

Hanford Site Waste Minimization and Pollution Prevention Awareness Program Plan

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HANFORD SITE WASTE MINIMIZATION AND POLLUTION PREVENTION

AWARENESS PROGRAM PLAN

1.0 OVERVIEW

1.1 Background

The Hanford site consists of 1,450 km² (560 square miles) of semi-arid land along the Columbia River in southeastern Washington. The DOE facilities are located throughout this site and the City of Richland (Figure 1).

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 operations generated waste, pollution, and contamination. 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.

Defense production at Hanford in the 1970s resulted in a huge amount of spent nuclear fuel - almost 80 percent of the DOE's national inventory. About 2,100 metric tons of this (4.62 million pounds) is in the form of fuel slugs stored underwater at K-Basins in two huge, 40-year-old, storage reservoirs just 380 meters (414 yards) from the Columbia River. The other spent fuel at Hanford, about 32.7 metric tons (36 tons), is stored at five other facilities.

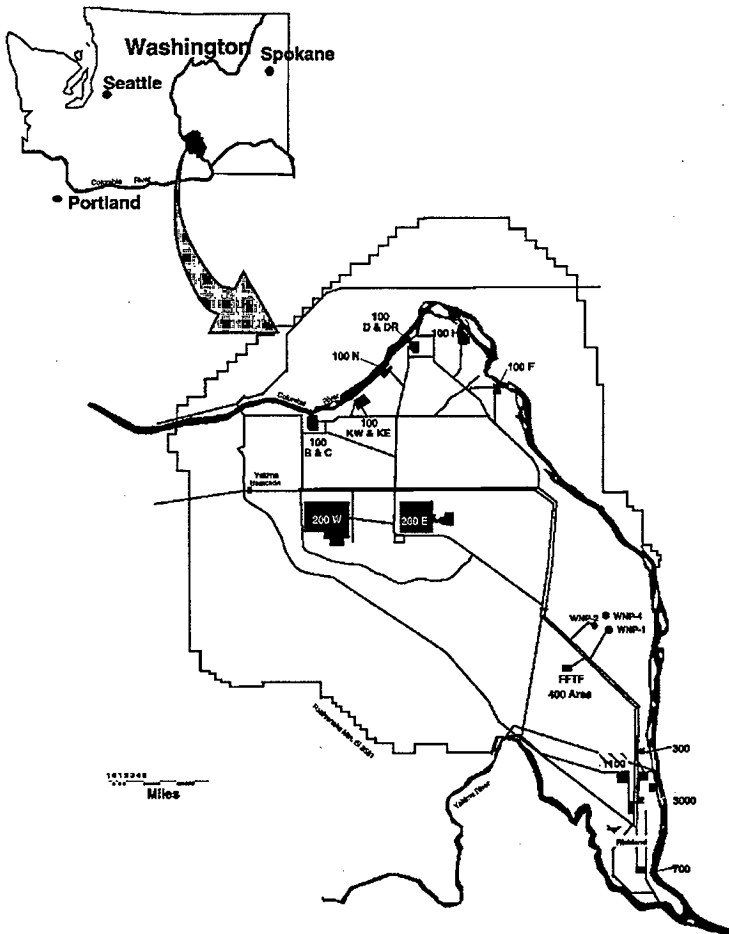
Until 1970, all radioactive solid waste generated on this site was buried. Since then, solid waste believed to contain transuranic material (radioactive elements requiring long-term isolation) has been separated from other solid waste and stored so that it can be retrieved. Today, more than twenty-four thousand 208-liter (55-gallon) drums containing transuranic wastes and transuranic mixed-wastes are kept inside 17 buildings. Hanford's 1.74 kilometers (433 acres) of trenches contain solid waste, low-level waste, and transuranic materials buried since 1970.

Highly radioactive, liquid, chemical defense wastes have also accumulated at Hanford since World War II. The most toxic wastes, currently about 216,000 cubic meters (57 million gallons) from reprocessing operations, are stored in 177 large underground tanks near the center of the site.

From the late 1960s to mid 1980s, Hanford extracted highly radioactive strontium and cesium from this tank waste, and made about 2,100 capsules 52 centimeters (two feet) long from the strontium and cesium. These capsules are currently stored in pools of water on the site. They ultimately will be packaged for disposal in a federal geologic repository when it is available.

The cleanup of Hanford is governed by an agreement signed in 1989 between the DOE, the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology.

Figure 1. Location and Regional Map of the Hanford Site.



This document, called the Tri-Party Agreement, outlines a plan to clean up the site by the year 2028. Milestones in the agreement are focused on bringing Hanford into compliance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). Many dramatic and significant changes have taken place at Hanford since its mission changed from production to cleanup with the signing of the original Tri-Party Agreement in 1989.

In support of the site's primary mission, the purpose of this plan is to respond to and comply with the pollution prevention and waste minimization regulations, executive orders, DOE orders, and policies. The regulatory and policy requirements for pollution prevention (P2) and waste minimization (WMin) include those shown below in Figure 2.

Figure 2. Legal and Policy Background.

The following tables provide 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

Function	Driver	Effect
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
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.

Function	Driver	Effect
Significant New Use Notification	Toxic Substance Control Act (TSCA)	Makes firms legally responsible to EPA for voluntary waste minimization commitment
Bans on Chemical Substances	TSCA	Eliminates feedstocks responsible for certain waste streams
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

Function	Driver	Effect
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
Energy Efficiency and Water conservation at federal facilities	EO 12902 (March 8, 1994)	Requires to reduce energy and water consumption from 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.

The P2/Wmin program is designed to integrate and coordinate P2 activities among site contractors to support DOE's Richland Office (RL) and DOE-HQ in the development and implementation of a site-wide program. In addition to regulatory compliance, the P2 program saves taxpayer dollars through high return-on-investment P2/WMin initiatives.

Contractors provide services and manage specific operations for RL, the site manager. Battelle Memorial Institute operates the Pacific Northwest National Laboratory (PNNL), one of five national multiprogram energy research laboratories in the DOE complex. PNNL is the research and development center for the Hanford site. Bechtel Hanford, Inc. (BHI) is the environmental restoration contractor providing cleanup services. The Hanford Environmental Health Foundation (HEHF) provides occupational health services. Fluor Daniel Hanford Inc, the project management Hanford contractor (PMHC), with Babcox and Wilcox Hanford Company, Duke Engineering & Services Hanford, Lockheed Martin Hanford Company, Numatec Hanford, Rust Federal Services, and DynCorp of Hanford as subcontractors, provides engineering, operation, construction, maintenance, and computer services for the Hanford site.

Site employment at the beginning of fiscal year (FY) 1995 was approximately 19,200. By the end of FY 1996 employment will be reduced by approximately 5,600 through downsizing and reengineering to meet expected future budget reductions.

1.2 Purpose

This plan documents the requirements of the Hanford Site Waste Minimization/Pollution Prevention (WMin/P2) Program. The plan specifies requirements for Hanford 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 generated at Hanford. The Pollution Prevention Awareness Program required by DOE 5400.1 (DOE 1988A) is included in the Hanford WMin/P2 Program.

1.3 Scope

The Hanford WMin/P2 Program is an organized, comprehensive, and continual effort to reduce the quantity and toxicity of hazardous, radioactive, mixed, and sanitary wastes; conserve resources; and prevent or minimize the release of pollutants to the environment from site activities. The Hanford WMin/P2 program plan reflects national and DOE waste minimization and pollution prevention goals and policies, and represents an ongoing effort to make WMin/P2 part of the site operating philosophy.

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

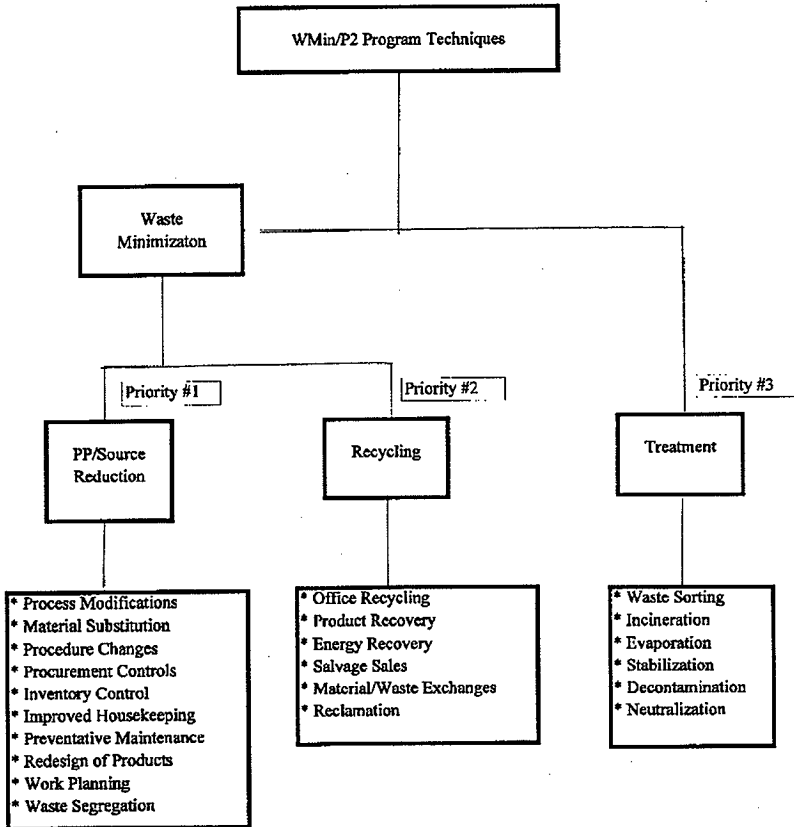
Various WMin/P2 techniques are implemented through employee training and awareness programs to prevent pollution and reduce waste, and to meet requirements for quality, productivity, safety, and environmental compliance (Figure 3).

Investing in P2/WMin will:

- Steadily reduce hazardous and radioactive waste generation and hazardous substance use.
- Reduce the need for waste management and unnecessary expenditures for waste treatment, storage, and disposal.
- Provide a preventive approach to waste management that will help solve current environmental and regulatory issues.
- Reduce the need for costly future corrective actions.

This plan applies to all Hanford activities and operations. Site contractors and sub-contractors (PNNL, BHI, HEHF, Fluor Daniel Hanford, Rust Federal Services of Hanford, Lockheed-Martin Hanford, Numatic Hanford, Duke Engineering & Services Hanford, Babcock & Wilcox Hanford, and DynCorp) are bound by the requirements in this document. Site contractors and the PHMC subcontractors will also be responsible for administering WMin/P2 guidance, instructions, and procedures for operations of any subcontractors working onsite. The plan will be reviewed annually and revised as necessary. At a minimum, it will be revised every three years.

Figure 3. WMin/P2 Techniques.



2.0 POLICY

2.1 DOE

DOE has established P2/WMin as a priority and an integral part of its business and environmental strategy. Secretary O'Leary formalized her commitment to P2 by issuing aggressive waste generation reduction goals. Waste reduction is included in the DOE 10-year Strategic Plan and has been raised to a national program which is direct funded by DOE-HQ and is not part of the site baselines or prioritization.

The 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 WMin/P2 program are met.

The RL Manager has issued a written policy that establishes commitment to implementing the following: an effective WMin/P2 program at Hanford, the 1994 DOE *Waste Minimization/Pollution Prevention (WMin/P2) Crosscut Plan*, the DOE *Pollution Prevention Program Plan* (1996) and all applicable executive orders. The policy is included in this plan as Appendix B.

2.2 Contractor WMin/P2 Program

In accordance with the laws and policies, DOE orders, executive orders, regulatory requirements, executive orders and Washington State administration codes listed in Figure 2, each Hanford contractor will develop or maintain a WMin/P2 program that:

- Documents a current WMin/P2 plan following the format and guidance established in this plan.
- Is a written and issued policy addressing affirmative procurement, P2/WMin, and how they plan to achieve the requirements in these areas.
- Implements the DOE-HQ documents, the 1994 DOE *WMin/P2 Crosscut Plan* and the *Pollution Prevention Program Plan* (1996), that provide the principal crosscutting guidance and strategy for fully implementing a P2 Program.
- Is reviewed annually and updated at least every three years.
- Gives WMin/P2 guidance, instructions, and procedures applicable to the operations of any subcontractors working onsite.

3.0 OBJECTIVES, GOALS, AND IMPLEMENTATION STRATEGIES

3.1 Program Objectives

A WMin/P2 program shall be developed that implements the 18 key elements of the WMin/P2 Activity Plan outlined in the 1994 *Waste Minimization/Pollution Prevention Crosscut Plan* and the 1996 DOE *Pollution Prevention Program Plan*. The foundation of this strategy is to obtain accurate and current waste stream generation data and information on waste management costs to provide the baseline information for implementing a cost-effective, results-oriented WMin/P2 program.

The near term objectives of the Hanford Site WMin/P2 Program are as follows:

- Develop and maintain a site pollution prevention program that complies with federal, state, and DOE directives.
- Develop and maintain consistent generator specific WMin/P2 programs.
- Implement WMin/P2 into the design of all new projects/facilities or major modifications per DOE 5820.2a.
- Implement an effective methodology to obtain funding for high return on investment Wmin/P2 activities.
- Track and report progress toward meeting the Secretary of Energy's waste reduction, recycling, and affirmative procurement goals.
- Schedule and conduct waste generator specific and pollution prevention opportunity assessments that crosscut the site to determine priority waste streams that can be reduced or eliminated.
- Communicate WMin/P2 objectives and goals to all site employees.

Each contractor, as applicable, shall develop its own schedule for completing WMin/P2 activities within its organization.

3.2 Goals/Performance Measures

A. Goals

Establishing goals is essential to a successful P2/WMin program. Goals provide management with tangible targets and provide the basis for measuring progress. As part of that effort, DOE-HQ has identified goals for the entire DOE complex. The achievement of these goals, which use 1993 as a baseline year, is required by December 31, 1999. The goals are:

For Routine Operations:

- Reduce the generation of radioactive (low-level) waste 50 percent.
- Reduce the generation of low-level mixed waste 50 percent.
- Reduce the generation of hazardous waste 50 percent.
- Reduce the generation of sanitary waste 33 percent.
- Reduce total releases and off-site transfers for treatment and disposal of EPCRA 313 toxic chemicals 50 percent.

For All Operations, Including Clean-up/Stabilization Activities:

- Recycle 33 percent of sanitary wastes.

For Affirmative Procurement:

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

Annual waste reduction goals will be given to site contractors/subcontractors by designated waste type, to reduce volume, promote recycling and meet the Secretary of Energy's WMin/P2 CY 1999 waste reduction goals. The routine waste reduction annual goals will be established and provided to the generators by WMin/P2 coordinator (Rust Federal Services Hanford) in their request to contractor/generator groups for submittal of information for the annual report.

In addition to the above goals, annual quantitative waste reduction goals will be established for each waste type for cleanup/stabilization wastes generated by construction activities, transition projects conducting deactivation activities, and wastes resulting from stabilization of nuclear and non-nuclear (chemical) materials. For each waste type, the waste generation projection for the upcoming calendar year will be taken from the baseline established in the *Hanford Site 30-year Solid Waste Forecast*. Qualitative goals will also be established for waste generation associated with decontamination and decommission and environmental restoration activities.

B. 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 waste reduction goals, as requested by DOE-HQ, the Hanford site WMin/P2 coordinator (Rust Federal Services Hanford) will develop and issue quarterly performance measures from information provided by the contractors in their quarterly and annual reports addressed in Section 5.3.

4.0 ORGANIZATION STRUCTURE AND RESOURCES

4.1 Organizational Structure

The overall management responsibility for the Hanford site resides with RL (Figure 4). The RL manager is responsible for leadership and direction of site WMin/P2 efforts. The RL Waste Program Division (WPD) is responsible for the overall Hanford Site WMin/P2 program. A WMin/P2 program manager has been established in WPD who is responsible for the oversight and interface of WMin/P2 program activities, reviewing and coordinating site WMin/P2 efforts, and ensuring the implementation of contractors' WMin/P2 programs.

Rust Federal Services Hanford, a subcontractor to Fluor Daniel Hanford, has been assigned the lead role in coordinating the Hanford WMin/P2 program. In response to this assignment, the Rust Federal Services Pollution Prevention organization meets regularly with RL and representatives from the other Hanford site contractors. The main objective of the Pollution Prevention organization is to support the coordination and implementation of the Hanford WMin/P2 program activities.

Each contractor is required to develop an appropriate organization to administer the WMin/P2 program. The primary function of these WMin/P2 organizations is to implement the key elements of the sitewide or generator-specific program identified in the 1994 DOE *Waste Minimization/Pollution Prevention Crosscut Plan* and the DOE *Pollution Prevention Program Plan* (1996).

4.2 Resources

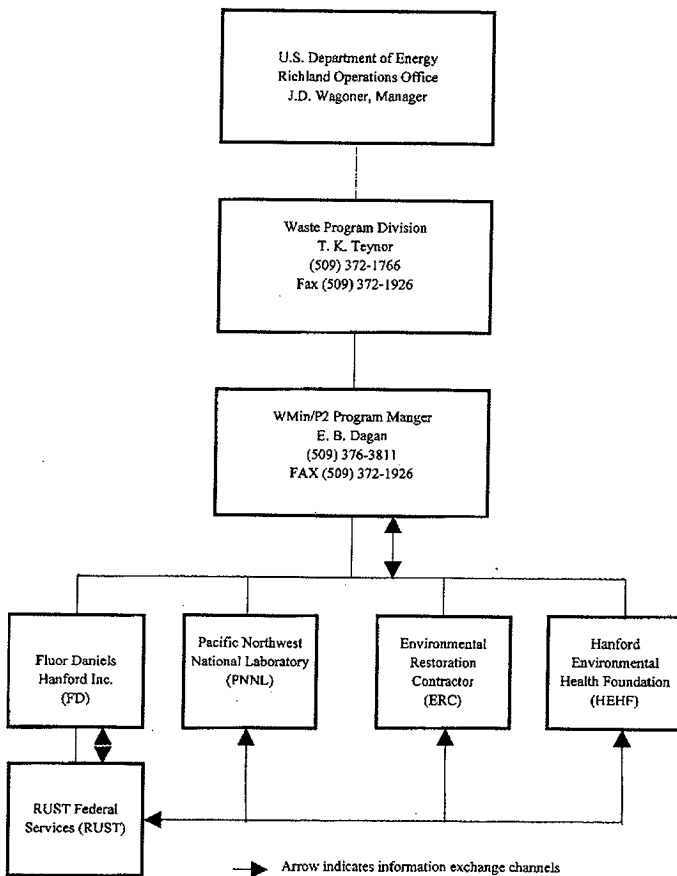
Resources for Hanford WMin/P2 activities will be provided by the cognizant Secretarial Offices of Environmental Management (EM). Funding is provided for the following activities:

Pollution Prevention - Costs associated with the administrative activities, policy development and deployment, technical support, tracking and reporting, implementation and other activities associated with the DOE pollution prevention program.

Complex-Wide Activities - Costs for activities whose purpose is to facilitate the application of pollution prevention across the complex including crosscutting planning, coordination and pilot programs.

Site-Wide Activities - Costs for implementation of site-wide program elements in the 1994 DOE *Pollution Prevention/Waste Minimization Crosscut Plan* and CY 1996 *Pollution Prevention Program Plan*, goal setting, progress tracking and reporting, pollution prevention opportunity assessments, recycling, affirmative procurement, and activities required to comply with regulatory requirements, executive orders, and DOE orders relating to pollution prevention.

Figure 4. Hanford Site WMin/P2 Program Organizational Chart.



Facility Specific Activities - Costs for implementation of specific measures that will reduce the generation of wastes/pollutants and will reduce the long term cost of operation including waste management to DOE such as high return-on-investment projects and projects identified by pollution prevention opportunity assessments.

5.0 SITE PROGRAM DESCRIPTION

For Hanford to have a successful WMin/P2 Program and meet the goals and objectives, the activities below must be incorporated into the contractor WMin/P2 programs.

5.1 Waste Minimization/Pollution Prevention Techniques

As stated in Section 1.3, Hanford uses a hierarchy of methods 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 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 requirements for source reduction or recycling of dangerous, radioactive, mixed or sanitary waste streams are addressed in the various regulatory, state, executive orders, and DOE orders listed in Figure 2. As a minimum, techniques discussed below will be employed at Hanford to prevent pollution and minimize the generation of waste.

5.1.1 Inventory Management

Current methods to control the types and quantities of materials purchased and used will be reviewed. Where necessary, inventory control techniques will be revised or expanded to reduce inventory size of hazardous chemicals, size of containers, and amount of chemicals, while increasing inventory turnover. Specifically, inventory control techniques will be used to reduce waste resulting from excess or out-of-date chemicals and hazardous substances.

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 if 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.

5.1.2 Design Guidelines

The site waste generating activities are periodically examined for replacement, reformulation, reduction, or elimination of hazardous or other raw materials. Per DOE Orders 5820.2A and 6430.1A and Washington Administrative Code requirements, WMin/P2 must be considered when designing new facilities or modifying existing facilities. WMin/P2 must also be considered when installing new equipment or modifying existing equipment. The guidance for conducting pollution prevention assessments on design projects is, *A Proposed Framework for Conducting Pollution Prevention Design Assessments (P2DAs) on US Department of Energy Projects*, March 1995 (PNNL 10204). The software program supporting pollution prevention in design is P2.EDGE.1.

5.1.3 Procedures

Existing procedures for site activities will be examined to determine whether the elimination or revision of procedures can contribute to the reduction of waste. This will include incorporating WMin/P2 into all appropriate onsite work procedures. Changes to procurement procedures to require affirmative procurement of EPA designated recycled products to 100%* will be made by site contractors in accordance with executive order requirements to reduce depleting substances and the DOE affirmative procurement goals addressed in the DOE *Pollution Prevention Program Plan* (1996). Each contractor shall also 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 WMin/P2. The revision and review of procedures for WMin/P2 opportunities will be fully documented and incorporated as part of Hanford employee training programs.

* Except where they are not commercially available competitively at a reasonable price or do not meet performance standards. Purchasing non-recycled versions of the EPA designated items will require written justification citing one or more of the above conditions.

5.1.4 Maintenance Program

The equipment maintenance program 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. The need for revising operational procedures, modifying equipment, and source segregation and recovery will be determined.

5.1.5 Recycling and Reuse

The WMin program considers recycling for all types of waste; 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.

5.1.6 Segregation

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

5.1.7 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 is also done to prevent mixing of materials or waste types.

5.2 Pollution Prevention Opportunity Assessments (P2OA)

In the past, opportunity assessments were performed on routine operations and activities. However, Hanford's new mission of environmental restoration has changed the nature of most activities being performed onsite. While routine maintenance activities still exist, the majority of waste generating activities at Hanford are discontinuous and project oriented. Therefore, opportunity assessment methods will be designed to be used on either routine or non-routine activities.

Pollution prevention opportunity assessments will be conducted, in accordance with the guidance provided in the *Pollution Prevention Opportunity Assessments A Training and Review Guide* (1996), as part of an ongoing program to identify, screen, and analyze options to prevent pollution and reduce waste generation. An opportunity assessment will determine the amount of hazardous substance used, pollutants released, and waste generated. It will identify practices, processes, and methods that will promote the minimization of waste, the prevention of pollution, and conservation of energy and resources. Potential pollution prevention opportunities will be identified, evaluated, and prioritized according to the WMin/P2 program hierarchy and environmental, health, safety, and economic criteria. Once pollution prevention opportunities have been assessed, schedules will be developed for the implementation of opportunities at the site.

Opportunity assessments on polluting and waste generating activities are performed by teams of individuals selected for their process knowledge, purchasing and material inventory knowledge, regulatory, and opportunity assessment expertise. Individuals with expertise in other areas may be added to the team depending on the nature of the process being assessed.

5.3 Pollution Prevention Reports and Documentation

The Hanford site contractors (Pacific Northwest National Laboratory, Bechtel Hanford, Inc., Hanford Environmental Health Foundation) and the Fluor Daniel Hanford Inc. subcontractors (Babco and Wilcox Hanford Company, Duke Engineering & Services Hanford, Dyncorp of Hanford, Lockheed Martin Hanford Company, Numatec Hanford, and Rust Federal Services) 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-95-103).

5.4 Tracking and Reporting Systems

Tracking systems developed under this program will be designed to identify WMin/P2 opportunities and to facilitate reporting WMin/P2 data and accomplishments to the DOE, Environmental Protection Agency (EPA), and Washington State Department of Ecology (Ecology). The program will use existing databases to meet programmatic needs and to streamline site and waste generator reporting methodologies.

Each Hanford site contractor shall develop/share and maintain a tracking system to identify waste generation data and WMin/P2 opportunities in order to provide essential feedback to successfully guide future efforts. The system shall identify program resource requirements and report cost benefits realized from implementation of WMin/P2 projects. The data collected by the system will be used for internal reporting, be capable of providing feedback on the progress of there WMin/P2 program, including the results of WMin/P2 technologies and other implemented options, and facilitate reporting WMin/P2 data and accomplishments to the DOE, EPA, and Washington State Department of 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. A method should also be developed to trace materials that are being recycled or reclaimed and volumes of wastes eliminated because of WMin/P2 efforts. Contractors are encouraged to modify or share existing tracking systems to meet this requirement, as appropriate.

5.5 Procurement Control System

Each contractor shall develop a procurement control system for implementing recent executive order requirements for the purchase of recycled products, the elimination of ozone-depleting substances, and for tracking hazardous substance purchases and use. The tracking system described in Section 5.4 may be used to track hazardous substances.

5.6 Cost Analysis

If life cycle cost 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.

5.7 Quality Assurance Program

DOE and contractor management, with support from Quality Assurance (QA) organizations, are responsible for implementing sitewide and generator-specific WMin/P2 quality programs. Management is responsible for ensuring WMin/P2 activities are effectively conducted and documented in accordance with DOE Directive 5700.6C and QA Programs. Independent assessments of sitewide and generator-specific WMin/P2 programs will be conducted to measure program quality and effectiveness. The organization performing independent assessments shall have sufficient authority and freedom from the line organizations to carry out its responsibilities. Persons conducting independent assessments shall be technically qualified and knowledgeable in the areas assessed. Contractor QA training programs shall be revised to include WMin/P2 policies, procedures, and documentation.

5.8 WMin/P2 Awareness

A successful WMin/P2 program requires employee commitment. By educating employees in the principles and benefits of WMin/P2, solutions to current and potential environmental management problems can be found. The broad objective of pollution prevention awareness (PPA) is to educate site employees in all environmental aspects of activities occurring at Hanford, in their community, and in their homes. Specific objectives of PPA are as follows:

- 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.
- Publicize pollution prevention success stories.

The Pollution Prevention Awareness Program consists of the four elements discussed below:

1. Pollution Prevention Awareness Campaign

A pollution prevention awareness campaign that will make extensive use of site newsletters, seminars, bulletin boards, signs, and slogans to enhance employee awareness of and participation in pollution prevention at the site.

2. Awards and Recognition

A program where individual and team pollution prevention achievements are recognized through special employee programs dedicated to cost savings, thanks, and great ideas.

3. Information Exchange

An important element of the WMin/P2 program is the exchange of technical ideas. Activities to accomplish this are discussed in Section 5.10.

4. Training

WMin/P2 training provided for all personnel. The goal of the training program is to make each employee aware of WMin/P2 and its impact on the site and the environment. All training courses will be revised and updated as needed in response to new regulatory requirements, new procedures, or revisions of existing procedures.

WMin/P2 training will also be conducted as part of the quality assurance procedures qualification process. As part of quality assurance, certain employees are required to be trained and examined on their knowledge of site operating procedures before performing work. WMin/P2 will be incorporated into operating, administrative, and waste procedures requiring documentation using data sheets or forms.

Each contractor shall define and implement a pollution prevention awareness program that contains all these elements.

5.9 Information Exchange, Outreach, and Public Involvement

Communicating 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. The Hanford WMin/P2 program will encourage site contractors to participate in the organizing of activities such as Earth Day and the local schools' Ambassadors program, and also publish information externally to help increase awareness and public trust. Public and stakeholder participation will 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.

All program staff are encouraged to make regular use of the DOE Energy Pollution Prevention Information Clearinghouse (EPIC) and the PNNL Pollution Prevention Information Exchange Center (P2INFO). Contractors also participate in business, education, and government forums

that are designed to provide technical assistance and exchange WMin/P2 information. Also, frequent onsite meetings will be held to promote information exchange.

5.10 Technology Transfer

Technology transfer is part of the Hanford mission according to Secretary of Energy Notice (SEN 30A-92). The core requirement of the technology transfer contract clause (I-109) 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 Cooperative Research and Development Agreements (CRADA), 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 WMin/P2 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.

5.11 Research and Development

Proposals for research and development (R&D) are expected from the pollution prevention opportunity assessment process described. Some 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. Budget requests should include support for appropriate R&D. Specific proposals for R&D work will be coordinated through RL and DOE-HQ to ensure effective allocation of resources.

6.0 PROGRAM ANALYSIS/EVALUATION

This section of the plan identifies discusses the Hanford site WMin/P2 priority activities and contains an analysis of program strengths and weaknesses, identifying issues and problems related to the implementation of the Hanford WMin/P2 program. It also discusses contractor periodic WMin/P2 self evaluation.

6.1 Program Analysis

Strengths of the Hanford site WMin/P2 program have led to several WMin/P2 accomplishments. Many of these accomplishments have been identified and implemented with limited resources. This can be credited to the significant grassroots efforts demonstrated during the history of the Hanford site WMin/P2 program. The priority Hanford WMin/P2

activity is to manage and implement a DOE approved WMin/P2 program with emphasis on goals, implementation of WMin/P2 into design, P2OAs that crosscut the site, pollution prevention high return on investment projects, and tracking and reporting of site wide activities.

The WMin/P2 program manager and the site Pollution Prevention organization coordinate with site contractors and waste generators to see that priority activities are performed and other key program elements are implemented. The program manager and the site Pollution Prevention organization also work together to reduce program inefficiencies and deficiencies. The WMin/P2 program manager has been working to avoid duplication of effort through organizing and coordinating WMin/P2 activities according to the types of activities being performed at Hanford.

Information exchange is encouraged among site generators and information networks are being established and maintained. The Hanford program has increased WMin/P2 accomplishments. Management support is increasing and programs are seeing the results of this support through increased funding for WMin/P2 activities. Some managers are championing generator WMin/P2 programs in their facilities. Also, program development activities have taken place for the sitewide and generator-specific programs, establishing many of the necessary program elements needed to achieve significant WMin/P2 results. Awareness has also been increasing through quality training courses and through sharing and publicizing Hanford WMin/P2 techniques and accomplishments across the site.

While many WMin/P2 in technologies are being implemented at Hanford, there are further opportunities to be realized. Some of the weaknesses of the Hanford WMin/P2 program stem from the following issues and problems. Funding is a significant issue. Although there has been a significant increase in DOE funding for Return On Investment Projects, the sitewide and many generator-specific programs have had very limited resources to implement effective programs. One reason for this has been inconsistent management support during this budget reduction period. Another is WMin/P2 activities beyond those needed for minimal regulatory and DOE compliance rank low in priority in the Hanford planning and budgeting process. Pollution prevention activities, such as opportunity assessment implementation, often end up on a list of unfunded items. There have also been limited resources in the past for providing technical assistance to generator-specific programs for establishing baselines and meaningful goals, and identifying and implementing WMin/P2 opportunities.

Another area where improvement is needed is pollution prevention awareness. While awareness is increasing, the broader concept of pollution prevention is neither well understood nor developed across the site. Continuing to expose site employees to WMin/P2 through training, sharing accomplishments, and establishing WMin/P2 as a part of the procedures for all work performed onsite will help to increase awareness.

6.2 Program Evaluation

The WMin/P2 program will be evaluated periodically. All major activities will be reviewed. The evaluation will document program achievements and identify potential areas for improvement. Achievements and milestones in the program will be a part of the contractors' performance evaluation and determination of award fees.

The following success criteria aid in the demonstration of effective WMin/P2 efforts:

- Reduced amount of hazardous waste and toxic chemical releases
- Reduced amount of pollutants released and waste generated
- Reduced waste management costs
- Improved regulatory compliance
- Reduced health risks
- Increased production efficiency
- Reduced accident risk
- Improved public relations.

Each contractor shall evaluate its pollution prevention program periodically and report findings to RL. The report shall contain current-year data, performance trends, forecasts, and measures used to gauge the performance of WMin/P2 activities. The evaluation report will be used to establish future WMin/P2 goals and program objectives. The report will also be used to determine changes to this plan.

7.0 REFERENCES

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- DOE, 1996, *Pollution Prevention Program Plan*, DOE/S-0118, U.S. Department of Energy, Office of the Secretary, Washington, DC.
- Ecology 1993, *Pollution Prevention Planning Guidance Manual for Chapter 173-307*, Washington Administrative Code, Washington State Department of Ecology, Olympia, Washington.
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Washington, D.C.

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APPENDIX A

GLOSSARY

cleanup/stabilization waste

Cleanup/stabilization includes environmental restoration of contaminated media (soil, groundwater, surface water, sediments, etc.), 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 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 have a 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 separately accounted for whenever possible. This secondary (newly generated) waste usually results from common activities such as handling, sampling, treatment, repackaging, shipping, etc.

generator

Each contractor or subcontractor within the scope of the DOE-RL P2 program whose activities or processes produce waste.

generator group

As defined by the responsible contractor or subcontractor, any discrete activity, project, or facility whose activity or processes produce waste.

hazardous substance

Any substance listed as hazardous in the *Emergency Planning and Community Right-to-Know Act* and its updates and all ozone depleting compounds as defined by the *Montreal Protocol of October 1987* and its updates.

hazardous waste

Those solid wastes that exhibit any of the characteristics of hazardous waste identified in 40 CFR 261, Subpart C (ignitable, corrosive, reactive, toxic), or that are listed in 40 CFR 261, Subpart D, "Lists of Hazardous Waste."

pollution prevention (P2)

The use of materials, processes, or practices that reduce or eliminate the creation of pollutants or wastes at the source. It includes practices that reduce the use of hazardous and nonhazardous materials, energy, water, or other resources as well as those that protect natural resources through conservation or more efficient use.

routine operations waste

Normal operations waste produced from any type of production, analytical, or research and development laboratory operations; treatment, storage, 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 to the specific activity that produced the waste. Periodic laboratory clean-outs and spill cleanups that occur as result of these processes are also considered normal operations.

recycling

Recycling techniques are characterized as use, 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 recovery of a useful or valuable material from a waste stream. Recycling allows potential waste materials to be put to a beneficial use instead of going to treatment, storage, or disposal.

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 such as inventory control, and housekeeping practices such as waste segregation. Source reduction results in reducing or eliminating the amount of potential waste material exiting from a process.

treatment

Technological processes that reduce the volume, toxicity, or mobility of waste. Examples include, but are not limited to, incineration, vitrification, neutralization, chemical extraction, physical separation, and solidification/stabilization technologies.

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.

waste reduction

Reduction of the total amount of waste that is generated and disposed of by DOE operations through WMin/P2 and treatment activities.

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APPENDIX B

**US DEPARTMENT OF ENERGY-RICHLAND OPERATIONS OFFICE POLLUTION
PREVENTION POLICY**

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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.

05-06-94

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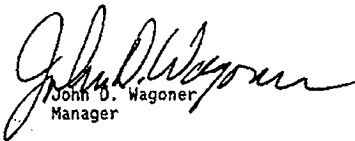
RL and Hanford Site contractors will also comply with Executive Order 12873, issued October 21, 1993, which requires federal agencies to expand waste prevention and recycling programs, implement affirmative procurement programs for recycled and energy efficient materials including the procurement of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

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