



BEST PRACTICES IN SUSTAINABLE ENVIRONMENTAL STEWARDSHIP

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U.S. Department of Energy Office of Health, Safety and Security

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Acronyms List

BNL	Brookhaven National Laboratory	HS-20	Office of Nuclear Safety, Quality
B20	Blend of 20% biodiesel with 80%		Assurance and Environment
	petroleum diesel	HS-22	Office of Environmental Assistance
CINT	Center for Integrated Nanotechnologies		and Policy
CO	Carbon Monoxide	INL	Idaho National Laboratory
CO_2	Carbon Dioxide	LEED	Leadership in Energy and
CTC	White House "Closing the Circle"		Environmental Design
	Award	LLNL	Lawrence Livermore National
DoD	Department of Defense		Laboratory
DOE	Department of Energy	LANL	Los Alamos National Laboratory
DSCP	Defense Supply Center Philadelphia	CH_4	Methane
E85	Fuel with 85% ethanol	NO_x	Nitrous Oxides
EM	Office of Environmental Management	ORNL	Oak Ridge National Laboratory
EMS	Environmental Management System	P2	Pollution Prevention
EO	Executive Order	$PM_{2.5}$	Particulate Matter < 2.5 microns in
EPEAT	Electronics Purchasing Environmental		size
	Assessment Tool	PM_{10}	Particulate Matter < 10 microns in size
EPP	Environmentally Preferable Purchasing	PNNL	Pacific Northwest National Laboratory
EPA	Environmental Protection Agency	SC	Office of Science
ESS	Environment, Safety, and Security	SNL	Sandia National Laboratory
FEC	Federal Electronics Challenge	SO_2	Sulfur Dioxide
FFV	Flexible Fuel Vehicle	SPR	Strategic Petroleum Reserve
FY	Fiscal Year	SRS	Savannah River Site
GSA	General Services Administration	USGBC	U.S. Green Building Council
		VOC	Volatile Organic Chemical

1. Introduction

The objective of DOE Order 450.1A, *Environmental Protection Program*, and its associated goals is to implement sound stewardship practices that are protective of the air, water, land, and other natural and cultural resources impacted by DOE operations. DOE O 450.1A requires Departmental sites to implement environmental management systems (EMSs) to cost effectively meet or exceed compliance with applicable environmental, public health, and resource protection laws, regulations, and DOE requirements.

A central feature of EMS is incorporation of continuous improvement and lessons learned from past experience. The DOE Office of Environmental Policy and Assistance (HS-22) regularly evaluates sustainable environmental stewardship projects from across the DOE complex and by other Federal agencies. To assist the DOE Field and Program Offices in identifying innovative and effective environmental stewardship practices or processes, HS-22 has compiled a list of examples of such projects for DOE sites to consider to reduce or minimize waste and to improve cost-effectiveness. This report contains summary descriptions of 24 projects from fiscal year (FY) 2007 that represent recent best practices and success stories from inside and outside DOE with the intention that these projects potentially can be implemented at other facilities.

HS-22 welcomes comments to improve the content of this report. In addition, we would appreciate any success stories or lessons learned arising from the direct application of any of the initiatives summarized in this report within your program or field operations. To provide feedback or request additional information concerning this report, please contact:

Beverly Whitehead Office of Environmental Policy and Assistance (HS-22) (202) 586-6073 beverly.whitehead@hq.doe.gov

2. Selecting the Projects

HS-22 reviewed hundreds of sustainable environmental stewardship projects in preparing this report, including nominations for the DOE P2 Awards Program and projects reported in the HS-20 Awards and Accomplishments Database. In addition, HS-22 reviewed projects performed by other Federal agencies that were nominated for White House Closing the Circle (CTC) Awards, as well as projects described in other publications. HS-22 undertook this review to identify projects that met the following criteria:

- involve cost-effective business practices to improve sustainable environmental stewardship performance;
- provision of a new idea not widely implemented throughout the DOE complex; and
- applicability of the project/practice to other DOE sites.

2.1. Information Sources

HS-22 reviewed sustainable environmental stewardship projects performed by both DOE and other Federal agencies. These projects were obtained from the following sources:

- <u>DOE's P2 Awards Program</u> DOE's internal environmental stewardship awards programming recognizing projects from throughout the DOE complex.
- White House Closing the Circle Awards Awards program that recognizes
 outstanding achievements of Federal employees and their facilities for efforts
 which resulted in significant contributions to, or have made a significant
 impact on, promoting environmental stewardship.
- White House Closing the Circle Newsletters OFEE's semi-annual newsletters highlighting environmental stewardship activities in the federal government.

3. Project Summaries

This section of the report contains 24 one-page summary descriptions of recent projects that the Office of Environmental Policy and Assistance has identified as best practices for improving sustainable environmental stewardship performance. Project Summaries are divided into two main categories, DOE Best Practices and other Federal Agency Best Practices.

3.1. Best Practice Summaries

The best practices project summaries are designed to provide key information about these projects by outlining the costs and benefits of the listed initiatives. The best practices presented as part of this report are listed on the following pages. Each project summary contains the following fields:

- **Source** The source of the described project and where further information is available.
- **Applicability** The type of action for which the project might be appropriate.
- Facility The location or site where the described project was performed.
- **Current Operational Issue** A brief description of the events or circumstances upon which the project was based.
- **Solution** The steps taken to implement the project. The commercial names of devices and companies used to achieve the objectives are identified in some cases. Identification of these devices and companies should not be construed as an endorsement of the specific devices and companies, but rather as a record of how the accomplishment was achieved.
- **Start-up Cost** The upfront costs associated with the project.
- **Lifecycle Costs Avoided** The operational, disposal, or treatment costs avoided over the lifetime of the project. This serves as a comparison to the start-up costs.
- Waste Reduced The amount of material that was either recycled or avoided due to the implementation of the project.
- **Contact Information** The contact information for the primary point of contact for the project.

3.2. Pollution Prevention Best Practices Database

In addition to this report, the best practices are included in an online database found at http://www.hss.doe.gov/pp/p2ll/. This database is a useful tool for finding best practices over a span of multiple years from the sources outlined above. The database, which has best practices starting from FY 2004, can be easily searched by keyword in the project title and/or project description. Figure 1 provides a screenshot of the database web interface.

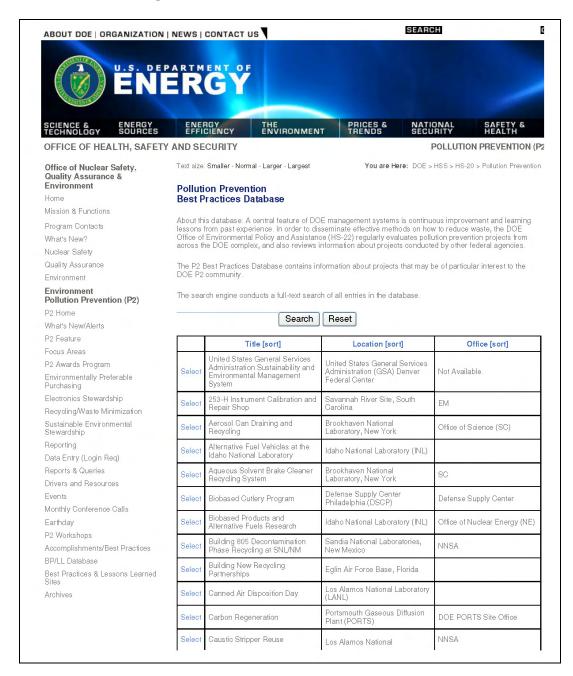


Figure 1: Best Practices Database Interface

4. Department of Energy Best Practices

Project Title: Canned Air Disposition Day

Project Summary		
Source:	P2 Awards Database	
Applicability:	Recycling	
Facility:	Los Alamos National Laboratory (LANL)	
Current Operational Issue:	Using canned air for non-programmatic purposes, such as keyboard cleanings, is problematic because EPA classifies canned air as a cryogen and an explosive. As a result, containers must be disposed as a hazardous waste under Resource Recovery and Conservation Act (RCRA) and Department of Transportation (DOT) requirements.	
Solution:	As part of the Environmental Management System's communications goals, LANL staff developed an Environment, Safety, and Security poster highlighting costs associated with the use of canned air at LANL. After the poster was distributed, staff organized a Canned Air Disposal Day on Aug. 29, 2007. The event was designed to collect, recycle, and dispose of canned air containers at the Laboratory. The majority of the collected cans did not appear on the Lab's ChemLog Inventory, so locating them helped the institution avoid potential hazardous waste compliance violations. Publicity from the EES poster regarding canned	
	air netted some 400 cans prior to the one day event.	
Cost and Benefit S	Summary	
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	Recycling of all gathered cans netted approximately \$200,000 in savings for LANL.	
Waste Reduced:	The event collected 303 cans for proper disposal, as well as 103 full cans that will be redistributed for programmatic applications.	
Contact Information		
Project Contact:	Michael Sweitzer	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	NNSA Service Center	
Phone:	505-845-4347	
E-mail:	msweitzer@doeal.gov	

Project Title: Development of a Technique to Use Fluorescently Labeled Oligonucleotides

Project Summary		
Source:	P2 Awards Database	
Applicability:	Waste/Pollution Prevention	
Facility:	Brookhaven National Laboratory (BNL)	
Current Operational Issue:	Understanding the effects of radiation on humans in the environment, in the workplace, and in radiotherapy requires insight into the induction and repair of damage to DNA. Most investigations of repair of clustered damages in synthetic oligonucleotides use small DNA molecules (known sequence oligonucleotides) labeled with 32P or 14C at one end of one strand. The intact 32P- or 14C-labelled strand migrates to a known position on an electrophoretic gel, and is detected by counting radioactivity.	
Solution:	The researchers at the BNL Biology Department developed a technique that uses fluorescently labeled oligonucleotides to replace the measurement of radioactivity. The research team used two fluorescent tags of different color, and assembled them into an oligonucleotide containing two DNA damage sites. They tested the action of a DNA repair enzyme to cut the DNA at these sites, then denatured the DNA, and separated the individual strands by size. They can identify the cleavage products both by size and by color or the fluorescent tags	
Cost and Benefit S		
Start-up Cost:	The purchase cost of the fluorescently labeled oligonucleotides, including supplies for their use and labor, was \$24,600.	
Lifecycle Costs Avoided:	Disposal of radioactive and hazardous waste cost avoidance of \$67,600	
Waste Reduced:	The waste reduction with this method included: 72 cubic feet of radioactive solid waste, 35 gallons of mixed liquid waste and 108 gallons of hazardous liquid waste.	
Contact Information		
Project Contact:	Betsy Sutherland and Brigitte Paap	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Brookhaven National Laboratory	
Phone:	(631) 344-3380	
E-mail:	bms@bnl.gov	

Project Title: Electronics Stewardship – Another Year of Progress

Project Summary		
Source:	P2 Star Winner	
Applicability:	Electronics Stewardship	
Facility:	Sandia National Laboratories – New Mexico (SNL/NM)	
Current Operational Issue:	Entering its first full year as a Federal Electronics Challenge (FEC) partner, SNL/NM needed to establish new electronics stewardship goals and activities in its FY 07 program plan.	
Solution:	With new FEC goals set in February 2007, the SNL/NM P2 program partnered with several groups to achieve significant improvements and efficiency gains in purchasing EPEAT-registered computers, enabling Energy Star operations and safely disposing of excess electronics to reduce their environmental impact. In FY07, SNL purchased 11,101 computer units, 96.9% of which were EPEAT-compliant, and recycled 136.3 metric tons (MT) of electronic scrap.	
	The recycling process for electronics means there is no more chance of accumulation and backlog of excess, unwanted electronic goods, which could have resulted in high disposal costs if the material had been declared waste. Now all materials are treated as recyclable.	
Cost and Benefit S	Summary	
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	\$41,400 in disposal costs avoided.	
Waste Reduced:	SNL/NM recycled 136.3 MT of electronic scrap.	
Contact Information		
Project Contact:	Ralph Wrons	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Sandia National Laboratories – New Mexico	
Phone:	505-844-0601	
E-mail:	rjwrons@sandia.gov	

Project Title: Exploring and Expanding Alternative Fuels and Alternative Fuel Vehicles at

the Idaho National Laboratory

Project Summary		
Source:	P2 Awards Database	
Applicability:	Alternative Fuels and Fuel Conservation	
Facility:	Idaho National Laboratory (INL)	
Current Operational Issue:	The INL transportation system began in 1953. Today over 2,500 workers use the vehicle fleet and bus system daily on the 890 square mile site. The remoteness of the site from surrounding towns and the distances between the 8 work locations create significant transportation demands.	
Solution:	In Fiscal Year 2007, INL established objectives in its EMS to increase alternative fuel use through the Pollution Prevention Plan and the Energy Management Plan. INL developed and implemented plans to support this goal to change fueling practices and increase awareness so that all FFV drivers use fuel with 86% ethanol (E85) when available. Alternative fuel vehicles at INL comprise 33 percent of the Site fleet with flex fuel vehicles (FFV) accounting for 22 percent, up from 7 percent the year prior. The impact of alternative fuel use at INL has decreased petroleum dependency by 142,317 gallons as a result. An ongoing initiative is to purchase more fuel efficient FFV's to replace older inefficient gasoline vehicles. This initiative is supported by INL working groups, including Facilities & Site Services, Transportation Services, Energy Management, Pollution Prevention Working Group and the INL Light Vehicle Utilization Working Group.	
Cost and Benefit S	Summary	
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	Not available.	
Waste Reduced:	1.47 million pounds of air emissions were prevented through the use of alternative fuels.	
Contact Information		
Project Contact:	David Gianotto	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Idaho National Laboratory	
Phone:	208-526-8529	
E-mail:	david.gianotto@icp.doe.gov	

Project Title: New LEED-NC Certified Buildings at Sandia National Laboratories/New

Mexico

Project Summary		
Source:	P2 Star Winner	
Applicability:	High Performance Sustainable Buildings	
Facility:	Sandia National Laboratories/New Mexico (SNL/NM)	
Current Operational Issue:	SNL/NM is continuously looking to reduce the environmental footprint of its buildings.	
Solution:	In 2007 three new buildings at SNL/NM were awarded certification under the US Green Building Council's (USGBC) Leadership in Energy and Environmental Design – New Construction (LEED-NC) green building rating system. These projects represent SNL/NM's continuing commitment to the application of high performance, sustainable green building principles and practices to complex research and development and laboratory-type facilities. The three buildings are Weapons Evaluation Test Laboratory, the Center for Integrated Nanotechnologies (CINT) facility, and MESA Microsystems Fabrication facility. For example, at the CINT facility, building-based water use efficiency was a primary design element in consideration of building operations, occupant needs, and lab processes. CINT was designed to provide a 20% decrease in water for lab use, 30% reduction in potable water for occupant use, and at least 50% decrease in non-potable water use. Also, the CINT heating and air conditioning system, lighting systems, and process functions, were designed to achieve a 30% reduction relative to the ASHRAE 90.1 standard.	
Cost and Benefit Summary		
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	Not available. Through increased operational efficiency, LEED certified buildings are expected to reduce lifecycle costs, especially those associated with energy and water usage.	
Waste Reduced:	2,258 tons construction waste avoided.	
Contact Information		
Project Contact:	Jack H. Mizner	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Sandia National Laboratories/New Mexico	
Phone:	505-845-3576	
E-mail:	jhmizne@sandia.gov	

Project Title: ORNL's Comprehensive Sustainability Initiative - Inside and Out

Project Summary		
Source:	P2 Star Winner	
Applicability:	Sustainable Stewardship	
Facility:	Oak Ridge National Laboratory (ORNL)	
Current Operational Issue:	In 2000, ORNL had an industrial look and feel with old, ad hoc landscaping.	
Solution:	ORNL staff developed a "Master Plan" for all new facilities and landscaping to transform the facility into a campus setting. This master plan integrated sustainability as an organizing design principle. The plan created a physical growth pattern based on ORNL's needs and served to provide a sense of coherence to the entire campus. This master plan continues to be the touchstone by which site and building proposals are evaluated, enabling each part of the ORNL campus to fit into the larger setting. ORNL's entire new six-building East Campus is Leadership in Energy and Environmental Design (LEED) certified and provides approximately 750,000 square feet of LEED-certified space. The most recently built facility in the East Campus, the Multi-Program Research Facility, was completed and awarded LEED Gold Level certification in December 2006. This facility added 210,000 square feet to the campus inventory of 500,000 square feet of LEED certified facilities.	
Cost and Benefit S	Summary	
Start-up Cost:	Not identified.	
Lifecycle Costs Avoided:	\$75,000 in disposal costs. Through increased operational efficiency, LEED certified buildings are expected to reduce lifecycle costs, especially those associated with energy and water usage.	
Waste Reduced:	Over 490 metric tons of landfill waste were avoided.	
Contact Information		
Project Contact:	Susan R. C. Michaud	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Oak Ridge National Laboratory, Office of Science	
Phone:	865-576-1562	
E-mail:	sun@ornl.gov	

Project Title: ORNL's Green Transportation Initiative

Project Summary		
Source:	P2 Star Winner	
Applicability:	Alternative Fuels and Fuel Conservation	
Facility:	Oak Ridge National Laboratory (ORNL)	
Current Operational Issue:	ORNL is continuously looking to reduce the facilities' reliance on petroleum fuels.	
Solution:	During the past several years, the ORNL campus has experienced a significant "green" transformation. Green transportation features were integrated into this transformation along with the addition of several environmentally-friendly buildings and landscaping. Specifically, ORNL has had a multi-pronged approach to green transportation: (1) encouraging lab personnel to walk and to ride bikes through innovative campus design, (2) encouraging shared transportation (on-site taxi and off-site carpooling with approximately 130 active participants), (3) integrating maximized fuel efficiency features when upgrading roads (roundabout to minimize idle time at traffic light), (4) continuing the expansion of the flex fuel vehicle fleet, and (5) implementing bio-diesel in the vehicle fleet. All of these activities help reduce petroleum consumption.	
Cost and Benefit S		
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	Not available.	
Waste Reduced:	ORNL's green transportation initiative has increased the use of bio-based materials, specifically increased the use of alternative fuel, reduced reliance on petroleum-based materials, and reduced tail pipe emissions.	
Contact Information		
Project Contact:	Susan R. C. Michaud	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Oak Ridge National Laboratory, Office of Science	
Phone:	865-576-1562	
E-mail:	michaudsr@ornl.gov	

Project Title: Pantex Plant E-85 and Biodiesel Programs Team

Project Summary		
Source:	P2 Awards Database	
Applicability:	Alternative Fuels	
Facility:	Pantex Plant	
Current Operational Issue:	Pantex is continuously looking to reduce the site's reliance on petroleum fuels.	
Solution:	Pantex, through the General Services Administration (GSA), leases Flexible Fuel Vehicles (FFVs), which can use any mixture ethanol and gasoline. The FFVs have control modules that automatically adjust to changes in ethanol content in the fuel, making the transition transparent to the vehicle's driver. When the E-85 Fuel Station opened in 2003, Pantex had 88 FFVs out of a fleet of 346 gasoline-powered vehicles. By FY 2007, the number of FFVs had grown to 124 out of a total of 303 GSA vehicles. This represents an increase from 25% FFVs in FY 2003 to 40% in FY 2007. As a follow-on to this progress, Pantex plans to replace an additional 21 gasoline-powered vehicles with FFVs during FY 2008. To further reduce the use of petroleum fuels, Pantex has also made the switch from diesel to B20 bio-diesel fuel, which is a mixture of 20% vegetable oil or animal fat and 80% diesel. While the primary benefit of B20 is the reduced use of nonrenewable petroleum energy, it also reduces particulates and greenhouse gas emissions compared to conventional diesel fuel. Pantex began experimenting with the use of B20 in a limited number of vehicles in 2002.	
Cost and Benefit S		
Start-up Cost:	Since the vehicles are leased through GSA, the start-up cost specific to alternative fuel vehicles is minimal.	
Lifecycle Costs Avoided:	Pantex has reduced the use of gasoline from 198,056 gallons in FY 2003 to only 100,166 gallons in FY 2007, almost a 50% reduction.	
Waste Reduced:	Pantex avoided the air pollution association with the reduction in fuel consumed.	
Contact Information		
Project Contact:	Julie Chavarria	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Pantex Plant	
Phone:	806-477-6533	
E-mail:	jchavarr@pantex.com	

Project Title: PPPL's Outstanding Recycling in FY 07

Project Summary		
Source:	P2 Star Winner	
Applicability:	Recycling	
Facility:	Princeton Plasma Physics Laboratory (PPPL)	
Current Operational Issue:	PPPL continues to improve its recycling efforts through a lab-wide effort.	
Solution:	PPPL more than tripled its recycling savings from FY 2006 to FY 2007 by finding new and innovative items and ways to recycle. For example, four million pounds (2,000 tons) of ballast stone from a major roof replacement were recovered and stored on site for landscaping projects in PPPL sustainable landscaping efforts. The estimated value of this smooth round landscaping stone (which was formerly disposed of off site) is \$42,840.	
Cost and Benefit S	Summary	
Start-up Cost:	None.	
Lifecycle Costs Avoided:	FY07 PPPL's net savings from recycling operations was \$257,287.	
Waste Reduced:	All materials recycled earned a reduction of 501 metric tons of greenhouse gases.	
Contact Information		
Project Contact:	Thomas J. McGeachen	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Princeton Plasma Physics Laboratory	
Phone:	609-243-2948	
E-mail:	tmcgeachen@pppl.gov	

Project Title: Recycling of Lead for CH2M Hill Hanford

Project Summary		
Source:	P2 Awards Database	
Applicability:	Waste/Pollution Prevention	
Facility:	Hanford Site	
Current Operational Issue:	At the Hanford Site, radioactively contaminated lead is generated through normal operations at the Tank Farms and 222S Laboratory. The lead would have to be disposed of as a radioactive and hazardous waste unless the site could find a way to recycle it.	
Solution:	Hanford's Waste Services Organization contracted with the TOXCO Materials Management Center to provide lead recycling to CH2M HILL Hanford, a contractor for Hanford's Tank Farms and 222S Laboratory.	
	Lead from Tank Farms and 222S Laboratory was consolidated and packaged for shipment to TOXCO. A shipment of approximately 11,000 kilograms left the Hanford site in late August 2007.	
	Recycling of lead at the TOXCO facility for use at other DOE facilities contributes to achieving DOE P2 sustainable environmental stewardship goals by reducing the amount of toxic materials disposed of and reduces the life cycle cost of mission related activities.	
Cost and Benefit S		
Start-up Cost:	The cost to recycle was approximately \$46,500.	
Lifecycle Costs Avoided:	The cost for treatment and disposal of the lead could be expected to be approximately \$71,000. There was a cost savings of approximately \$24,500.	
Waste Reduced:	11,000 kilograms of lead waste were recycled.	
Contact Information		
Project Contact:	Gae Neath	
Agency:	U.S. Department of Energy	
Program Office/ Organization:	Office of River Protection	
Phone:	509-376-7828	
E-mail:	Gae M Neath @orp.doe.gov	

Project Title: Recycling Out-of-Use Electrical Transformers from the ETTP Site

Project Summary	
Source:	P2 Awards Database
Applicability:	Recycling
Facility:	East Tennessee Technology Park (ETTP)
Current Operational Issue:	The DOE Environmental Management (EM) team in Oak Ridge is engaged in the decontamination, demolition and remediation of the ETTP in Oak Ridge, Tennessee. A component of the EM activities includes a major deactivation effort that involves all of the major utility systems and ultimately affects each building on the site. Two hundred transformers have been identified to date that will need to be further evaluated by EM.
Solution:	A comprehensive radiological contamination survey protocol was developed. By using that protocol and combining it with process knowledge, the project team identified the transformers that were not radiologically contaminated and therefore were releasable offsite for recycle. The transformers under consideration for recycling were sampled and the analytical results were documented to substantiate that hazardous substances did not exist on them or in them.
Cost and Benefit S	Summary
Start-up Cost:	None.
Lifecycle Costs Avoided:	An estimated \$1,333,000 cost avoidance was realized in labor (for dismantling, downsizing/shearing and actual disposal) and landfill disposal costs.
Waste Reduced:	To date, a total of 27 non-polychlorinated biphenyls oil containing electrical transformers (an estimated 1,800 cu. yd.) have been successfully recycled by the ETTP D&D project. It is estimated that during the lifecycle of this project, electrical transformers will be recycled.
Contact Information	
Project Contact:	Richard W. Martin
Agency:	U.S. Department of Energy
Program Office/ Organization:	DOE-Oak Ridge Office
Phone:	(865) 576-9428
E-mail:	MartinRW@oro.doe.gov

Project Title: Recycling of Soil, Asphalt, and Mulch

Project Summary			
Source:	P2 Awards Database		
Applicability:	Recycle/Reuse		
Facility:	Los Alamos National Laboratory (LANL)		
Current Operational Issue:	The Chemistry and Metallurgy Research Replacement (CMRR) project is constructing several buildings to replace the old Chemistry and Metallurgy building.		
Solution:	A substantial quantity of material is being reused from this multi-year construction project. An anticipated 207,000 cubic yards of soil will be reused at various sites at LANL and at the Los Alamos County landfill to help with closure capping work. The CMRR project reused 486 cubic yards of leftover crushed asphalt from another project as base course for vehicles to drive on at the CMRR site. The CMRR project used ground brush and trees as mulch for the site to suppress dust. This dust suppression practice was identified as a best management practice in LANL's Stormwater Pollution Prevention Plan. By avoiding hundreds of truck trips to Los Alamos, this recycling project improved safety and air quality while reducing fuel use.		
Cost and Benefit S	Summary		
Start-up Cost:	None.		
Lifecycle Costs Avoided:	Reuse of these materials could save LANL up to \$1.7 million.		
Waste Reduced:	An anticipated 207,000 cubic yards of soil will be reused at various sites at LANL. The CMRR project reused 486 cubic yards of leftover crushed asphalt from another project as base course for vehicles to drive on at the CMRR site.		
Contact Informati	Contact Information		
Project Contact:	Denny Hjeresen		
Agency:	U.S. Department of Energy		
Program Office/ Organization:	Los Alamos National Laboratory		
Phone:	505-665-7251		
E-mail:	dlh@lanl.gov		

Project Title: Reusing Science - The SciBooNE Experiment at Fermilab

Project Summary			
Source:	P2 Star Winner		
Applicability:	Recycling/Reuse		
Facility:	Fermi National Acceleratory Laboratory (Fermilab)		
Current Operational Issue:	SciBooNE is a large scale, high-energy physics experiment designed to measure neutrino cross sections (fraction of the time a neutrino interacts with matter). The project, like many recent projects, had been subject to tightening budgets. At the time the experiment was proposed, budgetary constraints severely limited what could be done.		
Solution:	The experimenters found a way around these constraints by reusing detector systems from around the world as well as surplus material from the Fermilab site. This extensive reuse enabled the SciBooNE experiment to proceed as planned by reducing the cost of the experiment to 27% of the construction cost using new materials. Many of the materials used in SciBooNE will be reused again in future experiments.		
Cost and Benefit S	Summary		
Start-up Cost:	None.		
Lifecycle Costs Avoided:	Reusing existing materials saved the experiment a total of \$3.3 million.		
Waste Reduced:	Approximately 70 tons of material and equipment was reused.		
Contact Informati	Contact Information		
Project Contact:	Rick Tesarek		
Agency:	U.S. Department of Energy		
Program Office/ Organization:	Fermilab, Office of Science		
Phone:	630-840-8609		
E-mail:	tesarek@fnal.gov		

Project Title: Rollback of H-Canyon Third Level (CA to RBA)

Project Summary		
Source:	P2 Awards Database	
Applicability:	Waste/Pollution Prevention	
Facility:	Savannah River Site (SRS)	
Current Operational Issue:	The site needed to convert H Canyon's third level of the canyon from a contamination area to a radiological buffer area.	
Solution:	H Canyon's Shift N4 decontaminated and recovered much of the third level of the canyon. The work consisted of wiping down and decontaminating over 200 linear feet of basins and walls filled with equipment, tanks, valves, and pipes. Staff performed detailed surveys as the team started on the south end of the third level and worked north. Construction and maintenance personnel relocated equipment to support the effort. Because this work eliminated a radiological barricade, personnel assigned to the canyon's third level no longer have to wear radiological protective clothing to perform valving evolutions, which eliminated the need for over 2,300 required dress-outs in radiological protective clothing per year.	
Cost and Benefit S	Summary	
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	\$275,000 in disposal costs of protective clothing.	
Waste Reduced:	Not available.	
Contact Informati	ion	
Project Contact:	John Harley	
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Project Title: Sandia's EMS Implementation and Exemplary Outreach Program and

Facilities Integration

Project Summary		
Source:	P2 Star Winner\Closing the Circle Honorable Mention	
Applicability:	Environmental Management Systems	
Facility:	Sandia National Laboratories – New Mexico (SNL/NM)	
Current Operational Issue:	Sandia needs to communicate and to continually improve upon its EMS.	
Solution:	Sandia is a large site organized by divisions. The EMS is implemented by taking advantage of that divisional structure. The Sandia EMS is a corporate system that is centrally organized and administered; however, each division is responsible for analyzing their individual activities, products, and services to identify significant environmental aspects and develop objectives and measurable targets to mitigate them. Additionally, Sandia has 17 environmental programs, which are crucial to the success of EMS and the improvement of Sandia's environmental performance. Each environmental program has a plan which designates the responsibility for achieving objectives and targets to relevant functions of the organization and to determine the means and timeframe by which they are to be achieved. These two components are integrated into the corporate EMS. Sandia has taken an integrated approach to incorporate environmental considerations into the workforce's daily habits through outreach, awareness and communication activities, such as quarterly EMS Newsletters. A presentation on project was given at the 2008 OFEE West Symposium, available for download at <a actions.cfm?action='Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id="htt</td' href="http://www.fedcenter.gov/kd/Items/actions.cfm?action=Show&item.id=" http:="" items="" kd="" www.fedcenter.gov="">	
Cost and Benefit S	Summary	
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	Not available.	
Waste Reduced:	Not available.	
Contact Information		
Project Contact:	Jack Mizner	
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Project Title: SPR Environmental Stewardship in the Computing Age

Project Summary		
Source:	P2 Awards Database	
Applicability:	Electronics Stewardship	
Facility:	Strategic Petroleum Reserve (SPR)	
Current Operational Issue:	Standard PCs grow obsolete quickly, are difficult to service, costly to maintain, pump out significant BTUs of heat, provide numerous security challenges, and represent much toxic waste when disposed.	
Solution:	Contrast a conventional PC with a thin client (TC) workstation and the TC wins the environmental challenge hands down; therefore, the SPR implemented a project-wide TC computing environment. In doing so, careful consideration was given to proper disposition of the now outdated, excess computing equipment. An inventory of 800 standard desktop client/server CPUs and CRTs weigh in at approximately of 41,600 lbs compared to the corresponding number of TC workstations which weigh only 14,600 lbs. The successful TC computing environment implementation represents performance improvements such as significant energy savings. TC uses only 5 – 7 percent of the typical wattage a PC uses. Less power usage, less heat emitted and less energy to cool offices leads to fewer tons of CO ₂ put into the environment each year. In addition to the energy related benefits, this project results in the reduction of both new equipment packaging waste, end of life downstream toxic wastes, and reduction in lifecycle costs.	
Cost and Benefit S	· · · · · · · · · · · · · · · · · · ·	
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	\$1.6 million (projected) in computer disposition costs. Energy costs are expected to decline through the use of low-power computers.	
Waste Reduced:	35% reduction in computer e-waste.	
Contact Information		
Project Contact:	Patricia D. Kuntz	
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Project Title: Using the EMS to Improve Chemical Management

Project Summary			
Source:	P2 Star Honorable Mention		
Applicability:	Environmental Management Systems		
Facility:	Pacific Northwest National Laboratory (PNNL)		
Current Operational Issue:	PNNL has an ISO 14001:2004 registered Environmental Management System (EMS) and has been a member of the Environmental Protection Agency Performance Track program since 2004. One of PNNL's Performance Track goals is to reduce hazardous and/or toxic material procurement.		
Solution:	Under its EMS, PNNL has examined its operations to determine which categories of environmental aspects have the greatest potential to occur and, hence, are most deserving of attention and control. By reducing the number of chemicals used and stored on the shelves, PNNL also reduced some other significant aspects including regulated waste generation and air emissions. Based on the increased importance of a strong Chemical Management System, PNNL initiated a significant change in the way chemical inventories were managed beginning in 2007. The method used to identify process improvements and necessary critical actions was systematically integrated with the EMS. Steps included identifying the need, conducting a baseline analysis, developing a strategy and implementing actions.		
Cost and Benefit S	Summary		
Start-up Cost:	Not available.		
Lifecycle Costs Avoided:	Disposal costs avoided were \$240,300.		
Waste Reduced:	476 pounds of Hazardous/Sanitary waste were avoided.		
Contact Informati	Contact Information		
Project Contact:	Alice Ikenberry		
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Program Office/ Organization:	Pacific Northwest National Laboratory		
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Project Title: Y-12 Medical Radiography Goes Digital

Project Summary			
Source:	P2 Awards Database		
Applicability:	Recycling		
Facility:	Y-12 National Security Complex (Y-12)		
Current Operational Issue:	Y-12's Occupational Health Services (OHS) clinic was using medical x-ray equipment that was greater than 25 years old and no longer serviceable.		
Solution:	New medical radiography equipment was procured to replace the old, outdated system. The OHS staff examined their options and chose to procure digital radiography equipment, which would reduce future storage issues associated with hard copy x-ray film, create electronic medical x-ray images, reduce the use of toxic chemicals, and eliminate the generation of hazardous waste associated with hard copy x-ray film processing.		
Cost and Benefit S	Summary		
Start-up Cost:	Cost of new equipment was not provided.		
Lifecycle Costs Avoided:	Disposals costs of \$17,000 annually were avoided.		
Waste Reduced:	By going digital, OHS eliminated the generation of approximately 38 gallons (144 kilograms) per year of RCRA hazardous waste.		
Contact Informati	Contact Information		
Project Contact:	James Donnelly		
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5. Other Federal Agency Best Practices

Project Title: Biobased Cutlery Program

Project Summary		
Source:	2008 White House Closing the Circle Awards Winners	
Applicability:	Green Purchasing	
Facility:	Defense Supply Center Philadelphia (DSCP)	
Current Operational Issue:	In an effort to "green" DOD and fulfill Executive Order 13423, a field activity within the Defense Logistics Agency (DLA), initiated acquisition of biobased utensils (fork, knife and spoons). Multiple production and manufacturing problems arose, such as utensil odor, color, tensile strength, heat resistance, insect attraction, injection cycle time, and mold costs. The cost associated with biobased resin was the major factor limiting use. Customers were not about to pay for biobased cutlery that would cost eight times the price of petroleum-based plastic products, nor would DLA force such a change in program. Up until the start of FY 2006, projected cost estimates for biobased cutlery were still 10-25% higher than conventional plastic ware.	
Solution:	DSCP awarded a small R&D contract to LC Industries, the vendor of a polylactic acid resin formula in an effort to correct the long cycle time of mass production. When LC finally determined which biobased resin to "use," DLA had to revisit the requirements/testing/approval process for the new, "improved" resins. At this juncture, one "promising point" was that the vast "cost gap" had significantly narrowed in 2007, allowing DSCP to make the first acquisition of biobased cutlery. Over the previous years, affordability of plastic ware had been overriding movement towards biobased cutlery. Government and industry partners pushed forward and the result was that DSCP's biobased procurement for this family of items has totaled \$2,402,607 from March 2007 to January 2008.	
Cost and Benefit S	Summary	
Start-up Cost:	No information was given regarding the premium paid for biobased materials.	
Lifecycle Costs Avoided:	Not available.	
Waste Reduced:	Not available. The reduction in the use of petroleum products would most likely reduce air emissions.	
Contact Informati	Contact Information	
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Project Title: Building New Recycling Partnerships

Project Summary	
Source:	2008 White House Closing the Circle Awards Winners
Applicability:	Recycling/Reuse
Facility:	Eglin Air Force Base, Florida
Current Operational Issue:	The Eglin recycling program sought to expand recycling partnerships within the surrounding military and local communities. Wastes from neighboring DOD branches and on-site base programs included 900 pounds per month of spent brass, 13 steel underground storage tanks, and several excess drone aircraft set for disposal.
Solution:	The Eglin Air Force Base recycling program collected and recycled brass, spent smoke grenades, and aluminum and iron parts from aircraft drones. The recycling team worked with the storage tank program manager and the units that owned the old underground storage tanks to determine if they could be recycled versus disposed. Additionally, the team initiated a program to recycle old library books from local community libraries. The Eglin recycling program also sponsored an aluminum can recycling contest for the third consecutive year.
Cost and Benefit S	Summary
Start-up Cost:	Not available.
Lifecycle Costs Avoided:	Eglin's Recycling Center had a \$214,000 increase in revenue and noted a cost avoidance of \$100,000 in storage tank removal and disposal fees.
Waste Reduced:	900 pounds a month of spent brass, up to 1,000 pounds of library materials, and 1,715 pounds of aluminum cans were recycled. New initiatives contributed to a solid waste diversion rate of 65.35 percent surpassing Eglin's annual goal of a 40 percent solid waste diversion rate. The Eglin Recycling Center processed 300 more tons of material in FY07 than in FY06, 2,200-plus tons in FY07 from 1,943 tons in FY06.
Contact Information	
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Project Title: Electronics Stewardship at TSA

Project Summary		
Source:	2008 White House Closing the Circle Awards Winners	
Applicability:	Electronics Stewardship	
Facility:	Transportation Security Administration (TSA)	
Current Operational Issue:	An agency-wide computer refreshment project that replaced every computer, monitor, and laptop acquired during initial procurement at the TSA headquarters, the TSA operations center, five mission support centers, and 450 airport operations resulted in increased electronics for disposal.	
Solution:	TSA's contract language was modified to ensure that all computers, monitors, and laptops procured were EPEAT-registered and achieved the EPEAT Silver rating. TSA also procured environmentally preferable printers, copiers, and fax machines. TSA's Environmental Management System (EMS) was modified to include electronics in its own program and an Environmental Management Program (EMP) was written that addresses all aspects and impacts of the use of electronics. During the computer refresh project, the manufacturer's Asset Recovery Service (ARS) took back all the used computers, refurbished the computers it could, and sent them for resale. The remaining computers were recycled. The computers that reached the end of their first life outside of the computer refresh project went through the Property Management Office's disposition process which posts all used electronics for donation on GSA Xcess.	
Cost and Benefit S	Summary	
Start-up Cost:	Not available.	
Lifecycle Costs Avoided:	Not available.	
Waste Reduced:	Each and every piece of used electronic equipment was either reused or recycled.	
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Project Title: LEED-EB Helps the Navy Certify Sustainability of Existing Buildings

Project Summary			
Source:	Spring 2008 White House Closing the Circle Newsletter		
Applicability:	Green Purchasing		
Facility:	Defense Supply Center Philadelphia (DSCP)		
Current Operational Issue:	The Navy has put in place strong requirements that require all new buildings to achieve a rating of silver or higher from the LEED-NC rating system. However, the Navy builds only about 100 new buildings each year. It operates and maintains more than 50,000 existing ones.		
Solution:	The Navy has registered and is on the way to having its first sustainable, LEED-certified existing building. That building is Naval Base Ventura County (NBVC) Building 1100 - the headquarters of Naval Facilities (NAVFAC) Engineering Service Center (ESC). LEED-EB is a method to assess existing buildings for their operations and maintenance with respect to sustainability criteria. Agencies can use it to document that the buildings are being operated and maintained in a sustainable manner.		
	The Navy plans to have NAVFAC ESC headquarters, Building 1100, certified as LEED-EB silver by fall 2008. The Navy plans to use that success as a springboard to apply the knowledge gained to the more than 7,500 buildings required to be certified to meet the E.O. requirements as well as increasing the sustainability of the entire Navy inventory of existing buildings.		
Cost and Benefit S	Summary		
Start-up Cost:	Not available.		
Lifecycle Costs Avoided:	The quantifiable economic benefits for Building 1100 are projected at a net benefit of more than \$19,000 per year, with a payback of implementation costs in 4.4 years. Through increased operational efficiency, LEED certified buildings are expected to reduce lifecycle costs, especially those associated with energy and water usage.		
Waste Reduced:	Environmental benefits include reductions in energy and water use, pollution (both directly from the building and indirectly through its operation), and light pollution. A study of the cuts in water usage in Building 1100 estimates that the Navy will slice water use by two-thirds.		
Contact Informati	Contact Information		
Project Contact:	Joseph A. Connett		
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Project Title: Recycling Leadership in the Transportation Sector

Project Summary	
Source:	2008 White House Closing the Circle Awards Winners
Applicability:	Recycling
Facility:	Federal Highway Administration (FHWA)
Current Operational Issue:	FHWA disposes of hundreds of millions of tons of materials from roadways and industrial processes each year.
Solution:	As a result of FHWA's environmental stewardship, each year approximately 200 million tons of materials from old highways and streets are taken to processing plants, where 80% of that material is reused in highway construction projects. In addition, 50 million tons of asphalt paving is recycled back directly into the road itself, which helps rehabilitate an old highway back into a smooth riding roadway. Recycled coal fly ash replaces structural fill in road construction and replaces a portion of the Portland cement used to make concrete, thereby avoiding carbon dioxide emissions from the manufacture of cement. FHWA also sponsors the Green Highways Partnership which identifies environmental considerations such as using recycled materials in road construction, designing roads to minimize water runoff to nearby waterways, and avoiding sensitive ecological areas when planning new roads.
Cost and Benefit Summary	
Start-up Cost:	Not available.
Lifecycle Costs Avoided:	Not available.
Waste Reduced:	At current coal fly ash usage rates (coal fly ash is replacing 15 million tons of Portland cement), 10. 5 million tons of carbon dioxide emissions are being avoided. The avoided energy consumption is 29 trillion BTUs.
Contact Information	
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January 2009

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