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DOE/RL-91-31
Revision 3

Hanford Site Waste Minimization and Pollution Prevention Awareness Program Plan

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United States
Department of Energy
Richland, Washington

Approved for Public Release

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5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

Printed in the United States of America

DISCLM-5.CHP (8-95)

DOE/RL-91-31
Revision 3

UC-721

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Date Published
May 1997

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

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Pollution Prevention Awareness Program Plan

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GLOSSARY

ABBREVIATIONS AND ACRONYMS

BHI	Bechtel Hanford, Inc.
CERCLA	*Comprehensive Environmental Response, Compensation and Liability Act*
CFR	Code of Federal Regulations
CRADA	Cooperative Research and Development Agreements
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy-Headquarters
DOE-RL	U.S. Department of Energy, Richland Operations Office
Ecology	Washington State Department of Ecology
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FDH	Fluor Daniel Hanford, Inc.
FY	Fiscal Year
HEHF	Hanford Environmental Health Foundation
LLW	Low-Level Waste
MLLW	Mixed Low-Level Waste
MTRU	Mixed Transuranic Waste
P2/WMin	Pollution Prevention/Waste Minimization
P2OA	Pollution Prevention Opportunity Assessment
PCB	Polychlorinated Biphenyl
PHMC	Project Hanford Management Contract
PNNL	Pacific Northwest National Laboratory
PPA	*Pollution Prevention Act*
RCRA	*Resource Conservation and Recovery Act of 1976*
ROI	Return On Investment
TRU	Transuranic Waste
TSCA	*Toxic Substances Control Act of 1976*
WAC	Washington Administrative Code
WPD	Waste Program Division

DEFINITIONS

Affirmative Procurement Program. A program that ensures that items composed of recovered materials will be purchased to the maximum extent practicable, consistent with Federal law and procurement regulations (*Resource Conservation and Recovery Act of 1976* [RCRA], Section 6002). Guidance on this program has been issued and is updated as the U.S. Environmental Protection Agency (EPA) issues additional guidelines.

Cleanup/Stabilization Waste. Cleanup/stabilization includes environmental restoration of contaminated media (e.g., soil, groundwater, surface water, sediments), stabilization of nuclear and non-nuclear (chemical) materials, and deactivation and decommissioning (including decontamination) of facilities.

Cleanup/stabilization waste consists of one-time operations waste produced from environmental restoration activities, including primary and secondary wastes associated with retrieval and remediation operations, "legacy wastes," and wastes from decontamination and decommissioning/transition operations. It also includes all *Toxic Substances Control Act of 1976* (TSCA) regulated wastes, such as polychlorinated biphenyl-contaminated fluids or equipment.

Cleanup/stabilization activities that generate wastes do not necessarily occur at a single point in time, but may last for several years while producing wastes. By definition, these activities are not considered to be routine (periodic and/or on-going), because *the waste is a direct result of past operations and activities,* rather than a current process. Newly generated wastes that are produced during these "one-time operations" are considered a secondary waste stream, and are accounted separately whenever possible. This secondary (newly generated) waste usually results from common activities such as handling, sampling, treatment, repackaging, shipping, etc.

Generator. Each contractor within the scope of the Pollution Prevention/Waste Minimization (P2/WMin) Program whose activities or processes produce waste.

Generator Group. As defined by the responsible contractor, any discrete activity, project, or facility whose act or process produces waste.

Goal. A specific result toward which efforts are directed.

Hazardous Substance. Any hazardous substance listed as a hazardous substance in the *Emergency Planning and Community Right-to-Know Act* and any further updates, and all ozone depleting compounds as defined by the *Montreal Protocol of October 1987* and any further updates of the protocol.

Hazardous Waste. Those solid wastes that exhibit any of the characteristics of hazardous waste identified in 40 Code of Federal Regulations (CFR) 261, Subpart C (e.g., ignitable, corrosive, reactive, acutely hazardous, or acutely toxic), that are listed as a dangerous waste in WAC 173-303, or that are listed in 40 CFR 261, Subpart D, "List of Hazardous Waste."

Low-Level Waste (LLW). Waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or spent nuclear fuel, or byproduct material as defined by U.S. Department of Energy (DOE) Order 5820.2A (DOE 1988a). Test specimens of fissionable material that are irradiated for research and development only, and not for the production of power or plutonium, may be classified as LLW, provided the concentration of transuranic is less than 100 nanocuries per gram (nCi/g).

Mixed Waste. Waste containing both radioactive and hazardous components as defined by the *Atomic Energy Act of 1954* and RCRA, respectively.

Non-Routine Waste. See Cleanup/Stabilization waste.

Pollution Prevention. The use of materials, processes, and practices that reduce or eliminate the generation and release of pollutants, contaminants, hazardous substances, and waste into land, water, and air. For DOE, this includes recycling activities.

Process Waste Water. Any water produced during manufacturing or processing operations that comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product. This determination is independent of the level and/or nature of the contaminants. Additionally, process waste waters are liquid wastes, which are piped directly to a permitted (onsite) waste treatment facility where treatment may consist of neutralization, evaporation, or placement in a settling or percolation pond, etc. This term does not include the liquid discharges to publicly owned treatment works that are governed by U.S. Environmental Protection Agency (EPA)- or state-issued national pollutant discharge elimination system permits, or local pretreatment standards.

RCRA-Regulated Waste. Solid waste, not specifically excluded from regulations under 40 CFR 261.4, "Identification and Listing of Hazardous Waste," or delisted by petition, that is either a listed hazardous waste (40 CFR 261.30 to 261.33) or exhibits the characteristics of a hazardous waste (40 CFR 261.20 to 261.24).

Recycling. Recycling techniques are characterized as reuse and reclamation techniques (resource recovery). **Use** or **reuse** involves the return of a potential waste material either to the originating process as a substitute for an input material or to another process as an input material. **Reclamation** is the processing or regeneration of a material to recover a useable product.

Routine Operations Waste. Normal operations waste produced from any type of production, analytical, and/or research and development laboratory operations; treatment, storage, or disposal operations; "work-for-others;" or any periodic and recurring work that is considered ongoing. The term "normal operations" refers to the type of ongoing process (e.g., production) not the specific activity that produced the waste. Periodic laboratory or facility clean-outs and spill cleanups that occur as a result of these processes are also considered normal operations.

Sanitary Waste. All non-hazardous and non-radioactive waste disposed in a sanitary landfill including demolition waste, industrial wastes, and wastes such as garbage generated by normal housekeeping activities.

Source Reduction. The elimination or reduction of waste generation at the source. Source reduction activities and techniques include substitution of less hazardous materials, process optimization or modification, technology changes and administrative changes (inventory control), and housekeeping practices (waste segregation). Source reduction results in reducing or eliminating potential waste material exiting from a process.

Spent Nuclear Fuel. Fuel that has been withdrawn from a nuclear reactor following irradiation, but that has not been reprocessed to remove its constituent elements.

State-Only Mixed Waste. A waste designated only by Washington Administrative Code (WAC) 173-303 and is not regulated as a hazardous waste under 40 CFR 261. This waste also contains radiological constituents governed under the Atomic Energy Commission.

State-Only Regulated Waste. Any other hazardous waste not specifically regulated under TSCA or RCRA, such as used oil, that may be regulated by Washington State Department of Ecology (Ecology) under WAC 173-303.

Transuranic Waste. Without regard to source or form, waste that is contaminated with alpha-emitting transuranium radionuclides with half-lives greater than 20 years and concentrations greater than 100 Nci/g at the time of assay. Heads of Field Elements can determine that other alpha contaminated wastes, peculiar to a specific site, must be managed as transuranic waste (DOE 1988a).

Treatment. Any method, technique, or process (including neutralization) designed to change the physical, chemical, or biological character or composition of any hazardous, radioactive, or sanitary waste so as to neutralize such waste, to recover energy or material resources from the waste, or to render such waste nonhazardous; safer to transport, store, or dispose; or amenable for recovery or storage; or reduced in volume.

TSCA-Regulated Waste. Hazardous chemical wastes, both liquid and solid, containing more than 50 parts per million of polychlorinated biphenyls (DOE 1996a).

Waste Reduction. Reduction of the total amount of waste that is generated and disposed of by DOE operations through waste minimization and treatment activities.

Waste Minimization. Elimination or minimization of the generation of waste before treatment, storage, or disposal. Waste minimization is any source reduction or recycling activity that results in (1) reduction of total volume of waste, (2) reduction of toxicity of waste, or (3) both, as long as that reduction is consistent with the general goal of minimizing present and future threats to human health and the environment.

1.0 OVERVIEW

Hanford's missions are to safely clean up and manage the Site's legacy wastes, and to develop and deploy science and technology. Through these missions Hanford will contribute to economic diversification of the region.

Hanford's environmental management or cleanup mission is to protect the health and safety of the public, workers, and the environment; control hazardous materials; and utilize the assets (people, infrastructure, Site) for other missions. Hanford's science and technology mission is to develop and deploy science and technology in the service of the nation including stewardship of the Hanford Site. Pollution Prevention is a key to the success of these missions.

Hanford's original mission, the production of nuclear materials for the nation's defense programs, lasted more than 40 years, and like most manufacturing operations, Hanford's operations generated large quantities of waste and pollution. However, the by-products from Hanford operations pose unique problems like radiation hazards, vast volumes of contaminated water and soil, and many contaminated structures including reactors, chemical plants and evaporation ponds.

The cleanup activity is an immense and challenging undertaking, which includes characterization and decommissioning of 149 single-shell storage tanks, treating 28 double-shell tanks, safely disposing of over 2,100 metric tons of spent nuclear fuel stored on site, removing numerous structures, and dealing with significant solid waste, ground water, and land restoration issues.

1.1 Purpose and Scope

The purpose of this plan is to specify the requirements for Hanford Site contractors to prevent pollution from entering the environment, to conserve resources and energy, and to reduce the quantity and toxicity of hazardous, radioactive, mixed and sanitary waste releases to the environment at the Hanford Site. The Pollution Prevention Awareness Program Plan required by DOE 5400.1 (DOE 1988b) is included in the Hanford P2/WMin Program.

The Hanford P2/WMin Program reflects the national and DOE waste minimization and pollution prevention goals and policies and represents an ongoing effort to make P2/WMin part of the Hanford Site operating philosophy.

In accordance with these policies, a hierarchical approach to environmental management has been adopted and is applied to all polluting and waste generating activities. Waste minimization through source reduction is the first priority in the Hanford P2/WMin Program, followed by environmentally safe recycling. Treatment to reduce the quantity, toxicity, and mobility of waste is considered only when source reduction or recycling are not possible or practical. Environmentally safe disposal is the last option.

This plan applies to all Hanford Site activities and operations. The Hanford Site contractors include Fluor Daniel Hanford, Inc. (FDH), as the management and integration contractor of the Project Hanford Management Contract (PHMC), Pacific Northwest National Laboratory (PNNL), Bechtel Hanford, Inc., (BHI), and the Hanford Environmental Health Foundation (HEHF). These Site contractors are expected to meet the requirements of this document. The Site contractors are responsible for administering P2/WMin guidance, instruction, and procedures for operations of any contractors or subcontractors working on the Hanford Site.

This plan will be reviewed annually and revised as necessary. At a minimum it will be revised every three years.

2.0 POLICY AND REGULATORY BACKGROUND

2.1 U.S. Department of Energy

The U.S. Department of Energy, Richland Operations Office (DOE-RL) Manager and senior management are committed to preventing pollution and minimizing the generation of waste. Top management will provide adequate personnel, budget, training, and material on a continuing basis to ensure that the objectives of the P2/WMin program are met.

The DOE-RL Manager has issued a written policy that establishes a commitment to implement an effective P2/WMin Program at the Hanford Site, the DOE *Pollution Prevention Program Plan* (DOE 1996a) and all applicable executive orders. The policy statement of policy is included in Appendix A of this plan.

2.2 Contractor P2/WMin Program

In accordance with the laws and policies, DOE orders, executive orders, regulatory requirements, and Washington State Administrative codes listed in Appendix B, FDH, BHI, PNNL, and HEHF shall develop and maintain a pollution prevention program that

- Documents a current P2/WMin implementation plan following the format and guidance established in this plan describing how the contractors' plan to achieve the P2/WMin requirements
- Includes a written and issued policy addressing affirmative procurement and P2/WMin and how they plan to achieve the requirements in these areas
- Includes written and issued implementation plans
- Implements the 1996 *Pollution Prevention Program Plan* (DOE 1996a) and other U.S. Department of Energy-Headquarters (DOE-HQ) documents that provide the principal guidance and strategy for fully implementing a pollution prevention program
- Is reviewed annually and updated at least every three years
- Provides pollution prevention guidance, instructions, and procedures applicable to the operations of any subcontractors working onsite.

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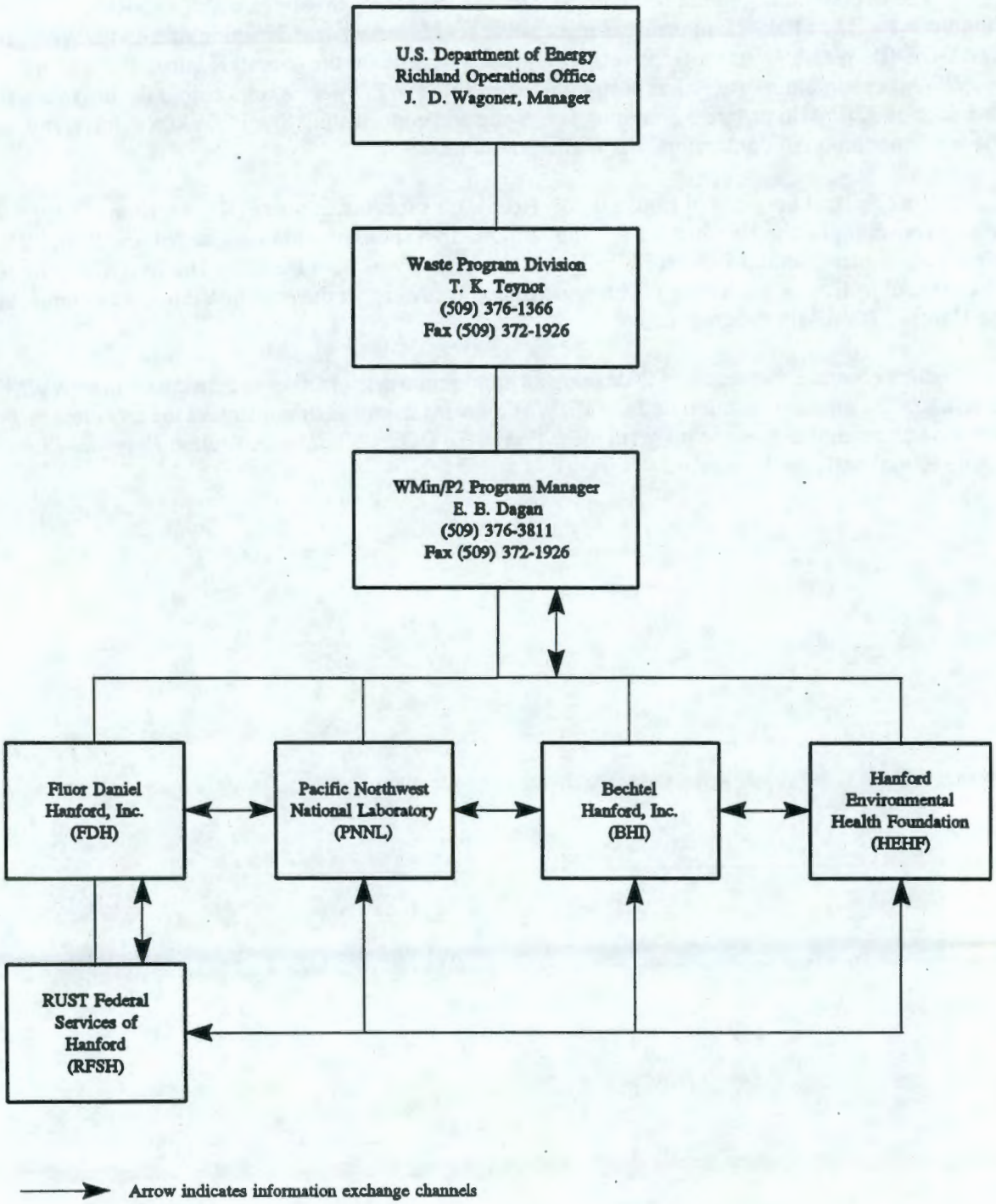
3.0 ORGANIZATIONAL STRUCTURE

The overall management responsibility for the Hanford Site resides with DOE-RL (Figure 3-1). The DOE-RL manager is responsible for leadership and direction of Site P2/WMin efforts. The DOE-RL Waste Program Division (WPD) is responsible for the overall Hanford P2/WMin program. A P2/WMin program manager has been established in the WPD who is responsible for the oversight and interface of P2/WMin program activities, reviewing and coordinating Site P2/WMin efforts, and ensuring the implementation of contractors' P2/WMin programs.

Rust Federal Services of Hanford, Inc. (RFSH), a subcontractor to FDH, has been assigned the lead role in coordinating the Hanford P2/WMin Program. In response to this assignment, the RFSH WMin organization meets regularly with DOE-RL and representatives from the other Hanford Site contractors. The main objective of the RFSH WMin organization is to support the coordination and implementation of the Hanford P2/WMin Program activities.

Each contractor is required to develop an appropriate organization to administer the P2/WMin program. The primary function of these P2/WMin organizations is to implement the key elements of the Sitewide or generator-specific program identified in the DOE *Pollution Prevention Program Plan* (DOE 1996a) and this document.

Figure 3-1. Hanford P2/WMin Program Organizational Chart.



4.0 PROGRAM OBJECTIVES/GOALS

A P2/WMin program shall be developed that implements the eighteen elements of the P2/WMin Activity Plan outlined in the 1996 *Pollution Prevention Program Plan* (DOE 1996a), identified below and discussed in Section 5.0. Eighteen activities are interdependent and are necessary to sustain a P2/WMin program that meets regulatory, DOE, and State requirements while achieving reductions in waste generation and releases to the environment.

4.1 Objectives to be Immediately Implemented

The following six activities are to be implemented by FY 1998. Implementation will allow the Hanford Site to focus resources on the most critical aspects of the P2/WMin program to achieve the waste reductions specified by the Secretary. The six activities are:

- Establish senior management commitment
- Set quantitative source reduction and recycling goals
- Institute performance measures
- Implement cost-saving pollution prevention projects
- Design pollution prevention into new products, processes, and facilities
- Ensure that programs comply with federal, state, and departmental directives.

4.2 Near-Term and Outyear Objectives

Implementation of the six near-term and six outyear activities will continue the development and strengthening of the Hanford P2/WMin Program that has not only reduced waste generation but has reduced environmental impacts and risks as well as the mortgage and support costs related to future waste management activities.

The six activities designated as near-term are the following:

- Implement consistent generator-specific pollution prevention programs
- Reduce releases of toxic chemicals
- Establish pollution prevention budgets
- Perform pollution prevention cost-benefit analyses
- Facilitate technology transfer and information exchange
- Implement pollution prevention employee training and awareness programs.

The six activities designated as out-year are the following:

- Implement environmentally sound pollution prevention procurement practices
- Integrate pollution prevention into research, development, demonstration, testing, and evaluation programs
- Ensure consistent policies, orders, and procedures
- Implement pollution prevention outreach and public involvement
- Develop pollution prevention incentives programs
- Promote regulatory review and reform.

The near term objectives are to be implemented by FY 1999, and the out-year objectives are to be implemented by FY 2000.

4.3 Goals

Establishing goals is essential to a successful P2/WMin program. Goals provide management with tangible targets and provide a basis for measuring progress. The Secretary of Energy, in a May 1996 memorandum (DOE 1996b), established waste reduction, recycling, and affirmative procurement goals for the DOE complex. This memorandum is presented in Appendix C.

Specific goals were established at Hanford to meet the Secretary of Energy goals. Listed below and in Table 4-1 are the Hanford Site waste reduction, recycling, and affirmative procurement goals for FYs 1997, 1998, and 1999.

- The reduction goal for the Toxic Chemical Release Inventory from the 1993 baseline, is a 50 percent reduction for FYs 1997, 1998, and 1999.
- The reduction goals for low level waste, hazardous wastes generated from routine operations, are 50 percent reductions from the 1993 baseline, for FYs 1997, 1998, and 1999.
- The reduction goals for mixed low level waste generated from routine operations from the 1993 baseline are 3 percent for fiscal year 1997 and 50 percent for FYs 1998 and 1999.
- The reduction goal for sanitary waste generated from routine operations from the 1993 baseline is 33 percent for FYs 1997, 1998, and 1999.
- The goal for sanitary waste recycled in FYs 1997, 1998, and 1999 will be 33 percent.
- In FY 1997, the total purchase of EPA-designated recycled products goal will be 60 percent. In FYs 1998 and 1999, the total purchase of EPA-designated recycled products goal will be 100 percent.

Prior to FYs 1998 and 1999, the above goals will be re-evaluated.

In addition to the above goals, annual quantitative waste reduction goals will be established for cleanup/stabilization wastes generated by construction activities, transition projects conducting deactivation activities, and waste resulting from stabilization of nuclear and non-nuclear (chemical) materials. For each waste type (i.e., LLW, MLLW, TRU, MTRU, RCRA, and State), the waste generation projection for the upcoming year should be used as the baseline.

Annual quantitative goals shall be established for cleanup activities such as decontamination and decommissioning, contaminated site cleanup, and legacy wastes. Areas to consider are recycling/reuse goals to reduce secondary wastes requiring disposal. Goals to reduce mixed waste, via segregation, should be considered. The baseline for the goal shall utilize the waste generation projection for the upcoming year.

Site HANFORD

Table 4-1
Pollution Prevention Waste Reduction Goals
from 1997 to 1999
Using 1993 Quantities as a Baseline*

Cat.	Goal	1993 (Baseline)**	Projected 1997 Goal		Projected 1998 Goal		Projected 1999 Goals		By 12-31-99
		Qty***	Qty***	% Reduction	Qty***	% Reduction	Qty***	% Reduction	DOE Reduction Goals
ROUTINE	Reduction of Toxic Chemical Release Inventory	14 lb	0 lb	50	7 lb	50	7 lb	50	50%
	Reduction of Low-Level Radioactive Waste Generation	3865	1932	50	1932	50	1932	50	50%
	Reduction of Low-Level Mixed Waste Generation	492	475	3	246	50	246	50	50%
	Reduction of Hazardous Waste Generation	217	108	50	108	50	108	50	50%
	Reduction of Sanitary Waste Generation	7660	5132	33	5132	33	5132	33	33%
ALL	Increase Sanitary Waste Recycling % = Recycled Amount x 100 / San. Waste + Recycled			33		33		33	33%
	Increase Affirmative Procedure of EPA-Designated Recycled Products			60 % of total purchases		100 % of total purchases		100 % of total purchases	100%

*Hanford Site goals are based on the fiscal year
**From *Annual Report on Waste Generation and Pollution Prevention Progress 1994* (DOE 1996c)
***Radioactive and mixed waste are reported in cu. meters, and hazardous and sanitary wastes are in metric tons.

5.0 SITE PROGRAM DESCRIPTION

For the Hanford Site to have a successful P2/WMin program and meet goals and objectives, the activities below must be incorporated into the FDH, BHI, and PNNL P2/WMin programs.

5.1 Establishment of Senior Management Commitment

Strong and visible senior management is necessary for a successful P2/WMin program. To demonstrate their commitment each Site contractor shall issue a P2/WMin policy that clearly defines expectations, goals, accountability, and the providing of adequate resources.

5.2 Institute Performance Measures

Pollution prevention performance measures provide essential feedback on progress made toward achieving goals. They also allow for program readjustment if progress is considered inadequate. In order to provide the Hanford Site progress toward meeting the Secretary of Energy's goals, the Hanford Site P2/WMin coordinator (RFSH) will develop and issue quarterly performance measures. These performance measures are listed below:

Performance Measures For Routine Operations

- Volume of radioactive waste reduced
- Volume of mixed waste reduced
- Weight of hazardous and sanitary waste reduced
- Weight of EPCRA 313 toxic chemical releases and off-site transfers reduced.

Performance Measures For All Operations (Routine and Cleanup/Stabilization)

- Percentage of sanitary waste recycled
- Percentage of total dollars spent on purchasing 24 EPA-designated products containing recovered materials.

5.3 Perform Pollution Prevention Opportunity Assessments and Implement High Return-on-Investment P2/WMin Projects

Source reduction and recycling goals can be achieved when P2 projects are aggressively implemented. Performance of pollution prevention opportunity assessments (P2OA) provide the first step in identifying cost-effective techniques to reduce waste generation and pollutants. Each Site contractor will annually conduct P2OAs, in accordance with the guidance provided in *Pollution Prevention Opportunity Assessments: A Training and Review Guide* (DOE-RL 1996a) as part of an ongoing program to identify, screen, and analyze P2/WMin options which promote cost savings. Each contractor should evaluate the opportunities resulting from the P2OAs conducted, prepare P2 proposals that provide a high return on investment (ROI) through reducing waste and associated management costs and submit them to DOE-RL for approval. Guidance for preparing ROI proposals and the acceptance criteria for an ROI proposal are addressed in *Return on Investment (ROI) Proposal Preparation Guide* (DOE-RL 1997).

5.4 Design Pollution Prevention Into New Products, Processes, and Facilities

The Site waste generating activities are examined periodically for replacement, reformulation, reduction, or elimination of hazardous or other raw materials. According to DOE Orders 5820.2A and 430.1 and Washington Administrative Code requirements, P2/WMin must be considered when designing new facilities or modifying existing facilities. P2/WMin must also be considered when installing new equipment or modifying existing equipment. Design for pollution prevention should encompass the entire life cycle of a project. Each contractor shall ensure P2/WMin is considered when designing new facilities or modifying existing facilities.

The guidance for conducting pollution prevention assessments on design projects is, *Waste Minimization/Pollution Prevention Good Practice Guide*, (DOE 1996d).

5.5 Develop and Maintain Site Pollution Prevention Programs that Comply with Federal, State and Departmental Directives

Certain Site activities must be performed to comply with Federal, State, and Departmental directives. Such activities include Sitewide coordination, planning, reporting, training, employee awareness, assessments, and recycling and affirmative procurement programs. Each contractor shall ensure that their P2/WMin program incorporate these requirements.

5.6 Waste Minimization/Pollution Prevention Techniques

As stated above, the Hanford Site P2/WMin Program uses a hierarchical approach to environmental management, placing primary importance on source reduction efforts to prevent pollution and eliminate or reduce the generation of waste. Potential pollutants and wastes that cannot be eliminated or minimized are

evaluated for recycling. Treatment to reduce the quantity, toxicity, or mobility of waste before storage or disposal will be considered only when prevention or recycling are not possible or practical. Environmentally safe disposal is the last option.

The techniques discussed below will be employed by the Site contractor to prevent pollution and minimize the generation of waste.

5.6.1 Inventory Management

Inventory management or control techniques will be used to reduce waste resulting from excess or out of date chemicals and hazardous substances. Where necessary, techniques will be implemented to reduce inventory size of hazardous chemicals, size of containers, and amount of chemicals, while increasing inventory turnover.

Excess chemicals that are still viable will be handled through the excess chemical program. Material control shall also be revised or expanded to reduce raw material and finished product loss and damage during handling, production, and storage. The inventory management techniques shall be applied to waste material as well as to raw materials and finished products.

The review of inventory management techniques includes determining:

- How existing inventory management procedures can be applied more effectively
- Whether new techniques should be added to or substituted for current procedures
- If the review and evaluation approval procedures for the purchase of materials should be revised
- If additional employee training in the principles and inventory management is needed
- How specifications for the review and revision of procurement limit the purchase of environmentally sound products
- How to increase the purchase of recycled products.

5.6.2 Maintenance Program

Equipment maintenance programs shall be periodically reviewed to determine whether improvements in corrective and preventive maintenance can reduce equipment failures that generate waste. The methods for maintenance cost tracking and preventive maintenance scheduling and monitoring will be

examined. Maintenance procedures will be reviewed to determine which are contributing to the production of waste in the form of process materials, scrap, and cleanup residue, and the need for revising operational procedures, modifying equipment, and source segregation and recovery will be determined.

5.6.3 Recycling and Reuse

Recycling of all types of waste shall be considered. Opportunities for reclamation and reuse of waste materials will be explored whenever feasible. Decontamination of tools, equipment, and materials for reuse or recycle will be used as possible to minimize the amount of waste for disposal. Impediments to recycling, whether regulatory or procedural, should be challenged to enable generators to recycle whenever possible.

5.6.4 Segregation

When waste is generated, proper handling, containerization, and segregation techniques will be employed to minimize contamination resulting in the generation of unnecessary waste.

5.6.5 Work Planning

Pre-job planning will be completed to determine what materials and equipment are needed to perform all other required work onsite. One objective of this planning is to prevent pollution and minimize the amount of waste that may be generated and to use only what is absolutely necessary to accomplish the work. Planning shall also be done to prevent mixing of materials or waste types.

5.7 Pollution Prevention Reporting and Tracking

5.7.1 Pollution Prevention Documentation Reporting Systems

Hanford Site contractors or Hanford Site contractor waste generator groups shall prepare, maintain and submit the program documentation and reports required in the *Hanford Site Guide for Preparing and Maintaining Generator Group Pollution Prevention Program Documentation* (DOE-RL 1996b).

5.7.2 Pollution Prevention Tracking Systems

If not available, each Hanford Site contractor shall develop a tracking system to identify waste generation data and pollution prevention opportunities in order to provide essential feedback to successfully guide future efforts. The data collected by the system will be used for internal reporting, will

be capable of providing feedback on the progress of the Pollution Prevention Program, including the results of the implementation of pollution prevention technologies, and will facilitate reporting pollution prevention data and accomplishments to the DOE, EPA, and Washington State Department of Ecology (Ecology).

The system shall track waste from point of generation to point of final disposition (cradle to grave). The system shall also permit the tracking of hazardous substances from the point of Site entry to final disposition to comply with environmental regulations and reporting requirements. The system should collect data on input material, material usage, type of waste, volume, hazardous constituents, generating system, generation date, waste management costs, and other relevant information.

5.8 Reduce Releases of Toxic Chemicals

Reduction of releases of toxic chemicals is addressed as a Site goal in Section 4.3.

5.9 Establish Pollution Prevention Budgets

Sufficient funding is an essential aspect of managing a P2/WMin program. Each Site contractor shall develop budgets for the activities that will help the contractor generator groups achieve the eighteen objectives. Separate identifiable funding shall be established within individual cost account plans at the cost account plan, work, or task package level, depending on the contractor funding needs.

The Sitewide program is funded directly from DOE-Headquarters. In the majority of the cases, the funding required for pollution prevention activities by generator groups is too small to require individual budget requests. Generator groups are required to integrate pollution prevention into proposed projects that will generate waste. Generator groups will also maintain program budgetary documentation as discussed in the *Hanford Site Guide for Preparing and Maintaining Generator Group Pollution Prevention Program Documentation* (DOE-RL 1996b).

5.10 Perform Pollution Prevention Cost-Benefit Analyses

If life cycle costs for the Hanford Site are not available, a system shall be developed by each contractor that accounts for the "true cost" of waste that is generated by the company and permits meaningful reviews and audits to be conducted.

The system should consider the fixed and variable costs arising from:

- Under use of raw materials found in the waste stream

- Management of the wastes that are generated
- Waste disposal
- Third-party liabilities if the waste is improperly disposed.

Associated costs will include personnel, record keeping, transportation (including onsite movement), pollution control equipment, treatment, storage, disposal, liability, compliance, and oversight costs.

The costs derived from the cost accounting system will be included in proposals, planning, and budgeting. Departments and managers should be accountable for the "true" waste management costs for the wastes they generate.

5.11 Facilitate Technology Transfer and Information Exchange

Hanford's missions are to safely clean up and manage the Site's legacy wastes and to develop and deploy science and technology. The core requirement of the technology transfer is implementation of the *National Competitiveness Technology Transfer Act of 1989* (Public Law 101-189). Activities involving technology transfer should be referred to contractor technology transfer organizations. These organizations are directed to coordinate all available technology transfer mechanisms including management of intellectual property, negotiating licenses, entering into CRADAs, and forming partnerships with private-sector business for commercialization of Hanford technologies to optimize support for both the Hanford cleanup mission and local and regional economic development.

Technology transfer also supports the Hanford cleanup mission by identifying and assisting facilities to acquire state-of-the-art technologies, and those requiring additional development, to meet specific cleanup challenges. Opportunities for transfer of technologies specific to P2/WMin programs may develop from information exchange systems, workshops, or topical conferences. Direct exchanges of technologies among facilities may be acceptable but the technology transfer organizations should be consulted to ensure proper handling of intellectual property.

All program staff are encouraged to make regular use of the DOE Energy Pollution Prevention Information Clearinghouse. Contractors also participate in business, education, and government forums that are designed to provide technical assistance and exchange P2/WMin information. Also, onsite meetings will be held to promote information exchange.

5.12 Implement Pollution Prevention Awareness Programs

A successful P2/WMin program requires employee commitment. By educating employees in the principles and benefits of P2/WMin, solutions to current and potential environmental management

problems can be found. The broad objective of pollution prevention awareness is to educate Site employees in all environmental aspects of activities occurring at the Hanford Site, in their community, and in their homes. Each contractor shall define and implement a pollution prevention awareness program that incorporates the following:

- Make employees aware of general environmental activities and hazards at the Site and pollution prevention program requirements, goals, and accomplishments
- Inform employees of specific environmental issues
- Train employees on their responsibilities in pollution prevention
- Recognize employees for efforts to improve environmental conditions through pollution prevention
- Encourage employees to participate in pollution prevention.

Each contractor shall develop a pollution prevention awareness program through specific training, special awareness campaigns, and incentive and award programs.

5.13 Implement Environmentally Sound Pollution Prevention Procurement Practices

Each contractor shall implement procurement practices that ensure compliance with regulatory, state, and executive orders, and other requirements for the purchase of recycled and energy efficient products and include the elimination of the purchase of ozone depleting substances and minimize the purchase of hazardous substances.

5.14 Integrate Pollution Prevention Into Research, Development, Demonstration, Testing, and Evaluation Programs

Some P2OA options may require development work before being implemented. The assessments may also identify process inefficiencies that offer the potential for significant waste reduction, but specific process modifications may require R&D work before implementation can be scheduled. Funding requests should be coordinated through the Technology Development Program (EM-50).

5.15 Assure Consistent Policies, Orders, and Procedures

Existing procedures for Site activities will be reviewed by Site contractors to determine whether the elimination or revision of procedures can contribute to the reduction of waste. This will include incorporating P2/WMin into all appropriate onsite work procedures. Changes to procurement procedures

to require affirmative procurement of EPA designated recycled products and reduction of procurement of ozone-depleting substances will also be made by Site contractors in accordance with executive order requirements and the DOE affirmative procurement goals.

In addition, each contractor shall review procedures for control and purchase of hazardous substances to determine whether less harmful materials may be used. All other applicable procedures will be reviewed and revised to include P2/WMin. The revision and review of procedures for P2/WMin opportunities will be fully documented and incorporated as part of Hanford Site employee training programs.

5.16 Implement Pollution Prevention Outreach and Public Involvement

Each contractor shall communicate waste minimization successes and information to employees and the community through outreach, and public involvement will assist in establishing public confidence and trust, increase awareness of environmental issues, and promote the reduction of waste. In addition, the Site contractors are encouraged to participate in the organizing of activities such as Earth Day and the local schools' Ambassadors program, as well as, publish information externally to help increase awareness and public trust. Public and stakeholder participation should also be sought for projects and program elements to encourage community involvement and to develop a broad base of input and understanding of relevant pollution prevention issues.

5.17 Develop Pollution Prevention Incentives Programs

Incentives are necessary to stimulate and maintain interest in changing processes and activities. As addressed in Section 5.12, "Implement Pollution Prevention Awareness Programs," each contractor shall develop programs to recognize an individual's or organization's pollution prevention achievements and suggestions that improve and promote P2/WMin.

5.18 Promote Regulatory Review and Reform

DOE orders, regulatory and state requirements, though providing significant benefits to the public, can sometimes hinder P2/WMin initiatives. Conservative requirements at times result in expensive treatment and disposal for waste that could otherwise be recycled, reused, or handled by commercial treatment and disposal facilities. Risks associated with hazardous and radioactive wastes need to be evaluated considering the latest scientific evidence. The contractors shall identify to DOE-RL and to DOE-HQ potential changes in regulations that would promote cost effective P2/WMin as opposed to expensive treatment, storage, or disposal practices.

6.0 RESOURCES AND PROGRAM EVALUATION

6.1 Resources

Hanford Site contractors must ensure resources are committed to meet the requirements outlined in this plan and specified contractually.

6.2 Program Evaluation

Each Hanford Site contractor shall evaluate their P2/WMin program periodically and report the findings to DOE-RL. This information will be used to establish future P2/WMin goals and program objectives. The information will also be used to determine changes to this plan.

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7.0 REFERENCES

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APPENDIX A

U.S. DEPARTMENT OF ENERGY-RICHLAND OPERATIONS OFFICE POLLUTION PREVENTION POLICY

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RL-F-1321.9/ DEF049
(04/93)

ANNOUNCEMENT

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

RL No.: 94-83

Issued: MAY 6 1994

To: All RL and Contractor Employees

Subject: POLLUTION PREVENTION POLICY

On August 3, 1993, the President signed Executive Order 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements." The issuance of this Executive Order and others enumerated below represents a major initiative on the part of the President to proclaim the Federal Government's role as the national leader in pollution prevention. I, too, am firmly committed to ensuring incorporation of all departmental and national pollution prevention goals in the daily conduct of our business.

Pursuant to requirements set forth in Executive Order 12856, it is the policy of the U.S. Department of Energy, Richland Operations Office (RL), to manage all Hanford Site facilities and operational activities in a manner that will reduce the generation of wastes and eliminate or minimize pollutants released to environmental media. To execute this policy, RL and Hanford Site contractor personnel shall incorporate waste minimization and pollution prevention performance measures and goals into all programmatic and operational activities including, but not limited to, the design, construction, and operation of new facilities, new product acquisition, the decontamination and decommissioning of surplus facilities and other waste generating activities including site environmental restoration and remediation work.

As a part of the implementation process, RL and Hanford Site contractors will follow the four-point priority system instituted by the Pollution Prevention Act of 1990. Additionally, Executive Order 12856 directs that voluntary goals be set to reduce total releases and the offsite transfer of Toxic Chemical Release Inventory chemicals reported under the Emergency Planning and Community Right-to-Know Act (EPCRA). RL and Hanford Site contractors will develop plans and goals to eliminate or reduce unnecessary acquisition of products containing extremely hazardous substances or toxic chemicals and to delineate progress in reaching these goals in yearly progress reports to my Office of Environmental Assurance, Permits, and Policy.

RL and Hanford Site contractors will also comply with Executive Order 12873, issued October 21, 1993, which requires federal agencies to expand waste prevention and recycling programs, implement affirmative procurement programs for recycled and energy efficient materials including the procurement of other environmentally preferable products and services.

RL and Hanford Site contractors will implement Executive Order 12843, issued April 21, 1993, which requires federal agencies to minimize and allow for phaseout of Class I and II ozone-depleting substances.

In conclusion, RL and Hanford Site contractors will establish performance measures and goals in accordance with these Executive Orders and consistent with previous pollution prevention and waste minimization requirements contained in the 1993 Department of Energy Waste Minimization/Pollution Prevention Crosscut Plan, the Pollution Prevention Act of 1990, the Resource Conservation and Recovery Act (RCRA), 40 Code of Federal Regulations Part 264, the Washington Administrative Code Chapters 173-303 and 173-307, and DOE Orders 5400.1 and 5820.2A.

Recognizing that pollution prevention will be strengthened in the future through the U.S. Environmental Protection Agency, the State of Washington, DOE Headquarters waste minimization guidance, and DOE Orders, we must try harder to achieve leadership in this discipline. Pollution prevention must become an integral part of the way work is performed at the Hanford Site. Your contribution is necessary for achievement of environmental excellence at Hanford.

I have assigned the responsibility of ensuring compliance with this policy to the Office of Environmental Assurance, Permits, and Policy. An implementing procedure will follow. Please contact Ellen Dagan, Manager of the Pollution Prevention Program, on 376-3811 if you have questions or need further information.

John D. Wagoner
Manager

Distribution
"D"

APPENDIX B

LEGAL AND POLICY BACKGROUND

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The following table provides the key and regulatory drivers that require the P2/WMin Program and its elements.

Function	Driver	Effect
Federal Procurement Guidelines	Resource Conservation and Recovery Act (RCRA) 40 CFR 247	Encourages procurement of recovered materials by the Federal Government
Generator Manifest Certification	RCRA 40 CFR 262, 264-265	Requires generator to put in place a hazardous waste minimization program
Generator Biennial Report Certification	RCRA 40 CFR 262, 264-265	Requires generator to put in place a hazardous waste minimization program
Part B Permit Conditions	RCRA	Requires generator to put in place a hazardous waste minimization program
Liability Insurance Requirements	RCRA	Generator and facility owners and operators reduce liability by reducing waste
Land Disposal Restrictions	RCRA	Increases the cost of waste management
Exclusion to the Toxicity Characteristic	RCRA	Minimizes chlorofluorocarbon (CFC) venting and encourages recycling
Waiver of Sovereign Immunity under RCRA	Federal Facilities Compliance Act (FFCA)	Government is subject to all RCRA requirements with a 3 year delayed effective date for mixed waste storage
Mixed Waste Minimization Reporting	FFCA	National inventory of all mixed waste including description of waste minimization actions
Toxic Release Inventory Reporting	Emergency Planning and Community Right-to-Know Act (EPCRA)	Establish reporting requirements for the use, storage, and on-site and off-site transfers of hazardous and toxic chemicals
National Policy	Pollution Prevention Act (PPA)	Declared pollution prevention as the first choice in environmental management
Toxic Release Inventory Reporting	PPA	Expands SARA 313 reporting requirements to include source reduction and recycling information
Increased Reporting Requirements	PPA	Increases public access to information, stimulating citizen enforcement and holds industry to stricter standards

Function	Driver	Effect
CERCLA Financial Liability	Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	Generators reduce future liability by reducing waste
National Ambient Air Quality Standards	Clean Air Act (CAA)	Promotes cutting emissions of six hazardous air pollutants
New Source Performance Standards	CAA	New plants must conform to strict emission requirements
Phased-In Requirements	CAA	Firms must meet new, more restrictive air emission standards
Early Reductions Program	CAA	Compliance extensions for voluntary early reductions of hazardous air pollutants
Maximum Achievable Control Technology (MACT)	CAA	Directs EPA to consider pollution prevention technologies when selecting MACT
Clean Fuel Fleet Program	CAA	Requirement to meet clean-fuel fleet vehicle emissions standards
Protection of Stratospheric Ozone	CAA	Phase-out of CFCs, halons, and carbon tetrachloride by 2000; limit on emissions of ozone-depleting substances during the servicing, use and disposal of equipment containing those substances
Minimization Certification	Clean Water Act (CWA)	Requires a plan for industrial firms to diminish the volume and toxicity of their hazardous discharges
Radiation Protection Programs	10 CFR 835	Requires the establishment of goals and performance indicators for the minimization of radioactive waste. It also requires a waste minimization program that will reduce the generation of radioactive waste and spread of contamination from Contamination, High Contamination or Airborne Radioactivity Areas.
Significant New Use Notification	*Toxic Substances Control Act of 1976* (TSCA)	Makes firms legally responsible to EPA for voluntary waste minimization commitment
Bans on Chemical Substances	TSCA	Eliminates feedstocks responsible for certain waste streams

Function	Driver	Effect
Handling and Transportation Requirements	Hazardous Materials Transportation Act (HMTA)	Safety requirements raise costs of transporting waste
Handling Requirements	Occupational Safety & Health Act (OSHA)	Safety requirements raise costs of transporting waste
Environmental Taxes	Revenue Reconciliation Act (RRA)	Taxes on ozone-depleting chemicals
Research and Development Tax Credits	Tax Reform Act (TRA)	Provides for a tax credit for increasing investment in research and development of processes and products that reduce waste
Stormwater Pollution Prevention Plan	CWA	Requires that industrial stormwater discharge facilities have an on-site pollution prevention plan
General Environmental Protection Program	DOE 5400.1	Requires P2/WMin Plans, Annual Waste Reduction Reports, and a Pollution Prevention Awareness Program
Radioactive Waste Management	DOE 5820.2A	Requires Waste Management Plans including actions to minimize radioactive waste generation
Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements	Executive Order (EO) 12856 (August 3, 1993)	Requires development of a pollution prevention strategy and agency development of a 50 percent reduction goal in toxic chemicals releases by the of 1999
Federal Acquisition Recycling, and Waste Prevention	EO 12873 (October 21, 1993)	Promotes reductions in waste generation through recycling and the use of recycled and energy efficient materials
Procurement Requirements and Policies for Ozone-Depleting Substances	(EO) 12843 (April 21, 1993)	Requires that Federal agencies minimize and allow for phaseout of Class I and II ozone-depleting substances
Federal Use of Alternative Fueled Vehicles	EO 12844 (April 21, 1993)	Stimulates the availability, acquisition, and use of alternatively-fueled vehicles for Federal agencies
Requiring Agencies to Purchase Energy Efficient Computer Equipment	EO 12845 (April 21, 1993)	Requires that all acquisitions of microcomputers meet "EPA Energy Star" requirements for energy efficiency

Function	Driver	Effect
Energy Efficiency and Water conservation at federal facilities	EO 12902 (March 8, 1994)	Requires to reduce energy and water consumption from Fiscal Year (FY) 1995-2005 according to established baselines.
Dangerous Waste Regulations	WAC 173-303	Requires generator certification that a waste minimization program is in place for hazardous waste.
National Policy	Energy Policy Act	Promotes energy conservation and efficiency and promote renewable energy.
Directs specific percentage waste reduction by waste type	Letter from Secretary O'Leary dated May 3, 1996	Requires site-specific P2 goals be established and progress be tracked.
Principal Guidance to fully implement P2 Program	DOE-HQ 1996 Pollution Prevention Program Plan	Provides contractors with specific steps to meet DOE's pollution prevention commitments.

APPENDIX C

SECRETARIAL MEMORANDUM: DEPARTMENT POLLUTION PREVENTION GOALS

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MEMORANDUM FOR HEADS OF DEPARTMENTAL ELEMENTS

FROM: HAZEL R. O'LEARY

SUBJECT: Departmental Pollution Prevention Goals

The Department of Energy pollution prevention strategy is to reduce the generation of all waste streams and thus minimize the impact of departmental operations on the environment. Preventing pollution also reduces risks to the health and safety of workers and the general public and saves scarce budget dollars. To demonstrate the Department's commitment to pollution prevention, we have set the following goals to be achieved by December 31, 1999, using calendar year 1993 as a baseline year.

For Routine Operations:

- Reduce by 50 percent the generation of radioactive waste.
- Reduce by 50 percent the generation of low-level mixed waste.
- Reduce by 50 percent the generation of hazardous waste.
- Reduce by 33 percent the generation of sanitary waste.
- Reduce by 50 percent total releases and off-site transfers for treatment and disposal of toxic chemicals.

For All Operations, Including Cleanup/Stabilization Activities:

- Recycle 33 percent of sanitary waste.

For Affirmative Procurement:

- Increase procurement of Environmental Protection Agency-designated, recycled products to 100 percent, except where they are not commercially available competitively at a reasonable price or do not meet performance standards.

Operations Offices will direct sites under their purview to set site-specific goals to assist in achieving the departmental goals. Progress toward meeting the departmental goals will be reported annually to me. It is the responsibility of each Federal and contractor manager to work diligently to meet these goals; to aggressively seek ways to reduce the amount of pollutants generated within the workplace; and to conserve, reuse, and recycle resources.

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