Executive Order 13148

Greening the Government Through Leadership in Environmental Management

Annual Progress Report: 2003

U.S. Department of Energy
Office of Environment, Safety and Health
March 2004

Department of Energy
Washington, DC 20585
March 29, 2004

Ms. Phyllis Harris
Acting Assistant Administrator
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Dear Ms. Harris:

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 Assistant Administrator John Suarez's January 21, 2004, letter to Agency Environmental Executives.

The report provides DOE's performance for 2003 in implementing the EO 13148 environmental leadership requirements. Specifically, it addresses the progress made in 2003 to establish environmental management systems at DOE sites and the Department's progress in meeting pollution prevention goals for reductions in waste generation and environmental releases.

If you or your staff have questions or need more information, please contact Jane Powers of my staff at (202) 586-7301, or *jane.powers@eh.doe.gov*.

Sincerely,

Beverly A. Cook
Assistant Secretary
Environment, Safety and Health

Enclosure

cc: J. Howard, Office of the Federal Environmental Executive
D. Kling, Federal Facilities Enforcement Office

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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 objectives that the Department of Energy (DOE or Department) developed in 1999 and the Department's Agency Environmental Executive (AEE) reaffirmed 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) 14001-96 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 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 and off-site treatment and disposal of toxic chemicals,
- 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 the fourth annual progress report to the 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 2003 unless otherwise noted.

The following sections describe the DOE participation in the EO 13148 Interagency Environmental Management Leadership Work Group; strategies for implementing the EO; and progress made in 2003 in meeting the EO goals, specifically regarding the Department's efforts to implement environmental management systems (EMS) and prevent pollution pursuant to the EO and its own pollution prevention goals. The appendices contain copies of the Department's pollution prevention leadership goals; the Secretary of Energy's Earth Day Message; DOE Order 450.1, *Environmental Protection Program*; the data used to generate the findings described in the body of the report; and brief summaries of site waste reduction projects and practices.

II. IMPLEMENTATION PROGRESS

A. Interagency Environmental Management Workgroup Activities

Representatives from DOE's Offices of Environment, Safety and Health (EH) and Science (SC) participated in meetings and activities of the EO 13148 Interagency Environmental Management Workgroup. Involvement included EH developing the DOE response to the Federal Agency Environmental Program Survey and participating in an interagency team reviewing and synthesizing agency responses. The review was initiated to determine if there are trends or patterns in the relationships between how agencies monitor and manage compliance and their actual compliance performance and status. It also seeks to identify whether non-compliance tends to occur in specific media or regulatory program areas and whether there are geographic distribution patterns in non-compliance.

DOE also participated in the EMS subgroup. The subgroup developed the *Environmental Management System (EMS) Agency Self-Declaration Protocol for Appropriate Federal Facilities* that was transmitted to all Federal agencies in January 2004. The Protocol establishes the framework agencies can use in formulating the process and guidance for their facilities to self-declare compliance with the EMS requirements of EO 13148. DOE participated in the metrics subgroup that developed and proposed criteria for the annual agency scorecard of agency EMS implementation.

EH and SC continued to serve as information conduits between the Workgroup and DOE sites for news about the availability of tools and guidance to advance the goals of EO 13148. The DOE Pollution Prevention Website (www.eh.doe.gov/p2), the DOE Environmental Stewardship Clearinghouse (epic.er.doe.gov/epic), the DOE Environmental Policy and Guidance Website (www.eh.doe.gov/oepa), and monthly

conference calls are used to disseminate information between DOE Headquarters and Field elements.

B. Implementation Strategy

B.1 Directives, Policies and Documents

In January 2003, the Department issued DOE Order 450.1, *Environmental Protection Program,* a new directive that implements the EMS and other requirements of EO 13148 (see Appendix B). It is DOE's policy to integrate environmental management systems 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.

DOE Order 450.1 requires all DOE elements to ensure that their ISMS includes an EMS that does the following:

- Provides for the systematic planning, integrated execution, and evaluation of programs for —
  - public health and environmental protection,
  - pollution prevention (P2), and
  - compliance with applicable environmental protection requirements,
- 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, and
- Includes measurable environmental goals, objectives, and targets that are reviewed annually and updated when appropriate.

> "It is my goal, consistent with the requirements of Executive Order 13148, *Greening the Government Through Leadership in Environmental Management*, to have environmental management systems in place at all major DOE facilities by the end of 2005. I intend for DOE to continue this leadership in the future."
>
> **Secretary Abraham's 2003 Earth Day Message**

In February 2004, the Department issued guidance on implementing an EMS. DOE Guide 450.1-1, *Implementation Guide for Use with DOE O 450.1, Environmental Protection Program*, provides broad guidance on establishing an EMS, meeting the requirements of DOE Order 450.1, integrating EMS with Integrated Safety Management, and assessing and reporting the implementation of an EMS. DOE also issued associated guidance, DOE Guide 450.1-4, *Wildland Fire Management Program for Use with DOE O 450.1, Environmental Protection Program,* to assist DOE Program Managers in meeting the DOE O 450.1 requirement to consider protection of site resources from wildland and operation fires when integrating an EMS into a site's ISMS.

In February 2004, the Department issued detailed draft (for use and comment) implementation guidance, DOE G 450.1-2, *Implementation Guidance for Integrating*

Environmental Management Systems into ISMS, to help sites develop EMSs and integrate them with their existing ISMS.

The Department completed a major update of the DOE Environmental Policy and Guidance Website (www.eh.doe.gov/oepa) to highlight Executive Order 13148. The website links users to key documents, guidance, resources, and line management points of contact. The website's EMS clock counts down the days remaining until the December 31, 2005 deadline for EMS implementation.

B.2 Acquisition

DOE amended the Department of Energy Acquisition Regulation (48 CFR 923, 936 and 970, Acquisition Regulation: Acquisition of Products Containing Recovered Materials) to require that management contractor subcontracts include the affirmative procurement requirements of EO 13101, *Greening the Government through Waste Prevention, Recycling, and Federal Acquisition*, and that they flow down those requirements in circumstances involving EPA-designated products. The acquisition regulation was also amended to require management and operating contractors to comply with the fuel efficiency goals and requirements of Executive Order 13149, *Greening the Government Through Federal Fleet and Transportation Efficiency.* Headquarters Policy Flash notifications of these regulatory changes were distributed to all DOE procurement directors.

Section 702(b) of EO 13148 requires each agency to determine the feasibility of implementing centralized procurement and distribution programs at its facilities for the tracking, distribution, and management of toxic or hazardous materials. Most DOE sites use computerized systems for procuring and managing chemicals at their facilities. The Department developed a Chemical Management System (CMS) Profile that sites can use to provide information on their systems. This information is available to other sites wishing to evaluate or upgrade their CMS or for sites planning to implement a CMS. The CMS Profiles reside at http://tis.eh.doe.gov/web/chem_safety/chemprofiles.html.

The Department's Office of Procurement and Assistance Management expanded its Acquisition and the Environment website to include training modules on Environmentally Preferable Purchasing and "Green" Janitorial Supplies. The modules are available at http://professionals.pr.doe.gov/ma5/MA-5Web.nsf/Procurement/Acquisition+and+the+Environment?OpenDocument. Environmentally preferable purchasing was also discussed during a telephone conference for all Department procurement personnel on August 20, 2003, as part of Procurement's Knowledge Management Seminar Series.

B.3 Training

In addition to the Acquisition training described above, the Department conducted a two-day national video training conference in February 2003 on the requirements of DOE Order 450.1. Speakers from the President's Council on Environmental Quality, the Department of Defense, the National Aeronautics and Space Administration, and EPA

joined DOE personnel in offering the training, available at http://www.eh.doe.gov/oepa/ems/tvcs.html.

Pollution prevention and EMS development were also training topics at several DOE sites:

- Stanford Linear Accelerator Center worked with EPA to provide training in the environmental review process as part of developing an EMS.
- Albany Research Center did outreach training in conjunction with preparing for ISO 14001 certification, including employee indoctrination training and specific auditor training.
- National Renewable Energy Laboratory conducted a one-day stakeholder forum titled *Sustainable Management Systems* and convened leaders from across the nation to discuss proven, practical approaches for putting sustainable development principles into operation.
- Strategic Petroleum Reserve collaborated with EPA and the Federal Network for Sustainability to provide a three-day EMS implementation training course attended by over 100 Federal employees from 25 different departments, agencies, and bureaus.
- Federal Energy Management Program offered on-line training courses in life-cycle costing, buying energy efficient products, and water resource management.
- A pilot televideo information exchange was held February 4, 2004, between Headquarters, Brookhaven National Laboratory (BNL), and the Oak Ridge Office. The purpose was to have BNL, a site that is ISO 14001-certified, share its experience with the Oak Ridge sites that are still developing their EMSs. These exchanges will be continued throughout 2004 and will be offered to all DOE sites required to implement an EMS.

C. Environmental Management System Implementation

The Interagency Environmental Management Leadership Workgroup identified criteria to describe the status of EMS implementation at Federal agencies. These criteria are used by the OFEE to prepare an annual "scorecard" to track the progress of DOE and other Federal agencies toward full implementation of EMS by December 2005. The following sections describe the Department's progress toward meeting the calendar year 2003 (CY03) criteria and the out-year criteria.

C.1 Department-Level Progress in Implementing Environmental Management Systems

C.1.1 Resources: **CY03 Criterion**: Resources for EMS implementation are included in the agency's FY04 budget request

In implementing EMS, DOE is pursuing the same successful approach it took in implementing its ISMS whereby all environmental, safety and health (ES&H) activities considered a necessary and important aspect of line management program responsibilities are funded as part of the cost of doing business. Resources for implementing ISMSs and EMSs are drawn from line management program budgets rather than a specific or separate ES&H 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)).

C.1.2 EMS Implementation Guidance: **CY03 Criterion**: Agency has issued EMS implementation guidance to all appropriate facilities

As described in the Department's 2002 Annual EO 13148 Report, the Department has issued EMS instructional materials since 1996. Guidance developed over the course of 2003 and introduced in February 2004 includes DOE Guide 450.1-1, *Implementation Guide for Use with DOE O 450.1, Environmental Protection Program*, and DOE Guide 450.1-4, *Wildland Fire Management Program for Use with DOE O 450.1, Environmental Protection Program*.

In February 2004, the Department also issued detailed draft (for use and comment) implementation guidance, DOE Guide 450.1-2, *Implementation Guidance for Integrating Environmental Management Systems into ISMS*, to help sites develop their EMS and integrate them with their existing ISMS. This guidance built on EMS implementation guidance successfully used by other agencies and companies; it was extensively tailored to meet the needs of the Department, and to address EMS integration with existing ISMS.

C.1.3 EMS Training for Senior-Level Managers: **CY03 Criterion**: Agency has provided EMS training for appropriate agency-level senior managers

In February 2003, the Department conducted EMS training as part of a DOE Order 450.1 workshop to familiarize Department managers and operational personnel with the elements that need to be considered in an EMS. This workshop was broadcast from DOE Headquarters to approximately 20 DOE sites across the country and included presentations from representatives of the OFEE and civilian and defense Federal agencies.

DOE has also begun preparing a "Senior Manager's Guide to Environmental Management System" highlighting the Department's commitment and the role of senior management in implementing EMS as part of ISMS. It will be supported by a "Frequently Asked Questions" list for use by those presenting briefings to senior management.

Previously, DOE issued an *Environmental Management Systems Primer for Federal Facilities* (developed jointly with EPA) to assist Departmental personnel in implementing EMSs. DOE conducted extensive training and Department-wide workshops on integrated safety management for DOE and contractor personnel at Headquarters and in the field from 1998 to the present. These training workshops brought together line managers, line workers, and environment, safety, and health support staff from DOE

sites, and included sessions on environmental management systems and integrating EMS into ISMS.

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 47 sites or organizations as "appropriate facilities" for implementing an EMS. The list of sites is included in Appendix D.

The EO 13148 Interagency Environmental Management Workgroup recognizes that it may be appropriate to implement one EMS for an organization which operates several similar facilities, and 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, either directly or indirectly, individually or cumulatively, due to operations of that facility's mission, processes or functions." Within DOE, the term "site" is used to identify contiguous geographic areas under Departmental ownership. DOE's 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 ISMS, so that all DOE sites required to implement an ISMS are considered "appropriate facilities" for EMS implementation. In addition, some DOE sites exempt from ISMS (e.g., Power Marketing Administrations) are required to implement an EMS.

Eight DOE sites have been certified by third-party registrars to the ISO 14001 EMS standard and six sites are members of EPA's National Environmental Performance Track program. Information on these sites is also provided in Appendix D.

C.2.2 Site EMS Policy Statement: **CY03Criterion**: Appropriate facilities have issued an EMS policy statement

Based on reports from the responsible program offices, 31 of DOE's 47 sites (66%) have issued an EMS policy statement.

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

Based on reports from the responsible program offices, 27 of DOE's 47 sites (57%) have provided implementation training to personnel responsible for implementing EMS.

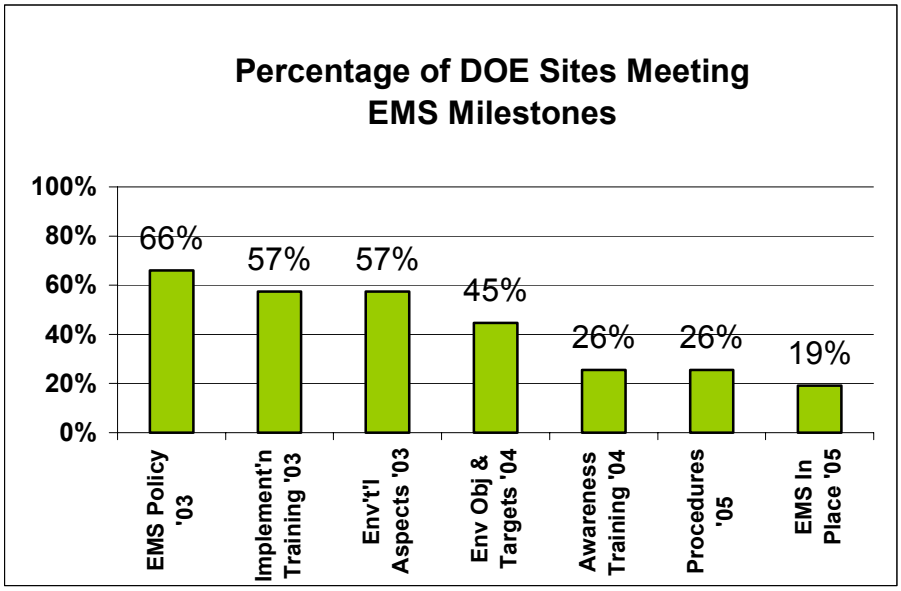
C.2.4 Documentation of Significant Environmental Aspects: **CY03 Criterion**: Appropriate facilities have documented their significant environmental aspects

Based on reports from the responsible program offices, 27 (57%) of DOE's 47 sites have documented their significant environmental aspects.

C.2.5 Summary

In addition to progress in achieving the 2003 EMS implementation criteria, many DOE sites made significant advances in satisfying out-year criteria for EMS implementation. As shown in Figure 1, 45% of DOE sites have already established measurable environmental objectives and targets, and 26% have established EMS awareness training programs even though these are 2004 criteria. With regard to the 2005 criteria, 26% of DOE sites have established all EMS procedures, and 19% have an EMS in place (either self-declared or third-party certified).

Figure 1. EMS Implementation Progress



D. DOE and the White House Awards Programs

D.1 Agency-Wide Awards Program

The DOE pollution prevention awards program is in its tenth year. It recognizes outstanding performance by sites and Departmental operations by granting awards in thirteen categories related to waste reduction and reuse, recycling, sustainable design, and affirmative procurement of materials with recycled content. Forty-nine nominations were submitted and seventeen pollution prevention awards were given in April 2003 for activities conducted in 2002. The award-winning activities are briefly described below; additional information on all the nominations is available at http://www.eh.doe.gov/p2/p2awards/index.html.

Affirmative Procurement: *Affirmative Procurement Initiative*
The Hanford site developed an automated procurement and tracking system that facilitates holders of P-Cards (Procurement Card) to select products containing recycled/recovered material when making small purchase transactions. Total value of purchased recycled content items was $112,000 for the year.

Bio-based Products: *SRS Champions Bio-fuels Use*
The Savannah River Site requires the over 500 alternative fueled vehicles in its vehicle fleet to use E85 ethanol fuel exclusively, resulting in consumption of 185,000 gallons of E85 fuel per year. The site is also working toward development of a publicly-accessible E85 fueling station.

Education and Outreach and Information Sharing: *SRS Education and Outreach Program*
Community pollution prevention outreach activities sponsored by the Savannah River Site included a community awareness event that built a 104 x 55 foot American flag from aluminum cans and won a National America Recycles Day Award. Other events included co-sponsoring Kids Earth Day and ECO-MEET, a team-based environmental competition for middle school students.

Environmental Management Systems: *New Approach to P2 Enhances Success at Hanford*
Integrating value engineering and the data quality objective process at the Hanford site and partnering with regulatory agencies to identify opportunities for waste volume reductions resulted in minimizing waste generation by over 300,000 tons.

Environmental Preferability: *Demonstration of a Web-Based Chemical Purchasing and Management System*
Oak Ridge National Laboratory Facilities and Operations Directorate increased the use of "green" chemicals by implementing an online purchasing and management system that provides essential environmental, health, and safety information on requested chemicals and environmentally preferable alternatives. Over 75% of chemicals used are now "green."

Environmental Restoration: *Lasagna™ Soil Remediation Technology*
The Paducah Gaseous Diffusion Plant avoided disposing of 10,311 cubic yards of trichloroethene (TCE) contaminated soil through using this innovative in-situ soil cleaning technology. Use of Lasagna™, named for its layers of treatment zones and electrodes placed in the ground, led to a significant cost saving and was well received by regulators and the public**.**

Excellence in Management: *P2 Coordinator*
For over a decade, John Marchetti, National Nuclear Safety Administration, has championed pollution prevention and sustainability. He founded the complex-wide Waste Minimization Management Group, developed and sponsored the

Pollution Prevention Hands-On Training Technology Workshops, and produced the award-winning videotape, No Higher Priority. He published the ESAVE (Environmental Stewardship and Value Engineering) newsletter, a previous winner of the White House Closing the Circle Award.

Green Buildings: *Incorporating Sustainability for New Buildings*
Sandia National Laboratories/NM demonstrated how sustainable design could be integrated at no added cost in facility planning, design, and construction. Incorporating sustainable design in building the Model Validation and Systems Certification Test Center proved so successful that the process has been used and refined for eight other facilities.

Model Facility Demonstration/Complex-wide Achievement: *Pollution Prevention Program*
Argonne National Laboratory incorporated training, awareness, and practices that significantly contributed to a complex-wide commitment to pollution prevention. P2 training is required for all employees and is integrated in National Environmental Policy Act evaluations and all new project reviews, and sustainable design is institutionalized for all construction. Past and current P2 initiatives resulted in significant cost savings to research and operations.

Model Facility Demonstration/Complex-wide Achievement: *DOE's Homeland Defense Equipment Reuse Program*
The Oak Ridge Operations Office of Assets Utilization spearheaded an initiative that deployed over 1,000 surplus radiological detectors to first responders in Washington, DC, Pennsylvania, Michigan, New York and Massachusetts and arranged for equipment use training. For as little as $20 a piece for refurbishment and initial calibration, radiation detection equipment ranging from $600 handheld units to $30,000 whole body monitors is in re-use by state and local emergency agencies, saving them over $600,000 to date in acquisition costs.

Radioactive/Hazardous Waste Recycling: *Gadolinium Nitrate Recycle Saves $$*
Savannah River Site engineers demonstrated that using the site's excess gadolinium nitrate as a neutron poison would reduce high-level waste generation. Their process eliminated the production of 62 containers of vitrified high-level waste and avoided substantial costs.

Recycling: *Deconstruction and Recycling of Building 8-8*
Over 90% of building waste was recycled and disposal costs avoided when the Pantex Plant adopted a "deconstruction and recycle" rather than a "demolition and disposal" approach when taking down a warehouse. Four tons of scrap metal, 826 tons of concrete, 6,240 board feet of sellable timber, and 60 tons of soil were recycled or reused.

Recycling: *Unique Solutions to Sanitize Weapons Components*
The Pantex Plant eliminated warehouse and inventory costs for 300,000 pounds of materials through materials sanitization, recycling, or reuse. The value of the recycled materials paid for the sanitization.

Recycling: *Technical Library Book Recycle Project*
The Y-12 National Security Complex recycled approximately 15,000 outdated books and journals thereby saving 500 cubic yards of landfill space and avoiding landfill disposal costs. The facility partnered with Dunn Diversified Industries, a non-profit corporation that provides employment opportunities for adults with disabilities, whose clients prepared the materials for recycle.

Return-On-Investment: *Advanced Characterization System*
Hanford site engineers designed a system of radiological sensing equipment with overlapping capabilities to characterize, identify, and quantify radiological contamination. The system allowed a drastic decrease in personnel and characterization time, led to significant cost savings, and reduced radioactive waste by over 1,000 tons.

Sowing the Seed for Change: *The Energy Nag: Grassroots Energy Conservation Goes Mainstream*
The efforts of its self-proclaimed energy nag, Al Zelicoff, led Sandia National Laboratories/NM to re-invigorate its energy management strategy with the potential to reduce energy consumption by 3% per year. The energy nag's cajoling and reminders of energy conservation opportunities resulted in reducing his building's energy consumption by 17.4% thereby reducing costs and carbon dioxide emissions by 660 tons.

Waste/Pollution Prevention: *Tritiated Waste Avoidance*
The Savannah River Site averted waste generation, reduced personnel exposure, accelerated schedule, and lowered the cost of removing tritium-contaminated, welded stainless steel piping by applying pollution prevention objectives during the search for appropriate cutting and size reduction technologies. The net waste volume avoidance was 1,510 cubic feet resulting in substantial disposal cost savings.

D.2 White House Closing-the-Circle Competition

The prestigious White House Closing the Circle Awards recognize Federal employees and their facilities for efforts that resulted in significant contributions to environmental stewardship. The competition is open to all Federal departments and agencies and receives hundreds of nominations.

The Sandia National Laboratories/NM won a 2003 Closing the Circle Award in the Sustainable Design/Green Buildings category in addition to a 2003 DOE P2 Award.

E. Toxic Chemical Reduction Goals/Baselines and Achievements

E.1 Overview

The Department's 1999 Pollution Prevention and Energy Efficiency 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. The 90% 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. This goal also serves the Department in meeting the requirements of EOs 13148 and 13101 for Federal agencies to establish pollution prevention goals. Thus, DOE uses its own internally established reduction goals for the purposes of section 502(a) of EO 13148.

E.2 TRI Releases

Figure 2 shows the total DOE TRI releases for reporting years 1994 through 2002 compared to the 1993 baseline year. Reporting year 2002 releases (reported in July 2003) are the most current TRI data available.

Releases have been reduced by 75% since 1993. To reach the year 2005 goal of less than 228 metric tons of reported toxic chemical releases, DOE will need to further reduce releases by 334 metric tons from reporting year 2002 levels.

Tables 1 and 2 show the total TRI chemical releases for reporting year 2002 by chemical and site as compared to the 1993 baseline. The level of reporting activity for year 2002 did not change, relative to reporting year 2001, in the number of sites (23) reporting and the number of chemicals and chemical compounds (24) being reported. The total amount of reported TRI chemicals being released complex wide increased by 161 metric tons (32%) between year 2001 and 2002. The increase in reported releases was, to a large extent, the result of more reporting for lead and lead compounds resulting from regulatory requirements lowering the lead reporting threshold. Reported releases of zinc compounds rose in the late-1990's primarily as a result of the coal-burning power plant at the Savannah River Site. However, zinc releases as well as releases in the miscellaneous category "Other TRI Chemicals" have not significantly increased over the past several reporting periods.

Figure 2. Total DOE TRI Releases (metric tons)

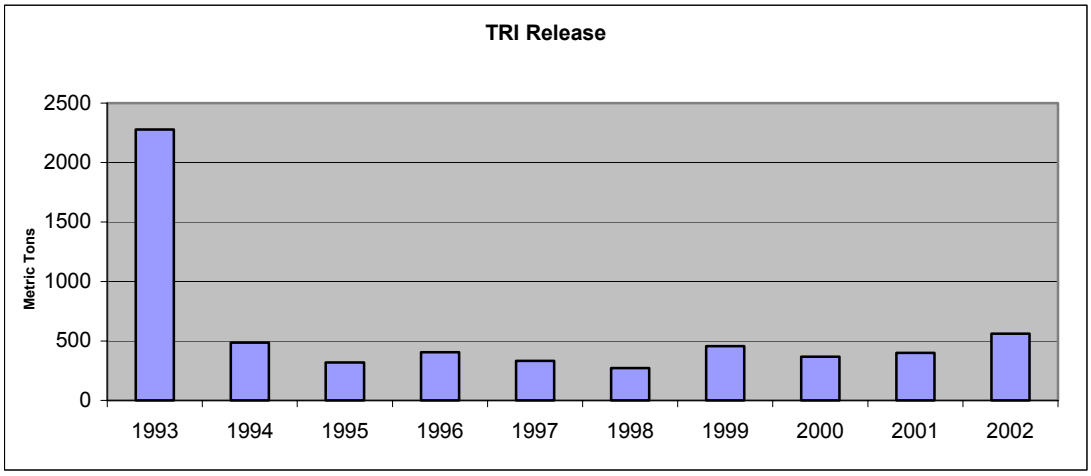


Table 1. Comparison of 1993 & 2002 DOE TRI Reporting by Toxic Chemical (pounds)

TRI Chemical	1993 EPCRA Form R (Sec. 8.1)	2002 EPCRA Form R (Sec. 8.1)	1993-2002 % Change
Methanol	3,665,169	65,350	(98%)
Sulfuric Acid	301,703	62,201	(79%)
Dichlorotetrafluoroethane	170,000	--	(100%)
Hydrochloric Acid	146,369	120,574	(18%)
Nitric Acid	125,978	9,061	(93%)
Ammonia	113,200	--	(100%)
1,1,1- Trichloroethane	17,800	--	(100%)
Chlorine	18,003	292	(98%)
Xylene (mixed isomers)	16,644	2,207	(87%)
Toluene	12,408	11,075	(11%)
Methyl Ethyl Ketone	9,800	--	(100%)
Methyl Isobutyl Ketone	9,000	--	(100%)
Lead	8,600	508,091	58,080%
Trichloroethylene	7,600	--	(100%)
Dichloromethane	6,319	--	(100%)
Hydrogen Fluoride	3,519	--	(100%)
Trichlorofluoromethane	1,800	600	(67%)
Acetone	1,700	--	(100%)
Methyl Tert-Butyl Ether	1,674	--	(100%)
Ethylene Glycol	1,599	--	(100%)
Manganese Compounds	1,300	4,081	214%
1,2,4- Trimethylbenzene	573	--	(100%)
Zinc Compounds	550	162,121	29,377%
Ethylbenzene	400	1,360	240%
Benzene	378	--	(100%)
Nitrate Compounds	N/A	132,956	N/A
Copper	N/A	38,335	N/A
Freon 113	N/A	16,604	N/A
Chromium Compounds	N/A	1,322	N/A
Other TRI Chemicals	50	11,065	22,030%
TOTAL	**4,642,136**	**1,147,295**	**(75%)**

Table 2. Comparison of 1993-2002 DOE TRI Reporting by Site (pounds)

DOE Site	1993 EPCRA Form R (Sec. 8.1)	2002 EPCRA Form R (Sec. 8.1)	1993-2002 % Change
Naval Petroleum Reserve #1	3,782,920	--	(100%)
Idaho National Eng. & Env. Lab	369,000	43,943	(88%)
Portsmouth Gas. Diff. Plant	171,918	22,069	(87%)
Energy Tech. Engr. Center	101,200	--	(100%)
Savannah River Site	79,155	234,637	196%
Y-12 National Security Complex	74,201	287,710	288%
Pinellas Plant	22,324	--	(100%)
Stanford Linear Accelerator	8,300	40	(100%)
Oak Ridge National Lab	7,353	75,395	925%
East Tennessee Technology Park	6,388	49,277	671%
Brookhaven National Lab	4,600	161,198	3,404%
Los Alamos National Lab	5,570	10,538	89%
Rocky Flats Plant	3,555	34,049	858%
Fermi Lab	1,872	36,640	1,857%
Kansas City Plant	1,400	28	(98%)
Naval Petroleum Reserve #3	95	--	(100%)
Mound Plant (Miamisburg)	19	--	(100%)
Argonne National Lab-East	7	135,300	N/A
Other DOE Sites	2,259	56,471	2,400%
TOTAL	**4,642,136**	**1,147,295**	**(75%)**

Reported chemical releases from six sites (Oak Ridge Y-12 National Security Complex, Savannah River Site, Brookhaven National Laboratory, Argonne National Laboratory-East, Oak Ridge National Laboratory and East Tennessee Technology Park) in year 2002 represented about 82% of the total complex-wide releases. The top six TRI chemicals in terms of pounds released (lead and lead compounds, zinc compounds, nitrate compounds, hydrochloric acid, methanol and sulfuric acid) represented about 92% of the total reported releases. Lead and lead compounds were the single largest category with 19 of the 63 submitted Form Rs reporting a total of 508,091 pounds being released, which is about 44% of the total reported releases. In contrast, for reporting year 2000, 5 Form Rs for lead were submitted reporting a total of 10,986 pounds being released.

The increased reporting for lead is largely the result of two factors. First, there was more reporting due to the lowering of the reporting threshold for lead from 25,000 pounds for manufacture or process and 10,000 pounds for other use to 100 pounds for manufacture, process or use. The lower reporting threshold was the result of lead being listed as a persistent, bioaccumulative and toxic (PBT) chemical starting in reporting year 2001 under the EPA rulemaking process. This has resulted in an increase in the number of sites reporting and in the overall amount reported. Second, there was an increase in the amount being disposed in the reporting year due to the reduction of stockpiles that had accumulated as a result of a January 2000, moratorium on the unrestricted release for recycling of scrap metals from radiation areas within DOE. Appendix E provides additional site and chemical specific TRI information for reporting year 2002.

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 validation of year 2002 reporting data indicated that 20 out of 22 reporting sites used the TRI-ME (Toxics Release Inventory-Made Easy) reporting software with 19 sites reporting electronically and one site reporting on paper copies generated from the software.

EO 13148 directs all Federal facilities to comply with the EPCRA reporting requirements 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 3 below provides a summary of DOE site EPCRA reporting for 2002, based on information collected during TRI reporting validation.

Table 3: 2002 EPCRA Reporting by DOE

Report Type	Number of Sites Meeting Reporting Criteria and Submitting Specified Reports
EPCRA 302-303: Planning Notification	8
EPCRA 304: EHS Release Notification	0
EPCRA 311-312: MSDS/Chemical Inventory	20

F. Reduction in the Generation of Hazardous, Radioactive, Radioactive Mixed, and Sanitary Waste

In 1999, the Secretary of Energy established pollution prevention goals for routine generation of transuranic, low-level radioactive, low-level mixed, hazardous, and sanitary waste. The goals are to be achieved in 2005 using 1993 as the baseline year. These goals also serve the Department in meeting the requirements of EOs 13148 and 13101 for Federal agencies to establish pollution prevention goals.

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

Table 4 illustrates the progress DOE made in 2003 in meeting its 2005 goals for transuranic, low-level radioactive, low-level mixed (radioactive and hazardous),

hazardous, and sanitary wastes and the progress it needs to make to achieve reduction goals for transuranic waste and low-level radioactive waste. In 2003, DOE sites collectively met or exceeded the challenge of a 90% reduction in hazardous waste, an 80% reduction in low-level mixed waste, and a 75% reduction in sanitary waste relative to the 1993 (routine waste) baseline.

Table 4: DOE Progress Toward Meeting Pollution Prevention Goals*

Type of Waste	1993 Baseline Waste Generated	2005 Goal Waste Generated	2003 Status Waste Generated	Waste Reduction Needed to Meet 2005 Goal	% Reduction Made to Date	2005 Goal % (baseline reduction)
Transuranic	708	142	187	45	74%	80%
Low-level Radioactive	41,653	8,331	12,560	4,229	70%	80%
Low-level Mixed	3,324	665	281	0	92%	80%
Hazardous	14,419	1,442	1,285	0	91%	90%
Sanitary	121,544	30,386	27,902	0	77%	75%

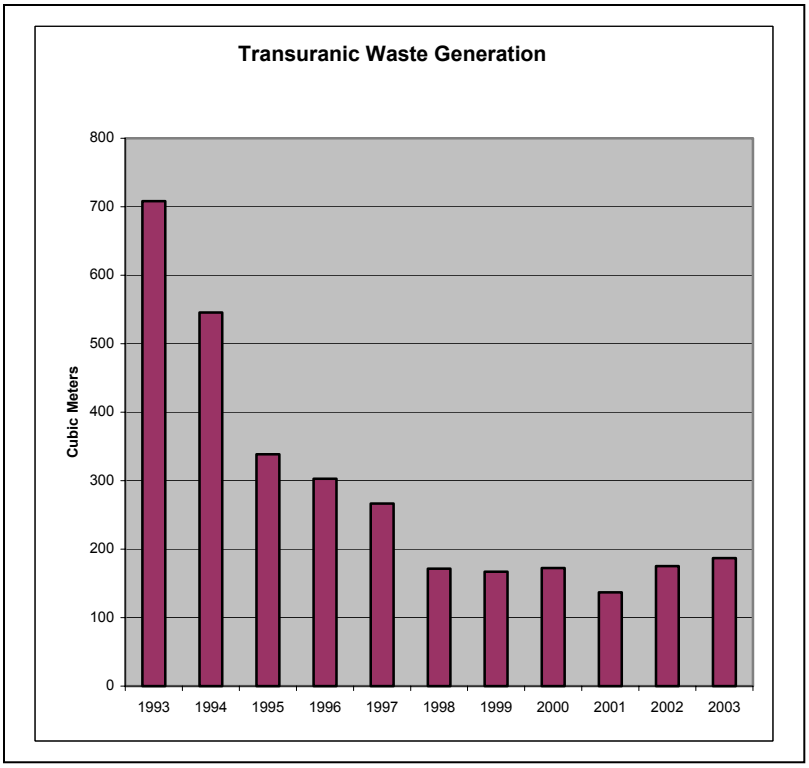
*Units are in metric tons (assumes 1 metric ton equals 1 cubic meter)

Table 5 and the following charts 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.

Table 5: Complex-Wide Routine Waste Generation from Baseline Year to Reporting Year

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Transuranic	708	546	339	303	266	172	167	173	137	175	187
Low-level Radioactive	41,653	31,854	21,841	15,002	16,483	13,618	11,099	10,248	10,628	12,167	12,560
Low-level Mixed	3,324	3,132	1,337	1,372	1,371	1,198	807	794	967	476	281
Hazardous	14,419	12,507	4,082	3,046	2,870	2,061	1,035	998	1,189	1,368	1,285
Totals w/out Sanitary	**60,104**	**50,136**	**30,160**	**22,450**	**23,037**	**19,321**	**15,488**	**14,080**	**15,930**	**17,093**	**14,313**
Sanitary	121,544	107,996	96,999	89,183	61,867	48,568	48,002	38,339	36,714	38,263	27,902
Totals	**181,648**	**158,132**	**127,159**	**111,633**	**84,904**	**67,889**	**63,712**	**52,609**	**52,809**	**55,356**	**42,215**

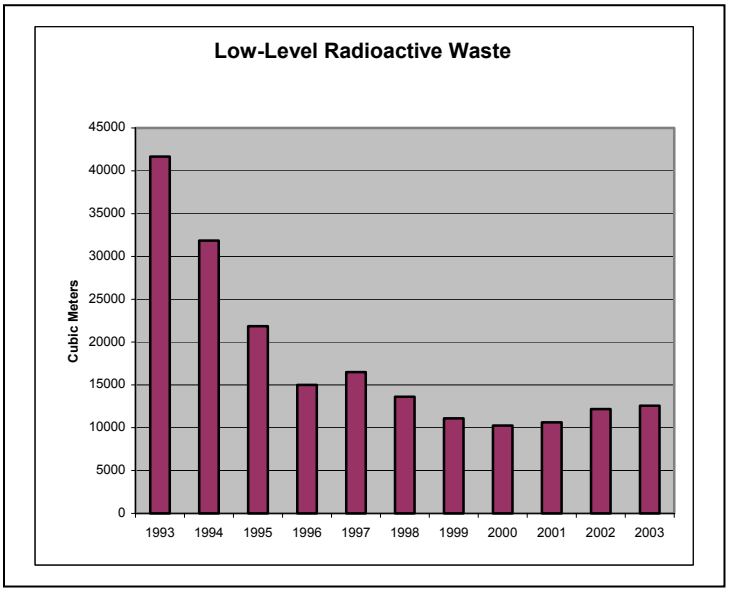
Transuranic Waste (TRU)



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 74% from the 1993 baseline. About half (98 metric tons) of the year's reported transuranic waste came from the Savannah River Site, GA (SRS), an Office of Environmental Management (EM) site. The SRS operations included an increase in work for their H and F canyons over the reporting period. Seventy-six metric tons originated at National Nuclear Security Administration (NNSA) sites, 74 of which came from Los Alamos National Laboratory, which had an increase in programmatic activities. Collectively, DOE sites will need to achieve an additional reduction of 45 metric tons over the 2003 reduction to achieve the 2005 goal of 142 metric tons.

Low-Level Radioactive Waste

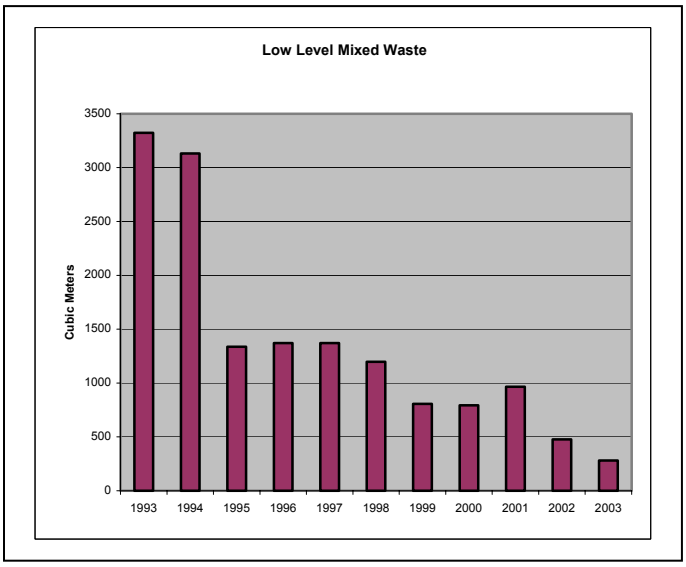


Low-level radioactive waste is generated from the use of radioactive materials in research or production, i.e., contaminated tools, protective clothing, etc.

Low-level radioactive waste generation dropped 70% from 1993. About a third of the low-level wastes came from EM's SRS with its increased work for the H and F canyons. An additional reduction of 4,229 metric tons of low-level radioactive waste is necessary at DOE sites to achieve the 2005 goal of 8,331 metric tons.

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). For example, the mixing of these wastes can occur when hazardous solvents are used to clean radioactively contaminated surfaces or through research and laboratory activities.

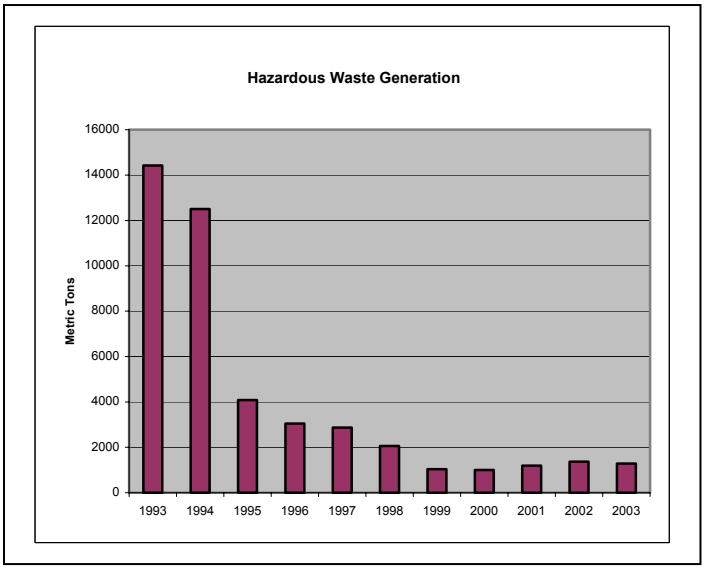


Sites achieved a 92% reduction in low-level mixed wastes against the 1993 amount and the 80% reduction level established as a 2005 goal. Over half of the routine low-level mixed wastes reported this year were generated at EM sites.

Hazardous Waste

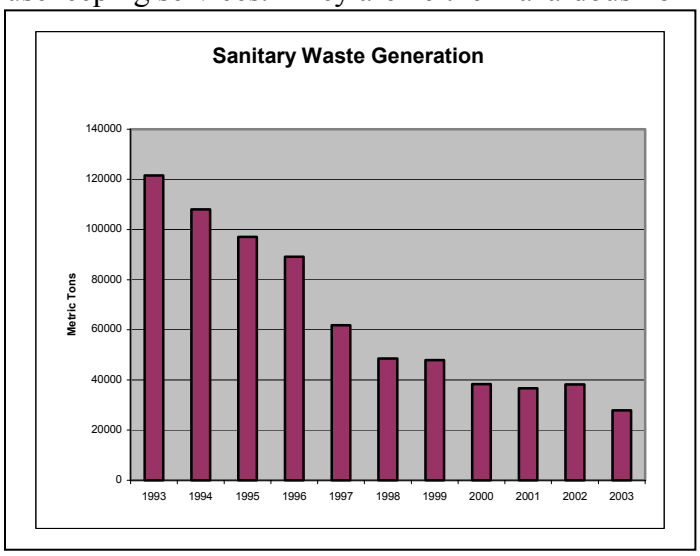
Hazardous wastes are those regulated either by RCRA, TSCA, or state laws because of their potentially harmful effect if improperly managed or released into the environment. They are generated from the use of hazardous materials such as solvents in routine cleaning or production.

Hazardous waste generation dropped 91% from the 1993 baseline and exceeded the 2005 90% reduction goal. About sixty percent of the reported waste is attributable to NNSA sites, primarily 385 metric tons generated at the Knolls Atomic Power Laboratory, CT.



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 (i.e., solid waste) such as construction and demolition debris.



Sanitary waste generation was reduced by 77% from the baseline year, exceeding the 75% goal established for 2005. NNSA sites accounted for about a third of the sanitary waste with major contributions coming from the Nevada Test Site, NV, Knolls Atomic Power Laboratory, CT, and Bettis Atomic Power Laboratory, NY. Additionally, several EM closure sites have reclassified their wastes from routine to non-routine because site activities have shifted to cleanup and stabilization of legacy wastes. This change precipitated a drop in sanitary waste generation reported here.

G. Ozone-Depleting Substances (ODS) Goal: Baseline and Achievements

Since the early 1990s, DOE instituted a number of efforts to reduce its inventory and use of Class I ODS in a cost-effective manner. The principal drivers for the Department's move toward discontinuing its 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 and Energy Efficiency Leadership Goals. The ODS-related goals require the retrofit or replacement of large, aging chillers that use Class I refrigerants by 2005 and the elimination of Class I ODS use by 2010, to the extent economically practicable. Recent progress in the phase-out of ODS at select DOE sites is reported in Appendix F.

In February 2004, DOE's Office of Air, Water and Radiation Protection Policy and Guidance (EH-41), forwarded a letter to EPA's Compliance Assessment and Media Programs Division concerning EPA's amended refrigerant recycling rule (40 CFR Part 82, Subpart F), which appeared in the July 24, 2003, Federal Register (68 FR 43786). The letter pointed out that the amended refrigerant recycling regulations could increase refrigerant phaseout costs borne by the Federal government, with no commensurate environmental benefit. The rule requires that phased-out agency refrigerant transferred to

the Department of Defense (DoD) to meet Executive Order 13148 requirements be reclaimed (i.e., reprocessed to meet a refrigerant purity standard) by the owning agency. The requirement for agencies to reclaim refrigerant would add an unnecessary expense, because DoD has already established internal procedures to ensure that DoD reclaims refrigerant going into its distribution system. This information is provided pursuant to the request in the EO 13148 Guidance for Calendar Year 2003 Annual Report that Federal facilities identify any challenges encountered in reducing the use of ODS.

H. Waste Reduction Accomplishments Revitalization Initiative

The Office of Pollution Prevention and Resource Conservation (EH-43) is finalizing a lessons-learned report to DOE management entitled *Waste Reduction Accomplishments Revitalization Initiative,* highlighting over thirty successful, site-specific waste reduction projects and practices that can be implemented at other DOE sites in a timeframe that supports DOE meeting the 2005 pollution prevention goals. Summaries of these P2 best-practice projects are provided in Appendix G. The final report is expected to be available for line management consideration in the spring. More information on these projects is available at www.eh.doe.gov/oepa/guidance/p2/p2bestpractices.pdf.

Appendix A

Department of Energy
Pollution Prevention and Energy Efficiency
Leadership Goals*

*Secretary of Energy Memorandum for Heads of Departmental Elements, 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
Environmental Protection Program

U.S. Department of Energy
Washington, D.C.

ORDER

DOE O 450.1

Approved: 1-15-03
Review Date: 1-15-05

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.

      (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.

   b. DOE Contractors.

      (1) 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.

(2) 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.

(3) 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.

(4) 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.

(5) 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, Office of Security, 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, re-use, segregation, and recycling and by procuring recycled-content materials and environmentally preferable products and services.

(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 411.1-1B, *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 P 450.5, *Line Environment, Safety and Health Oversight,* dated 6-26-97.

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 P 450.5.

(3) Ensure sites under their purview include site-specific goals in their ISMS that contribute to the accomplishment of DOE P2 and energy efficiency (P2E2) goals. (P2E2 goals are contained in a memorandum signed by the Secretary on November 12, 1999, http://www.eh.doe.gov/P2)

(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 P2 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 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, material segregation, 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 Asset Management Program of the Office of Worker and Community Transition as to the type and quantity of ODS transferred to the Department of Defense (DoD) ODS Reserve.

(9) Monitor progress toward meeting the P2 requirements of paragraph 4b(3) of this Order, and make such information available annually to the Office of Environment, Safety and Health.

(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 environmentally preferable products.

(12) Coordinate all acquisitions with the Department's "Green Acquisition Advocates" established pursuant to Acquisition Letter, AL-2000-03, dated 05/16/00, as appropriate.

(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.

(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 P 450.5 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 P2E2 goals. (P2E2 goals are contained in a memorandum signed by the Secretary on November 12, 1999, http://www.eh.doe.gov/P2)

(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 and Performance Assurance must evaluate the effectiveness of DOE Headquarters and field organization implementation of the requirements of this Order.

f. Director of Management, Budget and Evaluation, 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.

(3) Ensure DOE's personal property management policies and procedures preclude the Department's disposal of ODS without prior coordination with DoD.

(4) Ensure procurement policies and procedures encourage the Department's acquisition of recycled-content materials and environmentally preferable products and services.

(5) Incorporate DOE's P2E2 goals into the Department's strategic and annual performance plans required by the Government Performance and Results Act of 1993.

(6) 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.

g. Director, Office of Worker and Community Transition, must 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:

KYLE E. MCSLARROW
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 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 Independent Oversight and Performance Assurance (to the extent noted in paragraph 5e of the Order)

Office of Management, Budget and Evaluation and Chief Financial Officer (to the extent noted in paragraph 5f of the Order)

National Nuclear Security Administration

Office of Nuclear Energy, Science and Technology

Office of Science

Office of Worker and Community Transition (to the extent noted in paragraph 5g of the Order)

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, re-use, segregation, and recycling, and by procuring recycled-content materials and environmentally preferable products and services;

(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 P2 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 environmentally preferable products. As appropriate, all acquisitions must be coordinated with the DOE operations/field/site office "Green Acquisition Advocate." [See Acquisition Letter AL-2000-03, dated 05/16/00]

9. Conduct operational assessments, such as Pollution Prevention Opportunity Assessments, of site operations to identify opportunities for source reduction, material segregation, 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.

Appendix C

Secretary Abraham's Earth Day Message

The Secetary of Energy
Washington, DC 20585
April 21, 2003

MEMORANDUM FOR HEADS OF DEPARTMENTAL ELEMENTS

FROM: SPENCER ABRAHAM

SUBJECT: Earth Day 2003

The Department of Energy (DOE) is committed to protecting the environment while conducting its important national security and energy-related missions. In support of this commitment, we are implementing formal environmental management systems at our facilities thereby reducing the amount of waste we produce and release into the environment.

Environmental Management Systems

President George W. Bush supports the implementation of environmental management systems at Federal facilities, and his Performance Management Agenda recognizes the importance of such systems in the effective and efficient operation of the Federal government. An environmental management system provides a systematic framework to identify and address the environmental impacts of our work, ensures compliance with regulatory requirements, and determines opportunities for further and continual improvement.

At present, DOE has seven major facilities which have been registered--by independent third-party registrars--as conforming to ISO 14001, the international consensus standard for environmental management systems. Three of these facilities, as well as two additional ones, are recognized by the Environmental Protection Agency, under the National Environmental Performance Track program, for their environmental management system and sustained record of environmental performance.

It is my goal, consistent with the requirements of Executive Order 13148, *Greening the Government Through Leadership in Environmental Management*, to have environmental management systems in place at all major DOE facilities by the end of 2005. The Department recently updated our Order defining DOE's environmental protection program. The new DOE Order 450.1 implements Executive Order 13148 by requiring environmental management systems at DOE facilities as part of their integrated safety management systems.

Pollution Prevention

Pollution prevention is a fundamental aspect of an effective environmental management system and the Department's approach to protecting the environment, worker safety, and the public. Environmental management systems required by DOE Order 450.1 must provide for the systematic planning, execution, and evaluation of departmental programs for pollution prevention.

We have made notable progress in pollution prevention to date with many DOE facilities being recognized for their leadership. In 2002, DOE was the recipient of four White House Closing-the-Circle Awards recognizing the Department's success in pollution prevention. For 2003, I am pleased to announce that ten DOE facilities have won DOE pollution prevention awards for 17 initiatives ranging from waste minimization and recycling to environmental sustainability in building design and construction, and "green" procurement of environmentally preferable products and services. Each of these DOE award-winning initiatives has been entered into the 2003 White House Closing-the-Circle competition.

Several years ago, the Department set ambitious goals for reducing our generation of various types of waste by 2005. We have made tremendous strides toward reaching these goals, and while the Department's commitment to pollution prevention and our demonstration of environmental leadership are evident, opportunities for further improvements need to be pursued. Accordingly, I am charging all Department programs to use their ingenuity to reinvigorate their efforts towards meeting DOE's 2005 pollution prevention goals for reducing the generation of waste and release of pollutants into the environment. These goals apply to waste from routine operations. In addition, as we clean up our sites, we need to actively seek opportunities to minimize the amount of waste resulting from our cleanup, stabilization, and decommissioning activities.

Not only does pollution prevention pay for itself by reducing the life-cycle costs of our operations, but it is sustained by DOE's unique capability for innovation and continuous improvement.

The Department is already a leader in Greening the Federal Government. I intend for DOE to continue this leadership in the future.

Appendix D

DOE EMS Site List

Department of Energy "Appropriate Facilities" for Implementation of EMS[1]

DOE Site	Location	EMS Recognition
Albany Research Center	Albany OR	
Ames Laboratory	Ames IA	
Argonne National Laboratory –West	Idaho Falls ID	
Argonne National Laboratory –East	Argonne IL	
Bettis Atomic Power Laboratory	West Mifflin PA	
Bonneville Power Administration	Portland OR & multistates	
Brookhaven National Laboratory	Upton NY	ISO 14001
East Tennessee Technology Park	Oak Ridge TN	
Fermi National Accelerator Laboratory	Batavia IL	
Fernald Environmental Management Project	Cincinnati OH	
Grand Junction Office	Grand Junction CO	
Hanford -- Office of River Protection	Richland WA	
Hanford -- Environmental Restoration Project	Richland WA	
Hanford -- Project Hanford	Richland WA	
Idaho National Eng. & Env. Laboratory	Idaho Falls ID	ISO 14001
Idaho Advanced Mixed Waste Treatment Facility	Idaho Falls ID	
Kansas City Plant	Kansas City MO	ISO 14001; NEPT
Knolls Atomic Power Laboratory	Niskayuna NY	
Lawrence Berkeley National Laboratory	Berkeley CA	
Lawrence Livermore National Laboratory	Livermore CA	
Los Alamos National Laboratory	Los Alamos NM	
Miamisburg Environmental Management Project	Miamisburg OH	
National Energy Technology Laboratory	Pittsburgh PA Morgantown WV Tulsa OK	ISO 14001
National Renewable Energy Laboratory	Golden CO	
Naval Petroleum and Oil Shale Reserves CO/UT/WY	Casper WY	
Nevada Test Site	North Las Vegas NV	
Oak Ridge Institute for Science and Education	Oak Ridge TN	
Oak Ridge National Laboratory	Oak Ridge TN	
Pacific Northwest National Laboratory	Richland WA	ISO 14001; NEPT
Paducah Site	Paducah OH	
Pantex Plant	Amarillo TX	
Portsmouth Gaseous Diffusion Plant	Portsmouth OH	
Princeton Plasma Physics Laboratory	Princeton NJ	
Rocky Flats Site	Golden CO	
Sandia National Laboratory (CA)	Livermore CA	
Sandia National Laboratory (NM)	Albuquerque NM	
Savannah River Site	Aiken SC	ISO 14001[2]

[1] 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 management system system-wide, or by regions; DOE tallies each site organization with a distinct EMS as a separate "facility."

[2] Chose not to renew ISO 14001 registration.

DOE Site	Location	EMS Recognition
Savannah River Tritium Facility	Aiken SC	
Southwestern Power Administration	Gore OK & multistates	
Stanford Linear Accelerator Center	Stanford CA	
Strategic Petroleum Reserve	Bayou Choctaw LA New Orleans LA West Hackberry LA Big Hill TX Bryan Mound TX	ISO 14001; NEPT
Thomas Jefferson National Accelerator Facility	Newport News VA	
Waste Isolation Pilot Plant	Carlsbad NM	ISO 14001[3]; NEPT
West Valley Demonstration Project	West Valley NY	NEPT
Western Area Power Administration	Lakewood CO and 15 states	NEPT
Y-12 National Security Complex	Oak Ridge TN	
Yucca Mountain Project	Las Vegas NV	

ISO 14001 – Third-party certified to the ISO 14001 standard.
NEPT – Member of EPA's National Environmental Performance Track program.

[3] Chose not to renew ISO 14001 registration.

Appendix E

Toxic Release Inventory Reporting

2002 DOE EPCRA Section 313 TRI Reporting: Form R Section 8 Releases (in pounds)

FACILITY NAME	CHEMICAL NAME	SECT. 8.1 QUANTITY RELEASED
ARGONNE NATIONAL LAB – EAST	LEAD	135,300.0000
FACILITY TOTAL		**135,300.0000**
BONNEVILLE POWER ADMINSTRATION	MERCURY	6.1000
FACILITY TOTAL		**6.1000**
BROOKHAVEN NATIONAL LABORATORY	MERCURY	140.0000
BROOKHAVEN NATIONAL LABORATORY	PCB	25.0000
BROOKHAVEN NATIONAL LABORATORY	LEAD	161,033.0000
FACILITY TOTAL		**161,198.0000**
E. TENN. TECHNOLOGY PARK (OLD K-25)	HEXACHLOROBENZENE	0.0051
E. TENN. TECHNOLOGY PARK (OLD K-25)	LEAD	49,277.2000
E. TENN. TECHNOLOGY PARK (OLD K-25)	PCB	0.0039
FACILITY TOTAL		**49,277.2090**
FERMI LAB	COPPER	36,640.0000
FACILITY TOTAL		**36,640.0000**
HANFORD SITE	LEAD	16,044.4000
FACILITY TOTAL		**16,044.4000**
IDAHO NATL ENGR & ENV LAB (OLD INEL)	POLYCYCLIC AROMATIC COMPOUNDS	139.0323
IDAHO NATL ENGR & ENV LAB (OLD INEL)	TOLUENE	3,315.0000
IDAHO NATL ENGR & ENV LAB (OLD INEL)	ETHYLBENZENE	1,360.0000
IDAHO NATL ENGR & ENV LAB (OLD INEL)	NITRIC ACID	2,042.0000
IDAHO NATL ENGR & ENV LAB (OLD INEL)	LEAD	37,087.0814
FACILITY TOTAL		**43,943.1137**
KANSAS CITY PLANT	LEAD	28.0200
FACILITY TOTAL		**28.0200**
LAWRENCE LIVERMORE - SITE 300	LEAD	3,898.9000
FACILITY TOTAL		**3,898.9000**
LOS ALAMOS NATIONAL LABORATORY-NM	MERCURY	157.0000
LOS ALAMOS NATIONAL LABORATORY-NM	LEAD	10,381.1000
FACILITY TOTAL		**10,538.1000**
NEVADA TEST SITE	LEAD	3,905.0000
FACILITY TOTAL		**3,905.0000**
NONPROLIF NAT SECURITY INSTITUTE	LEAD	25,148.0000
FACILITY TOTAL		**25,148.0000**
OAK RIDGE NATIONAL LABORATORY	LEAD	4,395.0000
OAK RIDGE NATIONAL LABORATORY	NITRIC ACID	-
OAK RIDGE NATIONAL LABORATORY	NITRATE	71,000.0000
FACILITY TOTAL		**75,395.0000**
PADUCAH GASEIOUS DIFFUSION PLANT	PCB	-
FACILITY TOTAL		**-**
PANTEX PLANT	LEAD	5,251.0000
PANTEX PLANT	MERCURY	-
FACILITY TOTAL		**5,251.0000**
PORTSMOUTH GAS DIFF PLANT	NITRATE	5,646.0000

PORTSMOUTH GAS DIFF PLANT	LEAD	419.1660
PORTSMOUTH GAS DIFF PLANT	SODIUM NITRITE	16,004.0000
FACILITY TOTAL		**22,069.1660**
ROCKY FLATS PLANT	CHLORODIFLUOROMETHANE	4,670.0000
ROCKY FLATS PLANT	LEAD	29,379.0000
FACILITY TOTAL		**34,049.0000**
SANDIA NATIONAL LABORATORY/CALIFORNIA	LEAD	807.0000
FACILITY TOTAL		**807.0000**
SANDIA NATIONAL LABORATORY/NEW MEXICO	LEAD	1,406.0000
FACILITY TOTAL		**1,406.0000**
SAVANNAH RIVER SITE	MERCURY	211.4000
SAVANNAH RIVER SITE	CHLORINE	292.0000
SAVANNAH RIVER SITE	FORMIC ACID	1,706.0000
SAVANNAH RIVER SITE	ZINC	162,121.0000
SAVANNAH RIVER SITE	NICKEL	537.0000
SAVANNAH RIVER SITE	XYLENE	2,207.0000
SAVANNAH RIVER SITE	SODIUM NITRITE	2.0000
SAVANNAH RIVER SITE	MANGANESE	2,298.0000
SAVANNAH RIVER SITE	TOLUENE	7,760.0000
SAVANNAH RIVER SITE	NITRATE COMPOUNDS	40,242.0000
SAVANNAH RIVER SITE	LEAD	11,640.4000
SAVANNAH RIVER SITE	CHROMIUM	718.0000
SAVANNAH RIVER SITE	NITRIC ACID	4,902.0000
FACILITY TOTAL		**234,636.8000**
STANFORD LINEAR ACCELERATOR	LEAD	10.0000
STANFORD LINEAR ACCELERATOR	COPPER	30.0000
FACILITY TOTAL		**40.0000**
WEST VALLEY DEMONSTRATION PROJECT	NITRIC ACID	4.3200
FACILITY TOTAL		**4.3200**
Y-12 NATIONAL SECURITY COMPLEX	NITRATE	62.0000
Y-12 NATIONAL SECURITY COMPLEX	FREON 113	16,604.0000
Y-12 NATIONAL SECURITY COMPLEX	HYDROCHLORIC ACID	120,574.0000
Y-12 NATIONAL SECURITY COMPLEX	TRICHLOROFLUOROMETHANE	600.0000
Y-12 NATIONAL SECURITY COMPLEX	LEAD	12,681.2000
Y-12 NATIONAL SECURITY COMPLEX	NITRIC ACID	2,113.0000
Y-12 NATIONAL SECURITY COMPLEX	NICKEL	3,047.0000
Y-12 NATIONAL SECURITY COMPLEX	COPPER	1,665.0000
Y-12 NATIONAL SECURITY COMPLEX	CHROMIUM	604.0000
Y-12 NATIONAL SECURITY COMPLEX	MANGANESE	1,783.0000
Y-12 NATIONAL SECURITY COMPLEX	MERCURY	425.7000
Y-12 NATIONAL SECURITY COMPLEX	METHANOL	65,350.0000
Y-12 NATIONAL SECURITY COMPLEX	SULFURIC ACID	62,201.0000
FACILITY TOTAL		**287,709.9000**

TOTAL		1,147,295.0287

Appendix F

Ozone Depleting Substances Use Reporting

Recent Ozone-Depleting Substances (ODS) Use Reduction Performance by Select Sites

DOE Site	ODS Phase Out Progress
Brookhaven National Laboratory	▪ Deactivated cylinders containing 360 pounds of Halon 1301 from two fixed fire suppression systems and transferred to site's static inventory. ▪ Instituted as standard practice that, if a refrigerant leak is found, technicians will either immediately repair the leak or isolate it and prepare a work order for the needed repairs. This practice exceeds the leak repair provisions of 40 CFR 82.156.
Lawrence Berkeley National Laboratory	▪ Reduced its Class I ODS usage by about 99% since 1991 through ▫ replacing solvent cleaning systems, ▫ converting centrifugal chillers and research equipment, ▫ installing and converting refrigeration and freezer systems, ▫ installing leak detection sensors in key workrooms, and ▫ issuing an ODS buying policy and guidelines to purchasing staff. ▪ Class I[1] ODS emissions were estimated at less than 10 kg per year in 2002.
National Energy Technology Laboratory	▪ A design has been completed to replace two 225 ton chillers with high efficiency chlorofluorocarbon (CFC)-free 150 ton chillers.
Oak Ridge Reservation	▪ Replaced all but six Class I refrigeration appliances installed before 1984 that contained ODS and had cooling capacities of 150 tons. ▪ Decommissioning planned for remaining six units.
Pantex Plant	▪ Replaced by 2001 all chillers with greater than 150 tons of cooling capacity that were manufactured before 1984 and use Class I ODS refrigerants. ▪ Restricted the purchase of ODS for plant use, unless a critical need can be justified, through the Pantex Chemical Control System.
Portsmouth Gaseous Diffusion Plant	▪ Instituted a system, affecting all areas using ODS in equipment, to comply with the Clean Air Act Title VI record-keeping and labeling requirements. ▪ Requires contractor technicians who service equipment to be trained in accordance with EPA.
Sandia National Laboratories, New Mexico	▪ Transferred 2000 lbs of excess refrigerants and 96 accumulators with Halon 2402 to the Defense Logistics Agency Supply Center in 2002.
Savannah River Site	▪ Reduced CFC refrigerant use from 450 pounds in 2001 to 180 pounds in 2002. ▪ Continues to phase out Halon use.
Strategic Petroleum Reserve	▪ Initiated Halon removal at Bryan Mound in 2002. ▪ Initiated plan to remove over 8600 lbs of Halon 1301 (previous removal goal was 1356 lbs).

[1] Class I ODS are those chemicals listed in Appendix A to Subpart A of 40 CFR Part 82 that cause or contribute significantly to harmful effects of the stratospheric ozone layer. Section 602 of the Clean Air Act directs EPA to add to Class I list any chemical that EPA determines has ozone depletion potential of 0.2 or greater.

Thomas Jefferson National Accelerator Facility	▪ Replaced Building 28 chiller that contained Refrigerant-22 in 2002. ▪ Planning to replace two aging Refrigerant-113 units with two state-of-the-art, non-CFC, energy-efficient units in 2003.
Western Area Power Administration	▪ Eliminated use of ozone-depleting solvents throughout operations. with past inventories used and not replaced or sent for safe disposal. ▪ Phasing out Halon-containing hand-held fire extinguishing equipment and Halon-based large fire suppression systems for all but a few uses and replacing them with carbon dioxide, dry chemical extinguishers, and other approved chemical replacements.
Yucca Mountain Site.	▪ Reviewed all ODS purchase requests in 2002. ▪ Rejected new purchase requests for Class I ODS. ▪ Monitored use and storage of Class I ODS.

Appendix G

Waste Reduction Accomplishments
Revitalization Initiative Summaries

Brick Saw and Heating, Ventilation and Air Conditioning (HVAC) System: Oak Ridge Y-12 National Security Complex

The Oak Ridge Y-12 National Security Complex (Y-12) needed to establish a new brick sawing location to support re-bricking of its furnaces. Because the previous location was in a radiological area, all material and scrap from the brick sawing process had to be managed as a low-level waste. The Y-12 Pollution Prevention Program worked with the re-bricking crew to establish a new sawing location in a non-contaminated area, thereby lowering waste generation and disposal costs.

235-H Instrument Calibration and Repair Shop: Savannah River Site

Monitoring equipment used in the field at the Savannah River Site often needed to be taken from "hot zones" and decontaminated before being calibrated and/or serviced or repaired. The 253-H Instrument Calibration and Repair Shop provided a "hot shop" location in the field where monitoring equipment can be calibrated and/or serviced or repaired without first being decontaminated. Relocating the instrument calibration and repair shop resulted in reducing low-level waste generation and the cost of replacing equipment and decontamination materials.

Reuse/Recycle Radioactively-Contaminated Lead from Dismantled Casks: Idaho National Engineering and Environmental Laboratory

The usual disposal options for the 200,000 pounds (99 metric tons) of radioactively contaminated lead generated from dismantling casks and shielding would have been very costly. Recycling the lead into lead bricks for use at the Idaho State University Accelerator Center allows the Center to increase the number of experiments it can perform and prolongs the life of the Center by a 50-year projection. The lead recycle and reuse project eliminated a potential low-level mixed waste stream.

Steel Fittings Reduce Oil Spills: Los Alamos National Laboratory

Heavy equipment, such as garbage trucks and backhoes, occasionally leaked hydraulic fluid and oil during operations at Los Alamos National Laboratory (LANL). The leaks were nearly always caused by failure of the aluminum fittings on the rubber hoses through which the hydraulic fluid and oil flowed. The Maintenance Shop at LANL invested in a supply of steel fittings and a new machine that could crimp the steel fittings onto rubber hoses. Using steel fittings to replace aluminum fittings that had the highest risk of being physically damaged resulted in a 60% reduction in hydraulic fluid leaks. The reduced leak rate reduced the generation of oil-contaminated soil, thereby preventing approximately 13 metric tons of soil from having to be treated as New Mexico Special Waste.

Construction and Demolition (C&D) Waste Recycling: Argonne National Laboratory-East

Construction and demolition wastes generated as ongoing processes would consume significant landfill space if disposed as sanitary waste. The Construction and Demolition Recycling Program tracks and documents the amounts of waste and recycled material generated from construction projects. As part of the standard construction process, all construction contractors are required to report waste stream generation and recycle waste materials at feasible levels. The cost for data tracking is shared by the construction project budget and the Laboratory overhead (P2 Program). Roughly 7,270 metric tons of construction and demolition material were recycled during FY 2002 rather than disposed in landfills at considerable cost.

The Recycling of Building 913 at Sandia/CA: Sandia National Laboratories/CA

Traditionally, construction debris from a demolished building at Sandia National Laboratories/CA ended up in a landfill. Building 913, slated for demolition, had a footprint of approximately 84,500 square feet and sat on a concrete slab. Under the site's revised construction master specifications, segregation and recycling of construction debris is required, and deconstruction is encouraged and emphasized to bidding contractors. 91.5% of the 7,500 metric tons of Building 913 debris was recycled. The contractor avoided disposal fees and received the recycling proceeds. In addition, excess equipment was either reused on site or sent to other DOE facilities, and two fume hoods, with a total volume of about 500 cubic feet, were decontaminated by dismantling and removing the affected components, thereby reducing the low-level radioactive waste to less than 8 cubic feet, a 98% reduction.

Perseverance over Resistance: ORO Recycling of Excess Zinc Bromide: East Tennessee Technology Park

Approximately 37 metric tons (4,000 gallons) of zinc bromide solution (77% pure) had been in storage in the East Tennessee Technology Park (ETTP) since 1998. The zinc bromide solution, clouded due to iron corrosion, could not be easily clarified and was declared a borderline RCRA waste with negligible radioactive contamination. ETTP located a producer of a low-purity zinc bromide product used in the oil and gas industry. The producer was able to blend ETTP's surplus zinc bromide with lower-quality zinc bromide in 50,000-gallon batches resulting in a commercially viable product. ETTP sold the zinc bromide solution and avoided disposal costs.

Deconstruction and Recycling of Building 8-8: Pantex Plant

Building 8-8, a 100 ft. square, timber-frame, corrugated-steel-clad, single-story building constructed in 1945 on an elevated concrete pad 4 feet above grade, was slated for removal. The original plan was to bulldoze the building and dispose of all demolition waste at a landfill. The Pantex P2 Group changed the objectives of the plan from "Demolition and Disposal" to "Deconstruction and Recycle." As a result, the steel siding and all conduits, light fixtures, cable and lightning rods were removed and 8,320 pounds were sold as mixed metal for recycling. Disassembling the timber framing produced fifty-two 6"x10"x24" yellow pine timbers that will be auctioned to the highest bidder. The concrete pad and piers were broken up and sent for crushing into 826 tons of usable aggregate. Deconstruction and recycling prevented 4.1 tons of scrap metal, 826 tons of concrete, 6,240 board feet of sellable timber, and 60 tons of lead-contaminated soil from entering a landfill.

Work Control to Minimize Low-Level Waste: Los Alamos National Laboratory

Contractors performing work in radiological control areas often brought extra equipment and packaging with them to the job. When excess cardboard, wooden pallets, plastic wrap, and supplies touched the ground, they became suspect low-level waste and had to be tested for contamination in a time-consuming process. The site revised its work control program to require that jobs be carefully planned before execution so that only necessary equipment and supplies are brought into the work area. All unnecessary packaging is left outside the work area and recycled or disposed of as regular sanitary waste rather than low-level mixed waste which has a much higher disposal cost. Additional benefits are the time saved in determining if materials are low-level waste and a workforce that is more aware of P2 opportunities and impacts.

Washable Contamination Barriers: Los Alamos National Laboratory

Plastic sheeting was placed on the floor in radiological-control areas prior to almost all operations to simplify cleanup and prevent contamination from contacting the floor and spreading. All of this plastic sheeting was eventually disposed of as low-level waste. A team from the Solid Waste Operation switched to washable tarps that could be commercially cleaned and reused indefinitely thereby significantly decreasing the amount of waste generated.

Recycling Oil from Radiological Control Areas: Los Alamos National Laboratory

Oil from radiological control areas was screened for radioactivity using a liquid scintillation test to detect tritium. Due to the dense matrix of oil, the analysis often returned a false-positive result (tritium was rarely present). As a consequence, drums of oil were treated as potentially contaminated and disposed of as radioactive waste even though a high percentage were generated in ways in

which contamination could not have occurred. The oil was disposed as radioactive waste at a high cost instead of being economically recycled. By adopting an analytical test that includes an oxidation procedure to facilitate detection of radioactive isotopes, the problem of false-positives was eliminated and significant disposal savings were realized.

Lead-Free Protective Aprons: Los Alamos National Laboratory

Employees in the Pit Disposition and Science Technology Group wore lead-containing aprons in certain radiological control areas to minimize exposure to radiation. Since lead is a regulated metal, the aprons must be managed as hazardous waste or, if they become contaminated with any radioactive material, the aprons must then be more expensively managed as low-level mixed waste. In addition, the leaded aprons are quite heavy and uncomfortable to wear for long periods of time, and the vinyl apron covers could tear and cause lead exposure. All these problems were resolved by switching to EarthSafe™ aprons that do not contain any hazardous components but meet the same protection standards as traditional lead-containing aprons. Because they contain no hazardous materials, the aprons can be disposed more economically when they are no longer usable and the amount of low-level mixed waste is accordingly reduced.

Plutonium-238 Waste Reduction: Los Alamos National Laboratory

In creating plutonium-238 ingots to act as heat generators in spacecraft, plastic instruments and bottles used in the process deteriorate and require disposal as transuranic (TRU) waste. Individual instruments and bottles contain a substantial void volume, which resulted in inefficiently packaged drums of TRU waste. A team in the Plutonium-238 Science & Engineering Group incorporated a plaster-cast saw that would fit into a glovebox where plutonium-238 ingots are produced. As the plastic materials wore out and became waste, the plaster-cast saw was used to cut the materials into smaller pieces thereby significantly reducing the volume of generated waste. The new procedure reduces the production of TRU waste from this process by about 50%, resulting in savings in waste management and disposal.

Pu-238 Residue Solidification Process: Los Alamos National Laboratory

Acidic and basic plutonium-238 (Pu-238) contaminated liquids are processed to remove and solidify the residual plutonium in the solutions. The process to recover Pu-238 requires the pH of the initial feed to be ~4. Sodium hydroxide or nitric acid solution usually must be added to the solutions to achieve this pH, which sometimes more than double the initial volume of the solutions. In addition, the paper filters used to catch the precipitate formed during treatment of the solutions occasionally failed. Retreatment of the filtrate was required whenever this happened. Since both acidic and basic liquids contaminated with

Pu-238 were being generated and sent through the plutonium recovery process, the site began mixing necessary quantities of the two streams together to produce the desired initial pH. A degradation-resistant polypropylene filter was used in combination with the paper filter thereby eliminating the problem with failed filters. The new process reduces the production of TRU waste by 50% resulting in a corresponding reduction in waste management and disposal costs.

Reduction of Low-Level Radioactive and Low-Level Mixed Wastes with Imaging Scanner: Los Alamos National Laboratory

The Isotope and Nuclear Chemistry Group used analytical methods that generated low-level radioactive and low-level mixed wastes, were time consuming, and had the potential for spills and employee exposure. Converting to a Bioscan AR-2000 imaging scanner yielded more data; reduced the volume of low-level radioactive and low-level mixed wastes by about 95% (since the liquid scintillation fluid, vials, and pipette tips have been eliminated); eliminated generation and disposal of approximately 0.4 m^3 per year of low-level radioactive and low-level mixed wastes; and reduced the potential for spills or employee exposure to the samples and reagents. The scanner reduces preparation and analysis time for each sample by about 90% (from 2.5 hours to 20 minutes), thereby increasing lab productivity. The new method reduces costs with break-even expected after six years of use.

Closing the Loop on the Ferric Chloride Waste Stream: Los Alamos National Laboratory

The Detonator Technology Group (DX-1) uses a ferric chloride solution to etch copper. About 1,100 gallons of spent ferric chloride solution were disposed as hazardous waste every year, making this routine liquid waste stream the site's largest. The site located a company that recovers the copper and purifies the ferric chloride solution so that it can be used again. DX-1 buys regenerated ferric chloride solution from the company thereby closing the loop on the former waste stream and avoiding waste generation and waste disposal costs.

Rebuilt Radio Frequency Power Tubes Save Money: Los Alamos National Laboratory

A variety of unique types and sizes of high-power electron tubes are used by the Los Alamos Neutron Science Center (LANSCE) to support linear accelerator projects. LANSCE maintains a limited number as replacements but obtaining custom-made tubes can take up to a year which disrupts project schedules. Many tube manufacturers will accept old tubes that have failed and rebuild them in about half the time it takes to build a new tube thereby reducing the potential for project downtime. Rebuilt tubes cost an average of one-third less than new tubes so LANSCE saves money and has virtually eliminated a waste stream.

Hot Water Parts Washer at Heavy Equipment Shop: Los Alamos National Laboratory

The Heavy Equipment Maintenance Shop maintains all site vehicles. Shop workers cleaned mechanical parts with a blend of solvents and caustics that caused skin irritation for some workers. Fumes from the mixture and the potential for spills created safety and environmental hazards. The Shop purchased a hot-water parts washer that cleans parts better than the former solvent-based method, automatically separates oil from the water, reuses the water, eliminates a waste stream, and decreases the mechanics' exposure to solvents and spills.

Oven Cleans Lab Glassware: Los Alamos National Laboratory

The Applied Chemical Technology Group (C-ACT) operates organic synthesis laboratories that generate glassware covered with organic residues. Oxidizing acids and solvents were used to remove the organic residues but cleaning with these chemicals did not always completely remove the residues, potentially contaminating future experiments. Moreover, workers were exposed to these toxic chemicals during the manual cleaning process. C-ACT purchased a high-temperature Pyro-Clean® oven that uses heat to clean glass by decomposing organic compounds such as polymers, resins, and tars without damaging the glass. Organic vapors in the exhaust are destroyed by a catalytic oxidizer system and no liquid hazardous waste is produced. The oven is expected to prevent the generation of about 50 kg of hazardous waste annually and reduce cleaning costs and worker exposure to chemicals.

Nitric Acid Recovery from Metal Plating: Los Alamos National Laboratory

The Polymers & Coatings Group's research in the electroforming and metal plating laboratory generates copper-contaminated nitric acid. Equipment recovered wash water, hydrochloric acid and sulfuric acid for reuse thereby providing an incentive to find a method to recover and reuse the nitric acid solution as well. The purchase of a cold vaporization acid-recovery unit that separates the aqueous nitric acid solution from the residual copper compounds allowed the direct reuse of the nitric acid solution. Although some virgin nitric acid must be added to maintain the required concentration, over 90% of the nitric acid solution is recycled for reuse. The acid recovery unit reduces waste generation as well as waste disposal and chemical purchase costs.

Microbes Help Clean Up Oil Spills: Los Alamos National Laboratory

The oil and dirt removed from sites where heavy equipment had leaked oil was disposed as New Mexico Special Waste. To reduce the amount of these wastes, the site used Oil Sponge®, a mixture of absorbents and microbes that digest oil. Oil Sponge® was mixed with water and contaminated soil containing over

40,000 ppm of oil in large metal bins. After about six weeks of daily mixing to enhance aeration, the soil contained less than 1 ppm of oil and no longer met the criteria for New Mexico Special Waste. Instead of being disposed as a waste at a significant cost, the newly cleaned soil is used to fill holes or act as base fill for parking lots.

Machine Coolant: Los Alamos National Laboratory

The Weapons Materials & Manufacturing Group creates precision metal, composite, and plastic components. The Group's main machine shop, formerly the site's largest generator of waste coolant, produced approximately 14,000 kg of waste per year. To reduce waste coolant generation, the shop selected a coolant treatment system consisting of several components that were implemented sequentially. The former coolant was replaced with a non-toxic mineral-oil-based coolant. A Hyde Guardian Coolant Recycling System was installed to remove tramp oil and metal particles from the coolant to enable its reuse. An evaporator was installed to reduce the waste coolant volume by 95% by evaporating the water in the coolant without causing air pollution and allowing the coolant concentrate is recycled. The accumulated tramp oil also is recycled. The shop now generates less than 50 kg of hazardous waste and avoids waste disposal fees and the costs of virgin coolant.

Caustic Stripper Reuse: Los Alamos National Laboratory

The Detonator Technology Group uses sodium hydroxide solution to remove film from copper cables after etching. Over time, the sodium hydroxide solution becomes diluted and accumulates solid particles that can clog small nozzles of the equipment. Approximately 1,200 gallons of spent sodium hydroxide solution were disposed as hazardous waste each year. The site's Radioactive Liquid Waste Treatment Facility (RLWTF) was identified as a viable user of the solution since sodium hydroxide is routinely used to neutralize acidic waste. Reuse resulted in reduced generation of hazardous waste and disposal costs as well as savings from reduced purchase of sodium hydroxide.

Solar-Powered Barricade Flashers: Strategic Petroleum Reserve Project Management Office

The barricade flashers used at the Bryan Mound area were powered by two 6-volt batteries that needed monthly replacement, on average. By replacing them with solar-powered flashers, the site avoids disposing 136 pounds of batteries annually and realizes a cost savings over the two-year life cycle of the solar-powered flashers.

SPR Paint Waste Minimization Team: Strategic Petroleum Reserve Project Management Office

Paint waste and paint-related wastes were identified as primary hazardous waste sources. For example, during 1998, they represented 89% of the total hazardous waste generated. A Continuous Quality Improvement team consisting of maintenance, property and environmental personnel from all Office sites implemented paint product substitution, process modification, and waste minimization procedures in an effort to reduce paint waste and paint-related wastes. Storage areas, paint scheduling and ordering and inventory practices were evaluated to determine contributing factors to paint waste generation. A new two-coat/one touch-up coat system replaced the three-coat system. Paint waste was reduced to near zero. Waste disposal costs are reduced with additional savings accruing through reduced labor requirements.

You've Got Recyclable Mail: Los Alamos National Laboratory

The site was concerned with the large amount of non-white paper and other materials that were not covered under existing recycling programs. The MS A1000 (Mail Stop A1000) recycling program allows recycle of colored paper, magazines, junk mail, phone books, used toner cartridges, old transparencies, binders, and moving boxes. MSA1000 materials are gathered in the mailroom of every building and sorted at the mail center. Mixed paper is baled and sold to recyclers, used toner cartridges are returned to the manufacturers for refilling, old transparencies are sent to 3M Company for recycling and the binders are donated to local schools. Waste generation is significantly reduced and landfill fees for about 120 metric tons of mixed office waste are avoided.

Concrete Recycling: Pantex Plant

An unattractive pile of waste concrete from multiple demolition projects was accumulating in one area for several years. 861 metric tons (950 US tons) of concrete were trucked to a local recycler who turned the material into usable aggregate using a rock crusher thereby avoiding a waste stream and its disposal costs. All contracts involving disposition of waste concrete now require that it be recycled.

Materials Recovery Facility: Los Alamos National Laboratory

Cardboard, wood and other recyclable materials placed in dumpster trash were not effectively being removed from the solid waste stream. The site developed the Materials Recovery Facility (MRF) to inspect, sort and segregate dumpster trash and remove recyclable materials. MRF workers annually recover an estimated 170 metric tons of cardboard, 10 metric tons of metal, 12 metric tons of wood and various other recyclable materials. Waste generation is reduced,

disposal costs are avoided, and sellable material is used rather than disposed in landfills.

Diskette Recycling Project: Strategic Petroleum Reserve Project Management Office

The Strategic Petroleum Reserve (SPR) generated a high volume of computer diskettes for disposal but was dedicated to reducing sanitary waste. The SPR teamed with its security contractor and used information services equipment to securely clean data from used diskettes. Approximately 800 cleaned diskettes were retained for reuse and 6,400 diskettes were donated to Floppies for Kiddies, a project that distributes recycled floppies to public schools and non-profit organizations.

Styrofoam Reuse: Yucca Mountain Project

Thousands of linear feet of earthen core materials generated by drilling activities are stored on specially designed styrofoam cradles within cardboard boxes. Excess and scrap styrofoam is reduced to small "peanut" sized cubes for reuse as packing material. The cubed styrofoam is used as packaging material for rock, soil, water and gas samples; excess styrofoam is used by a vendor as packing material for industrial equipment. The site reduced waste generation and realized cost savings through reduced purchase of packing material and avoided landfill disposal costs.