



Department of Energy
Washington, DC 20585

April 27, 2006

Mr. Granta Y. Nakayama
Assistant Administrator
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460


Dear Mr. Nakayama:

The Department of Energy (DOE) is pleased to transmit the enclosed annual report in fulfillment of the reporting requirements under Executive Order (EO) 13148, *Greening the Government Through Leadership in Environmental Management*. The report was prepared in accordance with the guidance provided in your letter to Agency Environmental Executives, dated February 27, 2006.

The report provides DOE's performance for 2005 in implementing the EO 13148 environmental leadership requirements. Specifically, it addresses the Department's progress made in 2005 to establish environmental management systems at DOE sites and in the Department's progress in meeting pollution prevention goals. I am pleased to inform you that in 2005, DOE sites collectively met or surpassed all five of its pollution prevention goals. In addition, over ninety-three percent of the DOE sites that are "appropriate facilities" for implementing environmental management systems have successfully done so by the close of 2005.

If you or your staff have questions or need more information, please contact Jane Powers of my staff at (202) 586-7301.

Sincerely,


for C. Russell H. Shearer
Acting Assistant Secretary for
Environment, Safety and Health

Enclosure

cc: D. Kling, Director, Office of Federal Facilities Enforcement
W. Garvey, Office of Federal Facilities Enforcement

Executive Order 13148

Greening the Government Through Leadership in Environmental Management

Annual Progress Report: 2005



U.S. Department of Energy
Office of Environment, Safety and Health
April 2006

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Appendix A: Department of Energy Pollution Prevention Leadership Goals

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Appendix E: Status of Ozone-depleting Substances (ODS) Reduction Programs at Select
DOE Sites in Calendar Year 2005

Appendix F: Representative Examples of Pollution Prevention Practices Conducted in
2005

ACRONYMS

AEE	Agency Environmental Executive
ANSI-RAB	American National Standards Institute- Registrar Accreditation Board
BEES	Building for Environmental and Economic Sustainability
BNL	Brookhaven National Laboratory
CCD	charge-coupled device
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIO	Chief Information Officer
CMOS	complementary metal oxide semiconductor
CY	calendar year
DEMP	Departmental Energy Management Program
DOE	U.S. Department of Energy
EH	DOE Office of Environment, Safety and Health
EM	Office of Environmental Management
EMS	environmental management system
EMSs	environmental management systems
EO	Executive Order
EPA	U. S. Environmental Protection Agency
EPEAT	Electronic Products Environmental Assessment Tool
EPP	environmentally preferable purchasing
EPCRA	Emergency Planning and Community Right-to-Know Act
ES&H	environment, safety and health
ETTP	East Tennessee Technology Park
FEC	Federal Electronics Challenge
GSA	General Services Administration
INL	Idaho National Laboratory
ISM	Integrated Safety Management
ISMS	Integrated Safety Management Systems
ISO	International Organization for Standardization
LANL	Los Alamos National Laboratory
LCA	life-cycle assessment
LEED	Leadership in Energy and Environmental Design
NE	Office of Nuclear Energy
NEPA	National Environmental Policy Act

NEPT	National Environmental Performance Track
NNSA	National Nuclear Security Administration
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
ODS	ozone-depleting substances
OFEE	Office of the Federal Environmental Executive
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
P2	pollution prevention
PCB	polychlorinated biphenyls
PNNL	Pacific Northwest National Laboratory
PPOA/EMS	pollution prevention opportunity assessment/environmental management system
RCRA	Resource Conservation and Recovery Act
SC	Office of Science
SLAC	Stanford Linear Accelerator Center
SPR	Strategic Petroleum Reserve
SRS	Savannah River Site
TRI	Toxic Release Inventory
TRU	transuranic
TSCA	Toxic Substances Control Act
VOC	volatile organic compound
WAPA	Western Area Power Administration

I. INTRODUCTION

A. Background

Executive Order (EO) 13148, *Greening the Government Through Leadership in Environmental Management*, was issued to ensure that Federal agencies integrate environmental accountability into daily decision making and planning in all their activities. The EO, issued in 2000, complemented and reinforced already existing pollution prevention goals and environmental stewardship objectives that the Department of Energy (DOE or Department) developed in 1999 and reaffirmed by the Department's Agency Environmental Executive (AEE) in 2002 (see Appendix A). It also reinforced the implementation of environment, safety and health management systems at DOE facilities.

EO 13148 defines pollution prevention as source reduction and "other practices that reduce or eliminate the creation of pollutants through: (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation." Source reduction pertains to any practice that reduces the amount of hazardous substances, pollutants, or contaminants entering waste streams or the environment prior to recycling, treatment, or disposal, and the hazards to public health and the environment associated with them.

The Department has expanded the EO definition of pollution prevention to include recycling. This expanded definition is consistent with that used in the *International Organization for Standardization (ISO) 14001-2004 Environmental Management Systems — Specification with Guidance for Use* document and by the President's Council on Environmental Quality.

This report describes the Department's progress in 2005 toward meeting the EO 13148 goals.

Executive Order 13148 Goals

Federal agencies shall:

- develop and implement environmental management systems,
- establish and implement environmental audit programs,
- prevent or reduce pollution at the source whenever feasible and cost-effective,
- reduce Toxic Release Inventory (TRI) releases,
- reduce use of selected chemicals, hazardous substances, and pollutants or reduce generation of hazardous waste,
- phase out procurement of Class I ozone-depleting substances, and
- implement cost-effective, environmentally sound landscaping practices.

B. Report Structure

This is DOE's sixth annual progress report to the U.S. Environmental Protection Agency (EPA) and the Office of the Federal Environmental Executive (OFEE) as required by Section 307 of the EO. The activities described in this report occurred in calendar year 2005 unless otherwise noted.

The following sections describe DOE's participation in the EO 13148 Interagency Environmental Management Leadership Workgroup; strategies for implementing the EO; and progress made in 2005 in meeting the EO goals, specifically regarding the Department's efforts to implement environmental management systems (EMSs) and prevent pollution pursuant to the EO and implement its own pollution prevention goals. The appendices contain information pertaining to the pollution prevention goals in place for 2005 and the new Pollution Prevention and Sustainable Environmental Stewardship goals effective in 2006; the data used to generate the findings described in the body of the report; and brief summaries of representative site pollution prevention practices.

II. IMPLEMENTATION PROGRESS

A. Interagency Environmental Management Leadership Workgroup Activities

Representatives from DOE's Office of Environment, Safety and Health (EH) and Office of Science (SC) regularly participated in meetings and activities of the EO 13148 Interagency Environmental Management Leadership Work Group.

DOE continued to participate in the Workgroup's EMS Subgroup. The Department's involvement included reviewing self-declaration processes across Federal agencies and addressing EMS operational issues.

DOE's continued involvement in the Workgroup's Metrics Subgroup included participation in development of criteria for the annual agency scorecard of agency EMS implementation and looking ahead to metrics for ongoing implementation and continual improvement of EMSs.

DOE also participated in the following activities of the Workgroup:

- assessing the relationship between EO 13148 and EO 13327, *Federal Real Property Asset Management*;
- expanding the scope of FEDCENTER, the Federal government's source for comprehensive environmental stewardship and compliance assistance information;
- finalizing a discussion paper on the synergism between EMS and agency responsibilities pursuant to the National Environmental Policy Act (NEPA);
- developing alternative lists of priority chemicals for use reduction that respond to agency-specific concerns;
- assessing compliance with the requirements of EO 13148; and
- planning the OFEE 2006 Federal Environmental Symposium.

EH and SC serve as information conduits between the Workgroup and DOE Headquarters and field elements for news about the availability of tools and guidance to advance the goals of EO 13148. DOE's Environmental Policy & Guidance Website (www.eh.doe.gov/oepa), Pollution Prevention Website (www.eh.doe.gov/p2), Environmental Stewardship Clearinghouse (EPIC) (<http://epic.er.doe.gov/epic>), and monthly conference calls are used to disseminate information between DOE Headquarters and field elements.

B. Implementation Strategy

B.1. Directives, Policies, and Documents

The Office of Environment (EH-4) and the Office of Administration (MA-40) partnered to develop a DOE Headquarters Facilities EMS in 2005. The environmental management programs of the EMS were developed along three distinct areas: natural resources conservation; waste generation and recycling; and employee workplace. Additional progress in implementing EMSs at the department level is described in section C.1.

In January 2003, the Department issued DOE Order 450.1, *Environmental Protection Program*, a directive that implemented the EMS and other requirements of EO 13148. It is DOE's policy to integrate EMSs at its sites within the overall environment, safety and health management framework established by DOE Policy 450.4, *Safety Management System Policy* (in place since 1996), which requires DOE sites to establish Integrated Safety Management Systems (ISMS) to ensure the protection of workers, the public, and the environment.

In 2005, the Department committed to reinvigorate Integrated Safety Management (ISM) as part of the *Implementation Plan* developed in response to Recommendation 2004-1 of the Defense Nuclear Facilities Safety Board. The Office of Environment is working to ensure integration of environmental protection into the activities being developed under the *Implementation Plan*, including the new Oversight Manual and DOE ISM Manual.

Also in 2005, the Department revised DOE Order 450.1. DOE Order 450.1, Chg 2, establishes new performance-based Pollution Prevention and Sustainable Environmental Stewardship goals, objectives, and strategies (see Appendix B) that advance the pollution prevention and EMS provisions of EO 13148. The new goals supersede the pollution prevention goals and objectives that were developed in 1999 and expired at the end of 2005. The strategies listed in the updated Order for achieving the new goals are to be considered for inclusion in the Headquarters' EMS and DOE sites' EMSs as applicable or otherwise appropriate.

In addition to updating the Order, DOE issued two guidance documents that provide methods to comply with the Order:

- DOE G 450.1-5, *Implementation Guide for Integrating Pollution Prevention into Environmental Management Systems*, (<http://www.directives.doe.gov/pdfs/doe/doetext/neword/450/g4501-5.pdf>) and

- DOE Guide 450.1-9, *Ground Water Protection Program Implementation Guide for Use with DOE O 450.1, Environmental Protection Program* (<http://www.directives.doe.gov/pdfs/doe/doetext/neword/450/g4501-9.pdf>).

The Department also revised DOE G 450.1-1A, *Implementation Guide for Use with DOE O 450.1, Environmental Protection Program* (<http://www.directives.doe.gov/pdfs/doe/doetext/neword/450/g4501-1a.pdf>). The revised guide provides sample report letters for DOE Field Office Managers to use to declare conformity with DOE O 450.1 based on a first-party (internal) assessment or second-party or third-party (external) assessment.

B.2. Acquisition

The DOE Environmentally Preferable Purchasing (EPP) website was redesigned and expanded in 2005 (<http://www.eh.doe.gov/p2/epp/index.html>). In addition to including information on EPP requirements and products, the website offers suggestions on how to promote EPP and embed it in the EMS.

The Department held four teleconferences to stimulate technology transfer of green product information among DOE sites. Teleconference topics included the DOE Preferred Procurement Partnership that cooperates to optimize EPP purchases and resources, newly designated recycled content products, the BEES (Building for Environmental and Economic Sustainability) software tool for evaluating product life cycle performance, and opportunities to increase purchases of biobased/recycled coolant, recycled content viewgraphs, and toner cartridges.

Other acquisition outreach activities of 2005 were the EPP hotline and efforts to integrate EPP attributes in site service contracts. Through its hotline, the Department capitalized on lessons learned and provided technical assistance, strategic thinking, and problem solving support to 67 DOE organizations to solve EPP problems. This was an increase of 25 user organizations over the previous year.

The Department also identified 27 service subcontracts that would be issued in 2005. It provided the site procurement officers handling those subcontracts with EPP information, tailored to the specific nature of the contract, for their consideration for inclusion in contract requests for proposals.

B.3. Training

In March 2005, DOE held a well attended EMS training workshop on *Implementation, Lessons Learned and Best Practices*. The workshop was cosponsored by DOE's Office of Environment and the Environmental Subgroup of the Energy Facility Contractors Group and hosted by Battelle in Columbus, Ohio. The workshop agenda and presentations are available at http://www.efcog.org/wg/ism_e/events/March05/emsabstracts.htm.

The Department developed a Pollution Prevention Opportunity Assessment/ Environmental Management System (PPOA/EMS) training course in 2005. In addition to covering EMS aspect and impact analysis and development of objectives and targets, the course emphasizes the team development, opportunity identification process, and cost/efficiency calculations inherent in completing pollution prevention opportunity assessments. The interactive course, offered in 8-hour or 16-hour formats, uses case studies, sample opportunity assessments from DOE sites, and hands-on, team-oriented exercises. The PPOA/EMS training was provided at the Department's 2005 Pollution Prevention Workshop and at the Portsmouth Gaseous Diffusion Plant, Oak Ridge National Laboratory, and the Hanford Site.

Training in implementing sustainable design was also available at the 2005 Pollution Prevention Workshop. The goals of the training session were to familiarize participants with sustainable design principles and the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system and provide them with a working knowledge of how to implement sustainable design principles into the design and construction of a building. The training was provided by representatives from Sandia National Laboratories/NM, Lawrence Livermore National Laboratory, Livermore Area Office, Princeton Plasma Physics Laboratory, and the National Renewable Energy Laboratory. The training was also provided at Argonne National Laboratory.

EPP training was also offered at the 2005 Pollution Prevention Workshop. Participants learned how to minimize the use of petroleum in transportation, imbed EPP products in construction and service contracts, and transition to environmentally preferable biobased products.

DOE sites continued to integrate EMS training into their operations. For example, Argonne National Laboratory required senior management to complete its web-based training on DOE Order 450.1 and the Laboratory's EMS.

B.4. Federal Electronics Challenge

The Department was among the original eleven Federal agencies that signed the Federal Electronics Challenge (FEC) Memorandum of Understanding, *Promoting Sustainable Environmental Stewardship of Federal Electronic Assets*, on November 15, 2004. The Department participates in the Federal Electronic Stewardship Working Group and actively supports the FEC initiative.

In June 2005, the Assistant Secretary for Environment, Safety and Health, as DOE's AEE, and the Chief Information Officer (CIO) issued a joint memorandum committing the Department to improving life-cycle management of electronic assets and encouraging sites to participate as FEC Partners. Ten DOE sites, Headquarters, Bonneville Power Administration, Lawrence Livermore National Laboratory, Argonne National Laboratory, Fermi National Accelerator Laboratory, Pacific Northwest National Laboratory, Kansas City Plant, Los Alamos National Laboratory, Western Regional Office, and Yucca Mountain Project, became FEC Partners. Two of them, Bonneville Power

Administration and Lawrence Livermore National Laboratory, received gold and silver FEC awards in 2005, respectively, for their achievements in electronic stewardship. In 2006, Pacific Northwest National Laboratory received the silver FEC award and DOE Headquarters and the Kansas City Plant received bronze FEC awards.

In November 2005, DOE's AEE issued a memorandum announcing the Federal Electronics Recycling and Reuse Challenge and encouraging site participation. Argonne National Laboratory, Brookhaven National Laboratory, Fermi National Accelerator Laboratory, DOE Headquarters, Idaho National Laboratory, Kansas City Plant, Lawrence Livermore National Laboratory, National Energy Technology Laboratory, Richland Operations Office, Pacific Northwest National Laboratory, and the Waste Isolation Pilot Plant or WIPP joined this Challenge. DOE was presented the top civilian agency award for the 2006 Federal Electronics Recycling and Reuse Challenge on April 21, 2006. KCP and WIPP also received Federal Electronics Recycling and Reuse Challenge awards in the large mid-western and medium-southern facility categories, respectively.

The FEC was further highlighted by being included in the strategies listed in DOE Order 450.1, Chg 2 for achieving the new Pollution Prevention and Sustainable Environmental Stewardship goals (see Appendix B). FEC-related strategies put forth in the Order include procuring green electronics, enabling electronics power management capabilities, reusing surplus electronics, and recycling end-of-life electronics.

The Department's CIO supported FEC green procurement by including environmental criteria in the annual market survey of desktop computers. Specifically, the survey declared a preference for models of desktop computers, notebooks and monitors qualified through the Electronic Products Environmental Assessment Tool (EPEAT) or its successor. DOE property management also supported reuse and recycling of surplus electronics at Headquarters.

Additional FEC activities were:

- conducting more than a dozen FEC-related educational activities at DOE,
- integrating FEC into the DOE Headquarters' EMS,
- enabling energy efficient power management capabilities, including after-hour power off command and Energy Star standby power function for network user PCs, and
- requiring 100% Energy Star in all information technology contracts.

C. EMS Implementation

C.1. Department Level

During 2005, DOE's Office of Independent Oversight evaluated the effectiveness of the implementation of DOE Order 450.1 for EMS and pollution prevention (P2) during five environment, safety and health (ES&H) inspections. The Office of Independent Oversight has responsibility for evaluating programs, including ES&H programs, across the DOE complex and reporting on their status to the Secretary of Energy, senior DOE management, and Congress. To facilitate improvements across the DOE complex,

Independent Oversight selects focus areas that warrant increased attention and evaluates them during its inspection of DOE sites for a period of time, typically one year.

Independent Oversight summarized the results of the five inspections in *Independent Oversight Status Report: Implementation of DOE Order 450.1, Environmental Protection Program* (December 2005). That report stated:

“This focus area review showed that all five sites, at the time of their inspection could be expected to have implemented an EMS by December 31, 2005. Overall, working within the framework of the site Integrated Safety Management System, each site had developed an EMS that was moving, or had already moved, the environmental protection program beyond the support organizations (e.g., environmental compliance and/or waste management organizations) into line missions and activities.”

The *Status Report* identifies a number of positive attributes at several sites:

- DOE site offices provide clear expectations, set performance measures, and oversee EMS establishment activities;
- sites have obtained senior management commitment and support for EMS;
- several sites have established effective programs for implementing an EMS;
- sites plan to share resources for verification of EMS implementation; and
- sites have developed effective tools for assisting in the implementation of EMS.

Independent Oversight inspections did not identify any weaknesses that would prevent timely EMS implementation at the sites reviewed; however, a few weaknesses were identified in documentation and implementation strategies at lower tiers of site organizations. For example, line management at the division and facility level has not always demonstrated ownership for their portion of the EMS.

Additional progress in implementing EMSs at the Department level is described in the following criteria.

Agency Level Criterion 1: Agency has provided resources to complete, maintain and improve, the EMSs at the “appropriate facilities” across the agency.

DOE sites have received funding for EMS implementation through the amounts annually budgeted for site management. The success of the Department’s sites in implementing EMSs indicates that the Department’s approach has been appropriate and effective.

In implementing EMSs, DOE is pursuing the same successful approach it took in implementing its ISMS program whereby all ES&H activities are considered a necessary and important aspect of line management program responsibilities and are funded as part of overall site operations. Resources for implementing ISMSs and EMSs are drawn from line management program operating budgets rather than a specific or separate budget line item. To that end, the DOE Budget Call Guidance, prepared by the Department’s Chief

Financial Officer, instructs line management to ensure that ES&H requirements are supported in their program budget submissions.

DOE Order 450.1 requires managers at the field and Headquarters levels to request through the annual Departmental budgetary process the funding and resources needed for implementing the requirements of the Order (§§ 5.c.(2); 5.d.(7)). Under this approach, funding resources for operation and maintenance of the EMS and continual improvement of the EMS are also considered a necessary and important aspect of line management program responsibilities, and are funded as part of the cost of operating a DOE site.

Agency Level Criterion 2: Agency has provided written guidance on maintaining and improving EMSs.

DOE Guide 450.1-2 *Implementing Guide for Integrating Environmental Management Systems into Integrated Safety Management Systems*, (<http://www.directives.doe.gov/pdfs/doe/doetext/neword/450/g4501-2.pdf>) issued in August 2004, includes guidance in Section 9 on preparing for and conducting the Management Review, and guidance in Section 10 on “Keeping the ISMS/EMS Updated.”

As noted previously, pursuant to DOE Order 450.1, sites’ EMSs are to be integrated into their ISMSs. The existing Chapter IV of DOE Guide 450.4-1B, Volume 1, *Integrated Safety Management System Guide* (<http://www.directives.doe.gov/pdfs/doe/doetext/neword/450/g4504-1bv1.pdf>) addresses “Maintaining an Approved ISMS.” The chapter is intended to assist DOE and its contractors in keeping an approved ISMS effective through continuous improvement actions. It describes the actions needed to develop and respond to DOE’s annual program and budget execution guidance. It is also applicable to an ISMS/EMS.

Agency Level Criterion 3: Agency has begun implementing its response to the President’s Management Council Environmental Performance Improvement Initiative.

The Department is executing the Implementation Plan it developed in response to the Environmental Compliance Management Improvement Initiative of the President’s Management Council. In response to a memorandum from the Department’s AEE, program and field offices designated representatives to the Environmental Compliance Work Group. The Work Group has met several times and has:

- developed language which was included in the 2008 Field Budget Call;
- coordinated the response to the request by the EPA for ‘root cause’ information from four sites for putative violations of the National Pollutant Discharge Elimination System (NPDES) permits;
- established a representative list of environmental violations across the Department, for which the sites will be requested to provide root cause information;
- developed a draft questionnaire for sites to provide data on the central elements of the Department’s plan, including
 - root causes for environmental violations,

- environmental audit and corrective action processes at the sites, and
- collection and use of environmental performance data, and
- identified sites to pilot the draft questionnaire.

C.2 Site Level Progress in Implementing Environmental Management Systems

C.2.1 Identification of “Appropriate Facilities” for EMS Implementation

EO 13148 states that each agency should determine its appropriate facilities based on the “size, complexity, and the environmental aspects of facility operations.” DOE currently identifies 44 sites or organizations as “appropriate facilities” for implementing an EMS. Several changes took place in the organization or names of DOE sites in 2005. These are identified in the list of sites in Appendix C.

The EO 13148 Interagency Environmental Management Leadership Workgroup recognizes that it may be appropriate to implement one EMS for an organization which operates several similar facilities. The Workgroup has defined an appropriate facility for EMS implementation as “any Federal property, properties, organization or operation that conducts activities that can have a significant impact on the environment, directly or indirectly, individually or cumulatively, due to operations of that facility's mission, processes or functions.”

DOE uses the term "site" to identify contiguous geographic areas under Departmental ownership. DOE sites often have numerous facilities and normally a site is managed under a single management system. In addition, some organizations that manage several similar sites are implementing a single EMS. DOE Order 450.1 requires EMS to be integrated into a site's ISMS so that all DOE sites required to implement an ISMS are considered “appropriate facilities” for EMS implementation. In addition, some DOE organizations that are exempt from ISMS (e.g., the Power Marketing Administrations) are required to implement an EMS.

In 2005, the Department determined that three sites which are scheduled for closure in 2006 do not represent “appropriate facilities” to implement an environmental management system. All three sites are operating under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) records of decision, based on analysis of the environmental issues at the site, and agreement with the regulators on how they will be resolved.

Additionally, DOE's Office of Environment and the Office of Administration partnered to develop a DOE Headquarters Facilities EMS. For purposes of the EMS, DOE Headquarter facilities are the James Forrestal Building, Washington, D.C. and the Germantown Main Building, Germantown, Maryland. The facilities are owned by the General Services Administration (GSA); specific authority for building operations is delegated to DOE as tenant.

Ten DOE sites are currently certified by third-party registrars to the ISO 14001 EMS standard. Two additional facilities were previously certified to ISO 14001, but have chosen not to renew their registration. Five DOE sites are members of EPA's National Environmental Performance Track program. These sites are identified in Appendix C. Figure 1 depicts EMS implementation status at the DOE sites.

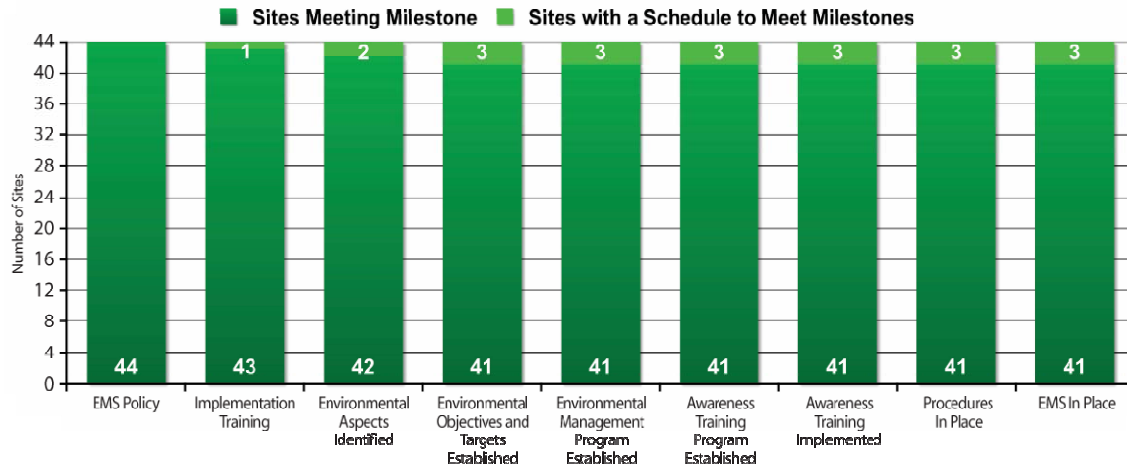


Figure 1 EMS Implementation Status

C.2.2 Facility EMS Policy: *CY03 Criterion 1: Appropriate facilities have issued an EMS policy statement.*

Based on reports from the responsible program offices, 44 of DOE's 44 sites (100%) have issued an EMS policy statement.

C.2.3 Facility Implementation Training: *CY03 Criterion 2: Appropriate facilities have provided EMS implementation training to the personnel responsible for implementing EMS.*

Based on reports from the responsible program offices, 43 of DOE's 44 sites (98%) have provided implementation training to personnel responsible for implementing EMS.

C.2.4 Facility Significant Environmental Aspects: *CY03 Criterion 3: Appropriate facilities have identified and documented their significant environmental aspects.*

Based on reports from the responsible program offices, 42 of DOE's 44 sites (95%) have documented their significant environmental aspects.

C.2.5 Facilities with Measurable Objectives and Targets: *CY04 Criterion 1: Percent of appropriate facilities that have documented measurable environmental objectives and targets.*

Based on reports from the responsible program offices, 41 of DOE's 44 sites (93%) have documented measurable environmental objectives and targets.

C.2.6. Facilities with Environmental Management Programs: *CY04 Criterion 2: Percent of appropriate facilities that have established environmental management programs specifically to achieve each of their environmental objectives and targets.*

Based on reports from the responsible program offices, 41 of DOE's 44 sites (93%) have established environmental management programs specifically to achieve each of their environmental objectives and targets

C.2.7 Facilities Developed Awareness Training Program: *CY04 Criterion 3: Percent of appropriate facilities that have developed a program for EMS awareness training.*

Based on reports from the responsible program offices, 41 of DOE's 44 sites (93%) have developed a program for EMS awareness training.

C.2.8 Facilities with Formal On-Going EMS Awareness Training Program *CY05 Facility-level Criterion 1: Number and percentage of appropriate facilities with a formal on-going program to conduct facility-wide EMS awareness training.*

Based on reports from the responsible program offices, 41 of DOE's 44 sites (93%) have in place a formal ongoing program to conduct facility-wide EMS awareness training.

C.2.9 Facilities with Documented Management System Procedures *CY05 Facility-level Criterion 2: Number and percentage of appropriate facilities that have documented all management system procedures, in accordance with Agency policy.*

Based on reports from the responsible program offices, 41 of DOE's 44 sites (93%) have documented all management system procedures, in accordance with Agency policy.

C.2.10 EMS Self-Declaration Completed *CY05 Facility-level Criterion 3: Number and percentage of appropriate facilities that have completed Self-Declaration in accordance with agency policy.*

DOE's self-declaration process is defined in DOE Order 450.1 and in DOE Guide 450.1-1. Each of DOE's Field Office Managers submitted a report by December 31, 2005, pursuant to DOE Order 450.1, "regarding whether the EMS requirements of DOE O 450.1 have been integrated into ISMS by site contractors."

Forty-one of forty-four DOE "appropriate facilities" (93%) have implemented an EMS.


Each of the three remaining sites recently underwent a change of operating contractor, and in each case a schedule is established for the new contractor to implement its EMS.

Declarations at ten facilities were based on ISO 14001 registration (third-party assessment). Declarations at seventeen facilities were based on an independent second-party assessment. Declarations at the remaining fourteen facilities were based on first-party assessments.

D. DOE and White House Awards

D.1. Agency-wide Awards

The DOE pollution prevention (P2) awards program is in its twelfth year. In 2005, the Office of Environment, Safety and Health inaugurated the P2 Star Award to recognize exemplary performance in integrating pollution prevention into site operations to protect public health and the environment and reduce mission vulnerability and costs. The P2 Star winners are chosen from site nominations that have been selected as Best in Class by the Department's Program Secretarial Officers and the Administrator of the National Nuclear Security Administration. The P2 Star and Best in Class Award winners were honored at the 2005 DOE Pollution Prevention Workshop; the P2 Star Award winners were given special recognition at the DOE Earth Day celebration.

The P2 Star and Best in Class awards are granted in six categories: bio-based products, environmental management systems, green purchasing, recycling, sustainable design/green buildings, and waste/pollution prevention. The Best in Class awards are grouped by those categories and described below. Both awards are given in 2005 for activities conducted in 2004. The P2 Star award-winning activities are noted with a star  in the descriptions below:

Environmental Management Systems

Y-12 Environmental Management System Sustainability Initiative

By thoroughly integrating P2 into its EMS, the Y-12 National Security Complex implemented 72 P2 projects that resulted in reducing almost 21 million kilograms of waste and eliminating \$6.4 million in costs. The P2 projects included five new recycling initiatives, the "Y-12 PrYde" program that includes a swap-list database to encourage recycling, and product substitutions using bio-based products.

Chemical Management Center

Under the leadership and vision of Jim Morgan, Manager of the Savannah River Site Chemical Management Center, the Site designed and implemented a comprehensive program that established chemical management as an integral business strategy and an EMS cornerstone. Mr. Morgan also led the teams that developed the 3-volume DOE Chemical Management Handbook.

Unique Web-based Process Ensures Successful Implementation of the Yucca Mountain Project EMS

To ensure maximum participation by the non-environmental organizations that own 40% of its EMS processes and are geographically scattered, the Yucca Mountain Project developed a web-based EMS that facilitates communication and EMS adherence.

Green Purchasing



Green Fleet Team

The National Renewable Energy Laboratory, the National Energy Technology Laboratory, and the Savannah River Site significantly reduced their petroleum consumption through efficiency measures and alternative fuel use. Each site achieved alternative fuel utilization rates that equated to 30% or more of its annual fuel use.



Early Adopters Buy Bio: Greening Our Purchasing Systems

Pacific Northwest National Laboratory (PNNL) achieved a 97% purchase compliance rate for recycled content products, and enhanced worker health through use of bio-based products. As part of its EMS, PNNL builds green purchasing into high-volume supply contracts, identifies bio-based products that meet purchasing requirements, and requires all purchase-card holders to be trained in purchasing bio-based products and environmentally preferable products.



New Market for Unserviceable Cargo Containers

The Savannah River Site recycled unserviceable cargo containers for use as waste disposal containers. The site obtained unserviceable cargo containers – otherwise destined to be disposed as waste – from commercial entities and the Department of Defense and worked with a local vendor who refurbished them to meet required waste disposal specifications for DOE sites. In addition to developing a new market for a recyclable item, the Department estimated saving \$12 million over 3 years.

Recycling



Reusing Laboratory Equipment and Supplies

The Grand Junction Office transferred approximately \$3 million worth of energy analyzers, spectrometers, filtration systems, sodium hydroxide, and precious metals such as gold, platinum, and palladium to universities, colleges, and DOE national laboratories.

Recycling Initiatives at Oak Ridge National Laboratory

The Laboratory recycled 2,478 metric tons of materials ranging from gas cylinders to nickel-cadmium batteries. The battery re-use initiative alone eliminated the generation of 4,100 kilograms of hazardous waste.

Pantex Environmental Partnerships

The Pantex Plant initiated partnering with the City of Panhandle and a local industry to develop a self-sustaining community recycling program. Through its recycling efforts, Pantex kept 500 metric tons of waste from being disposed in landfills. As part of the partnership, Pantex and area community organizations sponsored a Children's Fair on Earth Day to promote environmental protection awareness.

Building 805 Decontamination Phase

Sandia National Laboratories/New Mexico conducted a materials opportunity assessment to identify waste minimization, reuse and recycling opportunities in the decontamination of Building 805. As a result of prior P2 planning, the Laboratory diverted 200 tons of materials from landfill disposal and avoided \$37,000 of labor costs.

Sustainable Design / Green Buildings*Sustainability Activities at the Oak Ridge National Laboratory's Spallation Neutron Source*

Through evaluating each potential point of waste, segregating clean from potentially contaminated sources, and monitoring effluents prior to determining a disposition pathway, the Laboratory reduced the amount of process waste requiring treatment from an estimated 35,000 gallons to less than 375 gallons per day at its Spallation Neutron Source.

Joint Computational Engineering Laboratory (JCEL)

Sandia National Laboratories/New Mexico implemented sustainable design in the planning and construction of the Joint Computational Engineering Laboratory, a 60,000 square foot office/computational facility and the first LEED certified "Silver" building in the State of New Mexico. The Laboratory is incorporating the same sustainable design principles in four additional buildings.

Waste/Pollution Prevention*Preventing Downstream Emissions through Sustainable Product Stewardship*

The Strategic Petroleum Reserve (SPR) integrated sound environmental management into the process of developing and implementing a degasification technology that maximized retention and use of the Reserve's stores of crude oil and eliminated 77,000 tons of volatile organic compound (VOC) emissions and 210 tons of benzene. This emissions elimination would occur in the event the SPR was called upon for a major draw down and delivery of crude oil. Workers, the public, and the environment are protected from exposure to air emissions, and a business value of \$218 million was added to Strategic Petroleum Reserve operations.

*Chemistry Environmental Services' Low-level Waste Stream Development*

Lawrence Livermore National Laboratory's on-site environmental analytical laboratory, Chemistry Environmental Services, reduced its generation of mixed waste by 44% through a simple but rigorous characterization, segregation, management and training program. These P2 practices also significantly reduced personnel exposure to hazardous waste streams.

LCA (Life-cycle Assessment) Decision Making for Post-closure Waste Water Treatment Facility

The Fernald Closure Project used life-cycle assessment to determine that immediately downsizing a water treatment plant rather than deferring the action would achieve remediation goals and reduce waste disposal costs.

TRU (Transuranic) Waste Reduction at 233-S Plutonium Facility

The Hanford Site avoided disposing 72 cubic meters of TRU waste through working with regulators and implementing rigorous radiological characterization and segregation techniques. The site avoided \$2.7 million of disposal costs by incorporating P2 principles in work planning.

Source Reduction Initiatives at the Oak Ridge National Laboratory

The Laboratory improved safety and eliminated the annual generation of 96 kilograms of hazardous waste and use of 1 million gallons of once-through process water by replacing a plasma arc torch with a water jet cutter and a wet chemistry photographic process with an imaging plate system.

Zapping Unwanted Pests at the Yucca Mountain Project

Workers' concerns about exposures to pests (e.g., mice, ants, spiders, scorpions, snakes) and the chemicals normally used to control them were eliminated when the Yucca Mountain Project replaced its chemical pest control system with an electronic technology that is non-sonar, non-ultrasound, and environmentally friendly.

Plutonium Facility Tilt-pour Process

Lawrence Livermore National Laboratory reduced worker exposure by half and minimized TRU waste generation by a factor of 50 through reusing crucibles in a tilt-pour furnace process.

D.2 White House Closing the Circle Competition

The prestigious White House Closing the Circle awards recognize Federal employees and their facilities for efforts which resulted in significant contributions to environmental stewardship. The competition is open to all Federal departments and agencies and receives hundreds of nominations annually. DOE received four Honorable Mention awards in the competition.

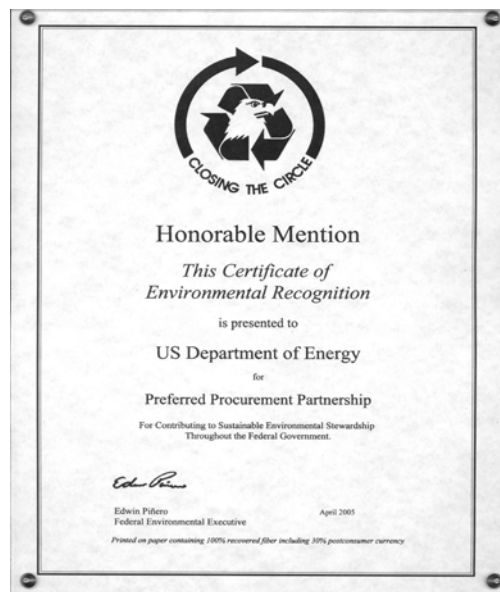
The Strategic Petroleum Reserve received an Honorable Mention award for its activity, *Preventing Downstream Emissions through Sustainable Product Stewardship*, described in the previous section for receiving a P2 Star award. The Pantex Plant, which won a Best in Class for the *Pantex Environmental Partnerships* project described above, also received a Closing the Circle Honorable Mention award.

Sandia National Laboratory/NM received an Honorable Mention award for integrating waste reduction techniques and training in landscaping. Activities for which it was honored included requiring master gardener certification of certain workers, installing a

computerized irrigation system that returns the investment in three years, and reusing materials such as washed gravel.

The fourth Closing the Circle Honorable Mention award was earned by three Headquarters Program Offices for their initiative in cutting across several DOE programs to stimulate preferred procurement of products, fuels, and power that are recyclable, energy efficient, biobased, or alternatives to petroleum derived products and fuels.

The three offices were the Offices of Energy Efficiency and Renewable Energy; Management, Budget and Evaluation; and Environment, Safety and Health.



E. DOE Toxic Chemical Reduction Goals: Baselines and Achievements

E.1 Overview

The Department's 1999 Pollution Prevention Leadership Goals include a release reduction goal for toxic chemicals subject to section 313 reporting under the Emergency Planning and Community Right-to-Know Act (EPCRA). This goal is to reduce releases of toxic chemicals subject to Toxic Release Inventory (TRI) reporting by 90% by 2005, using 1993 release levels as a baseline. This particular reduction goal applies to the total TRI releases to the environment as reported under Section 8.1 of the EPCRA section 313 Form R report. Releases include the amount of toxic chemicals directly discharged to air, water, land, and injected underground at the site, as well as amounts sent off-site for disposal.

Since DOE established its TRI goals in 1999, the EPA has made changes to TRI reporting requirements. The effect of these changes has resulted in an increased number of DOE facilities that are required to report their TRI releases and an increase in the amounts of releases reported by the Department. Given these changes, DOE can no longer measure its progress toward attaining its 2005 TRI goal using a common data set. Instead, the Department will track annual reductions from the previous year's reporting. Thus, releases from 2004, the latest year for which TRI reporting is available, are compared to those from 2003.

E.2 TRI Releases

The total amount of reported TRI chemicals released complex-wide decreased by 247 metric tons (26%) between reporting years 2003 and 2004. Figure 2 depicts the top seven TRI chemicals for reporting year 2004. These chemicals represent about 96% of the total

reported releases: lead and lead compounds, nitrate compounds, hydrochloric acid, zinc compounds, copper compounds, methanol and sulfuric acid.

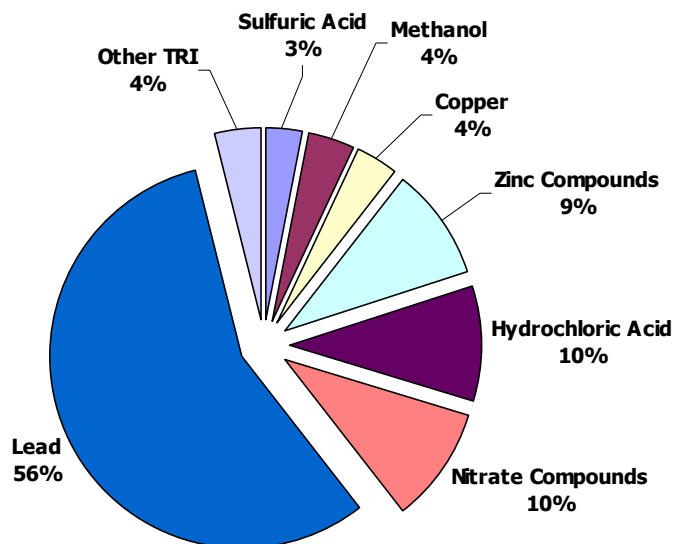


Figure 2 DOE TRI Releases by Chemical (Pounds)

Lead releases decreased by 541,317 pounds (39%) from the previous year. However, lead and lead compounds were still the single largest category (disposal of 864,484 pounds in 2004) and accounted for approximately 56% of the total reported releases. Reductions were primarily due to decreases in the amounts of lead-containing wastes being disposed at the Hanford Site and the Waste Isolation Pilot Plant, and decreases at Argonne National Laboratory and Brookhaven National Laboratory (BNL) of lead-containing wastes shipped off-site for disposal.

Figure 3 shows TRI releases (quantity and percentage) reported by the six DOE sites with the highest releases. Reported TRI releases from these sites (Idaho National Laboratory (INL), Y-12 National Security Complex, Savannah River Site (SRS), Rocky Flats, Oak Ridge National Laboratory (ORNL), and Hanford) in reporting year 2004 represented about 89% of the DOE total, complex-wide releases.

Lead and lead compounds constituted 90% of the reported releases at INL, 100% at Rocky Flats, and almost 100% of the reported releases at Hanford. Nitrate represented 82% of the releases at ORNL and derives primarily from the site waste water treatment plant. The hydrochloric and sulfuric acid releases derive primarily from the coal-fired steam plant at Y-12. At SRS, reported releases of zinc compounds rose in the late 1990's primarily as a result of the coal-burning power plant and have remained near this level over the past several reporting periods.

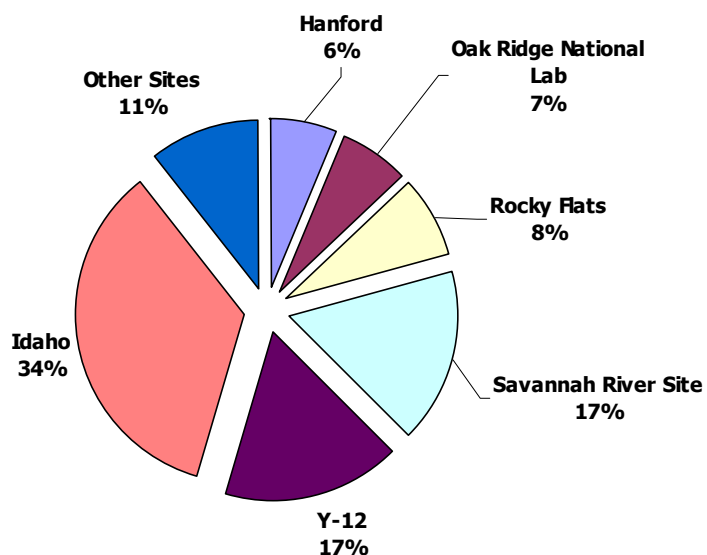


Figure 3 DOE TRI Releases By Site (Pounds) in 2004

Polychlorinated Biphenyls (PCB) releases increased from the previous reporting year primarily due to a one-time 2004 project to remove and dispose of PCB-containing equipment at BNL. Appendix D provides additional site- and chemical-specific TRI information for reporting year 2004 in comparison to reporting year 2003.

E.3 Compliance with EPCRA TRI Reporting

EO 13148 encourages Federal facilities to use computerized software for the electronic submission of TRI reports. Information collected during the validation of year 2004 reporting data indicated that 28 out of 28 reporting sites used computer based reporting software with 22 sites reporting electronically and 6 sites reporting on paper copies generated from the software.

EO 13148 directs all Federal facilities to comply with the EPCRA reporting requirements, once certain thresholds are met, for planning for chemical emergencies (Section 302-303); emergency notification of chemical accidents and releases (Section 304); and reporting of hazardous chemical inventories (Section 311 and 312). These provisions require DOE to notify state emergency response commissions (SERCs) and local emergency planning committees on the inventories and environmental releases of those substances. The intent of these requirements is to provide the public with information on hazardous chemicals in their communities, enhance public awareness of chemical hazards, and facilitate development of state and local emergency response plans. Table 1 below provides a summary of DOE site EPCRA reporting for 2004, based on information collected during TRI reporting validation.

Table 1 2004 EPCRA Reporting by DOE Facilities

Report Type	Number of Sites Meeting Reporting Criteria And Submitting Specified Reports
EPCRA 302-303: Planning Notification	10
EPCRA 304: EHS Release Notification	0
EPCRA 311-312: MSDS/Chemical Inventory	24

F. Reduction in the Generation of Routine Hazardous, Low-level Radioactive, Low-level Radioactive Mixed, Transuranic, and Sanitary Waste

In 1999, the Secretary of Energy established Departmental Pollution Prevention Leadership goals for reducing the routine generation of transuranic, low-level radioactive, low-level mixed (radioactive and hazardous), hazardous, and sanitary waste.¹ The goals were to be achieved in 2005 using 1993 as the baseline year. These goals also served the Department in meeting the requirements of EOs 13148 and 13101 for Federal agency pollution prevention goals.

As of December 31, 2005, DOE has met or exceeded all five of these goals. These reductions in waste generation have greatly reduced operating costs, improved worker safety, and contributed environmental benefits to the sites and their surrounding communities. Table 2 illustrates that in 2005, DOE sites collectively met or exceeded the challenge of a 90% reduction in hazardous waste; an 80% reduction in transuranic waste; an 80% reduction in low-level waste; an 80% reduction in low-level mixed waste; and a 75% reduction in sanitary waste relative to the 1993 baseline.

Table 2 DOE Progress Toward Meeting Pollution Prevention Goals*

Type of Waste	1993 Baseline: Waste Generated	2005 Goal: Waste Generated	2005 Status: Waste Generated	Waste Reduction Needed to Meet 2005 Goal	% Reduction Made to Date	2005 Goal % (baseline reduction)
Transuranic	708	142	101	0	86%	80%
Low-level radioactive	41,653	8,331	7,825	0	81%	80%
Low-level mixed	3,324	665	295	0	91%	80%
Hazardous Waste	14,419	1,442	783	0	95%	90%
Sanitary Waste	121,544	30,386	26,329	0	78%	75%

* Units are in metric tons (assumes 1 metric ton equals 1 cubic meter)

Table 3 and the charts that follow demonstrate the waste amounts generated each year since the baseline year of 1993. Data spikes from year-to-year can be attributed to programmatic needs such as the initiation or termination of research projects or site stockpiling of wastes until an opportunity arose for safe, cost-effective recycling, reuse or disposal.

¹ The Department tracks both its non-routine and routine waste generation. "Non-routine" wastes are associated with cleanup and stabilization of legacy wastes. "Routine" wastes are associated with all other site activities (e.g., waste from national security operations, scientific research, program administration, site infrastructure, and maintenance and refurbishing of facilities in standby status) and are covered in this annual report.

Table 3 Routine Waste Generation from Baseline Year to 2005 Reporting Year*

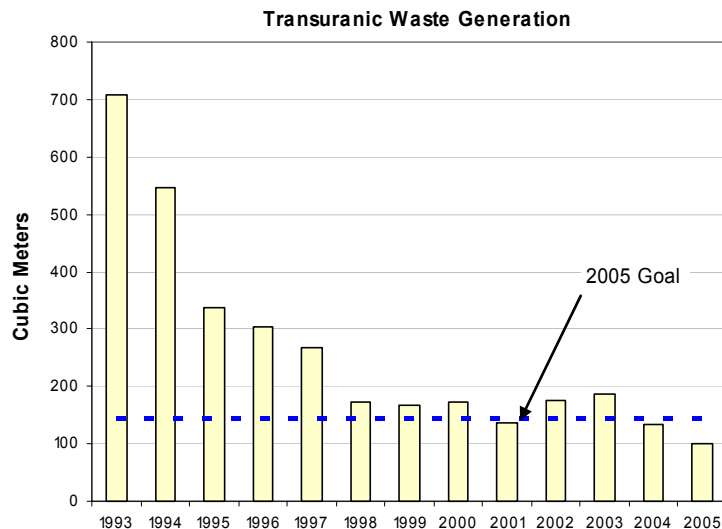
Waste Type	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Transuranic	708	546	339	303	267	172	167	173	137	175	171	135	101
Low-Level Rad	41,653	31,870	21,895	15,051	16,533	13,653	11,105	10,257	10,640	12,167	14,269	10,791	7,825
Low-Level Mixed	3,324	3,133	1,333	1,372	1,369	1,198	807	794	968	476	309	315	295
Hazardous	14,419	12,516	4,098	3,054	2,875	2,061	1,036	998	1,194	1,368	1,302	794	783
Totals without Sanitary	60,104	50,136	30,160	22,450	23,037	19,321	15,488	14,080	15,930	17,093	18,974	12,035	9,010
Sanitary	121,544	107,996	96,999	89,183	61,867	48,568	48,224	38,529	36,879	38,263	48,522	27,7494	26,329
Totals	181,648	158,132	127,159	111,633	84,904	67,889	63,712	52,609	52,809	55,356	67,496	39,529	35,339

* Units are in metric tons (assumes 1 metric ton equals 1 cubic meter)

Transuranic Waste (TRU)

Transuranic (TRU) waste contains alpha-emitting radionuclides with an atomic number greater than 92 (heavier than uranium). It is generated primarily through production of nuclear weapons but non-defense research activities can also create TRU waste. TRU waste generation was reduced 86% from the 1993 baseline.

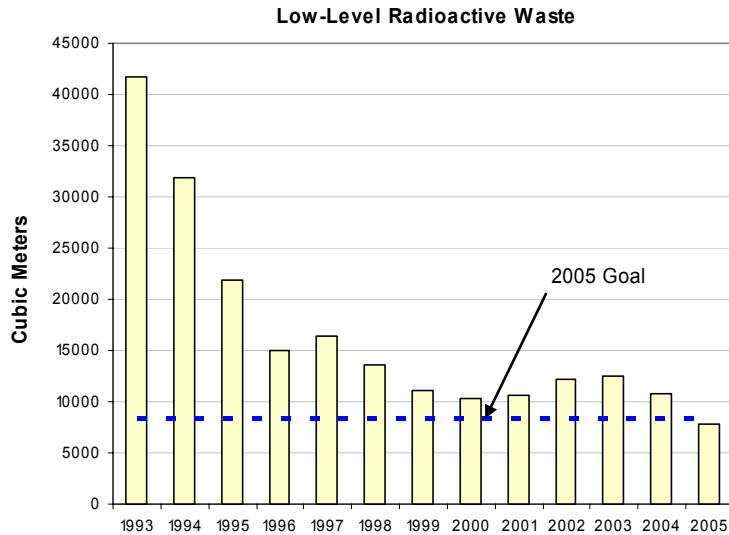
About 60% (64 metric tons) of DOE's total TRU waste came from the Los Alamos National Laboratory (LANL), a National Nuclear Security Administration (NNSA) site, due to mission and associated research operations related to nuclear weapons programs. The Savannah River Site, an Office of Environmental Management (EM) landlord site, reported 32 metric tons of TRU waste generated in its stabilization and preparation of radioactive materials for long-term storage.



Low-Level Radioactive Waste

Low-level radioactive waste is generated from the use of radioactive materials in research or production and consists of things such as contaminated tools and protective clothing. Low-level radioactive waste generation dropped 81% from 1993, meeting and surpassing the 2005 goal.

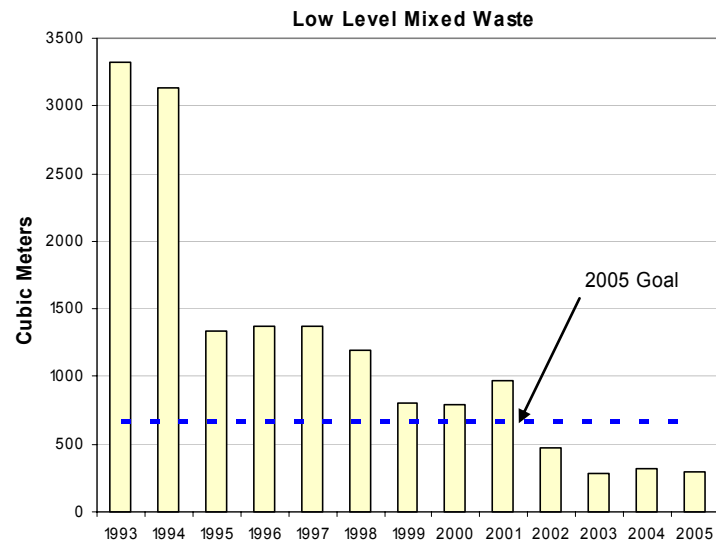
About 39% of the low-level wastes came from EM sites while about 30% came from NNSA sites. The Office of Nuclear Energy (NE) sites accounted for 20%.



The Savannah River Site is the largest producer of low-level mixed waste, accounting for 98% of EM's waste (38% overall). It should be noted that SRS has reduced its generation of low-level waste by approximately 20% from 2004 levels.

Low-Level Mixed Waste

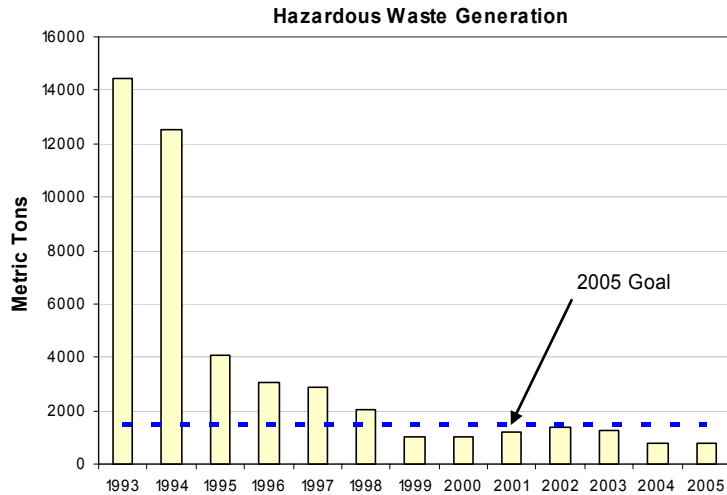
Low-level mixed waste is low-level radioactive waste that has become mixed with hazardous waste regulated by the Resource Conservation and Recovery Act (RCRA) or the Toxic Substances Control Act (TSCA). The mixing of these wastes can occur when hazardous solvents are used to clean radioactively contaminated surfaces or through research and laboratory activities. Sites achieved a 91% reduction in low-level mixed waste compared to the 80% reduction level established as the 2005 goal. About 54% percent of the low-level mixed wastes reported this year were generated at NE sites. EM sites accounted for another 34% of low-level mixed wastes generated.



Hazardous Waste

Hazardous wastes are those regulated either by RCRA, TSCA, or state laws because of their potentially harmful effect if improperly managed or released into the environment. They are generated from the use of hazardous materials such as solvents in routine cleaning or production.

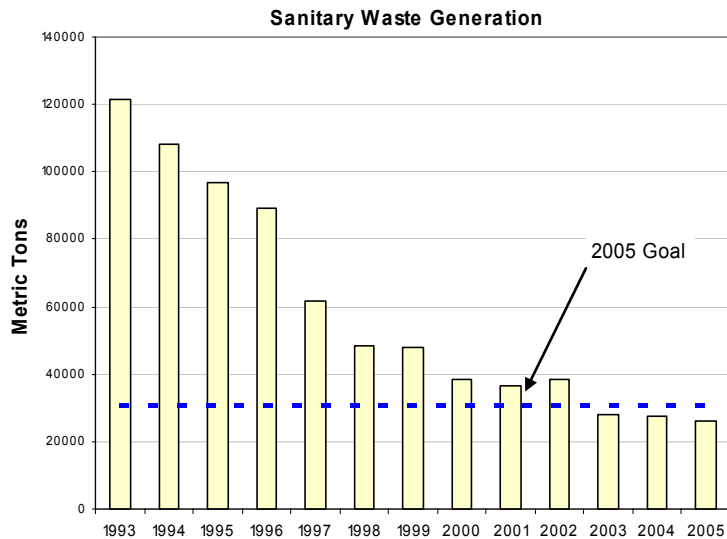
Hazardous waste generation dropped 95% from the 1993 baseline and surpassed the 2005 90% reduction goal.



About 43% of the reported waste is attributable to NNSA sites and the Office of Science (SC) sites account for 32% of the reported waste. SC sites generate hazardous waste from research activities encompassing diverse fields of study such as biology, energy research, material sciences, chemistry, and physics. Hazardous waste from these activities can include specialty chemicals and solvents as well wastes more commonly associated with industry such as sewage sludge, fly ash, automotive waste, and building construction and demolition waste (commonly asbestos, PCBs, lead-based paint, and hazardous metals from solder and electrical systems).

Sanitary Waste

Sanitary wastes are generated through normal operations such as office work, food service operations, and normal housekeeping services. They are neither hazardous nor radioactive and can be recycled or disposed in regular (sanitary) landfills. For purposes of this report, “sanitary waste” refers to municipal solid waste as defined by EPA and does



not include other materials such as construction and demolition debris. Sanitary waste generation was reduced by 78% from the baseline year, surpassing the 75% goal established for 2005.

NNSA sites accounted for over half of the sanitary waste with major contributions coming from the Nevada Test Site, Knolls Atomic Power Laboratory, and Bettis Atomic Power Laboratory.

G. Ozone-depleting Substances Goal: Baseline and Achievements

Since the early 1990s, DOE has been reducing its inventory and use of class I ozone-depleting substances (ODS) in a cost-effective manner. The principal drivers directing the Department's elements to move towards discontinuing their use of ODS are the Section 505 requirements in EO 13148, the EPA's Clean Air Act stratospheric ozone protection regulations, and two ODS phase-out goals that are part of DOE's 1999 Pollution Prevention Leadership Goals. The ODS-related goals require the retrofit or replacement by 2005 of large, aging chillers that use class I refrigerants, and the elimination of class I ODS use by 2010, to the extent economically practicable. During calendar year 2005, DOE's Office of Air, Water and Radiation Protection Policy and Guidance issued an analysis of a final EPA stratospheric ozone protection rule on leak repair requirements for appliances using substitute refrigerants in order to enhance awareness and implementation of the new rule by DOE sites. Recent progress in the phase-out of ODS at select DOE sites is reported in Appendix E.

H. Site-specific Accomplishments

The Office of Pollution Prevention and Resource Conservation (EH-43) issued a lessons-learned report, *Compilation of Pollution Prevention Best Practices In Support of the Waste Reduction Revitalization Initiative*, in April 2004 and developed the Best Practices/Lessons Learned Database to highlight successful, site-specific waste reduction projects and practices that can be implemented at other DOE sites. The report and database are available at <http://www.eh.doe.gov/p2/accomplishments.html>.

Representative examples of notable site-specific pollution prevention projects and practices undertaken in 2005 are summarized in Appendix F.

Appendix A

Department of Energy Pollution Prevention Leadership Goals*

*Secretary of Energy Memorandum, dated November 12, 1999

DOE will strive to minimize waste and maximize energy efficiency as measured by continuous, cost-effective improvements in the use of materials and energy, with the years 2005 and 2010 as interim measurement points.

Reducing Waste and Recycling.

1. Reduce waste from routine operations by 2005, using a 1993 baseline, for these waste types:

Hazardous	90 percent
Low Level Radioactive	80 percent
Low Level-Mixed Radioactive	80 percent
Transuranic (TRU)	80 percent

2. Reduce releases of toxic chemicals subject to Toxic Chemical Release Inventory reporting by 90 percent by 2005, using a 1993 baseline
3. Reduce sanitary waste from routine by 75 percent by 2005, and 80 percent by 2010, using a 1993 baseline.
4. Recycle 45 percent of sanitary wastes from all operations by 2005 and 50 percent by 2010.
5. Reduce waste resulting from cleanup, stabilization, and decommissioning activities by 10 percent on an annual basis.

Buying Items with Recycled Content.

6. Increase purchases of EPA-designated items with recycled content to 100 percent, except when not available competitively at reasonable price or that do not meet performance standards.

Improving Energy Usage.

7. Reduce energy consumption through life-cycle cost effective measures by:

40 percent by 2005 and 45 percent by 2010 per gross square foot for buildings, using a 1985 baseline

20 percent by 2005 and 30 percent by 2010 per gross square foot, or per other unit as applicable, for laboratory and industrial facilities, using a 1990 baseline.

8. Increase the purchase of electricity from clean energy sources:
 - (a) Increase purchase of electricity from renewable energy sources by including provisions for such purchase as a component of our request for bids in 100 percent of all future DOE competitive solicitations for electricity
 - (b) Increase the purchase of electricity from less greenhouse gas-intensive sources, including, but not limited to, new advanced technology fossil energy systems, and other highly efficient generating technologies.

Reducing Ozone Depleting Substances and Greenhouse Gases.

9. Retrofit or replace 100 percent of chillers greater than 150 tons of cooling capacity and manufactured before 1984 that use class I refrigerants by 2005.
10. Eliminate use of class I ozone depleting substances by 2010, to the extent economically practicable, and to the extent that safe alternative chemicals are available for DOE class I applications.
11. Reduce greenhouse gas emissions attributed to facility energy use through life-cycle cost effective measures by 25 percent by 2005 and 30 percent by 2010, using 1990 as a baseline.

Increasing Vehicle Fleet Efficiency and Use of Alternative Fuels.

12. Reduce our entire fleet's annual petroleum consumption by at least 20 percent by 2005 in comparison to 1999, including improving the fuel economy of new light duty vehicle acquisitions and by other means.
13. Acquire each year at least 75 percent of light duty vehicles as alternative fuel vehicles, in accordance with the requirements of the Energy Policy Act of 1992.
14. Increase usage rate of alternative fuel in departmental alternative fuel vehicles to 75 percent by 2005 and 90 percent by 2010 in areas where alternative fuel infrastructure is available.

Appendix B

DOE Order 450.1, Chg 2, *Environmental Protection Program*

Approved: 1-15-03
Review Date: 1-15-05
Chg 1: 1-24-05
Chg 2: 12-7-05

SUBJECT: ENVIRONMENTAL PROTECTION PROGRAM

1. **OBJECTIVES.** To implement sound stewardship practices that are protective of the air, water, land, and other natural and cultural resources impacted by Department of Energy (DOE) operations and by which DOE cost effectively meets or exceeds compliance with applicable environmental; public health; and resource protection laws, regulations, and DOE requirements. This objective must be accomplished by implementing Environmental Management Systems (EMSs) at DOE sites. An EMS is a continuing cycle of planning, implementing, evaluating, and improving processes and actions undertaken to achieve environmental goals. These EMSs must be part of Integrated Safety Management Systems (ISMSs) established pursuant to DOE P 450.4, *Safety Management System Policy*, dated 10-15-96.
2. **CANCELLATION.** DOE O 5400.1, *General Environmental Protection Program*, dated 11-9-88 and DOE N 450.4, *Assignment of Responsibilities for Executive Order 13148, Greening the Government through Leadership in Environmental Management*, dated 2-05-01. Cancellation of a Directive does not, by itself, modify or otherwise affect any contractual obligation to comply with the Directive. Cancelled Directives that are incorporated by reference in a contract remain in effect until the contract is modified to delete the references to the requirements in the cancelled Directives.
3. **APPLICABILITY.**
 - a. **DOE Elements.**
 - (1) Except as noted in paragraph 3c, this Order applies to all DOE elements listed on Attachment 1 that are responsible for the management and operation of the Department's facilities, including elements of the National Nuclear Security Administration and power administrations.

The Administrator of NNSA shall assure that NNSA employees comply with their respective responsibilities under this Order.
 - (2) Where ISMSs are not applicable, DOE elements must ensure the implementation of EMSs. These DOE elements must interpret all references to ISMSs within this Order to mean EMSs.

Vertical line denotes change

b. DOE Contractors.

The Contractor Requirements Document (CRD), Attachment 2, sets forth requirements of this Order that will apply to contractors responsible for the management and operation of the Department-owned facilities whose contracts include the CRD.

- (1) This CRD must be included, as appropriate, in all site/facility management contracts involving activities associated with the use, storage, disposal and transportation of waste; emissions to air; discharges to water; and management of cultural and other natural resources.
- (2) This Order does not apply to other than site/facility management contracts. Any application of any requirements of this Order to other than site/facility management contracts will be communicated separately from this Order.
- (3) The office identified in paragraph 5.d. is responsible for notifying the contracting officer of which contracts are affected. Once notified, the contracting officer is responsible for incorporating the CRD into each affected contract via the laws, regulations, and DOE directives clause of the contract.
- (4) As the laws, regulations, and DOE directives clause states, regardless of the performer of the work, a contractor with the CRD incorporated into its contract is responsible for compliance with the requirements of the CRD. An affected contractor is responsible for flowing down the requirements of this CRD to subcontracts at any tier to the extent necessary to ensure the contractor's compliance with the requirements.

c. Exclusions.

- (1) Activities conducted under the authority of the Director, Naval Nuclear Propulsion Program, as described in Executive Order 12344 and set forth in Public Laws 98-525 and 106-65.
- (2) Activities conducted by the Bonneville Power Administration as authorized by Delegation Order No. 00-033.00A.
- (3) Activities conducted by the Office of the Secretary, Chief Information Office, Office of Congressional and Intergovernmental Affairs, Office of Counterintelligence, Departmental Representative to the Defense Nuclear Facilities Safety Board, Office of Economic Impact and Diversity, Energy Information Administration, Office of General

Counsel, Office of Hearings and Appeals, Office of Inspector General, Office of Intelligence, Office of Policy and International Affairs, Office of Public Affairs, and Secretary of Energy Advisory Board.

4. REQUIREMENTS.

- a. General Requirements. All DOE elements must ensure that site ISMSs include an EMS that does the following.
- (1) Provides for the systematic planning, integrated execution, and evaluation of programs for—
 - (a) public health and environmental protection,
 - (b) pollution prevention (P2), and
 - (c) compliance with applicable environmental protection requirements.
 - (2) Includes policies, procedures, and training to identify activities with significant environmental impacts, to manage, control, and mitigate the impacts of these activities, and to assess performance and implement corrective actions where needed.
 - (3) Includes measurable environmental goals, objectives, and targets that are reviewed annually and updated when appropriate.
- b. Integration of an EMS into ISMS. As part of integrating EMSs into site ISMSs, DOE elements must do the following.
- (1) Consider the following for inclusion as applicable:
 - (a) conformity of DOE proposed actions with State Implementation Plans to attain and maintain national ambient air quality standards,
 - (b) implementation of a watershed approach for surface water protection,
 - (c) implementation of a site-wide approach for groundwater protection,
 - (d) protection of other natural resources including biota,
 - (e) protection of site resources from wildland and operational fires, and

- (f) protection of cultural resources.
 - (2) Promote the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life cycle.
 - (3) Reduce or eliminate the generation of waste, the release of pollutants to the environment, and the use of Class I ozone-depleting substances (ODS) through source reduction including segregation and substitution, re-use, recycling, and sustainable development, and by procuring environmentally preferable products and services, pursuant to the DOE P2 and Sustainable Environmental Stewardship Goals found in Attachment 3.
 - (4) Ensure the early identification of, and appropriate response to, potential adverse environmental impacts associated with DOE operations, including, as appropriate, preoperational characterization and assessment, and effluent and surveillance monitoring.
5. RESPONSIBILITIES. All DOE elements, as specified in paragraph 3a of this Order, are responsible for implementing the requirements specified in paragraph 4. Corporate responsibilities for management of environment, safety and health assigned to DOE elements are delineated in Section 9 of DOE M 411.1-1C, *Safety Management Functions, Responsibilities, and Authorities Manual*, dated 5-22-01. Specific responsibilities for implementing this Order are set forth below.
- a. Assistant Secretary for Environment, Safety and Health, in coordination with other DOE elements, must do the following.
 - (1) Develop or revise, as needed, existing DOE environmental protection directives, policies, guidance, requirements, and procedures to—
 - (a) provide guidance to Program Secretarial Offices (PSOs) and field organizations for ensuring site ISMSs provide for EMSs that promote the protection of the environment, efficient compliance with environmental requirements, and enhanced environmental performance in the conduct of DOE operations (guidance must include instruction for integration of EMS self-assessment requirements into ISMS self-assessment protocols); and
 - (b) maximize the use of safe alternatives to, evaluate present and future uses of, and disseminate information regarding successful efforts to phase out ODS.
 - (2) Serve as the Agency Environmental Executive pursuant to Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling and Federal Acquisition," with responsibility for—

- (a) coordination, in conjunction with the Office of Management, Budget and Evaluation, of environmental programs relating to waste prevention, recycling, and acquisition;
 - (b) preparation of annual corporate reports on the Department's progress in implementing Executive Order 13101 and Executive Order 13148, "Greening the Government Through Leadership in Environmental Management" based on input from Departmental elements; and
 - (c) submission of the reports indicated in paragraph 5a(2)(b) above to the Office of Management and Budget, the Council on Environmental Quality, and the Environmental Protection Agency.
- b. Program Secretarial Officers, the Administrator for the National Nuclear Security Administration, Administrators for Power Administrations, and DOE Operations/Field/Site Office Managers must assess implementation of EMSs as a component of the implementation of DOE O 226.1, *Implementation of Department of Energy Oversight Policy*, dated 9-15-05.
- c. Program Secretarial Officers, the Administrator for the National Nuclear Security Administration, and Administrators for the Power Administrations, in addition to the requirements in paragraph 5b, must do the following.
- (1) Ensure that by December 31, 2005, all sites under their purview have implemented the management system requirements of this Order.
 - (2) Request through the annual Departmental budgetary process, the funding and resources needed for implementing the requirements of this Order and funding to address findings and recommendations from oversight and self-assessment activities conducted in accordance with DOE O 226.1.
 - (3) Ensure sites under their purview include site-specific goals in their ISMS that contribute to the accomplishment of DOE P2 and Sustainable Environmental Stewardship Goals found in Attachment 3.
 - (4) Ensure sites under their purview develop and implement cost-effective P2 programs that use life-cycle assessment concepts and practices in determining program return-on-investment (ROI).
 - (5) Evaluate on an annual basis P2 nominations from sites under their purview, select "best in class" nominees, and transmit the nominating information to the Office of Environment, Safety and Health for submittal to the White House's "Closing the Circle Awards" program.

- (6) Ensure sites under their purview monitor progress toward meeting the requirements of paragraph 4b(3) of this Order, and make such information available annually to the Office of Environment, Safety and Health.

d. DOE Operations/Field/Site Office Managers, in addition to the requirements in paragraph 5b and in coordination with their reporting sites and PSOs, must do the following.

- (1) Report by December 31, 2005, to the Cognizant Program Secretarial Officer the status regarding whether the EMS requirements of DOE O 450.1 have been integrated into ISMSs by site contractors.
- (2) Ensure contractors with approved ISMS descriptions update the ISMS descriptions, as necessary, to include the EMS requirements of this Order.
- (3) Obtain, as appropriate, local community advice relevant to aspects of Executive Order 13101; Executive Order 13221, "Energy Efficiency Standby Power Devices"; Executive Order 13123, "Greening the Government Through Efficient Energy Management;" Executive Order 13148; and Executive Order 13149, "Greening the Government Through Federal Fleet and Transportation Efficiency," through new or existing outreach programs.
- (4) Incorporate, where appropriate, environmentally and economically beneficial landscape practices into all new landscaping programs, policies, and practices for facilities under their purview, in furtherance of compliance with Executive Order 13148.
- (5) Where appropriate, ensure implementation of centralized procurement and distribution programs (e.g., pharmacy) for purchasing, tracking, distributing, and managing materials with toxic or hazardous content at facilities under their purview.
- (6) Conduct operational assessments, such as pollution prevention opportunity assessments, of site operations to identify opportunities for source reduction including material segregation and substitution, recycle/reuse, or other P2 projects. Based on the results of these assessments, implement cost-effective P2 projects, using life-cycle assessment concepts and practices in determining ROI.
- (7) Ensure site annual budgetary processes include the funding and resources needed to implement this Order, including P2 program implementation and monitoring.

- (8) Notify the Director, Office of Strategic Materials, Office of Legacy Management as to the type and quantity of ODS transferred to the Department of Defense (DoD) ODS Reserve.
- (9) Monitor progress toward meeting the requirements of paragraph 4b(3) of this Order, and make such information available annually to the Office of Environment, Safety and Health (ES&H).
- (10) Develop and implement a program and procedures to maximize the use of safe alternatives to ODS whereby—
 - (a) procurement of Class I ODS for all nonexcepted uses is discontinued by December 31, 2010, consistent with Executive Order 13148, and
 - (b) coordination is conducted within DOE and with DoD, as appropriate, before disposal of ODS removed or reclaimed from equipment (including disposal as part of a contract, trade, or donation), and for situations in which the recovered ODS is a critical requirement for DoD missions, the DOE facility transfers the ODS to DoD.
- (11) Consider P2 in the specification and acquisition of departmental supplies to cost effectively maximize procurement of recycled content and biobased content materials, and other environmentally preferable products.
- (12) Coordinate all acquisitions with the Department's "Green Acquisition Advocates" established pursuant to Acquisition Letter AL-2002-05, dated 07/10/02.
- (13) Comply with the requirements of the Emergency Planning and Community Right-to-Know Act (EPCRA or Title III of Superfund Amendments and Reauthorization Act of 1986), 42 U.S.C. 11001, and the Pollution Prevention Act of 1990, 42 U.S.C. 13101, et seq.
- (14) Conduct environmental monitoring, as appropriate, to support the site's ISMS, to detect, characterize, and respond to releases from DOE activities; assess impacts; estimate dispersal patterns in the environment; characterize the pathways of exposure to members of the public; characterize the exposures and doses to individuals, to the population; and to evaluate the potential impacts to the biota in the vicinity of the DOE activity.

- (15) Ensure the analytical work supporting environmental monitoring is implemented using—
 - (a) a consistent system for collecting, assessing, and documenting environmental data of known and documented quality;
 - (b) a validated and consistent approach for sampling and analysis of radionuclide samples to ensure laboratory data meets program-specific needs and requirements within the framework of a performance-based approach for analytical laboratory work; and
 - (c) an integrated sampling approach to avoid duplicative data collection.
- (16) Ensure contractor ES&H self-assessment programs are established within the framework of DOE O 226.1 and continue to be effective.
- (17) Ensure, through the annual ISM review process [established pursuant to DEAR 970.5223-1 (e)] that contractor ES&H performance objectives, performance measures, and commitments include appropriate environmental elements based on the environmental risks, impacts of activities at the site and established Departmental P2 and Sustainable Environmental Stewardship Goals found in Attachment 3.
- (18) Determine which contracts are affected by the requirements of this Order and ensure that the CRD is incorporated into only those contracts for which it is appropriate.
- e. Office of Independent Oversight must evaluate the effectiveness of DOE Headquarters and field organization implementation of the requirements of this Order.
- f. Office of Human Capital Management, in coordination with other DOE elements, must develop or revise existing DOE directives, policies, and documents to accomplish the following.
 - (1) Include, as appropriate, training on environmental requirements and EMSs in the standard senior-level management training for program managers, contracting personnel, procurement and acquisition personnel, facility managers, and other personnel.
 - (2) Include, as appropriate, the successful implementation of EMSs in the position descriptions and performance evaluations for Senior Executive Service and career Headquarters managers and operations/field/site office managers.

- | g. Office of Management, in coordination with other DOE elements, must develop or revise existing DOE directives, policies, and documents to accomplish the following.
- (1) Ensure DOE's personal property management policies and procedures preclude the Department's disposal of ODS without prior coordination with DoD.
 - | (2) Ensure procurement policies and procedures encourage the Department's acquisition of recycled-content and biobased-content materials, and other environmentally preferable products and services.
 - (3) Ensure incorporation of planning and management requirements for historic property and environmental management pursuant to Section 3 (b)(vi) of Executive Order 13327, "Federal Real Property Asset Management."
- | h. Office of the Chief Financial Officer, in coordination with other DOE elements, must develop or revise existing DOE directives, policies, and documents to accomplish the following
- | (1) Reference DOE P2 and Sustainable Environmental Stewardship Goals in the Department's strategic and annual performance plans required by the Government Performance and Results Act of 1993.
 - (2) Ensure that requests for funding to implement the requirements of this Order, made by PSOs are considered in the formulation of DOE's annual budget request.
- i. Director, Office of Legacy Management, must, in addition to their PSO responsibilities in paragraphs 5b and 5c, coordinate with other DOE elements and DoD to dispose of critical Class I ODS.
6. CONTACT. For assistance contact the Office of Environmental Policy and Guidance at 202-586-7870.

BY ORDER OF THE SECRETARY OF ENERGY:



CLAY SELL
Deputy Secretary

DOE ORGANIZATIONS TO WHICH DOE O 450.1 IS APPLICABLE

DOE O 450.1 is applicable to the following organizations and all sites under their purview:

| Office of the Chief Financial Officer
Office of Civilian Radioactive Waste Management
Office of Energy Efficiency and Renewable Energy
Office of Environment, Safety and Health
Office of Environmental Management
Office of Fossil Energy
| Office of Human Capital Management
| Office of Management
National Nuclear Security Administration
Office of Nuclear Energy, Science and Technology
| Office of Security and Safety Performance Assurance
Office of Science
| Office of Legacy Management
Office of Energy Assurance
Southeastern Power Administration
Southwestern Power Administration
Western Area Power Administration

CONTRACTOR REQUIREMENTS DOCUMENT
DOE O 450.1, *Environmental Protection Program*

Regardless of the performer of the work, contractors with this Contractor Requirements Document (CRD) incorporated into their contracts are responsible for (1) compliance with the requirements of the CRD and (2) flowing down the requirements of the CRD to subcontracts at any tier to the extent necessary to ensure the contractors' compliance with the requirements.

This CRD requires contractors to integrate numerous environmentally related requirements already placed on it by existing statutes, regulations, and policies through the use of an Environmental Management System (EMS) incorporated into an Integrated Safety Management System (ISMS). EMS requirements must be addressed in the contractor's ISMS which must be submitted for DOE review and approval under DEAR 970.5223-1, Integration of environment, safety, and health into work planning and execution.

Contractors must:

1. General Requirements. Ensure their integrated safety management systems (ISMSs) include environmental management systems (EMSs) that do the following.
 - (a) Provide for the systematic planning, integrated execution, and evaluation of programs for—
 - (1) public health and environmental protection,
 - (2) pollution prevention (P2), and
 - (3) compliance with applicable environmental protection requirements.
 - (b) Include policies, procedures, and training to identify activities with significant environmental impacts, to manage, control, and mitigate the impacts of these activities, and to assess performance and implement corrective actions where needed.
 - (c) Include measurable environmental goals, objectives, and targets that are reviewed annually and updated when appropriate.
2. Integration of an EMS into ISMS. As part of integrating EMSs into their ISMSs, do the following.
 - (a) Consider the following for inclusion as applicable:
 - (1) conformity of DOE proposed actions with State Implementation Plans to attain and maintain national ambient air quality standards,

- (2) implementation of a watershed approach for surface water protection,
 - (3) implementation of a site-wide approach for groundwater protection,
 - (4) protection of other natural resources including biota,
 - (5) protection of site resources from wildland and operational fires, and
 - (6) protection of cultural resources.
 - (b) promote the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life cycle;
 - (c) reduce or eliminate the generation of waste, the release of pollutants to the environment, and the use of Class I ozone-depleting substances (ODS) through source reduction including segregation and substitution, re-use, recycling, and sustainable development, and by procuring environmentally preferable products and services, pursuant to the DOE P2 and Sustainable Environmental Stewardship Goals found in Attachment 3; and
 - (d) ensure the early identification of, and appropriate response to, potential adverse environmental impacts associated with DOE operations, including as appropriate, preoperational characterization and assessment; and effluent and surveillance monitoring.
3. Update approved ISMS descriptions as necessary to include EMS requirements of this CRD. Report to DOE operations/field/site office managers within 12 months after insertion of this CRD into the contract on the status of implementation of appropriate management system elements of this CRD.
 4. Assist the Department in meeting its requirements and in its efforts to obtain, as appropriate, local community advice relevant to aspects of Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling and Federal Acquisition;" Executive Order 13221, "Energy Efficiency Standby Power Devices;" Executive Order 13123, "Greening the Government Through Efficient Energy Management;" Executive Order 13148, "Greening the Government Through Leadership in Environmental Management;" and Executive Order 13149, "Greening the Government Through Federal Fleet and Transportation Efficiency."
 5. Assist the Department in meeting its requirements under Executive Order 13148 by ensuring, where appropriate, implementation of centralized procurement and distribution programs (e.g., pharmacy) for purchasing, tracking, distributing, and managing materials with toxic or hazardous content at facilities under their purview.
 6. Incorporate, where appropriate, environmentally and economically beneficial landscape practices into all new landscaping programs, policies, and practices for facilities. [See

requirements placed on Federal agencies in Executive Order 13148, “Greening the Government Through Leadership in Environmental Management.”]

7. Monitor progress toward meeting the requirements of paragraph 2c above and make such information available annually to the DOE operations/field/site office.
8. Consider P2 in the specification and acquisition of supplies to cost effectively maximize procurement of recycled-content and biobased-content materials, and other environmentally preferable products and services. As appropriate, all acquisitions must be coordinated with the DOE operations/field/site office “Green Acquisition Advocate.” [See Acquisition Letter AL-2002-05, dated 07/10/02]
9. Conduct operational assessments, such as pollution prevention opportunity assessments, of site operations to identify opportunities for source reduction including material segregation and substitution, recycle/reuse, or other P2 projects. Based on the results of these assessments, implement cost-effective P2 projects, using life-cycle assessment concepts and practices in determining return-on-investment.
10. Conduct environmental monitoring, as appropriate, to support the site’s ISMSs, to detect and characterize releases from DOE activities; assess impacts; estimate the dispersal patterns in the environment; characterize the pathways of exposure to members of the public; and characterize the exposures and doses to individuals, and to the population; and to evaluate the potential impacts to the biota in the vicinity of the DOE activity.
11. Ensure the analytical work supporting environmental monitoring is implemented using—
 - (a) a consistent system for collecting, assessing, and documenting environmental data of known and documented quality;
 - (b) a validated and consistent approach for sampling and analysis of radionuclide samples to ensure laboratory data meets program-specific needs and requirements within the framework of a performance-based approach for analytical laboratory work; and
 - (c) an integrated sampling approach to avoid duplicative data collection.
12. Develop and implement a program and procedures to maximize the use of safe alternatives to ODS whereby—
 - (a) the procurement of Class I ODS for all nonexcepted uses is discontinued by December 31, 2010 [See Executive Order 13148], and
 - (b) disposal of ODS removed or reclaimed from equipment (including disposal as part of a contract, trade, or donation) is coordinated within DOE and with DoD,

and for situations in which the recovered ODS is a critical requirement for DoD missions, the facility transfers the ODS to DoD.

13. Assist the Department with its requirement under Executive Order 13148 by meeting reporting and planning requirements under the Emergency Planning and Community Right-to-Know Act (EPCRA or Title III of Superfund Amendments and Reauthorization Act of 1986), 42 U.S.C. 11001, and the Pollution Prevention Act of 1990, 42 U.S.C. 13101.
14. Assist the Department with its requirement under Executive Order 13327, “Federal Real Property Asset Management”, Section 3(b)(vi), by ensuring incorporation of planning and management requirements for historic property and environmental management.

POLLUTION PREVENTION AND SUSTAINABLE ENVIRONMENTAL STEWARDSHIP GOALS

1. PURPOSE.

- a. To establish Department of Energy (DOE) goals that advance the pollution prevention and environmental management system provisions of DOE O 450.1, *Environmental Protection Program*, and Executive Orders 13148, *Greening the Government Through Leadership in Environmental Management*, and 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*.
- b. To supersede the pollution prevention leadership goals expiring in 2005.
- c. To integrate pollution prevention and sustainable environmental stewardship into DOE operations as a cost-effective business practice that will:
 - (1) reduce environmental hazards,
 - (2) protect environmental resources,
 - (3) avoid pollution control costs, and
 - (4) improve operational capability and mission sustainability.

2. GOALS, OBJECTIVES AND STRATEGIES.

The Department herein establishes five performance-based P2 and Sustainable Environmental Stewardship goals that are to be achieved by DOE sites through the integration of P2 into environmental management systems pursuant to DOE 450.1 and its Contractor Requirements Document (CRD). The accompanying strategies for achieving the P2 and Sustainable Environmental Stewardship goals are to be considered for inclusion in sites' environmental management systems, as applicable or otherwise appropriate. DOE sites are also to consider mission performance and life-cycle costs when selecting specific strategies for achieving the P2 and Sustainable Environmental Stewardship goals.

3. PERFORMANCE MEASURES.

Measure progress towards meeting the requirements of paragraph 4b(3) of this Order and section 2c of the CRD, and make such information available annually to the Agency Environmental Executive pursuant to sections 5c(6) and 5d(9) of this Order and section 7 of its CRD.

GOAL	PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH WASTE PREVENTION
OBJECTIVE	Reduce environmental hazards, protect environmental resources, minimize life-cycle cost and liability of DOE programs, and maximize operational capability by eliminating or minimizing the generation of wastes that would otherwise require storage, treatment, disposal, and long-term monitoring and surveillance (i.e., future environmental legacies).
STRATEGIES	<ul style="list-style-type: none"> • Establish operational assessments (OAs), such as pollution prevention opportunity assessments, of waste generating activities, as objectives and measurable targets in site environmental management systems (EMSs). • Based on OAs, establish objectives and measurable targets in site EMSs for the prevention, reduction, reuse and recycling of waste streams generated at sites. • Identify resources needed to implement this pollution prevention goal and site-specific objectives and targets in site annual budgetary processes. • Participate in voluntary environmental partnership programs (e.g., National Waste Minimization Program, Waste Wise, National Environmental Performance Track, etc.) where there is a programmatic benefit from doing so (community outreach, technology transfer, regulatory incentives, etc.).

GOAL	PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH <i>REDUCTION OF ENVIRONMENTAL RELEASES</i>
OBJECTIVE	Reduce environmental hazards, protect environmental resources, minimize life-cycle cost and liability of DOE programs, and maximize operational capability by eliminating or minimizing the use of toxic chemicals and associated releases of pollutants to the environment that would otherwise require control, treatment, monitoring, and reporting.
STRATEGIES	<ul style="list-style-type: none"> • Establish operational assessments (OAs), such as pollution prevention opportunity assessments, of activities using toxic chemicals, as objectives and measurable targets in site environmental management systems (EMSs). • Based on OAs, establish objectives and measurable targets in site EMSs for minimizing the use of toxic chemicals, and reducing associated releases of pollutants to the environment (air, water, soil, biota). • Identify resources needed to implement this pollution prevention goal and site-specific objectives and targets in site annual budgetary processes. • Participate in voluntary environmental partnership programs (e.g., Adopt Your Watershed, Climate Leaders, Green Engineering, National Environmental Performance Track, etc.) where there is a programmatic benefit from doing so (community outreach, technology transfer, regulatory incentives, etc.).

<p>GOAL</p>	<p>PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH <i>ENVIRONMENTALLY PREFERABLE PURCHASING</i></p>
<p>OBJECTIVE</p>	<p>Reduce environmental hazards, conserve environmental resources, minimize life-cycle cost and liability of DOE programs, and maximize operational capability through the procurement of recycled-content, biobased-content and other environmentally preferable products thereby minimizing the economic and environmental impacts of managing toxic by-products and hazardous wastes generated in the conduct of site activities.</p>
<p>STRATEGIES</p>	<ul style="list-style-type: none"> • Establish environmentally preferable purchasing objectives and measurable targets in site environmental management systems (EMSs). • Green Purchasing <ul style="list-style-type: none"> – Specify environmentally preferable products* in the acquisition of site supplies and services. – Procure the following environmentally preferable products, when available, affordable and effective: <ul style="list-style-type: none"> • Environmental Protection Agency-designated recycled-content products • Department of Agriculture-designated biobased-content products • EPA Significant New Alternatives Policy (SNAP) Program acceptable substitutes for ozone-depleting substances • cleaning products certified by GreenSeal, a U.S. standard setting and environmental labeling organization (www.greenseal.org) and/or EPA-designated green cleaning products (www.epa.gov/opptintr/epp/cleaners/select) <p>* Products that have a lesser or reduced effect on human health and the environment when compared with competing products that serve the same purpose, including materials that result in no waste, less waste or less toxic waste across the entire life-cycle.</p> <ul style="list-style-type: none"> • Federal Electronics Challenge <ul style="list-style-type: none"> – Specify a preference for environmentally preferable electronics qualified through the Electronic Procurement Environmental Assessment Tool (EPEAT) or its successor, in the solicitation and acquisition of desktop computers, notebooks, and monitors. – Utilize the EPEAT network to identify specific models of desktop

Vertical line denotes change.

<p>GOAL</p>	<p>PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH <i>ENVIRONMENTALLY PREFERABLE PURCHASING</i></p>
	<p>computers, notebooks and monitors certified by manufacturers and vendors as environmentally preferable and listed according to three tiers of ascending environmental performance and order of preference—bronze, silver, and gold (www.epeat.net).</p> <ul style="list-style-type: none"> • Operate a vehicle fleet that is the most environmentally preferable possible while meeting performance, cost-effectiveness and regulatory demands. <ul style="list-style-type: none"> – Utilize API-rated re-refined oil, retread truck tires, antifreeze/engine coolant recyclers, water recycling/reclamation vehicle wash facilities, and biobased lubricants, fuels and degreasers/cleaners. – Utilize alternative fuel (clean air) vehicles. • Identify resources needed to implement this pollution prevention goal and site-specific objectives and targets in site annual budgetary processes. • Participate in voluntary environmental partnership programs (e.g., FEC “Partner”) where there is a programmatic benefit from doing so (community outreach, technology transfer, regulatory incentives, etc.).

<p>GOAL</p>	<p>PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH INCORPORATION OF ENVIRONMENTAL STEWARDSHIP IN PROGRAM PLANNING AND OPERATIONAL DESIGN</p>
<p>OBJECTIVE</p>	<p>Reduce environmental hazards, conserve environmental and energy resources, minimize life-cycle cost and liability of DOE programs, and maximize operational capability by incorporating sustainable environmental stewardship in the commissioning of site operations and facilities.</p>
<p>STRATEGIES</p>	<ul style="list-style-type: none"> • Establish sustainable environmental stewardship objectives and measurable targets in site environmental management systems (EMSs). • Green Building <ul style="list-style-type: none"> – Apply sustainable building design criteria when planning and constructing new facilities or modifying existing facilities to optimize life-cycle costs, reduce pollution, minimize energy consumption, conserve water, and enhance indoor air quality, worker safety and productivity. – Utilize resources available through the following Federal and DOE Energy Management Programs (FEMP/DEMP) to assist in the development of green buildings that are life-cycle cost-effective, and meet mission and functional performance needs: <ul style="list-style-type: none"> ○ FEMP New Building Design Project Assistance ○ FEMP New Construction Project Assistance ○ DEMP Retrofit Project Assistance ○ DEMP Energy Management Model Program Assistance – Utilize the National Institute of Standards and Technology’s Building for Environmental and Economic Sustainability (tool for selecting cost effective, environmentally preferable building construction products) (www.bfrl.nist.gov/oae/software/bees.html). – Include sustainable design and development criteria in built-to-lease solicitations. – Include a preference for buildings meeting sustainability provisions of the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED™) Green Building Rating System, the Green Buildings Initiative’s Green Globes assessment and rating

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<p>GOAL</p>	<p>PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH INCORPORATION OF ENVIRONMENTAL STEWARDSHIP IN PROGRAM PLANNING AND OPERATIONAL DESIGN</p>
	<p>tool, the Whole Building Design Guide, or the American Society for Testing and Materials' Standard Guide for the General Principles of Sustainability Relative to Buildings (ASTM E2432) in solicitations and selection criteria for acquiring leased buildings.</p> <ul style="list-style-type: none"> – Retire inefficient building equipment on an accelerated basis where replacement results in lower life-cycle costs (reduced energy and water consumption, and waste generation). • Green Chemistry <ul style="list-style-type: none"> – Participate in the EPA/DOE sponsored Laboratories for the 21st Century (Labs21) voluntary program dedicated to improving the environmental performance and stewardship of U.S. laboratories through the design of chemical products and analytical processes that reduce or eliminate the use and/or generation of hazardous substances. – Establish operational assessments (OAs), such as pollution prevention opportunity assessments, of laboratory activities, as objectives and measurable targets in site environmental management systems (EMSs). – Based on OAs, establish objectives and measurable targets in site EMSs for: <ul style="list-style-type: none"> ○ development and utilization of more environmentally benign solvents and solvent-less systems that reduce or eliminate the use of hazardous solvents; ○ design of analytical products and processes that reduce or eliminate the use and/or generation of hazardous substances; ○ application of Labs21 Environmental Performance Criteria in the operation of laboratory facilities. • Green Landscaping <ul style="list-style-type: none"> – Implement cost-effective, sustainable landscape design and management practices to reduce adverse impact to the natural environment and native ecological systems. – Utilize EPA GreenScapes environmentally beneficial landscaping

GOAL	PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH INCORPORATION OF ENVIRONMENTAL STEWARDSHIP IN PROGRAM PLANNING AND OPERATIONAL DESIGN
	<p>methods to reduce waste and energy usage, conserve water, and reduce greenhouse gas emissions. (www.epa.gov/greenskapes).</p> <ul style="list-style-type: none">• Identify resources needed to implement this sustainable environmental stewardship goal and site-specific objectives and targets in site annual budgetary processes.

<p>GOAL</p>	<p>PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH <i>POST-CONSUMER MATERIAL RECYCLING</i></p>
<p>OBJECTIVE</p>	<p>Protect environmental resources, minimize life-cycle cost of DOE programs, and maximize operational capability by diverting materials suitable for reuse and recycling from landfills thereby minimizing the economic and environmental impacts of waste disposal and long-term monitoring and surveillance.</p>
<p>STRATEGIES</p>	<ul style="list-style-type: none"> • Establish post-consumer material recycling objectives and measurable targets in site environmental management systems (EMSs). • Recycle office paper, cardboard, aluminum, plastics, and glass. • Recycle spent oil, hydraulic fluid, lubricants, and solvents. • Recycle construction and demolition debris. <ul style="list-style-type: none"> – Reuse demolition rubble (concrete, brick, and other masonry) on-site by crushing the material to stone for grading, laying utilities, and building roads, driveways and parking areas. Pulverize and reuse gravel asphalt and sub-base. – Utilize the General Services Administration Construction Waste Management Database to identify recyclers of 15 commonly-recycled construction and demolition debris such as concrete, asphalt, masonry, metal, plastic, and wood (cwm.wbdg.org). • Recycle empty, non-refillable, high-density polyethylene (HDPE) plastic pesticide product containers. <ul style="list-style-type: none"> – Utilize the Ag Container Recycling Council (ACRC), a non-profit organization that collects and recycles professional end-users' containers of EPA registered pesticide products to include agricultural, turf, forestry, vegetative management, specialty pest control, adjuvants, crop oils, and surfactants (www.acrecycle.org). • Collect spent toner cartridges and batteries for remanufacturing. • Federal Electronics Challenge - Recycle computers, monitors and peripheral information technology electronics. <ul style="list-style-type: none"> – Extend the useful lifespan of computers through software upgrades; enable power management capabilities, and – Utilize the recycling services available through the following sources as an environmentally compliant means for disposition of end-of-life electronics:

<p>GOAL</p>	<p>PROTECT THE ENVIRONMENT AND ENHANCE MISSION ACCOMPLISHMENT THROUGH <i>POST-CONSUMER MATERIAL RECYCLING</i></p>
<p>STRATEGIES</p>	<ul style="list-style-type: none"> ○ Environmental Protection Agency Recycling Electronics and Asset Disposition (READ) Services Government Wide Acquisition Contract (www.epa.gov/oam/read/index.htm), or ○ Department of Justice UNICOR Electronic Recycling Program (www.unicor.gov/recycling), or ○ General Services Administration Federal Supply Service Multiple Award Schedule 899, Reclamation, Recycling, and Disposal Services, or ○ Recyclers that are members, in good standing, of one or more of the following professional associations: <ul style="list-style-type: none"> · International Association of Electronic Recyclers · Institute of Scrap Recycling Industries · National Recycling Coalition · Electronic Industries Alliance • Recycle surplus commodities and by-products. <ul style="list-style-type: none"> – Utilize material exchange programs such as Recycler’s World Network (www.recycle.net) and the DOE Materials Exchange Network (wastenot.er.doe.gov) to transfer unwanted materials to alternate users. • Identify resources needed to implement this pollution prevention goal and site-specific objectives and targets in site annual budgetary processes.

Vertical line denotes change.

Approved: 1-15-03
Chg 1: 1-24-05

SUBJECT: ENVIRONMENTAL PROTECTION PROGRAM

1. PURPOSE. To transmit revised pages to DOE O 450.1, *Environmental Protection Program*, dated 1-15-03.
2. EXPLANATION OF CHANGES. To add requirements from Executive Order 13327 “Federal Real Property Asset Management,” and incorporates responsibilities for the Office of Legacy Management.
3. LOCATION OF CHANGES.

<u>Pages</u>	<u>Paragraphs</u>
1	3a(1)
3	3c(3)
4	5
6	5d(8)
7	5d(13)
9	5f(7)
9	5g
Att 1, Page 1	
Att 2, Page 4	14

After filing the attached pages, this transmittal may be discarded.

BY ORDER OF THE SECRETARY OF ENERGY:



KYLE E. McSLARROW
Deputy Secretary

SUBJECT: ENVIRONMENTAL PROTECTION PROGRAM

4. PURPOSE. To transmit revised pages to DOE O 450.1, *Environmental Protection Program*, dated 1-15-03.
5. EXPLANATION OF CHANGES. To add new pollution prevention and sustainable environmental stewardship (P2) goals as attachment 3. Also, administrative changes have been made throughout the Order to correspondence with the new P2 goals. Additionally, the responsibilities of the former Office of Management, Budget and Evaluation have been separated into the three newly established organizations derived there from.
6. LOCATION OF CHANGES.

<u>Pages</u>	<u>Paragraphs</u>
4	4b(3)
5	5b, 5c(2, 3)
6	5c(6), 5d(6)
7	5d(9, 11, 12)
8	5d(16, 17), 5e, 5f
9	5g, 5g(2), 5h, and 5h(1)

Att 1, Page 1

Att 2, Page 2 2c

Att 2, Page 3 7, 8, 9

Att 3

After filing the attached pages, this transmittal may be discarded.

BY ORDER OF THE SECRETARY OF ENERGY:



CLAY SELL
Deputy Secretary

Appendix C

2005 Department of Energy EMS Status at “Appropriate Facilities”

2005 Department of Energy EMS Status at “Appropriate Facilities”

DOE uses the term “sites” rather than “facilities.” Within DOE, the term “site” is used to identify a contiguous geographic area under DOE ownership, such as the Savannah River Site. DOE's sites often have numerous “facilities.” Normally, a site is managed under a single management system. In addition, DOE's Power Administrations have numerous powerlines and substations located across multiple states. They organize their EMS system-wide, or by regions; DOE tallies each site organization with a distinct EMS as a separate “facility.”

There are two changes to this list from the list reported in the Department’s 2004 annual report, resulting in a decrease from 47 to 44 “appropriate facilities.”

- Three sites scheduled for closure in 2006 (Miamisburg OH, Fernald OH, Rocky Flats CO) were determined not to be “appropriate facilities” to implement EMS. [Net decrease of 3.]
- The former Idaho National Environmental and Engineering Laboratory was split into Idaho National Laboratory and Idaho Cleanup Project. The former Argonne National Laboratory-West was merged into Idaho National Laboratory. [No net change.]

This year’s table of “appropriate facilities” identifies the basis used by each DOE site manager to declare that an EMS is in place. The definitions were developed by the Interagency Environmental Leadership Workgroup established under EO 13148.

- First-Party Audits: EMS audits conducted by the participants within the scope of the EMS under consideration.
- Second-Party Audits: EMS audits conducted by reviewers from outside the scope of the EMS in question.
- Third-Party Audits: EMS audits conducted by an ANSI-RAB accredited, independent registrar.

DOE Site	Location	EMS Status	First/Second/Third Party Basis	Other EMS Recognition *
Albany Research Center	Albany OR 97321	in place	3	ISO 14001
Ames Laboratory	Ames IA 50011	in place	1	
Argonne National Laboratory	Argonne IL 60439	in place	2	
Bettis Atomic Power Laboratory	West Mifflin PA 15122	in place	1	
Bonneville Power Administration	Portland OR 97232 & multiple states	in place	1	
Brookhaven National Laboratory	Upton NY 11973	in place	3	ISO 14001, NEPT
DOE Headquarters§	Washington DC 20585 Germantown MD 20874	in place	1	

DOE Site	Location	EMS Status	First/Second/Third Party Basis	Other EMS Recognition *
East Tennessee Technology Park	Oak Ridge TN 37831	in place	2	
Fermi National Accelerator Laboratory	Batavia IL 60510	in place	2	
Hanford -- Central Plateau Project	Richland WA 99352	in place	1	
Hanford -- Office of River Protection	Richland WA 99352	in place	1	
Hanford -- River Corridor Project	Richland WA 99352	in place	1	
Idaho Advanced Mixed Waste Treatment Facility	Idaho Falls ID 83401	by Apr '07	–	
Idaho Cleanup Project	Idaho Falls ID 83401	in place	3	ISO 14001
Idaho National Laboratory	Idaho Falls ID 83415	in place	3	ISO 14001
Kansas City Plant	Kansas City MO 64141	in place	3	ISO 14001
Knolls Atomic Power Laboratory	Niskayuna NY 12309	in place	1	
Lawrence Berkeley National Laboratory	Berkeley CA 94720	in place	2	
Lawrence Livermore National Laboratory	Livermore CA 94550	in place	2	
Los Alamos National Laboratory	Los Alamos NM 87545	in place	2	†
National Energy Technology Laboratory	Pittsburgh PA 15236 Morgantown WV 26507 Tulsa OK 74103	in place	3	ISO 14001
National Renewable Energy Laboratory	Golden CO 80401	in place	2	NEPT
Nevada Test Site	North Las Vegas NV 89030	in place	1	
Oak Ridge Institute for Science and Education	Oak Ridge TN 37830	in place	3	ISO 14001
Oak Ridge National Laboratory	Oak Ridge TN 37831	in place	3	ISO 14001
Office of Legacy Management	Grand Junction CO 81503 & sites nationwide	in place	2	
Pacific Northwest National Laboratory	Richland WA 99352	in place	3	ISO 14001; NEPT
Paducah Site	West Paducah KY 42086	by Sept '06	–	
Pantex Plant	Amarillo TX 79177	in place	2	
Portsmouth Gaseous Diffusion Plant	Portsmouth OH 45661	by Sept '06	–	
Princeton Plasma Physics Laboratory	Princeton NJ 08543	in place	2	
Rocky Mountain Oil Field Testing Center	Casper WY 82601	in place	2	
Sandia National Laboratory	Albuquerque NM 87123 Livermore CA 94550	in place	2	†

DOE Site	Location	EMS Status	First/ Second/ Third Party Basis	Other EMS Recognition *
Savannah River Site	Aiken SC 29802	in place	1	‡
Savannah River Tritium Facility	Aiken SC 29802	in place	1	‡
Southwestern Power Administration	Gore OK 74435 & multiple states	in place	2	
Stanford Linear Accelerator Center	Stanford CA 94025	in place	2	
Strategic Petroleum Reserve	New Orleans LA 70123 Bayou Choctaw LA 70764 West Hackberry LA 70645 Big Hill TX 77605 Bryan Mound TX 77451 Stennis Space Ctr MS 39529	in place	3	ISO 14001; NEPT
Thomas Jefferson National Accelerator Facility	Newport News VA 23606	in place	2	
Waste Isolation Pilot Plant ISO	Carlsbad NM 88221	in place	1	‡
West Valley Demonstration Project	West Valley NY 14171	in place	1	NEPT
Western Area Power Administration	Lakewood CO 80228 & 15 states	in place	1	
Y-12 National Security Complex	Oak Ridge TN 37831	in place	2	
Yucca Mountain Project	Las Vegas NV 89134	in place	2	

* Other EMS Recognition includes:

ISO 14001 – Third-party certified to the ISO 14001 Standard.

NEPT – Member of EPA's National Environmental Performance Track program.

† Expected to seek ISO 14001 registration in 2006

‡ Previously registered to ISO 14001 standard; chose not to renew ISO 14001 registration.

§ Data for the DOE Headquarters EMS were included in the Department's 2005 Annual Report, but the site was omitted from the "Appropriate Facilities" table.

Note: The 2005 table also reflects the following name changes

2004	2005
Argonne National Laboratory – East	Argonne National Laboratory
Naval Petroleum and Oil Shale Reserves CO/UT/WY	Rocky Mountain Oil Field Test Center
Hanford -- Environmental Restoration Project	Hanford -- Central Plateau Project
Hanford -- Project Hanford	Hanford -- River Protection Project
Grand Junction Office	Office of Legacy Management

Appendix D

TRI Reporting by Chemical and by Site

Comparison of 2003 & 2004 DOE TRI Reporting by Toxic Chemical (pounds)

TRI Chemical	2003 EPCRA Form R (Sec. 8.1)	2004 EPCRA Form R (Sec. 8.1)	2003-2004 % Change
Lead	1,398,750	864,484	(38%)
Zinc Compounds	168,768	142,735	(15%)
Nitrate Compounds	127,349	150,368	18%
Hydrochloric Acid	116,899	148,886	27 %
Methanol	77,101	56,012	(27%)
Sulfuric Acid	58,983	48,003	(19%)
Freon 113	32,020	14,000	(56%)
Copper	26,518	57,900	118%
Chromium Compounds	15,625	2,162	(86%)
Nitric Acid	13,677	13,845	1%
Cadmium	13,659	--	(100%)
Manganese Compounds	6,696	5,663	(15%)
Nickel and Compounds	3,686	2,894	(21%)
Sodium Nitrite	2,701	461	(83%)
Toluene	2,418	5,402	123%
Formic Acid	1,753	1,925	10%
Polycyclic Aromatics	1,299	1,375	6%
Mercury and compounds	952	3,500	268%
Cobalt	914	--	(100%)
Polychlorinated Biphenyls	584	3,345	473%
Chlorine	483	184	(62%)
Ethylbenzene	334	855	156%
Ethylene Glycol	286	--	(100%)
Propylene	105	631	501%
Naphthalene	24	138	475%
Benzo(ghi)Perylene	0.011	0.017	55%
Benzene	0	47	NA
Nhexane	0	2,206	NA
TOTAL	2,071,584	1,527,022	(26%)

See section E.2 of this report for explanations of TRI release changes.

Comparison of 2003-2004 DOE TRI Reporting by Site (pounds)

DOE Site	2003 EPCRA Form R (Sec. 8.1)	2004 EPCRA Form R (Sec. 8.1)	2003-2004 % Change
Hanford	641,747	95,909	(85%)
Y-12 National Security Complex	322,584	259,650	(20%)
Savannah River Site	261,630	254,136	(3%)
Argonne National Lab-East	172,963	16,832	(90%)
Brookhaven National Lab	165,616	5,708	(97%)
Idaho National Lab	103,999	533,417	413%
Oak Ridge National Lab	97,422	101,357	4%
Rocky Flats Plant	93,475	120,798	29%
Waste Isolation Pilot Plant	81,707	330	(99.5%)
East Tennessee Technology Park	72,048	1.3	(99.9%)
Fermi Lab	17,843	49,739	179%
Los Alamos National Lab	14,443	37,821	162%
National Training Center (NNSI)	10,371	28,242	172%
Portsmouth Gas. Diff. Plant	163	68	(58%)
Stanford Linear Accelerator	512	733	43%
Pantex	5,959	7,416	24%
Nevada Test Site	5,607	8,473	51%
LLNL Site 300	1,130	1,289	14%
Sandia National Lab-NV	946	1,790	89%
Sandia National Lab-CA	746	898	20%
Paducah	577	142	(75%)
Bonneville Power Administration	89	8	(91%)
Kansas City Plant	8	12	50%
Sandia National Lab-NM	0	0	NA
Bayou Choctaw SPR	0	616	NA
Bryan Mound SPR	0	580	NA
West Hackberry SPR	0	1057	NA
TOTAL	2,071,584	1,527,022	(26%)

Appendix E

Status of Ozone-depleting Substances (ODS) Reduction Programs at Select DOE Sites in Calendar Year 2005

Status of Ozone-depleting Substances (ODS) Reduction Programs at Select DOE Sites in Calendar Year 2005

DOE Site	ODS Phaseout Progress
Los Alamos National Laboratory (LANL)	<ul style="list-style-type: none"> ▪ Replaced remaining four chillers subject to the DOE 2005 phaseout goal. ▪ Replaced over 4000 pounds of refrigerants in eighteen units subject to 2010 goal.
Brookhaven National Laboratory (BNL)	<ul style="list-style-type: none"> ▪ Recovered and recycled approximately 450 pounds of R-11, 4 pounds of R-12, and 185 pounds of R-22 from refrigeration equipment that was serviced. ▪ Phased out halon 1211 and 1301 . Transferred 5,284 pounds of excess halon 1301 and approximately 175 pounds of excess halon 1011 to the DOE Savannah River Site halon repository. The fire suppressants sent to the halon repository had been accumulated over several years because they were no longer needed, or because ODS systems were replaced with systems that use alternative agents.
Western Area Power Administration (WAPA)	<ul style="list-style-type: none"> ▪ Replaced older appliances containing icemakers using R-12 gas with chlorofluorocarbon (CFC)-free units. ▪ Reduced the use of ozone-depleting solvents. Almost all past inventories have been eliminated or appropriately disposed of. ▪ Phased out halon-containing, hand-held fire extinguishing equipment for all but a few uses. Several regions have almost phased out halon-based large fire suppression systems. These fire suppression systems and equipment were replaced with carbon dioxide, dry chemical extinguishers and other approved chemical replacements.
Savannah River Site (SRS)	<ul style="list-style-type: none"> ▪ Reduced CFC refrigerant usage in large ODS emission sources more than 99 per cent compared to 1993 baseline data; reduced CFC refrigerant usage in large sources of ODS from 50 pounds in 2003 to 45 pounds in 2004. ▪ Decreased halon 1301 total inventory on site from 102,285 pounds in 2002 to 75,577 pounds in 2003 and 74,664 pounds in 2004. The site had an inventory of 52,645 pounds of stored halon 1301 at the end of 2004. ▪ Reduced halon operating systems from 111 in 2002 to 94 in 2004; the two remaining systems abandoned in place containing halon charges were properly disposed of.
Pantex Plant	<ul style="list-style-type: none"> ▪ Replaced or removed most halon-based fire protection systems. The replacement systems do not use Class 1 ODS. ▪ Recovered halon-based chemicals have been shipped to the DOE's halon repository at the Savannah River Site.

DOE Site	ODS Phaseout Progress
Oak Ridge Reservation (ORR)	<ul style="list-style-type: none"><li data-bbox="586 239 1369 449">▪ Replaced all units at East Tennessee Technology Park (ETTP), Oak Ridge National Laboratory (ORNL) and the Y-12 National Security complex containing Class 1 ODS that have a cooling capacity of greater than 150 tons and were installed before 1984, except for six units located at ORNL. All of these units will be decommissioned.

Appendix F

Representative Examples of Pollution Prevention Practices Conducted in 2005

In addition to the activities described in other sections of this report, DOE sites engaged in a variety of noteworthy pollution prevention practices in 2005. Representative examples are described below; point-of-contact information is also provided.

Fermi National Accelerator Laboratory partnered with Argonne National Laboratory to recycle or reclaim over 200,000 pounds of unneeded electronic equipment. Program success derived from developing material disposal policies, providing employee training, and creating an asset management and waste surveillance program. Contact: Sally Arnold, 630-840-2239, sally.arnold@ch.doe.gov

Idaho National Laboratory (INL), the National Renewable Energy Laboratory (NREL), and the Pacific Northwest National Laboratory (PNNL) submitted proposals to the United Soybean Board to conduct pilot studies of biobased products. The INL and PNNL pilot projects were funded in 2005; the NREL proposal will be funded in 2006. INL piloted biobased products for its fleet and PNNL piloted biobased carpet. Contacts: Anne Dustin, 208-526-3952, dustal@inel.gov; Steve Blazek, 303-275-4723, steve.blazek@go.doe.gov; Wayne Larson, 509-376-2483, wayne.larson@pnl.gov

The following activities occurred at Brookhaven National Laboratory. Contact: George Goode, 631-344-4549, goode@bnl.gov

- Used hydrogen peroxide to strip paint from 47 helium tanks and associated equipment to eliminate human health risks, environmental releases, and hazardous waste streams. The alternatives, grit blasting or methylene chloride, were unacceptable from safety and hazardous materials disposal cost considerations.
- Switching from petroleum-based to biobased hydraulic fluid in underground pistons of a motor pool vehicle lift completely eliminated the potential for groundwater contamination. The canola-based hydraulic fluid is fully biodegradable.
- Removing and disposing a PCB regulator and 280 large capacitors reduced the onsite on-site inventory of PCBs by almost 80%.
- Continuing its efforts to meet its EPA National Environmental Performance Track commitments resulted in achieving 95% of its ODS reduction commitment, 100% of its radiological emissions reduction goal, and 73% of its commitment to conserve or restore natural areas.

The Fernald Closure Project re-used equipment from several facilities slated for decommissioning to construct the new Radium Treatment Facility. Re-using equipment and reconfiguring approximately 85% of the equipment in an existing treatment facility avoided generating 250 cubic meters of waste and spending \$1.5 million in procurement and waste disposal costs. Contact: Elizabeth (Betsy) Brucken, 513-648-5254, elizabeth.brucken@fernald.gov

Applying pollution principles to the cleanup of 108 tons of debris in a lay down yard at the Hanford site led to recycling 67 tons of steel and 9 tons of wooden cable spools.

Contact: Gae Neath, 509-376-7828, Gae_M_Neath@orp.doe.gov

Idaho National Laboratory accomplished the following activities. Contact: Anne Dustin, 208-526-3952, dustal@inel.gov

- Demonstrating its commitment to a green fleet, the Laboratory added a fourth alternative fuel station, incorporated four different alternative fuels in fleet operations, and increased its fleet percentage of alternative fuel vehicles to 24% even though the site is exempt on geographic grounds from the requirement to purchase alternative fuel vehicles.
- Equipping 11 four-cycle diesel-engine buses and 6 gasoline-engines Chevrolet Tahoes with oil bypass filter systems led to reductions of 89% in oil use and waste generation in the buses and 75% in the test Tahoes. The bypass filters extend engine oil life by cleaning solid contaminants as small as one micron out of engine oil.
- Researching and testing biobased and alternative fuels resulted in increased use of API-rated refined oil, retread tires, antifreeze/engine coolant recyclers, biodiesel, and Freon recovery systems in the site's 100 buses and 1500 pieces of equipment.
- Documenting green building standards for newly constructed buildings and major renovations in the Laboratory's Green Building Strategy will lead to energy efficiency, resource protection, and reductions in solid waste and production of toxins in future construction projects.
- Replacing the chloride analysis procedure at the Remote Analytical Laboratory with an ion chromatography instrument eliminated the need for acetone (a volatile organic compound), combined four existing analytical methods into one, and reduced analysis time by approximately 75%.
- Retrofitting a transportation facility to eliminate energy use during off hours and weekends resulted in annual savings of \$26,725.00. The project was funded through the Departmental Energy Management Program (DEMP); DEMP funds will be paid back in four years.

The Kansas City Plant reduced hazardous waste generation by 42%. The sludge generated from treating production wastewaters is recycled off-site into a product that is used in making new steel. Contact: Phil Keary, 816-997-5059, pkeary@kcp.com

The following activities occurred at Lawrence Livermore National Laboratory. Contact: Bruce Campbell, 925-423-3481, campbell15@llnl.gov

- Using the value of materials as an offset against demolition work costs, the “Assets for Value” contractual strategy led to lowering facility operating costs, eliminating waste streams, and maximizing re-use and recycling opportunities.
- Redesigning facility operating procedures at the Site 300 Contained Firing Facility to be more environmentally sustainable improved worker health and safety and reduced waste. In addition, re-thinking the operation enhanced mission performance by increasing the availability of the facility for research and testing.
- Eliminating use of a potent greenhouse gas through product substitution enhanced worker health and safety and decreased operating costs from \$800 to \$25 per bottle of product. Ultra-Zero Compressed Air replaced use of sulfur-hexafluoride, an asphyxiant with global warming potential, in the Site 300 Experimental Explosive Facility.

The following activities occurred at Los Alamos National Laboratory. Contact: Dennis Hjeresen, 505-665-7251, dlh@lanl.gov

- Centralizing sustainable design requirements in the Laboratory’s Engineering Standards Manual reduced energy consumption and operating costs, prevented pollution, and enhanced productivity. The sustainable design requirements apply to the construction of new buildings and major renovations of existing buildings.
- Substituting tantalum for graphite in molds used to produce plutonium aliquots for pit manufacturing avoided generating 200 pounds of transuranic waste and spending \$250,000 in annual waste management costs. Although a tantalum mold costs more than a graphite mold, the graphite mold could only be used twice – the tantalum mold can be used indefinitely.
- Integrating EMS into the Integrated Work Management process and actively involving all Laboratory divisions in developing, testing, and implementing the EMS resulted in identifying 592 division-level environmental improvement actions. Several institution-wide improvement actions were also identified and funded for future action.
- Building the Sanitary Effluent Recycle Facility allowed treatment of 20 million gallons of water annually and re-use for cooling purposes at the supercomputing facility. This re-use allowed the Laboratory to expand its mission since it was previously using over 90% of its water allotment.
- Surveying and packaging lead resulted in an 81% reduction in lead stored on site which minimized the generation of lead contaminated debris and reduced the potential impacts associated with lead storage. Over 210,000 pounds of lead were shipped for recycling.

- Labeling lithium batteries as hazardous waste resulted in collecting and recycling approximately 60 pounds of the batteries. This action reduces the risk of harm to the environment and human health from inappropriate disposal.

- Working with a local, minority owned, small business enterprise to increase its operating capability led to recycling 144 metric tons of wood scraps and pallets. Approximately 10% of the Laboratory's sanitary waste will be diverted from a local landfill through this program.

- Replacing just the burned out element of carbolite furnaces rather than the entire furnace, as usually done, reduced waste generation by 83% and saved nearly 200 worker hours per furnace repair.

The National Renewable Energy Laboratory promoted sustainable environmental stewardship by integrating a compliance commitment, laboratory-wide life-cycle assessments of its environmental footprint, and community outreach into the EMS. The Laboratory has more than 40 policies and procedures that promote sustainability and the EMS. Contact: Steve Blazek, 303-275-4723, steve.blazek@go.doe.gov

The following activities took place at the Nevada Test Site. Contact: Alfred Karns, 702-295-5689, karnsaj@nv.doe.gov

- Incorporating pollution prevention into project design, execution, and maintenance at the Joint Actinide Shock Physics Experimental Research project eliminated low-level and mixed waste streams through product substitution and process change. Integration of pollution prevention in project planning is consistent with the site's Safety and Security Policy.

- Reducing petroleum usage at the site was expedited by using biodiesel in all diesel engines, constructing an E-85 (gasoline containing 85% ethanol) refueling station on-site, and purchasing 23 energy-efficient "micro-vehicles" for base camp areas. The micro-vehicles cost about \$10,000 less than a full-sized truck or van and average 35-40 miles per gallon.

- Converting to an electronic payroll system reduced paper waste by over 3 metric tons and eliminated \$570,000 in payroll costs per year.

- Developing and promoting the web-based Material Exchange Site led to reuse of approximately 5.87 metric tons of office supplies and equipment over 2 1/2 years. The website is used by more than 1,000 employees on a regular basis.

The Oak Ridge National Laboratory conducted the following activities. Contact: Susan R.C. Michaud, 865-576-1562, michaudsr@ornl.gov

- Recycled 150 tons of material and avoided \$3.3 million of purchase and waste disposal costs by segregating and re-using materials from the cleanout of two large high-bay, shop, and laboratory areas totaling almost 6,400 square feet.

- Integrated sustainable landscape principles into the site master plan to reduce use of natural resources, maximize use of recycled-content materials, increase use of renewable energy sources, and promote use of native vegetation.
- Modified its water jet cutter to create even greater operational efficiency and safety. The \$15,000.00 upgrade to add a solids removal system also reduced process wastewater and sludge generation by approximately 11,000 kg per year.
- Developed a green transportation initiative that combines traffic flow and roadway modifications (e.g., creating a traffic circle which eliminates unneeded stops at a traffic light and a bicycle/walking lane) with an active carpool program and the use of flex-fuel vehicles.

The Oak Ridge Institute for Science and Education (ORISE) reused over 18,000 pounds of aluminum and over 12,000 pounds from a building demolition by requiring the contractor to adhere to good pollution prevention practices. Over 80% of the building materials were reused. Contact: Mac Roddye 865-576-7705, roddyelc@ornl.gov

The East Tennessee Technology Park's Accelerated Clean-up Project recycled approximately 818,000 pounds or 876 cubic yards of recycled scrap metal, steel, and conveyor equipment from the decontamination and decommissioning of an on-site steam plant and numerous auxiliary facilities during 2005. The need to evaluate scrap metal recycling opportunities has been emphasized to the D&D teams and improved reporting coordination is proving to be successful. Contact: Glen R. Galen, 865-576-3968, galengr@bjcllc.org

Pacific Northwest National Laboratory conducted the following activities. Contact: Wayne Larson, 509-376-2483, wayne.larson@pnl.gov

- Avoided \$2.2 million in purchasing and waste disposal costs by thoroughly integrating pollution prevention into the Lab's EMS. Examples include upgrades to extend the useful life of computers from 3 to 6 years, the "ChemAgain" chemical reuse program, the Office Product Exchange program, and partnering with local educational and non-profit groups to redistribute office equipment.
- Eliminated procuring 180 B-25 boxes and generating 490 cubic meters of low-level radioactive waste by surveying areas of roofs prior to roof replacement and properly segregating roofing materials. Waste management costs of more than \$640,000 were avoided.

The following activities occurred at the Pantex Plant. Contact: Craig Snider, 806-477-5906, csnider@pantex.doe.gov

- Recycled 6,600 pounds of titanium and 31 pounds of tungsten for use in armored vehicles. This aided the Army (who paid shipping costs for the materials), freed up

200 square feet of needed warehouse space, and avoided disposing valuable materials as waste.

- Achieved 100% B-20 (biodiesel) fuel use in the site's diesel vehicles and equipment. The site also increased its number of alternative fuel vehicles to 47% of the fleet.
- Installed a drip irrigation system to use treated discharge water to irrigate 300 acres of adjacent land used as a school farm by Texas Tech University. Crop yields increased and chlorine treatment of the discharge water was eliminated.
- Eliminated cleaners testing high for oil and grease and experienced no new exceedances of oil and grease permit limits in effluent from the Wastewater Treatment Plant.

The Portsmouth Gaseous Diffusion Plant integrated P2 into facility design of the new X-622T Groundwater Treatment Facility and avoided over 7,000 pounds of mixed low-level waste generation and \$1.4 million in waste management costs. The new facility uses an air stripper and regenerable vapor-phase activated carbon as the primary means to remove VOCs from the groundwater. Contact: Kristi Wiehle, 740-897-5020, kristi.wiehle@lex.doe.gov

When Princeton Plasma Physics Laboratory planned its elevator renovations for the L-Wing building it opted for a vegetable-based hydraulic fluid as a superior replacement for conventional petroleum-based oil. Similarly, in procuring new hydraulic security gates the Laboratory selected a premium performance, environmentally aware hydraulic fluid that would not damage the environment if spilled because it is biodegradable and non-toxic. Contact: Tom McGeachen, 609-243-2948, tmcgeach@pppl.gov

The following activities were conducted at Sandia National Laboratories/CA. Contact: Carolyn Holloway, 505-845-5248, cholloway@doeal.gov

- Doubled the empty container recycling rate in one year and significantly reduced hazardous waste generation through a targeted education and communication program.
- Integrated P2 in a building decommissioning and recycled \$3 million of equipment and avoided sending 3,900 cubic yards of materials to a landfill.

Sandia National Laboratories/NM completed the following activities. Contact: Jack Mizner, 505-845-3576, jhmizne@sandia.gov

- Increased the number of the Laboratory's alternative fuel vehicles to 295 which is 79% of the fleet. The site also replaced 75% of its diesel fuel with B-20 (biodiesel).

- Tested and committed to using an environmentally safe soil stabilization product on the site's dirt roads. This product substitution will reduce water consumption by 5.4 million gallons annually and achieve compliance with the State's fugitive dust requirements.
- Eliminated a waste stream and avoided \$45,000 in new purchasing costs in 4 months through implementing and promoting a web-based exchange system for excess printer and copier supplies. The exchange system even matches potential users with excess products to facilitate the use of supplies that would otherwise be discarded.
- Integrated environmentally preferable purchasing (EPP) into all site activities through teams that incorporate EPP into new construction project contracts and construction specifications, verify that potential new products are protective of human health and the environment, and streamline procurement methods.
- Achieved a 100% reduction in use of hazardous solvents to clean gel from test plates by replacing hexane and toluene with a non-hazardous detergent. Ten liters of the safe detergent replace 416 liters of the hazardous solvent and completely eliminate a health and safety issue.
- Developed a roofing sustainability program that integrates assessment, preventative maintenance, and use of improved materials. New roofs last 15 years longer and reduce maintenance roof tickets by 90%.
- Developed mandatory Design-Build Scope and Performance Criteria to incorporate and document the application of sustainable design principals in limited budget, small office building construction projects.

The following activities occurred at the Savannah River Site. Contact: John Harley, 803-557-6332, john.harley@srs.gov

- Characterizing materials before decontaminating and razing buildings averted generation of over 4,000 cubic meters of low-level waste and over \$9 million in waste management costs. Waste Identification Forms and Waste Stream Worksheets are used to characterize all materials to be removed from facilities and identify re-use opportunities.
- Capitalizing on re-use opportunities on-site and throughout the DOE complex enabled the site to avoid over \$1.3 million in purchases and waste disposal costs. Excess equipment from other DOE sites was salvaged for mission activities and the site reclaimed rather than purchased mercury for site operations.

- Implementing a segregation program and technically proving lead purity led to recycling 6,000 pounds of lead and avoiding \$10,000 in purchase and waste management costs in just over 3 months. Proving the purity of the lead for site use allowed the re-start of the site's lead smelter.
- Continuing to be the leader for alternative fuel use within the DOE fleet, the site increased E-85 (gasoline containing 85% ethanol) use 20% over the previous year, increased the number of E-85 vehicles to 80% of all applicable vehicles, and constructed two on-site E-85 fueling stations.
- Remediating approximately 3,000 cubic yards of contaminated vegetation involved preparing a bioremediation area with runoff controls, chipping and composting the material, adding lime and other fertilizers, and tilling the compost into soil.

The following activities were completed at the Stanford Linear Accelerator Center (SLAC). Contact: Richard Cellamare, 650-926-3401, rcellamare@slac.stanford.edu

- Honored engineering physicist Dieter Walz for his dedication to pollution prevention through material re-use. He re-used 2,800 tons of concrete and 150 tons of iron in designing the site's Final Focus Test Beam facility.
- Reduced mixed waste generation from 970 grams to 7 grams per camera repair by replacing charge-coupled device (CCD) cameras with complementary metal oxide semiconductor (CMOS) cameras used throughout the accelerator complex. Since the complex uses hundreds of cameras, switching to the SLAC-developed CMOS camera significantly reduces mixed waste generation as old cameras are periodically replaced over time.
- Implemented the Chemical Mapping Project to chart all site chemical locations. This mapping project helps SLAC more effectively define and manage chemical delivery and storage locations associated with the Chemical Management Services program. Mapping these locations helps support the program by consolidating chemical usage and reducing storage of excess chemicals.

Despite withstanding two hurricanes and an emergency distribution of oil, the Strategic Petroleum Reserve, with the assistance of Sandia National Laboratory/New Mexico, integrated sustainable design features in a new building. More importantly, it established a sustainable building model for future projects. Contact: Katherine Batiste, 504-734-4400, katherine.batiste@spr.doe.gov

The Y-12 National Security Complex completed these activities. Contact: Jan Gilbert Jackson, 865-241-2567, gilbertjm@y12.doe.gov

- Achieved a P2 commitment from all site organizations and established the multi-organizational Reduce/Re-use/Recycle Team to continually improve P2 efforts. Team efforts resulted in completing 70 projects that recycled or re-used 20 tons of materials and avoided \$1.67 million in waste management costs.

- Replaced traditional vacuum pumps with oil-free vacuum pumps and eliminated approximately 2.2 metric tons of liquid low-level radioactive waste and \$66,000 in annual waste management costs.

The Yucca Mountain Project donated over 200 electronic items to schools in Clark and White Pine counties and recycled 900 pieces of excess electronic equipment through an EPA- and GSA-approved electronic equipment re-use and recycling company. Contact: Matthew Hagenow, 702-794-1438, matthew.hagenow@ymp.gov