value by improving its environmental and social performance beyond mere compliance with laws and regulations"*. Environmental performance has been improved via a consumption reduction of the key environmental performance indicators, operating expenses have been reduced via a decrease in utility and supply needs and recognition of environmental initiatives has been gained via public communication of certification.

ISO 14001 Implementation – Cost vs. Benefits

Total Cost of Implementation:

Compliance Audit:	$7,500.00
ISO Process Training:	$1,500.00
Stage 1 Certification Audit:	$7,500.00
Stage 2 Certification Audit (2006):	$2,500.00
Annual Surveillance Audit (2007):	$2,500.00
Annual surveillance Audit (2008)	$2,500.00
Total Implementation Cost	**$24,000.00**

Total Average Annual Benefits/Savings:

Electrical Energy Savings: 9,722,400 Kwh – 9,016,132 kwh = 706,268 Kwh @ $0.072/Kwh = $50,851.30 average annual savings from 2005 through 2007

Natural Gas Savings: 416,884 Therms – 368,747 Therms = 48,137 Therms @ $1.315/Therm = $63,300.16 average annual savings from 2005 through 2007

Water Consumption Savings: 13,771,500 Gallons – 8,710,900 Gallons = 5,060,600 Gallons @ $.00023/gallon for water treatment chemicals = $1,164.93 average annual savings from 2005 through 2007

Paper Consumption: 45.54 Tons – 39.36 Tons = 6.18 Tons (280 cartons) @ $33.60/carton = $9,406.00 average annual saving from 2005 through 2007

Cleaning Chemicals: There were no additional costs or savings associated with changing cleaning chemicals.

Landscaping Products: There were no additional costs or savings associated with changing landscaping practices.

	Total Average Annual Savings:	**Total Savings:**
Electrical Energy Consumption:	$ 50,851.30	$ 101,702.60
Natural Gas Savings:	$ 63,300.16	$ 126,600.32
Water Consumption Savings:	$ 1,164.93	$ 2,329.86
Paper Consumption Savings:	$ 9,406.00	$ 18,812.00
Cleaning Chemical Savings:	$ 0.00	$ 0.00
Landscaping Chemical Savings:	$ 0.00	$ 0.00
Total Savings:	**$ 124,722.39**	**$ 249,444.78**

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6. United States Environmental Protection Agency *Laws, Regulations, Guidance and Dockets Website*

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8. New York City *Department of Environmental Conservation - Watershed Protection Website*

http://www.nyc.gov/html/dep/html/watershed_protection/home.html

9. Building Owners and Management Association Website

http://www.boma.org/

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Appendix I

ENVIRONMENTAL POLICY

Environmental Policy

Swiss Re, Armonk - Logistics believes that the environment constitutes a fundamental asset for society as a whole and that it is the task of everyone to preserve it and to work for sustainable development.

Swiss Re, Armonk - Logistics therefore intends to assimilate the environmental policy of the Group in the firm conviction of the necessity and value of caring for the environment: this will also benefit the development of its own business.

The environmental policy of **Swiss Re, Armonk - Logistics** is based on the Sustainability Mission statement of the Swiss Re group, updated in March 2002 as follows:

“Swiss Re’s commitment to being an environmentally and socially responsible financial services provider is an essential part of creating long term, sustainable value”

Below are the fundamental principles on which the mission statement is based:

- **Vision**: Endeavoring to create long term value, Swiss Re is committed to the principle of sustainability. Accordingly, we generate economic wealth which maintains ecological and social impacts at a level which will enable future generations to meet their needs.
- **Sustainability Management**: The sustainability principle is embedded in our corporate governance. Through its ongoing application to management processes, business decisions and communications, we take collective responsibility for sustainable development. We regularly report on our progress.
- **Our Employees**: We provide our employees with a working environment conducive to their personal and professional development. They actively contribute to the implementation and further development of our sustainability commitment.

It is within this framework that **Swiss Re, Armonk - Logistics** has undertaken to pursue an environmental policy based on the following points:

1. To regard as fundamental a constant respect and compliance to and for the relevant laws and agreements signed with the authorities and agencies responsible for the protection of the environment.
2. To prevent all forms of environmental pollution and to seek a continuous relationship with the environment via objectives which can be achieved in practice.
3. To analyze and evaluate the environmental aspects and impacts of its own offices.
4. To involve all staff in plans for environmental management and improvement in order to ensure correct “environmental’ behavior in the performance of everyone’s duties.
5. To propagate a “culture of the environment” among its own employees, customers and stakeholders in general, via communication, information and training activities.
6. To improve relations with the bodies responsible for the protection of the environment, making available the skills acquired both at the location and corporate levels in the management of environmental problems.
7. To constantly monitor improvements in environmental performance and to periodically re-examine the entire Environmental Management System in order to ensure its efficiency and effectiveness.

In making available the necessary resources to implement these policies, **Swiss Re, Armonk - Logistics** firmly believes that its own commitment will be matched by that of its staff to ensure that its own activities are fully compatible with the surrounding environment.

Appendix II

ENVIRONMENTAL ASPECTS AND IMPACTS

Responsible Function	Environmental Related Process	Environmental Aspect	Environmental Impact	Operational Controls	Monitoring and Measurement	Legal and Regulatory Requirements	Training and Awareness	Objectives, Targets and Goals	Regulated?	Community Effect	Controllable	Total Rating
Property Management	Engineering Services	Natural Gas Consumption	Use of Natural Resources	Property Manager reviews methods and processes with energy consultant to optimize efficiency	Property Manager receives daily usage reports from building engineering staff	N/A	Building engineering staff trained in the Swiss Re, Armonk – Logistics EMS	Reduce Natural Gas Consumption by 5% per FTE by December 2009: COMPLETED	No	7	8	56
Property Management	Engineering Services	Natural Gas Consumption	CO2 Emissions	Property Manager insures proper maintenance of HVAC equipment	Property Manager receives maintenance reports for HVAC equipment	N/A	Equipment management company staff are trained in the proper maintenance techniques for all HVAC equipment	N/A	No	7	8	56
Property Management	Engineering Services	Power Consumption - Electrical Energy	Use of Natural Resources	Property Manager working with Director, Logistics , IEMgr and energy consultant review methods and processes to reduce consumption	Property Manager receives daily usage statistics of electrical energy consumption from building engineering staff	N/A	Building engineering staff trained in the Swiss Re, Armonk – Logistics EMS	Reduce overall power consumption by 10% by December 2009.	No	7	8	56
Property Management	Engineering Services	Power Consumption – Electrical Energy	CO2 Emissions	Property Manager working with Director, Logistics , IEMgr and energy consultant review methods and processes to reduce consumption	Property Manager receives daily usage statistics of electrical energy consumption from building engineering staff	N/A	Building engineering staff trained in the Swiss Re, Armonk – Logistics EMS	Purchase 100% power from renewable sources by December 2009. 60% completed as of December 2008	No	7	8	56
Property Management	Engineering Services	Fuel Tank Filling	Potential Fuel Spill	Member of building engineering staff present during refueling process.	Fuel tank is observed during refueling process to insure no overflow or leakage occurs.	40CFR112 – Spill Prevention Control and Countermeasure Plan Requirements	Building engineering staff trained in the Swiss Re, Armonk – Logistics EMS and SPCC Plan	N/A	Yes	9	9	162
Property Management	Engineering Services	Fuel Storage	Potential Fuel Leak	Fuel tank resides in separate, locked storage room. Double floor to protect from fuel spill leakage. Authorized access only allowed.	Automated fuel gauge reports fuel volume in tank. Engineering staff regularly record fuel volume.	Westchester Department of Health: Petroleum Bulk Storage Registration Certificate Required. SARA Title III – Community Right to Know Tier II Inventory Report required to be filed annually with the SERC, LERC and local Fire Department	Building engineering staff trained in the Swiss Re, Armonk – Logistics EMS. Head, Internal Services trained on Filing Tier II Inventory Report for hazardous substances.	N/A	Yes	9	9	162
Property Management	Engineering Services	Water Treatment	Contaminated Waste Water	Building engineering staff control all chemicals used in the process. Water treatment equipment is regularly checked for operating accuracy.	All water treatment chemicals are measured when treating the water.	Westchester County Department of Health: Permit to Operate a Public Water Supply in compliance with the provisions of Chapter 873, Article VII of the laws of Westchester County and Part 5 of the New York State Sanitary Code.	Building engineering staff are trained in the Swiss Re, Armonk – Logistics EMS All building engineering staff are trained in the proper use and handling of water treatment chemicals.	N/A	Yes	7	8	112
Property Management	Engineering Services	Water Treatment Chemical Storage	Potential Contaminated Waste Due To Chemical Spill	All chemicals have secondary containment.. Local drains have spill prevention filters near the tank storage.,	Visual inspection performed by building engineering staff daily.	N/A	Building engineering staff are trained in the Swiss Re, Armonk – Logistics EMS All building engineering staff are trained in the proper use and handling of water treatment chemicals.	N/A	No	8	7	56

Responsible Function	Environmental Related Process	Environmental Aspect	Environmental Impact	Operational Controls	Monitoring and Measurement	Legal and Regulatory Requirements	Training and Awareness	Objectives, Targets and Goals	Regulated?	Community Effect	Controllable	Total Rating
Property Management	Engineering Services	Use of Cooling and Refrigeration Agents	Potential Air Emissions	HVAC chiller equipment is housed in a separate locked room Automatic leak detector equipment is in place and tested periodically	All control gauges and levels are regularly checked by HVAC maintenance staff	40 CFR Part 82 subpart F Refrigerant Operators License requirement	HVAC maintenance staff maintain current licenses to handle cooling and refrigeration agents. HVAC staff are trained in the Swiss Re,, Armonk – Logistics EMS	N/A	Yes	8	8	128
Property Management	Engineering Services	Use of Cooling and Refrigeration Agents	Potential Contaminated Waste Due to Agent Leakage	HVAC equipment is routinely and regularly maintained so leakage does not occur No refrigerants are stored on the facility	All control gauges and levels are regularly checked by HVAC maintenance staff	40 CFR Part 82 subpart F Refrigerant Operators License requirement	HVAC maintenance staff maintain current licenses to handle cooling and refrigeration agents. HVAC staff are trained in the Swiss Re,, Armonk – Logistics EMS	N/A	Yes	8	8	128
Property Management	Maintenance Services	Water Consumption	Use of Natural Resources	Water conserving fixtures are in place at all water dispensers in the building Water aerators are attached to all faucets in the building	Water meters readings are reported to Property Manager on a regular basis.	N/A	Building Engineers, cleaning contractor and all other outsourced building maintenance staff are trained in the Swiss Re, Armonk – Logistics EMS	Reduce water consumption by 15% by December 2009.	No	7	8	56
Property Management	Maintenance Services	Discharge of Waste Water	Contaminated Waste Water	All waste water is drained into pumping station Float alarms notify town maintenance staff if levels exceed allowance	Sewage system checked regularly by town inspectors	N/A	Town inspectors are trained in pumping station operations	N/A	No	8	7	56
Property Management	Cleaning Services	Consumption of Cleaning Chemicals	Contaminated Waste	Property Manager in concert with the cleaning contractor regularly review alternative cleaning agents that do not contain hazardous substances	Cleaning contractor maintains a regular inventory of all cleaning agents used	29 CFR 1900.1200 Employees Right to Know	Cleaning contractor employees are trained in the proper handling and use of all cleaning agents	100% elimination of the use of non-green cleaning agents: COMPLETED	Yes	4	7	56
Property Management	Landscaping Services	Use of Herbicides/Pesticides	Contaminated Water Run Off	Chemicals are handled by professional landscaping staff only	Landscaping contractor controls all chemicals brought onto and used at the site	29 CFR 1900.1200 – OSHA Toxic and Hazardous Substances NYS DEC – Application of Pesticides Parts 320 - 329	Landscaping contractors staff are licensed for the commercial application of pesticides	Reduce the use of herbicides/pesticides by 100%: COMPLETED	Yes	5	10	100
Property Management	Landscaping Services	Use of Non-Organic Fertilizer	Contaminated Water Run Off	Fertilizer is handled by professional landscaping staff only	Landscaping contractor controls all fertilizers brought onto and used at the site	N/A	Landscaping contractor is trained in the Swiss Re, Armonk – Logistics EMS	Completely eliminate the use of non-organic fertilizer: COMPLETED	No	8	10	80
Property Management	Landscaping Services	Herbicide/Pesticide Storage	Contaminated Waste Water Due to Leakage	All landscaping chemicals are kept in a separate facility and area on the Armonk Property Chemicals are handled by professional staff only	Landscaping contractor monitors all chemical volume brought on to and used on the site	N/A	Landscaping contractor are trained in the Swiss Re, Armonk – Logistics EMS Landscaping contractor staff are trained in the appropriate use of chemicals	N/A	No	8	8	64
Property Management	Maintenance Services	General Waste Collection	Landfill	All waste is collected by building maintenance staff and placed in trash compactor	Carting company weighs all waste removed from the premises. Volumes are recorded and reported to	Westchester County Source Separation Law, Chapter 825	Maintenance staff are trained in the Swiss Re, Armonk – Logistics EMS	N/A	Yes	6	6	72

Responsible Function	Environmental Related Process	Environmental Aspect	Environmental Impact	Operational Controls	Monitoring and Measurement	Legal and Regulatory Requirements	Training and Awareness	Objectives, Targets and Goals	Regulated?	Community Effect	Controllable	Total Rating
				Carting company hauls all waste in containers	Zurich per the IEM reporting requirements.		Maintenance staff are trained in proper trash disposal techniques					
Property Management	Maintenance Services	Use of Paint/Varnish	Hazardous Waste	All paint and varnish products are stored in a separate locked room with access by authorized building staff only	The building maintenance staff visually inspect the location of stored paint products to insure they are secured in a safe and secure manner.	29 CFR 1900.1200 – OSHA Toxic and Hazardous Substances	Maintenance staff are informed of all ingredients and proper handling of paint and varnish.	N/A	Yes	6	7	84
Office Services	Purchasing	Consumption of Copier Paper	Use of Natural Resources	All copier paper is purchased through the Logistics Buyer to control volume	Paper purchased is measured in volume ordered. All orders are placed by the Logistics Buyer.	N/A	All Swiss Re Armonk staff are trained in the use of scanning capable copiers to limit the amount of paper used	Increase the use of recycled content of copier paper by 5% by December 2007.	No	6	9	54
Office Services	Purchasing	Consumption of Copier Paper	Landfill	Recycle containers are available to all Swiss Re Armonk staff via the convenience copy rooms.	Building maintenance staff collect all recycled paper trash cans and dispose of in the appropriate container in the trash room for pick up.	Westchester County Source Separation Law, Chapter 825	All building maintenance staff are trained in the recycling collection process	N/A	Yes	6	9	108
Real Estate	Food Services	Purchase of Raw Ingredients	Landfill	All raw ingredient packages are recycled	Building Maintenance staff collect cardboard containers from food purchases and bale in baler located on loading dock	Westchester County Source Separation Law, Chapter 825	All building maintenance staff are trained in the recycling collection process	N/A	Yes	6	6	72
Real Estate	Engineering Services	Light Bulb Disposal	Universal Waste Disposal	Bulb removal is performed exclusively by building engineering staff Bulbs are stored in a secure area of the lower level of the building Replacement bulbs TLCP compliant CFR 261.APP II	Bulk bulbs are disposed of via registered hauler Receipts are provided at time of pick up	NYSDEC 6NYCRR Part 201-4 Air Facility Registration Certificate 40 CFR Part 273.14-15	Engineering staff are trained in the storage and removal of damaged tubes	N/A	Yes	6	9	108
Real Estate	Engineering Services	Elevator hydraulic Fluid Storage	Potential contaminated waste due to fluid leak	No excess fluid is stored on-site Fluid reservoir's are inspected quarterly by elevator maintenance staff Drip pans and overflow buckets are in place in shafts	Quarterly inspections are performed by the elevator maintenance company	N/A	Engineering staff are trained in coordinating inspections with elevator maintenance provider	N/A	No	5	9	45
Real Estate	Engineering Services	Battery Storage	Potential contaminated waste due to sulfuric acid leak	Batteries are stored in a contained and secure area	Weekly testing of systems require routine inspections of batteries	SARA Title III Community Right to Know 40 CFR 370.20 Tier II Inventory Report for EHS required to be filed annually with the SERC, LERC and local Fire Department	Engineering staff is familiar with the location and security involved with back up battery storage and use.. Head, Internal Services trained on filing Tier II Inventory Report for extremely hazardous substances	N/A	Yes	9	9	162

Appendix III

OPERATIONAL CONTROLS

TYPICAL SIGNAGE CONTROL

SECONDARY CONTAINMENT FOR OIL STORAGE TANK

SECONDARY CONTAINMENT FOR OIL DAY TANK

SECONDARY CONTAINMENT FOR WATER TREATMENT CHEMICALS

SPILL CONTROL STATION

ODS RELEASE WARNING AND ALARM SYSTEM

Appendix IV

TARGETS, GOALS, AND OBJECTIVES

Objective: Reduce the use of non-organic fertilizer by 100%

Project Phase:	Volume	Action To be Taken	Status/Comments
	6,850 lbs.	**Initial Measurement**	N/A
1	N/A	The Property Manager will contact the Landscaping sub-contractor to determine and implement alternate methods to using non-organic fertilizer on the property	Sub-contractor contacted and notified to eliminate the use of non-organic fertilizer
2	N/A	Landscaping sun-contractor will propose alternated methods for plant treatment	Alternate fertilizers proposed
3	N/A	Property Manager will evaluate recommendations	Recommendations evaluated
4	N/A	Property Manger will coordinate with Landscaping sub-contractor to implement alternative methods for fertilizer use	Implementation begun for 2005 season
5	7,450 lbs.	Annual Measurement	5,600 lbs. of fertilizer containing phosphorous replaced per Westchester County regulation change
6		Review fertilizers to be used in new season	Property Manager reviewed fertilizers with Landscaping contractor
7		Report monthly fertilizer volumes to Property Manager	All non-organic fertilizer replaced
		Annual Measurement	**COMPLETED**

Product Name	Use	Amount used	Status
14-14-14	Fertilizer for Shrubs	680 lbs. (2003)/100 lbs. (2004)/0 lbs. (2005)	Eliminated
4-6-4	Hollytone for Shrubs	0 lbs. (2003)/0 lbs. (2004)/300 lbs. (2005)	Added
12-3-6	Acre for Shrubs	750 lbs. (2003)/0 lbs. (2004)/ 0 lbs. (2005)	Eliminated
21-3-18	Fertilizer for Lawn	800 lbs. (2003)/0 lbs. (2004)/ 0lbs. (2005)	Eliminated
8-3-5	Nature Safe Fertilizer	0 lbs. (2003)/6,750 lbs. (2004)/1,150 lbs (2005)	Added, reduced volume
9-0-9	Nature Safe Fertilizer	0 lbs. (2003)/ 0lbs. (2004)/6,000 lbs. (2005)	Added

Objective: Reduce the use of herbicides/pesticides/fungicides by 100%

Project Phase:	Volume	Action To be Taken	Status/Comments
	3,000 lbs/600.5 Gallons	**Initial Measurement**	Pesticide Usage at Year End
1	N/A	**The Property Manager will contact the Landscaping sub-contractor to determine and implement alternate methods to using pesticides on the property**	Sub-contractor contacted
2	N/A	Landscaping sun-contractor will propose alternated methods for plant treatment	Alternate chemicals proposed by sub-contractor pro
3	N/A	Property Manager will evaluate recommendations and submit to the Director, Logistics	Recommendations evaluated and selections made
4	N/A	Property Manger coordinates with landscaping sub-contractor to implement alternative methods for pesticide use	Review conducted with Landscaping sub-contractor
5	0 lbs./606.8 Gallons	Annual Measurement	3,000 lbs of chemicals eliminated in 2005
6		Property Manager to review final landscaping plan	Property Manager reviewed landscaping plan with landscaping contractor
7			**COMPLETED**

Product Name	Use	Amount used	Replaced
Sol-U-Cal Gypsum		0 lbs. (2003)/3,000 lbs. (2004)/0 lbs (2005)	Eliminated
Compost Tea		0 lbs. (2003)/ 600 gal. (2004)/ 600 gal. (2005)	Added as replacement
Dimension 12.7%	Herbicide	108 oz. 2003)/0 oz. (2004)/ 0 oz. (2005)	Eliminated
Bayleton 50%	Fungicide	22 oz. (2003)/0 oz. (2004)/o oz. (2005)	Eliminated
COMPASS 50%	Fungicide	2 oz. (2003)/ 0 oz. (2004)/ 0 oz. (2005)	Eliminated
Prosecutor 41%	Pesticide	363.5 oz. (2003)/60 oz. (2004)/560 oz. (2005)	Eliminated
Concorde SST J470	Pesticide	700 oz. (2003)/0 oz. (2004)/ o oz. (2005)	Eliminated
MERIT 75%	Insecticide	18 oz. (2003)/ 0 oz. (2004)/ 0 oz. (2005)	Eliminated
Three Way 49.87%	herbicide	96 oz. (2003)/0 oz. (2004)/ 0 oz. (2005)	Eliminated
Pennant Magnum 85.1%	Herbicide	56.25 oz. (2003)/0 oz. (2004)/0 oz. (2005)	Eliminated
Acclaim X-Tra 65%	Herbicide	27 oz. (2003)/0 oz. (2004)/0 oz. (2005)	Eliminated
Scythe 57%	Herbicide	160 oz. (2003)/0 oz.(2004)/0 oz. (2005)	Eliminated
DEER OFF	Pesticide	16 oz. (2003)/0 oz. (2004)/320 oz. (2005)	Eliminated

Objective: Eliminate the use of nongreen cleaning agents by 100%

Project Phase:	Volume	Action To be Taken	Status/Comments
	87 Gallons/Month Total Usage	Initial Measurement	N/A
1	28.5 Gallons/Month potential chemical reduction	The Property Manager will contact the cleaning sub-contractor to determine and implement alternate methods to using non-green chemicals on the property	Cleaning sub-contractor provided list of available green chemicals
2	14.5 Gallons/Month identified for replacement	Property Manager will evaluate proposed chemicals by the cleaning sub-contractor.	Chemicals evaluated
3	14.5 Gallons/Month replaced with green products	Selection of alternate chemicals to be made by the Property Manager and their use to begin	Alternate chemicals selected – See list below (replaced chemicals in bold)
3	10 Gallons/Month replaced with green products	Property Manager to follow up with cleaning sub-contractor to determine availability of additional green cleaning agents	Cleaning contractor proposed and changed two more cleaning agents to green certified products.
4		Cleaning sub-contractor to report quarterly usage statistics for all cleaning chemicals	COMPLETED

Product Name	Use	Amount used	Replaced
G-Force	Floor Finish	5 Gallons/Month	Replaced
G-Force	Floor Stripper	5 Gallons/Month	Replaced
Rejuvenate Floor Maintainer	Floor Cleaner	2 Gallons/Month	Currently used
Lotion Hand Soap	Hand Cleaner	36 Gallons/Month	Currently used
BLAST Cleaner/Degreaser	Cleaner/Degreaser	3 Gallons/Month	Currently used
Iron Stone	Acrylic Sealer	5 Gallons/Month	Currently used
Amplify	High Solids Floor Finish	5 Gallons/Month	Yes - Replaced with G-Force
Crowbar	Floor Stripper	5 Gallons/Month	Yes - Replaced with G-Force Floor Stripper
Morning Mist	Disinfectant Cleaner	3 Gallons/Month	Eliminated
RAINDANCE	Low Foam Neutral Floor Cleaner	3 Gallons/Month	Currently used – Green Certified
Morning Mist	Neutral Disinfectant Cleaner	3 Gallons/Month	Currently used
Look Non-Ammoniated	Glass Cleaner Concentrate	3 Gallons/Month	Currently used – Green Certified
Professional Lysol	Disinfectant Spray	12 – 16 oz. Cans/Month	Currently used
Ajax	Oxygen Bleach Cleanser	12 – 16 oz. Cans/Month	Currently used
Swell	Stainless Steel Cleaner	12 – 16 oz. Cans/Month	Currently Used
Bathmate	**Non-Acid Washroom Cleaner Concentrate**	**3 Gallons/Month**	**Replaced**
Riptide II	**Foaming Shower Room Cleaner**	**2 Gallons/Month12 – 16 oz. Cans/Month**	**Replaced**
4 Sundance	**Neutral Floor Cleaner Concentrate**	**3 Gallons/Month**	**Replaced with Raindance**
3 Glisten	**Glass and Surface Cleaner Concentrate**	**3 Gallons/Month**	**Replaced with Look Non-Ammoniated**
Austin A-1 Bleach	**Commercial Disinfectant Sanitizer**	**2 Gallons/Month**	**Limited use to showers only**
Pledge Aerosol	**Furniture Cleaning Wax**	**12 – 16 Oz. Cans/Month**	**Replaced**

Objective: Reduce CO2 Emission by 5% per FTE

Project Phase:	Electrical Energy Usage	Action To be Taken	Status/Comments
	9,333,600 Kwh	Initial electrical energy measurement	Full year electrical energy usage; 9,333,600/810 FTE's = 11,523 Kwh per FTE 11,523 Kwh X 723 gCo2/Kwh = 8,331,129 gCo2 per FTE
1	758,400 Kwh	Property Manager will coordinate the replacement of all lighting in the garage	Lighting has been replaced for all locations in the garage
2	799,200 Kwh	Property Manager will coordinate with Security Manager building walk through to determine status of computer equipment turn off	Security has conducted walk through's nightly and notified users when computer equipment has been left on
3	794,400 Kwh	Sustainability Management Americas Division will issue announcement regarding electrical energy conservation	Announcement issued via Lotus Notes
4	722,400 Kwh	Property Manager and Director, Logistics will review proposals for buying electrical energy from renewable resources	Proposals received and are under review
	9,679,200 Kwh	One year assessment of electrical energy usage	Full year electrical energy usage: 9,679,200/ 885 FTE's = 10,936 Kwh per FTE 10,936 Kwh X 723 gCO2/Kwh = 7,906,728 gCO2 per FTE **14.8% decrease in CO2 emissions per FTE**
5		Director, Logistics will select appropriate means to purchase energy from renewable sources	Contracts are under review by various legal and specialists within Swiss Re
6		Contracts to be signed with energy supplier	Contracts are pending sign off by legal department
7		30% of electrical energy will begin to be purchased from renewable sources	Contract signed. Energy consumption to be measured in June.
8	4,408,800 Kwh	Half year measurement will be recorded to measure Co2 per FTE	Half year usage: 4,408,800 Kwh; Projected full year usage = 8,817,600 Kwh
9	6,794,400 Kwh	9 month measurement will be recorded to measure CO2 per FTE	9 month usage: 6,794,400 Kwh; Projected full year usage = 9,059,199 Kwh
10	9,112,352 Kwh	Full year measurement will be recorded to measure CO2 per FTE	Full year electrical energy usage: 9,112,352/885 FTE's = 10,296.KwH/FTE 10,296 Kwh X 723gCO2/Kwh = 7,444,008 gCO2 per FTE 5.8% decrease in CO2 emissions per FTE (physical reduction)

Objective: Reduce natural gas consumption by 5% per FTE

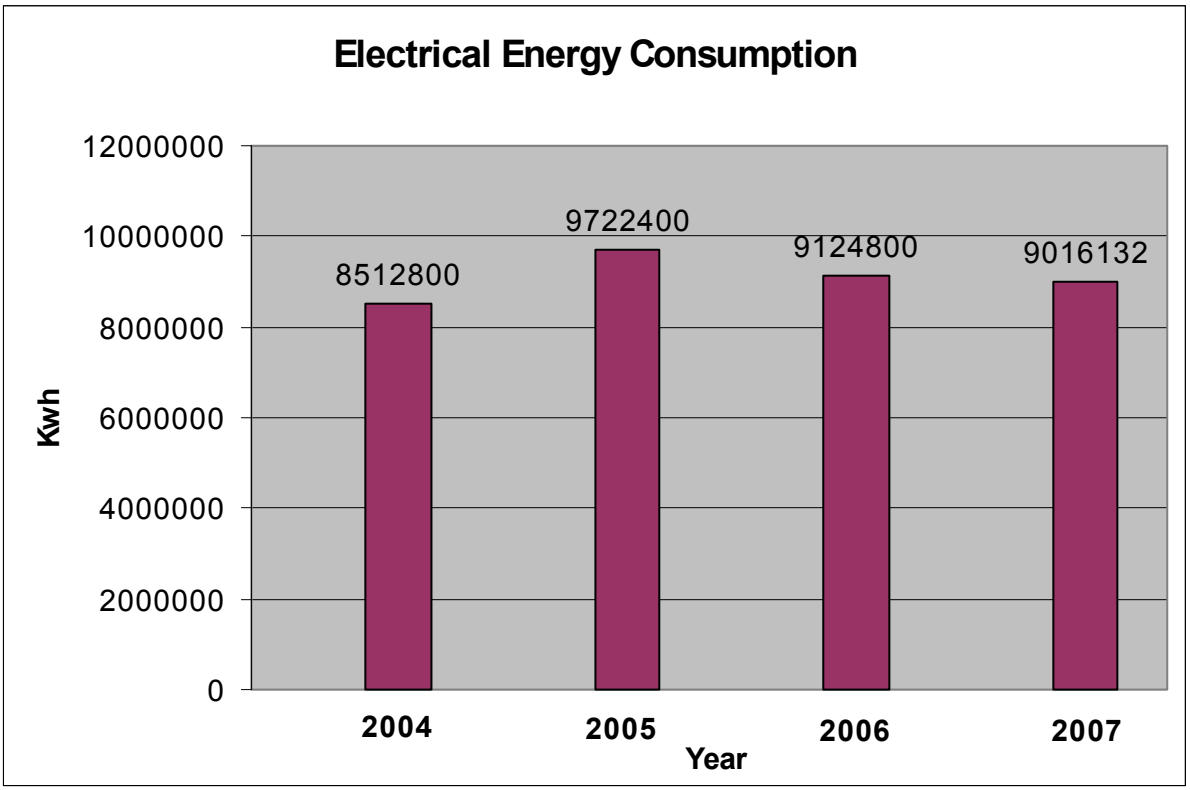
Project Phase:	Natural Gas Usage	Action To be Taken	Status/Comments
	404,453 Therms	Initial Measurement	Full year usage: 401,809/810 FTE's = 496 Therms per FTE
1	N/A	Property Manager will coordinate with the Engineering sub-contractor to maintain internal office temperatures to optimize efficiency	Engineering sub-contractor begins randomly monitoring facility temperature
2	N/A	Property Manager will review HVAC equipment for efficiency	
3	439,327	Annual Measurement	Full year usage: 439,327/885 FTE's = 496 Therms/FTE 0% change in usage 2004 vs. 2005
4		Property Manager coordinates with energy consultant to review heat generating equipment for efficiency	Consultant report indicated gas consumption is within acceptable limits for this facility. This goals is being reviewed for effectiveness.
		1st Quarter measurement reported	116,138 Therms; Projected full year usage = 464552 Therms
5		Energy Consultant recommendations to be implemented	
		2nd Quarter measurement reported	199,554 Therms; Projected annual usage; 399,108 Therms
6		3rd Quarter measurement reported	314,134 Therms; Projected annual usage 418,845 Therms
7	407,364 Therms	Annual measurement reported	Full year usage: 407,364 Therms/885 FTE's = 460 Therms/FTE 7.2% decrease Therms/FTE
8			COMPLETED

Objective: Decrease the use of copier paper by 5% per FTE

Project Phase:	Copier paper used	Action To be Taken	Status/Comments
1	Full year usage: 2,517 cartons	Initial Measurement	Full year usage: 2,517/810 FTE's = 3.1 cartons per FTE
2		Internal Services Manager to place recycle posters in coffee stations to raise employee awareness	Recycle posters were put in all coffee stations in the Armonk facility
3	1st Quarter usage: 630 cartons	All copiers to be replaced with scanning capable machines	Copiers replaced
4	2nd Quarter usage: 650 cartons	Internal Services Manager to put posters in copy room to raise awareness of using scanners	Posters placed in all convenience copy rooms
	3rd Quarter usage: 620 cartons	Quarterly Measurement	N/A
	4th Quarter usage: 620 cartons Full year usage: 2520 cartons	One year assessment	Full year usage: 2,520 cartons/885 FTE's = 2.84 cartons per FTE: Decrease of 9.6%
5		Ikon Office Solutions to train all Armonk staff on scanning capabilities for all convenience copiers	Training completed
6	1st qtr usage : 710 cartons	Internal Services Manager will evaluate consumption based on 1st Quarter data	N/A
7	2nd qtr. usage:690 cartons	Internal Services Manager will evaluate consumption based on 2nd Quarter data	N/A
8		Internal Services to conduct survey of users to determine status of employing scanners	N/A
9	3rd qtr: usage 480 cartons	Internal Services Manager will evaluate consumption based on 3rd Quarter data	N/A
10	4th qtr: usage 550 Cartons	Year End Measurement	Full year usage: 2,430 Cartons/885 FTE's = 2.74 cartons/FTE Decrease of 3.5 %

Appendix V

GRAPHS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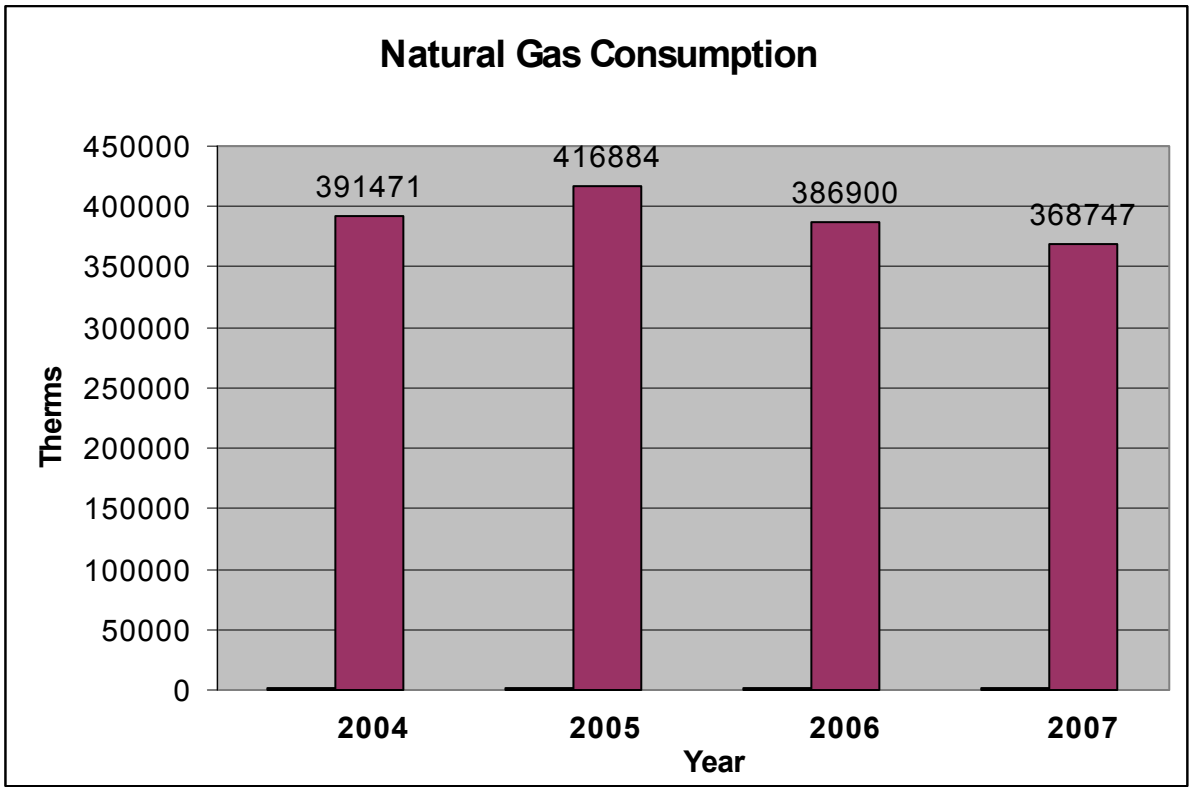
2007
Year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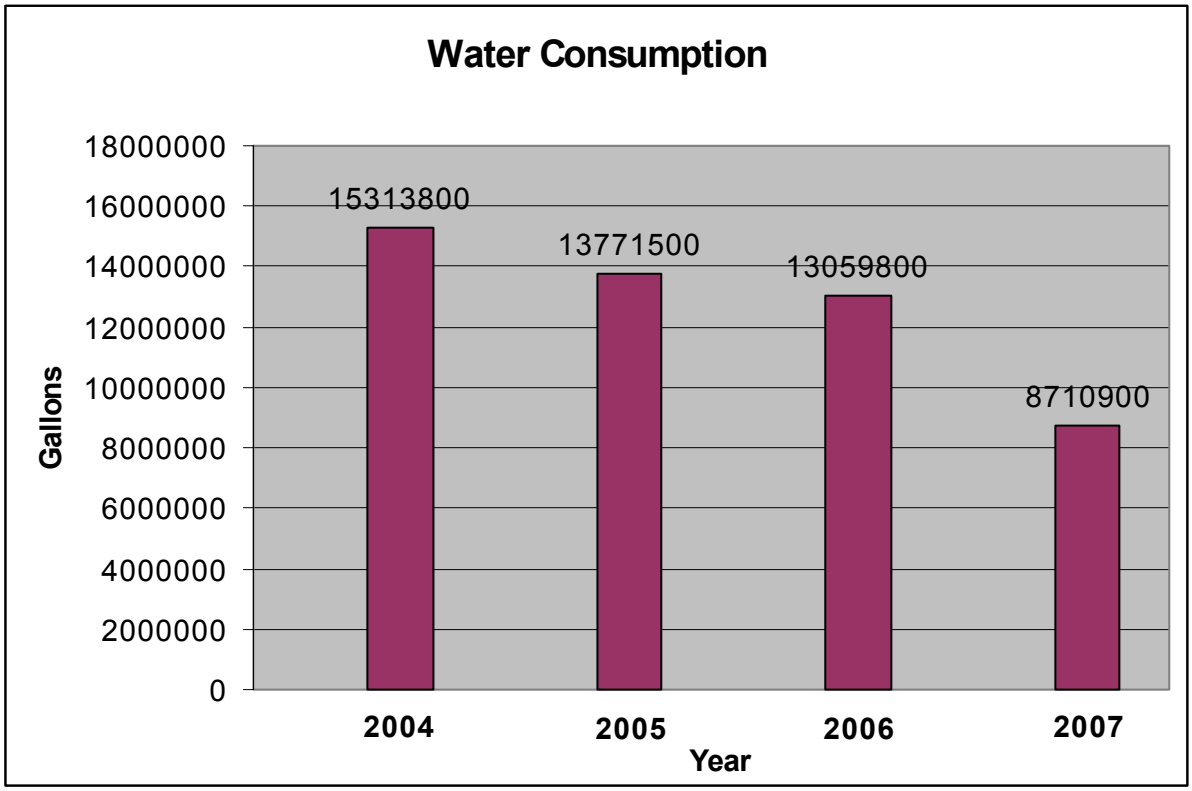
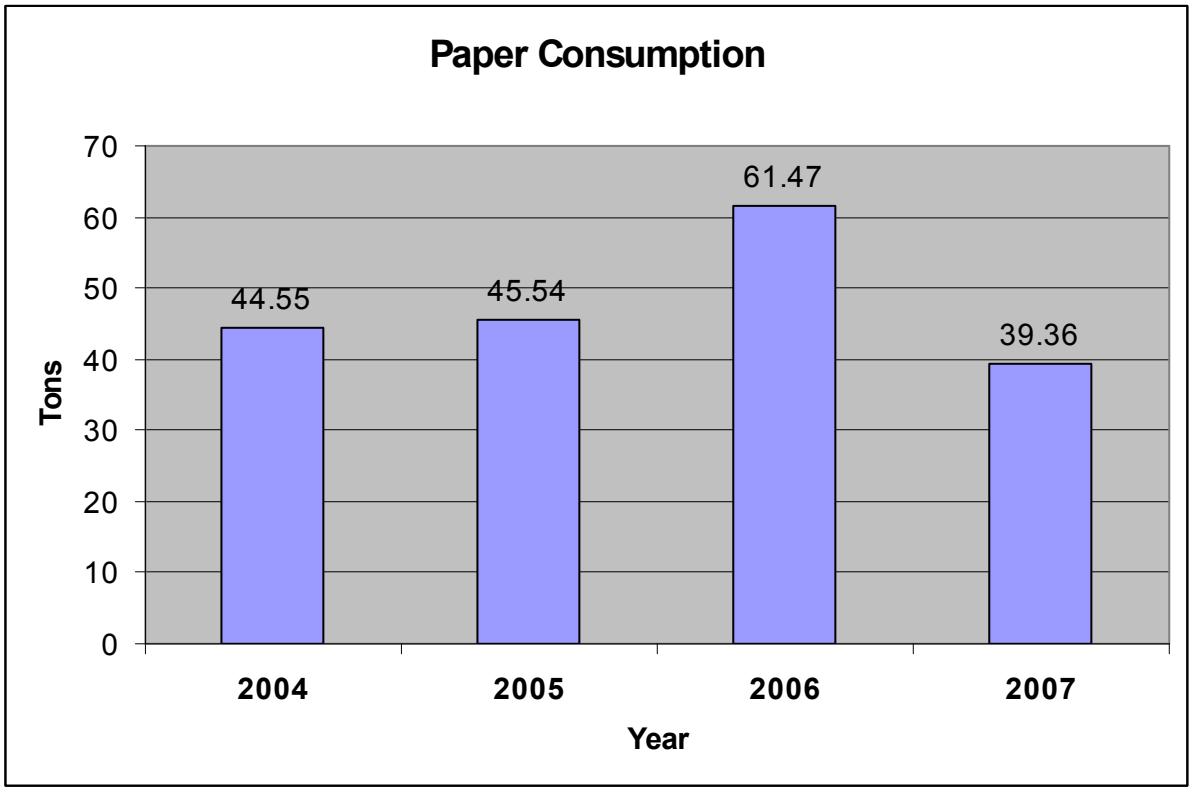
2005
2006
2007
Year


Water Consumption
18000000
16000000
14000000
12000000
10000000
8000000
6000000
4000000
2000000
0
Gallons
15313800
13771500
13059800
8710900
2004
2005
2006
2007
Year


Paper Consumption
70
60
50
40
30
20
10
0
Tons
44.55
45.54
61.47
39.36
2004
2005
2006
2007
Year