Federal Transit Administration
Environmental Management Systems
Training & Assistance

Final Report

Federal Transit Administration Office of Planning & Environment
September 2003 – January 2006

Foreword

This report contains the results of a 29 month effort by the Federal Transit Administration (FTA), ten local transit agencies and the Center for Organizational and Technological Advancement (COTA) at Virginia Polytechnic Institute and State University (Virginia Tech) to advance international environmental management standards (ISO 14001) in public transit agencies in the United States. The report summarizes FTA's environmental management systems (EMS) training and assistance project. The intent of this program was three-fold:

1. To introduce a geographically and size diverse set of public transit entities throughout the US to EMS;
2. To stimulate these agencies into adopting EMS and becoming EMS champions in the universe of public transit agencies; and
3. To develop an EMS training program that would be, to a certain extent, transit specific.

Training and assistance participants included FTA grantees from New England, the Middle Atlantic Region, the Mid West, the Rocky Mountains, the Southwest and the West Coast. These agencies ranged from medium sized traditional bus and para-transit operations to large organizations operating busses, ferries and commuter rail. The testimonials of Senior Management are a tribute to both the enthusiasm of the individual EMS teams and the estimable qualities of ISO 14001 Standards. At this writing two participating agencies have obtained ISO 14001 certification and one other agency is seeking certification. FTA believes that COTA has developed a transit related EMS training program that would greatly assist all FTA grantees in pursuing environmentally harmonious and sustainable operations.

Acknowledgements

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Executive Summary

In the summer of 2003, the Federal Transit Administrator issued a Dear Colleague letter to the 100 transit agencies throughout the United States with the highest ridership levels inviting them to apply for the FTA sponsored training and assistance for implementing an ISO 14001 based EMS. FTA's initiative of EMS training for public transit agencies supports President's Bush's Executive Order 13148 *Greening the Government* initiative and Executive Order 13274 *Environmental Stewardship and Transportation Infrastructure Project Reviews*, which directs federal agencies to promote environmental stewardship in the nation's transportation system while streamlining the environmental review and development of proposed transportation projects.

An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. Organizations with an EMS report being able to more effectively manage their environmental obligations. Additionally, organizations report enhanced ability to analyze, control and reduce environmental impacts, and to operate with greater efficiency and control.

FTA believes that EMS is a valuable tool and desired to introduce the doctrine of environmental management systems to a pilot group within the public transit sector. The ISO 14001 Standards served as the basis of EMS training. FTA left the option of ISO certification to the discretion of the individual agencies.

How Were Teams Selected?

In December 2003, after receiving applications and completing interviews, FTA selected ten of the applicant agencies to participate in the training. FTA used a number of criteria to select participants, including:

- Organizational commitment by transit agency leadership to EMS implementation;
- Geographical diversity;
- Previous environmental experiences; and
- Environmental challenges from operations and/or pending capital projects.

FTA believed that organizational commitment to environmental protection and sustainability were the most important elements of the program and that senior management buy-in was crucial to successful implementation.

It was important to the FTA that participating agencies attempt to demonstrate quantitative costs and benefits of the EMS implementation. FTA required teams to track both internal and external costs such as staff (managerial time and other employee time), costs of potential consulting assistance and outside training of personnel, and to the extent possible, the quantitative benefits of measuring individual environmental objectives and targets.

FTA Assistance

FTA contracted with The Center for Organizational and Technological Advancement (COTA) at Virginia Polytechnic Institute and State University (Virginia Tech) to support training and assistance under a cooperative agreement. COTA developed a Memorandum of Understanding (MOU) with each participating transit agency that outlined the roles and responsibilities of all the parties (FTA, Virginia Tech and the transit agency). The MOU was signed by the parties as a condition of participation, prior to any work being performed. COTA provided assistance in the form of:

1. Baseline Environmental Reviews at each site
2. Four 3-day workshops
3. Team Conference Calls between workshops
4. Senior Management Conference Calls prior to Workshops 2, 3 and 4
5. Two technical site visits
6. One concluding EMS audit at each site

Benefits of Adopting an EMS

Benefits of implementing an EMS were reported by each participant transit agency and are documented in individual case studies found in ***Appendix "A"***. Reported benefits include:

- Improved relationships with state and federal regulators;
- Enhanced public image with system users and the general public;
- Improved employee awareness of potential environmental impacts of work activities;
- Improved communications and cooperation through training and outreach;
- Increased management awareness of environmental issues;
- Reinforcement of environmental processes currently in place;
- Proactive management systems for environmental issues;
- Documentation of standard operating procedures;
- Institutionalization of best practices in and permanent improvements of on-time performance;
- Increased fuel economy;
- Reduction of air emissions; and
- Reduction of amount of oil in waste water.

Cost Savings

Cost savings and cost avoidances are identified in each agency case study. Examples of documented cost savings:

Agency	Efficiency	Annual Savings
Hampton Roads Transit	Bus Idling Shutdown Campaign	$140,400
MBTA	Bus Idling Monitoring Campaign	$116,553
City of Phoenix Transit	Reduced energy use	
	Switched to solvent-based parts washer	$49,000

Agency	Efficiency	Annual Savings
Transit Agency of River City	Natural Gas reduction campaign and 270,000 reduction in kilowatt hours	$15,000
	Emissions Reductions	CO2=906,802 lb/yr SO2=1,425 lb/yr NOx=945 lb/yr
Utah Transit Authority	Idling fuel savings policy	$675,000
	Idling labor savings	$63,000
	Emission Reductions	PM=2,484 lb/yr NO_x=91,125 lb/yr CO_2=3,037, 500 lbs/yr
	Addressing print shop environmental issues	$72,000
	Industrial waste savings (one time)	$500,000
	Recycle used oil	$4,000
	Grand Total calendar 2005	$1,300,000
	Annualized savings each year in future	$814,000
Bay Area Rapid Transit	Reduced costs by puncturing and disposing of aerosol cans	$15,740
	Reduced use of aerosol insecticide product	
	Reduced cost of recycling vs. landfilling of creosote crosstie	

Senior Management Comments

Senior Management's dedication to the development and implementation of the EMS was noteworthy as demonstrated by the following excerpts from the case studies in **Appendix "A":**

- *"…BART has always been environmentally aware, but EMS gives us the tools to set goals, monitor performance, and report results to the key decision makers at the agency."*

John Mack, BART Executive Manager, Transit System Compliance

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- *"The EMS program fits well into Community Transit's core values because it establishes clear priorities and sets realistic goals to provide a safe and clean workplace; it also adds to the quality of life for citizens in our community."*

Joyce Olson, CEO, Community Transit

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- *"The EMS is one of my key strategic initiatives because it provides us with a disciplined framework for meeting our environmental responsibilities and allows us to continually improve our organizational performance."*

Daniel A. Grabauskas, GM, MBTA

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- *"The EMS provides us with a ready-made and internationally recognized program that can be tailored to our needs."*

Vernon Stoner, Deputy CEO, Sound Transit

- *"Strong environmental management makes 'green' sense but it also makes good business sense. TARC intends to treat this as seriously as we treat our other requirements, such as Affirmative Action and EEOC compliance. With funding tight and gas prices rising, it will be more essential than ever for TARC to cut costs and run efficiently. The EMS helps us move in that direction."*

J. Barry Barker, TARC, Executive Director

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- *"The Environmental Management System (EMS) is a lifestyle change we are integrating into our everyday approach of doing business"*

George Caria, GM, Sun Tran

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- *"UTA's Environmental Management System helps managers identify harmful environmental impacts of our projects, services and activities and finding ways to resolve and prevent these impacts. The implementation of an Environmental Management System is not just a requirement--it's a good idea. It supports our credo to provide a good transportation value for a better quality of life."*

John Inglish, GM, UTA

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- *"Environmental management is an individual, as well as collective responsibility. The EMS is an effective tool for employees to use together to establish new goals and implement new programs to protect the community and the environment for future generations."*

Debbie Cotton, Public Transit Department Director, City of Phoenix

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- *"The EMS is an effective 'grass roots' method for implementing WMATA's environmental policy and programs. The FTA/Virginia Tech assistance gave us the vehicle to move our policy from paper to a functioning program at the Greenbelt Yard. "*

Fred Goodine AGM, WMATA

The Federal Transit Administration Effort

In the summer of 2003, the FTA Administrator issued a *Dear Colleague* letter to 100 transit agencies throughout the United States with the highest ridership levels inviting them to apply for the FTA sponsored training for implementing an EMS. FTA's initiative of EMS training for public transit agencies supports President's Bush's Executive Order 13148 *Greening the Government* initiative. Additionally the FTA initiative supports Executive Order 13274 *Environmental Stewardship and Transportation Infrastructure Project Reviews*, which directs Federal agencies to promote environmental stewardship in the nation's transportation system while streamlining the environmental review and development of proposed transportation projects.

FTA believes that EMS is a valuable tool and desired to introduce the doctrine of environmental management system on a voluntary basis to a pilot group within the public transit sector. ISO 14001 served as the basis of EMS training. FTA left ISO 14001 certification by an outside 3rd party auditor to the discretion of the individual agencies.

Selection Methodology

ln December 2003, after receiving applications and completing interviews, FTA selected ten of the applicant agencies to participate in the training. FTA used a number of criteria to select participants, including:

- Organizational commitment by transit agency leadership to EMS implementation;
- Geographical diversity;
- Previous environmental experiences; and
- Environmental challenges from operations and/or pending capital projects.

FTA believed that organizational commitment to environmental protection and sustainability were the most important elements of the program and that regular and meaningful senior management participation was crucial to successful EMS implementation. With this in mind, FTA selected the following agencies to participate in the training:

Public Transit Agency	Fenceline
Massachusetts Bay Transportation Authority Boston, MA	**Wellington Carhouse Maintenance Facility (rail)** **Albany Bus Garage Facility**
Washington Metropolitan Area Transit Authority, DC	**Greenbelt Rail Yard**
Hampton Roads Transit, Hampton, VA	**HQ Maintenance and Operations Facility**
Transit Authority of River City, Louisville, KY	**Union Station Bus Maintenance**
Bay Area Rapid Transit, Oakland, CA	**Richmond Shop and Yard**
Utah Transit Authority, Salt Lake City, UT	**Meadowbrook Maintenance Division**
Sound Transit, Seattle, WA	**Sound Transit Environmental Compliance Division**
Community Transit, Everett, WA	**Kasch Park Operating Base**
City of Phoenix, AZ	**South Operating Facility**
City of Tucson, AZ	**Bus Maintenance Facility**

Selected agencies ranged from medium sized agencies with bus and paratransit services to agencies with large, complex operations including ferry services, heavy rail, commuter rail and bus rapid transit. Participating transit organizations faced a variety of environmental challenges including one local transit participant that was operating under a consent decree from EPA to develop an agency wide EMS.

Training teams from transit agencies were comprised of four to seven staff members. Teams intentional included management, operational and mechanical personnel in an attempt to create support for the EMS through all organizational levels. A special effort was made to include trade unionists in an attempt to harness shop-floor loyalties to development and implementation of the EMS.

Project Outline

The Center for Organizational and Technological Advancement (COTA) at Virginia Polytechnic Institute and State University was selected by FTA to support efforts of training and assistance under a cooperative agreement. On behalf of the FTA, COTA developed a Memorandum of Understanding (MOU) with each of the transit agencies that outlined the roles and responsibilities of all the parties. The MOU was signed by the parties prior to the beginning of training. It was the expectation of FTA that each of the transit agencies would utilize the training and implement an ISO 14001 EMS at the facility of choice and that COTA would audit the degree of implementation at the end of the 24 month initiative. FTA required that ISO 14001 serve as the basis of the EMS training, although it would be at the discretion of the individual agencies to pursue ISO certification.

FTA modeled the initiative after a successful Environmental Protection Agency (EPA) program called *EMS Initiative for Governmental Agencies.* FTA and COTA structured the two year program to address specific environmental requirements of transit agencies. Local transit agencies paid for their travel, room and board and FTA funded all contractor training and assistance including technical support site visits to the participating agencies.

It was important to the FTA that participating agencies attempt to demonstrate quantitative costs and benefits of the EMS implementation. COTA required teams to track both internal and external costs such as staff, managerial time and other employee time on a quarterly basis; costs of potential consulting assistance and outside training of personnel. COTA also asked teams to track benefits which could include savings from improved environmental performance, enhanced environmental compliance, cost reductions, pollution prevention and resource conservation. Additional indirect benefits were expected to include increased efficiencies, enhanced employee morale, an improved public image and greater employee awareness of environmental issues and responsibilities.

FTA provided assistance in the form of:

Baseline Environmental Reviews: COTA, a Public Entity EMS Local Resource (PEER) Center (www.peercenter.net) began its effort in January 2004 with a one day visit to each participating agency to meet with executive management and the core EMS team. The site visit

included a presentation of FTA expectations followed by the signing of the MOU, briefing of workshop(s) curriculum and a one day environmental audit of the agency's fenceline facility. Fencelines chosen by participants typically included a bus or rail maintenance facility. One exception was Sound Transit which had significant new facilities coming on line in its Transit Plan. Sound Transit was interested in first developing an EMS for its capital program.

During the baseline audit, COTA took note of a variety of physical improvements as well as site storm water runoff, hazardous waste disposition, water and energy usage, recycling efforts, waste management, fuel storage and environmental permitting. A summary report of the environmental findings was prepared by COTA for each agency and provided as background material in advance of Workshop #1.

EMS Training Workshops: Four 3-day workshops were held over a 10 month period at Virginia Tech's Roanoke, Virginia training facility.

1. Workshop # 1: March 2004
2. Workshop # 2: June 2004
3. Workshop # 3 : September 2004
4. Workshop # 4: December 2004

Ten teams came to Roanoke for each of the four workshops. Approximately one fourth of the 17 basic elements of ISO 14001 were presented at each workshop. The COTA concept was to introduce the ISO Standards, provide transit specific case studies to practice implementation, and then send the teams back to their locality for a 4 month implementation period.

The ISO 14001 implementation strategy included selecting individualized environmental objectives and targets based upon agency need and rigorous homework requirements. Each team received one copy of GreenWare software. GreenWare software included a comprehensive set of worksheets, procedures and operational controls for implementing an ISO 14001 EMS, and step-by-step detailed workflow, calendaring and task management features. Finally, the software included detailed sample EMS procedures for every section of ISO 14001 which were easily modified to meet specific user needs.

On site training was supported by regular conference calls with individual participant team, COTA and the FTA project manager. Conference calls helped identify problems teams might be having implementing workshop homework. As a condition of participation, all teams were required to hold regular agency EMS meetings, maintain good meeting minutes and regularly brief senior management on the progress of their EMS.

The FTA project manager held quarterly senior manager conference calls with agency upper management in an effort to maintain a high level of management support for the implementation efforts and to address intra-agency roadblocks. As the project went forward, these calls were the critical component in sustaining the momentum of the EMS core teams.

Post Workshop Activities: Homework assignments were to be completed by May 1, 2005. COTA scheduled a two-day site visit to each agency to conduct an EMS pre-assessment. Two to four months later, COTA returned to each agency to conduct a formal two day EMS-audit,

utilizing GreenWare's ISO 14001 Audit software. This software enabled a qualified Virginia Tech ISO 14001 auditor to verify and document systematically the degree to which each transit agency has an EMS in place in conformance with the audit criteria set out in *ISO 14010, Guidelines for Environmental Auditing - General Principles of Environmental Auditing and ISO 14011, Guidelines for environmental auditing - Audit procedures - Auditing of environmental management systems*. The tenth and final EMS Audit was completed on October 24, 2005. Final scoring from the COTA EMS Audit is provided for each agency at the end of each case study found in Appendix "A".

The 10 transit agencies produced their initial EMS case studies documenting the organizations efforts related to their obligations outlined in the MOU. Case studies include:

- Narrative outlining their participation in the program;
- Costs and benefits of EMS implementation;
- Documentation on hours spent implementing the EMS;
- Statement of benefits of adopting an EMS;
- Cost savings and cost avoidances;
- Next steps for the EMS in the agency; and
- Statement of management commitment to sustain the EMS.

What is an EMS?

An Environmental Management System (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. Organizations with an EMS report being able to more effectively manage their environmental obligations. Additionally, organizations report enhanced ability to analyze, control and reduce environmental impacts, and to operate with greater efficiency and control.

Additional program benefits include cost savings over time, improved bond ratings, reduced insurance premiums, and better community relations. An EMS integrates the environmental ethic into business operations, and environmental stewardship becomes part of the daily organizational responsibility.

An EMS is appropriate for organizations of varying size in public and private sectors. From start to finish, a two-year timeframe is suggested for the EMS implementation process. However, the process can be shortened or extended based upon the organizational culture and needs.

FTA transit participants utilized the 17 elements ISO 14001 International Standard Reference number ISO: 1996(E). Working definitions of the 17 elements are as follows:

1. **Environmental Policy**: Statement by the organization of its intentions and principles in relation to its overall environmental performance. The Environmental Policy is the driver for implementing and improving the organizations environmental management system so that it can maintain and potentially improve it environmental performance.
2. **Environmental Aspects**: Elements of an organization's activities, products and services that can interact with the environment. Consideration should be given to normal and abnormal operations within the organization and to potential emergency conditions.

3. **Legal and Other Requirements**: Element is heavily focused on all regulatory obligations legislated by local, state and federal environmental enforcement agencies as well as other requirements that subscribe to industry codes of practice and agreements with public authorities.
4. **Objectives and Targets**: Element requires that once the agency's aspects have been deemed significant, to set objectives and targets that are measurable and in concert with the Environmental Policy.
5. **Environmental Management Programs (EMP)**: Element requires organization to establish a program to complete Objectives and Targets for each of its significant aspects as well as the means and time frame by which they are to be achieved.
6. **Structure and Responsibility**: Element requires organization to define, document and communicate roles, responsibility and authorities to implement the EMS. Roles refer to appointing specific management representative(s) who have responsibility for ensuring the ongoing implementation of the EMS as well as reporting the performance of the EMS to top management.
7. **Training, Awareness and Competence**: Element requires the identification of training needs and requires that all personnel whose work may impact the environment, in regards to their environmental duties and activities, receive specific and appropriate training.
8. **Communication**: Element requires organization to insure that procedures be established and maintained that assure good internal communication between the various levels and functions of the organization as well as receiving, documenting and responding to relevant communications from external interested parties.
9. **Documentation**: Element requires the agency to establish and maintain information in paper or electronic format to describe the management system.
10. **Document Control**: Organization is required to establish and maintain procedures for controlling all documents and assure that documents can be located, periodically reviewed, revised and approved by authorized personnel.
11. **Operational Control**: Element requires the establishment and maintenance of documented procedures to cover operations where the absence of procedures could lead to deviations from the environmental policy and the objectives and targets.
12. **Emergency Preparedness and Response:** Element requires the establishment and maintenance of procedures to identify potential for and response to accidents and emergency situations and periodically test the procedures where practicable.
13. **Monitoring and Measurement:** The organization establishes and maintains documented procedures to monitor and measure the key characteristics of its operations and activities that have a significant impact on the environment. The organization commits to monitor the calibration and maintenance of its equipment and ensures that procedures are in place that requires periodic evaluation of compliance with environmental legislation.
14. **Nonconformance, Corrective and Preventive action:** The organization establishes and maintains procedures for defining responsibility and authority for handling and investigating nonconformance and taking action to mitigate any impacts caused. Additionally, the element requires a further review to identify preventive actions to eliminate nonconformances.

15. **Records:** The organization is required to develop procedures that will establish and maintain the identification, maintenance and disposition of environmental records, training records, and the results of audits and reviews.
16. **EMS Audits:** The internal EMS audit evaluates the adequacy of documents, procedures, programs, and records and reviews the implementation, integration, and consistency of procedures and programs at that moment. It looks at the organization's planned activities for meeting its objectives and targets, its control of significant aspects, and pollution prevention accomplishments. It looks for evidence of management's commitment to the environmental policy and the EMS, and awareness and competency among employees. Finally the audit has a look at how the organization is fulfilling its commitment to continual improvement. Results of internal audits are ***part of,*** not a substitute for the management review process.
17. **Management Review:** The EMS core team ensures that the management review addresses the possible need for changes to policies, objectives and other element of the EMS, in light of EMS audit results, changing circumstances and the commitment to continual improvement. Senior management must be informed on the progress of objectives and targets as well as results of internal EMS audits. Senior management will then review the recommendations from the EMS Team for suitability, adequacy and effectiveness. The frequency of Management Review is recommended quarterly during the first two years of the EMS implementation to keep Senior Management informed and engaged with the process of setting and tracking progress on the Objectives, Targets and Programs and monitoring the results of Audits.

Four Phases of EMS

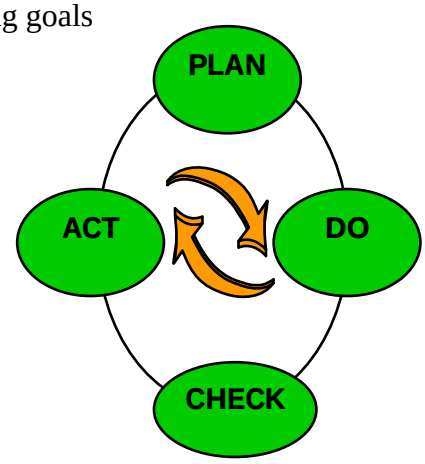
A four-phased implementation process (four workshop series) was utilized and ultimately provided a successful model for manageable implementation of the EMS elements/requirements. Most EMS are built on the "Plan, Do, Check, Act" model. This model leads to continual improvement based upon:

PLAN
Planning, including identifying environmental aspects and establishing goals

DO
Implementing, including training and operational controls
Framework

CHECK
Checking, including monitoring and corrective action

ACT
Reviewing, including progress reviews and acting to make needed changes to the EMS



Benefits of EMS

EMS can result in both business and environmental benefits. For example, an EMS may help you:

- Improve environmental performance;
- Enhance compliance;
- Prevent pollution and conserve resources;
- Reduce/mitigate risks;
- Increase efficiency;
- Reduce costs;
- Enhance employee morale and possibly enhance recruitment of new employees;
- Enhance image with public, regulators, lenders, investors; and
- Achieve/improve employee awareness of environmental issues and responsibilities.

Appendix "A" contains 10 participant transit agency case studies. The case studies delineate in detail the individual accrued benefits documented by the participant transit agencies.

Resource Commitments

The Federal Transit Agency required COTA to track the financial and human resources committed by each the 10 participating transit agencies. Each agency submitted an individual case study (**Appendix B**). Resources tracked throughout the project period included:

- Number of direct labor hours committed to EMS implementation;
- Dollar value of direct labor;
- Travel related expenses; and
- Consultant expenses.

Transit Agency	Direct Labor Hours	Payroll Value
Massachusetts Bay Transportation Authority		
Core Team Hours	2610	$ 163,600
Sub Team Hours	2532	
Other Personnel Hours	95	
Consultant/Training Hours	695	52,194
Travel to EMS Training and supplies		50,617
Washington Metropolitan Area Transit Authority		
Core Team Hours	1535	150,670
Sub Team Hours	223	
Employee Training Hours	560	
Consultant Hours	670	48,127
Hampton Roads Transit, VA		
Core Team Hours	*789	not available
Transit Authority of River City, KY		
Core Team Hours	615	19,875
Bay Area Rapid Transit, CA		
Core Team Hours	1127	145,655
Staff Support Hours	2040	
Utah Transit Authority, UT		
Core Team Hours	1549	72,946
Other Hours	279	
Sound Transit, WA		
Core Team Hours	2715	* 233,447
Sub Team Hours	635	includes travel costs/time
Community Transit, WA		
Core Team Hours	1926	77,740
Sub Team Hours	114	
City of Phoenix, AZ		
Core Team and Sub Team Hours	2530	101,700
City of Tucson, AZ		
Internal Labor	2631	$ 92,085

Travel		
Other		1200
Average Per Participant	**Average Direct Labor Hours 2,635 hours**	**Average Payroll Value $126,125**

Direct Labor hours listed above were tracked by each agency on a quarterly basis. In each case, direct labor hours can be placed in two categories.

- **Category I Direct Labor**: Staff hours for EMS Core Team dedicated to learning, practicing and implementing the 17 elements of the ISO 14001 EMS Standards. Prior to entry in the FTA sponsored EMS initiative, most of the 10 transit organizations had little formal knowledge of the ISO 14001 Environmental Management System.

Transit agencies spent significant time learning, practicing and implementing:

1. The ISO 14001 Standard
2. Conducting comprehensive Legal and Other research
3. Ranking and selecting 4-6 Significant Aspects
4. Creating policies and procedures for each of the 17 elements
5. Creating Environmental Management Programs or work procedures to guide and measure their significant aspects, and implementing a formal system of documentation and document control

- **Category II Direct Labor**: Training directed at the line employee work force plays a significant role in the long term sustainability of the EMS. Transit agencies sponsored considerable training to familiarize both existing and new employees on the purpose and benefits of an EMS. Agencies tracked specific EMS training hours related to their "Objectives and Targets" and Environmental Management Programs. Transit agencies were already obligated by state and federal law to properly train their workforce on environment related legal obligations. Because this was training that already should be part of their annual training plan, the hours in this category may have inflated the overall EMS implementation direct labor hours.

Keys to Successful Implementation

EMS Core Team: FTA required each team to be organized around a minimum of 4 persons. A number of agencies created core teams made of six to eight individuals. Having sufficient manpower to learn the ISO elements, practice them on transit specific case studies and then to return home to implement after each workshop was critical to the success of the EMS.

Virginia Tech identified a skill set for an **ideal EMS team** and guided the FTA teams to create their teams based on:

Top Management Representative: This person should be top management's representative and have the authority and responsibility to ensure that the EMS is fully implemented through the Virginia Tech program. This team member would travel to and

participate in all four of the Virginia Tech workshops with the three individuals recommended below.

Environmental Champion*:* This person should be:

- An excellent communicator;
- A respected leader;
- Technically competent regarding EMS;
- Experienced at delegation
- Experienced at implementing change;
- Knowledgeable at conducting systems audits; and
- Capable of transferring information learned and developed at the workshops back to the facility/department.

Operations Manager, Superintendent or Supervisor: This person should have the following characteristics:

- Strong knowledge of all facility/department operations;
- Respected by the organization;
- Possess strong communication skills;
- Effective at delegation;
- Exhibit leadership characteristics; and
- Possess the management authority to implement changes as necessary.

Administrative Person: This person should have the following characteristics:

- Excellent computer skills;
- Aptitude to learn software;
- Be organized and project oriented;
- Be diligent;
- Portray effective communication skills;
- Aptitude for conducting audits; and
- Have an environmental interest.

Senior Management Support: The interest and support of senior management proved critical to the success of EMS implementation. FTA required a formal commitment by senior management to conduct a quarterly management review of the team's homework prior to returning to workshops 2-4. More importantly, FTA required the 10 transit agency senior management representatives to participate in an FTA conference call one week prior to workshops 2-4. Two categories of critical questions were asked:

1. Are you satisfied with the quality of instruction provided by Virginia Tech? Do you have any concerns or requests for change in the format of the program?
2. Is your team completing their assigned homework? Are you discussing barriers to EMS implementation and are you coaching them how to overcome barriers or if necessary, intervening on their behalf?

Objectives and Targets: FTA urged teams to select measurable objectives and to chart their progress based on valid baseline data. Relevant Objectives and Targets are critical to long term

success of the EMS. Senior Management discussed and approved this element at an early stage, and they tracked the progress of the steps necessary to achieve the objectives through quarterly management review sessions.

EMS Audits: Along with the above, auditing the progress of the EMS was absolutely necessary in insuring ongoing progress of the EMS. The results of the audit drive the continual improvement effort that is the centerpiece of EMS.

Management Review: Regular participation by Senior Management in the development and progress of the EMS is extremely important to its success. FTA required this effort as a condition of participation. Both COTA staff and FTA believe that s**enior management participation in management review was a crucial factor in the success of the participating agencies.**

Senior Management EMS Comments

Excerpts from individual transit agency case studies:

"The discipline required through the EMS process is critical to the successful implementation of this program. BART has always been environmentally aware, but EMS gives us the tools to set goals, monitor performance, and report results to the key decision makers at the agency."

John Mack, Executive Manager, Transit System Compliance, BART

♦♦♦

"*The FTA/ Virginia Tech approach in routinely involving me in performance reviews with the Team was an excellent motivator for me to get involved with the process and provide support as needed. I strongly recommend that future training sessions use this approach, and if possible, FTA should consider reconvening the teams of the recent session for a 'lessons learned' reunion in 12 to 18 months."*

Paul Oversier, Assistant General Manager, Operations BART

♦♦♦

"Community Transit is committed to protecting the environment. As responsible stewards of the public's resources, we are also committed to using cost effective management practices in our environmental programs."

The EMS program fits well into Community Transit's core values because it establishes clear priorities and sets realistic goals to provide a safe and clean workplace; it also adds to the quality of life for citizens in our community.

Our employees are proud to work here because of the outstanding service we provide, and that pride is evident in the care they take while doing their jobs. EMS is a strong tool to help our employees do their jobs well and it encourages everyone to contribute to our environmental stewardship obligation."

Joyce Olson, Chief Executive Officer, Community Transit

♦♦♦

"The EMS is one of my key strategic initiatives because it provides us with a disciplined framework for meeting our environmental responsibilities and allows us to continually improve our organizational performance."

Daniel A. Grabauskas, General Manager, Massachusetts Bay Transportation Authority

♦♦♦

"Since Sound Transit was created in 1996, our staff has hit the ground running to deliver projects that have both aggressive schedules and expectations. Our agency has grown in a very short time from having no dedicated environmental staff to a 6-person Environmental Compliance Division that provides environmental expertise during all phases of capital project development. It's been very challenging to take the time to address the "pro-active" side of managing the division while constantly reacting to the demand for environmental expertise and services. Although our agency has an excellent environmental record, we had been looking for ways to take our environmental program to the next level. When FTA offered technical training to develop an EMS, it provided the catalyst we needed to create some structure and institutional longevity. The other appeal of the EMS for us is that we didn't have to start developing something from scratch. The EMS provides us with a ready-made and internationally recognized program that can be tailored to our needs.

We took an innovative approach to EMS by applying it to our capital program rather than an operating facility. We feel that this EMS is vitally important to our agency, and CEO Joni Earl and I are absolutely committed to its successful implementation."

Vernon Stoner, Deputy CEO, Sound Transit

♦♦♦

"Strong environmental management makes 'green' sense but it also makes good business sense. TARC intends to treat this as seriously as we treat our other requirements, such as Affirmative Action and EEOC compliance. With funding tight and gas prices rising, it will be more essential than ever for TARC to cut costs and run efficiently. The EMS helps us move in that direction."

J. Barry Barker, Executive Director Transit Authority of River City

♦♦♦

"The Environmental Management System (EMS) is a lifestyle change we are integrating into our everyday approach of doing business. We are dedicated to incorporating the principals of EMS, and to improve our stewardship and reduce the impacts to our environments in all activities and services we provide."

George Caria, General Manager, Sun Tran

♦♦♦

"Utah Transit Authority is working to further develop its Environmental Management System and to be one of the first public transit agencies in the nation to become certified with the International Standards Organization's ISO 14001 principles. This is a proven, effective organizational tool that provides a framework for managing environmental responsibilities so they become more efficient and more integrated into our overall business operations. The EMS is a business management tool for any organization."

John Inglish, General Manager, UTA

♦♦♦

"Environmental management is an individual, as well as collective responsibility. The EMS is an effective tool for employees to use together to establish new goals and implement new programs to protect the community and the environment for future generations".

Debbie Cotton, Public Transit Department Director, City of Phoenix

♦♦♦

"The EMS is an effective 'grass roots' method for implementing WMATA's environmental policy and programs. The FTA/Virginia Tech assistance gave us the vehicle to move our policy from paper to a functioning program at the Greenbelt Yard."

Fred Goodine, Assistant General Manager
Department of Safety and Risk Protection, WMATA

Appendix "A"

Case Studies

Bay Area Rapid Transit **20**

Community Transit **29**

Hampton Roads Transit **40**

Massachusetts Bay Transportation Authority **48**

City of Phoenix, Public Transit Department **58**

Sound Transit **66**

Transit Authority of River City **76**

Department of Transportation – Sun Tran, City of Tucson **84**

Utah Transit Authority **94**

Washington Metropolitan Area Transit Authority **104**

San Francisco Bay Area Rapid Transit District (BART) Oakland, CA

Profile

The San Francisco Bay Area Rapid Transit District (BART) is a high-speed inter-city and metropolitan rail transit system. It consists of 43 stations and over 100 miles of trackway in four counties. It provides transit service to patrons in the Bay Area region including more than a hundred municipalities. BART is the backbone of the regional and local transportation network.

BART was born over 40 years ago when civic leaders of the Bay Area had the foresight to recognize the importance of preserving the environment of the Bay Area. In the 1957 final report of the San Francisco Bay Area Rapid Transit Commission, this concern was emphatically expressed by the following:

"If the Bay Area is to be preserved as a fine place to live and work, a regional transit system is essential to prevent total dependence to automobiles and freeways."

Today BART delivers over 300,000 daily riders. BART has become an essential part of the region's economy and quality of life.

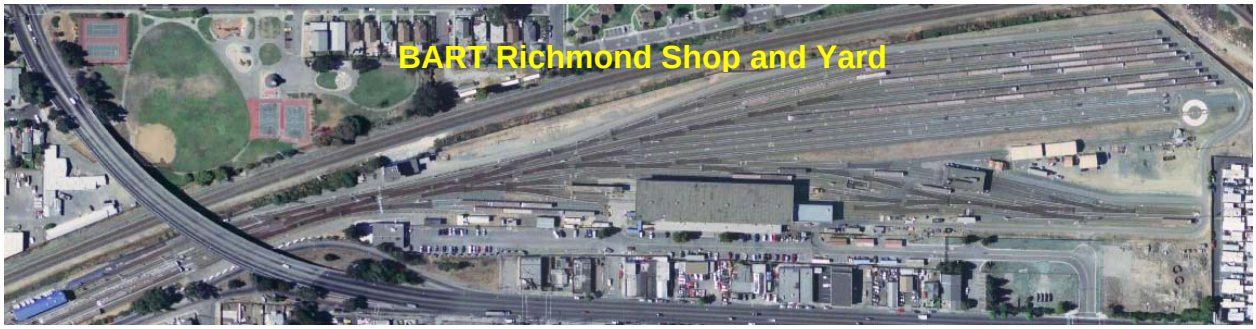
A nine member elected board governs BART. Each board member represents a geographical area within the three original counties of San Francisco, Alameda, and Contra Costa, which BART serves. A fourth county, San Mateo is served by special agreement. The Board sets the policy and direction for the agency. The General Manager, Chief Counsel, Treasurer/Controller, and District Secretary are appointed by the Board to carry out its direction and run the agency. BART employs approximately 3500 people.

BART's operating Budget for FY 2005 is $412 million. BART fare revenue contributes about 60%, with the remainder coming from a dedicated 3-county sales tax and a small property tax increment.

Fenceline

BART currently runs regional passenger rail service over five routes with a fleet size of 669 revenue vehicles. To support operations, the District has four yard and shop facilities: Concord, Richmond, Daly City, and Hayward. BART employs the "captive fleet" concept, in which under

normal circumstances, a given car is stored and maintained only by the yard and shop facility to which it is assigned. The BART EMS Team selected The Richmond Yard and Shop as the EMS Fenceline project site. Richmond is the largest, and busiest, of the BART yards with a fleet size of 220 vehicles and responsibility for 33% of the systems daily dispatches.



While the primary function of the yard and shop is to receive and dispatch revenue ready vehicles from and to the mainline, support operations include, vehicle maintenance, vehicle cleaning, track maintenance, train control maintenance, grounds keeping and administrative support. More than 600 employees report to the Richmond Yard.

Facilities supporting yard operations include:

A. Transportation Building – Headquarters for yard administrative functions.
B. Yard Control Tower – Center for management and control of train movement in the yard
C. Car Wash Building – Exterior Car washer.
D. Traction Power Substation and Gap Breaker Station – A fenced area containing electrical equipment supplying 1000 V dc power to the third rail system in the yard.
E. Employee Parking – lot sized for approximately 150 employees.
F. Storm Drain System – surrounding facility with discharge to San Francisco Bay.
G. Shop Facilities – Facilities for all maintenance activities related to the revenue vehicle fleet including; preventive maintenance, unscheduled repair, component or fleet modification, and accident repair. Support facilities include:
    - Main Repair Bay – pit and vehicle lift locations for repair activity.
    - Truck Repair Area –equipped for the repair of truck assemblies including suspension, braking, traction pickup, bearings, draft gear, and other components.
    - Body Repair Area –for the heavy repair of vehicle structural and body skin damages
    - Wheel Truing Facility –located as an annex to the main shop building.
    - Other shop areas include parts storage, battery storage, and machine and welding shop.
    - Blow Down Building – structure for power wash of vehicle underside and components.
    - Car Cleaner's Facility – A structure for dispatching cleaning crews and storage of cleaning supplies and equipment.

Core Team

The core team is made up of four members:

- Tian Feng, District Architect,
- James Dunn Chief Engineer, Maintenance and Engineering

- Tamar Allen, Chief Mechanical Officer, Rolling Stock and Shops, and
- Gary Jensen, Principal Environmental Engineer and lead for BART's EMS implementation.

Key Drivers for Adopting an EMS

The San Francisco Bay Area is a very environmentally conscious region. Politicians, citizens, and our own employees hold high expectations that BART will assume a leadership role in the preservation of the region's environment. In 2002, BART established its Sustainability Policy to guide the District in providing the Bay Area communities with resource efficient, high quality and affordable transit service while furthering the District's strong commitment to environmental preservation.

The Sustainability Policy establishes goals for sustainable practices in all major areas of BART's business; planning, access, design, construction, and operation and maintenance. As we began to explore methods of fulfilling our operational sustainability commitment, we found EMS to be a natural fit. EMS provided a formal management structure for identifying and tracking environmental impacts, opportunities for improvement, environmental performance, and organizational as well as individual responsibility and accountability.

Beyond external political pressures, BART needed the EMS program to harness employee environmental enthusiasm. Prior to adoption of an EMS policy, we were keenly aware of our deficiencies and in need of a mechanism for providing input and improvement. The EMS program has provided this mechanism and employees are seizing the opportunity.

Here at BART we recognize that environmental performance is the key to our legacy. Individually and collectively we want it to be a good legacy. Therefore, we are willing to find better ways to do business in an effort to make the world a better place for generations to come; to create a world where our children are free to swim in the water, dig in the dirt, breathe the air, and eat the fish.

Significant Aspects & Impacts

BART developed its aspects using teams representing each functional area of our maintenance and shops departments. After identifying aspects and impacts, the teams met with environmental staff to refine the lists and begin grading.


Significant Aspect – Aerosol Insecticide

Each aspect was evaluated using two matrices. The first, Environmental Factors, evaluated the scale, severity, probability, and duration of the impact. The second, Implementation Factors, evaluated legal exposure, operational impacts, public image, degree of change, and human factors. BART identified 80 aspects and selected 7 of them as significant aspects.

Aspect	**Undercar cleaning of revenue vehicles prior to maintenance**	**Policy Commitment**
Impact	Heavy metal contamination in runoff contributes to violations of wastewater discharge permit.	Pollution Prevention Regulatory Compliance
Objectives and Targets	Meet industrial waste discharge limits for metals in 100% of tests. Meet biochemical oxygen demand guidelines in 75% of tests.	

Environmental Management Programs

Source identification

Revise cleaning methods

- no chemical compounds
- no motor-brush cleaning in blowpit

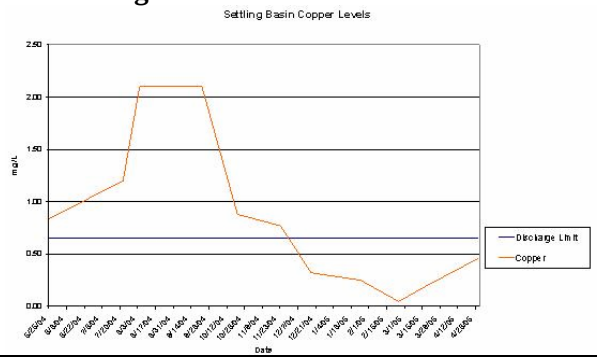
Increased maintenance

Operational Controls

Blowdown Procedure

Blowpit Cleanout Procedure

Monitoring and Measurement



Aspect	**Graffiti Removal using Aerosol Cleaners**	**Policy Commitment**
Impact	Discharge of volatile organic compounds to the air.	Pollution Prevention
Objectives and Targets	Reduce volatile organic compound emissions associated with graffiti removal by 25% by 6/30/05.	

Environmental Management Programs

Establish baseline usage

Identify Alternate Products

Establish procedures and controls

Track usage

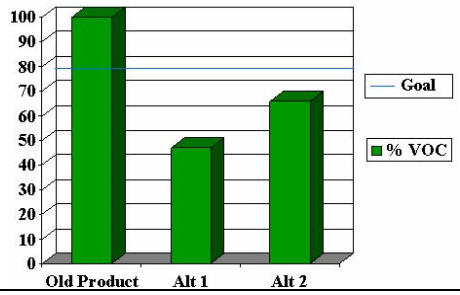
Operational Controls

Rail Vehicle Interior Cleaning Procedure

Aerosol Can Puncture Procedure

Monitoring and Measurement

VOC content of alternate cleaning compounds



Aspect	**Aerosol Insecticide Use from Flea Abatement Program**	**Policy Commitment**
Impact	Discharge of volatile organic compounds to the air.	Pollution Prevention
Objectives and Targets	Reduce volatile organic compound emissions associated with revenue vehicle flea bombing by 33% by 6/30/05.	

Environmental Management Programs

Establish baseline usage

Evaluate alternate de-flea applications

Establish procedures and controls

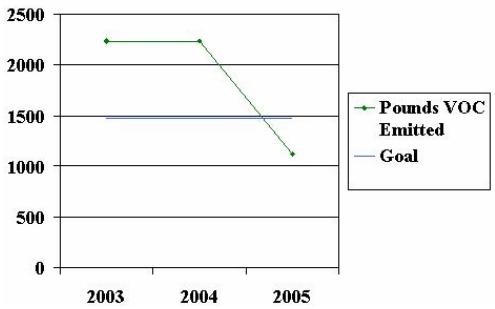
Track usage

Operational Controls

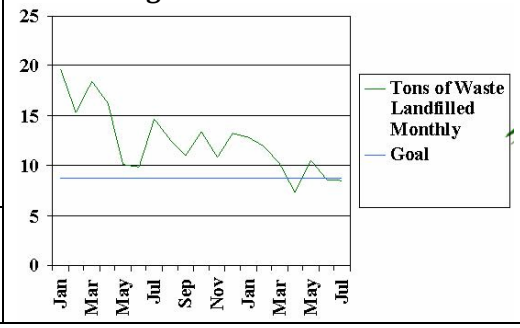
Rail Vehicle Interior Cleaning - Flea Abatement Program

Monitoring and Measurement

VOC emissions from flea-abatement per year.



Aspect	**Solid Waste Production**	**Policy Commitment**
Impact	Discarded materials take up valuable landfill space and pollute soil, air, and water.	Pollution Prevention Environmental Preservation Sustainability
Objectives and Targets	Establish a recycling program to reduce solid waste disposal to landfill by 50% after the first year.	

Environmental Management Programs	**Monitoring and Measurement**
Evaluate waste streams Identify alternatives to disposal Establish procedures Establish collection areas Track Progress	
Operational Controls Collection of Office and Shop Recyclables	

Aspect	**Disposal of Creosote Treated Wood Ties**	**Policy Commitment**
Impact	Discarded ties may be used improperly or disposed of as waste that takes up valuable landfill space and pollutes soil, air, and water	Pollution Prevention Environmental Preservation Sustainability
Objectives and Targets	Eliminate reclaimed creosote crossties from going to landfills by 12/31/05.	

Environmental Management Programs	**Monitoring and Measurement**
Establish tracking program Develop policy of recycling ties Establish procedures and controls Track and report tie disposal	Wheelabrator Shasta Energy Company selected for recycling ties for energy cogeneration. Transportation arrangements being finalized. 100% of ties will be recycled. Target on Track
Operational Controls Creosote Crosstie Disposal Procedure	

Aspect	**Hydraulic Oil Spills from On-rail Equipment**	**Policy Commitment**
Impact	Oil spills from on-rail equipment can result in pollution of soil and water.	Pollution Prevention Regulatory Compliance
Objectives and Targets	Procure necessary spill response supplies. Train all affected employees in spill procedures by 9/30/05.	

Environmental Management Programs	**Monitoring and Measurement**
Evaluate spill potential for each vehicle Develop spill response procedures Procure spill response equipment Conduct employee training	Spill response equipment has been procured and mounted on each vehicle with a significant spill potential. Spill procedures have been written. Training video is done and training is underway. Target on track.
Operational Controls On-rail Vehicle Spill Response Procedure	

Aspect	**Florescent Lamps and Electronic Waste**	**Policy Commitment**
Impact	Disposal of lamps and electronic waste to landfills can result in heavy metal pollution of soil and air.	Pollution Prevention Regulatory Compliance
Objectives and Targets	Recycle all salvaged materials from florescent and HID mercury vapor lamps and reduce electronic waste entering landfills by 80% by 12/1/05.	
Environmental Management Programs Develop procedure for handling and disposal of lamps and electronic waste. Select vendors to recycle electronic waste. Train employees on e-waste procedures. Track progress		**Monitoring and Measurement** Procedures have been established. Vendor has been selected and collection stations have been established. Developing metrics to track performance. Target on track.
Operational Controls Florescent Tube and Ballast Disposal Procedure		

Benefits of Adopting an EMS

BART has realized a number benefits from EMS over the course of our first year. They Include:

- Providing a mechanism for expanding BART's robust Sustainability Policy and Program to include daily operations.
- Communicating through our Board of Directors, to the public, BART's commitment to Environmental Sustainability
- Providing a forum for a new level of inter-departmental communication and cooperation. This has not only positively impacted our environmental performance, but has enhanced our ability to conduct our core business.
- Developing an excellent training mechanism, allowing for a single repeatable consistent message broadcast throughout the organization.
- Creating a structure that encourages and enables employee participation in environmental and work place process improvements.
- Elevating the priority of environmental performance and safety compliance at all levels of the organization. Problems tend to get immediate attention.
- Dramatically reducing VOC emissions, solid waste disposal and hydraulic spill contamination potential.

Resources

The number of hours associated with the development and fenceline implementation of BART's EMS programs is:

EMS Core Team	1127 hours
Staff Support	2040 hours
Labor Cost Total	$145,655 (through May 31, 2005)

Cost Savings and Avoidance

The management of several of our significant aspects has resulted in greater efficiency and corresponding cost savings. We have already put programs in place that will save the District

over $15,000 per year. Additional initiatives that we have underway will result in cost savings but we have not yet collected enough data to quantify the savings.

Aspect	Efficiency	Annual Savings
Aerosol Graffiti Removal	Reduced disposal costs by puncturing spent cans.	$4,770
Aerosol Insecticide Use	Savings due to reduced product use.	$2,700
Creosote Crosstie Disposal	Reduced cost for recycling compared to landfill.	$8,000

Additional cost savings come from the intangible costs that are avoided by having a high level of environmental compliance. Fines and penalties are avoided. Citizen suits that could have been filed are avoided. Both of these items have the potential to be a huge drain of District resources.

Next Steps

The EMS team will continue to refine the EMS process within the Richmond Shop and Yard with a focus on further expanding employee participation. Additionally, the EMS team will work to involve more BART departments in the EMS process. The team will specifically target the Procurement Department in an effort to establish EMS criteria for inclusion in purchase requisitions and service contracts. Finally, the EMS team will look for opportunities to expand EMS concepts developed within the fenceline to other parts of the organization, with the long-term goal of extending the EMS program to all areas of the District.

Management Commitment

BART's executive management has been committed to the EMS project from the beginning, providing the necessary resources to implement the program. In addition to top management support, the support and participation of key managers in the Maintenance and Engineering and Rolling Stock and Shops departments has been critical to achieving and maintaining the momentum we have enjoyed on this project.

"The FTA/ Virginia Tech approach in routinely involving me in performance reviews with the Team was an excellent motivator for me to get involved with the process and provide support as needed. I strongly recommend that future training sessions use this approach, and if possible, FTA should consider reconvening the teams of the recent session for a 'lessons learned' reunion in 12 to 18 months."

Paul Oversier
Assistant General Manager, Operations, BART

BART Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for Bay Area Rapid Transit (BART) – San Francisco, CA on August 8 and 9, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental Management System – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The BART EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **ninety-five percent (95%)**.

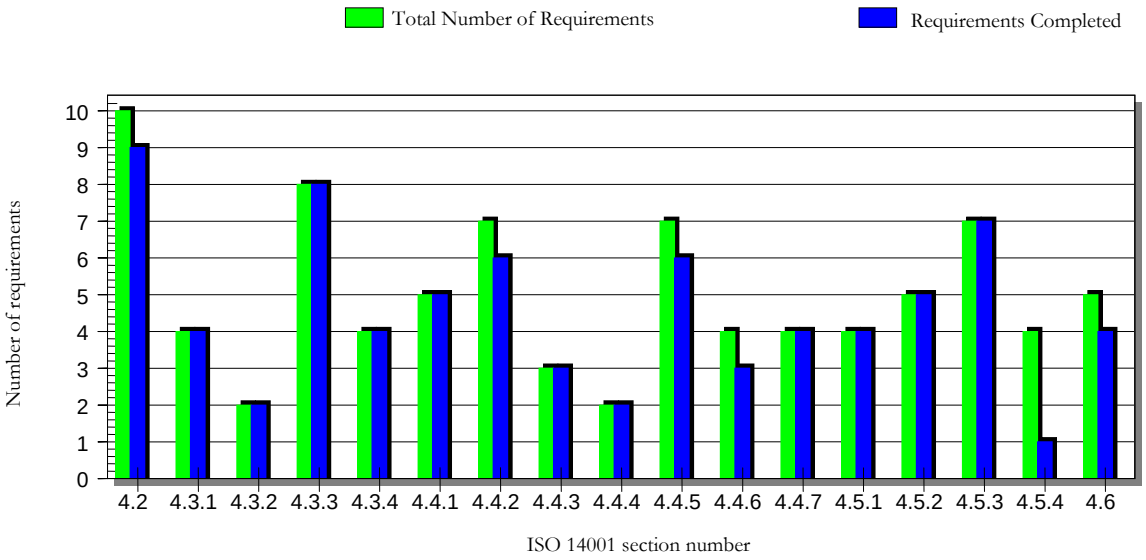
2. **Ninety-one percent (91%)** of the requirements were **"met."**

3. **Nine percent (9%)** of the requirements were **"partially met."**

Detailed scoring on next page.

BART EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		**Overall Score (%)**	**Met (%)**	**Partially Met (%)**	**Not Met (%)**	**Ref.**
4.2	Environmental Policy	95	90	10	-	4.2.10
4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	100	100	-	-	4.3.41
4.4.1	Structure & Responsibility	100	100	-	-	4.4.11
4.4.2	Training, Awareness & Competence	93	86	14	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	93	86	14	-	4.4.51
4.4.6	Operational Control	88	75	25	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	100	100	-	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	100	100	-	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	63	25	75	-	4.5.41
4.6	Management Review	90	80	20	-	4.6.10

Snohomish County, Washington

Profile

Community Transit is a full-service, public transportation provider, operating local service throughout Snohomish County, Washington and commuter service to Seattle and the University of Washington. Our services include fixed route transit, paratransit, vanpool, ride matching, and Sound Transit Express services to the Seattle metropolitan market. In 2004, approximately 9.5 million passenger trips were made throughout all services.

The Snohomish County Public Transportation Benefit Area (PTBA) encompasses approximately 1,300 square miles in the northwest section of Washington State and contains a diversity of land uses and population/employment densities. Community Transit is both a rural and urban transit service provider.

Currently, Community Transit operates 32 local bus routes, 31 commuter routes and Dial-A-Ride Transportation (DART) services in Snohomish County and south into neighboring King County. We also offer carpool matching and our successful vanpool program ranks as one of the largest in the nation.

In September 2001, voters approved an additional sales tax increase from .6% to .9%, effective January 1, 2002. With the voter-approved funding, Community Transit began growing again, restoring Sunday service in February 2002 and expanding service by 18 percent during 2003.

Fenceline

The fenceline for EMS development at Community Transit is the Diesel Fueling Operations at the Kasch Park Operating Base (KPOB), located at 2300 Kasch Park Road, Everett, Washington. Approximately 240 employees work out of KPOB, of which 180 are contract employees supporting the operation and maintenance of our commuter fixed route service. The other 60 employees work directly for Community Transit in Facilities Maintenance, Marketing, Vanpool,

Contracted Services, and Automotive Maintenance who services approximately 275 vanpool vehicles, and 92 support vehicles. There are two unions at the Kasch Park facility – International Association of Machinists (IAM) representing the mechanics, and the Amalgamated Transit Union (ATU) representing Facilities Maintenance, coach operators, customer service, and internal security. The facility operates 24/7/365 and just celebrated its 20th year of operation.

Diesel Fueling Operations include the following departments and areas:

1. **Diesel Fueling Operations**. This occurs at the fueling island in the center of the facility where Community Transit's contractor fuels transit buses.
2. **Diesel Fuel Delivery**. This constitutes outside fuel delivery contractors from the time they enter Community Transit property, fill the underground storage tanks with diesel fuel, clean-up as necessary, engage in preparations for emergency response, seek final delivery approval by Community Transit's contractor, and exit from the property.
3. **Underground Storage Tanks (UST)**. There are eight USTs at our Kasch Park tank, one 10,000 gallon lube oil tank, one 6,000 gallon antifreeze tank, one 6,000 gallon automatic transmission fluid tank, and one 6,000 gallon waste oil tank. The fenceline includes all maintenance, operation, and emergency response associated with these tanks.
4. **Bus Leaks in the Yard**. This incorporates all leaks – fuel, coolants, oils, or any liquids that could potentially cause a spill of any amount on the KPOB bus yard. The bus yard runoff drains to our oil-water separators, then to our underground detention tank and finally through our wetlands property.

Our goal for the tasks falling within the fenceline is to ensure compliance with our Environmental Policy Statement to minimize pollution and comply with all applicable environmental regulations, as well as to improve the quality of life for all of Community Transit's employees, contractors and the general public who are affected by our transportation services.

Core Team

Our current EMS Core Team consists of six members from throughout the company. Our senior executive representative is Community Transit's Director of Administration, Emmett Heath. The remainder of the EMS Core Team is made up of:

- Mike Burress, Risk Manager
- Bruce Bachtel, Manager of Facilities and Automotive Services
- Dan Jerome, Capital Facilities Planner
- Colleen Sather, Loss Control Coordinator
- Tom Huden, Facilities Journeyman

The make-up of the team has enabled us to create a program that encompasses all factors of environmental issues, from planning and permitting to operation, monitoring, and inspecting.

Key Drivers for adopting an EMS

We have identified the following key drivers for Community Transit's development of an EMS program:

- To be an environmental leader in the transit industry
- To improve our environmental awareness
- To elevate our current environmental processes and programs
- To gain commitment from our employees and contractors on environmental issues
- To show the community our support for environmental issues
- To develop a fully documented environmental program for the benefit of the future of Community Transit
- To capitalize on an FTA-sponsored framework for developing an EMS

Significant Aspects and Impacts

Community Transit's environmental impacts include storm water, industrial wastewater, ground water, air, and noise. Environmental aspects are defined as activities, products or services that can affect one or more environmental impact. After a thorough survey of Community Transit's KPOB facility, many environmental aspects were identified. A numerical weighting system was used to determine how significant each aspect was regarding its potential for negatively or positively affecting each environmental impact.

For the initial development of Community Transit's EMS program, the four most significant aspects based upon numerical priorities became our fenceline.

- Diesel fueling operations
- Diesel product delivery
- Diesel underground storage
- Bus leaks in the yard

The remainder of our list of highest priority aspects to review, evaluate and recommend steps for improvement is included later in this report in the *Beyond Current Fenceline* section.

Objective and Targets

The objectives and targets for the significant aspects we are currently managing are listed in the table below; along with the process we will use to evaluate our success.

Significant Aspect	**Diesel Fueling Operations**
Policy Commitment:	Pollution prevention
Objective:	Improve training and procedures to reduce potential for diesel spills

Target(s) and Date(s):	Zero reportable spills Reduce non-reportable diesel spills in 2005 by 10% over 2003-2004 numbers
Performance Indicator(s):	Number of reported or observed spills
Evaluation Process:	Compare 2005 data with 2003–2004 data to determine if the increased awareness due to the training and procedures directly impacted the difference, or if we encouraged more accurate reporting of spills

STATUS: Spill Prevention Procedure updated; 100% of fuelers trained on the procedure; created and implemented a spill log for tracking spills; baseline for spills in 2003-2004 established.

Significant Aspect	**Diesel Product Delivery**
Policy Commitment:	Pollution Prevention, waste minimization
Objective:	Reduce potential for product delivery errors and potential for product delivery spills
Target(s) and Date(s):	Zero product delivery errors Zero storm water permit violations Implement QC procedures and Standard Operating Procedures (SOPs) for fuel delivery by 2006 contract
Performance Indicator(s):	Number of spills during delivery, number of product delivery errors
Evaluation Process:	Implement procedure to inspect area around truck after delivery, track number of leaks or spills

STATUS: All tank delivery ports labeled; established agreement with fuel delivery vendor to implement our Standard Operating Procedure for spill prevention during delivery; vendor issued memo to all employees requiring these new procedures.

Significant Aspect	**Diesel Underground Storage**
Policy Commitment:	Pollution Prevention
Objective:	Eliminate potential for ground contamination from underground storage tanks
Target(s) and Date(s):	Increase understanding of operation of monitoring system by Jan. 31, 2006 Establish annual training on Veeder-Root monitoring system by Jan. 31, 2006 Establish and implement reporting procedures for underground

Performance Indicator(s):	storage tank monitoring system by Jan. 31, 2006 Timely reporting of alarms, corrective action
Evaluation Process:	Generation of monthly in-tank leak report, timeliness in reporting and responding to alarms, routine inspection to ensure alarms are reported

STATUS: Received training from vendor on Veeder-Root monitoring system; corrective action plan for deficiencies prepared and being implemented; drafted procedure for inspection and response to alarms; need to complete training for affected employees.

Significant Aspect	**Bus Leaks in Yard**
Policy Commitment:	Pollution Prevention
Objective:	Reduce bus leaks in yard
Target(s) and Date(s):	Develop daily inspection procedures by July 31, 2004 Reduce number of bus leaks in yard by 10% in 7/1/05 – 6/30/06 over 7/1/04 – 6/30/05 data Conduct training on proper clean-up of spills by Oct. 31, 2005
Performance Indicator(s):	Evidence of bus leaks and reportable spills Compare 7/1/05 – 6/30/06 data with 7/1/04 – 6/30/04 data
Evaluation Process:	

STATUS: Daily inspection procedure established June, 2004; baseline established; training outline prepared; need to complete training.

Benefits of Adopting an EMS

Community Transit has seen the following benefits within the first year:

- Increased awareness of environmental issues with sub-contractor through training and process improvements.
- Involved other departments within Community Transit to assist and partner in the development of our EMS program.
- Developed a documented process for managing our environmental issues.
- The Board of Directors has adopted an EMS Policy which demonstrates to the general community our environmental commitment.
- Learned from numerous other transit and public agencies how to improve our environmental quality.
- Eliminated “phantom” oil spills in our storm water and industrial wastewater because everyone is more aware of the importance of working together to prevent spills, to maintain equipment better, and to report and properly clean-up spills immediately if they do occur.

Resources

Resources used for program development (Feb. 2004 to Aug. 2005) are as follows:

	Hours	Labor Costs
Core Team	2,351	$91,423
Sub-Teams	154	$4,192

In addition to program development, we have implemented specific training and daily inspection procedures. The time and labor costs for these activities are not included in the numbers above.

Cost Savings or Avoidance

Due to the implementation of our EMS, we anticipate cost avoidance savings in three categories:

1. Product delivery
   In years past, vendors have delivered the wrong product to the underground storage tanks within our fenceline, resulting in wasted fuel and product contamination, and cleanup costs of approximately $18,000 for labor and disposal per instance. To prevent this from occurring, we have labeled the delivery ports for each tank and worked with the vendor to standardized and implement best practices for fuel delivery. Additionally, we inspect the delivery ports each month to ensure they remain correctly labeled.

2. Spill Cleanup
   Historically, we have averaged 3 major diesel spills (over 1 gallon) within our fenceline from fueling operations per year. The past year, we had two major spills. Due to the implementation of our EMS including increased awareness and additional training, the spills were handled more expeditiously, resulting in proper cleanup prior to the spills reaching the wastewater system. The decreased number and severity of the spills has resulted in a savings of over $2,000, as well as eliminating the potential for fines from the regulating agency of up to $1,000 per instance.

3. Groundwater and soil contamination
   Community Transit had a major remediation due to leaking lines of our underground storage tanks in 1990, which went unnoticed for a significant period of time, resulting in extensive soil contamination and significant cleanup costs in excess of 1.5 million dollars. The tanks and lines were replaced with double walled tanks and a monitoring system. Through the EMS, we have developed daily, weekly, and monthly inspections along with providing training and notification procedures of any inspection failure or alarms from the monitoring system. Due to the increased training and inspections, should we experience any problems with the tanks or lines, they will be detected and remedied immediately. We believe that savings of this nature cannot be quantified, but evaluated instead as a good business practice.

Next Steps

We have completed the development of our EMS; now we are focusing on continual improvement. To ensure that our EMS continues to be up to date and as effective as it can be, we are planning to perform self-audit assessments annually. We will use these assessments to track progress, incorporate changes, and expand the fenceline to other Community Transit properties. We are working on a transition plan to complete our work plan and expand the EMS to other activities that contribute to our overall environmental footprint.

The EMS Core Team is working with sub-teams throughout the company to further the development and implementation of our EMS. We are working with the Purchasing Department to include an environmental supplement in each RFP to ensure environmental impacts are addressed by subcontractors. The Marketing Department is developing an EMS General Awareness Video which will be shown during new employee orientation and refresher training. We worked with Marketing to produce a poster campaign to increase employee awareness about our EMS. We worked with our Public Information Officer to produce other forms of communication for employees and other community outreach projects. Our Information Technology Department has included the EMS on both our internal and external websites.

In addition to the on-going development and implementation, we have identified the following aspects as high priority items to be evaluated in the up-coming months and years.

Future Work Plan: Highest Priority Items

Aspect Issue	Problem	Solutions: Processes/Procedures
Soaps and detergents	Potential storm water contamination and harsh chemical usage	Evaluate secondary containment for drums
		Evaluate "greener" soaps
Oil and waste oil	Potential groundwater contamination and opportunity for better use of natural resources	Evaluate use of recycled oil
		Evaluate containment and spill procedures
		Evaluate filtration for storm water
Hydraulic fluid	Potential groundwater contamination	Develop inspection process for early detection and spill prevention
Tires	Zinc in the storm water	Evaluate covered storage for surplus tires
Brake dust	Air quality (heavy metals)	Evaluate options
Gasoline	Potential groundwater, storm water or air quality contamination	Evaluate conditions and prevention measures
Antifreeze and waste antifreeze	Potential groundwater contamination	Evaluate conditions and prevention measures

EBS pump station	Potential storm water contamination	Develop inspection and prevention procedures for pump and sump
Steam cleaning	Potential wastewater contamination (high pH)	Evaluate alternatives and procedures for chemical use
Bus wash	Potential wastewater contamination (high pH)	Evaluate alternatives for chemical use
Misc. chemicals/ aerosols	Potential air quality contamination, worker safety	Evaluate vapor recovery system
		Evaluate alternatives and procedures for chemicals used
Contractor cleaning chemicals for buses	Potential storm water, wastewater contamination	Evaluate chemicals used and procedures
Shop floor cleaning	Potential wastewater contamination	Evaluate chemicals used and procedures
Paint booth	Potential air quality contamination	Evaluate filtration and inspection procedures
Carbon monoxide	Potential air quality contamination	Evaluate fuels, filtration and preventative maintenance procedures
Refrigerants	Potential air quality contamination	Evaluate procedures
Acetylene/ oxygen tanks	Potential air quality contamination	Evaluate inspection and operational procedures
Propane	Potential air quality contamination	Evaluate inspection and operational procedures
Batteries	Potential air quality contamination, worker safety	Evaluate inspection and operational procedures

Management Commitment

A key factor to the success of our EMS has been the support and active participation of our executive leadership. The Chair of the Board and our Chief Executive Officer both signed our Environmental Policy Statement, ensuring that our EMS makes business sense for the future, as it adds to the quality of life for citizens in our community, and helps quantify and document our improvements, cost savings and benefits to our environment. Because of the support of our Executive Team, we have been able to utilize the expertise of other departments, including Contracted Services, Purchasing, Information Technology, Public Affairs and Marketing, and Records Management in the development of procedures and work products that support our EMS Policy.

"Community Transit is committed to protecting the environment. As responsible stewards of the public's resources, we are also committed to using cost effective management practices in our environmental programs.

The EMS program fits well into Community Transit's core values because it establishes clear priorities and sets realistic goals to provide a safe and clean workplace; it also adds to the quality of life for citizens in our community.

Our employees are proud to work here because of the outstanding service we provide, and that pride is evident in the care they take while doing their jobs. EMS is a strong tool to help our employees do their jobs well and it encourages everyone to contribute to our environmental stewardship obligation".

Joyce Olson
Chief Executive Officer
Community Transit

Community Transit Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for Community Transit on September 14 and 15, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental management system – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The Community Transit EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **ninety-five percent (95%)**.

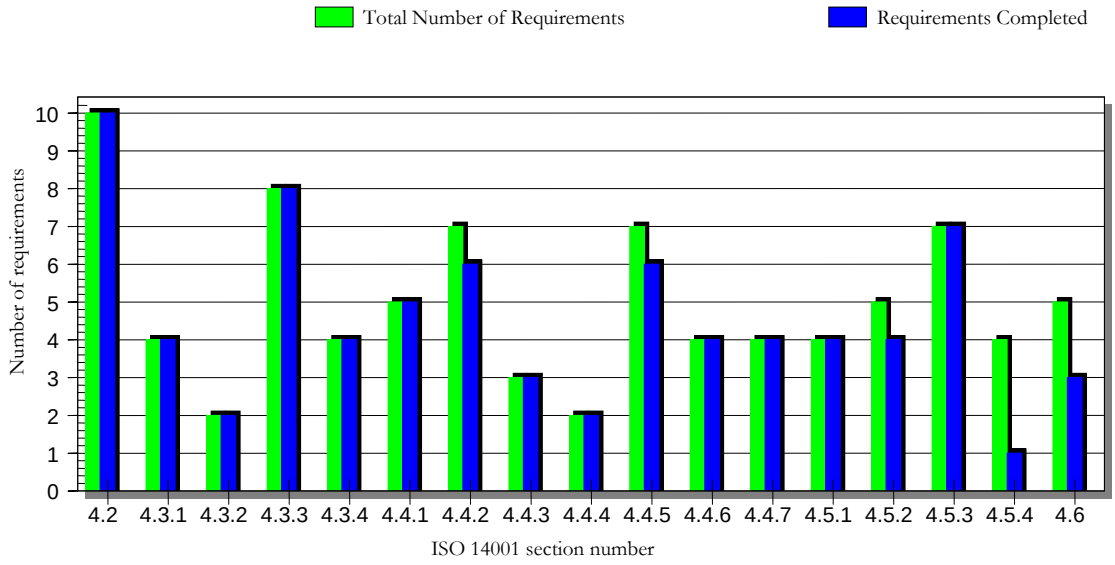
2. **Ninety-one percent (91%)** of the requirements were **"met."**

3. **Nine percent (9%)** of the requirements were **"partially met."**

Detailed scoring on next page.

Community Transit EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		Overall Score (%)	Met (%)	Partially Met (%)	Not Met (%)	Ref.
4.2	Environmental Policy	100	100	-	-	4.2.10
4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	100	100	-	-	4.3.41
4.4.1	Structure & Responsibility	100	100	-	-	4.4.11
4.4.2	Training, Awareness & Competence	93	86	14	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	93	86	14	-	4.4.51
4.4.6	Operational Control	100	100	-	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	100	100	-	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	90	80	20	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	63	25	75	-	4.5.41
4.6	Management Review	80	60	40	-	4.6.10

Hampton, Virginia

Profile

The Transportation District Commission of Hampton Roads (operating as Hampton Roads Transit - HRT) is an independent political subdivision of the Commonwealth of Virginia authorized by the Transportation District Act of 1964, Code of Virginia. HRT is tasked to plan, develop, own, improve, repair, maintain, operate, and manage a transit system in the Hampton Roads regional area of southeastern Virginia. HRT operates in the (7) seven cities of Hampton, Newport News, Virginia Beach, Chesapeake, Norfolk, Portsmouth and Suffolk comprising a service area population of 1.3 million, and over 369 square miles of urban service area.

HRT provides all public transportation services in Hampton Roads in the form of a fixed route bus fleet of 340 vehicles; 97 Para-transit (ADA) vehicles; 3-river passenger ferries; 48 carpool/vanpool stands, and other transportation services. The HRT-EMS will be incorporated into these existing, plus all new services, including upcoming LRT and BRT as they are developed.

Initial EMS Project Fenceline

The Initial EMS Fenceline for HRT is the HQ Maintenance and Operations Facility, located at 3400 Victoria Blvd., Hampton, VA. Including the following specific facility areas and equipment:

1. *Fueling Islands and Daily Service Buildings (DSB)* where HRT trained employees to fuel the bus fleet, service vehicles and non-revenue fleet.

2. *Bus Wash Facilities* where HRT employees operate the automatic bus wash equipment including waste wash water-recycling system.

3. *Diesel Fuel Delivery* and Storage where a local distributor delivers over 1.2 mil. gallons in diesel fuel and 180,000 gallons of gasoline annually.

4. *Underground Storage Tanks (UST)* including 2 diesel tanks with a capacity of 24,000 gallons plus an 8,000 gal gasoline tank.

5. *Oil / Water Separators* for storm water runoff retention, processing 50 gallons per hour.

6. *Hydraulic Lifts* in the shop with 8 lift bays.

7. *Bus Leaks in the Yard* managed via active spill response team of trained and dedicated employees.

The goal of these Fenceline Tasks is for HRT to actively manage and mitigate pollution and ultimately be good stewards of the environment while setting the best example as a good corporate partner with local, state, and federal agencies and environmental organizations.

Core Team

The HRT EMS Core Team is composed of four members from various departments within the company plus an Environmental Manager from one of the sponsoring / commission member cities. The team is led by our COO / Vice-President of Operations, along with the Manager of Operations Analyst, the Risk Manager, a Development Program Project Manager plus the aforementioned environmental representative from the City of Chesapeake, Virginia. With this Team, we are able to affect, control, document, manage and incorporate all aspects of an EMS Program into project planning, development, engineering, facility management, equipment monitoring & inspection, and fleet service / operations.

Key Drivers EMS Program: Partnerships and Ownership

Key drivers for EMS success are the development of partnerships with other environmental agencies as well as public entities that share our ownership concerns for keeping our regional environment clean and healthy. These partnerships and our memberships include:

- HRT is a member and sponsor of the *Elizabeth River Project*, whose mission is to preserve and protect the Elizabeth River running through the Hampton Roads region. HRT is vested in that our passenger ferry service travels many hundreds of trips weekly between Downtown Norfolk and Downtown Portsmouth using the Elizabeth River. Our Families recreate on this river, so we have an interest in her long-term viability and vitality.

- Hampton Roads Transit is a partner agency with the Hampton Roads Sanitation District (HRSD) and has been the recipient of the *"Gold Pretreatment Excellence Award in 2004"*. Recipients of this award have demonstrated a significant regional commitment to environmental excellence in maintaining a healthy Chesapeake Bay estuary system.

- HRT is in partnership with the *Chesapeake Bay Foundation*, an organization committed to implementing regional pollution control and mitigation programs affecting the water quality of the entire Chesapeake Bay estuary system.

- *HRT is an FTA Sponsored Participant* and member agency working towards the requirements of the Second EMS Initiative for Government Entities

- HRT is a pledge signatory of the *UITP Charter on Sustainable Development* with intent to reach full signatory status in the next few years.

Hampton Roads Transit is also committed to complete the following specific steps toward sustainable development:

- Establishing an EMS that complies with all applicable environmental legislation, regulations, internal requirements, and United States Federal Transit Administration standards.

- The EMS system will allow our organization to set specific environmental goals for operations and measure performance in achieving such goals, and is based on the 14001 Standard of the International Organization for Standardization (ISO).

- This EMS policy will be reviewed annually, documented and communicated to all Hampton Roads Transit employees and to the public.

- Commitment towards identifying and implementing environmentally sound practices of pollution prevention, reuse, recycling and proper disposal methods, such as:

  (a) Maintain commitment to alternative fuel powered means of transportation (i.e. our electric buses and natural gas powered ferries),

  (b) Maintain our Transportation Demand Management program known as TRAFFIX which provides travel alternatives to the single occupant vehicle including, car and vanpooling, express HOV lane bus service, ride matching, Bike-to-Bus programs, and other programs geared to mitigate vehicle congestion and improve air quality, and

  (c) Implement a number of new commuter and express transit services including BRT and LRT Services to address the escalating traffic congestion and air quality problems in the region.

- Dedicated to educating and training our employees to improve environmental performance and increase their awareness of environmental issues; educating our business partners on HRT's Environmental Management System; soliciting employee input for creating viable operational controls and for defining environmental roles and responsibilities for incorporation into existing work activities.

Significant Aspects and Impacts

Implementation of the ***initial phase*** of the EMS Program will be confined to the operations and maintenance areas of the HRT Headquarters facility. The environmental significant aspects and impacts to be controlled, monitored, managed and documented are:

1). Vehicle Parking Lot Storm-Water Runoff,
2). Vehicle Engine Air Emissions Control, and
3). Chemical Leaks and Spills Control and Abatement.

To the result of an immediate impact and mitigation of the 3 Significant Aspects, HRT has initiated a Program to inspect and Repair the entire 114-vehicle tripper fleet within the initial Fenceline Area. Via the process of Work Orders for Preventative Maintenance, the 1st step is to thoroughly steam-clean engines, transmissions and undercarriage while capturing the waste water with a oil / water separator. The process continues with a full detail and documentation of a close vehicle inspection for leaks of oil, coolant refrigerant, hydraulic fluid, brake fluid and other liquids. Once any leaks are identified and repaired, air emissions are then measured and further repairs ordered as needed. The Inspection process requires at minimum 2 hours per vehicle, even if no shop repairs or general serviceability are needed. This Fenceline Fleet Inspection and Repair Program will be completed by September 1, 2005.

The following List of Aspects/Issues is for future review and mitigation by the EMS Core Team:

Aspects Issue	Problem	Solutions Processes/Procedure
Increased computer disposal	Mercury & silver contamination	I.T. Awareness training & proper disposal
Hazardous Waste disposal	Ground water contamination	Evaluate Training
Mold fungi within buildings	Sick building syndrome	Regular Inspections
Leaks of CFC's in heating, A/C systems (HVAC)	Atmosphere Ozone Depletion	Regular Inspections
Bio-hazards, body fluids, blood, etc.	HIV, hepatitis exposures, etc.	Evaluate and Update Operator Training & Awareness
Trash & dirt accumulation	Soil, surface, & groundwater contamination	Regular Inspections
Oily rags & soiled uniforms	Soil, surface, & groundwater contamination	Proper disposal
Paints, thinners, fillers disposal	Air, soil, surface and ground water	Awareness training & proper disposal
Scrap metal & metal debris	Soil, surface & ground water pollution associated w/land filling	Awareness training & proper disposal

Objectives and Targets

Objective	Target	Evaluation Process
Prevent pollutants from entering the storm drain system	Immediate cleanup of leaks & spills; sweeping of parking lot; scrub parking lot	Daily visual check of parking lot; monthly visual inspection of storm drain catch basin; monthly grab sample and visual inspection of runoff; favorable DEQ audit
Minimize air pollution emissions from fleet engines	Purchase engines & sub-components that are compliant with regulatory requirements; inspections & engine tune-ups during PMs; alternative fuels usage	100 % of OEM & aftermarket components meet required emission regs; supervisory review of all PM work orders; agency will participate in regional environmental initiatives
Reduce occurrence/severity of fleet leaks and spills	Maintenance supervisory review of all preventive maintenance work orders as they are completed; operators pre & post trip inspection of bus	Maintenance supervisory review of all preventive maintenance work orders to ensure inspections and parts replacement are completed as needed; training for operators on proper completion of vehicle condition reports

Benefits of Adopting and Applying an EMS

There have been numerous important benefits to HRT from adopting an EMS. First, bringing various departments together to address our significant environmental aspects has created an overall enhanced awareness of environmental issues and has fostered better communication between departments, which will continue well past the EMS development process into long-term benefit. Next, enlisting cooperation from all levels of the organization within the Fenceline has allowed everyone to take ownership of the EMS Program and everyone then strives to make it work to the most benefit. Most importantly, the EMS Program has facilitated HRT becoming a better steward of the natural environment. This benefits the entire community and Eco-System.

The success of this EMS program will be measured in several ways:

- Stakeholder feedback
- Employee interest/feedback
- Visual improvements (i.e. bus emissions, storm water quality)
- Improved housekeeping

Additionally, the EMS Communications Program will have the following measurable goals,

- Expressions of interest from employees and external individuals in our program.
- The number of hits on the EMS page of the HRT website.

- Periodic surveys conducted among employees in general about HRT EMS communications.
- When a "Call to Action" is included in the information request, we will track and count the number of responses we receive to the call, and respond appropriately.

Resources

	Hours	Labor Costs
Core Team	789	Not available

Cost Savings

Analyzed cost savings from decreased idling with our "*Bus Shutdown Campaign*" provides the following quantitative information:

Av. Idle "Rate of Burn" / Consumption per hr…	1.5 gph (2 hrs.) = 3 gals per 2 hrs. idle
Current Price per Gal. Diesel…	$2.00 per gal. = $3.00 per hr.
# of hours of Idling eliminated, per bus…	x 2 hrs. daily = 3 gals daily
# Days per week…	5
# Hrs. per week…	10
# Of weeks…	36
Per vehicle annual reduction in fuel use…	10 hrs per wk. (36 wks.) = 360 hrs. Year
Fenceline Fleet Size…	130 vehicles (360 hrs. per yr.) = 46,800 hrs. per @ $3.00 per hr. = $140,400 @ 1.5 gph

Total estimated annual cost savings (130 Tripper Vehicle Fleet) "Bus Shutdown Campaign" is $140,400.

Next Steps

The HRT - EMS Core Team is working with sub-teams within the agency Operations, Maintenance and Facilities Departments. HRT will also continue to partner with, among other Agencies, the City of Chesapeake and Southeastern Public Service Authority (SPSA), both currently engaged with EMS programs of their own. With this and other ongoing Partnerships and assistance, and the conducting and exchange of auditing and monitoring results, we anticipate further positive input and improvements to the program.

HRT Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for HRT – Hampton, VA on September 20 and 21, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental management system – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The HRT EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **seventy-two percent (72%)**.

2. **Fifty-one percent (51%)** of the requirements were **"met."**

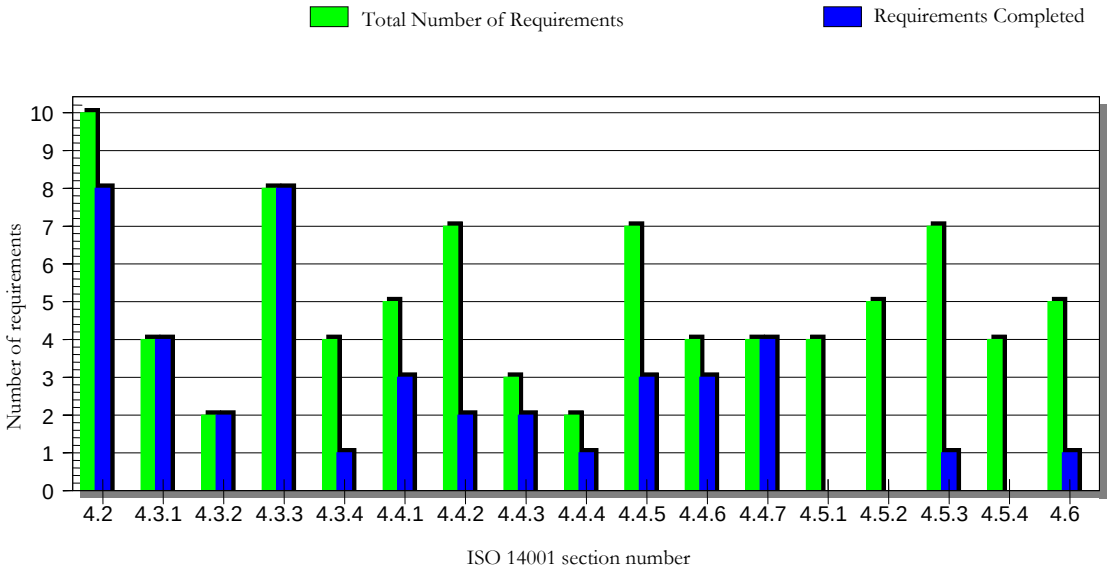
3. **Forty-two percent (42%)** of the requirements were **"partially met."**

4. **Seven percent (7%)** of the requirements were **"not met."**

Detailed scoring on next page.

HRT EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		**Overall Score (%)**	**Met (%)**	**Partially Met (%)**	**Not Met (%)**	**Ref.**
4.2	Environmental Policy	90	80	20	-	4.2.10
4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	63	25	75	-	4.3.41
4.4.1	Structure & Responsibility	80	60	40	-	4.4.11
4.4.2	Training, Awareness & Competence	57	29	57	14	4.4.21
4.4.3	Communication	83	67	33	-	4.4.31
4.4.4	EMS Documentation	75	50	50	-	4.4.41
4.4.5	Document Control	71	43	57	-	4.4.51
4.4.6	Operational Control	88	75	25	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	50	-	100	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	40	-	80	20	4.5.21
4.5.3	Records	57	14	86	-	4.5.31
4.5.4	EMS Audit	13	-	25	75	4.5.41
4.6	Management Review	50	20	60	20	4.6.10

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY (MBTA)
BOSTON, MASSACHUSETTS

Profile

In 1897, America's first subway was constructed between Park Street and Boylston Street in Boston, Massachusetts. This half-mile section of subway is still operated today by the MBTA, making the MBTA the oldest continuously operating subway system in the country. In the 108 years since this service opened, Boston's public transportation system has remained a critical part of the city, and has grown dramatically in response to an ever-increasing demand for transportation services. The MBTA now serves 175 communities, providing transit alternatives to a population of 4.7 million over an area of 3,200 square miles.

Currently, the MBTA is the fifth largest mass transit system in the United States as measured by ridership. The Authority serves a daily ridership of approximately 1.2 million passengers. To provide these services the Authority maintains 200 bus routes, 4 rapid transit lines of heavy and light rail, 1 bus rapid transit line, 4 trackless trolley lines, 11 commuter rail lines, several ferry lines and a paratransit service. Its large roster of equipment currently consists of 408 heavy rail vehicles, 204 light rail vehicles, 927 diesel buses, 61 compressed natural gas (CNG) buses, 2 prototype alternative fuel buses, 40 trackless trolleys, 80 commuter rail locomotives, 377 commuter rail coaches, 2 ferry boats, and 418 vehicles for the RIDE. Service is provided to 275 stations. The Authority maintains 885 miles of track, 478 bridges, and 20 miles of tunnels. System expansion efforts over the next five years include two new commuter rail lines and the new Silver Line. The MBTA operates 19 commuter rail, light/heavy rail and bus maintenance facilities, numerous right-of-way (ROW) maintenance facilities, and currently has 6,000+ employees.

A nine member Board of Directors manages the affairs of the Authority. The Secretary of the Commonwealth's Executive Office of Transportation (EOT) chairs the Board. The Governor on a rotating schedule appoints the remaining members of the Board. The Board has the power to appoint and employ a General Manager and other officers and approves all capital investments over $500,000. The MBTA has an Advisory Board, consisting of representatives from each of

the cities and towns within the MBTA's service area that approves the annual operating budget and reviews the five-year Capital Investment Program.

In 1999, the Governor of Massachusetts signed into law legislation reforming the finances of the MBTA. This new law, known as "Forward Funding" established a new funding mechanism as of July 1, 2000. MBTA funding is now limited to: fares and other own source revenues, 20% of the state-wide sales tax, and assessments from the 175 cities and towns in its service district.

Fenceline

The MBTA selected two facilities, the Wellington Carhouse Maintenance Facility (Wellington) and the Albany Street Bus Garage Facility (Albany) respectively, to represent Subway Operations and Bus Operations for its fenceline.

Wellington was constructed in 1975; the 135,500 square foot maintenance facility is located along the northern bank of the Mystic River. The facility services the 120 car Orange Line Fleet that transports 164,000 weekday passengers and Maintenance of Way Equipment. Wellington currently has 50 employees consisting of mechanics, trades people, car cleaners, foremen, administrators, and managers. Wellington operates 24 hours.

Wellington Orange Line

Albany was constructed in 1937 originally designed to handle 37 buses, it currently houses 139 buses with a 24-hour operation Monday thru Friday. Albany has 44 employees consisting of

Albany Bus Fleet

buses with a 24-hour operation Monday thru Friday. Albany has 44 employees consisting of mechanics, trades people, car cleaners, foreman, administrators and mangers, along with 100 bus operators drawn from a pool of 500 operators in conjunction with a nearby facility. The age of this facility combined with the current number of buses it services along with the large number of bus operators operating out of Albany make this a challenging facility to develop and implement an EMS.

Core Team

The MBTA formed a seven-member core team to travel to Roanoke, Virginia for EMS training. The core team consisted of two representatives from the Environmental Affairs Department, two representatives from Subway Operations, two representatives from Bus Operations, and one representative from Operation and Support:

Assistant General Manager for Environmental Affairs
Environmental Counsel
Chief Mechanical Officer, Subway Operations
Superintendent, Orange Line (Subway)
Deputy Chief Mechanical Officer Bus Operations
Superintendent Bus Operations
Environmental Coordinator, Operations and Support

Upon return to the Authority, the Core Team was expanded to include additional members representing Subway Operations, Bus Operations, Environmental Department, Safety Department, and Labor Relations. The Core Team established a standing meeting every Thursday morning. Additionally each fenceline facility established an Environmental Sub-team. The Sub-teams consisted of employees at each facility representing all operations and trades conducted at the facility. Members of the Core Team meet with the Sub-teams on a regular basis as a way of tracking progress at each facility.

Key Drivers for Adopting an EMS

The MBTA began its efforts to develop an EMS in 2002 with the adoption of our Environmental Policy. Our commitment to develop an EMS was further solidified and formalized in a Settlement Agreement with the Massachusetts Department of Environmental Protection (DEP) and in a Consent Decree with the United States Department of Justice (DOJ) and the United States Environmental Protection Agency Region 1 (EPA). The settlement with DEP involved soil contamination at an old rail yard acquired by the MBTA through the Penn Central Railroad Bankruptcy Proceedings.

The Consent Decree with the DOJ and EPA stemmed from violations of the Clean Water Act (CWA) and the Clean Air Act (CAA). The CWA violations involved the un-permitted discharging of process water and storm water associated with industrial activity, the failure to prepare Spill Prevention Control and Countermeasure (SPCC) plans, and the failure to prepare Storm Water Pollution Prevention Plans (SWPPP). The CAA violation involved the excessive idling of 56 buses at four MBTA Bus Yards. In Massachusetts, the operator of a motor vehicle is

not permitted to unnecessarily operate "the engine of a motor vehicle while said vehicle is stopped for a foreseeable period of time in excess of five minutes." (310 CMR 7.11)

The Agreement/Consent Decree contain specific requirements for the content of our EMS as well as a definite schedule for development, implementation and audit of our EMS. Under these agreements, the MBTA is required to conduct initial assessments and develop a Pilot EMS Manual at Wellington and Albany. The Pilot EMS Manual shall be submitted to EPA and DEP for comment. Once the MBTA implements the Pilot EMS Manual at Wellington and Albany, the MBTA will then roll out the EMS System-wide in three phases (Phase I – 5 additional facilities, Phase II – 6 additional facilities, Phase III – 5+ facilities).

Significant Aspects & Impacts

Members of the Core Team met with Environmental Sub Teams at both Wellington and Albany. After reviewing operations and processes within both facilities, many environmental aspects and impacts were identified. To determine the significance of each aspect the Sub Teams scored them using a numerical weighting system on a matrix answering the following questions:

1. Is the aspect regulated?
2. Does the aspect pose a potential environmental impact?
3. Is the aspect associated with a legal obligation?
4. Is there significant financial risk or an opportunity to control the aspect?

For the development of our EMS, the MBTA selected the four most significant aspects identified at the fenceline facilities, and established objectives and targets to improve our environmental performance of each.

ASSIGNING IMPACTS TO ASPECTS & DETERMINING SIGNIFICANCE

Facility: _____ Page ____ of_____
Prepared by: _____
Date: _____
Activity: _____

Aspects	Impacts				Is it Regulated	Questions for Significance			Is it a significant aspect? Yes/No
	Air	Water	Land	Resource		Does the aspect pose a potential environmental impact	Is there significant stakeholder interest	Is there significant financial risk or opportunity	

SCALE: 1 = low impact through 5 = high impact

Objectives and Targets

Aspect	Objectives	Targets	Results
Hazardous Materials Handling	Improve the management of petroleum products and hazardous materials (In Massachusetts, waste oil is considered a hazardous waste.)	• Identify personnel to be trained • Develop training module • Determine training schedule • Conduct Subway employee training • Conduct Bus employee training • Train 100% of affected employee	• Conducted Compliance Training • Conducted EMS Awareness Training • Trained employees on Standard Opera- ting Procedures (SOPs)
Washing Trains and Buses	Ensure compliance with water discharge standards	• Develop baseline and obtain last quarterly sampling results • Obtain schematics of treatment systems • Evaluate baseline data to determine patterns of discharge • Establish standard operating procedure • Evaluate and audit vehicle washes after one year	• Improved knowledge of our pre-treatment systems for our vehicle washes • Trained employees on SOPs • No violations to date
Start Up and Operation of Buses	Reduce bus idling	• Develop training video for bus operators • Train bus operators • Develop standard operating procedure for bus operators • Monitor peak pull out periods	• Developed training video • Trained operators at Pilot Facilities • Trained additional operators, outside of fenceline
Water Discharges	Create water discharge permit tracking database	• Confirm location of all industrial and storm water discharges • Confirm permit, Storm water Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasure Plan (SPCC) for each facility • Insure facility training on SWPPP and SPCC • Track and evaluate all permits, SWPPP and SPCC Plans	• Trained employees on requirements of SWPPP, SPCC and NPDES permits • Increased know-ledge of permitting requirements, plans and water discharges

Benefits of Adopting an EMS

MBTA has realized a number of immediate benefits resulting from instituting an EMS at the fenceline facilities. These benefits include:

- The creation of the Core Team and the development of the EMS have improved communications across departments at the MBTA.

- The increased and improved understanding of all operations at the MBTA, specifically by employees of different departments.
- The development of Standard Operating Procedures has allowed the MBTA to better retain and document institutional knowledge.
- The increased enthusiasm and pride in how employees do their job.
- The improved control and inventory of documentation.
- The improved knowledge by all employees of environmental aspects and impacts.

Resources

To date, the MBTA expended the following level of effort (estimated in hours) in the development of the EMS:

Core Team	2,610
Sub Teams	2,532
Other Personnel	95
Consultants	695

To date, the MBTA incurred the following estimated cost in the development of the EMS:

MBTA Labor	$163,600.20
Travel/Supplies	$ 50,617.57
Consultant/Training	$ 52,194.00

Cost Savings or Avoidance

By developing our EMS internally, we believe we have not only learned valuable management tools to apply throughout our organization, but additionally we saved extensively on outside services.

The focus of our EMS is compliance, and as such, our major environmental initiatives have focused on improved environmentally compliant operations and performance, as well as improved relations with federal, state and local regulators. Compliance-based objectives and targets are difficult to quantify, one known cost savings is reduced fines and penalties.

One clear improvement in our daily operations is the reduction in idling times of our buses. Since focusing our efforts on training and standard operating procedures to reduce and monitor the idling of our buses, we have observed improvements at our bus yards and layover areas.

We believe we can conservatively state that we have on average reduced the unnecessary idling of our buses by at least 15 minutes per bus per day.

Assuming:

1. The average fuel saving on consumption per bus for 15 minutes is 0.20 gallons per day;
2. The average cost for diesel (ultra low sulfur) is $2.06/gal;

3. The average cost for CNG is $2.03 per gallon equivalent.
4. No calculation is available for emission reduction

Calculation:

Cost saving for diesel bus per date:	0.2 gal x $2.06= $0.42
Cost saving for 549 diesel bus on weekday per year:	549 x $0.42 x 261 (week days/year) = **$59,035**
Cost saving for 289 diesel bus on weekend per year:	289 x $0.42 x 104 (weekend days/year) = **$12,623**
Annual Cost Savings for Diesel Bus Fleet :	$59,035 + $12,623 = **$71,658**
Cost saving for CNG bus per date:	0.2 gal x $2.03 = $0.41
Cost saving for 300 CNG bus on weekday per year:	300 x $0.41 x 261 (Weekdays/year) = **$32.103**
Cost saving for 300 CNG bus on weekend per year:	300 x $0.41 x 104 (Weekend days/year) = **$12,792**
Annual Cost Savings for CNG Bus Fleet:	$32,103 + $12,792 = **$44,895**

Annual Total Cost Savings for Entire Bus Fleet: $116,553

Next Steps

It is anticipated that the EMS for the fenceline facilities will be operational by the summer of 2006. The MBTA is committed to implementing a system-wide EMS over the next five years. The EMS implemented at the fenceline facilities will be evaluated annually by the MBTA Core Team and fenceline facility superintendent.

The MBTA has developed a Pilot EMS Manual, as well as an Environmental Management System page on our Portal. The MBTA Portal is an online resource that provides information to employees via the web-browser, 24 hours a day, 7 days a week. The MBTA is currently working to incorporate the SOPs, Environmental Procedures, and Programs developed during this FTA EMS Implementation Course into our Pilot EMS Manual. We have found both our EMS Manual and the Portal useful tools for EMS Training and Documentation.

Management Commitment

"The FTA/Virginia Tech training and assistance helped us to make our EMS not only effective but real. The management and training skills we learned have greatly helped us to clearly measure and improve our performance."

Robert Doyle, Superintendent, Orange Line Maintenance

The Senior Management at the MBTA is committed to implementing a successful EMS.

The Board of Directors recently hired Daniel Grabauskas as General Manager to replace Michael Mulhern, who retired in May 2005. Mr. Grabauskas previously served as the Secretary of EOT when the MBTA adopted its Environmental Policy. The new General Manager has made eliminating negative environmental impacts as one of the things that will make the MTBA, a world class world ld-class public transportation system.

The EMS is one of my key strategic initiatives because it provides us with a disciplined framework for meeting our environmental responsibilities and allows us to continually improve our organizational performance."

Daniel A. Grabauskas, General Manager

MBTA Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for MBTA on October 24 and 25, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental Management System – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The MBTA EMS Team participated in the review and discussion regarding the scoring. The following scores are the result of the EMS Audit for the **Wellington** facility:

1. The overall score with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **ninety-six percent (96%)**.

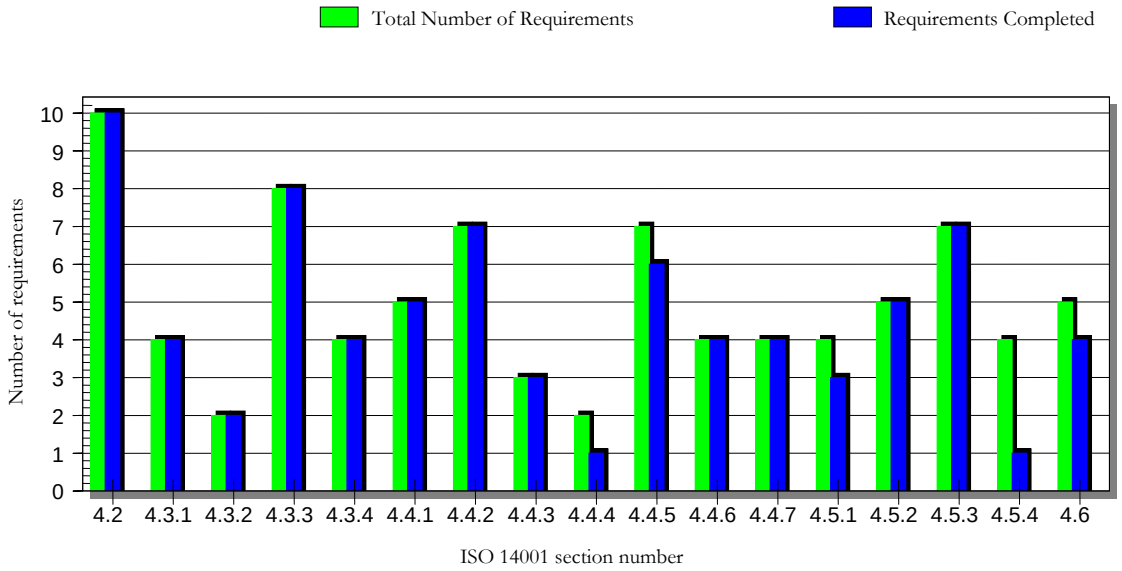
2. **Ninety-two percent (92%)** of the requirements were **"met."**

3. **Eight percent (8%)** of the requirements were **"partially met."**

Detailed scoring on next page.

MBTA EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		**Overall Score (%)**	**Met (%)**	**Partially Met (%)**	**Not Met (%)**	**Ref.**
4.2	Environmental Policy	100	100	-	-	4.2.10
4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	100	100	-	-	4.3.41
4.4.1	Structure & Responsibility	100	100	-	-	4.4.11
4.4.2	Training, Awareness & Competence	100	100	-	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	75	50	50	-	4.4.41
4.4.5	Document Control	93	86	14	-	4.4.51
4.4.6	Operational Control	100	100	-	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	88	75	25	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	100	100	-	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	63	25	75	-	4.5.41
4.6	Management Review	90	80	20	-	4.6.10

City of Phoenix

City of Phoenix Public Transit Department
Phoenix, AZ

Profile

The city of Phoenix, located in Maricopa County, encompasses 514 square miles and has a population of 1.4 million, making it the fifth largest city in the nation. The City of Phoenix Public Transit Department operates and maintains the largest bus fleet in the metropolitan area with two transit maintenance facilities, 464 buses and an average daily ridership of 118,225. Phoenix Public Transit services include local bus service, RAPID (commuter bus), DASH (downtown area shuttle), ALEX (neighborhood circulator), and Dial-a-Ride. METRO, a light rail system, is currently under construction and will serve Phoenix, Glendale, Tempe and Mesa.


Downtown Phoenix

In recent elections, Phoenix and area voters approved measures that provide for transit and roadway improvements needed to keep up with the area's growing population. In March 2000, Phoenix voters approved *Transit 2000*, a plan that provided 4/10 of a percent local sales tax for public transit improvements. *Transit 2000* provided for additional local and commuter buses and Dial-a-Ride vehicles, increased frequency and hours of service, and other transit improvements including METRO, the regional light rail system.

In November 2004, voters approved the Regional Transportation Plan, a multi-modal plan that provides for buses, park-and-ride facilities, METRO, as well as other transit and roadway improvements in Maricopa County through the year 2026. Other exciting Phoenix Transit projects include the construction of a West Operating facility to add maintenance and operations capability to the existing two maintenance facilities.

Phoenix Public Transit Vehicles (clockwise from top left): ALEX (neighborhood circulator); RAPID (commuter bus); DASH (downtown area shuttle); Local Bus Service; depiction of METRO, light rail service currently under construction.

Fenceline

Phoenix Public Transit selected the South Operating Facility (2225 W. Lower Buckeye Rd, Phoenix, AZ) to serve as the EMS fenceline facility. The South Operating Facility is the larger of two maintenance and operating facilities that currently serve Phoenix Public Transit. The facility is approximately 15-acres in size and is open 24 hours, 7 days a week. ATC Phoenix, under contract with the City of Phoenix, provides fenceline facility operations. The facility has 130 maintenance employees and serves approximately 245 buses. Components of the fenceline facility include service and cleaning for the facility and vehicles, maintenance for buses and support equipment, body and paint shop operations, administrative services, revenue collection, and parts storage and distribution.

Core Team

The Core Team consists of five people selected from Phoenix Public Transit, ATC Phoenix and the City of Phoenix Office of Environmental Programs. The EMS Management Representative is the designated Core Team Leader. Core Team members for 2004/2005:

- Rob Cox, ATC Phoenix Environmental Administrator
- Reed Caldwell, City of Phoenix Public Transit Department EMS Management Representative
- Monica Rabb, City of Phoenix Office of Environmental Programs EMS Auditor
- Amanda Luecker, City of Phoenix Public Transit Department EMS Coordinator
- Larry Kucera, ATC Phoenix Management Representative

The City of Phoenix created an Environmental Team consisting of a collection of employees responsible for the daily implementation of the EMS. Many of the Environmental Team members work at the fenceline facility and make regular reports on EMS progress to the Core Team. The Core Team and Environmental Team met weekly, or bi-weekly, as needed during the first year of EMS implementation.

Key Drivers for Adopting an EMS

The Federal Transit Administration's invitation to participate in the EMS program was the key external driver for adopting the EMS. Internal drivers included:

- Developing a Public Transit Department environmental policy.
- Increasing awareness of employee environmental roles and responsibilities.
- Improving internal communication of environmental issues.
- Improving fenceline facility compliance with environmental regulations.

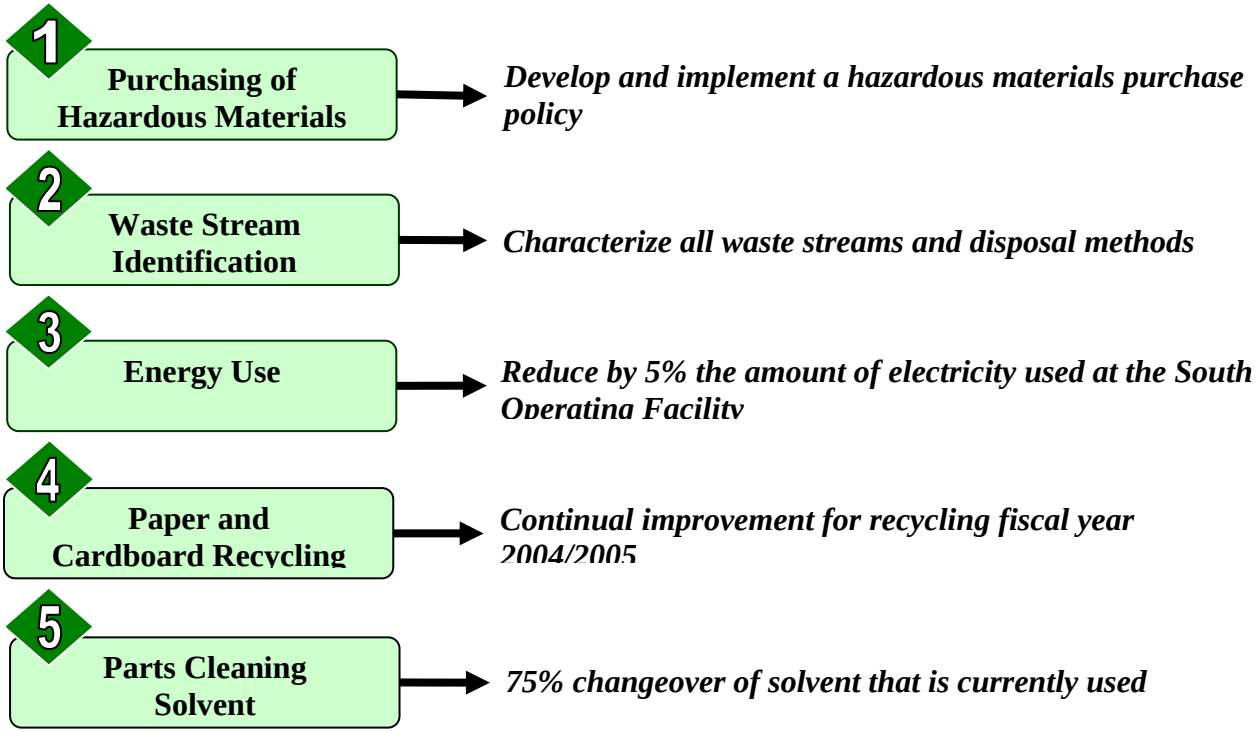
Significant Aspects and Impacts

The 2004-2005 EMS significant aspects are:

a. Purchasing of Hazardous Materials
b. Waste Stream Identification

c. Energy Use
d. Paper and Cardboard Recycling
e. Parts Cleaning Solvent

The Core Team began the aspect identification process by introducing the EMS program to fenceline employees and asking them to identify environmental impacts from their daily activities. Fenceline supervisors met with the Core Team and used their understanding of employee identified impacts, combined with other considerations such as severity of impact, cost and feasibility to narrow the original list of aspects to the top thirteen for rating against EMS criteria. The Core Team rated each of the thirteen aspects against criteria such as environmental, business and legal impacts to reach agreement on the top five aspects selected for action in the 2004-2005 EMS programs. The remaining eight aspects will be carried over to 2005-2006 for consideration along with any newly identified items.



Benefits of Adopting an EMS

The City of Phoenix Public Transit Department South Operating Facility benefited from the adoption of an EMS. Some of these benefits are tangible; however others involve changes to daily employee behaviors and improved overall awareness of how transit operations impact the environment. Some of the benefits of the EMS include:

- Cost savings
- Reduced risk

- Increased operational efficiency
- Positive external relations and public image
- Improved communication
- Greater employee stewardship
- Shared environmental solutions
- Improved public relations

Resources

The number of hours associated with the development and implementation of the Phoenix EMS from March 1st, 2004 to June 1st, 2005 are listed below.

Core Team and Environmental Team EMS Hours and Wages (March 2004 to June 2005)	
TOTAL hours	**2530**
TOTAL Internal Labor Cost	**$101,700.00**

Personnel working on the implementation of the EMS include Phoenix Public Transit Department upper management and staff. An Environmental Specialist from the City's Office of Environmental Programs participated as a Core Team member. The EMS has received considerable support from ATC Phoenix, including participation on the Core Team by the ATC Phoenix General Manager and Risk Manager. As the EMS moved into its implementation phase, staff began regular meetings with an Environmental Team comprised of ATC supervisory personnel and other employees.

Cost Savings or Avoidance

Cost savings or avoidance could be calculated in some circumstances after the first year of EMS implementation. Other EMS activities resulted in baselines and recommendations for future improvements. First year EMS cost savings, avoidance and recommendations included:

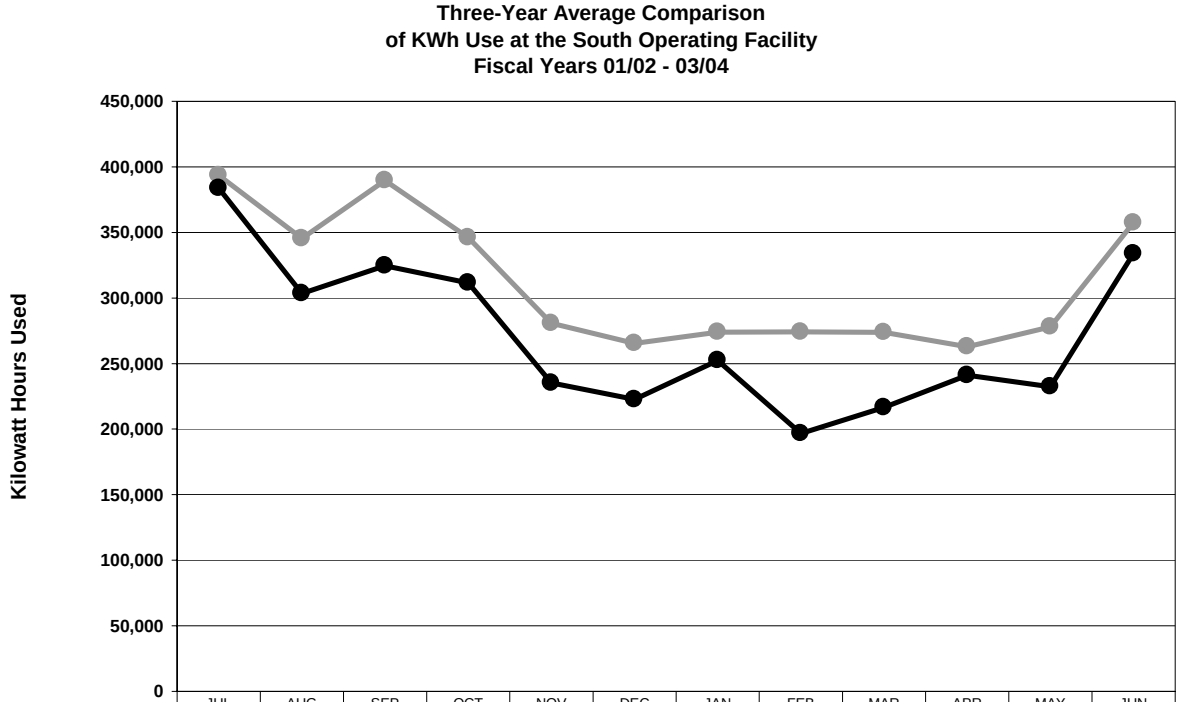
- Staff implemented a paper and cardboard recycling program at no charge to the fenceline facility. The program began with 0 lbs. recycled in August 2004 to a total of 15,590 lbs. recycled through the end of December 2005.

- Staff completed the waste stream identification aspect and developed a baseline for evaluating disposal activities. The aspect has future cost avoidance potential because it resulted in recommendations for more efficient and environmentally friendly disposal methods.

- Employees at the fenceline facility noticed improved employee and contractor awareness of environmental impacts from transit operations and increased opportunities for environmentally preferable and/or cost saving work procedures. To date, 445 employees received EMS General Awareness Training. Improved employee environmental awareness resulted in positive changes that benefit the environment but are difficult to assign a dollar value.

- The fenceline facility Energy Management Team reduced energy use at the fenceline facility, which resulted in a cost savings of approximately $34,000 fiscal year to date when compared to average energy use over the prior three years. The EMS Energy Management Team is currently exploring options for future energy use reductions.

- The City of Phoenix Public Transit Department purchased five new aqueous-based parts washers in FY05-06 at a total cost of $22,000. It is expected that replacement of solvent-based parts washers with the new machines will lower servicing fees by $15,000 per year. In addition, the aqueous-based washers will reduce the amount of solvent used by over 3,000 gallons per year.



	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Three-Yr. Average	393,514	345,493	389,707	346,100	280,781	265,475	273,901	274,198	273,798	262,870	277,939	357,375
KWh Use FY 04/05	383,615	303,538	324,652	311,620	235,272	222,699	252,294	196,632	216,464	241,093	232,382	333,763

Next Steps

Continuation of environmental stewardship is vital to the success of our organization. As we extend our rehabilitated environmental interest throughout the organization more innovative means and methods will allow continual improvements. A simple aspect as recycling has given renewed significance to protecting our environment.

Future facilities will open with an environmental plan in place. A department-wide environmental management system will incorporate all department facilities. Implementation of these goals is dependent upon additional staff to create and ensure continual monitoring of the EMS.

Management Commitment

"Environmental management is an individual, as well as collective responsibility. The EMS is an effective tool for employees to use together to establish new goals and implement new programs to protect the community and the environment for future generations".

Debbie Cotton, Public Transit Department Director, City of Phoenix

City of Phoenix Public Transit Department Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for the City of Phoenix, Phoenix, AX on August 22 and 23, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental Management System – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The Phoenix EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

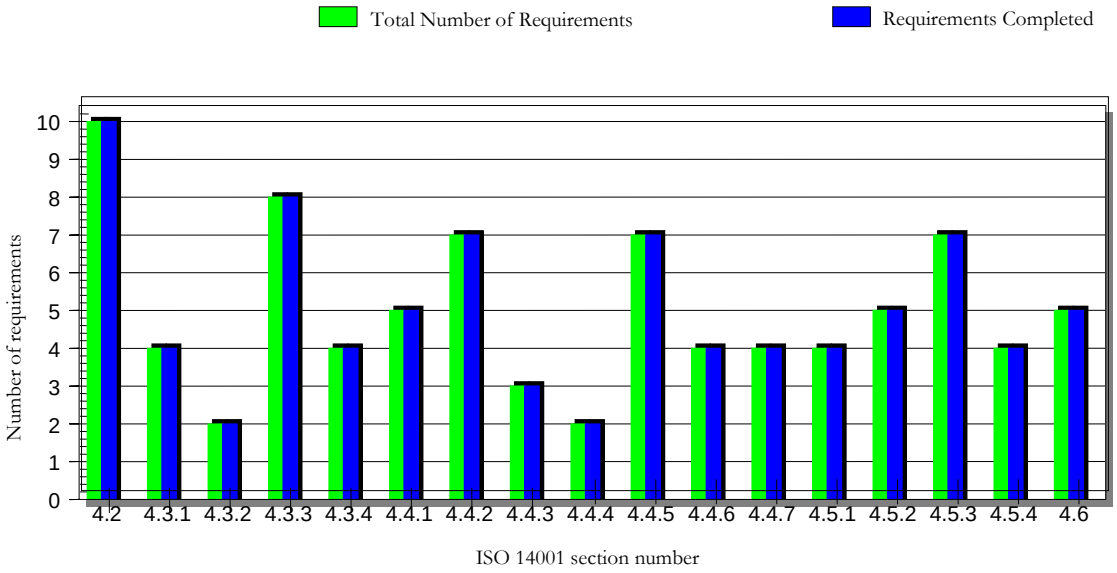
1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **one-hundred percent (100%)**.

2. The City of Phoenix Public Transit facility has **met all** of the requirements specified in the ISO 14001;1996 Standard and may wish to consider seeking registration or making a self-declaration to the standard.

Detailed scoring on next page.

City of Phoenix Public Transit Department EMS Audit Report

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		Overall Score (%)	Met (%)	Partially Met (%)	Not Met (%)	Ref.
4.2	Environmental Policy	100	100	-	-	4.2.10
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4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	100	100	-	-	4.3.41
4.4.1	Structure & Responsibility	100	100	-	-	4.4.11
4.4.2	Training, Awareness & Competence	100	100	-	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	100	100	-	-	4.4.51
4.4.6	Operational Control	100	100	-	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	100	100	-	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	100	100	-	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	100	100	-	-	4.5.41
4.6	Management Review	100	100	-	-	4.6.10

Seattle, Washington

Profile

The Puget Sound region of western Washington is characterized by natural beauty: cool ocean waters, glistening lakes, and snow-capped mountains are the natural backdrop of life in the Pacific Northwest. Navigating around this region involves bridges, tunnels and ferries, and two main interstates on either side of Lake Washington. In the midst of this natural beauty lie the three most urbanized counties and the bulk of Washington State's population. This region has experienced tremendous growth since the late 1980's, fueled by the notoriety of being named one of the country's best places to live.

The region's transportation infrastructure has not kept pace with population growth, however, leading to significant and worsening traffic congestion. In 1993, the Councils in King, Pierce and Snohomish counties voted to participate to form a single transit authority – Sound Transit – to implement high capacity transit alternatives in this fast-growing region.

In November 1996, voters in King, Pierce and Snohomish Counties approved a new local tax giving Sound Transit the authority to implement Sound Move, a comprehensive regional transit plan encompassing almost 100 separate but interrelated transportation improvements. Some of the highlights of this multi-modal plan include:

- A new 14-mile "Link" light rail system from Seattle to Sea-Tac Airport and one-mile light rail line in the city of Tacoma;
- An 81-mile "Sounder" commuter rail system using the existing freight railroad from Everett to Seattle to Tacoma to Lakewood; and
- ST Regional express bus service connecting urban centers throughout the service area, including design and construction of high-occupancy vehicle (HOV) lanes for buses and carpools, park-and-ride lots, transit centers, and access improvements.

The value of all of these improvements is approximately $13 billion. Nineteen ST Express bus routes and more than 80 miles of commuter rail service currently are operating, with additional service increasing over time. Light rail service is operating in Tacoma and will be operating in Seattle in 2009. With the exception of the Tacoma light rail system, Sound Transit does not directly operate the service but instead contracts with transit partners and the Burlington Northern Santa Fe Railway. System-wide ridership in the first quarter of 2005 was 2.6 million riders, or approximately 36,000 riders per day.

Since inception, Sound Transit has focused primarily on planning, design, and construction. Construction activities have been underway in the Sounder commuter rail program and the ST Express program, but the primary responsibility has been handled by our project partners, the Burlington Northern Santa Fe Railway Company and the Washington State Department of Transportation. The construction of Tacoma Link was handled in-house and was completed in 2003. In 2004, significant construction activities were initiated for the rest of the Link light rail project, and the construction will continue until 2009. System operations are contracted to local transit agencies that operate complementary transit services for the region.

Sound Transit is governed by an 18-member Board of Directors comprising local elected officials and the Washington State Secretary of Transportation. Board representation includes mayors, city council members, county executives, and county council members from within the Sound Transit service area. Sound Transit also strongly believes in independent outside oversight: the agency is overseen by a Citizen Oversight Panel that examines tough Sound Transit issues from an expert outside perspective; The Citizens' Accessibility Advisory Committee that promotes mobility and transit accessibility for the disabled and elderly in our communities; and the Performance Audit Committee that provides an independent, third party review of management's performance, including efficiency of operations, effectiveness in achieving desired results, and compliance with relevant policies, laws and regulations. Approximately 350 people are employed at Sound Transit. More information on Sound Transit background, projects and recent news is located at www.soundtransit.org.

Fenceline

Unlike other transit agencies that draw an EMS fenceline around operations or maintenance facilities, Sound Transit has established its fenceline around environmental compliance activities that occur mostly during planning, design and construction rather than operations and maintenance. These activities are those handled or supported by Sound Transit's Environmental Compliance Division, and include a broad array of environmental services and programs, such as environmental impact assessment, environmental permitting, hazardous waste management, natural resources mitigation, regulation of threatened and endangered species, historic and cultural resource evaluation, conformity with clean air requirements, storm water management and compliance, and cleanup of contaminated properties.

Core Team

The Sound Transit EMS Core Team is referred to as the EMS Steering Committee, and is comprised of personnel representing the various departments within the Agency. It includes eight full-time members including staff from the Environmental Compliance Division, representatives from each of the capital project departments (commuter rail, express bus, and light rail), systems operation and project delivery support services. The Environmental Compliance Manager is the chair of the EMS Steering Committee.

Adjunct to the EMS Steering Committee are subcommittees that focus on developing and implementing operational controls for each significant aspect. Each subcommittee, composed of between three to seven members, is chaired by the member of the EMS Steering Committee

whose daily work pertains to the aspect. The subcommittees are responsible for development of detailed work instructions. The work performed by subcommittees is brought before the EMS Steering Committee for review and approval.

Sound Transit chose to appoint an eight-member steering committee rather than a typical four-person team because of a desire to encourage involvement in EMS from capital development, project delivery, and operations departments as well as from environmental staff.

Key Drivers for Adopting an EMS

Sound Transit recognizes that a healthy and sustainable environment is important to our economy, our future, and the citizens of the Puget Sound region. We have devoted our best efforts and attention to managing environmental resources for the benefit and enjoyment of current and future generations. Consistent with our environmental commitment, and to improve and document our environmental performance, the Agency decided to develop and implement the EMS. Also, as an agency approaching its 10-year anniversary, Sound Transit is very young in the evolution of public agencies. Although the environmental program has worked very well up to this point, it is time to formalize our business practices to provide clear direction and to create institutional stability.

Significant Aspects & Impacts

Within the fenceline, the Steering Committee established and identified aspects by determining the Agency activities that impact the environment in either a beneficial or an adverse manner. The Steering Committee prioritized and identified significant aspects based on the following criteria:

- Scale and Severity of Impact;
- Probability of Occurrence;
- Cost of Addressing;
- Potential Legal and Regulatory Exposure;
- Ease of Impact Avoidance;
- Effect on Public Image;
- Ease of Implementing Process Change;
- Concerns of Agency Stakeholders; and
- Impact on Program and Project Cost and Schedule.

Significant EMS aspects, meaning those of the highest priority in meeting the Agency's commitment to the environment, were then identified by the Steering Committee as being the following:

- Environmental Commitment Implementation Monitoring;
- Endangered Species Act (ESA) Compliance;
- Compliance with National Environmental Policy Act / State Environmental Policy Act (NEPA/SEPA); and

- Hazardous Materials Risk Assessment, Management and Cleanup.

The Steering Committee intends to review Agency operations at least annually to determine if additional EMS aspects should be considered.

Objectives & Targets 2005

Objectives	Targets
Implement project commitments made in environmental documents, permits, and other executed agreements by ensuring a system exists to manage, monitor and track compliance throughout the project lifecycle in order to minimize environmental impacts, prevent pollution, and protect and enhance the environment.	**Target 1:** Perform gap analysis to identify current business practices for managing commitments for Link, Regional Express, and Sounder. **Target 2:** Modify existing processes and define new processes, as applicable, resulting from the Target 1 gap analysis. **Target 3:** Create a tracking system for monitoring and reporting on commitments for Link, Regional Express, and Sounder.
Assure agency compliance with and consistent implementation of the Endangered Species Act process and requirements in order to avoid environmental degradation.	**Target 1:** Adopt a procedure that will govern Sound Transit's formal and informal consultation process. This procedure should address the relationship between the ESA process and the NEPA process. **Target 2:** Adopt a procedure regarding the commencement of soil-disturbing work (geotechnical drilling, utility potholing, etc.) prior to completion of the consultation process. **Target 3:** Adopt a procedure regarding the need to reinitiate informal consultations in light of project changes, new information, or other changed circumstances. **Target 4:** Adopt a procedure for ensuring due consideration is given to the protection of endangered species when no federal consultation requirement exists.
Assure Agency compliance with, and consistent implementation of, NEPA/SEPA and related environmental review processes and requirements throughout the agency in order to help prevent pollution and avoid environmental degradation.	**Target 1:** Adopt a procedure for handling project or plan changes that occur after the completion of initial environmental review. **Target 2**: Adopt a procedure for integrating SEPA requirements into Sound Transit decision-making, including the Sound Transit Board. **Target 3:** Develop, document and train staff in business practices for scoping and screening of alternatives. **Target 4:** Adopt a procedure for distributing draft and final environmental documents and determinations. **Target 5:** Develop a list and schedule for addressing future topic by order of priority.

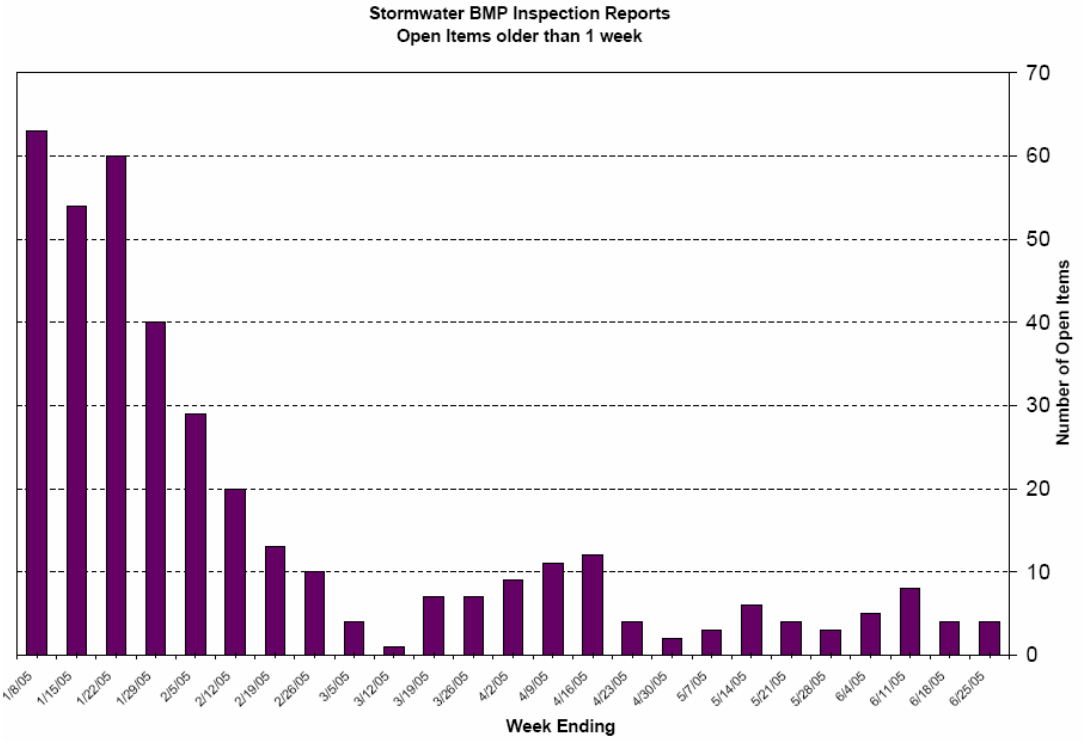
Objectives	Targets
Manage the handling and disposal of hazardous materials used, discovered, and generated by Sound Transit in order to help prevent pollution and avoid environmental degradation.	**Target 1:** Adopt a procedure for production and review of environmental due diligence investigations. **Target 2:** Adopt a procedure for the tracking and reporting of hazardous waste "generated" by Sound Transit. **Target 3:** Adopt a procedure for hazardous materials emergency response. **Target 4:** Adopt a procedure for construction spoils and wastewater sampling during construction. **Target 5:** Develop a list and schedule for addressing future targets by order of priority.

Benefits of Adopting an EMS

Sound Transit recognizes benefits of developing an EMS. Some benefits seen include:

- Establishing an inter-departmental Steering Committee and subcommittees that allow key staff to address environmental questions from multiple perspectives;
- Receiving support from the Board of Directors in the form of a resolution to adopt the Sound Transit Environmental Policy early on in the EMS development process;
- Putting crucial institutional knowledge into written form and establishing document control;
- Providing a strong foundation to support the Agency in choosing sustainable and environmentally responsible practices.

Some quantifiable results have been found in the area of contractor management and environmental commitment implementation. For example, results of storm water inspections are presented below. The graph indicates that, although contractor performance in the area of managing storm water Best Management Practices (BMPs) was initially very poor, as measured by the frequency of recurrence of the same reported BMP deficiencies from week to week, overall contractor performance steadily improved. In this case, improvement is attributed to increasing awareness of the importance of compliance monitoring and enforcement by Construction Management staff. In addition, we were able to draw personnel from our agency-wide Quality Assurance Department into the monitoring activities, thereby integrating a formal auditing and Corrective Action sequence into any continued deficiencies exhibited by the contractors. Through the authority of the guiding principles established in Sound Transit's Environmental Policy, the proactive implementation of the monitoring/corrective action sequence resulted in a continual improvement process for the prevention of environmental degradation.



Resources

Sound Transit estimates it has devoted the following staff time to undergo the training (including travel cost/time) and develop the EMS from the period between February 2004 and June 2005 as follows:

EMS Steering Committee:	2,715 hours
Subcommittees and Other Personnel	635 hours
Estimated Cost	**$233,447.50**

Most of the effort was expended on development of EMS procedures and work instructions. Additional time has also been expended with EMS training and auditing and communicating the status of the EMS.

Cost Savings or Avoidance

Steering Committee, with the assistance of construction representatives, developed a work instruction outlining the protocols for management of construction spoils to ensure they are disposed of properly. Improper disposal can result in hundreds of thousands if not millions of dollars in cleanup costs. This work instruction can be applied to other construction programs of the Agency. With the Sound Transit EMS in its early stages of development and implementation, the Agency has not yet been able to quantify cost savings from the EMS. Nonetheless, we are beginning to recognize savings. For example, the Agency anticipates avoiding fines related to environmental compliance with implementation of EMS. Additionally, cost savings are attributed to the recent implementation of the EMS process for management of construction spoils associated with the construction of the initial segment of the Link light rail project. The EMS

Sound Transit also values the benefits and efficiencies resulting from improved lines of communication among staff, improved relationships with regulatory agencies by having a clear environmental policy, development of written procedures for implementing environmental obligations, capture of institutional knowledge related to addressing transit system environmental impacts, and promotion of proactive responses in evaluating and addressing environmental issues.

We envision that these efficiencies will reduce the amount of time required for development and approval of environmental documentation and permit acquisition. In the future, where possible, we intend to track project schedules closely to identify opportunities for savings and cost efficiencies resulting from the implementation of the EMS.

Next Steps

Over the next 12 months, the EMS will be implemented and appropriate revisions to the procedures and work instructions to address project specific issues and incorporate system improvements will be developed. EMS revisions also may be necessary with project transition from planning, design and construction to operations.

In the initial planning cycle, four significant aspects were identified. The Steering Committee will continually review these aspects to determine that they are satisfactorily addressed in the EMS. Future expansion of the EMS to include aspects such as reduction in solid waste generation, sustainable design, office waste prevention/recycling/purchasing and potential use of alternative fuel and energy sources may be identified and evaluated.

Management Commitment

As a steward of public funding and trust, Sound Transit is committed to balancing the implementation of Sound Move with the protection and preservation of the environment. To that end, the Board of Directors of the Agency adopted an environmental policy that not only

identifies our commitment to be an environmental leader, but also requires the development and implementation of the Environmental Management System.

In addition, the EMS program has benefited greatly from the strong and unwavering support of senior management, including the Chief Executive Officer, the Deputy CEO, and the department directors.

"Since Sound Transit was created in 1996, our staff has hit the ground running to deliver projects that have both aggressive schedules and expectations. Our agency has grown in a very short time from having no dedicated environmental staff to a 6-person Environmental Compliance Division that provides environmental expertise during all phases of capital project development. It's been very challenging to take the time to address the "pro-active" side of managing the division while constantly reacting to the demand for environmental expertise and services. ……. Although our agency has an excellent environmental record, we had been looking for ways to take our environmental program to the next level. When FTA offered technical training to develop an EMS, it provided the catalyst we needed to create some structure and institutional longevity. The other appeal of the EMS for us is that we didn't have to start developing something from scratch. The EMS provides us with a ready-made and internationally recognized program that can be tailored to our needs. We took an innovative approach to EMS by applying it to our capital program rather than an operating facility. ……We feel that this EMS is vitally important to our agency, and CEO Joni Earl and I are absolutely committed to its successful implementation."

Vernon Stoner, Deputy CEO

Sound Transit Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for Sound Transit, Seattle WA, on September 12 and 13, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental management system – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The Sound Transit EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **ninety-eight percent (98%)**.

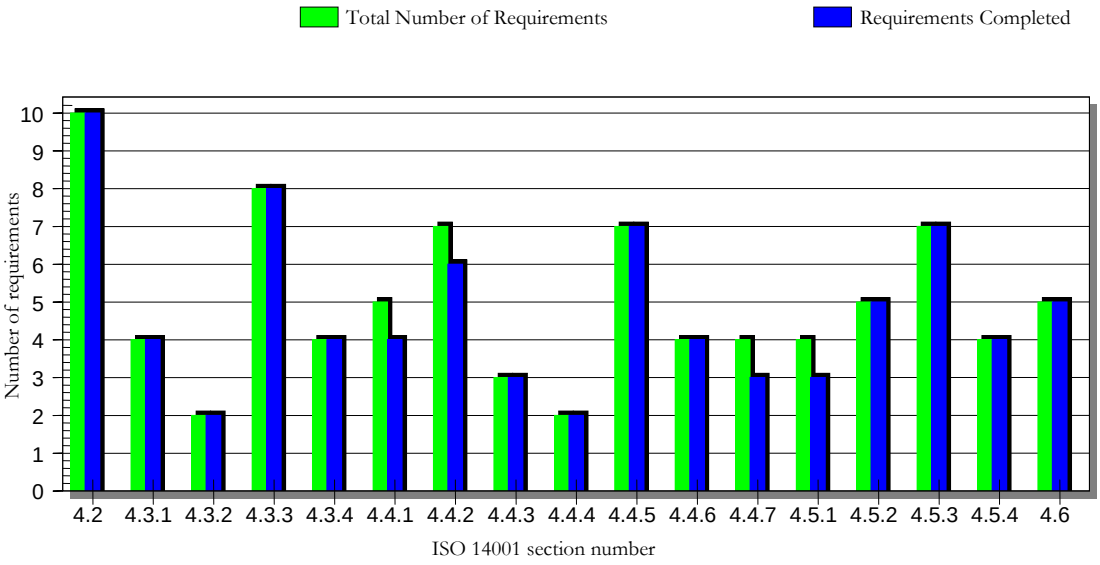
2. **Ninety-five percent (95%)** of the requirements were **"met."**

3. **Five percent (5%)** of the requirements were **"partially met."**

Detailed scoring on next page.

Sound Transit EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		**Overall Score (%)**	**Met (%)**	**Partially Met (%)**	**Not Met (%)**	**Ref.**
4.2	Environmental Policy	100	100	-	-	4.2.10
4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	100	100	-	-	4.3.41
4.4.1	Structure & Responsibility	90	80	20	-	4.4.11
4.4.2	Training, Awareness & Competence	93	86	14	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	100	100	-	-	4.4.51
4.4.6	Operational Control	100	100	-	-	4.4.61
4.4.7	Emergency Preparedness & Response	88	75	25	-	4.4.71
4.5.1	Monitoring & Measurement	88	75	25	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	100	100	-	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	100	100	-	-	4.5.41
4.6	Management Review	100	100	-	-	4.6.10

Profile

In service since 1974, the Transit Authority of River City (TARC) provides 50,000 rides every day on 55 fixed routes in a five-county area in Kentucky and Southern Indiana. Each year TARC serves over 14 million passengers with nearly 7.725 million vehicle miles and 531,275 vehicle hours.

TARC's mission is to explore and implement transportation opportunities that enhance the social, economic and environmental well being of the greater Louisville community. Louisville has a rich transportation history, beginning with the steamboat industry that thrived on the Ohio River in the 18th century. Once the 10th largest city in the United States, Louisville was soon at the center of booming railroad expansion and had a significant passenger rail system in operation by the early 1900s, a system that continued operation until the 1940s. With the conversion from rail (interurban and streetcar) to diesel buses several private bus companies began operating in the community. In 1974 the largest of these, the Louisville Transit Co., was acquired by the City of Louisville became the Transit Authority of River City.

TARC makes Louisville a better place to live by implementing innovative services that respond to the changing transportation needs of the Greater Louisville community. Some of the changes we've made to enhance our community's environmental well being include installation of bike racks on all of our fixed route buses, switching to ultra low sulfur diesel fuel and introducing hybrid electric buses into service. TARC is integral to the development of our community because it provides greater mobility for passengers young and old, and access to opportunities for all citizens, including those with disabilities and new Americans; all while helping reduce congestion and air pollution.

With an industrial component to its economy and its location in the Ohio River Valley, Louisville has struggled to maintain air quality standards. It has been out of compliance with federal ozone standards many of the last 15 years. TARC continues to play an active role in keeping the community in compliance by reducing tailpipe emissions.

Fenceline

TARC chose to limit the initial implementation of its Environmental Management System (EMS) to Maintenance Department functions at its Union Station division. Here 103 mechanics and service employees (88 are members of the Amalgamated Transit Union) work around the clock, seven days a week taking care of TARC's active revenue fleet of 263 buses and trolleys.

The five-acre site includes a bus storage building (the "barn") where the fleet is serviced and washed daily, six general repair bays, three preventive maintenance bays and five specialty bays. The organization has recognized the "permeability" of that fenceline, however. Where it makes good sense to expand an environmental management program to include another department, we do so.


Bus Barn & Maintenance Facility

TARC intends ultimately for the scope of its EMS to include all operations, departments and facilities.

Core Team

At startup, the EMS Core Team included:

- Dan Franklin, Director of Transportation
- Cathy Reasor, Safety Assistant
- Dan Jim Barrett, Assistant Director of Maintenance
- Geoff Hobin, Special Projects Manager

Later Chris Ward of our Purchasing Department and Steve Javins, Maintenance Training Supervisor, joined the team. Most recently the team was bolstered by the addition of Russ Rakestraw, TARC's new Director of Safety.

Key Drivers for Adopting an EMS

TARC has maintained an excellent record of environmental compliance throughout its existence. So, when the FTA presented the opportunity to receive training about and guidance in developing an environmental management system, TARC responded without hesitation. To begin with, accepting the opportunity and the challenge was in keeping with our stated goals of continuous improvement and becoming a learning organization. In addition, while we were proud of our environmental record, we knew that we had not adequately documented our practices. We believed that the training provided would help us learn valuable management skills that could be shared and extended beyond our EMS. We also understood that successful implementation would likely improve our standing with the local, State and Federal agencies that administer environmental regulations.

Significant Aspects and Impacts

TARC's EMS Core Team identified over 120 aspects associated with our revenue vehicle maintenance. While considering the relative significance of each aspect, the team gave most weight to those aspects whose negative impacts were most likely to occur and to those aspects that could most easily be managed. A survey of maintenance employees at Union Station was also considered before arriving at a final decision.

After much deliberation, three aspects were finally chosen that the Team felt would most likely yield significant improvement through appropriate management, and that could most readily be addressed. The three aspects were:

1. Utility use associated with heating and cooling the bus barn
2. Consumption of virgin oil
3. Consumption of virgin paper

Objectives and Targets

The objectives reflect commitments stated in TARC's environmental policy to reduce consumption of natural resources and pollution.

	Objectives	Targets
	Reduce TARC's consumption of virgin engine oil	3% reduction in first year of implementation
	Reduce electrical/natural gas usage	5% reduction in electrical and natural gas consumption
	Continually reduce amount of paper used and begin to use recycled paper	10% reduction in amount of paper consumed by TARC Purchasing & Maintenance departments

Benefits of adopting an EMS

In addition to some looked-for benefits of cost and risk reduction, TARC is realizing a number of less tangible benefits from developing its EMS. Most of those have to do with learning new ways of managing and documenting processes. We also see evidence of the kind of incremental shift in organizational behavior that can be extremely difficult to bring about.

Sharing What Works

- The Maintenance and Training departments have applied the EMS template for operational controls to all of their Standard Operating Procedures.
- Simply talking about purchasing recycled paper for the Maintenance Department has led the Planning Department to order office paper with 30% "post-consumer" content.
- Our Transportation Department, the agency's largest consumer of paper, has begun to talk to the Core Team about ways to reduce that consumption.

Audits and Becoming a Learning Organization

As a result of our work on the EMS, awareness of the importance of documentation is growing, both as a way of capturing knowledge, and as a way of creating audit trails for regulatory

compliance. We are also growing a culture that believes in the maxim, "What is measured is managed."

Keep it Simple

We've found that simple, inexpensive solutions, such as tracking oil changes right on engine compartments (pictured at right), can have meaningful, significant impacts.

Tracking oil changes on engine covers

Resources

For the period from March 1, 2004 through July 31, 2005, during which TARC's EMS was developed and implemented, TARC staff and consultants committed their time as follows:

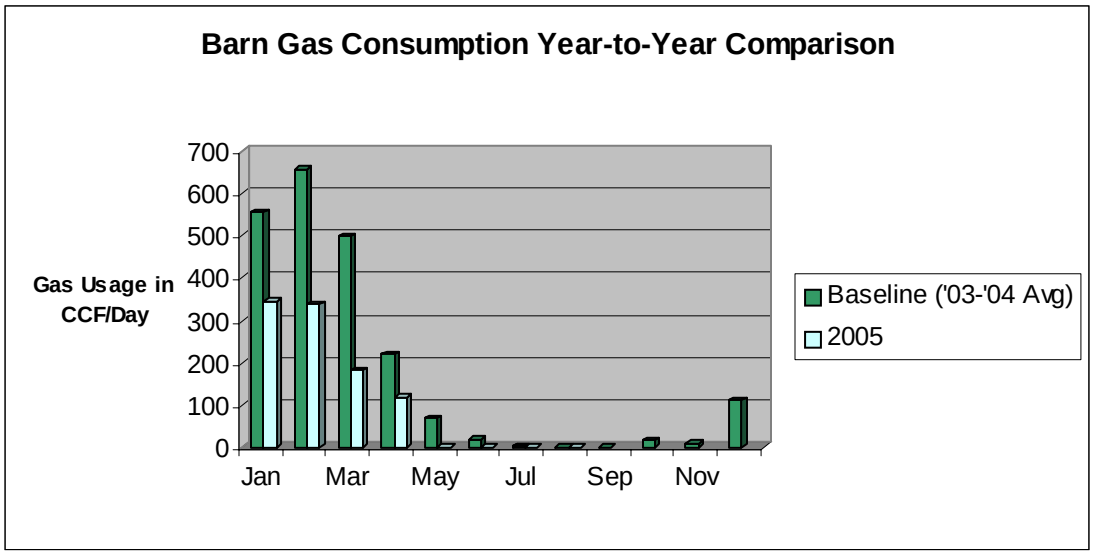
Member	Hours
Environmental Management Representative	202
Core Team	413
Other	84
Consultants	38
TOTAL Labor Hours	**737**

The cost of labor associated with the development of TARC's EMS is:

Category	Cost
Total Labor expense	22,670
Travel expenses	18,447
Other Costs	450
TOTAL Cost	**41,567**

Cost Savings or Avoidance

Since we began managing utility use in the bus barn (January 2005) we have reduced our consumption of natural gas by over 31,000 cubic feet, **saving almost $15,000 against our baseline, despite rising gas prices.**



Emissions Reduction

At the same time, we've used 270,000 fewer kilowatt-hours of electricity, exceeding our target by more than 7%.

Resulting Emission Reductions

Best of all, we've begun to see significant pollution reduction.

Pollutants	CO^2	SO^2	NOx	CO	VOC	PM2.5
Lbs./ year	**999,381**	**1,853**	**1,088**	**125**	**17**	**24**

Next Steps

During the next few months the EMS Core Team will complete the initial implementation or our EMS. Our contractors and suppliers will be receiving communication about TARC's environmental policy. Construction and service providers will be asked to fill out an environmental checklist before receiving a contract. Our environmental consultants will perform an internal audit of our EMS this year. We expect that audit to be repeated annually as a way to provide feedback for continuous improvement. EMS procedures will be incorporated into the design and construction processes of the maintenance annex we hope to begin building this year.

Development of TARC's EMS has led to involvement with Louisville Metro's "Green Team" and with Metro's "Partnership for a Green City." We expect those partnerships to broaden and deepen in the coming months and years. TARC is committed to expanding its EMS throughout the agency and to raising awareness among all our team members of the many ways we impact

our environment. Ultimately, we hope TARC's EMS will help to move the greater Louisville community toward truly sustainable public transportation.

Management Commitment

"Strong environmental management makes 'green' sense but it also makes good business sense. TARC intends to treat this as seriously as we treat our other requirements, such as Affirmative Action and EEOC compliance. With funding tight and gas prices rising, it will be more essential than ever for TARC to cut costs and run efficiently. The EMS helps us move in that direction."

J. Barry Barker, TARC Executive Director

TARC Audit Report

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Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for TARC – Louisville, KY on September 29 and 30, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental management system – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The TARC EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **ninety-three percent (93%)**.

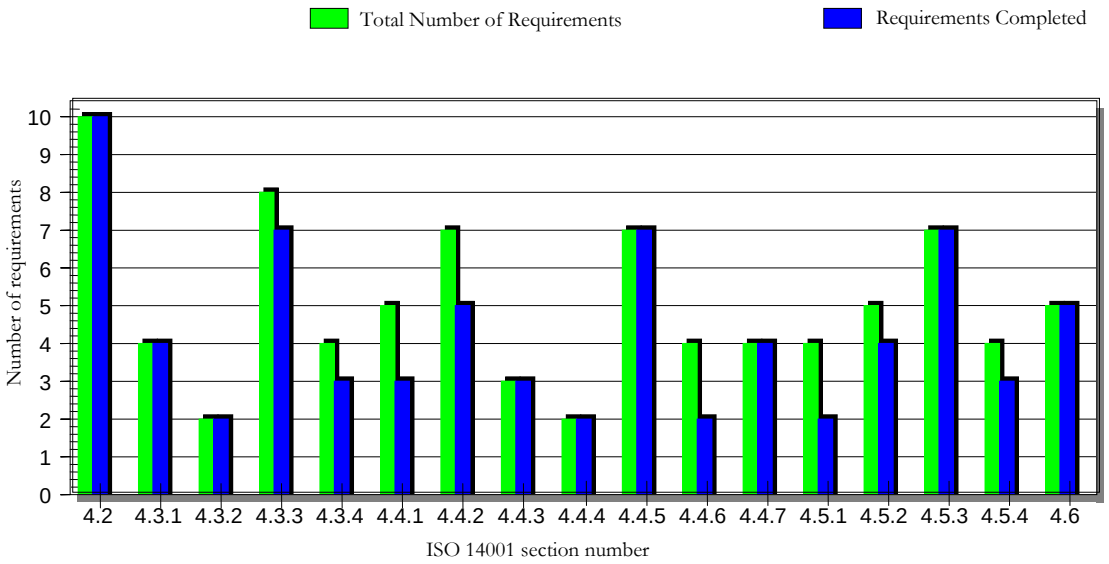
2. **Eighty-six percent (86%)** of the requirements were **"met."**

3. **Fourteen percent (14%)** of the requirements were **"partially met."**

Detailed scoring on next page.

TARC EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



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4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	94	88	13	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	88	75	25	-	4.3.41
4.4.1	Structure & Responsibility	80	60	40	-	4.4.11
4.4.2	Training, Awareness & Competence	86	71	29	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	100	100	-	-	4.4.51
4.4.6	Operational Control	75	50	50	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	75	50	50	-	4.5.11
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4.5.3	Records	100	100	-	-	4.5.31
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4.6	Management Review	100	100	-	-	4.6.10

Tucson, Arizona
Department of Transportation/Sun Tran

Profile

Located in sunny Tucson, Arizona, Sun Tran is the Tucson metro area's mass transit provider. With the region's population hovering around a million residents, Sun Tran facilitates approximately 15 million passenger trips annually over its 27 regular and 10 express routes. This translates to approximately 50,000 passenger trips per average work-day and 17,000 average trips each weekend day. Three transit centers located throughout the city facilitate route information and easy passenger transfers. Service outside city limits is funded by inter-governmental agreements (IGA's) between Tucson and three nearby municipalities requesting service. Passenger fares account for approximately 22% of annual revenue, and more than 50% is subsidized by the City of Tucson's General Fund. Additional funding is garnered through the federal government and the State of Arizona.

Mass transit in Tucson had its humble beginnings in 1879 with a herdic (horse and mule-drawn) line operated by William Morgan, which traveled to and from Nine-Mile Water Hole to meet the Casa Grande Stage. Over the next 17 years, companies such as the *Tucson Land & Herdic Coach Company* and the *University Hack Line* (the first scheduled public service within the town) were added. Horse and mule-drawn cars with rear entrances and side facing seats served Tucson's retail district. In 1905, Sun Tran's forerunner, Tucson Rapid Transit (TRT), bought out the horse-drawn streetcar system and introduced electric streetcars the following year. On New Year's Day 1931, buses replaced the streetcars and the modern era was born. In 1969, the City of Tucson purchased TRT. Throughout all these changes, public transportation kept expanding into the modern, regional mass transit system serving today's Tucsonans from an 8 acre complex with 520 employees, and a fleet of 189 diesel, dual diesel/CNG, and CNG buses. Under contract, Professional Transit Management, Ltd. of Loveland, Ohio manages the system on a

daily basis for the City of Tucson. In 2004, Sun Tran was the recipient of the Arizona Transit Association's "Excellence Award Outstanding Transit Organization". In 2005, Sun Tran was given the American Public Transportation Association's "Outstanding Public Transportation System Achievement Award" in the category of 4 to 30 million annual passenger trips.

In the spring of 2004, the City of Tucson Department of Transportation (TDOT) and Sun Tran were selected by the Federal Transit Administration (FTA) to receive technical assistance and training, with the goal of developing and implementing an Environmental Management System (EMS). An EMS is a set of procedures designed to allow an organization to assess the environmental impacts of its activities and develop appropriate mechanisms to manage them, thus allowing the organization to operate with greater efficiency and control.

Different organizations have different reasons for wanting to implement an EMS. Prior to TDOT/Sun Tran involvement in this FTA/Virginia Tech Pilot Program, TDOT's environmental efforts mainly encompassed only a storm water program, operational procedures, and emergency management. The primary management impetus for TDOT/Sun Tran's pursuit of an EMS is three-fold: 1) to help achieve and maintain regulatory compliance, 2) to ensure waste stream minimization, and 3) to design and implement more effective operational controls. However, TDOT and Sun Tran also want to be at the forefront in environmental management. They are not merely committed to meeting environmental minimum standards; they are committed to **exceeding** them.

Fenceline

The Sun Tran bus maintenance facility operates 24 hours 7 days a week, staffed by approximately 100 maintenance employees. The Fenceline includes services associated with repair and maintenance of the transit buses. Sun Tran's bus maintenance facility became the fenceline for the purposes of piloting the EMS approach. It was selected by TDOT because of the variety of potential environmental impacts in the facility and because of the enthusiastic support for EMS implementation from Sun Tran's management and staff.

Core Team

The Core team was developed to involve senior management as well as employees who would provide direct input into the EMS development and processes. The members include:

- Kevin Faulkner, Maintenance Director-Sun Tran;
- Clare Conley, Staff Assistant-TDOT;
- Ivey Schmitz, Deputy Director-TDOT;
- George Caria, General Manager-Sun Tran; and
- John Zukas, Transit Services Coordinator-TDOT.

In addition to the Core Team, an Environmental Team and an Oversight and Implementation Team were developed to create and manage the Environmental Management System. Further, smaller sub-groups were formed to address development, coordination, and implementation of specific elements of the EMS

Key Drivers for Adopting an EMS

Environmental management has become part of Sun Tran's daily mindset, leading to improved efficiency, waste minimization, and more cost-effective operation. Furthermore, Sun Tran's public image is directly tied to its attitude toward the environment. Being cognizant of this, employees must assure the public that their activities and services, especially those with the potential to cause pollution, are effectively and efficiently managed. Sun Tran is strongly committed to maintaining a safe and clean environment, preventing pollution, and preserving the community's natural desert resources. The development of our EMS program is also in response to a challenge issued by former City Manager James Keene to the City of Tucson to "become one of America's ten best cities".

The Sun Tran maintenance facility was the City of Tucson's pilot program for its Storm Water Pollution Prevention Plan and continues to strive for continual improvement in all areas of environmental issues.

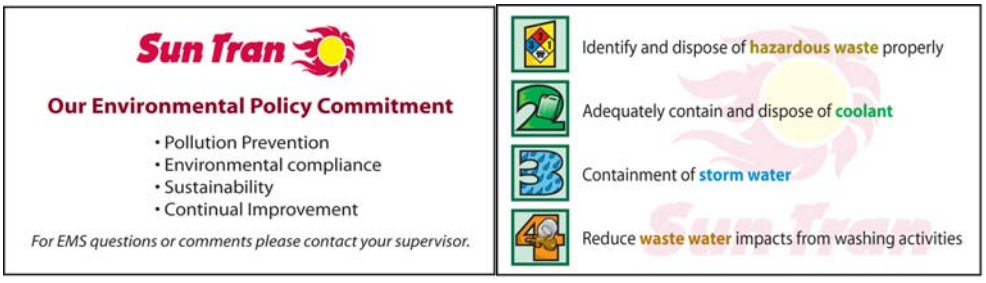
Sun Tran strives to continuously improve environmental practices with the goal of meeting or exceeding all environmental requirements concerning the bus maintenance facility, and the services associated with repair and maintenance of the transit buses. We also seek to empower each individual employee through ongoing training and will actively seek employee and public input in promoting environmental stewardship.

In addition, Sun Tran identified several critical factors leading to the decision to pursue creation of an EMS. These included a conviction that insurers and bonding agencies could reward the adoption of an EMS; acknowledging a safer work environment and reduced risks, the recognition that the EMS could be a valuable marketing and public relations tool that would clearly demonstrate the desire to hold Sun Tran to a very high standard of environmental contact; and the ability to partner environmental management with existing health and safety programs.

Significant Aspects & Impacts

Sun Tran is committed to minimizing significant environmental impacts identified in Sun Tran's environmental management system (EMS) by setting environmental objectives and continually evaluating progress toward meeting those objectives. Over 30 environmental aspects were identified and evaluated. However, the four most critically important aspects were selected for the first phase of the EMS.

These are **hazardous waste, coolant, storm water** and **waste water.**



Objectives and Targets

Each significant Aspect was evaluated by the environmental committee in order to set objectives and targets. The environmental committee looked at the activities, products, services, and policy commitments, in order to set the objectives, targets, target date, and performance indicator(s):

Significant Aspect	**Engine Coolant**
Management program:	Recycling and Handling
Activity/product/service:	Installation, recovery, and recycling
Policy commitment:	Prevent pollution and minimize significant Environmental impact
Objective:	Recycling to achieve initial 5% reduction in waste produced and shipped offsite
Target:	Training of 95% of maintenance related employees
Target Date:	Training done by July 2005
Performance Indicator(s):	Annual manifests from Tucson Fire Department Training Records

STATUS: Coolant: 98% of employees have been trained in the Coolant Curriculum. Reduction objective was not achieved. All coolant is being properly handled and recycled where practical.

Significant Aspect	**Hazardous Waste**
Management program:	Disposal of Hazardous Waste off Site
Activity/product/service:	Storage, disposal, and shipment of hazardous wastes
Policy commitment:	Reduce Waste
Objective:	Reduce the amount of hazardous waste generated by the Sun Maintenance Facility
Target:	Reduce hazardous waste shipped off site by 10%
Target Date:	April 1, 2005
Performance Indicator(s):	Aggregate quantity of waste generated (in lbs) as reflected on Manifests

STATUS: Hazardous waste: On track to achieve a 65% reduction in waste shipped in 2005 over 2002/2003 baseline levels. 99% of employees have been trained.

Significant Aspect	**Storm Water**
Management program:	Reducing impacts to storm water
Activity/product/service:	Storage of equipment and resources
Policy commitment:	Prevent pollution, minimize significant environmental impact, and improve system-wide environmental practices
Objective:	Reduce storm water impacts by training and properly storing all Materials
Target:	Training of 95% of maintenance-related employees in proper storage and housekeeping
Target Date:	7/1/05
Performance Indicator(s):	Annual audit at 4/22

STATUS: Storm water: 100% of employees have been trained in the Stormwater Curriculum. No adverse storm water impacts observed.

Significant Aspect	Waste Water
Management program:	Training of all maintenance-related employees
Activity/product/service:	Steam cleaning, bus washing, discharge of wastewater from maintenance facility into the sewer system
Policy commitment:	Prevent pollution, minimize significant environmental impact, and improve system-wide environmental practices
Objective:	Maintain non-significant user status
Target:	Training of 95% of maintenance-related employees in proper wastewater use.
Target Date:	7/1/05
Performance Indicator(s):	Annual audit at 4/22

STATUS: Wastewater: 100% of employees have been trained in the Wastewater Curriculum. Maintaining non-significant user status and meeting wastewater discharge permit limits.

Benefits of Adopting an EMS

As a result of developing and adopting an EMS, Sun Tran has realized a number of benefits:

- The environmental committees continue to meet on a regular basis in an effort to meet the EMS objectives. These meetings have promoted non-traditional, inter-departmental collaboration, which fundamentally stems from promoting continual improvement and meeting goals and objectives.

- Sun Tran has seen an increased level of environmental awareness among management, front-line employees, and vendors as a result of developing objectives & targets, environmental management programs, work procedures, and facilitating regularly scheduled meetings. At all levels, people are becoming stewards of the EMS. In addition, through these meetings with employees, Sun Tran receives feedback from employees for new ideas and improving existing ones. Sun Tran has sponsored an awareness day for employees where over 300 tee shirts and 400 information cards were given to employees and it has recently completed a vendor fair wherein over 60 vendors were provided information about their responsibilities and Sun Tran's regarding the EMS.

- Operating procedures are standardizing the flow of work, assuring that Sun Tran activities are both efficient and as sensitive as possible to environmental concerns. Moreover, as data is collected over the next several years, Sun Tran anticipates a significant decrease in waste generation, greater attention to resource management, and eventual cost savings.

- Due to the cooperation displayed during the creation of the EMS, departments that never before interacted are now providing resources and cooperation that were not previously available. This increased cooperation with departments not currently in the Fenceline raises the potential to eventually expand the Fenceline to the City's paratransit operations in the near future, and further a field as opportunities arises.

- Sun Tran employees are better trained because of the specialized curricula developed to address the four aspects chosen to be addressed first because of their criticality. In addition, the process of developing the Elements of the EMS, such as communications, involved a broad cross-section of Sun Tran staff, which raised their environmental consciousness and knowledge. There have been a number of notable "ah ha!" moments such as when members of subcommittees finally "got" the distinction between storm water and wastewater, or learned the proper disposal method of aerosol cans.

- The 10% reduction in hazardous waste generated in the Sun Tran maintenance facility results in lowered disposal costs borne by the City of Tucson's Fire Department.

- Monitoring and measuring have accomplished the goal of maintaining our non-significant water user status. This has resulted in a significant cost savings for the City, which would have been required to pay the fees for and meet the regulatory requirements for a significant water user.

The TDOT/Sun Tran EMS implementation continues to provide sound evidence to employees, taxpayers, financial institutions, and other stakeholders that the system controls are in place to achieve management goals and to strive for improvement of the environmental impacts of its operations. Successful implementation requires that TDOT/Sun Tran focus on activities that have always been considered routine and identify ways to do them in a more environmentally friendly manner.

Resources

The number of hours associated with the development and implementation of the program from February 2004 – May 2005 are listed below:

Members	Hours
Environmental Management Representatives	1,094
Core, Steering and Administrative Teams	1,294
Other	163
Virginia Tech direct technical support	80
TOTAL Hours	**2,631**

Category	Cost
Total Internal Labor expense	92,085
Travel expenses	14,102
Other	1,200
TOTAL Cost	**107,387**

Cost Savings

Sun Tran's initial objectives and targets were focused largely on training and development of employee awareness of environmental issues. After review of our progress in achieving these initial objectives and targets, and after completion of our evaluation of compliance with regulatory requirements, several new objectives and targets were established. Setting these new objectives and demonstrating progress in achieving them was critical to the certification of Sun Tran's EMS as compliant with the ISO14001 standard in October 2005.

One of these new objectives was "Ensure proper management of all waste streams". This required that we identify all waste streams and ensure we had documentation to support how each waste stream was managed (as hazardous or non-hazardous waste). Lack of documentation to support waste stream hazard determinations was identified as a concern by our compliance evaluation. This also required a physical inventory of all hazardous materials on site and a review to ensure we had current material safety data sheets (MSDS) for all items. While most MSDS were on site, many were not readily available for employee review and several hundred MSDS were found to be in the system for materials no longer in use.

Another new objective was to convert the fleet of diesel buses to bio-diesel fuel. 38% of Sun Tran's diesel only fleet has been replaced as of October 2005 by new buses that run on diesel fuel with 20% bio content (B20). This fuel reduces emissions of both carbon monoxide and particulate matter, both pollutants of concern to local air quality, by 12% over conventional diesel fuel. Having 20% of the fuel derived from a domestic, renewable source, also helps decrease US dependence on foreign oil. We are currently evaluating the feasibility of converting the remaining existing fleet of diesel buses to 5% Bio-diesel fuel. For November and December of 2005 Bio-diesel has been averaging $.17 per gallon less than regular #2 diesel. A total of 76,964 Bio-diesel gallons used has resulted in a total savings of **$13,080** for this 2 month period.

A new target for our objective of reducing storm water impacts is to evaluate the use of oil absorbing line skimmers at our main storm water outfall location. We have installed these skimmers and are anxiously awaiting our desert's winter rains to evaluate their effectiveness in eliminating the slight oil sheen that has been observed in runoff at this outfall.

Next Steps

TDOT/Sun Tran has increased dedicated resources by including additional staff and allowing existing staff to contribute time to the development and implementation of the EMS. With this added involvement and dedication to the program Sun Tran is committed was successful in becoming certified to the 2004 ISO 14001 standard in October 2005. This has been challenging but rewarding in that revisions to the 1996 standard had to be documented and the program implemented to meet the changes. The benefits to this will be the consistent monitoring of the program that will insure continual improvement.

Management Commitment

"The Environmental Management System (EMS) is a lifestyle change we are integrating into our everyday approach of doing business.

We are dedicated to incorporating the principals of EMS, and to improve our stewardship and reduce the impacts to our environments in all activities and services we provide."

Sun Tran

George Caria, General Manager, Sun Tran

The EMS Team has made several presentations to the Director of Transportation, who has demonstrated a continued commitment in the program. The Tucson Department of Transportation's Management Team has received presentations on the efforts to develop and implement an environmental management system, and will receive further updates on a regular basis.

In addition, the Tucson Finance Department's Central Safety Services Manager and the Environmental Manager for the City of Tucson have actively participated in program review. The current Tucson City Manager has approved of Tucson's participation in the program, and also receives periodic updates.

Tucson Department of Transportation Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for Tucson Department of Transportation, Tucson, AZ on August 24 and 25, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental management system – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The Tucson EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **ninety-nine percent (99%)**.

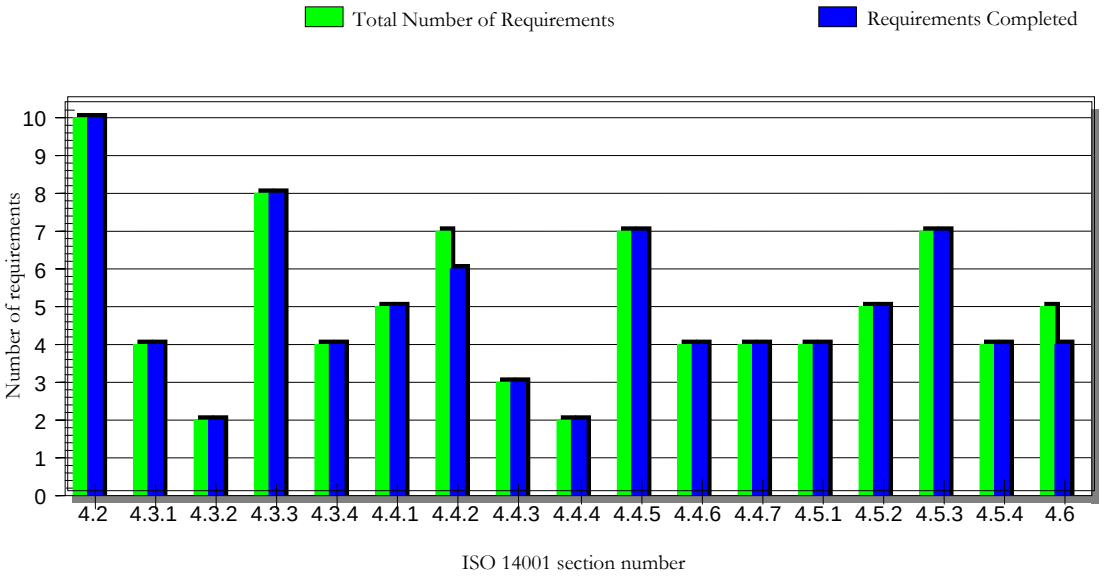
2. **Ninety-eight percent (98%)** of the requirements were **"met."**

3. **Two percent (2%)** of the requirements were **"partially met."**

Detailed scoring on next page.

Tucson Department of Transportation EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		**Overall Score (%)**	**Met (%)**	**Partially Met (%)**	**Not Met (%)**	**Ref.**
4.2	Environmental Policy	100	100	-	-	4.2.10
4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	100	100	-	-	4.3.41
4.4.1	Structure & Responsibility	100	100	-	-	4.4.11
4.4.2	Training, Awareness & Competence	93	86	14	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	100	100	-	-	4.4.51
4.4.6	Operational Control	100	100	-	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	100	100	-	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	100	100	-	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	100	100	-	-	4.5.41
4.6	Management Review	90	80	20	-	4.6.10

Utah Transit Authority

Profile

The Utah Transit Authority (UTA) operates along a region known as the Wasatch Front. The service area is 116 miles long, 50 miles at its widest point, 2 miles at its narrowest and encompasses over 1,633 square miles. UTA serves more than 60 municipalities with a population of over 1.7 million people which is about 80% of Utah's total population.

The Authority was incorporated on March 3, 1970, and began operation on August 10, 1970. UTA operates under state enabling legislation, Title 17A of the Utah State Code, and is classified as a special district. UTA is governed by a board of 15 trustees appointed by the local government entities within the service area. Management of UTA is overseen by a general manager, John M. Inglish, who directly reports of the Board of Trustees. UTA's current operating budget is approximately $130 million. The majority of UTA's funding comes from city and county local option sales tax. UTA operates 129 bus routes and over 20 miles of light rail service with approximately 1750 employees. In 2004, UTA provided over 34 million passenger trips.

In 2003, UTA had a major reorganization and now operates under a business unit concept. There are three bus operating business units, one rail services business unit, a support services business unit, a Capital Development Office, an Office of General Counsel, an Office of Operations Performance and an Office of the General Manager. In addition to traditional operations and maintenance functions, each operating business unit is responsible for the planning, marketing and implementation of its respective transit service. Coordination between the operating business units and administrative functions takes place through a Policy Forum. The Policy Forum includes all Corporate Officers as well as all Business Units Managers.

In 2000, the public in three counties voted to increase the local option sales tax dedicated to transit in order to fund the expansion of rail transit along the Wasatch Front. The advent of TRAX revolutionized UTA's concept and the public's perception of public transit. Over the next ten years, UTA plans to develop an additional 25 miles of light rail service, 100 miles of commuter rail service, implement a bus rapid transit system and revamp the Salt Lake area bus service.

UTA has a long tradition of environmental stewardship and the organization views the implementation of ISO 14001 as a way to reinforce the current practices as it embarks on a major expansion of transit along the Wasatch Front.

Fenceline

As a fenceline for its EMS, UTA chose the Meadowbrook maintenance division. The Meadowbrook facility is located in Salt Lake County and serves as both UTA's administrative headquarters and the largest of UTA's operating and maintenance divisions. The Meadowbrook operating division is one of two operating divisions in the Salt Lake Business Unit. The Salt Lake Business Unit operates approximately 370 buses, 250 of which operate out of the Meadowbrook division, seen below. There are 1,090 employees in the Salt Lake Business Unit, 789 are bus operators, 233 are mechanics and 68 are administrative employees. The operation and maintenance staff are, for the most part represented by the Amalgamated Transit Union.

UTA's Meadowbrook facility

Core Team

The core team is made up of eight members representing various functions within UTA, the Salt Lake Business Unit, the Support Services Business Unit, the Operations Performance Office and the Capital Development Office. The name and title of the team members are:

- Jerry Benson, Chief Performance Office – Senior Management Representative
- Grantley Martelly, Manager Safety & Environmental Protection – EMS Team Leader
- George Bryant, Manager of Maintenance
- Allen Petersen, Manager of Facility Maintenance
- Rick Garcia, Maintenance Training
- Ed Buchanan, Rail Safety Administrator
- Tim Rhoades, Bus Safety Administrator
- Jeffery Harris, Deputy Chief – Asset Management & Business Development

UTA chose such a large, diverse team in anticipation of expanding the EMS into other areas of the organization and because these representatives brought to the table a unique set of skills and knowledge that would benefit the implementation of the EMS. In addition to the core team, the ISO process involved a significant proportion of the fence line's maintenance, operation, and administrative staff. For example, as part of the process to identify environmental aspects the core team surveyed all the personnel within the fence line. This effort not only provided valuable information to the teams deliberations, it created a sense of ownership and participation that facilitated the implementation of the ISO 14001 program.

Key Drivers

UTA is goal oriented with a basic tenant of that orientation centering on the concept of continual improvement. Largely, UTA's efforts surrounding the continual improvement concept are a result of its governance structure. UTA is governed by an appointed, 15 member Board of Trustees. The Board's role is to set the overall strategic direction of the organization. It sets the strategic direction by establishing ends and means policies and by establishing yearly performance goals for the management team. Management's role is to implement the policy direction of the Board and strive to achieve the goals and objectives set by the Board. ISO 9001 and 14001 tenants are a natural complement to the organization's basic business philosophy and are seen as another set of tools that help the management team achieve its goals. In addition to the philosophical reason for adopting ISO standards, UTA choose to embark on its quality improvement program by adopting the ISO 14001 standard and implement an EMS because of several issues surrounding the organization's environmental compliance obligations.

On several occasions over the two years preceding its decision to adopt the EMS, UTA exceed the permitted amount of emulsified oil allowed in its waste water discharge. As a result of these violations, UTA began an internal review of related management practices and initiated an engineering assessment of associated mechanical systems. The results of this evaluation revealed that the discharge violations were not necessarily caused by a mechanical failure in the existing oil water separator (OWS). While staff did discover that the OWS was incapable of processing certain oil/water emulsions and ultimately recommended and implemented the installation of an improved OWS system, the primary cause of the violations was human in nature. Staff determined that existing management practices were either not being followed by UTA employees and contractors, or they inadequately addressed circumstances and practices that could lead to excessive discharges.

UTA recognized the processes outlined in the ISO 14001 standard would provide an improved framework for identifying and correcting troubled areas before they became problems. UTA also saw that the EMS structure would improve its ability to train and communicate the goals and expectations to all employees. As a result of this effort, UTA identified several key drivers for adopting an EMS which included the following:

- Paradigm shift from "reactive" to "proactive" management approach
- Development of better day-to-day management systems
- Creation of a more efficient operational system

- Avoidance of environmental disasters
- Enhanced awareness of employee impact on environment

Significant Aspects and Impacts

The establishment of these key drivers guided the core team's identification and evaluation of significant aspects and impacts. The core team analyzed the organization's activities and evaluated the potential for adverse environmental impacts, the extent of those potential impacts, environmental controls already in place and the ability of UTA to manage and/or influence those impacts.

The core team initiated an extensive, internal outreach program designed to inform personnel about the EMS program and solicit input and help in identifying potential environmental aspects and their associated impacts. The primary tools used for the outreach program were open houses and presentations to UTA management and staff both within and outside the EMS fence line. The core team also conducted surveys of all operations and maintenance personnel as its primary tool for collecting information on potential environmental aspects and their associated impacts.

Members of the core team then rated each aspect based on newly established criteria. Each aspect was given a score between one and five. The scores were then averaged and the aspects with the highest scores became the focus of the EMS. The team came up with a list of over 20 aspects and rated 13 of them. The list of aspects, with the six significant aspects included (I) in the EMS are listed below:

- Print shop (I)
- Industrial waste water treatment (I)
- Fuel consumption and excessive idling (I)
- Used oil management (I)
- Used oil/fuel/antifreeze filters (I)
- Paint related waste – aerosol cans and other pain products (I)
- Electricity usage
- Petroleum spills
- Electronic waste
- Paper recycling
- Recycling used tires
- Damaged batteries
- Breakdown leaks

Objectives and Targets

From the larger aspect list of 13 aspects, the team, through the rating process, identified six significant aspects to be covered in the initial EMS. The team then established a series of objectives and targets for those six aspects. The following table outlines the objectives and targets of some of the main aspects:

Aspect	Objective	Targets	Results
Print Shop: Employee Exposure in Shop; Exposure adjacent to shop; Disposal of chemicals	Reduce the number of employee complaints by 50%	• Establish process controls • Reduce print shop odors into employee areas outside of print shop by 04/01/05 • Inventory chemicals used in print shop by 07/31/04 • Document work procedures by 08/15/04 • Train employees in Hazard Communication and work procedures **Target Date: 12/29/04**	• Print shop odors reduced by more than 50%. • Chemicals Inventoried. • Work Procedures documented. • Training completed on Procedures.
Industrial Waste Water Treatment	No violations of permitted discharge limits	• Document baseline for Meadowbrook Industrial Wastewater Discharge System • Establish baseline of current situation as documented in the Notices of Violation reports and the Engineering Basis Document by 8/31/04 • Complete engineering evaluation and design for modification to current system to reflect current permit requirements and operational needs • Install new equipment by 10/31/04 • Document and implement operational controls • Monitor operational controls • Document BMPs • Train employees **Target Date: 07/31/05**	• Baseline document completed. • Basis document completed. • Engineering evaluation and design modifications documented and design completed. • New modified oil water separator installed. • Employees trained on operation and maintenance of the system.
Fuel Consumption and Excessive Idling	Increase fuel economy within the division's bus fleet	• Restructure Sing-Out procedures to better utilize fleet equipment characteristics in the areas of fuel economy and feasibility. • Restructure the vehicle starting process for the November 2004 Change Day period (Nov. 2004 – April 2005). • Document and evaluate the effectiveness of the changes to the system by April 29, 2005. • Develop and implement vehicle idling procedures for maintenance and operations employees by 11/31/2004 • Document and refine fuel delivery procedures and overfill reporting requirements by 09/30/2004. • Investigate fuel economy improvement opportunities by 10/31/2004 • Have Fleet Engineering study areas within the system and make recommendations for areas of improvement by 9/30/ 2004 **Target Date: 05/31/05**	• Signout procedures restructured to optimize fleet assignments and fuel economy. • Vehicle starting process revised to limit idling down to one hour or less. • Vehicle idling policy developed and approved for Bus Operations and Maintenance. • Fuel delivery procedure documented and trained. • Fleet Engineering study completed. • Fuel economy has improved in the fenceline facilities as idling has been reduced by about 70%.
Used Oil Management	To document the handling and recycling of used oil	• Develop standard operating procedures for used oil management by 11/30/04 • Train maintenance fenceline employees by 02/28/05	• SOP adopted, approved and training completed.
Used Oil / Fuel / Antifreeze Filters	To document the handling of used filters	• Develop standard operating procedures for handling used oil / fuel / antifreeze filters by 11/30/04 • Train maintenance fenceline employees by 02/28/05	• SOP adopted, approved and training completed.
Aerosol / Paint Can Disposal	To document the proper disposal of aerosol and paint cans	• Develop standard operating procedures for handling and disposal of aerosol and paint cans by 11/30/04 • Train maintenance fenceline employees by 02/28/05	• SOP adopted, approved and training completed.

Benefits of Adopting an EMS

The core team regards the process of establishing an EMS program as very productive. The adoption of the EMS program has improved its ability to anticipate and evaluate potential environmental aspect and associated impacts. With the adoption of its EMS, UTA has realized the following benefits:

- Increased employee awareness of environmental issues
- Increased management awareness
- Reinforcement of environmental processes currently in place
- Employee involvement with EMS implementation
- Proactive management systems
- Documentation of standard operating procedures
- Institutionalization of best practices in and permanent improvements of on-time performance
- Increased fuel economy of 3% due to reduction of bus idling time
- Reduction of air emissions
- Reduction of amount of oil in waste water by a factor of 10
- Reduction in adverse employee effects from print shop
- Training matrix for maintenance and operations
- Database for tracking employee training
- Increased employee initiative
- Increased accountability throughout organization
- Built-in controls
- Increased ability to identify exposure and smaller aspects
- Framework for sustainable growth

Resources

The resources needed to implement the EMS at UTA are represented below:

Members	Hours
Environmental Management Representative	14
Core Team	1,534
Other	1,200
Consulting	0
TOTAL Hours	**1,827**

Total Internal Labor Cost $ 72,964

Cost Savings

UTA documented the following cost savings during the initial EMS implementation:

Efficiency	Annual Savings
Idling fuel savings policy	$675,000
Idling labor savings	$63,000
Emission Reductions	PM=2,484 lb/yr NO_x=91,125 lb/yr **CO_2=3,037, 500 lbs/yr**
Addressing print shop environmental issues	$72,000
Industrial waste savings (one time)	$500,000
Recycle used oil	$4,000
Grand Total calendar **2005**	$1,300,000
Annualized savings each year in future	$814,000

Next Steps

Based on the success UTA has experienced in implementing an EMS at its Meadowbrook division, the organization is seeking to further expand the ISO 14001 standard to each of the six remaining bus and rail operating divisions. The current plan is to complete the process by the end of 2005. While the EMS will not be formally implemented in the Capital Development Office, the office is reevaluating the existing quality assurance and quality control programs and will likely adopt a frame work similar to that of ISO quality improvement programs.

Management Commitment

The management of UTA is highly committed to the continued success of ISO 14001 and the EMS within the organization. The high levels of commitment from top management have contributed greatly to UTA's overall success with the program. This, coupled with FTA support, has produced a positive and growing experience for the core team as well as all UTA employees. The ultimate result will not only be satisfaction from UTA, but a sustainable system that will continue to serve the public and environment of Utah.

"…….I'm proud of our employees who come to work each day, doing their part to bring a better quality of life to residents, businesses and all those who live and work along the Wasatch Front. This attitude reflects our agency's commitment to the environment and our desire to protect and manage the resources around us.

Many of you have heard the phrase, 'think globally, and act locally,' which means that actions to protect our rich natural heritage begin at home. That is why the Utah Transit Authority is working to further develop its Environmental Management System and to be one of the first public transit agencies in the nation to become certified with the International Standards Organization's ISO 14001 principles. ……..The EMS is a business management tool for any organization.

UTA's Environmental Management System helps managers identify harmful environmental impacts of our projects, services and activities and finds ways to resolve and prevent these impacts. And it allows every employee to take part in preventing problems and promoting environmental sustainability at work and even at home. …The implementation of an Environmental Management System is not just a requirement--it's a good idea……."

John Inglish, General Manager, UTA

UTA Audit Report

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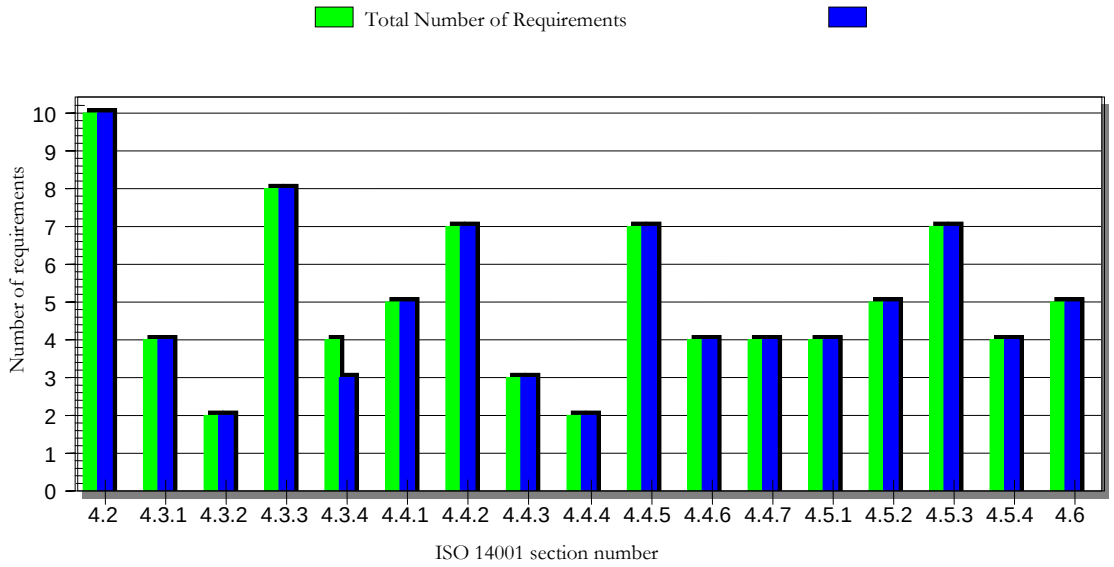
2. **Ninety-nine percent (99%)** of the requirements were **"met."**

3. **One percent (1%)** of the requirements was **"partially met."**

Detailed scoring on next page.

UTA EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		**Overall Score (%)**	**Met (%)**	**Partially Met (%)**	**Not Met (%)**	**Ref.**
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4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	100	100	-	-	4.4.51
4.4.6	Operational Control	100	100	-	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	100	100	-	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	100	100	-	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	100	100	-	-	4.5.41
4.6	Management Review	100	100	-	-	4.6.10

The Washington Metropolitan Area Transit Authority

Profile

Based on annual passenger miles, the Washington Metropolitan Area Transit Authority (WMATA) operates the second largest rail transit system and the fifth largest bus network in the United States. Safe, clean and reliable, "America's Transit System" transports more than a third of the federal government to work and millions of tourists to the landmarks in the Nation's Capital. Thirty-five Metrorail stations serve federal facilities and 47 percent of Metro's peak period commuters are federal employees.

WMATA was created in 1967 by an Interstate Compact to plan, develop, build, finance and operate a balanced regional transportation system in the National Capital area, including the District of Columbia, and portions of Virginia and Maryland. Construction of the Metrorail system began in 1969. Subsequently, WMATA acquired four area bus systems in 1973. The first phase of the Metrorail began operation in 1976 and the final leg of the planned 103-mile system was completed in 2001. In 2004, the first in-fill station opened along with two extension stations. There are now 86 Metrorail Stations serving a 106-mile system. The bus system services 12,435 bus stops. Additional expansions of Metrorail are in the planning stages.

Metrorail and Metrobus serve a population of 3.5 million within a 1,500 square mile area. Overall, 42 percent of those working in the center core – Washington and parts of Arlington County – use mass transit. Over a million riders per day are served by a fleet of 950 rail cars and over 1400 buses (including 160 fueled by CNG) with more cars and buses to arrive in the next few years.

WMATA is governed by a Board of Directors that is comprised of six appointed voting members and two appointed alternates from the District of Columbia, Virginia and Maryland. The General Manager/Chief Executive Officer serves at the Board's pleasure and operates WMATA, which employs over 10,000 people.

Since WMATA's inception, the federal government has contributed 65 percent of the capital costs for construction. Fares and other revenue fund 56 percent of the daily operations while state and local governments fund the remaining 44 percent. There is no dedicated source of

funding for WMATA. The FY2006 operating budget is about $1 billion and the capital budget is $500 million.

Fenceline

With support from the Chief Operating Officer for Metrorail, WMATA safety and environmental management chose the Greenbelt Rail Yard to be the fenceline for the pilot program to implement the ISO 14001 standard Environmental Management System (EMS). The facility is a 90-acre site located in Beltsville, Maryland. There are several organizations from the Department of Operations that work at or report to Greenbelt Rail Yard 24 hours/day, seven days/week, including Car Maintenance, Plant Maintenance, Systems Maintenance, Track and Structures and Rail Transportation, with a total of 155 union and 10 nonunion. The following operations occur at the Greenbelt Yard:

Car Maintenance (CMNT)

The majority of the CMNT employees work at the Service and Inspection Shop (7 tracks), which is a maintenance facility and a service/inspection area. Maintenance activities include complete and routine inspections, routine servicing, preventive maintenance, minor body repairs and interior and exterior cleaning. To manage the expanding fleet, additional heavy repair and overhaul are now located at this facility.

There is a paint booth and body shop where each rail car is prepared and painted. The Maryland Department of the Environment (MDE) has issued a permit for this operation.

In another building, a group is dedicated to the maintenance of track equipment used to maintain the system.

Plant Maintenance (PLNT)

PLNT is responsible for maintaining stationary equipment and providing custodial and grounds maintenance services. Many of the employees report to the Greenbelt Yard but work throughout the system and include HVAC maintenance and landscaping crews. Small engine repairs and custodial serves are provided on-site.

Systems Maintenance (SMNT)

SMNT is responsible for communications, power, and automatic fare card systems. The employees that report to the Greenbelt Yard perform battery maintenance and some communication repairs.

Track and Structures (TRST)

These employees mostly report to the Greenbelt Yard and pick up equipment prior to making repairs at other locations. Equipment and materials are stored in the Yard. Diesel and gasoline fueling is available for track equipment as well as non-revenue vehicles and other equipment.

Rail Transportation (RTRA)

The rail operators report to this location prior to being dispatched to passenger rail cars. Around 40 operators report to this facility.

WMATA was fortunate in that there was an established environmental program with a policy manual based on ISO EMS and there were procedures established to address regulatory requirements. However, a recent internal audit of the program indicated that there were communication and cooperation concerns between the groups sharing Rail Yards. It was concluded that Greenbelt, the only Yard with a painting operation in addition to the multiple groups, would be an excellent prototype.

Core Team

Our EMS core team consisted of six members:

- Kevin Lyons, Director, Department of Safety and Risk Protection
- Joan LeLacheur, Manager of Environmental Services
- Diana Wood, Environmental Protection Oversight Administrator
- Earl Harper, Supervisor in Car Maintenance
- David Hardt, Supervisor in Car Maintenance
- Claire Fox of Versar, Inc., Environmental Services Consultant

Key Drivers for Adopting an EMS

Because WMATA had an ISO 14001 based environmental program, management determined that it should be fully implemented. The FTA-sponsored program offered an opportunity for WMATA to learn from others how to most successfully achieve this goal.

WMATA was also aware of the potential benefits for adopting an EMS and was receiving encouragement from regulatory agencies throughout the region to adopt the formal system. WMATA management has identified communication as a key challenge throughout the organization. The EMS, with a substantial communication component, could result in improvements.

Significant Aspects and Impacts

The Core Team reviewed rating criteria with environmental staff and decided to adopt a matrix that first rated negative impacts such as scale of impact, potential regulatory exposure, probability of occurrence, and concerns of interested parties to determine the negative score which represents a lack of controls. The team then rated the positive impacts such as design, operating procedures; regulatory compliance history, training and competence to develop a positive average score for the presence of management controls.

The Team then proceeded to meet with supervisors and other employees from all of the work groups who report to Greenbelt to review their work activities and identify and rank the environmental aspects. Over 50 environmental aspects were identified; the most significant were:

- Rail Car Wash
- Battery Management
- Track Lubricators
- Storm Water Permit
- Wheel Lathe & Bore
- Blow Pit
- Diesel/Gas Storage

In retrospect, the list of aspects was long and detailed. For next year, the Team intends to generalize this list to better fit our management program and list aspects such as hazardous waste, storm water management, wastewater management, and also modify the aspect rating to include compliance audit results. This would better focus attention, facilitate training and communications, and provide for continuous environmental performance improvement.

Objectives and Targets

For each significant aspect, the Core Team, with appropriate supervisors, developed Objectives and Targets to address the significant environmental aspects.

EMS ACTION PLAN MATRICES - GREENBELT RAIL YARD						
Action Plans	**Target Date**	**Person Responsible**	**Completed**	**Partially Met**	**In Progress**	**Completion Date**
ENVIRONMENTAL MANAGEMENT PROGRAMS (EMPs)						
DIESEL & GAS CAN STORAGE **Objective: 100% Proper Storage**						
Target: Provide Signage						
ENSV staff assigned to Greenbelt will request signage to be made and posted.	**9/1/2004**	**ENSV**	☑			**10/1/2004**
Target: Train PLNT employees and supervisors on operational control						
Draft operational control	**8/19/2004**	**ENSV**	☑			**8/18/2004**
Attend PLNT safety meetings to discuss and review the operational control.	**9/30/2004**	**ENSV**	☑			**9/15/2004**
Train all employees in storm water management EMS awareness and aspects.	**10/1/2004**	**EPOA/ENSV**	☑			**5/15/2005**
Target: Remove all storage equipment that is rusted and damaged						
PLNT to remove all damaged storage equipment	**9/1/2004**	**PLNT DCO**	☑			**8/25/2005**
PLNT to replace all damaged storage equipment with suitable storage containers that comply with NFPA/USDOT flamm/comb. Liq. Storage and have proper labels.	**5/1/2005**	**ECO/DCO**	☑			**8/25/2005**
Target: Identify how the storage cabinets and cans are currently purchased and identify procedures to ensure approved containers are purchased.						
Identify how PRMT purchases containers and cabinets.	**8/1/2005**	**ENSV/PRMT**	☑			**8/17/2005**
Look at stock items and purchase card requests.	**8/1/2005**	**ENSV/PRMT**	☑			**8/17/2005**
INLINE LATHE / WHEEL BORE **Objective: To control the env. Impact of the cutting fluid used in the machining process and the metal chips left from machining process of rail car wheels.**						
Target: Develop a plan to identify, evaluate and monitor disposal contractors						
Identify all available contractors to dispose of metal chips	**N/A**					
Evaluate all contractors concerning methods and performance	**N/A**					
Monitor contractors performance to protect WMATA's liability	**N/A**					
Develop procedure to prevent oil release during storage and disposal						
Modify hopper	**7/1/2005**	**CMNT**	☑			**8/15/2005**
Post procedures	**7/1/2005**	**CMNT**	☑			**8/15/2005**

BLOW PITS **Objective: Comply with wastewater discharge permits for the facility. Cease use of chemicals to clean undercarriage of rail cars. Comply with RCRA requirements for solid waste disposal.**						
Target: Eliminiate use of chemicals to clean rail car undercarriage in Blow Pit.						
Review wastewater discharge permit for S&I Shop	**9/15/2004**	**SARP**	☑			**9/30/2004**
Use only high-pressure hot water to clean rail car undercarriage.	**ongoing**	**CMNT**	☑			**ongoing**
Prevent build-up of sludge in Blow Pit through regular floor cleaning after each work shift.	**ongoing**	**ENSV**	☑			**ongoing**
Sample wastewater discharge for presence of regulated materials	**9/15/2004**	**ENSV**	☑			**9/1/2004**
Target: Properly characterize sludge waste from Blow Pit. Properly characterize "tunnel dust" collected by Blow Pit local exhaust ventilation system.						
Review records for laboratory analysis results for sludge and for "tunnel dust" collected from Blow Pit.	**12/1/2004**	**ENSV**	☑			**11/15/2005**
Submit samples of sludge and collected "tunnel dust" for analysis in accordance with RCRA regulations, if not previously analyzed or, if results of analyses were from samples collected prior to August 31, 2003.	**ongoing**	**ENSV**	☑			**ongoing**
Manage waste disposal based on laboratory results, either as solid waste or as hazardous waste.	**ongoing**	**ENSV**	☑			**ongoing**
Analyze and characterize waste at least annually	**ongoing**	**ENSV**	☑			**ongoing**
Target: Provide and ensure understanding of this EMP to (by) CMNT personnel to the Blow Pit and PLNT personnel assigned to the Greenbelt S&I Shop						
Instruct CMNT Blow Pit personnel in the importance of following this EMP and the WMATA Rail Car Maintenance (CMNT) P.I. Procedures, Periodic "C" Inspection, Section 1, Undercar Cleaning Procedure; ENVE Engineering, WMATA MSI-180094, Rev. 07.	**10/1/2004**	**ENSV**	☑			**9/30/2004**
Instruct PLNT personnel, assigned to Greenbelt S&I Shop, of the importance of maintaining the Blow Pit local exhaust ventilation system, including the dust collector unit, in proper operating condition.	**10/1/2004**	**CMNT**	☑			**9/30/2004**
Ensure proper labeling, handling, storage and disposal of containers of sludge removed from Blow Pits and "tunnel dust" from hopper of dust collector through training of responsible CMNT and PLNT personnel.	**1/15/2006**	**CMNT/PLNT**		☑		
Maintain records of all laboratory analysis and disposal of Blow Pit solid waste at Greenbelt S&I Shop and centrally at ENSV.	**10/1/2004**	**ENSV**	☑			**5/7/2005**
LEAD-ACID BATTERIES **Objective: Develop and implement proper storage techniques for spent lead-acid batteries, and make improvements to handling and management practices.**						
Target: Communicate proper handling and management practices of spent lead-acid batteries in accordance with appl. Fed, state, and local regulations, the ECO Handbook and Consolidated Plans, and make improvements as required.						
Develop WIP	**8/29/2004**	**EPOA**	☑			**8/18/2004**
Communicate WIP to appropriate personnel.	**10/29/2004**	**EPOA**	☑			**10/20/2004**

STORM WATER PERMIT **Objective: To communicate good housekeeping requirements and recommendations of storm water mgmt permit and Consolidated Plan to facility operations and to ensure that such measures are being implemented.**						
Target: Conduct a reconnaissance visit to Greenbelt facility. Assess current site conditions with regard to good-housekeeping practices outlined in the Consolidated Plan and Storm water permit and determine where improvements are needed.						
Review storm water permit and Consolidated Plan for Greenbelt.	**3/30/2005**	**EMS TEAM**	☑			**3/15/2005**
Field visit the site and prepare map of potential pollutant sources with regard to storm drain inlets/structures and storm water management ponds.	**4/15/2005**	**ENSV**	☑			**3/30/2005**
Take photographs of proper and improper good-housekeeping practices	**4/15/2005**	**ENSV**	☑			**3/30/2000**
Determine responsible departments/personnel and conduct site visits accordingly. Discuss the importance of maintaining areas exposed to precipitation with regard to site drainage and regulatory storm water permit requirements and management practices and controls in the Consolidated Plan.	**4/15/2005**	**ENSV**	☑			**3/30/2005**
Discuss alternative management practices and the need to initiate a routine maintenance program.	**3/30/2005**	**ENSV**	☑			**3/15/2005**
All identified areas shall be cleaned up and a routine maintenance program/schedule initiated.	**7/30/2005**	**ECO/DCO**	☑			**7/20/2005**
Target: Provide two hours of storm water training to all personnel by April 2005 and amend Monthly Environmental Checklist to include baseline BMPs from the Consolidated Plan as a means of communicating the importance of maintaining good-housekeeping measures by July 20, 2005.						
Develop training syllabus by January 31, 2005.	**2/1/2005**	**ENSV/EPOA**	☑			**5/15/2005**
Train all personnel by April 30, 2005.	**4/30/2005**	**ENSV/EPOA**	☑			**5/30/2005**
Revise the Monthly Environmental Compliance Checklist to require monthly inspections of storm water management devices and to include associated baseline BMP recommendations from the Consolidated Plan and the storm water permit.	**7/20/2005**	**ENSV**	☑			**7/1/2005**
Ensure that employees who are responsible for clean-up and maintenance have knowledge of the requirements of the storm water permit, the Consolidated Plan, the ECO Handbook, the EMPM, and the Monthly Environmental Compliance Checklist by conducting periodic site visits/meetings.	**ongoing**	**ECO/DCO**	☑			**ongoing**
CAR WASH **Objective: Minimize water usage; Minimize chemical usage; Discharge waste water within acceptable pH range.**						
Target: Establish effective safeguards against the discharge of waste water that is outside of the acceptable pH range as established by WSSC.						
Evaluate effectiveness of water treatment system relative to use of currently approved chemicals as well as potential alternative chemicals referenced in Detailed Objective 1.1.	**11/30/2004**	**ENSV**	☑			**11/15/2004**
Immediate notification of ENSV for equipment malfunctions and/or undesired discharges.	**ongoing**	**ENSV**	☑			**ongoing**
Quarterly progress reports on amount and pH level of discharges to EMS Team for monitoring purposes.	**12/30/2005**	**ENSV**	☑			**11/30/2005**
Semi-annual progress summary report on this EMP for the Management Review meeting.	**12/30/2005**	**ENSV**	☑			**11/30/2005**

Benefits of Adopting an EMS

There are many benefits identified for adopting an EMS; specific areas that were significant to WMATA include:

- Improved employee awareness of potential environmental impacts of work activities
- Improved communications and cooperation through training and outreach (over 280 employees)
- Improved awareness through banners, flyers, environmental posters and cup cozies
- Improved knowledge of work activities
- Improved relations with regulatory agencies
- Modified environmental procedures and improved work procedures
- Gap analysis for ISO 14001 EMS certification
- Adoption of an environmental policy for the Greenbelt Yard
- Improved environmental performance in all the significant aspects and other aspects and reduced environmental liabilities

Resources

Since we first met with Virginia Tech and FTA, through June 1, 2005, the following labor hours were expended:

	Hours
EMS Core Team	1535
Other WMATA Employees	223
Consultant	670
Employee Training	560
TOTAL	**2988**

The total costs (using estimated hourly costs) were:

WMATA labor	$ 150,670
Consultant	48,127
Travel	10,200
Materials	2,600
TOTAL	**$211,597***

*These expenses were reallocated within the existing environmental management budget.

We found that resources can be an issue given competing priorities at WMATA and the demands of the existing environmental program. The Core Team envisions that this commitment of resources will be reduced as the EMS is expanded using the Greenbelt environmental procedures and components of the existing program.

Cost Savings and Avoidance

The Authority has had an environmental management program in place for over ten years so that many of the typical cost reductions obtained through waste minimization and pollution prevention have already been realized. For example, solvent parts washers were previously replaced by aqueous parts washers which significantly reduced waste and exempted the bus divisions as hazardous waste generators.

Through the EMS implementation at Greenbelt, some direct savings were obtained. The inline lathe/wheel bore environmental aspect involved the refusal by the metal recycle contractor to pick up the oily metal chips generated. If the chips can not be recycled, WMATA must dispose of them as oily waste at a cost of $135/drum or about $3500/year. Instead, the team found a way to absorb the oil prior to recycling so that the Authority would be **paid** about $3300/year by the recycle contractor (price varies with the market). Therefore, we have a net gain of $6800/year at the fence line. When the program is expanded to the other rail yards that generate the oily chips, there is a net gain of over $34,000/year.

We also believe there are cost savings obtained in improving the management of diesel and gas cans and lead acid batteries by reducing the potential for spills. Further, training in storm water management and EMA awareness and should reduce the likelihood of spills.

We see greater intangible benefits and reduced environmental liabilities. There have been improvements in communication and cooperation within the fence line and a new appreciation for environmental requirements by the employees. The EMS team gained a better understanding of work activities and their impacts. We anticipate more cost savings and reduced liabilities as the EMS is implemented at additional facilities.

Next Steps

The EMS Core Team sees the EMS components divided into three basic areas:

Administrative:	Document Control, Structure/Organization, Legal Requirements, Audits, Management Reviews, Records, Monitoring & Measuring
Communications:	Environmental Policy, Training and Outreach
Actions:	Aspects, Objectives and Targets, Environmental Management Plans, Operational Controls, Contractor Management, Emergency Response, Corrective/Preventive Actions

Although there are interactions between these three areas, it is a framework for the participants. The Administrative components are mostly addressed by safety and environmental management. The actual operating work groups at the facility are the keys to the Actions components. All employees are involved with communications, with safety and environmental management taking the lead.

Given the success of this model, WMATA will continue to maintain the EMS at Greenbelt Yard and will determine how best to expand it. Future steps include:

- Based on our pre-assessment, fill in gaps in preparation for the Virginia Tech EMS Audit (8/31/05) and continue quarterly internal EMS audits
- Reevaluate environmental aspects based on the compliance audit and lessons learned
- Develop a plan for expansion to other facilities
- Identify alternative training method for training in Spring 2006
- Transfer the Intranet-based WMATA EMS site to an Internet-based site
- Expand participation in the Greenbelt EMS

Management Commitment

The most senior management of WMATA was committed to the intent of the FTA-sponsored implementation of the EMS at the fence line. However, as the program progressed, it was difficult to get consistent participation and support due to competing priorities and reorganizations. The EMS Core Team realigned the management presentation to show how the EMS goals supported WMATA's priorities. Improved work procedures and environmental performance strengthen WMATA's primary service and reliability goals. This helped WMATA's senior management to better value the benefits of an EMS and understand management's role.

The Team also refocused its efforts to concentrate on the senior management at Greenbelt. The senior management from each WMATA operating work group were invited to the fourth quarter presentation. This presentation was then repeated for the Greenbelt Environmental Compliance Officer and Deputy Compliance Officers for each working group in addition to some supervisors.

The Greenbelt Environmental Compliance Officer and Deputies from each work group comprise the senior management for the Greenbelt Yard. They have approved and adopted the environmental policy for the Yard. This senior management team will continue to support and maintain the EMS at Greenbelt.

"The EMS is an effective 'grass roots' method for implementing WMATA's environmental policy and programs. The FTA/Virginia Tech assistance gave us the vehicle to move our policy from paper to a functioning program at the Greenbelt Yard."

Fred Goodine, Assistant General Manager
Department of Safety and Risk Protection

WMATA Audit Report

This Environmental Management System (EMS) Audit was based on a request by Virginia Tech (VT) and the Federal Transit Administration (FTA) as a final follow-up to an eighteen month program for EMS development and was conducted in accordance with the approved schedule.

Ms. Michele M. Lawton – EMS Specialist with Virginia Tech conducted the EMS Audit for WMATA – Washington D.C. on August 31 and September 1, 2005 to report on its conformance with the requirements of the ISO 14001:1996 standard.

The EMS was evaluated against each of the requirements set out in the ISO 14001:1996 standard titled "Environmental Management System – Specification with guidance for use." The Audit included the examination of documents, interviews of personnel and observations of activities and conditions.

The site visit involved a review of the core EMS documents with the EMS team. The WMATA EMS Team participated in the review and discussion regarding the scoring.

The following scores are the result of the EMS Assessment:

1. The overall score for the Assessment with respect to meeting the requirements of an EMS as specified in the ISO 14001:1996 Standard is **ninety-seven percent (97%)**.

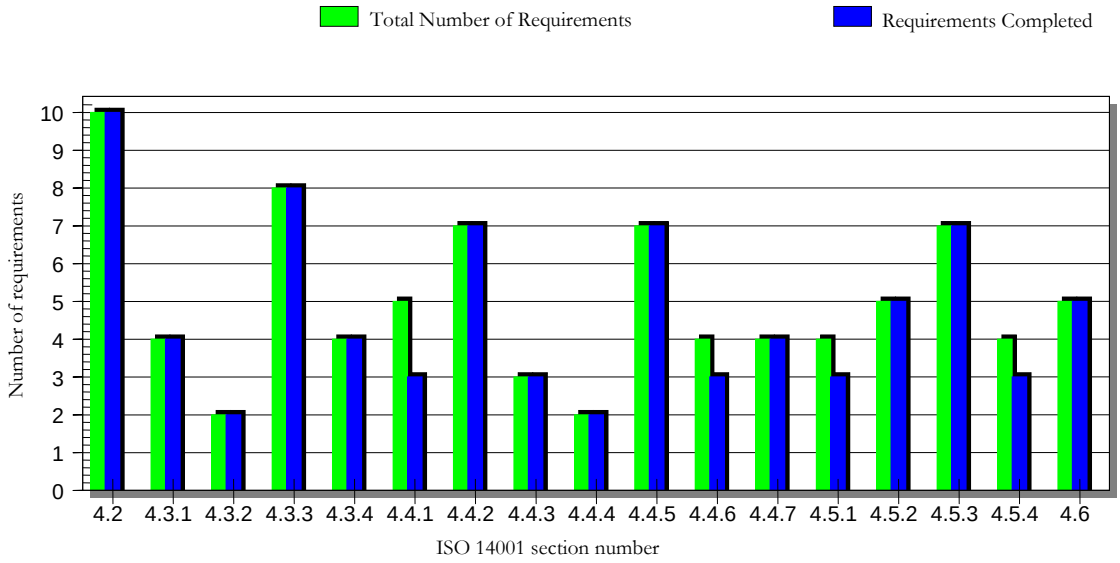
2. **Ninety-four percent (94%)** of the requirements were **"met."**

3**. Six percent (6%)** of the requirements were **"partially met."**

Detailed scoring on next page.

WMATA EMS Audit Results

The following graph compares the total number of requirements met *(shown in blue)* to the total number of requirements from the ISO 14001:1996 Standard *(shown in green)*.



This section compares the percentage of requirements *met*, *partially met*, and *not met* in each element of the EMS.

The ISO 14001:1996 Standard Elements of an EMS		Overall Score (%)	Met (%)	Partially Met (%)	Not Met (%)	Ref.
4.2	Environmental Policy	100	100	-	-	4.2.10
4.3.1	Environmental Aspects	100	100	-	-	4.3.11
4.3.2	Legal & Other Requirements	100	100	-	-	4.3.21
4.3.3	Objectives & Targets	100	100	-	-	4.3.31
4.3.4	Environmental Management Program(s) (EMPs)	100	100	-	-	4.3.41
4.4.1	Structure & Responsibility	80	60	40	-	4.4.11
4.4.2	Training, Awareness & Competence	100	100	-	-	4.4.21
4.4.3	Communication	100	100	-	-	4.4.31
4.4.4	EMS Documentation	100	100	-	-	4.4.41
4.4.5	Document Control	100	100	-	-	4.4.51
4.4.6	Operational Control	88	75	25	-	4.4.61
4.4.7	Emergency Preparedness & Response	100	100	-	-	4.4.71
4.5.1	Monitoring & Measurement	88	75	25	-	4.5.11
4.5.2	Nonconformance, Corrective & Preventive Action	100	100	-	-	4.5.21
4.5.3	Records	100	100	-	-	4.5.31
4.5.4	EMS Audit	88	75	25	-	4.5.41
4.6	Management Review	100	100	-	-	4.6.10