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LOCKHEED MARTIN

Oak Ridge National Laboratory Pollution Prevention Program Plan

March 1997

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TM-11853/R7

OAK RIDGE NATIONAL LABORATORY

POLLUTION PREVENTION

PROGRAM PLAN

March 1997

Prepared for:

Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831
managed by
Lockheed Martin Energy Research, Inc.
for the
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Lockheed Martin Energy Systems, Inc.
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for the
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Date

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List of Acronyms

ACW	alpha contaminated waste
ADS	Activity Data Sheet
ALARA	as low as reasonably achievable
BMP	Best Management Practice
BUS	Between-Use-Storage Area
CAA	Clean Air Act
Committee	Oak Ridge National Laboratory (ORNL) Pollution Prevention Committee
CRADA	cooperative research and development agreement
CWA	Clean Water Act
CWTS	Central Waste Tracking System
DOE	U.S. Department of Energy
DOE Energy Research	Assistant Secretary for Energy Research
DP	Defense Programs
EM	Environmental Management
EMWIR	Environmental Mixed Waste Inventory Report
Energy Research	Lockheed Martin Energy Research, Inc.
Energy Systems	Lockheed Martin Energy Systems, Inc.
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ER	Environmental Restoration
ETTP	East Tennessee Technology Park
FFCA	Federal Facilities Compliance Agreement
FFC Act	Federal Facility Compliance Act
FLC	Federal Laboratory Consortium
FWP	Field Work Proposal
FY	fiscal year
GCO	Generator Certification Officer
GET	General Employee Training
GSAF	Generator Set Aside Fund
HAP	hazardous air pollutant
HiVal	High Implementation Value
HMIS	Hazardous Materials Inventory System

List of Acronyms (Continued)

HSWA	Hazardous and Solid Waste Amendments
kg	kilogram
LDR	land disposal restrictions
LLLW	liquid low-level waste
m^3	cubic meter
M&C	Metals and Ceramics Division
NEPA	National Environmental Policy Act
ORNL	Oak Ridge National Laboratory
ORO	Oak Ridge Operations
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
OTD	Office of Technology Development
P2IMS	Pollution Prevention Information Management System
PCB	polychlorinated biphenyl
PPA	Pollution Prevention Act
PPAP	Pollution Prevention Awareness Program
PPC	Pollution Prevention Coordinator
PPOA	pollution prevention opportunity assessment
PPR	Pollution Prevention Representative
Program	Pollution Prevention Program
PWA	process waste assessment
PW	process waste
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
ROI	Return on Investment
R&D	research and development
SARA	Superfund Amendments and Reauthorization Act
SEN	Secretary of Energy Notice
SLLW	solid low-level waste
SPCC	Spill Prevention, Control, and Countermeasures
TDEC	Tennessee Department of Environment and Conservation
THWRA	Tennessee Hazardous Waste Reduction Act

List of Acronyms (Continued)

TOA	The State Oversight Agreement between the State of Tennessee and the Department of Energy (Tennessee Oversight Agreement)
TRI	Toxic Chemical Release Inventory
TRU	transuranic
TVA	Tennessee Valley Authority
WAC	waste acceptance criteria
WCP	Waste Certification Program
WMin/PP	Waste Minimization/Pollution Prevention
WMRAD	Waste Management and Remedial Action Division

Executive Summary

The Oak Ridge National Laboratory (ORNL) Pollution Prevention Program (Program) Plan illustrates the commitment of the ORNL management to reduce the generation and toxicity of waste in all media at ORNL, and to fully comply with state, federal, and U.S. Department of Energy (DOE) requirements concerning pollution prevention. The ORNL Program Plan captures ongoing and planned activities and is compatible with DOE's program initiatives. The goals of the ORNL Program Plan require the merging of administrative and cultural changes with new technologies and techniques. To maximize the efficiency of program implementation and information exchange, the Program's elements are consistent with those used at other Oak Ridge Reservation facilities.

The framework of this plan is generally based on the following documents, which also generally parallel the budget-requesting process for the ORNL Program and waste generator-based pollution prevention activities:

- December 1993 DOE *Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan* published by DOE Defense Programs (DP).
- March 1994 *DOE Order 5400.1 Site WMin/PP Awareness Plans DOE-wide Implementation Guidance-Update* from DOE Environmental Management (EM)
- February 1997 DOE *Guidance for Preparation of Site Pollution Prevention Plans* from DOE EM.

The formats provided in these guidance documents are addressed in the Plan; however, they were modified and augmented to ensure compliance with all pollution prevention requirements. Therefore, the Plan is divided into nine chapters plus supplemental appendices as needed. The infrastructure of the Plan encompasses the statement of ORNL management commitment, the ORNL Program policy and objectives, the Program strategy, the organizational structure, and goals. The support activities that fortify the Program, such as tracking, training, incentives, resources, information exchange, and technology transfer, are described. The implementation tools of pollution prevention opportunity assessments (PPOA), pollution prevention techniques, research and development, and projects are also depicted.

The framework of the ORNL strategy is based on five major elements: (1) organization and infrastructure, (2) program development, (3) reporting, (4) laboratory-wide source reduction and recycling activities implementation, and (5) technical assistance.

The ORNL Program Plan integrates these elements into a strategic plan, budgeting and reference tool, and guidance document and should, therefore, facilitate the implementation of various pollution prevention techniques at ORNL. The resulting program conserves resources and supports quality, productivity, safety, and environmental compliance activities.

1.0 Introduction/Background

The Oak Ridge National Laboratory (ORNL) Pollution Prevention Program (Program) for ORNL, Oak Ridge, Tennessee, is designed to fully comply with state, federal, and U.S. Department of Energy (DOE) requirements concerning pollution prevention. The Program is formulated to reduce the generation and toxicity of ORNL wastes in all media. The framework of this Program Plan is based on the following:

- December 1993 DOE *Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan* published by DOE Defense Programs (DP)[1]
- March 1994 *DOE Order 5400.1 Site WMin/PP Awareness Plans DOE-wide Implementation Guidance-Update* from DOE Environmental Management (EM)[2]
- February 1997 DOE *Guidance for Preparation of Site Pollution Prevention Plans* from DOE EM.[3]

ORNL is not a DP facility, but it does receive DP funding; therefore, the DP guidance was also used. These guidance documents also parallel the basis for the budget-requesting process for the ORNL Program and waste generator-based pollution prevention activities. Per these documents, ORNL annually develops and updates a Field Work Proposal (FWP) for generator activities and an Activity Data Sheet (ADS) for program activities, which document the need for funding and are submitted to DOE. The ADS for program activities is funded through EM. A generator-based ADS has also been compiled to reflect the funding requested through the FWP. The ADS and FWP submitted by ORNL to DOE follow the prescribed format. However, for ORNL to ensure compliance with all pollution prevention requirements, the formats delineated in these three guidance documents were modified and augmented in the ORNL Program Plan. The finalized ADS and FWP, which outline the pollution prevention activities of the ORNL Program and the ORNL waste generators, supplement this Program Plan to ensure compliance with the listed DOE documents. Therefore, all other regulatory and DOE requirements are met by this plan.

1.1 Purpose of Plan

This plan documents the development and continuing expansion of the ORNL Program, specifically ORNL's objectives and strategies for conserving resources and reducing the quantity and toxicity of wastes and other environmental releases. The plan specifies activities and methods that have been and continue to be planned and employed to realize these

reductions. This plan is intended to satisfy DOE and other legal requirements that are listed in Section 5.2 and discussed in Appendix A. The planning of the symbiotically related Pollution Prevention Awareness Program is included with the Waste Minimization Program planning as permitted by guidance for implementing planning requirements in DOE Order 5400.1.[1,2,3] Additionally, waste reduction, which is defined in this plan as pollution prevention techniques plus waste treatment, is addressed by this plan as necessary to meet the specifications of certain requirements delineated in Section 5.2. Waste reduction, although not favored over pollution prevention, is included near the bottom of the pollution prevention and pollution control/waste management hierarchy depicted in Figure 1-1 and is discussed accordingly within this plan as appropriate. A history of the Program is provided in Appendix A.

1.2 Scope of Program

The Program is an organized, comprehensive, and continuous effort to systematically reduce the quantity and toxicity of all types of wastes and environmental releases at ORNL. The term "pollution prevention" at ORNL is consistent with DOE's definition and includes activities that involve multimedia source reduction and recycling of all wastes and pollutants in all media.

As byproducts of production, research and development, supporting activities, and environmental restoration activities, the site generates a variety of waste materials that are carefully controlled during ORNL operations and regulated by the federal government and state agencies. This Program applies to all waste streams generated by site operations. The categories of ORNL waste streams are listed in Table 1-1.

This plan applies to pollution prevention projects and activities that are under the direction of the ORNL Waste Management and Remedial Action Division (WMRAD), ORNL research and development (R&D) activities, ORNL operations, and ORNL support organizations, including certain activities at ORNL under the Environmental Restoration (ER) Program and central or reservation-wide activities to which ORNL provides support. One or more specific implementation plans may be compiled internally to provide additional detailed support and guidance to the various activities associated with the Program. Details of the scope of this plan are included in Appendix A.

Figure 1-1. Oak Ridge National Laboratory Pollution Prevention and Pollution Control/ Waste Management Hierarchy

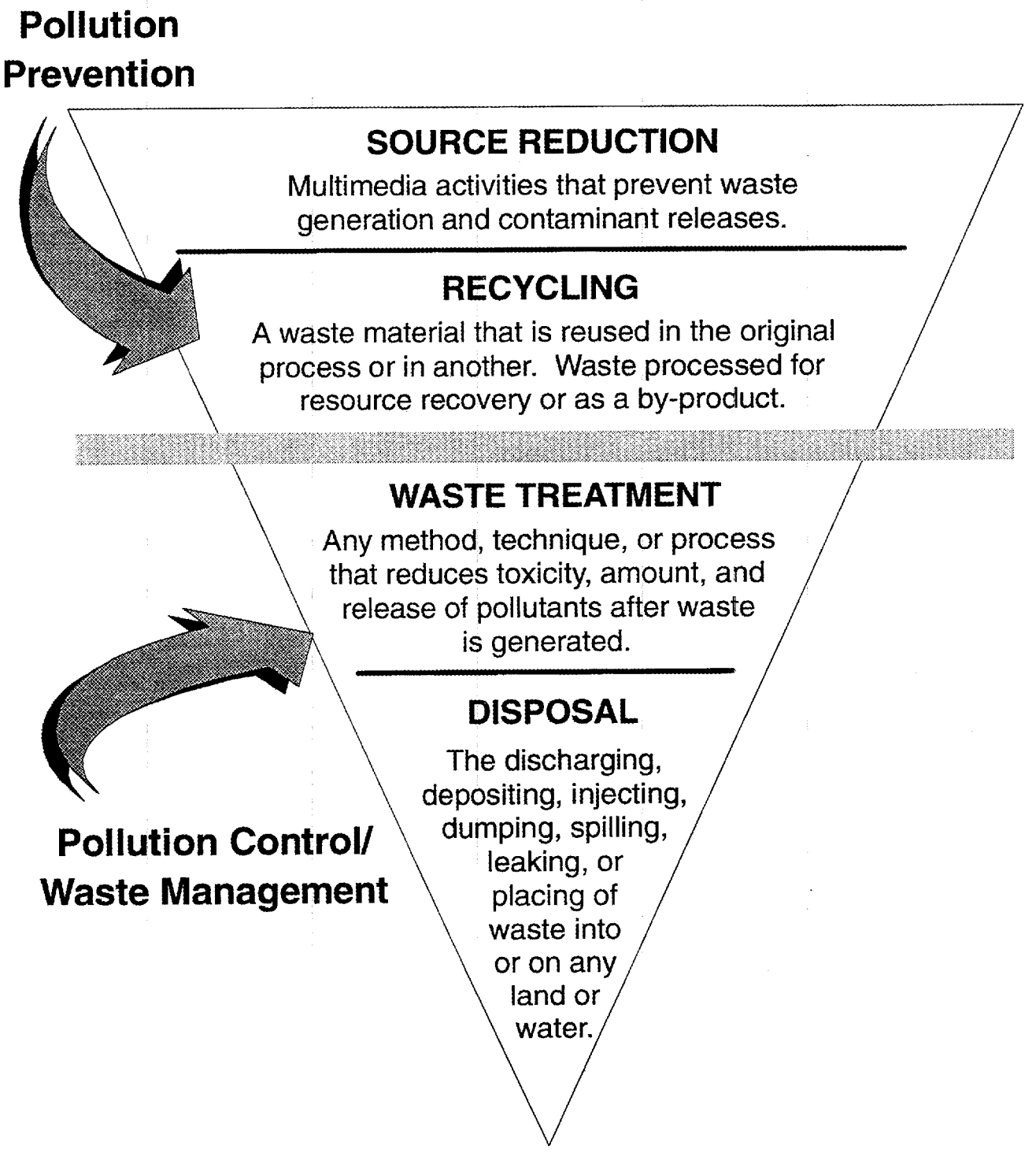


Table 1-1

Oak Ridge National Laboratory (ORNL) Waste Types

Waste Type	Subtype
Radioactive Transuranic Waste (TRU)	TRU Liquid
	TRU Solid
Mixed-TRU [Resource Conservation and Recovery Act (RCRA) Regulated and TRU]	Mixed-TRU Solid
Radioactive Low-Level Waste (LLW)	LLW Liquid
	LLW Solid
	LLW Process Wastewater
Mixed-LLW (RCRA Regulated and LLW)	Mixed-LLW Liquid
	Mixed-LLW Solid
	Mixed-LLW Process Wastewater
RCRA Regulated Waste	RCRA Regulated (Liquid and Solid)
	RCRA Regulated Process Wastewater
Toxic Substance and Control Act (TSCA) Regulated Waste	TSCA (Liquid and Solid)
Mixed-TSCA	Mixed-TSCA (Liquid and Solid)
Industrial Waste	Industrial Solid
	Industrial Process Wastewater
	Sanitary Wastewater
Untreated Wastewater Discharges/Stormwater Outfalls	
Air Emissions	

NOTE: Solid industrial waste is equivalent to the U.S. Department of Energy sanitary waste type. Sanitary wastewaters are any waters that should be treated at a sanitary sewage treatment plant. Alpha contaminated wastes (ACW) are also generated at ORNL, but ACW are managed in the same manner as TRU waste.

1.3 Program Plan Structure

The structure of this Program Plan is based on the three previously listed DOE documents.[1,2,3] These guidance documents basically parallel the budgeting format for pollution prevention funding requests through ADSs. The format listed in these guidance documents has been slightly modified to meet other requirements with which ORNL must comply, such as laws, regulations, and agreements specifying pollution prevention program plans. Appendices are used to supplement this plan. In Appendix A, a matrix for each DOE guidance document has been compiled and specifies sections of this Program Plan to corresponding sections in each guidance document.

1.4 Mission and Site Description

ORNL is owned and operated by the U.S. Government. Since 1984, ORNL has been managed by Lockheed Martin Energy Systems, Inc. (Energy Systems) or Lockheed Martin Energy Research, Inc. (Energy Research) under prime contracts with DOE. Waste management activities at ORNL are also managed by either Energy Systems or Energy Research under these prime contracts with DOE. Energy Systems was previously known as Martin Marietta Energy Systems, Inc. These prime contracts are administered by the DOE-Oak Ridge Operations (ORO) Office.

ORNL is a Assistant Secretary for Energy Research (DOE Energy Research) facility; however, funding is also received from the following for activities that generate waste in all media:

- Assistant Secretary for DP
- Assistant Secretary for Energy Efficiency and Renewable Energy
- Assistant Secretary for Environment, Safety, and Health
- Assistant Secretary for EM
- Assistant Secretary for Fossil Energy
- Assistant Secretary for Human Resources and Administration
- Assistant Secretary for Policy Planning and Program Evaluation
- Office of the Administrator, Energy Information Administration
- Office of the Associate Deputy Secretary for Field Management
- Office of Civilian Radioactive Waste Management
- Office of Economic Impact and Diversity
- Office of Laboratory Management
- Office of Nonproliferation and National Security
- Office of Nuclear Energy
- Office of Science Education and Technical Information
- Federal Energy Regulation Commission.

ORNL facilities are located in Anderson County, southwest of Oak Ridge, Tennessee. ORNL employs approximately 5,700 people. ORNL also has additional facilities located at the Y-12 Plant, another government-owned facility located southwest of Oak Ridge and northeast of the primary ORNL site. A limited number of ORNL personnel are located at the East Tennessee Technology Park (ETTP) (previously referred to as the K-25 Site), another government-owned facility in Roane County. ORNL was built in the early 1940s and is a multipurpose R&D facility consisting of more than 960 small laboratories.

ORNL's primary role is the support of energy technology through applied research and engineering development and scientific research in basic and physical sciences. ORNL is also a valuable resource in the quest to solve problems of national importance, such as nuclear and chemical waste management. ORNL's current stated mission is as follows:

> "The mission of Oak Ridge National Laboratory is to advance the frontiers of science and technology in three broad arenas: energy, the environment, and economic competitiveness. First, we seek better ways of producing, distributing, and conserving energy. Second, we work to reduce the environmental and health effects of energy technologies and to increase understanding of environmental processes. And third, we stimulate economic competitiveness by conducting research that strengthens the nation's technological foundations, by sharing our expertise and facilities with U.S. industry, and by promoting math and science education to inspire a new generation of scientists and engineers. In pursuit of this mission, ORNL conducts basic and applied research in these key areas of strength:
>
> - materials sciences and engineering;
> - physical, chemical, and engineering sciences;
> - biological and life sciences;
> - computational sciences; and
> - manufacturing sciences and technologies."

As a DOE facility, ORNL also supports DOE's pollution prevention mission:[4]

> "The Department's pollution prevention mission is to minimize the generation and release of pollutants to the environment by implementing cost-effective pollution prevention technologies, practices, and policies with partners in government and industry. The Department will simultaneously conduct its operations in such a way as to minimize impact on the environment, improve the safety of operations and energy efficiency, and promote the sustainable use of natural resources."

2.0 Policy

2.1 Policy Statement

In 1986, Energy Systems issued the Energy Systems Waste Minimization Policy statement. In 1989, the ORNL Director issued a written statement supporting pollution prevention to all ORNL staff. Subsequently, in 1991, 1993, and 1997, an updated pollution prevention policy statement was issued by the ORNL Deputy Director. The current ORNL policy is appended in this plan as Appendix B. The DOE-ORO Office and DOE ORNL Site Office both support ORNL and its pollution prevention policy and program activities. This policy supported by ORNL, DOE Site, and DOE-ORO management ensures the implementation of a comprehensive, effective ORNL Program. The policy also requires compliance and implementation of all requirements, including all pertinent laws, regulations, Executive Orders, DOE Orders, and DOE guidance and requirements such as the 1996 DOE *Pollution Prevention Program Plan.*[4]

2.2 Statement of Management Commitment

The ORNL Director, ORNL management, and ORNL staff are fully committed to minimizing the generation and toxicity of waste by giving preference to source reduction, material substitution, and environmentally sound recycling over treatment, control, and disposal or release of such wastes. When pollution prevention techniques cannot be applied to specific wastes, waste reduction techniques that are not included in pollution prevention will be favored over disposal. These techniques include treatment to reduce volume, toxicity, mobility, or a combination of these. Management continues to take appropriate action to provide adequate personnel, budget, training, and materials to ensure that the objectives of the Program are met and that the principles of the Code of Environmental Management Principles (CEMP) for Federal Agencies[3] are supported.

2.3 Subcontractor Pollution Prevention Program Compliance

All subcontractors under contract with ORNL who have the potential for generating waste at ORNL are required to adhere to the Program requirements. This requirement is met through the updated *National Environmental Policy Act* (NEPA) checklist.[5]

3.0 Organization and Staff Responsibilities

3.1 Description of Pollution Prevention Organization

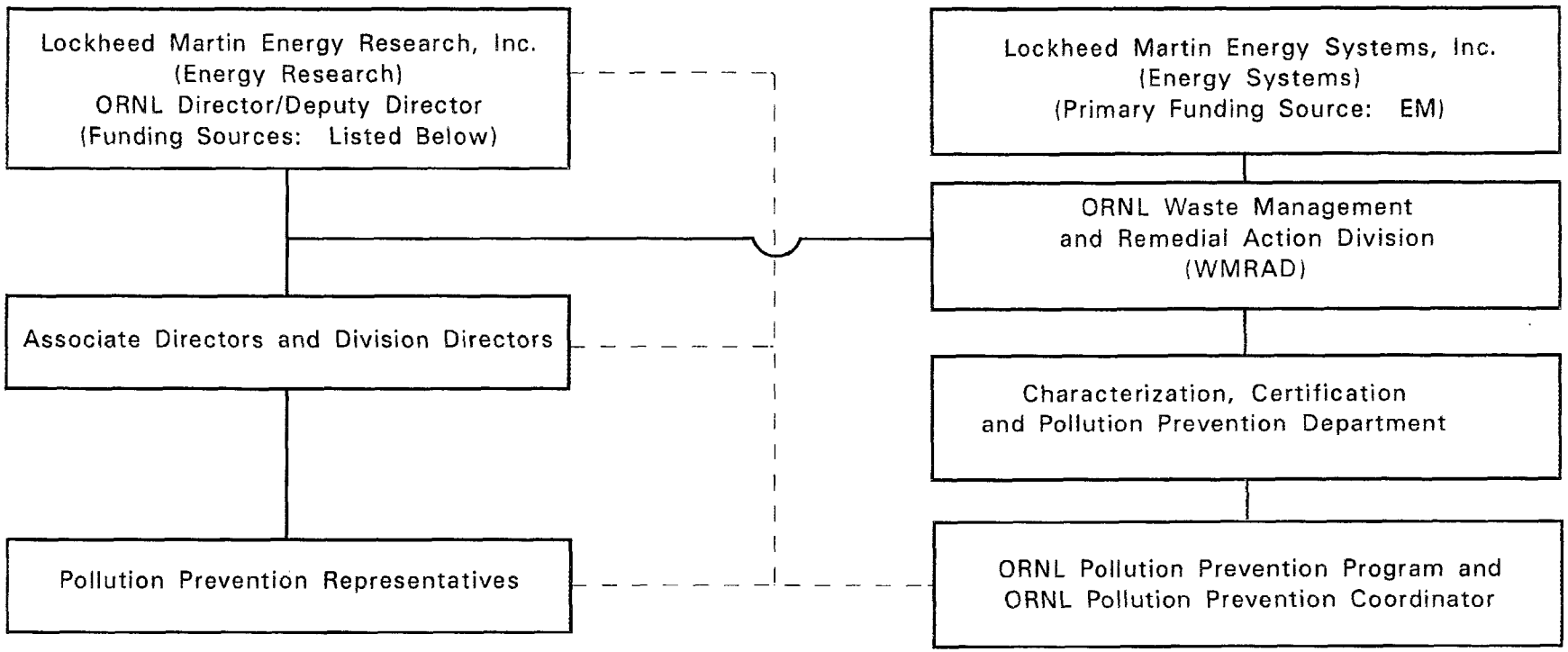
The ORNL Director and his management and technical staff, in support of the DOE-ORO Office and ORNL DOE Site Office, administer and implement the ORNL Program, including providing support and generating employee awareness. The Pollution Prevention Coordinator (PPC) has been appointed by ORNL management to manage the Program. The Program's purpose is to unite pollution prevention activities into one program and to integrate these activities into all ORNL operations, as well as to support technology development programs aimed at minimizing multimedia waste generation.

The Program organizational structure shown in Figure 3-1 is designed to maximize the collection, dissemination, and flow of pollution prevention information and to provide waste-generating line organizations with managerial responsibility and authority for the development, design, construction, and implementation of pollution prevention projects. The ORNL Program is responsible for requesting funding for the overall laboratory program and laboratory-wide activities, while the waste-generating line organizations are responsible for requesting organization-specific implementation funding. The ORNL Program ultimately reports to WMRAD and is matrixed to the ORNL Director. The DOE-ORO Waste Management Division functions as the programmatic oversight for the Program, with the PPC managing the associated program activities and funding. DOE-Headquarters Office of Waste Management and Energy Systems Central Environmental Compliance staff provide independent oversight of the Program.

3.2 Pollution Prevention Representatives Committee

Since 1985, each ORNL waste generating division has had a Pollution Prevention Representative (PPR). The PPRs are assigned to represent and support the Division Directors and serve as the pollution prevention information and technology transfer point within their division. This responsibility includes providing information about the wastes generated within their division for reporting purposes; ensuring that new projects or changes to existing facilities have considered pollution prevention in design or construction; and submitting ideas, problems, or nominations of pollution prevention efforts originating within their division.

The PPC meets with the PPR Committee (Committee) at least four times a year to exchange information, provide updates on pollution prevention developments, discuss problems, elicit



Notes: (1) ORNL activities, including generator pollution prevention planning and implementation, are funded through:

Assistant Secretary for Defense Programs
Assistant Secretary for Energy Efficiency and Renewable Energy
Assistant Secretary for Energy Research
Assistant Secretary for Environment, Safety, and Health
Assistant Secretary for Environmental Management (EM)
Assistant Secretary for Fossil Energy
Assistant Secretary for Human Resources and Administration
Assistant Secretary for Policy Planning and Program Evaluation
Office of the Administrator, Energy Information Administration
Office of the Associate Deputy Secretary for Field Management
Office of Civilian Radioactive Waste Management
Office of Economic Impact and Diversity
Office of Laboratory Management
Office of Nonproliferation and National Security
Office of Nuclear Energy
Office of Science Education and Technical Information
Federal Energy Regulation Commission

Waste management and pollution prevention program activities are primarily funded through EM.

(2) The solid lines show flow of authority, funding, and information within managerial organizations. The dashed lines show matrixed flow of authority and information exchange between organizations. Portions of the Characterization, Certification, and Pollution Prevention Department and portions of WMRAD that are not directly related to the ORNL Pollution Prevention Program report through Energy Research, not Energy Systems.

(3) The ORNL Pollution Prevention Program, which maintains an updated listing of all Pollution Prevention Representatives, their addresses, and telecopy and telephone numbers, can be reached at (423)576-8832.

Figure 3-1. Oak Ridge National Laboratory (ORNL) Pollution Prevention Program Simplified Organization

suggestions, and review the Program. Informally, contact with the PPRs on pollution prevention activities occurs on a more frequent basis. The list of current division PPRs is maintained by the Characterization, Certification, and Pollution Prevention Department.[6]

Areas and responsibilities where the PPRs or teams may support the PPC include:

- Reviewing the objectives of the ORNL Program in accordance with this plan and the laboratory's mission and needs
- Periodically communicating program objectives to division personnel
- Obtaining waste generator support and input for the ORNL Program
- Facilitating integration and coordinated interaction between waste generators and waste managers on new and current pollution prevention matters
- Evaluating and revising pollution prevention goals and objectives in accordance with regulatory and DOE requirements
- Sponsoring ongoing employee awareness and training
- Coordinating Program participation by represented areas
- Supporting the waste tracking system efforts
- Prioritizing waste streams or ORNL areas for assessment
- Supporting the selection of teams to conduct pollution prevention opportunity assessments (PPOA)
- Supporting the evaluation of the technical and economical feasibility of options to reduce waste generation
- Supporting the recommendations and ranking of options for specific implementation by management
- Supporting the monitoring of the performance of pollution prevention options that have been implemented and evaluating performance according to success criteria
- Supporting the monitoring and reporting of progress of the ORNL Program through evaluations such as audits and reviews

- Soliciting personnel nominations for achievement and incentives awards
- Facilitating technology transfer and pollution prevention awareness.

3.3 Waste Generators and Employees

All ORNL employees generate waste and are, therefore, waste generators. ORNL waste generators are responsible for properly managing their waste according to their certification training and procedural requirements to minimize the generation of waste from spills or mixing of different waste streams. To support and promote waste minimization/reduction and pollution prevention, these generators and the associated generating organization are also required to perform the following:

- Support tracking and reporting activities related to their material usage, waste generation, and pollution prevention progress made.
- Support PPOA activities related to their wastes and investigate and implement pollution prevention techniques.
- Support the development and implementation of new pollution prevention techniques as necessary.
- Participate in laboratory-wide source reduction and recycling programs.
- Request technical assistance when required from the Program.

The integration of pollution prevention into the waste generator's activities is vital to the success of the Program.

3.4 Related Programs

The following program activities are related to the ORNL Program. The Pollution Prevention Awareness Program (PPAP) activities are discussed in Section 6.2.2.1.2.

3.4.1 As Low As Reasonably Achievable Program

As for any ORNL operation, the principle of as low as reasonably achievable (ALARA) must be considered when planning pollution prevention. The ALARA and Pollution Prevention Programs have common objectives. All new and existing projects must be reviewed under ALARA. By ALARA guidelines, the planning of any project or operation should give consideration to minimizing or reducing waste, protecting the safety and health of employees, and minimizing impacts to the environment. The five ALARA Program elements are:

- A policy statement and commitment from management to the ALARA philosophy and process
- Incentive programs for individuals who suggest ALARA related improvements in process operations or in the implementation of the ALARA programs as part of their commitment to ALARA
- A designated organizational responsibility, authority, and structure for implementing the ALARA Program
- A systematic evaluation of the operations at the site to identify activities that are responsible for the exposures of the public and workers and releases of radioactive material
- A procedure by which the operations or activities will be analyzed to determine whether they are being performed in a manner that will ensure that the radiological impacts are ALARA.

When feasible, goals and priorities for pollution prevention and ALARA will be coordinated to minimize resources required because the objectives of both programs are ultimately the same.

3.4.2 Quality Program

Pollution prevention efforts and suggestions have been supported by the Laboratory Quality Program. The Quality Program supports all activities that continue to analyze and recommend pollution prevention activities. While all organizations implement the Quality Program, the Quality Program oversight is provided by the ORNL Office of Quality Programs and Inspection.

3.4.3 Certification Programs

The certification program at ORNL has initiatives that include all categories of waste. Certification program objectives include improved waste stream characterization and segregation, coinciding with pollution prevention objectives. Waste generator certification training is required, and the required training addresses pollution prevention.

Development of the ORNL Waste Certification Programs is being closely coordinated with the ORNL Program. Liquid low-level waste (LLLW) and transuranic (TRU) waste Generator Certification Officers (GCO) have been appointed and, when required, compile procedures for managing their wastes and to provide WMRAD with requested information. Where

appropriate, these procedures or information may be used to determine methods for reducing waste generation.

3.4.4 Other ORNL Activities Related to Program

In addition to the ALARA, quality, and certification programs, several activities under other programs within ORNL are related to pollution prevention but are not under the ORNL Program. The ORNL Program supports these activities and associated responsible organizations in various areas, including information and expertise. However, the organizations managing these programs maintain primary responsibility. The following is a partial listing of specific example activities:

- Affirmative procurement under the Resource Conservation and Recovery Act (RCRA), which is also addressed in Executive Order 12873,[7] and associated activities such as reporting are the responsibility of the Central Procurement Division with the ORNL Program providing support, including participating on rebid contract committees, participating in meetings, and providing information on environmental-friendly and recycled-content products. Energy Systems Central Procurement staff leads the Energy Systems Affirmative Procurement Team. The ORNL Program participates on this team.

  Currently, based on contractual and funding conditions, Energy Research and Energy Systems are not directly addressing Executive Order 12873. However, certain aspects of this Order, which are required under RCRA, are addressed by Energy Research and Energy Systems.

- The reporting under the *Superfund Amendments and Reauthorization Act*[8] (SARA) Title III, which is also referred to as the *Emergency Planning and Community Right-to-Know Act* (EPCRA),[8] including the Toxic Chemical Release Inventory (TRI) reporting on the "Form R" and associated reporting to DOE are the responsibility of the environmental compliance group at ORNL.

- The requirements associated with the Montreal Protocol and the *Clean Air Act* (CAA) *Amendments of 1990*,[9] such as phasing out the purchase and use of ozone-depleting substances, reporting annual progress in phasing out ozone-depleting substances to DOE, establishing goals for reduction in hazardous air pollutants (HAP), reporting progress in early reduction of HAPs, and applying for compliance extensions related to HAPs, are the responsibility of the environmental compliance group at ORNL.

- The site-specific storm water pollution prevention plan as required by the *Clean Water Act* (CWA),[10] along with the Best Management Practices (BMP) plan and the Spill Prevention, Control, and Countermeasures (SPCC) plan, are the responsibility of the environmental compliance group at ORNL.

- The requirements associated with the *National Environmental Policy Act* (NEPA),[5] such as the review of proposed projects for potential adverse impact to the environment, are the responsibility of the Environmental Review and Documentation Section at ORNL.

- Pollution abatement requirements, including those under Executive Order 12088,[11] are the responsibility of the environmental compliance and waste management organizations.

Other activities under other programs may also fall within this pollution prevention-related category; however, this list was not meant to be all inclusive.

4.0 Program Goals

4.1 Strategy

The ORNL Program continues to support the implementation of systems to provide accurate and current waste stream-specific information. This information provides baseline information to support the identification of the true source of waste generation, the implementation of specific pollution prevention techniques and technologies, and the quantitative monitoring of the progress of these activities. The Program continues to develop methods for collecting information, evaluating options, and identifying cost-effective pollution prevention techniques. The essential features of the strategy are to maintain an organization that comprises management and staff representatives who continue to develop and administer the Program; continue to identify materials, wastes, discharges, and emissions to be targeted for reduction; continue to develop methods for tracking performance and progress of the Program; and continue to foster and encourage the development of pollution prevention technologies, the awareness of environmental problems, and the philosophy that includes pollution prevention.

4.2 Program Objectives

The overall objectives of the Program are to:

- Foster a laboratory-wide philosophy to conserve resources, reduce the costs of R&D activities, and create a minimum of waste and pollution in achieving site-strategic objectives through developing and implementing techniques, technologies, and programs that minimize waste and pollution generation.

- Promote the use of nonhazardous materials in ORNL activities to minimize the potential risks to human health and the environment.

- Reduce or eliminate the generation of waste materials through input substitution, product reformulation, process or laboratory modification, improved housekeeping, on-site closed-loop recycling, and off-site recycling to achieve minimal adverse effects on the air, water, and land when technically and economically feasible and cost effective.

- Comply with federal and state regulations and DOE requirements for pollution prevention.

The enabling program objectives, which will support the overall objectives, are divided into five categories: promotional activities, information and technology exchange, tracking and reporting activities, opportunity assessments and projects, and resource allocation.

Promotional activities include:

- Maintain open channels of communication laterally and vertically among the ORNL organizations to enhance awareness and convey pollution prevention objectives, goals, ideas, methods, and successes.

- Involve all employees in the pollution prevention effort by promoting integration and coordination of waste generators and waste management personnel on pollution prevention matters.

- Develop and revise, as necessary, specific goals and schedules for pollution prevention activities.

- Create incentives for pollution prevention by establishing a program of awards for pollution prevention suggestions and accomplishments, and establishing achievable, measurable pollution prevention goals as part of each Division Director's annual measures of performance.

- Develop and implement employee pollution prevention awareness and occupational training programs.

- Support the procurement and use of products containing recovered materials.

Information and technology exchange includes:

- Collect and exchange pollution prevention information through technology transfer, outreach, and educational networks.

- Develop and maintain mechanisms for fully disseminating current technical information to ORNL personnel as applicable.

- Share pollution prevention information with other DOE sites in Oak Ridge and across the DOE complex.

Tracking and reporting activities include:

- Establish tracking and communication systems that are designed to provide waste stream characterization and baseline waste stream generation data, and to enable quantitative evaluation of pollution prevention efforts.

- Develop and maintain a system of reporting pollution prevention activities and results of minimization efforts both internally and in accordance with regulatory and DOE requirements.

Opportunity assessments, pollution prevention options, and project implementation include:

- Identify and implement pollution prevention methods and technologies to reduce generated waste volume and toxicity.
- Test and evaluate new pollution prevention opportunities and associated technologies as applicable.
- Target any policies, procedures, or practices that may be barriers to pollution prevention.
- Evaluate progress made in implementation of pollution prevention opportunities identified in previous PPOAs and determine if additional PPOA activities are required on an annual basis.

Resource allocation includes:

- Identify funding requirements, obtain funding and personnel, and establish schedules for the implementation of selected pollution prevention options and Program activities.
- Track associated resource utilization to allow evaluation of use and needs.

4.3 Goals

Per the *Tennessee Hazardous Waste Reduction Act* (THWRA),[12] ORNL developed and established quantitative performance goals for each hazardous waste stream during 1994. Goals have been established for all of ORNL's waste types and subtypes, as well as for reducing releases of hazardous materials to the environment and reducing hazardous materials usage. These goals are published in Appendix C of this Program Plan. These goals are consistent with DOE-Headquarters guidance and will be revised periodically. These revisions will be based on the results of potential projects recommended in PPOAs and on data from more accurate tracking systems that may be updated and implemented. The baseline year for these goals, and the rationales for establishing the waste stream-specific and category-specific goals, are outlined; the impediments to the goals are also presented in Appendix C. If additional regulatory goals are established in the future, the Program goals will be evaluated and adjusted as applicable to ensure compliance.

In addition to Program goals, programs that indirectly support the ORNL Program have adopted goals, which are listed in Appendix C. Separate additional activities may be necessary to meet these supplemental goals. Pollution prevention goals have been developed for ORNL site managers, and as applicable, major waste-generating organizations will also establish organization-specific goals in the plans discussed in Subsection 6.5.1.1.

4.4 Pollution Prevention Performance Measures

ORNL has established pollution prevention performance measures that also correlate to many of the goal categories listed in Appendix C. ORNL's pollution prevention performance measures that only apply to routine wastes are:

- Volume of radioactive waste reduced
- Volume of mixed waste reduced
- Weight of hazardous and industrial waste reduced
- Weight of EPCRA Section 313 toxic chemical releases and off-site transfers reduced
- Weight of toxic chemical releases and off-site transfers reduced, project-by-project, due to pollution prevention activities.

ORNL's pollution prevention performance measures that apply to all operational routine and clean-up/stabilization wastes are:

- Total number of pollution prevention projects completed in the reporting year, and project-by-project implementation costs, wastes avoided, and savings realized

- Percentage of industrial waste recycled

- Percentage of affirmative procurement guideline materials purchased.

5.0 Site-Wide Analysis

Many internal and external requirements and forces impact the current Program, its progress, and its requirements. These influences include the following:

- Program directives listed in Section 5.2 and site directives and guidance discussed in Sections 5.3 and 5.8
- Issues, barriers, and obstacles listed in Section 5.4
- Program-specific planning assumptions, strengths, and weaknesses listed in Sections 5.5 and 5.6
- Insufficient resources listed in Section 5.7.

5.1 Current Situation

The ORNL Program has been in place since 1985. The program history is included in Appendix A. Program funding information is summarized in Appendix D. The ORNL Program and waste generator programs continue to develop into mature, effective programs based on the following elements:

ORNL Program:

- Organization and Infrastructure
- Program Development
- Reporting
- Site-Wide Program Implementation (Source Reduction and Recycling)
- Technical Assistance.

Waste Generator Programs:

- Organization and Infrastructure
- Site/Facility Program Development
- Site-Wide Program Participation
- Site/Facility Training
- Opportunity Assessments
- Implementation of Opportunities (Source Reduction and Recycling)
- Design Considerations
- Program Evaluation.

The Program's completion of activities within the program elements has been significant in the areas of organization and infrastructure, program development, employee involvement,

tracking, reporting, technical assistance, and information and technical exchange. The Program also has identified the need to identify additional areas for site-wide program implementation activities and has developed a methodology for performing program evaluations. Implementation activities at EM facilities at ORNL are also in the funding and implementation process.

The waste generating organizations' programs have developed specific elements of their programs, including the organization and infrastructure, program participation, opportunity assessments, specific implementation of opportunities, and program evaluation (optional). ORNL generators have recognized that additional effort is required in the areas of program development, training, further opportunity assessments, additional implementation of opportunities, and design considerations.

The status of pollution prevention efforts at ORNL is described in the Annual Report on Waste Generation and Waste Minimization Progress (Secretary of Energy Notice [SEN]-37) that is submitted to DOE. Planned activities related to the ORNL Program and the generator-based programs are summarized in the rest of this Plan and associated appendices.

5.2 Program Directives

As detailed in Appendix A, the Program is driven by the following laws, regulations, orders, agreements, and policies:

- The *Hazardous and Solid Waste Amendments* (HSWA) to the *Resource Conservation and Recovery Act* (RCRA)[13]
- The *Pollution Prevention Act of 1990* (PPA)[14]
- The *Federal Facilities Compliance Agreement* (FFCA) *for Storage of Radioactive Mixed Waste Subject to Land Disposal Restrictions* (LDR) *for the Oak Ridge Reservation*[15] [Agreement met and has been essentially replaced by the *Federal Facility Compliance Act* (FFC Act) of 1992[16]]
- The THWRA[12] and Tennessee hazardous waste regulations
- The *State Oversight Agreement between the State of Tennessee and the Department of Energy*[17] (Tennessee Oversight Agreement [TOA])
- DOE Orders 5400.1,[18] 5820.2A,[19] and 5400.3[20] (5400.3 has been cancelled.)
- Executive Order 12873,[7] *Federal Acquisition, Recycling, and Waste Prevention*

- Executive Order 12856,[21] *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*
- DOE policies[22,23,24]
- Internal policies and BMPs.

Currently, based on contractual and funding conditions, Energy Research and Energy Systems are not directly addressing Executive Orders 12856 and 12873. However, certain aspects of these orders, which are required under RCRA and the PPA, are addressed by Energy Research and Energy Systems.

The Program is also supported indirectly by the following:

- The *Emergency Planning and Community Right-to-Know Act* (EPCRA)[8]
- The CAA Amendments of 1990[9]
- DOE Orders 5400.5[25] and 6430.1A[26]
- The CWA of 1992[10]
- FFC Act of 1992[16]
- Executive Order 12088,[11] *Federal Compliance With Pollution Control Standards*
- Executive Order 12969,[27] *Federal Acquisition and Community Right to Know.*

The existence of other pollution prevention measures discussed in Section 3.4 are recognized as supporting program efforts, but are not further addressed.

Detailed information related to this legal and policy background and matrices specifying compliance with the plan requirements are found in Appendix A. The directly applicable requirements of the 1996 DOE *Pollution Prevention Program Plan*[4] are included in this Plan. Other possible legislation or DOE documents addressing pollution prevention requirements will be incorporated into this Plan after legislation is enacted or the DOE document is issued as a final version.

5.3 Relevant Site Directives or Guidance

The procedures and policies that indirectly support the implementation of this Program and Program Plan and provide additional guidance are found in Table 5-1 and in Appendix B. Relevant pollution prevention reports required under this Program are listed in the schedule in Appendix E. Relevant programs and associated documents that indirectly support the Program are described in Appendix A.

Table 5-1

Procedures and Policies Indirectly Supporting the ORNL Pollution Prevention Program

(Page 1 of 2)

Procedure Number	Procedure Title
X-AD-1	Administration of ORNL Procedures
X-AD-6	ORNL Buy-or-Make Analysis: Justification for In-House Activity
X-AD-7	ORNL Records Management
X-AD-8	Site Development and Facilities Design Review
X-AD-9	ORNL Document Management
X-ESH-1	ORNL Facility and Nuclear Criticality Safety Manual
X-ESH-2	Environmental Protection Manual
X-ESH-3	Health Physics Manual
X-ESH-4	Industrial Hygiene Manual
X-ESH-5	ORNL Safety Manual
X-ESH-6	ORNL Environmental, Safety, and Health Procedures Control System
X-ESH-7	Environmental, Safety, and Health Technical Training
X-ESH-8	Control of Explosives
X-ESH-12	Storage and Availability of Potassium Iodide
X-ESH-15	Administration of Operational Safety Requirements and Limiting Conditions Documents
X-OS-3	Safety Analysis and Review Program
X-OS-4	Facility Safety-Operational Safety Reviews and Approvals
X-FIN-1	Idle Equipment Utilization
X-FIN-2	Rare and Precious Metals Control and Accountability
X-GP-1	Laboratory Emergency Management Program
X-GP-4	Fire Prevention, Protection, and Control
X-GP-7	ORNL Readiness Reviews
X-GP-8	Control and Calibration of Measuring and Test Equipment at ORNL
X-GP-10	Restrictive Sign Posting
X-GP-11	ORNL Operations Security (OPSEC) Program
X-GP-12	Facility Management
X-GP-13	Occurrence Reporting System

Table 5-1

(Page 2 of 2)

Procedure Number	Procedure Title
X-GP-19	Administrative Procedures for Packaging and Off-Site Transportation of Hazardous and Nonhazardous Materials and Waste Shipments - Receipt of Hazardous and Nonhazardous Materials Shipments
X-GP-20	Receipt and Off-Site Transportation of Spent Nuclear Fuel
X-GP-21	Packaging of Hazardous Materials and Wastes, Including Radioactive Materials, To Be Transported Off Site
X-GP-22	Receipt and Off-Site Transportation of Radioactive Materials and Radioactive Waste
X-GP-23	Cargo-Carrying Motor Vehicle Safety Inspections
X-GP-28	Off-Site Transportation of Hazardous Wastes
X-QA-1	ORNL Quality Assurance Program
X-QA-2	The ORNL Audit Program
X-QA-3	ORNL Energy Systems Action Management System (ESAMS) Administration
X-QA-4	Corrective Action Management
X-QA-5	ORNL Root Cause Analysis Program
X-QA-6	Lessons Learned Program and Alert System
X-QA-7	ORNL Quality Assurance Audits
X-QA-8	Quality Assurance for ORNL Computer Software
X-QA-9	ORNL Nonconformance Reporting

Legend:

X-AD Administration
X-ESH Environment-Safety-Health
X-FIN Finance
X-GP General Policies
X-OS Environment-Safety-Health
X-QA Quality Assurance

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5.4 Barrier Analysis

Specific issues, barriers, and obstacles that impact the implementation and progress of the Program have been identified. These issues and barriers are as follows:

- Under the current DOE organizational structure, generators are not accountable for the vast majority of waste treatment, storage, and disposal costs. Because they are not accountable for these costs, the economic incentive for generators to minimize waste is partially limited. However, the Generator Set Aside Fund Program (GSAF) has been initiated.

- Currently, funding levels from DOE organizations for pollution prevention activities are sporadically provided and, therefore, are inadequate for effective implementation of pollution prevention activities at ORNL.

- Executive Orders 12856[21] and 12873[7] address affirmative procurement, EPCRA (SARA Title III) reporting, and pollution prevention under the PPA, and will ultimately impact ORNL. Substantial effort will be expended to gather data and then amend the current databases for the collection of data to comply with the goals, tracking, and reporting requirements associated with these executive orders. Based on current contractual and funding conditions, Energy Research and Energy Systems are not directly addressing Executive Orders 12856[21] and 12873.[7] However, certain aspects of these orders, which are required under RCRA and the PPA, are addressed by Energy Research and Energy Systems.

- State and federal regulations, as well as local public expectations, are becoming more stringent. Review processes, which include all stakeholders, are lengthening document approvals and, therefore, schedules.

Many of these issues, barriers, and obstacles will impact the cost of doing business at ORNL and thereby increase the budget requirements for waste management and the Program. With the budget already at minimal operation level, decisions may have to be made as to which operations and programs will have to be terminated to keep facilities and programs in compliance.

5.5 Planning Assumptions

The continued progress of the ORNL Program is based on the following assumptions:

- Program funding summarized in Appendix D will be received, and funding can be reallocated within the Oak Ridge Reservation (ORR) Waste Management programs to ensure continued operation of critical elements of the Program.

- When applicable, technology development activities will be funded and will be successful.

- The Program and related programs will have consistent personnel resources required to accomplish the scheduled activities in Appendix D.

- The regulatory and societal climate will continue to shift toward and emphasize the prevention of pollution versus the control of pollution.

- The required structure, laws, regulations, orders, agreements, and policies of the Program will not significantly change and will continue to force pollution prevention.

- The required planning, reporting, goals, and other program activities delineated in the various Program requirements will not significantly change.

- Activity levels and associated waste generation will not significantly increase or decrease.

- The mission of the laboratory will not significantly change.

- The reorganization of ORNL, in which ORNL and portions of WMRAD are managed by Energy Research and the remaining portions of WMRAD and the Program are managed by Energy Systems, will not hinder the implementation of pollution prevention-related activities.

5.6 Strengths and Weaknesses

The ORNL Program has made significant progress over the last several years. The following are examples of its strengths:

- The ORNL Program is well established because of senior management and grass roots commitment.

- ORNL has performed a waste stream prioritization.

- ORNL has performed several PPOAs based on the results of the prioritization.

- ORNL has implemented many pollution prevention projects resulting in a reduction in toxicity and volume for waste generation.

- ORNL has established an integrated waste tracking system and has identified and listed current waste-generating processes and activities for subsequent evaluation.

- ORNL has well-established pollution prevention awareness activities and publications to promote pollution prevention and to exchange information.

- The Program has become more formalized and coordinated, which supports consistent, complete pollution prevention planning through implementation.

The ORNL Program also recognizes that the Program still has several weaknesses, including the following examples:

- The budgeting structure and process does not favor pollution prevention because Program and waste treatment, storage, and disposal funding is provided by EM, while the generators are supposed to fund their own pollution prevention projects. The GSAF Program has been established, which taxes organizations that generate specific waste types. Although projects are funded, this structure does not provide a strong incentive for generators to implement projects because they do not realize the total associated waste handling savings; the savings are realized by EM.

- The Program requires additional formality and coordination through additional training programs to ensure consistent, complete pollution prevention planning through implementation.

- The Program needs to maintain a strong link between ORNL and the other DOE facilities, especially the Y-12 Plant and the ETTP, to maximize information and technology exchange and to minimize costs.

- As an R&D facility, ORNL generates a multitude of small, diverse waste streams. Therefore, ORNL has screened and prioritized its wastestreams and associated PPOAs.

5.7 Consequences of Insufficient Resources

If sufficient resources are not provided to totally support each element of the Program, the following will result:

General:

- Pollution prevention evaluations and implementation will continue to be delayed.

- Priority will continue to be given to compliance-driven activities, not implementation.

Organization and Infrastructure:

- The cost-effectiveness, coordination, and consistency of the pollution prevention activities at ORNL will be seriously impaired.

- Potential duplication of effort will increase costs, and inconsistency will generate difficulty with state and federal regulatory agencies.

- Coordination with the DOE pollution prevention initiative will be reduced.

Program Development:

- Without sufficient funding to support effective program management, the pollution prevention effort at ORNL will not be of sufficient quality to demonstrate an effective waste reduction effort.

- The lack of updated plans or the annual report for the THWRA carries a fine of $10,000 per day.

- Insufficient effort expended on budget preparation will result in a seriously truncated program.

- Insufficient effort expended in the development of programmatic goals and objectives will cause adverse regulatory action on the part of the state of Tennessee.

- Without sufficient employee awareness, the Program will suffer from a lack of participation and loss of focus on the individual's responsibility. A total lack of an awareness program would be in violation of the THWRA and DOE Orders.

- By not carrying out an effective self-evaluation, the ORNL Program will slip from a preventative, forward-thinking stance to a reactive stance that simply responds to negative findings.

- If inadequate participation in audits becomes the case, the Program, Energy Research, Energy Systems, DOE-ORO, and DOE-Headquarters will suffer embarrassment and possible regulatory penalties.

Reporting:

- Information that is not required by a compliance driver will not be available, such as the information traditionally used by top DOE-ORO management to meet with the Governor of Tennessee.

- Data that are necessary for the completion of required reports will not be available, casting the schedule and quality of those reports in doubt.

- Energy Research, Energy Systems, and DOE will be subject to substantial fines if required reporting is not completed.

Site-Wide Implementation:

- Unnecessary generation of waste will continue at ORNL, at a significant cost for waste management.
- Wastes for which markets already exist will be needlessly disposed of in a noncost effective manner.
- Superfluous waste generation will result in avoidable sampling, characterization, transportation, storage, treatment, and disposal costs.
- Cost savings associated with implementation will not be realized.
- DOE's, Energy Research's, and Energy Systems' legal liabilities associated with protecting the environment and human health will needlessly increase because operational liability reduction resulting from implementation will not be realized.
- Opportunities to support other DOE operations and American industry will be missed.

Technical Assistance:

- Potential duplication of pollution prevention at ORNL and other DOE sites is possible.
- Loss of benefit of interaction with private sector pollution prevention programs will occur.
- Interaction in pollution prevention with other federal agencies will decrease.

5.8 Pollution Prevention Priorities and Out-year Activities

The 1996 DOE *Pollution Prevention Program Plan* established 18 priorities that are essential to the success of the Department's pollution prevention program. The 18 items are divided into six immediate priorities (to be accomplished by fiscal year [FY] 1998), six near-term priorities (to be accomplished by FY 1999), and six out-year activities (to be accomplished by FY 2000).

<u>Immediate Priorities</u> (to be accomplished by FY 1998)

Priority One: Establish Senior Management Commitment. ORNL Senior Management Commitment is demonstrated in Chapter 2.0, Policy, and specifically in Section 2.2, Statement of Management Commitment, and in the ORNL Pollution Prevention Policy

presented in Appendix B. ORNL's incentives and awards activities are summarized in Subsection 6.2.2.1.3, Incentive Awards and Recognition.

Priority Two: Set Quantitative Source Reduction and Recycling Goals. ORNL has established quantitative source reduction and recycling goals as demonstrated in Chapter 4.0, Program Goals, and Appendix C.

Priority Three: Institute Performance Measures. ORNL has instituted performance measures. These performance measures are presented in Section 4.4, Pollution Prevention Performance Measures.

Priority Four: Implement Cost-Saving Pollution Prevention Projects. A description of the site-wide projects that ORNL has implemented is presented in Section 6.4, Site-Wide Implementation. ORNL's planned and implemented projects are tracked and reported by ORNL through the Pollution Prevention Information Management System (P2IMS) database described in Subsection 6.3.1.2.5, Program Activity Tracking. Ongoing Return on Investment (ROI) Program projects are listed in Appendix D.

Priority Five: Design Pollution Prevention into New Products, Processes, and Facilities. ORNL is committed to designing pollution prevention into new products, processes, and facilities, as discussed in Subsection 6.5.4, Design Considerations.

Priority Six: Ensure that Programs Comply with Federal, State, and Departmental Directives. Section 5.2, Program Directives, and Appendix A show how ORNL complies with federal, state, and DOE directives including laws, regulations, orders, agreements, and policies.

Near-Term Priorities (to be completed by FY 1999)

Priority One: Implement Generator-Specific Pollution Prevention Programs. As discussed in Section 6.2, Program Development, and Section 6.5, Technical Assistance, each of the waste generating organizations has established organization-specific PPR Handbooks, which include organization-specific plans as applicable. Also, general description of the site-wide projects that ORNL has implemented is presented in Section 6.4, Site-Wide Implementation.

Priority Two: Reduce Releases of Toxic Chemicals. Reduction of the release of toxic chemicals is a part of the site-wide implementation plan presented in Section 6.4, Site-Wide Implementation. ORNL's planned and implemented projects that reduce the release of toxic chemicals are tracked and reported through the P2IMS described in Subsection 6.3.1.2.5, Program Activity Tracking. ORNL's goals related to reducing releases of toxic chemicals are listed in Appendix C.

Priority Three: Establish Pollution Prevention Budgets Based Upon ADSs. The ORNL ADSs used to develop the pollution prevention budgets are presented and summarized in tables in Appendix D.

Priority Four: Perform Pollution Prevention Cost/Benefit Analyses. The methodology and mechanism used to perform pollution prevention cost/benefit analyses are discussed in Subsections 6.3.1.1, Cost Accounting, and Section 6.4, Site-Wide Implementation.

Priority Five: Facilitate Technology Transfer and Information Exchange. The ORNL technology transfer and information exchange activities are summarized in Subsection 6.5.3.1, Information Exchange and Outreach.

Priority Six: Implement Pollution Prevention Employee Training and Awareness Programs. The ORNL pollution prevention and employee training and awareness programs are presented in Subsection 6.2.2, Employee Involvement and Participation, Subsection 6.5.2, Training, and listed in Appendix E.

<u>Out-Year Activities</u> (to be completed by FY 2000)

Activity One: Implement Environmentally Sound Pollution Prevention Procurement Practices. ORNL has implemented environmentally sound pollution prevention procurement practices that are described in Subsection 6.3.1.2.2, Hazardous Material Procurement Control, and Subsection 6.3.1.2.4, Procurement of Recycled Products, and listed in Appendix C.

Activity Two: Integrate Pollution Prevention into Research, Development, Demonstration, Test, and Evaluation Programs. ORNL's integration of pollution prevention into research, development, demonstration, testing, and evaluation activities is

summarized in Section 6.4, Site-Wide Implementation, and in Subsection 6.5.3.3, Research and Development.

Activity Three: Make All DOE Policies, Orders, and Procedures Consistent with Regard to Pollution Prevention. As noted in Chapter 4.0, Program Goals, and listed in Appendix C, the goals for the ORNL pollution prevention program are consistent with all DOE policies, orders, and procedures with regard to pollution prevention. When requested, ORNL also reviews and comments DOE pollution prevention-related documents, but only DOE has the authority to modify these documents to make them consistent.

Activity Four: Implement Pollution Prevention Outreach and Public Involvement Programs. The ORNL pollution prevention outreach and public involvement activities are described in Subsection 6.5.3, Information and Technology Exchange, and listed in Appendix E.

Activity Five: Develop Pollution Prevention Incentives Programs. The ORNL Program incorporates incentives and awards into its activities as described in Subsection 6.2.2.1.3, Incentive Awards and Recognition, and shown in Appendices E and F.

Activity Six: Promote Regulatory Review and Reform. When requested, ORNL reviews and comments proposed regulations, but the Program does not have the authority to promote regulatory review and reform.

6.0 Pollution Prevention Activities and Resource Requirements

In Appendix D, the requested budget for the ORNL Program and specific waste generator pollution prevention activities is listed by FY. These figures do not include additional personnel support provided by the actual waste generators who perform or support pollution prevention activities. Specific ORNL Program elements are summarized in the following sections:

6.1 Program Organization and Infrastructure
6.2 Program Development
6.3 Reporting
6.4 Site-Wide Implementation
6.5 Technical Assistance.

These elements are based on the DOE guidance documents[1,2,3] specified in Chapter 1.0. Budgeting documents, including ADSs, specify distinct actions and funding levels required to support the activities listed and described as appropriate for each of these elements. The ADSs for Program and generator pollution prevention activities are included in Appendix D. A detailed schedule of Program activities is included in Appendix E.

6.1 Program Organization and Infrastructure

The ORNL Program organization is described in Chapter 3.0. The ORNL Program, Program staff, and generators perform the following activities to maintain this organization:

- Establish and lead the ORNL Program and coordinate the Committee.
- Ensure the Program and Committee are properly staffed (Chapter 3.0 and Appendices B and D).
- Support the PPRs and generators and the ORR Affirmative Procurement Team (Chapter 3.0 and Section 6.5).
- Establish and support the Committee, laboratory-wide, and Energy Systems pollution prevention programs, PPOA teams, pollution prevention-related teams, and pollution prevention projects (Chapter 3.0 and Sections 6.2, 6.4, and 6.5).
- Ensure that the PPRs and generators participate in laboratory-wide and operation-specific pollution prevention activities (Chapter 3.0 and Sections 6.2, 6.4, and 6.5).

- Integrate and monitor the elements of the Program and the generators' programs and review and update management's pollution prevention performance measures criteria (Chapter 3.0 and Sections 6.2 and 6.3).

- Interface with and participate in the Energy Systems, Corporate, DOE ORNL Site Office, DOE-ORO, and DOE-Headquarters pollution prevention program activities as appropriate (Chapter 3.0 and Subsection 6.5.3).

- Institute corrective actions resulting from annual pollution prevention self-assessments and other internal and external pollution prevention surveillances, audits, and assessments (Chapter 3.0 and Subsection 6.2.3).

Supporting activities are scheduled in Appendix E. The funding requested to support this program element is listed in Appendix D. ER activities, wastes, and associated pollution prevention planning and activities are the responsibility of the ER Organization. Similarly, decontamination and decommissioning activities, wastes, and associated pollution prevention requirements are also the responsibility of the ER Organization, which funds these activities. ORNL, however, will provide integration support when appropriate. Additional information concerning performance measures is included in Sections 4.4 and 6.2.

6.2 Program Development

The ORNL Program continues to mature toward a formalized and coordinated program. Program activities that support this development include the following:

- Provide support for coordination, planning, and reporting of pollution prevention activities (Chapter 3.0).

- Periodically update the Program Plan as detailed in Appendix A and periodically update the PPR Handbooks and waste generating organizations' pollution prevention plans discussed in Section 6.5.

- Update the ORNL Pollution Prevention Policy included in Appendix B as necessary.

- Update the Program objectives listed in Section 4.2, performance measures in Section 4.4, and quantitative goals in Appendix C and update organization-specific pollution prevention program objectives, measures, and quantitative and qualitative goals.

- Update the Program and related programs activities schedule found in Appendix E, update organization-specific activities schedules, and schedule pollution prevention milestones in other scheduling mechanisms when appropriate.

- Update funding requested and budgets for programmatic activities, generator activities, and projects; estimate waste-based costs; and support GSAF Program activities (Appendix D).

- With the support of ORNL management and the Committee, recruit and assign additional personnel to support program implementation, including specific projects as needed.

- Assign and maintain personnel to develop and implement each organization's pollution prevention program and plan.

- Continue to integrate pollution prevention principles and practices into ORNL procedures, including reviewing pollution prevention-based procedures (Section 5.3).

- Continue to integrate affirmative procurement requirements specified under RCRA into Program activities as appropriate.

- Continue to incorporate and integrate quality assurance (QA) objectives and methods into Program activities and review the WMRAD's QA plan.

- Manage pollution prevention subtasks for liquid radioactive waste streams, including research and development activities, waste stream evaluations, education programs, and reuse and recycling programs.

- Coordinate pollution prevention activities with related activities directed by strategic planning groups, waste operations groups, capital projects groups, and waste generators.

- Continue to coordinate the generation of annual waste reduction reports as required by regulations and orders.

Specifically, guidance implementing DOE Order 5820.2A[19] stresses the requirement and need for QA in conducting pollution prevention activities. It indicates that pollution prevention programs are required to "retain an appropriate level of documentation and accountability. The documentation of these programs should be designed to satisfy all requirements of the Waste Operations Quality Assurance Program at each field office." QA program objectives and methods from DOE Order 5700.6C[28] are incorporated into the ORNL Program as applicable. Program self-assessments are conducted annually as discussed in Section 6.2.3 and scheduled in Appendix E.

6.2.1 Funding Planning and Management

Pollution prevention budget planning and management activities include compiling budget requests and tracking funding. Specifically, ADSs and related documentation are completed to request funding for the Program and are compiled annually and revised based on special requests and changes in funding and work breakdown structures. Generator funding request activities are also supported. For instance, the Program periodically compiles cost-oriented data concerning waste costs, which are used to illustrate pollution prevention benefits. Generator funding requests include annually requesting site funding to support internal activities. Periodically, the Program supports the generators in completing project implementation funding requests to DOE Energy Research and through special funding programs. The special funding programs are discussed further in Section 6.4. Energy Systems and Energy Research also have developed and instituted the GSAF Program, which requires strong support from the Program. Finally, once funding is received, all funded activities and related resources must be managed and tracked, and funding-based reporting must periodically be completed.

6.2.2 Employee Involvement and Participation

Program participation and employee involvement activities require the following activities:

- Continue to implement and update the PPAP activities as needed to continue to increase employee awareness (Subsection 6.2.2.1.2).
- Continue to award and recognize employees for pollution prevention efforts (Subsection 6.2.2.1.3).
- Continue to include pollution prevention criteria in employee measures of performance (Subsection 6.2.2.1.1).
- Continue to publicize pollution prevention progress in newsletters and other ORNL and Energy Systems publications (Subsection 6.2.2.1.2).
- Continue generator participation in PPOA and implementation awareness activities as applicable (Subsection 6.2.2.1.2).

Additional information concerning ORNL Program activities supporting this function is provided in the following sections. Related training activities are discussed in Section 6.5.

6.2.2.1 Employee Participation

6.2.2.1.1 Performance Evaluations

Pollution prevention has been incorporated into senior ORNL management measures of performance standards. The pollution prevention goals, objectives, and accomplishments are then summarized and incorporated into the annual evaluations of job performance for top level management who have pollution prevention responsibilities.

6.2.2.1.2 Pollution Prevention Awareness

The PPAP required by DOE Order 5400.1[18] has been incorporated with the ORNL Program awareness activities for planning purposes. DOE Order 5400.1 specifies that a documented PPAP be part of mission statements and project plans. The purpose of the PPAP is to foster the philosophy that prevention is superior to remediation. The goal of the program is to incorporate pollution prevention into the decision-making process at every level throughout the organization.

Similar to the ORNL Program, the PPAP objectives are to instill awareness, disseminate information, provide training and rewards for identifying the true source or cause of wastes, and encourage employee participation in solving environmental issues and preventing pollution. The PPAP is an ongoing, continual effort. Specifically, the PPAP has the following objectives, in addition to the Program objectives previously listed:

- Increase employees' awareness of general environmental activities and hazards at ORNL and of the Program requirements, goals, and accomplishments.
- Inform employees of specific environmental issues.
- Train employees on their responsibilities in pollution prevention (Section 6.5).
- Recognize employees for efforts to improve environmental conditions through pollution prevention.
- Encourage employees to participate in pollution prevention at ORNL.
- Publicize success stories.

The ORNL Program is responsible for the PPAP and incorporates many of the PPAP activities into other ORNL activities. The ORNL Program manages the associated planning and implementation of the PPAP. The pollution prevention awareness activities are conducted

throughout the year, with an increased emphasis during the Earth Day and Pollution Prevention Month time frames. The ORNL Program attempts to fully utilize established systems for information dissemination, existing training programs, and existing incentive programs as described in other sections of this plan. Specific activities include the dissemination of information through the ORNL Pollution Prevention Home Page, laboratory-wide bulletin distribution, posters, ORNL Electronic Information System (*ORNL Today*) bulletins, and internal and external newsletters. The PPAP also issues the newsletter *ORNL Recycler* on the ORNL Pollution Prevention Home Page quarterly, sponsors a booth at the EnvironMENTAL Fair, and supports and coordinates special one-time activities, such as the mini-EnvironMENTAL Fairs. New ORNL employees also receive pollution prevention packages that include a summary of the Program, a file folder for collecting recyclable paper if in an approved area, and a reusable mug made of recycled plastic. Scheduled promotional activities are listed in Appendix E. Awareness and training activities such as the Earth Day activities periodically promote recycling of reusable materials, including composting. Related newsletter activities are discussed in Section 6.3, and related training activities are discussed in Section 6.5.

6.2.2.1.3 Incentive Awards and Recognition

Awards are used to recognize individual and team pollution prevention achievements. Potential awards for which successful projects will be submitted as candidates are listed in the schedule in Appendix E. A compilation of awards received to date are listed in Appendix F.

6.2.3 Program Evaluation

The Program and generators perform periodic evaluations of ORNL Program and generator activities. Specific activities required for this evaluation activity are:

- Assess employee participation.
- Assess Program implementation status.
- Evaluate performance against goals for the ORNL Program and the generators' programs.
- Participate in generator pollution prevention self-assessments evaluating generator program implementation status (optional).
- Evaluate effect of source reduction and recycling on waste generation and disposal rates.

- Evaluate waste generator awareness of pollution prevention concepts.
- Participate in audits, reviews, and assessments.

Specifically, a self-assessment of the ORNL Program is scheduled to be performed annually. Waste generating organizations perform self-assessments periodically (optional). As appropriate, these self-assessments include all elements of the site's and generator's pollution prevention programs. The basic elements of these programs are listed in Tables 6-1 and 6-2.

ORNL has compiled a methodology for performing these programmatic self-assessments. The ORNL Program also compiled a methodology for generators to use in their organizations as appropriate. Both methodologies include checklist-based forms with designated areas to provide comments and backup documentation. This format facilitates consistent collection of information and completion of these assessments.

In general, Program achievements are documented, and potential areas for improvement are identified. The self-assessment results are reported to the Program and organization management. As appropriate, information from the self-assessment are incorporated into established reports at ORNL and sent to DOE and to the regulators when required. The results also are used to establish future pollution prevention goals and Program objectives and are used to determine if changes to this plan are required. Updates, as appropriate, are made to this plan to provide a current, accurate description of the ORNL Program.

6.3 Reporting

Program tracking and reporting activities are essential to the success of the Program and require the following activities:

Tracking:

- Continue to expand and enhance site material inventory tracking for pollution prevention purposes (Section 6.3.1.2.2).
- Continue to expand and enhance the ORNL waste tracking capabilities and system for pollution prevention purposes (Section 6.3.1.2.1).
- Continue to formalize the estimation of waste generation and waste management costs and benefits of pollution prevention (Section 6.3.1.1).

Table 6-1

Potential Elements and Criteria for the Oak Ridge National Laboratory Pollution Prevention Program Self-Assessment

(Page 1 of 5)

Elements	Criteria
1. Organization and Infrastructure	• Designate and maintain a Pollution Prevention Coordinator (PPC) and staff. • Designate and maintain a Pollution Prevention Representative (PPR) for each waste-generating division and the PPR Committee. • Establish, integrate, and monitor the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program (Program), the generator programs, pollution prevention opportunity assessment (PPOA) teams, and pollution prevention projects. • Interface with and participate in the U.S. Department of Energy (DOE)-Oak Ridge Operations (ORO) and DOE-Headquarters Pollution Prevention Program.
2. Program Development	• Develop and periodically update ORNL Program Plan. • Develop and establish a Pollution Prevention Policy for ORNL. • Develop and maintain ORNL Program objectives and establish quantitative and qualitative goals. • Develop activity schedules for specific tasks and projects. • Formulate budgets for ORNL programmatic activities. • Assign personnel to develop and implement the ORNL Program. • Integrate pollution prevention practices into operating procedures. • Incorporate DOE quality assurance objectives and methods (DOE Order 5700.6C) into pollution prevention activities. • Provide support for coordinating, planning, and reporting pollution prevention activities. • Integrate affirmative procurement requirements specified under the Resource Conservation and Recovery Act into Program activities as appropriate. • Manage pollution prevention subtasks for liquid radioactive waste streams, including research and development activities, waste stream evaluations, education programs, and reuse and recycling programs. • Coordinate pollution prevention activities with related activities directed by strategic planning groups, waste operations groups, capital projects groups, and waste generators. • Coordinate the generation of annual waste reduction reports as required by regulations and orders.

Table 6-1

Elements	Criteria
3. Employee Involvement	• Develop and update employee general pollution prevention training. • Increase employee pollution prevention awareness. • Award and recognize employees for pollution prevention efforts. • Include pollution prevention as criteria in employee evaluation. • Publicize pollution prevention progress in newsletters and other site publications. • Develop and update employee general pollution prevention training as applicable; ORNL employees receive general training, when appropriate, to promote awareness, and PPRs and other applicable ORNL employees receive PPOA training, as needed.
4. Tracking	• Establish or enhance site material inventory tracking for pollution prevention purposes. • Establish or enhance waste tracking for pollution prevention purposes. • Estimate waste generation and waste management costs/benefits of pollution prevention.
5. Reporting	• Determine and report waste generation baseline. • Fulfill all pollution prevention-driven compliance reporting requirements. • Complete all pollution prevention Headquarters and Operations Office reporting requirements. • Report removal of wastes from environmental restoration activities (not applicable at ORNL - managed by a centralized organization).

Table 6-1

Elements	Criteria
6. Site-Wide Program Implementation	
6a. Site-Wide Source Reduction Programs for Hazardous, Radioactive, and Mixed Wastes	6a. • Reduce the use and release of toxic chemicals. • Substitute toxic chemicals and other hazardous materials. • Exchange excess toxic chemicals and hazardous materials so that they do not become wastes. • Support existing chlorofluorocarbon solvent substitution program. • Develop and implement ORNL-wide materials substitution programs, develop and maintain inventory control programs, foster increased use of affirmative procurement, and participate in the Toxics Reduction Initiative. • Request funding for pollution prevention projects through the Lockheed Martin Energy Systems, Inc. (Energy Systems) High Implementation Value (HiVal) Program and DOE's Return on Investment (ROI) Program.
6b. Site-Wide Recycling Programs for Hazardous, Radioactive, and Mixed Wastes	6b. • Reduce or recycle hazardous and radioactive wastes on site. • Recycle hazardous wastes off site. • Support existing program and develop additional programs. • Request funding for pollution prevention projects through the Energy Systems HiVal Program and DOE's ROI Program.
6c. Site-Wide Source Reduction and Recycle Programs for Industrial Waste (DOE Sanitary Waste Type)	6c. • Use affirmative procurement practices to encourage the purchase and use of recovered materials. • Reuse or recycle solid industrial wastes. • Support existing programs and develop additional programs. • Request funding for pollution prevention projects through the Energy Systems HiVal Program and DOE's ROI Program.

Table 6-1

(Page 4 of 5)

Elements	Criteria
7. Technical Assistance	• Assist generators in setting quantitative and qualitative goals. • Assist generators in determining waste generation baseline. • Assist generators in assessing and implementing opportunities. • Assist generators in establishing Model Pollution Prevention Programs. • Assist generators in identifying technical impediments to implementation of pollution prevention opportunities and solutions to these barriers. • Provide for direct participation in the application of innovative pollution prevention technologies that will result in pollution prevention at ORNL and at DOE sites nationwide. • Focus on identifying ways to eliminate waste streams, change generator processes to reduce the volume or toxicity of waste streams, segregate waste streams to allow efficient treatment for storage or disposal, and improve treatment of waste at the point of generation and in centralized facilities to (1) solicit and evaluate proposals, (2) perform and provide support for PPOAs, (3) provide PPOA training, and (4) provide program planning assistance. • Support prioritization of waste streams to ensure a systematic approach to pollution prevention.
8. Information and Technical Exchange	• Participate in seminars, workshops, and meetings. • Periodically hold meetings with generator PPRs. • Participate in pollution prevention information clearinghouse. • Foster outreach and participate in public relations.
9. Program Evaluation	• Assess employee participation. • Assess program implementation status. • Evaluate program performance against goals. • Participate in audits, reviews, and assessments.

Table 6-1

Elements	Criteria
10. Implementation at Environmental Management (EM)-30 Facilities[a]	Source Reduction: • Modify processes to reduce hazardous and radioactive waste generation. • Substitute materials to reduce toxic chemical use and release. • Substitute materials to reduce hazardous and radioactive waste generation. • Procure capital equipment to implement pollution prevention opportunities. • Conduct research, development, and demonstration on difficult-to-manage waste streams. Recycling: • Reuse and recycle hazardous and radioactive wastes on site. • Recycle hazardous wastes off site. • Use affirmative procurement practices to encourage the purchase and use of recovered materials. • Apply source reduction, reuse, or recycle of solid industrial wastes.

[a] When required, the Program supports the ORNL Waste Management and Remedial Action Division PPR in implementing pollution prevention options in EM facilities.

Table 6-2

Potential Elements and Criteria for the Oak Ridge National Laboratory Line Organizations' Pollution Prevention Programs Self-Assessment

(Page 1 of 2)

Elements	Criteria
1. Organization and Infrastructure	• Designate a divisional Pollution Prevention Representative (PPR). • Support and interface with the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program (Program), Pollution Prevention Coordinator (PPC) and staff, and U.S. Department of Energy (DOE) Headquarters. • Participate on the PPR Committee and Coordinator Network. • Ensure participation of PPRs and generators in laboratory-wide and operation-specific pollution prevention activities. • Institute corrective actions resulting from program evaluation.
2. Site/Facility Program Development	• Develop and periodically update divisional pollution prevention plan and/or PPR Handbook. • Develop divisional pollution prevention program objectives and establish quantitative and qualitative goals. • Develop activity schedules for specific tasks and projects. • Formulate budgets for divisional programmatic activities. • Assign personnel to develop and implement the divisional pollution prevention program. • Integrate pollution prevention practices into divisional operating procedures.
3. Site-Wide Program Participation	• Involve employees in job-specific pollution prevention practices. • Exchange information and technologies with other waste generators. • Seek technical assistance from the site-wide program. • Track material use, waste generation rates, and recycling rates. • Report on material usage, waste generation, recycling, and progress made due to implementing pollution prevention practices. • Participate in site-wide source reduction and recycling programs. • Participate in site-wide awareness activities and in site-wide or organizational pollution prevention opportunity assessment (PPOA) activities.
4. Site/Facility Training	• Provide job-specific training. • Participate in opportunity assessment(s) and implementation training.

Table 6-2

(Page 2 of 2)

Elements	Criteria
5. Opportunity Assessments	• Identify and evaluate current and potential waste-generating activities. • Identify and prioritize pollution prevention opportunities. • Identify research and development needs.
6a. Implement Source Reduction Opportunities for Hazardous, Radioactive, and Mixed Wastes	6a. • Modify processes to reduce hazardous, radioactive, and mixed waste generation, as well as emissions and discharges. • Substitute materials to reduce toxic chemical use and release. • Substitute materials to reduce hazardous, radioactive, and mixed waste generation. • Procure capital equipment to implement pollution prevention opportunities. • Conduct research, development, and demonstration on difficult-to-manage waste streams. • Request funding for pollution prevention projects through the Lockheed Martin Energy Systems, Inc. (Energy Systems) High Implementation Value (HiVal) Program and DOE's Return on Investment (ROI) Program.
6b. Implement Recycling Opportunities for Hazardous, Radioactive, and Mixed Wastes	6b. • Reuse or recycle hazardous, radioactive, and mixed wastes on site. • Recycle hazardous, radioactive, and mixed wastes off site. • Request funding for pollution prevention projects through the Energy Systems HiVal Program and DOE's ROI Program.
6c. Implement Source Reduction and Recycle Opportunities for Industrial Waste (DOE Sanitary Waste Type)	6c. • Use affirmative procurement practices to encourage the purchase and use of recovered materials. • Apply source reduction, reuse, or recycle of solid industrial wastes on site and off site. • Request funding for pollution prevention projects through the Energy Systems HiVal Program and DOE's ROI Program.
7. Design Considerations	• Design pollution prevention principles into new facilities and operations including projects/experiments. • Incorporate pollution prevention into facilities upgrades and process modifications. • Evaluate the potential of new technologies for waste generating activities.
8. Program Evaluation	• Evaluate generator program implementation status. • Evaluate effect of source reduction and recycling on waste generation and disposal rates.

- Continue support provided by generators for tracking activities associated with material usage, waste generation rates, recycling rates, and progress made due to implementing pollution prevention practices (Section 3.3).

Reporting:

- Maintain and report waste generation baseline per DOE requirements as well as maintain and report waste generation baseline per THWRA (Section 4.3 and Appendix C).

- Continue to fulfill all pollution prevention-driven compliance reporting requirements (Section 5.2 and Appendix E).

- Continue to complete all pollution prevention DOE-Headquarters, DOE-ORO Office, and DOE ORNL Site Office reporting requirements; continue to compile and submit requested data for reports submitted through WMRAD; and compile and electronically publish ORNL newsletters (Section 6.3.2 and Appendix E).

- Continue support provided by generators for reporting activities associated with material usage, waste generation, recycling, and progress made due to implementing pollution prevention practices (Section 3.3).

The reporting of the removal of wastes from ER activities is not applicable to the ORNL Program because these activities are managed by a centralized organization. ORNL also electronically issues the newsletter *ORNL Recycler* quarterly on the ORNL Pollution Prevention Home Page. Related awareness activities are discussed in Section 6.2. Additional information concerning ORNL Program activities supporting these reporting-related functions is provided in the following sections.

6.3.1 Tracking

ORNL continues to strive for integrated tracking activities, which are required to comply with reporting requirements. This section describes the tracking activities currently performed and planned that support pollution prevention at ORNL.

6.3.1.1 Cost Accounting

In general, the accounting, timekeeping, and waste tracking systems at ORNL are used to retrieve waste stream-specific cost data for use during PPOAs and project assessments. Specific costs applied based on each project's needs include costs of raw materials, direct personnel costs, transportation costs, storage costs, and disposal costs. As appropriate, the costs associated with compliance activities, regulatory oversight, and future liabilities, as well

as life cycle costs are considered to the extent feasible as part of the cost calculations performed during assessments. DOE and the Program have both developed guidance on calculating waste-related costs. As appropriate, ORNL uses the current version of *FY 1996 HIVal Proposal Standards and Guidelines*[29] and the *Guide to Estimating and Reporting Pollution Prevention Cost Benefits for Oak Ridge Reservation, Paducah, and Portsmith.*[30]

ORNL recognizes that private industrial generators have implemented the greatest reductions in waste generation when the costs of generating the wastes are directly charged to the generating organization in an expedient manner. Prior to FY 1990, ORNL utilized a cost accounting system whereby waste generators were directly charged for specific costs for managing their waste (dollars per kilogram [kg] or cubic meter [m^3]). Through the *Environmental Restoration and Waste Management 5-Year Plan,*[31] waste generating programs contribute funds at the DOE-Headquarters level. The amount collected from each program is determined according to the quantity of waste it generated during the prior FY. Waste collection and management are paid for from this pool of funds. However, as part of the GSAF Program, generators are directly charged a fee based on waste generated.

6.3.1.2 Tracking and Reporting Systems

6.3.1.2.1 Tracking from Point of Generation to Point of Disposition

A comprehensive, computerized tracking system is required to identify trends and measure achievements concerning pollution prevention opportunities and future efforts at ORNL. Overall, during the last several years, ORNL used a combination of several databases to track generated wastes. ORNL had identified a need for tracking system upgrades. Therefore, the current system was developed. This system tracks hazardous and radioactive wastes and any industrial wastes managed by WMRAD. Historical data from the databases used prior to this system have been transferred into this new system. ORNL has also implemented several supporting activities including barcoding all items and containers and weighing all waste placed in storage. The current mechanism for central tracking and reporting is the Environmental Mixed Waste Inventory Report (EMWIR). Within this system, the wastes are segregated by waste type.

The objectives of the EMWIR system are as follows:

- Provide a common and consistent baseline source of waste information.

- Enable the evolution of Energy Research and Energy Systems from waste tracking systems to waste management systems.
- Continue to support the TOA.
- Support establishing consistent waste tracking business practices across Energy Research and Energy Systems.

The benefits of the EMWIR are as follows:

- Integration of waste information from existing information systems
- Improved communications within and among sites (business and systems personnel) through joint efforts
- Ease with which the Tennessee Department of Environment and Conservation (TDEC) and DOE can deal with community system and business rules
- Common data transfer format.

As noted, ORNL will continue to support the EMWIR as appropriate.

6.3.1.2.2 Hazardous Material Procurement Control

The Hazardous Material Inventory System (HMIS) is used by ORNL to track all procurements of hazardous materials from procurement to the user. The HMIS-Procurement Interface allows ORNL to compile data on materials procured for use in reporting, performing PPOAs, and evaluating progress.

The HMIS allows customers to "shop" in other laboratories' inventories within their division, thus reducing the volume of new chemicals purchased and allowing consumption of chemicals already on the shelf prior to their expiration. Specifically, one or more personnel within the division are assigned to be HMIS representatives. Only HMIS representatives have access to the HMIS that allows them to update system data.

6.3.1.2.3 Waste Certification

A waste certification/pollution prevention checklist has been developed. This checklist documents pollution prevention techniques and activities examined or applied to a specific waste stream or streams. This checklist also requires the organization's PPR to sign the checklist.

6.3.1.2.4 Procurement of Recycled Products

If developed and implemented, an affirmative procurement system for tracking the purchases of products containing recycled materials as a function of the total procurement of such products would be the responsibility of Central Procurement and would be supported by ORNL.

6.3.1.2.5 Program Activity Tracking

A computerized database system has been developed and updated to provide feedback on the progress of the Program, including the results of pollution prevention projects and other implemented pollution prevention options. The Program also developed a form that includes all of the project-related information that must be retrieved from the waste generators and entered into the database. The PPRs provide the vital interface between the waste generators and the Program by ensuring that projects are identified and related information is captured. The PPRs help ensure that each form is correctly completed by working with the waste generators. During the past 2 years, specific tracking needs had been defined and implemented for Energy Systems using a compatible database, the P2IMS. Data for all three sites are stored on the centralized system, which allows the other sites to have view-only access to all of the pollution prevention projects. All activities such as PPOAs, High Implementation Value (HiVal) Program projects, and ROI Program projects are now directly tied to each other via the database structure.

6.3.2 Reporting Requirements

Reporting activities are performed by the Program and associated organizations at ORNL to ensure compliance with regulatory and DOE reporting requirements. The schedule in Appendix E includes several pollution prevention-oriented reports completed by ORNL.

Federal and State Reporting Requirements. Tracking systems developed under this and other programs have been and will continue to be designed to facilitate reporting pollution prevention data and accomplishments to DOE, the U.S. Environmental Protection Agency (EPA), TDEC, Energy Research management, and Energy Systems management.

6.4 Site-Wide Implementation

Source reduction and recycling activities at ORNL are the most measurable end result of a successful pollution prevention program. The Program performs or supports laboratory-wide source reduction and recycling activities when applicable and strongly supports generator activities. Many of these activities result from recommendations made by PPOAs. The identification, prioritization, and update of these PPOAs are included in this section, but PPOAs are primarily discussed in Section 6.5. The following sections list the types of activities that ORNL supports.

6.4.1 Site-Wide Source Reduction Programs for Hazardous, Radioactive, and Mixed Waste Streams

Laboratory-wide source reduction programs for hazardous, radioactive, and mixed waste streams, including polychlorinated biphenyls (PCB) wastes, specifically require the following Program and generator activities:

- Continue to reduce the use and release of toxic chemicals.
- Continue to substitute nonhazardous or less hazardous materials for toxic chemicals and other hazardous materials, including using HMIS pollution prevention evaluations and substitutions.
- Continue to exchange excess toxic chemicals and hazardous materials so they do not become wastes, using the Swap Shop and suggesting enhancements to the Swap Shop.
- Expand the use of Between-Use-Storage Areas (BUS) Stops across ORNL.
- Support existing chlorofluorocarbon solvent substitution program.
- Develop and implement ORNL-wide materials substitution programs, develop and maintain inventory control programs, foster increased use of affirmative procurement including interfacing with and supporting the ORR Affirmative Procurement Team, and participate in the Toxics Reduction Initiative (Section 6.1).
- Continue generator participation in laboratory-wide source reduction programs (Section 3.3 and Subsection 6.2.2.1).
- Continue to solicit and review proposals to request funding for and manage resulting pollution prevention projects through the Energy Systems HiVal Program, DOE's ROI Program, and other funding sources such as the GSAF Program.

6.4.1.1 Source Reduction Opportunities Implementation for Hazardous, Radioactive, and Mixed Waste Streams

While laboratory-wide source reduction activities have reduced waste at ORNL, coordinated generator implementation of source reduction opportunities for hazardous, radioactive, and mixed waste streams, including PCB wastes, ultimately will continue to have the greatest impact on reducing ORNL's wastes. The following activities are required to implement generator-based source reduction activities:

- Continue to modify processes to reduce hazardous, radioactive, and mixed waste generation, as well as emissions and discharges.
- Continue to substitute materials to reduce toxic chemical use and release.
- Continue to substitute materials to reduce hazardous, radioactive, and mixed waste generation.
- Continue to procure capital equipment to implement pollution prevention opportunities (Appendix D).
- Continue to conduct research, development, and demonstration activities for priority waste streams (Subsection 6.5.3.3).
- Continue to request funding for and manage resulting pollution prevention projects through the Energy Systems HiVal Program, DOE's ROI Program, and other funding sources such as the GSAF Program.

6.4.2 Site-Wide Recycling Programs for Hazardous, Radioactive, and Mixed Waste Streams

Laboratory-wide recycling programs for hazardous, radioactive, and mixed waste streams, including PCB wastes, specifically require the following Program and generator activities:

- Continue to reuse or recycle hazardous, radioactive, and mixed wastes on site, including interfacing with the Swap Shop prior to declaring a material a waste.
- Continue to expand the recycle of hazardous wastes off site.
- Continue to support existing programs and develop additional programs.
- Continue generator participation in laboratory-wide recycling programs (Section 3.3).

- Continue to solicit and review proposals to request funding for and manage resulting pollution prevention projects through the Energy Systems HiVal Program, DOE's ROI Program, and other funding sources such as the GSAF Program.

6.4.2.1 Recycling Opportunities Implementation for Hazardous, Radioactive, and Mixed Waste Streams

While laboratory-wide recycling activities have reduced the quantity of ORNL waste destined for disposal, coordinated generator implementation of recycling opportunities for hazardous, radioactive, and mixed waste streams, including PCB wastes, ultimately will continue to have a great impact on reducing ORNL's wastes. The following activities are required to implement generator-based recycling activities:

- Continue to reuse or recycle hazardous, radioactive, and mixed wastes on site, including interfacing with the Swap Shop prior to declaring a material a waste.

- Continue to expand and support the recycling of hazardous wastes off site.

- Continue to request funding for and manage resulting pollution prevention projects through the Energy Systems HiVal Program, DOE's ROI Program, and other funding sources such as the GSAF Program.

6.4.3 Site-Wide Source Reduction and Recycling Programs for Industrial Waste Streams

DOE refers to this waste type as sanitary waste. Laboratory-wide reduction and recycling programs for solid industrial waste streams specifically require the following Program and generator activities:

- Expand the use of affirmative procurement practices to encourage the purchase and use of recovered materials including interfacing with and supporting the ORR Affirmative Procurement Team (Subsection 6.3.1.2.4 and Appendix A).

- Continue to reuse or recycle solid industrial wastes, including interfacing with the Swap Shop prior to declaring a material a waste.

- Continue to support existing programs and develop additional programs.

- Continue generator participation in laboratory-wide source reduction and recycling programs (Section 3.3).

- Continue to solicit and review proposals to request funding for and manage resulting pollution prevention projects through the Energy Systems HiVal Program, DOE's ROI Program, and other funding sources such as the GSAF Program.

6.4.3.1 Source Reduction and Recycling Opportunities Implementation for Industrial Waste Streams

While laboratory-wide source reduction and recycling activities have reduced the quantity of ORNL waste destined for disposal, coordinated generator implementation of source reduction and recycling opportunities for solid industrial waste streams will also continue to have a great impact on reducing ORNL's wastes. The following activities are required to implement generator-based source reduction and recycling activities:

- Expand and support affirmative procurement practices to encourage the purchase and use of recovered materials (Subsection 6.3.1.2.4 and Appendix A).

- Continue to apply source reduction, reuse, or recycling of solid industrial wastes on site and off site, including interfacing with the Swap Shop prior to declaring a material a waste.

- Continue to request funding for and manage resulting pollution prevention projects through the Energy Systems HiVal Program, DOE's ROI Program, and other funding sources such as the GSAF Program.

ORNL initiated the ORNL Recycling Program for solid industrial wastes in 1991, which now includes fly ash, white paper, mixed paper, cardboard, plastic, aluminum beverage cans, and toner cartridges. The recycling effort involves all ORNL organizations and requires substantial coordination among the following three organizations:

- ORNL Plant and Equipment Division, which collects many of the recycled materials

- ORNL Office of Radiation Protection, which approves the areas from where the materials are collected

- ORNL Pollution and Prevention Program, which manages the programs, tracks and reports amounts recycled, and manages the portions of the programs that are subcontracted.

Funding is summarized in Appendix D.

6.5 Technical Assistance

Waste generators often require pollution prevention-related technical assistance. Without this assistance, potential pollution prevention opportunities and progress may not be recognized or tracked. Technical assistance provided by the Program specifically requires the following ongoing activities:

- Assist generators in setting quantitative and qualitative goals (Section 4.3).
- Assist generators in determining waste generation baselines.
- Assist generators in assessing, implementing, and reporting opportunities, including establishing standard methods for evaluating pollution prevention alternatives (total cost analysis) and participating in the NEPA documentation review.
- Assist generators in developing and establishing organization-specific pollution prevention program plans and/or PPR Handbooks.
- Assist generators in identifying technical impediments to implementation of pollution prevention opportunities and solutions to these barriers.
- Provide for direct participation in the application of innovative pollution prevention technologies that will result in pollution prevention at ORNL and at DOE sites nationwide, and participate in HiVal Team meetings.
- Focus on identifying ways to eliminate waste streams, change generator processes to reduce the volume or toxicity of waste streams, segregate waste streams to allow efficient treatment for storage or disposal, and improve treatment of waste at the point of generation and in centralized facilities to (1) solicit and evaluate proposals, (2) perform and provide support for PPOAs, (3) provide PPOA training, and (4) provide program planning assistance.
- Support prioritization of waste streams to ensure a systematic approach to pollution prevention.

Generators are responsible for actually requesting this technical assistance from the Program (Section 3.3).

6.5.1 Opportunity Assessments and Pollution Prevention Terminology

PPOAs that evaluate ORNL processes and operations for potential opportunities to apply pollution prevention techniques are crucial to reducing waste generation and disposal. Opportunity assessments specifically require the following Program and generator activities:

- Continue to identify and evaluate current and potential waste generating activities.
- Continue to identify and prioritize PPOAs and pollution prevention opportunities.
- Continue to identify research and development needs.
- Continue waste generator participation in opportunity assessments and updating of PPOAs (Section 3.3).

The identification, prioritization, and update of PPOAs are included in Section 6.4. Additional information concerning ORNL Program activities supporting all PPOA activities is provided in the following sections.

6.5.1.1 Opportunity Assessments

Since 1990, ORNL has completed numerous PPOAs, previously referred to as process waste assessments (PWA). The PPOAs that were performed are listed in Table 6-3. ORNL screened and prioritized its high-priority waste streams for PPOAs and related activities. The resulting projects are also prioritized using standardized ranking criteria developed and implemented by the ORNL Program. ORNL also reviews planned ORNL activities, through the NEPA review process, to determine if any areas need to be assessed or reassessed for pollution prevention opportunities.

The DOE PPOA guidance also was modified and is described in the February 1996 *U.S. Department of Energy Model Pollution Prevention Opportunity Assessment Guidance*.[32] This methodology is based on Level I assessment activities that involve characterizing the waste generating activity. Based on the results of this Level I activity, informal (Level II) or formal (Level III) assessments are performed on specific activities that generate waste, discharges, or emissions.

Based on the identified processes and projects and the modified PPOA methodology, ORNL has been and will continue performing generator planning and PPOA activities this year. Because generator plans are not required, as needed the ORNL generators will work in conjunction with the Program to develop, publish, and implement optional organization-specific plans, which will be designed to meet each organization's needs. Each of the waste generating organizations has established organization-specific PPR Handbooks, which include organization-specific plans as applicable. The ORNL Program is developing guidance for

Table 6-3

Oak Ridge National Laboratory
Pollution Prevention Opportunity Assessments Completed

Areas Assessed
Oak Ridge National Laboratory-specific areas:
Photographic Wastes
Degreasing Solvents
Methylene Chloride[1]
Uranyl Nitrate[2]
Used Oils
Carcinogens and Reproductive Hazards[3]
Spent Air Filters[3]
Miscellaneous and Office Waste[3]
Mercury and Mercury Waste Constituents
Acetone and Methanol Solvent Reduction
Legacy and Surplus Chemical
Radioactive Research Waste Reduction
Building Decontamination and Decommissioning (Level II PPOA)
Radioactive Soil and Asphalt[4]
Oak Ridge Reservation-specific areas:
Solid Industrial Waste (Level II/III)
Spent Fluorescent Lamps (Level II/III)
Personal Protective Equipment (Level II/III)
Analytical Services Organization (Level I)

Note: [1] In Analytical Chemistry only.
[2] In Robotics and Process Systems only.
[3] In the Metals and Ceramics Division only.
[4] This PPOA is ongoing.

PPOA - pollution prevention opportunity assessment

compiling these organization-specific plans. The Program staff will support these organizations through each phase of these generator activities.

A summary of the history and methodology associated with the PPOAs at ORNL is included in Appendix A. The schedule for these activities at ORNL is included in Appendix E.

6.5.1.2 Pollution Prevention Terminology

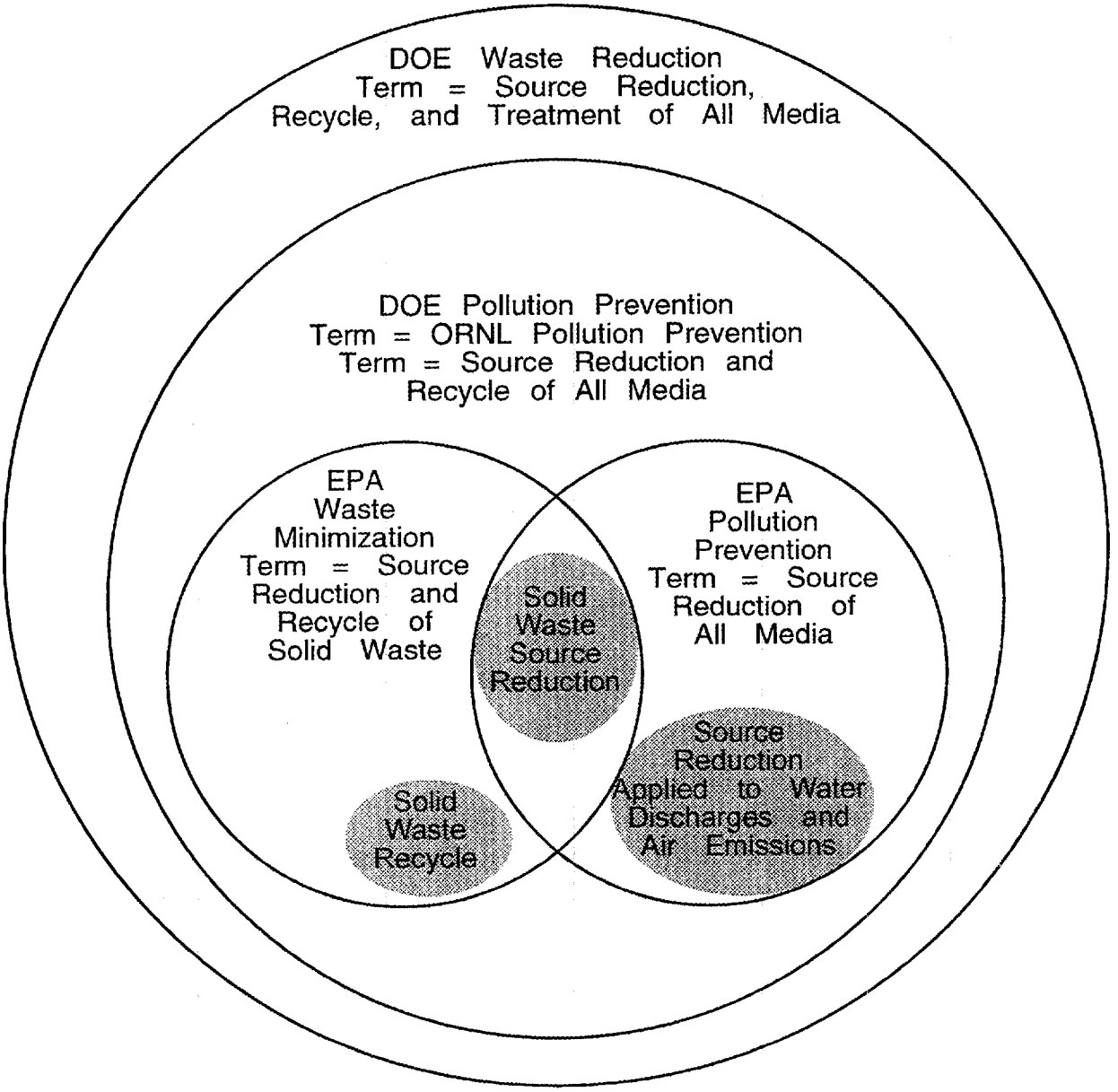
Pollution prevention includes those activities that minimize or eliminate the volume or toxicity (or both) of waste generated, and recycling processes that use, reuse, or reclaim a material from a waste stream in any media. ORNL's and DOE's respective definitions of "pollution prevention" are equivalent and include activities that involve source reduction and recycling of all wastes and pollutants. This definition is a combination of EPA's definitions of waste minimization and pollution prevention. EPA uses the waste minimization term to designate source reduction and recycling activities of solid wastes. EPA also defines pollution prevention as multimedia source reduction activities that prevent waste generation and contaminant releases. DOE, however, includes the multimedia aspects of the EPA pollution prevention term with the recycling aspects of EPA's waste minimization term under DOE's "pollution prevention" term. Figure 6-1 shows the relationship among the various definitions used by ORNL, DOE, and EPA.

Some activities commonly thought to be pollution prevention are actually waste treatment, which is included in the DOE term "waste reduction." Waste reduction is DOE's "pollution prevention" term plus treatment. The following activities are not considered pollution prevention at ORNL, but they may be considered waste reduction, based on the specific situation and operation involved:

- Transfer of hazardous constituents from one environmental medium to another even if volume reduction is achieved
- Compaction of waste conducted solely for reducing volume, unless later recycled
- Dilution as a means of toxicity reduction, unless later recycling steps are involved.

These treatment techniques that make the waste more amenable for disposal, such as those that reduce volume, toxicity, mobility, or a combination of these before storage, disposal, or controlled release to the environment, are not included in this Program.

Figure 6-1
Reduction Activities Included in Terms Used by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Energy (DOE), and the Oak Ridge National Laboratory (ORNL)



The THWRA uses different terms than Energy Research and Energy Systems do to categorize pollution prevention techniques. Table 6-4 shows how Energy Research and Energy Systems categories correspond to THWRA categories. The THWRA includes a category for support and planning activities such as PPOAs, research and development, pilot projects, and projects in various phases from conceptual design through procurement and startup. The THWRA pollution prevention technique category is "f. Reduction Research/Planning."

6.5.2 Training

Program- and generator-related training require the following activities:

- Develop and update pollution prevention training for ORNL employees.
- Continue to involve employees in job-specific pollution prevention practices and to provide job-specific training.
- Continue generator participation in PPOA and implementation training activities as applicable.

Related awareness activities are discussed in Section 6.2.

6.5.2.1 Training Goals

One of the most important elements of the ORNL Program is training. The training program includes all levels of personnel within the site. The goal of the training program is to make each employee aware of waste generation and its causes, its impact on the laboratory and the environment, and ways to reduce waste and prevent pollution. ORNL training is coordinated by Technical Resources and is performed by trainers within each ORNL organization. Additionally, WMRAD administers and tracks waste generator training.

6.5.2.2 Employee Orientation and Refresher Training

A brief overview of pollution prevention is provided as part of the General Employee Training (GET), which is required for all new ORNL employees and specific on-site contractors. Every 2 years, all ORNL employees and specific on-site contractors are also required to complete the GET refresher. Both the overview and refresher training modules are performance-based programs.

Table 6-4

Correlation Between Pollution Prevention Technique Terms

(Page 1 of 4)

Energy Research and Energy Systems Pollution Prevention Term	THWRA Pollution Prevention Term
Inventory Control	Improved Operations
Good Operating Practice	Improved Operations
Equipment/Technology Change	Equipment/Technology Modification
Segregation	Other - Segregation
Spill and Leak Prevention	Improved Operations
Product or Process Change	• Reformulation/Redesign of Product • In-Process Recycling/Process Modification
Input Material Change	Substituting Raw Materials
Affirmative Procurement	Reduction Research/Planning
On-Site Recovery/Recycle	• In-Process Recycling/Process Modification • Other - Reuse and Other Recycling
Off-Site Recovery/Recycle	Other - Reuse and Other Recycling
N/A - Program Activities such as PPOAs, Pilot Projects, and Projects in Conceptual Design	Reduction Research/Planning
N/A	No Effort

Energy Research - Lockheed Martin Energy Research, Inc.
Energy Systems - Lockheed Martin Energy Systems, Inc.
N/A - Not applicable
ORNL - Oak Ridge National Laboratory
PPOA - pollution prevention opportunity assessment
THWRA - Tennessee Hazardous Waste Reduction Act

Definitions of THWRA Pollution Prevention Terms

a. Reformulation/Redesign of Product - Changes in design, composition, or specifications of end products that allow fundamental changes in its production.
b. In-Process Recycling/Process Modification - Redesign of the procedures of a generation process to reduce, reuse, or recycle the waste as an integral part of the process.
c. Equipment/Technology Modification - Redesign, retrofitting, or change in equipment or incorporation of a technology to reduce the volume or toxicity of the waste, e.g., installation of counterflow systems in electroplating operations.
d. Substituting Raw Materials - Changes in raw materials to reduce volume and toxicity of generated wastes.
e. Improved Operations - Improved employee training, equipment maintenance, handling of raw materials, detection and control of emissions, etc.
f. Reduction Research/Planning - Research or planning was conducted to develop future specific waste reduction efforts.
g. No Effort - If no changes were planned, attempted, or implemented this year, be sure to describe impediments in annual summary information and progress report.
h. Other - Briefly explain.

Description of ORNL Pollution Prevention-Related Techniques:

The following are pollution prevention techniques that may be employed to prevent or minimize the generation of waste at ORNL. Note that several techniques may apply to one project. For instance, if an organic solvent degreaser is replaced with an aqueous ultrasonic cleaning system, the equipment/technology change, product or process change, and input material change techniques may all apply.

Inventory Control
At ORNL, inventory control includes the review and modification of methods to control the types and quantities of materials in the site inventory. Specifically, inventory control involves revising and expanding control techniques to increase inventory turnover while reducing inventory size, hazardous chemical use, size of containers, amount of chemicals, and waste resulting from excess, out-of-date, and no-longer-used raw materials. Inventory control measures should reduce raw material and finished product loss and damage during handling, operations, and storage.

The review of inventory control techniques includes studying (1) how existing inventory management procedures can be applied more effectively, (2) whether new techniques should be added to or substituted for current procedures, (3) the need for review and evaluation of approval procedures for the purchase of materials, and (4) the need for additional employee training.

Note that incoming chemicals are marked with the expiration date by the manufacturer when applicable, which encourages employees to use older chemicals before they expire. ORNL laboratories and operations are also required to keep current logs of chemicals in stock, which are consulted before ordering new supplies. Two examples of an inventory control method would be (1) decreasing the different types and colors of paints available for use or (2) instituting an organization-based between-use-storage area for shared materials. Both of these examples will reduce the amount of excess chemicals deemed as waste.

Good Operating Practice
Good operating practices at ORNL include making changes to the standard activities, practices, and procedures that result in the replacement, reduction, or elimination of hazardous materials in any activity including those associated with laboratory, operations, maintenance, and cleaning processes. This

technique also applies to site equipment preventative maintenance, which should be periodically reviewed to determine whether improvements in corrective and preventative maintenance, including scheduling and monitoring, can reduce waste generation caused by equipment failure and scheduled maintenance. An example of good operating practice would be examining the standard practices and procedures associated with replacing refrigeration unit oil. A sampling and analysis program could be put in place to determine when the oil needs to be changed. If in the past the oil was changed out more frequently than needed, this change in this activity could reduce the amount of waste oil generated.

Equipment/Technology Change

Equipment or technology change at ORNL involves using a new technology and/or installing new equipment that results in the replacement, reduction, or elimination of hazardous materials in any activity, including those associated with laboratory, operations, maintenance, and cleaning processes. When appropriate, the design criteria and specifications for new or modified facilities should favor the use of equipment manufactured using recovered materials. An example of equipment/technology change would be replacing the wet chemistry-based photography process with a dry photoimaging/digitization process.

Segregation

Although discussed in other techniques, segregation of materials and wastes involves preventing the mixing of various material or waste types, which decreases the generation of the more hazardous categories of waste. Segregation may also include sampling and analyzing or monitoring potentially contaminated materials or wastes to determine proper segregation of contaminated and uncontaminated materials or wastes. For instance, as part of the implementation planning for radiological control requirements, implementation requires that materials entering radiological buffer areas be restricted to those needed to perform work in the designated radiological areas. Also, the amount and type of hazardous materials such as paints, solvents, cleaners, fuels, and other chemicals entering these buffer areas are to be restricted and additional measures are to be taken to prevent accidental radioactive contamination of these materials. Known uncontaminated materials and wastes are to be segregated from potentially contaminated materials or wastes. Further, unless deemed a RCRA-listed hazardous waste, potentially contaminated materials or wastes are to be sampled or monitored to determine proper segregation of contaminated and uncontaminated materials or wastes. During the removal of asbestos-contaminated materials, for instance, these materials are segregated from materials not containing asbestos to minimize the quantity of waste generated.

Spill and Leak Prevention

Spill and leak prevention at ORNL involves implementing a change that results in the reduction or elimination of the release of hazardous materials from any activity, including those associated with laboratory, production, maintenance, and cleaning processes. When appropriate, the design criteria and specifications for new or modified facilities should favor the use of prevention measures that use recovered materials. An example of spill and leak protection would involve placing pans under pumps to catch oil, which is then reused.

Product or Process Change

Product or process change at ORNL involves modifying the "product" being produced or changing a process or activity that results in the replacement, reformation, reduction, or elimination of hazardous materials in any activity including those associated with laboratory, production, maintenance, and cleaning processes. When appropriate, the design criteria and specifications for new or modified facilities should favor the use of processes and product reformulations that use recovered materials. An example of product or process change would be modifying a plating system so that clean rinsewater is no longer continuously added to the rinse tank and is only added when the plating line is actually being used.

Table 6-4

Input Material Change
Input material change at ORNL involves eliminating a raw material used in an activity or replacing it with a less hazardous substitute. This change ultimately results in the replacement, reduction, or elimination of hazardous materials in any activity including those associated with laboratory, production, maintenance, and cleaning processes. When appropriate, the design criteria and specifications for new or modified facilities should favor either the elimination of hazardous materials or the use of less hazardous materials that use recovered materials. An example of input material change would be substituting a less hazardous solvent, such as MMK Blend in cleaning operations that use acetone.

On-Site Recovery/Recycle
The on-site recovery of wastes is used after first considering reducing the amount of waste generated at the source. On-site recovery/recycle involves reusing a material or processing a material for subsequent reuse as an effective substitute for a commercial product or as an ingredient or feedstock in a process. Examples of on-site recovery/recycle include (1) decontaminating tools, equipment, and materials for reuse or recycle for another activity, (2) use of a solvent in a maintenance activity after it has been used to clean specimens in a laboratory experiment, and (3) distillation of a solvent to remove impurities so that it can be reused.

Off-Site Recovery/Recycle
The off-site recovery of wastes is used after first considering reducing the amount of waste generated at the source and evaluating on-site recovery/recycle. Off-site recovery/recycle involves a non-ORNL organization/facility reusing a material or processing a material for subsequent reuse as an effective substitute for a commercial product or as an ingredient or feedstock in a process. Examples of off-site recovery/recycle include (1) smelting radioactively contaminated scrap metal for subsequent reuse, (2) use of a solvent in an off-site maintenance activity after it has been used to clean specimens in a laboratory experiment, and (3) off-site distillation of a solvent to remove impurities so that it can be reused.

Affirmative Procurement
(Supports Pollution Prevention by Encouraging Market for Recovered Materials)
Affirmative procurement activities involve procuring materials that contain recovered materials: for instance, procuring and using (1) cement that contains fly ash; (2) recycled paper products; and (3) retread tires supports affirmative procurement efforts.

Energy Recovery
(Not Usually Considered Pollution Prevention)
Energy recovery involves using a waste material as a feed material in a process that will recover energy from the waste material. For instance, burning paper waste, spent solvents, used oil, or chipped tires in a facility that produces electricity would be an example of energy recovery.

Treatment
(A Waste Reduction Technique, Not Pollution Prevention)
Treatment is any method, technique, or process that changes the physical, chemical, or biological character of any waste in a way that neutralizes the waste or renders the waste nonhazardous, less hazardous, safer to manage, amenable for storage, or reduced in volume.

Pollution Control
(A Waste Reduction Technique, Not Pollution Prevention)
Pollution control is any method, technique, or process that changes the physical, chemical, or biological character of any waste in a way that renders the waste (1) nonhazardous or less hazardous and (2) acceptable to be discharged or emitted to the environment.

6.5.2.3 Specialized Training Program

A training program specifically addressing pollution prevention techniques was developed in 1988. This course described some of the problems in waste management, explained the impetus behind implementing the Program, and included a classroom exercise in identifying the true sources of waste streams to which pollution prevention techniques could be applied. This training was used for several years when needed but has been replaced with other training described in this section.

In 1994 and 1996, the PPRs and interested ORNL waste generators received PPOA training, which included classroom instruction and assessment-based exercises.

A training module for stormwater pollution prevention was developed for site-wide use. The required module covers the CWA stormwater pollution prevention plan requirements as they apply to ORNL. This module has been incorporated into the regularly-scheduled training program.

Pollution prevention training is also integrated into the following training modules:

- SARA/Occupational Safety and Health Administration (OSHA) Training
- SARA/OSHA Refresher Training
- Waste Generator Training.

The Waste Generator Training modules are described in Section 6.5.2.4.

6.5.2.4 Procedures Qualification

As part of ensuring quality and regulatory compliance, certain employees are required to be trained and examined on their knowledge of ORNL procedures, including waste management. Specifically, the Waste Generator Training Program includes several courses offered to programs and divisions that produce hazardous or radioactive wastes. The solid industrial (sanitary) waste control program disseminated information to the Environmental Protection Officers. The information provided guidance on what can be handled as sanitary/industrial waste and emphasized participation in the existing recycling program. In general, these training sessions are designed to instruct the waste generator personnel in the proper techniques for waste segregation, certification, minimization/reduction, and packaging, and in the applicable procedures and documentation for waste handling and disposal. The program includes four training courses emphasizing, among other things, pollution prevention techniques. The following courses are offered:

- Hazardous and Mixed Waste Generator Training
- Waste Certification Program (WCP) General Awareness Training
- WCP Training for Generator Interface Personnel
- Liquid Waste Training.

Hazardous and Mixed Waste Generator Training. This course is specifically directed toward hazardous and mixed waste generators, describing the procedures and requirements for managing those wastes at ORNL. This training course addresses such topics as identification of hazardous waste, management of accumulation areas, and minimizing the amount of waste being generated. The program was developed in 1988 and was presented to a trial audience of 36 ORNL employees in December 1988. After making corrections and adjustments to the training module, hazardous waste generator training was implemented in 1989 and 180 additional employees were trained through this module. In 1990 and 1995, the training program was revamped and specialized modules were developed and conducted for satellite accumulation area operators and 90-day collection area operators.

WCP General Awareness Training. This training is for all ORNL waste generators and includes the following: an overview of the implementation strategy for the WCP, an overview of the WCP Plan for ORNL, review of the generator responsibilities for each of the Implementing Procedures (solid low-level waste [SLLW], TRU and alpha contaminated waste [ACW], liquid waste, and hazardous/mixed waste), and instructions in accessing the appropriate procedures/documentation (Waste Acceptance Criteria [WAC], implementing procedures, and characterization guidance documents). The General Awareness Training is offered on the web as a self-study module. The recertification period is 3 years.

This training does not negate the current training requirements for such programs as RCRA Awareness, RCRA Generator (including Hazardous Waste Characterization, Satellite Accumulation Area, and 90-Day Accumulation Area), Pollution Prevention, and No-RAD Added.

WCP Training for Generator Interface Personnel. This training is for ORNL generator interface personnel and will include: an overview of the WCP, an overview of the WCP Plan, in-depth training for each of the WACs (SLLW, TRU and ACW, liquid waste, and hazardous/mixed waste), and in-depth training of the characterization guidance documents. The training will be offered in a classroom setting, and the recertification period is 3 years.

Liquid Waste Training. Certification is provided to ORNL generators of liquid waste, which includes LLLW and process waste (PW). The purpose of this instruction is to familiarize liquid waste generator personnel with the WAC for liquid waste. The liquid waste WAC specify certain physical, chemical, and radiological properties to which liquid waste must conform to be processed and treated. The requirements for this waste type are presented in the training program. Pollution prevention and waste reduction requirements and techniques are part of this certification training. The WAC for liquid waste has been published and distributed to generators.

Sanitary/Industrial Waste Training. Presently, there is no formal training specifically for generators of sanitary/industrial waste. Employees who are in approved recycling areas are given a training seminar on the materials they can recycle.

6.5.3 Information and Technology Exchange

The Program strongly supports information and technology exchange activities. Specific activities required to support this exchange are as follows:

- Continue to participate in seminars, workshops, and meetings and assist in developing and promulgating consistent guidance related to pollution prevention.
- Continue to periodically hold meetings with the PPRs and other waste generator representatives as necessary.
- Participate in pollution prevention information clearinghouses and exchanges as applicable.
- Continue to exchange information and technologies with other waste generators at ORNL, across ORR, and at other DOE sites.
- Continue to foster outreach activities and participate in public relations activities.

Additional information concerning ORNL Program activities supporting this exchange is provided in the following sections.

6.5.3.1 Information Exchange and Outreach

The purpose of information exchange and outreach is to facilitate the implementation of pollution prevention by providing information concerning pollution prevention to ORNL personnel, DOE and other DOE facilities, and private industry as applicable. This information exchange can be provided through three major areas: (1) other DOE facilities, (2) other external sources, and (3) in-plant sources.

6.5.3.1.1 Other DOE Facilities

The ORNL Program staff are members of and/or support the ORR Pollution Prevention Program Team and the Energy Systems Central Environmental Compliance Pollution Prevention Task Team. Both groups foster the exchange of information and technology among the DOE facilities located in the Oak Ridge area. The DOE-supported electronic systems, with features such as electronic mail, bulletin board systems, and databases, allow all DOE facilities to exchange ideas, problems, and technology electronically. Pollution prevention workshops, conferences, and seminars also establish contacts between DOE sites and facilitate the exchange of pollution prevention information. Communication with specific DOE facilities also is used to exchange additional information as needed. The PPRs and ORNL Management continue to encourage and support participation in business, education, and government forums that are designed to provide technical assistance and to exchange pollution prevention information.

6.5.3.1.2 Other External Sources

ORNL has used and will continue to use the free pollution prevention planning and assessment resources from the University of Tennessee's Center for Industrial Services. ORNL participates in the Tennessee Pollution Prevention Partnership, which is strongly supported across the state by several major organizations such as Energy Systems, the Tennessee Valley Authority (TVA), DOE, and the University of Tennessee. EPA has established the Waste Reduction Resource Center of the Southeast, which is also a resource for information and technology transfer. To ensure efficient use and conservation of resources and materials, ORNL participates in the Southeast Regional Waste Exchange when applicable. Visits to other commercial manufacturing facilities to evaluate their pollution prevention programs have been utilized. Additionally, guest speakers who are experts in a particular pollution prevention field have spoken to select groups and have provided general and topic-based seminars at ORNL.

6.5.3.1.3 In-Plant Sources

In addition to the information exchange activities outlined in the PPAP and training programs discussed in Sections 6.2 and 6.5, a variety of different information exchange tools are utilized within the ORNL. ORNL management and DOE pollution prevention briefings are held to keep management and DOE abreast of the various pollution prevention activities. These briefings include summaries of overall activities and project- or activity-specific presentations to provide a clear picture of the status of the Program. Pertinent aspects of this information as well as the Program Plan are incorporated into laboratory-wide training. Written literature related to pollution prevention is also circulated as appropriate and can include books, articles, and vendor information. As appropriate, the schedule for all of these information exchange activities is provided in Appendix E.

6.5.3.2 Technology Transfer

The transfer of federally developed technology between laboratories and potential users is a contractual responsibility of DOE facilities and laboratories. Activities involving technology transfer should be coordinated through the office or committee within ORNL that has been designated to represent ORNL on the Federal Laboratory Consortium (FLC) for Technology Transfer. The FLC promotes technology transfer through links to the public and private sectors and through support services, such as training and assistance in implementing partnership opportunities (e.g., cooperative agreements and patent licensing). Opportunities for transfer of technologies specific to pollution prevention programs may develop from information exchange systems, workshops, or topical conferences. Direct exchanges of process technology between facilities are encouraged, but the support services of FLC should be used where appropriate. Technology projects that are identified and implemented are coordinated, as applicable, with the DOE-Headquarters' Office of Technology Development (OTD).

As a DOE-owned R&D facility, this technology transfer is an especially important aspect of the ORNL pollution prevention philosophy. The transfer of information about the ORNL pollution prevention efforts to other facilities, organizations, and industry is accomplished through all available routes. Following are examples of how pollution prevention technology can be successfully transferred:

- Utilize the ORNL Technology Transfer Organization and specifically cooperative research and development agreements (CRADA) to their full extent.

- Participate in and report on successful projects at DOE-sponsored workshops that include representatives from other DOE facilities.
- Participate in technology transfer conferences.
- Exchange technology and information with the University of Tennessee's Center of Industrial Services.
- Transfer pollution prevention technology successes with the EPA Pollution Prevention Information Clearinghouse and the Waste Reduction Resource Center of the Southeast.

In the past, information on various aspects of the Program was provided to other DOE contractors and commercial facilities.

6.5.3.3 Research and Development

Proposals for pollution prevention-specific R&D and technology development are expected to arise from the various ORNL activities and from the continued evaluation and ranking of pollution prevention options generated from PPOAs. Some options require development work before being implemented. The assessments also identify process inefficiencies that offer the potential for significant waste reduction, but specific modifications may require pollution prevention-specific technology development before implementation can be scheduled. Proposed projects will be prioritized by life-cycle cost and payback period, as appropriate and when data are available. Organizations that develop specific proposals for technology development work notify or coordinate their plans through Operations Offices and the OTD at DOE-Headquarters, as appropriate, to ensure effective allocation of resources. Additionally, technology development support is periodically provided for pollution prevention efforts for other DOE facilities.

6.5.4 Design Considerations

The generators are required to incorporate pollution prevention concepts into design considerations. This requirement is specified in the three DOE guidance documents[1,2,3] that were used as the basis of this plan. These requirements include the following:

- Design pollution prevention principles and practices into new facilities.
- Incorporate pollution prevention into facility upgrades and process modifications.
- Evaluate the potential impact of new technologies on waste generating activities.

Also, Executive Order 12873[7] specifies design consideration requirements. However, due to contractual and funding conditions, this specific order currently is not directly addressed by Energy Research or Energy Systems.

Design modifications are performed by the Energy Systems Central Engineering Organization. To facilitate this integration of pollution prevention concepts, engineering design procedures and specifications continue to be modified and updated. Currently, when engineering support is requested related to design modifications, a pollution prevention review is performed as part of the NEPA review. This review documents that the process related to the new facility, upgrade, or modification has been examined to ensure the following:

- Pollution prevention principles and practices have been considered and incorporated as applicable.
- The potential impact of new technologies on waste generating activities have been evaluated and new technologies incorporated when appropriate.

Also, as discussed in this section, ORNL has been performing PPOA activities. Level II (informal) or Level III (formal) assessments will continue to be performed. These assessments will evaluate potential pollution prevention options that may include process modifications, facility upgrades, new facilities, and new technologies.

7.0 Program Status Summary

Several documents summarize the status of the various elements of the Program. These documents include the following:

- October 1996, *1995 Annual Report on Waste Generation and Waste Minimization Progress as Required by DOE Order 5400.1*[33]

- October 1995, *1994 Annual Report on Waste Generation and Waste Minimization Progress as Required by DOE Order 5400.1*[34]

- November 1994, *1993 Annual Report on Waste Generation and Waste Minimization Progress as Required by DOE Order 5400.1*[35]

- March 1997, *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1996*[36]

- March 1996, *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1995*[37]

- February 1995, *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1994*[38] and October 1995, *Supplement to the Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1994*[39]

- February 1994, *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1993*,[40] and May 1994, *Supplement to the Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1993*[41]

- February 1993, *Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1992*[42]

- May 1995, *Oak Ridge Reservation Land Disposal Restrictions Federal Facilities Compliance Agreement Waste Minimization Status Update*.[43]

The PPC should be contacted to obtain the most recent version of any documents of interest.

8.0 References

1. U.S. Department of Energy (DOE), Defense Programs, *Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan* (December 1993).

2. U.S. Department of Energy (DOE), Environmental Management, *DOE Order 5400.1 Site WMin/PP Awareness Plans DOE-wide Implementation Guidance-Update* (March 1994).

3. U.S. Department of Energy (DOE), Environmental Management, *Guidance for Preparation of Site Pollution Prevention Plans* (February 1997).

4. U.S. Department of Energy (DOE), *Pollution Prevention Program Plan* (1996).

5. U.S. Environmental Protection Agency (EPA), *National Environmental Policy Act*, PL 94-83 (August 9, 1975).

6. Oak Ridge National Laboratory (ORNL) Waste Management Staff, *Waste Reduction Plan for the Oak Ridge National Laboratory* (December 1991).

7. U.S. Environmental Protection Agency (EPA), *Federal Acquisition, Recycling, and Waste Prevention*, Executive Order 12873, (October 22, 1993).

8 U.S. Environmental Protection Agency (EPA), *The Emergency Planning and Community Right-to-Know Act of 1986*, PL 99-499 (October 17, 1986).

9. U.S. Environmental Protection Agency (EPA), *The Clean Air Act Amendments of 1990*, PL 101-549, 104 Stat. 2399-2712 (November 15, 1990).

10. U.S. Environmental Protection Agency (EPA), *Clean Water Act of 1992*, PL 102-580 (October 31, 1992).

11. U.S. Environmental Protection Agency (EPA), *Federal Compliance With Pollution Control Standards*, Executive Order 12088, (October 13, 1978).

12. Tennessee Department of Environment and Conservation (TDEC), *Tennessee Hazardous Waste Reduction Act of 1990*, TCA 68-212-301 et. seq. (1990).

13. U.S. Environmental Protection Agency (EPA), *Hazardous and Solid Waste Amendments*, PL 98-616, 98 Stat. 3221 (November 8, 1984).

14. U.S. Environmental Protection Agency (EPA), *The Pollution Prevention Act of 1990*, PL 101-508 (November 5, 1990).

15. U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA), *Federal Facilities Compliance Agreement for Storage of Radioactive Mixed Waste Subject to Land Disposal Restrictions for the Oak Ridge Reservation* (June 12, 1992).

16. U.S. Environmental Protection Agency (EPA), *Federal Facility Compliance Act of 1992*, PL 102-886 (September 22, 1992).

17. U.S. Department of Energy (DOE) and Tennessee Department of Environment and Conservation (TDEC), *State Oversight Agreement between the State of Tennessee and the Department of Energy* (May 13, 1991).

18. U.S. Department of Energy (DOE), *General Environmental Protection Program*, DOE Order 5400.1 (November 9, 1988).

19. U.S. Department of Energy (DOE), *Radioactive Waste Management*, DOE Order 5820.2A (September 26, 1988).

20. U.S. Department of Energy (DOE), *Hazardous and Radioactive Mixed Waste Program*, DOE Order 5400.3 (February 22, 1989).

21. U.S. Environmental Protection Agency (EPA), *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*, Executive Order 12856, (August 3, 1993).

22. U.S. Department of Energy (DOE), Secretary of Energy Notice SEN-37-92 from James D. Watkins, Admiral, U.S. Navy (Retired), DOE, Secretary of Energy, "Waste Minimization Crosscut Plan Implementation" (May 13, 1992).

23. U.S. Department of Energy (DOE), "Waste Minimization and Pollution Prevention Policy" (September 1992).

24. U.S. Department of Energy (DOE), Memorandum from John C. Tuck, Under Secretary of Energy, Peter N. Brush, Acting Assistant Secretary, Environment, Safety, and Health, Leo P. Duffy, Director, Office of Environmental Restoration and Waste Management, to Distribution (all elements of DOE), "Waste Reduction Policy" (June 27, 1990).

25. U.S. Department of Energy (DOE), *Radiation Protection of the Public and the Environment*, U.S. DOE Order 5400.5 (June 5, 1990).

26. U.S. Department of Energy (DOE), *General Design Criteria*, DOE Order 6430.1A (April 6, 1989).

27. U.S. Environmental Protection Agency (EPA), *Federal Acquisition and Community Right to Know*, Executive Order 12969 (August 8, 1995).

28. U.S. Department of Energy (DOE), *Quality Assurance*, DOE Order 5700.6C (August 21, 1991).

29. Lockheed Martin Energy Systems, Inc. (Energy Systems), *FY 1996 HIVal Proposal Standards and Guidelines* (September 27, 1995).

30. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Guide to Estimating and Reporting Pollution Prevention Cost Benefits for Oak Ridge Reservation, Paducah, and Portsmith* (July 1995).

31. U.S. Department of Energy (DOE), *Environmental Restoration and Waste Management 5-Year Plan* (1993).

32. U.S. Department of Energy (DOE), *U.S. Department of Energy Pollution Prevention Opportunity Assessment Guidance* (December 1993).

33. Oak Ridge National Laboratory (ORNL), *1995 Annual Report on Waste Generation and Waste Minimization as Required by DOE Order 5400.1* (October 8, 1996).

34. Oak Ridge National Laboratory (ORNL), *1994 Annual Report on Waste Generation and Waste Minimization Progress as Required by DOE Order 5400.1* (October 18, 1995).

35. Oak Ridge National Laboratory (ORNL), *1993 Annual Report on Waste Generation and Waste Minimization Progress as Required by DOE Order 5400.1* (November 10, 1994).

36. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1996* (March 1997).

37. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1995* (March 1996).

38. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1994* (February 1995).

39. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Supplement to the Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1994* (October 1995).

40. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1993* (February 1994).

41. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Supplement to the Oak Ridge National Laboratory Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1993* (May 1994).

42. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Progress Report for the Tennessee Hazardous Waste Reduction Act for Calendar Year 1992* (February 1993).

43. Lockheed Martin Energy Systems, Inc. (Energy Systems), *Oak Ridge Reservation Land Disposal Restrictions Federal Facilities Compliance Agreement Waste Minimization Status Update*, Report ES/WM-46 (May 1995).

9.0 Bibliography

Kelvin M. Cash (Martin Marietta Energy Systems, Inc.) and Anne P. Ostergaard (IT Corporation), "Waste Minimization - the Planned-Parenthood-to-Grave Philosophy," *Proceedings of the 1992 Industrial Pollution Control Conference*, Atlanta, Georgia (February 11, 1992).

Lockheed Martin Energy Systems, Inc. (Energy Systems), *Environment, Safety, and Health Strategic Plan*, Report ES/ESH/INT-2 Revision 1 (August 1993).

Lockheed Martin Energy Systems, Inc. (Energy Systems), *Environmental Restoration Program Waste Minimization and Pollution Prevention Awareness Plan*, Report ES/ER/TM-21 (September 1993).

Lockheed Martin Energy Systems, Inc. (Energy Systems), *Oak Ridge National Laboratory (ORNL) Pollution Prevention Program Plan*, Report ORNL/TM-11853/R6 (March 1996).

U.S. Department of Energy (DOE), *DOE Model Process Waste Assessment Plan* (January 15, 1991).

U.S. Department of Energy (DOE), *Draft Activity Data Sheet Development and Budget Formulation Field Guidance for the FY 1996 Planning and Budget Cycle* (January 12, 1994).

U.S. Department of Energy (DOE), *DOE Radiological Control Manual* (June 1992).

U.S. Environmental Protection Agency (EPA), *Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program* Federal Register Vol. 58, No. 102 (May 28, 1993).

U.S. Environmental Protection Agency (EPA), *Waste Minimization Opportunity Assessment Manual*, EPA/625/7-88/003 (July 1988).

Lockheed Martin Energy Systems, Inc. (Energy Systems), *Y-12 Plant Environmental As Low As Reasonably Achievable (ALARA) Program Plan*, Report Y/TS-1160/R1 (December 1994).

Lockheed Martin Energy Systems, Inc. (Energy Systems), *Y-12 Pollution Prevention Program Plan*, Report Y/WM-182/R4 (March 1997).

U.S. Department of Energy (DOE), Memorandum from Hazel R. O'Leary, Secretary of Energy, to Distribution (all elements of the DOE), "Implementation of Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements" (November 15, 1994).

Lockheed Martin Energy Systems, Inc. (Energy Systems), *Stormwater Pollution Prevention Plan for the Y-12 Plant*, Report Y/TS-1180 (December 1994).

APPENDIX A

Background and Compliance of the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program and Program Plan

APPENDIX A

Background and Compliance of the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program and Program Plan

This appendix contains the history of the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program (Program), the detailed scope of the ORNL Program Plan, a summary of the legal and policy background related to the ORNL Program, and compliance matrices for the ORNL Program Plan for ORNL in Oak Ridge, Tennessee. Specifically, these compliance matrices illustrate compliance of the ORNL Program Plan with the regulatory and U.S. Department of Energy (DOE) requirements that stipulate requirements for this plan.

A.1 Program History

Various activities that reduced waste had been continually pursued in the past at ORNL, but a pollution prevention/waste minimization program had not been formally established until the regulatory requirements delineated in Section 5.2 of this plan were determined to apply to ORNL activities. The formal ORNL Program, then called a waste reduction program, was established in mid-1985. As part of the development of the Program, ORNL defined waste minimization, now called pollution prevention, as specified in Chapter 6.0. The Program policy, objectives, and strategy were developed and revised from 1985 through the present to tailor the Program to the specific, unique needs of a research and development (R&D) facility with more than 960 individual laboratories. Although many guidance documents were written for the implementation of waste minimization/pollution prevention programs at production-based facilities, very little guidance tailored for R&D facilities has been written to date. ORNL used and modified all of the appropriate elements of the guidance available in order to minimize duplicating work performed. However, ORNL has had to completely develop certain elements of its program and learn from its experiences during this development process, as well as to deal with funding source and level issues. The required funding level issues for the support of the program itself have been resolved, but the source of the funding for actual pollution prevention projects versus waste disposal still needs to be completely addressed.

The overall strategy has been updated and continues to provide the support mechanisms to promote the evaluation of pollution prevention opportunities during the developmental and design phases of existing and new projects and processes. The Program organizational structure has developed into a matrixed organization that is focused around the Pollution Prevention Coordinator (PPC) in the Waste Management and Remedial Action Division (WMRAD). This format allows support to be obtained from the various production, development, and support organizations based on the requirements of the facility and projects. This format allows the Pollution Prevention Committee (Committee), the Pollution Prevention Representatives (PPR), and the pollution prevention opportunity assessment (PPOA) teams to be composed of members from various operational and support organizations based on the requirements of the laboratory and projects. The ORNL Program continues to mature. A summary of examples of completed projects and activities can be found in past versions of this Program Plan.

A.1.1 Pollution Prevention Opportunity Assessments History

In the past, the evaluation of waste generation has been organization- or waste-specific; special teams were formed to examine reduction opportunities for specific materials or organization-wide wastes. Individuals working with supervision have also contributed to significant reductions in waste generation at the source and through recycling. However, to continue to formalize the pollution prevention opportunities evaluation process, it was recognized that a more standardized evaluation process was needed. The *U.S. Department of Energy (DOE) Model Process Waste Assessment Plan* was originally used as the foundation for PPOAs at ORNL. Based on DOE guidance, ORNL now uses the February 1996 *U.S. Department of Energy Model Pollution Prevention Opportunity Assessment Guidance* as the basis for ORNL PPOAs. PPOAs performed per this guidance are based on three levels. Level I assessment activities involve characterizing the waste generating activity. Level II assessment activities include an informal evaluation of potential pollution prevention options. Level III assessment activities entail a formal evaluation of potential pollution prevention options.

Several PPOAs have been completed since 1990, and other PPOAs will be conducted as part of ongoing activities to continue to develop and update detailed baseline data on waste generation and to continue to identify, screen, and analyze options to reduce the generation of waste. A PPOA determines the amount of material in a workplace that is disposed of as waste during normal work operations. A PPOA provides a summary of hazardous materials usage and waste production and helps identify those processes and operations that require

improvement or replacement to promote pollution prevention. The assessment provides a basis for prioritizing the specific modifications to site processes or other pollution prevention options that are developed as a result of the assessment.

The PPOAs conducted at ORNL consisted of five primary steps:

- Organization of the PPOA teams
- Assessment of operations and waste streams (Level I)
- Development and evaluation of pollution prevention options (Level II or III)
- Compilation, review, and publication of the PPOA report and supporting data
- Implementation of pollution prevention options.

Assessments of all waste-generating operations at the site were originally conducted by PPOA teams organized by the ORNL Program personnel and site management. The assigned leader of each PPOA team was an employee empowered with line responsibility, who was familiar with the facility's activities and waste management operations, and who had proven technical and problem-solving abilities. The remainder of each assessment team was drawn from line, staff, or subcontractor personnel who furnished the specialized expertise needed to conduct the assessment.

Typically, past and current PPOA teams have consisted of a small core of individuals familiar with the site's operations, who have directed the focus of the assessment efforts and guided the data gathering. Other personnel furnishing specialized expertise have been used part-time as needed. Each team has included members who have had knowledge in the following areas:

- Facility-specific operations and requirements
- Federal, state, and local waste-related statutes and regulations including air, water, hazardous waste, and solid waste regulations
- Production and pollution prevention principles and techniques
- Quality control requirements
- Purchasing and material control/inventory procedures.

Several team members have received training on the procedures, methodologies, techniques, and documentation requirements for PPOAs before the assessment was conducted.

Each PPOA team developed flow diagrams, material balances, process descriptions, and waste stream characterizations for each assigned assessment area. Information found in the DOE guidance and *U.S. Environmental Protection Agency Waste Minimization Opportunity Assessment Manual* was used, as appropriate, in conducting the assessments.

Completion of flow diagrams, material balances, and related narratives permitted the identification of process inefficiencies that might be modified or corrected to reduce waste generation. These pollution prevention opportunities were evaluated and identified with specific projects to reduce the volume and toxicity of the waste streams. The PPOAs culminated in recommended options. In identifying and recommending pollution prevention options, the PPOA teams concentrated first on source reduction options, followed by recycling technologies. Options were screened and evaluated for technical and economic feasibility and benefit. Compliance with all health, safety, and environmental regulations and requirements were considered for all options as appropriate.

The PPOAs completed since 1993 were based on the DOE methodology described in the February 1996 *U.S. Department of Energy Model Pollution Prevention Opportunity Assessment Guidance*. Future assessments of other areas will also be based on this methodology. These PPOAs are discussed in Chapter 6.0 of this Plan and are scheduled in Appendix E.

A.1.2 ORNL Pollution Prevention Projects Prioritization Criteria

ORNL established criteria to use to prioritize ORNL pollution prevention projects. These criteria parallel the current criteria for screening and selecting Energy Systems High Implementation Value Program (HiVal) pollution prevention projects, which are listed in Figure A-1.

A.2 Detailed Scope of Plan

The ORNL Program is designed to eliminate or minimize pollutant releases to all environmental media from all aspects of the site's operations. These efforts offer increased protection of public health and the environment. They also yield the following additional benefits for the facility as a whole:

- Reduced waste management and compliance costs
- Reduced resource usage
- Improved process efficiencies and product yields

Figure A-1

The Criteria for Screening and Selecting High Investment Value Pollution Prevention Projects

(Page 1 of 2)

Category	Weight	Score	Comments
Return on Investment	0.30	10 greater than 167% 8 133 - 166% 6 100 - 132% 4 67 - 99% 2 33 - 66% 0 less than 33%	ROI is defined as (Estimated Cost Savings)/(Project Estimated Cost)
Waste Hazard	0.25	10 MLLW or MTRU or RHAZ or MTSCA 6 LLW or TRU 4 CAA Class I or EPA (33/50 List of 17) or Permitted Air Emissions or All PWW except IW PWW 3 TSCA 2 SIW or Other Air Emissions or IW PWW	For cases where multiple waste streams of different scores are proposed, the higher scoring waste stream will be used.
Waste Quantity	0.25	Waste: 10 greater than 5% 8 3% - 4.99% 6 1.50% - 2.99% 5 1% - 1.49% 4 0.75% - 0.99% 3 0.50% - 0.74% 2 0.25% - 0.49% 1 less than 0.25%	Calculation for percent for all waste streams except air emissions and Environmental Restoration activities with no baseline amounts: [(estimated annual waste amount reduced) divided by (CY 1993 baseline for amount of waste of same category/type)] multiplied by 100
		Air Emission: 5 75% - 100% 3 50% - 74% 2 25% - 49% 1 less than 25%	Calculation for percent for air emissions with no baseline amounts: [(estimated annual waste amount reduced) divided by (amount of waste generated by that process annually)] multiplied by 100
		Environmental Restoration: 5 75% - 100% 3 50% - 74% 2 25% - 49% 1 less than 25%	Calculation for percent for Environmental Restoration activities with no baseline amounts: [(estimated waste produced by the project with P2 incorporated) divided by (estimated waste produced by the project without P2 incorporated)] multiplied by 100

Figure A-1

(Page 2 of 2)

Category	Weight	Score		Comments
Technical Risk	0.10	10	Proven Technology/Methodology: Commercially available technology/methodology found to be successful at a facility with similar requirements. Optimization of procedural standards and test and check out procedures following installation provided the schedule does not require extensive time to perform (greater than 2 months).	None
		5	Technology Commercially Available: commercially available technology that has not yet been used at a facility with similar requirements and does not require extensive field validation. Proven technology/methodology for which special approval is required from outside agencies (e.g., EPA) prior to full implementation.	
		1	Field Validation Required: Technology already researched and developed which requires field validation.	
		0.5	Experimental Technology: Technology that must be researched and developed.	
Position on EPA Hierarchy	0.10	10	(P2 Technique) = Source Reduction	Source reduction includes waste avoided, substitution, and toxicity reduction.
		5	(P2 Technique) = Onsite Recycling	
		3	(P2 Technique) = Offsite Recycling	

Legend:

CAA = Clean Air Act
CY = Calendar year
EPA = U.S. Environmental Protection Agency
IW PWW = Industrial Process Wastewater
LLW = Low Level Waste
MLLW = Mixed Low Level Waste (RHaz and LLW)
MTRU = Mixed Transuranic Waste
MTSCA = Mixed Toxic Substances Control Act Waste (PCB and LLW Waste)
P2 = Pollution Prevention
PWW = Process Wastewater
RHaz = Resource Conservation and Recovery Act Hazardous Waste
ROI = Return on Investment
SIW = Solid Industrial Waste
TRU = Transuranic Waste
TSCA = Toxic Substances Control Act Waste (PCB Waste)

- Reduced or eliminated inventories and releases of hazardous chemicals including those chemicals reportable under the *Emergency Planning and Community Right-to-Know Act* (EPCRA)

- Reduced or eliminated civil and criminal liabilities under environmental laws and associated regulations through enhanced compliance

- Improved public relations and public image.

The Program reflects the goals and policies for pollution prevention of the ORNL organization and represents an ongoing effort to make pollution prevention part of the site's operating philosophy. In accordance with DOE policy, a hierarchical approach to pollution prevention has been adopted and is applied to all types of waste.

Pollution prevention has been and continues to be accomplished by eliminating or minimizing the generation of waste through source reduction. Those potential waste materials that cannot be eliminated or minimized will be recycled (i.e., used, reused, or reclaimed) when feasible. All waste that is nevertheless generated will be treated when feasible to reduce volume, toxicity, or mobility before storage or disposal.

The scope of this Plan is confined to source reduction, material substitution, material and waste segregation, and environmentally sound recycling. Methods for treatment of waste are covered in other directives and associated documentation.

This plan is a reference tool and guidance for managers, operations personnel, and support staff. It contains the policy, objectives, strategy, and support activities of the ORNL Program. The framework of the ORNL strategy is based on five major elements: (1) organization and infrastructure, (2) program development, (3) reporting, (4) laboratory-wide source reduction and recycling activities implementation, and (5) technical assistance. Pollution prevention goals, the development of waste generation baseline information through waste tracking and PPOAs, and a process for continual self-assessment of the Program are significant segments of these elements. Various pollution prevention techniques continue to be implemented with the support of associated employee training and awareness programs to reduce waste and still meet the requirements for quality, productivity, safety, and environmental compliance.

This plan applies to all site operations and associated support operations including ORNL facility operations located at the Y-12 Plant. Activities associated with environmental restoration and decontamination and decommissioning will be coordinated with the Lockheed Martin Energy Systems, Inc. (Energy Systems) Environmental Restoration Program, which has the ultimate responsibility. Requirements for site subcontractors are discussed in Section 2.3 of the text of this Program Plan. This Program Plan is reviewed at least annually and revised as necessary. At a minimum, the Program Plan is updated every 3 years. If required per regulatory or DOE requirements, the Plan will be amended or updated annually.

The Program Plan has been and will continue to be distributed to specific employees and selected site subcontractors. A notice related to the plan has been distributed facility-wide, and the policy, goals, objectives, and strategy of the plan has been and will continue to be explained to all employees.

A.3 Legal and Policy Background

Numerous laws, regulations, DOE and Executive Orders, and administrative policies either directly require or indirectly support pollution prevention. In this section, the regulations and policies that require waste minimization/pollution prevention are listed and explained and a summary of examples of other legislation and policies that indirectly support waste minimization/pollution prevention is provided.

A.3.1 Waste Minimization/Pollution Prevention Requirements

The 1984 *Hazardous and Solid Waste Amendments* (HSWA) to the *Resource Conservation and Recovery Act* (RCRA) required that by September 1, 1985, hazardous waste generators must have in place "a Program to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to be economically practicable." Per the RCRA regulations, hazardous waste generators must certify in their manifest that this requirement has been fulfilled, and owners and operators of treatment, storage, and disposal facilities (TSDF) must certify waste minimization efforts related to new TSDFs. Generators in the state of Tennessee must also identify in their annual reports to the state the efforts undertaken during the year to reduce the volume and toxicity of waste generated and the changes in volume and toxicity actually achieved. The state of Tennessee then completes a biennial report to the U.S. Environmental Protection Agency (EPA) that includes this information. The ORNL environmental compliance group is responsible for overall RCRA compliance, while the Program is responsible for the waste minimization aspects of this act.

Additionally, the EPA published the interim final *Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program* required under RCRA. This guidance delineates elements that the program should have and are listed as follows in the interim final guidance:

- Top management support
- Characterization of waste generation and waste management costs
- Periodic waste minimization assessments
- A cost allocation system
- Encouragement of technology transfer
- Program implementation and evaluation.

The Program currently incorporates all of these elements except for a cost allocation system and certain aspects of the waste management costs guidance. In the past, DOE's funding structure did not allow implementation of the cost allocation system described in the guidance. Planned changes should allow implementation of many aspects of cost allocation. However, most cost calculations for wastes at ORNL do not include all aspects, such as cleanup and employee exposure and health care costs. The comment period has been extended once on this guidance, and final guidance has not been published. When finalized, ORNL will evaluate this guidance and ensure that the Program includes all elements that do not conflict with legal or DOE requirements.

Also under RCRA, Section 6002 of the act, federal procurement requirements are specified for the purchase of products that contain recovered materials. These requirements were strengthened by Executive Order 12873, which is also discussed in this section of this document.

The *Pollution Prevention Act of 1990* (PPA) requires EPA to develop and implement a strategy to promote source reduction and to report to Congress in 1992 on the results of actions taken to implement the strategy. EPA published a Pollution Prevention Strategy in the *Federal Register* (FR) on February 26, 1991, that responded to a Congressional request to outline the agency's plan to incorporate pollution prevention into its existing programs. A major component of this strategy is the 33/50 Program. This strategy publication also responded to comments received on a 1989 draft policy statement on pollution prevention. The reporting required under this act has been incorporated into the Toxic Chemical Release Inventory (TRI) Form R reports submitted to the EPA under EPCRA. The ORNL environmental compliance group is responsible for completing the associated reporting forms, while the Program provides technical support as needed.

The 33/50 Program, which was announced in February 1991, is one of the major components of EPA's pollution prevention strategy. The Program establishes a national goal of reducing releases and off-site transfers of 17 chemicals from 1988 levels by 33 percent by the end of 1992 and by 50 percent by the end of 1995.

The EPA Administrator has asked private companies and federal agencies that produce or use the 17 chemicals to participate in the 33/50 Program by making voluntary commitments to reduce their releases to all environmental media. EPA is encouraging 33/50 Program participants to use pollution prevention practices (rather than end-of-pipe treatment) to achieve these reductions.

The Secretary of Energy approved DOE participation in the 33/50 Program on March 6, 1992. Initially, DOE anticipated using a baseline from 1988 to calculate reductions in releases for first-year reports for DOE facilities that have been submitting TRI Form R reports to EPA under the EPCRA. For those facilities, the DOE goal was expected to be a 50 percent reduction department-wide in release of the 17 priority chemicals by the end of calendar year (CY) 1995. All other DOE facilities that meet the TRI reporting threshold would have started reporting for 1993, and 1993 would become their baseline for calculating reductions. For those facilities, the DOE goal was expected to be a 33 percent reduction department-wide in releases of the 17 priority chemicals by 1997. However, for consistency and continuity, the DOE baseline year for all facilities is 1993.

DOE facilities that do not meet the release thresholds are not participants in the 33/50 Program. Releases associated with environmental restoration, decontamination and decommissioning activities, and cleanup of legacy waste are not counted in determining progress toward achieving reductions in releases of the 17 priority chemicals. DOE provides EPA with progress reports on an annual basis. The ORNL environmental compliance group is responsible for completing the TRI Form R reports under EPCRA Section 313, while the Program is responsible for supporting the overall 33/50 Program. Central Environmental Compliance, however, has ultimate responsibility for the 33/50 TRI Report. At this time, ORNL generates wastes containing lead, one of the 17 priority chemicals. In the past, ORNL met all goals associated with the 33/50 Program; however, to increase the amount of lead recycled, the Lead Shop was started up and is now operational. Therefore, ORNL anticipates reporting lead-related information under the 33/50 Program.

Executive Order 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements* strengthened the requirements of the EPCRA and the PPA in regard to federal facilities in August 1993. This Order places responsibility on each agency, and indirectly on DOE Operations Offices and contractors, for ensuring that all necessary actions are taken to comply with the TRI reporting provisions of the PPA and with all provisions of the EPCRA, which is discussed in Section A.3.2 of this document. The Order also strengthens the provisions for public access to strategies, plans, and reports by federal agencies under this Order. Currently, based on contractual and funding conditions, Energy Research and Energy Systems are not directly addressing Executive Order 12856. However, as discussed in the PPA summary and in Section A.3.2, certain aspects of this Order that are required under EPCRA and PPA are addressed. These EPCRA and PPA requirements are met through the activities of the ORNL environmental compliance group and Program.

The *Federal Facilities Compliance Agreement* (FFCA) *for Storage of Radioactive Mixed Waste Subject to Land Disposal Restrictions* (LDR) *under RCRA for the Oak Ridge Reservation* (ORR) was established in June 1992 by the DOE-Oak Ridge Operations (ORO) Office and EPA. This agreement required DOE to submit a plan for a waste minimization program for the ORR, which "must provide for the segregation of Hazardous Waste from Radioactive Mixed Wastes, the substitution of nonhazardous solvents for hazardous solvents where technically practicable, and the minimization of the generation of Hazardous Waste throughout the ORR." Once EPA reviewed the plan, settled concerns or issues related to the plan, and approved the plan, DOE was required to implement the waste minimization program per the approved plan. DOE must also submit an annual report describing progress made in the program. The requirements of this agreement have been completed. The annual report is not expected to be required in the future. The *Federal Facility Compliance Act* (FFC Act) of 1992, which is discussed in Section A.3.2, essentially replaced this agreement. In the past, the Central Energy Systems Waste Management Organization (ESWMO) was responsible for the requirements under this agreement, but the Program provided support and information as appropriate.

The *Tennessee Hazardous Waste Reduction Act of 1990* (THWRA) sets a goal of a 25 percent reduction of hazardous waste in the state by 1995, based on 1989 generation rates. The THWRA requires all large quantity generators, and small quantity generators as defined by 1989 waste generation rates, to complete a hazardous waste reduction plan by January 1, 1992 and by January 1, 1994, respectively. A current copy of this plan must be maintained at the waste generating facility and must be made available to the Tennessee Department of

Environment and Conservation (TDEC) upon request. The plan must be reviewed annually, and progress reporting is also required. The first annual Hazardous Waste Reduction Progress Report for large quantity generators was required to be completed by March 1, 1993. The first annual Hazardous Waste Reduction Progress Report for small quantity generators was required to be completed by March 1, 1995. The report must be retained at the waste generating facility, and the report must be made available to the TDEC upon request. This progress report must:

- "Analyze and quantify progress made, if any, in hazardous waste reduction, relative to each performance goal established."
- "Set forth amendments, if needed, to the hazardous waste reduction plan and explain the need for the amendments."

The THWRA also requires the generator to correct any deficiencies identified by the TDEC in the plan or the progress report.

Additionally, summary information from the progress report must be submitted to the TDEC and is included as part of the Annual Generator Report required by the *Tennessee Hazardous Waste Management Rules*, which parallel the RCRA regulations. This information includes the following for each hazardous waste stream:

- "A statement of specific performance goals, and a report on the progress made in achieving these goals. The results should be reported in numeric terms...or goals; and...a report on the actions taken toward establishing numeric goals."
- "A narrative explaining the reported data."
- "A description of any impediments to reducing the generation of hazardous waste."

Also, under the *Tennessee Hazardous Waste Management Rules* as amended in April 1991, as part of the required Annual Generator Report, the following information should be reported:

- A description of the actions pursued to reduce the volume and toxicity of wastes generated that year
- A description of volume and toxicity changes of the waste that year as compared to previous years.

Under these rules, TSDF owners must certify annually that they have a waste minimization program in place to reduce, as economically practicable, the volume and toxicity of hazardous

waste generated. The ORNL environmental compliance group is responsible for overall compliance and waste generation reporting; the ORNL WMRAD and the Safety and Health Director are responsible for completing the waste minimization certification on manifests, and the Program is responsible for completing the planning and reporting under the THWRA. ORNL ensures that at least one manifest or certifying letter is signed per year in order to comply with the annual certification requirements for TSDFs.

The Tennessee solid waste regulations pertaining to municipal landfill permits also include a 25 percent reduction provision to be used at the discretion of the regulators. This provision allows the regulators the option of requiring a permittee to reduce the waste going to the affected landfill by 25 percent through recycling to obtain an operating permit. Because this requirement is only applicable to municipal landfills, the ORR solid landfills operated by the Y-12 Plant are not included under this provision; however, off-site municipal landfills such as the Chestnut Ridge Sanitary Landfill that may receive waste from the ORR may be impacted. Therefore, to support the intent of this requirement, the Program supports recycling of solid industrial waste including white file folder and mixed waste paper, cardboard, aluminum beverage cans, toner cartridges, and steam plant fly ash.

The *State Oversight Agreement between the State of Tennessee and the Department of Energy* (Tennessee Oversight Agreement [TOA]) was established in May 1991 between TDEC and DOE. This agreement requires DOE to complete a waste minimization plan "in accordance with the Tennessee Hazardous Waste Management Rule 1200-1-11-06(5)3(d)2(IX) and DOE Orders 5400.1 and 5820.2A" to reduce or eliminate wastes from facility operations. This plan was submitted to the TDEC, and any updates of this plan also will be submitted to the TDEC TOA organization. This agreement also requires DOE to "conduct a study of appropriate available and long-range methods to reduce or eliminate ORR discharges of contaminants from plant operations to the environment." The report associated with this study, which includes a source reduction review, was submitted to the TDEC by November 1992, 18 months after the effective date of the agreement. Finally, the TOA includes requirements for a major support activity, waste tracking. This agreement requires a schedule for the waste tracking activity, including a target completion date, quarterly progress reports, and completion of a comprehensive waste tracking system, which tracks wastes from generation to disposal. While the current comprehensive waste tracking system provides substantial support to the site Program, wastes are presently tracked by a separate organization, the Document Management Center in the WMRAD.

DOE Orders 5400.1, 5400.3, and 5820.2A mandate that radioactive wastes and other hazardous pollutants shall be managed so that the generation of such wastes is minimized. The Program is responsible for the pollution prevention aspects of these Orders. The ORNL environmental compliance group is responsible for meeting all of the other planning and reporting requirements in these Orders. The Orders are described in the following paragraphs.

DOE Order 5400.1 establishes General Environmental Protection Program requirements and responsibilities for ensuring compliance with environmental protection laws. The Order requires the establishment of a Waste Minimization Program "that will contain goals for minimizing the volume and toxicity of all wastes that are generated" and a Pollution Prevention Awareness Program. The Waste Minimization Program and the Pollution Prevention Awareness Program are to be established through implementing plans. The current implementing guidance documents listed in Section A.3.3 permit the two programs and implementing plans to be consolidated. The specific requirements for each program plan delineated in this Order are listed in Table A-1.

DOE Order 5400.3 established DOE hazardous and radioactive mixed waste policies and requirements, and implemented the requirements of RCRA within the framework of the environmental programs established under DOE Order 5400.1. DOE Order 5400.3 has officially been cancelled by DOE, because it duplicated RCRA requirements.

DOE Order 5820.2A establishes policies, guidelines, and minimum requirements by which DOE manages its radioactive and mixed waste and contaminated facilities. It states that the "generation, treatment, storage, transportation, and/or disposal of radioactive wastes and the other pollutants or hazardous substances they contain, shall be accomplished in a manner that minimizes the generation of such wastes across program office functions and complies with all applicable Federal, State, and local environmental, safety, and health laws and regulations and DOE requirements." The Order requires the preparation of a waste management plan for each site that generates, treats, stores, or disposes of DOE wastes. The elements of the waste management plan are incorporated into the site-specific plan, which "will indicate actions to minimize hazardous waste generation" as specified in the Order. The implementation of this plan will result in an auditable program. Additionally, DOE Order 5820.2A contains specific waste minimization requirements for managing high-level, transuranic, and low-level waste. These requirements include process modification, process optimization, and materials substitution.

Table A-1
Waste Minimization and Pollution Prevention Awareness Program Plans Requirements Under DOE Order 5400.1

Waste Minimization Program Plan Requirements	Pollution Prevention Awareness Program Plan Requirements
Plan will be completed within 18 months of effective date of Order, by May 1990.	Plan will be completed within 12 months of effective date of Order, by November 1989.
Plan will be reviewed annually.	Plan will be reviewed annually.
Plan will be updated at least every 3 years.	Plan will be updated at least every 3 years.
"Goals for minimizing the volume and toxicity of all wastes that are generated, with annual reductions if programmatic requirements allow."	Program will "be specifically identified in site's environmental protection statement."
"Changes in waste quantity, volume and toxicity that are achieved shall be compared with quantities generated in the previous year."	"All mission statements and project plans shall recognize a requirement for pollution prevention, where appropriate."
"The proposed methods of treatment, storage, and disposal that accomplish waste minimization that are technically and economically practicable shall be reported as appropriate."	Program implementation will include "elements for employee awareness through specific training, special awareness campaigns, and incentives and award programs."
"Waste minimization plans required by specific legislation, such as RCRA, shall be included as part of this Program plan."	

DOE - U.S. Department of Energy
RCRA - Resource Conservation and Recovery Act

Executive Order 12873, *Federal Acquisition, Recycling, and Waste Prevention* is designed to strengthen the RCRA requirement that federal agencies must establish a comprehensive program to promote and require the procurement of items that are composed of recovered materials. The RCRA requirement for an affirmative procurement program within each agency has existed since 1976 but has not been enforced. Executive Order 12873 was signed by President Clinton on October 20, 1993.

Executive Order 12873 requires government agencies to "incorporate waste prevention and recycling into daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products." It also requires government agencies to "comply with executive branch policies for the acquisition and use of environmentally preferable products and services and implement cost-effective procurement preference programs favoring the purchase of these products and services."

Segments of this Order reinforce the RCRA requirement for each agency to implement an affirmative procurement program. Specifically, RCRA requires each procuring agency to develop an affirmative procurement program that will ensure that items composed of recovered materials will be purchased to the maximum extent practicable that is consistent with applicable provisions of federal procurement law. Each affirmative procurement program is to include, at a minimum, the following four elements:

- A recovered materials preference program
- An agency program to promote the preference program
- A program for requiring estimates of the total percentage of recovered material utilized in the performance of a contract; certification of minimum recovered material content actually utilized; and reasonable verification procedures for estimates and certifications
- An annual review and monitoring of the effectiveness of the agency's affirmative procurement program.

Each federal agency must review annually the effectiveness of its affirmative procurement program and submit a report on its findings. When requested and applicable, the Central Procurement Division will provide input to DOE to address RCRA-based requirements. DOE's reports are also to be made available to the public.

Executive Order 12873 requires activities beyond those included under RCRA. This Order includes requirements for the following:

- Acquisition planning and affirmative procurement programs
- Standards, specifications, and designation of items
- Agency goals and reporting requirements
- Applicability and other requirements
- Awareness.

The section concerning applicability and other requirements specifically states the following requirement for contractor-operated government facilities:

> Contracts that provide for contractor operation of a government-owned or leased facility, awarded after the effective date of this order, shall include provisions that obligate the contractor to comply with the requirements of this order within the scope of its operations. In addition, to the extent permitted by law and where economically feasible, existing contracts should be modified.

Based on this section of the Order, Energy Research and Energy Systems will ultimately need to meet all applicable requirements of this Order once the contract with DOE has been modified or possibly renewed. To ensure efficiency and compliance, procurement for Energy Research and Energy Systems is centralized.

The Central Procurement Division, Affirmative Procurement Team, and ORNL Program developed the necessary programs for compliance with the RCRA-based aspects of this Order. The Program provides technical support in the identification, selection, and evaluation of recycled-content products.

Additionally, ORNL supports compliance with these RCRA-based requirements as evidenced by the Program and Program Plan. Specifically, in the Program Plan, pollution prevention methods are described in Chapter 6.0, and the current and completed pollution prevention projects are documented in the Program's tracking system. Also, ORNL supports the procurement of products containing recovered materials through activities described in Chapter 6.0 of the Program Plan.

Currently, based on contractual and funding conditions, Energy Research and Energy Systems are not directly addressing Executive Order 12873. However, certain aspects of this Order, which are required under RCRA, are addressed by Energy Research and Energy Systems.

The *DOE Radiological Control Manual* includes a suggested performance goal based on the volume (cubic feet) of radioactive waste and explains that "minimizing the generation of radioactive waste reduces the environmental impact of DOE operations, helps reduce personnel exposure and reduces costs associated with handling, packaging, and disposal." The actual performance goals are to be established by senior site management. These goals are to "be measurable, achievable, auditable, challenging, and meaningful in promoting improvement." Finally, these goals are to be reviewed at least annually and revised as appropriate. The ORNL line organizations, with the support of the Office of Radiation Protection, are responsible for implementing this manual.

This manual states that "a radioactive waste minimization program shall be in effect to reduce the generation of radioactive waste and spread of contamination from Contamination, High Contamination or Airborne Radioactivity Areas." The manual recommends specific practices to support waste minimization, and the following are incorporated into the Program:

- "Restrict material entering Radiological Buffer Areas to those needed for performance of work."
- "Restrict quantities of hazardous materials, such as paints, solvents, chemicals, cleaners and fuels, entering Radiological Buffer Areas and take measures to prevent inadvertent radioactive contamination of these materials."
- "Substitute recyclable items in place of disposable ones and reuse equipment when practical."
- "Survey potentially contaminated material from Radiological Buffer Areas to separate uncontaminated from contaminated materials."
- "Segregate known uncontaminated from potentially contaminated waste."
- "Emphasize training in waste reduction philosophies, techniques and improved methods."

Suggested performance indicators in this manual as related to radiological waste minimization include the following for waste minimization:

- "Volume and activity of radioactive waste in cubic feet and Curies, respectively"
- "Number of cubic feet not subject to volume reduction by incineration, compaction, or other means."

It should be noted that waste reduction as defined in the Program Plan is included in the definition of waste minimization in this manual and will be tracked and reported as appropriate. The manual also requires that the provisions for waste minimization be reviewed as part of the radiological or as-low-as-reasonably-achievable (ALARA) review associated with the planning for maintenance, operations, and modifications. Although applicable methodologies, suggested performance indicators, and requirements can be found in the Program Plan, this manual does not specifically require that a waste minimization/reduction plan be written.

DOE Policies. DOE's "Waste Reduction Policy Statement" requires all DOE Program Offices and Field Operations to "institute a waste reduction policy to reduce the total amount of waste that is generated and disposed of by DOE operating facilities through waste minimization (source reduction and recycling) and waste treatment." The policy consolidates the requirements of DOE Orders 5400.1, 5400.3 (subsequently cancelled Order), and 5820.2A for either a waste minimization or waste reduction plan and attaches guidance for satisfying the reporting requirements of those Orders. The statement adopts the hierarchical approach to waste reduction and applies the policy to all types of waste. The policy requires waste reduction to be a "prime consideration" in research activities, process design, and facility design and operations. Implementation is facilitated by DOE's "Waste Minimization Crosscut Plan Implementation" Secretary of Energy Notice (SEN-37-92), and DOE's "Waste Minimization and Pollution Prevention Policy." The "Waste Minimization Crosscut Plan Implementation," Secretary of Energy Notice (SEN-37-92), establishes the organizational and management arrangements necessary to implement the recommendations and strategies of the *Waste Minimization/Pollution Prevention Crosscut Plan*, which is now referred to as the DOE *Pollution Prevention Program Plan*. The September 1992 DOE's "Waste Minimization and Pollution Prevention Policy" also focuses on the implementation of all aspects of a comprehensive waste minimization and pollution prevention program across the DOE complex. Specifically, it requires the emphasis of waste minimization practices, awareness, training, incentives, and implementation of the DOE *Waste Minimization/Pollution Prevention Crosscut Plan*, which is now referred to as the DOE *Pollution Prevention Program Plan*. The Program ensures that all requirements related to these policies and plans are met.

The 1996 *Pollution Prevention Program Plan* establishes the strategic framework for integrating pollution prevention into all of DOE's internal activities. This plan specifically integrates pollution prevention requirements from recent Executive Orders; specifies source reduction, recycling, and affirmative procurement goals to be achieved by the end of 1999; and outlines specific performance measures to assess pollution prevention progress. This plan

also provides a framework for a comprehensive DOE-wide pollution prevention program by setting forth 18 key activities necessary for success:

Six Immediate Priorities (to be accomplished by Fiscal Year [FY] 1998):

- Priority One - Establish Senior Management Commitment
- Priority Two - Set Quantitative Source Reduction and Recycling Goals
- Priority Three - Institute Performance Measures
- Priority Four - Implement Cost-Saving Pollution Prevention Projects
- Priority Five - Design Pollution Prevention into New Products, Processes, and Facilities
- Priority Six - Ensure that Programs Comply with Federal, State, and DOE Directives.

Six Near-Term Priorities (to be completed by FY 1999):

- Priority One - Implement Generator-Specific Pollution Prevention Programs
- Priority Two - Reduce Releases of Toxic Chemicals
- Priority Three - Establish Pollution Prevention Budgets Based Upon Activity Data Sheets (ADS)
- Priority Four - Perform Pollution Prevention Cost/Benefit Analyses
- Priority Five - Facilitate Technology Transfer and Information Exchange
- Priority Six - Implement Pollution Prevention Employee Training and Awareness Programs.

Six Out-Year Activities (to be completed by FY 2000):

- Activity One - Implement Environmentally Sound Pollution Prevention Procurement Practices
- Activity Two - Integrate Pollution Prevention into Research, Development, Demonstration, Test, and Evaluation Programs

- Activity Three - Make All DOE Policies, Orders, and Procedures Consistent with Regard to Pollution Prevention
- Activity Four - Implement Pollution Prevention Outreach and Public Involvement Programs
- Activity Five - Develop Pollution Prevention Incentives Programs
- Activity Six - Promote Regulatory Review and Reform.

The Program and the ORNL waste generating organizations are responsible for ensuring that the requirements of this plan are met at ORNL.

A.3.2 Indirect Requirements Supporting Pollution Prevention

The Program is supported indirectly by the legislation and policies written to address other compliance concerns. Examples of this type of rule are summarized in the following paragraphs.

EPCRA (Section 313 of Title III of the *Superfund Amendments and Reauthorization Act of 1986* [SARA]) requires owners and operators of certain facilities to submit reports to EPA on the manufacture and use of certain toxic chemicals. The purpose of the reporting is to provide local communities with information on the releases of listed toxic chemicals in their areas and to provide EPA with release information to assist the agency in determining the need for future regulations. Facilities must report the quantities of both routine and accidental releases of listed toxic chemicals as well as the maximum amount of the listed toxic chemical on site during the CY and the amount contained in wastes transferred off site.

Since 1988, ORNL has completed reports under Section 313 of EPCRA that are made on EPA Form R, the TRI Reporting Form. Form R is submitted to EPA and the Tennessee Emergency Response Council. New regulations promulgated under the PPA added source reduction and recycling data reporting requirements to Form R, beginning with reports for CY 1991. Reporting of source reduction and recycling data on Form R had previously been optional. The ORNL environmental compliance group completes this reporting, and the Program provides the ORNL environmental compliance group with pollution prevention information as needed.

Executive Order 12969, *Federal Acquisition and Community Right to Know*, is designed to promote economy and efficiency in government procurement of supplies and services by encouraging contractor companies to report to the public their toxic chemical releases. It requires federal agencies to include in contract solicitations as an eligibility criterion for the award of competitive acquisition contracts expected to equal or exceed $100,000, the requirement that such contractors must file a TRI Form ("Form R") as described in EPCRA, or certify that it does not meet the EPCRA requirements for filing a Form R. Executive Order 12969 was signed by President Clinton on August 8, 1995.

This Executive Order 12969 is based on the idea that sharing toxic release information with the public has provided a strong incentive for reduction in the generation and, ultimately, release into the environment of toxic chemicals. The Order states that the efficiency of the federal government is served when it purchases high quality supplies and services that have been produced with a minimum impact on public health and environment. Savings associated with reduced raw materials usage, reduced use of costly inefficient end-of-pipeline pollution controls, and reduced liability and remediation costs all serve to increase the economical and efficient provisions of essential supplies and services to the government. Therefore, information concerning chemical releases can assist the government to purchase efficiently produced, lower cost, and higher quality supplies and services that also have a minimum adverse impact on community health and the environment. The Energy Systems Central Environmental Compliance Staff is responsible for addressing the requirements of this Order as appropriate.

The *Clean Air Act* (CAA) *Amendments of 1990* adds to the CAA by establishing two waste minimization-related reporting requirements. The first requirement is found in a program for the voluntary early reduction of hazardous air pollutants (HAP) emissions and allows the operator of a source to obtain a 6-year extension of compliance if the operator demonstrates that the source has achieved a reduction of 90 percent or more by certain dates. The second requirement results from the President's decision to accelerate the reduction of the most significant ozone-depleting substances and provides for a 4-year acceleration in the phaseout of production and use of most significant ozone-depleting substances. A primary goal of the CAA is "to encourage or otherwise promote reasonable Federal, State, and local government actions...for pollution prevention."

The purpose of the Early Reduction Program is to encourage early reduction in HAP emissions. Section 112(i)(5) of CAA, as amended in 1990, allows an existing source to obtain a 6-year extension of compliance with an emission standard promulgated pursuant to

Section 112(d) of the act. To obtain the extension, the owner or operator of the source must demonstrate that the source has achieved an emission reduction of 90 percent or more of HAPs (95 percent or more for particulates) by certain dates specified in the act. If the source is granted a compliance extension, an alternative emission limitation will be established by permit to ensure continued achievement of the emission reduction.

The regulatory nature of the Early Reduction Program distinguishes it from the voluntary nature of the 33/50 Program. EPA has attempted to implement the 33/50 Program and the Early Reduction Program in a coordinated manner to minimize confusion over their differing requirements and to encourage participation. Reductions under the Early Reduction Program also can be submitted and credited under the 33/50 Program.

EPA will administer the Early Reduction Program until states have approved permit programs under Title V of the CAA, and source owners or operators seeking compliance extensions will submit enforceable commitments and permit applications to the appropriate EPA Regional Office. After a state has an approved permit program, it will process and evaluate for approval the enforceable commitments and permit applications.

A state also may require that greater than a 90 percent reduction of HAP emissions (95 percent for particulates) be achieved by the source to obtain a compliance extension. An application cannot be submitted for a compliance extension for a new source.

On February 11, 1992, President Bush announced a 4-year acceleration in the phaseout of production of the most significant ozone-depleting substances. Production of major chloro-fluorocarbons, halons, methyl chloroform, and carbon tetrachloride, with limited exceptions, is to cease by December 31, 1995. The President called upon United States producers to reduce production of these substances to 50 percent of 1986 levels by the end of 1992. The President indicated that he had authority to accelerate the phaseout of these substances under the CAA and that such acceleration would be faster than required by the Montreal Protocol. On July 29, 1992, the Secretary of Energy issued a memorandum directing actions to promote the use of safe chemical substitutes in place of ozone-depleting substances used at DOE facilities, and to accelerate the phaseout of ozone-depleting substances. DOE organizations are to report annually in January efforts to phase out the use of ozone-depleting substances. Recommendations on future steps that could accelerate the phaseout are to be included in the report. The environmental compliance group is responsible for ensuring compliance with the CAA.

DOE Order 6430.1A (Section 1300-8, "General Design Criteria") specifies that "process systems shall minimize the production of wastes at the sources and minimize the mixing of radioactive and non-radioactive hazardous wastes. The waste management systems shall provide facilities and equipment to handle those wastes safely and effectively." The Order further states that "Mixed waste that cannot be avoided shall be identified and considered in the design at the earliest possible time. Facility design shall provide for the segregation of hazardous wastes into compatible groups for storage...." The final objective stated for Section 1300-8 is to "Minimize exposures of personnel and the general public to hazardous materials by emphasizing these concerns during all design, construction, and operational phases of special facilities." The Central Engineering Organization is responsible for design activities but is supported by the Program. ORNL supports compliance with these requirements as evidenced by the Program and Program Plan, the Pollution Prevention Policy (Appendix B of the Program Plan), the pollution prevention techniques discussed in Chapter 6.0 of the Program Plan, and the current and completed pollution prevention projects documented in the Program tracking system.

The FFC Act, Public Law 102-886, amends RCRA to require that DOE prepare two inventory reports:

- A report containing a national inventory of all mixed wastes that DOE stores or generates, regardless of the time they were generated
- A report containing a national inventory of mixed waste treatment capacities and technologies.

The reports are to cover only DOE mixed wastes. "Mixed waste" is defined by the FFC Act to mean "waste that contains both hazardous waste and source, special nuclear, or by-product material subject to the Atomic Energy Act of 1954." The legislation specifies the content of the reports and requires that the reports should have been submitted no later than April 4, 1993.

The FFC Act also requires the Secretary of Energy to prepare a treatment capacities and technologies plan for each facility at which DOE generates or stores mixed wastes. The facility plans are to provide for the development of treatment capacities and technologies to treat all of each facility's mixed wastes to the standards promulgated in accordance with RCRA Section 3004(m). All of each facility's wastes are to be considered, regardless of the time when they were generated. The requirement to prepare a plan does not apply to any facility subject to any permit establishing a schedule for treatment of mixed waste, or any

existing agreement or administrative or judicial order governing the treatment of mixed wastes at the facility to which the state is a party.

A facility plan is also to be submitted to the state in which the facility is located if the state (1) has authority under state law to prohibit land disposal of mixed waste until the waste has been treated and to regulate the hazardous components of mixed waste, and (2) is authorized by EPA under RCRA Section 3006 to regulate mixed waste. Facility plans are to be made available to the public before they are approved. Upon approval of a plan by EPA or a state, the approving agency shall issue an order requiring compliance with the approved plan.

A state may waive the requirement for DOE to develop a facility plan if the state (1) enters into an agreement with the Secretary of Energy that addresses compliance at the facility with the mixed waste requirements of RCRA Section 3004(j), and (2) issues an order requiring compliance with such agreement. WMRAD is responsible for complying with FFC Act requirements. In the past, ORNL complied with these reporting requirements under the FFCA with the state of Tennessee.

The *Clean Water Act* (CWA) *Amendments of 1992* (Section 402p) establishes new regulations related to pollution prevention. The CWA states that storm water discharges associated with industrial activity to waters of the United States must be authorized by a National Pollutant Discharge Elimination System (NPDES) permit. In April 1992, EPA published in the FR a National Strategy for issuing NPDES permits for storm water discharges associated with industrial activity and a regulation that establishes minimum requirements for a Notice of Intent (NOI) that a discharger must file in order to be authorized to discharge under a NPDES general permit. EPA published a notice in the FR on September 9, 1992, indicating that it was issuing final NPDES general permits for storm water discharges associated with industrial activity and construction. These general permits establish NOI requirements, special requirements for facilities that are subject to EPCRA Section 313 reporting, requirements to develop and implement storm water pollution prevention plans, and requirements to conduct site inspections for facilities with discharges authorized by the permit.

The NPDES general permits for storm water discharges associated with industrial and construction activity require that a discharger submit an NOI to be covered by the general permit before the authorization of its discharges under such permit [40 Code of Federal Regulations (CFR) 122.28(b)(2), 57 FR 11394]. The NOI must contain a certification that a

storm water pollution prevention plan has been prepared for the site in accordance with the permit.

The pollution prevention approach adopted in the permits focuses on two major objectives: (1) to identify the source of pollution potentially affecting the quality of storm water discharges associated with industrial or construction activity from the facility and (2) to implement measures to prevent or reduce pollutants in storm water discharges to ensure compliance with the general permit. The ORNL environmental compliance group is responsible for ensuring CWA compliance and documentation, including the storm water pollution prevention plan. The ORNL environmental compliance group has met this requirement.

Executive Order 12088, *Federal Compliance with Pollution Control Standards*, makes the head of each federal agency responsible for ensuring that all necessary action is taken for the prevention of environmental pollution at federal facilities and during activities under the control of the agency. The Order requires each federal agency to submit a Pollution Control Plan to the Director, Office of Management and Budget (OMB), that provides for any necessary improvement in the design, construction, management, operation, and maintenance of federal facilities and activities, and which includes annual cost estimates. Each executive agency must "ensure that the plan provides for compliance with all applicable pollution control standards."

Executive Order 12088 is implemented by the OMB Circular A-106, which requires federal agencies to report pollution abatement measures to the OMB in a 5-year plan. DOE Order 5400.1 requires DOE field organizations to report pollution abatement projects as part of a 5-year plan semiannually to EG-1 on dates determined by EH-1, "but in any event no later than May 1 and December 15 of each year." Central Environmental Compliance has responsibility for ensuring compliance with this report. However, DOE will actually compile the report based on program plans and reports submitted. This plan is not a facility-specific plan, and pollution control standards are met through planning, upgrades, and proper operations of all of the site operations when needed and funded.

The CWA and Executive Order 12088 support the Program by exemplifying the importance of pollution prevention. The CWA stresses source identification, source reduction, and the implementation of measures to segregate pollution from stormwater. These pollution prevention methods are discussed in Chapter 6.0 of the Program Plan.

DOE Order 5400.5 requires the development of a program and program plan to maintain environmental releases of pollutants arising from facility activities at ALARA levels. DOE plans to replace this Order with a public law. The environmental program plan applies to environmental discharges and wastes containing radiological and chemical hazards that are from plant activities, including construction of new facilities, modification of existing facilities, ongoing operation of facilities, decontamination and decommissioning, and remediation. The basic environmental ALARA Program elements required by DOE include the following:

- A statement of management commitment to the ALARA process and a policy statement supporting that commitment
- A designated organization with responsibility, authority, and structure designed for implementing this plan
- A set of methods and procedures to systematically evaluate activities at ORNL to identify those which cause environmental discharges and wastes of concern from the standpoint of public exposure to radiological or chemical hazards
- A set of procedures used to evaluate these activities to ensure that these environmental discharges and wastes are maintained at ALARA levels, considering technology, economic, and social factors.

The ORNL environmental compliance group is responsible for this program and the associated program plan. At ORNL, when feasible, goals and priorities for pollution prevention and ALARA are coordinated to minimize resources required because the objectives of both programs are ultimately the same.

A.3.3 Program Plan Compliance

As described in Sections A.3.1 and A.3.2, regulatory and DOE requirements specifying a waste minimization/pollution prevention plan include the following guidance, agreements, orders, and laws:

- The ORR FFCA (Table A-2)
- The THWRA (Table A-3), which pertains to hazardous wastes regulated under the RCRA and the *Tennessee Hazardous Waste Management Rules*
- The TOA (Table A-4)
- DOE Order 5400.1 (Table A-5)

- March 1994 *DOE Order 5400.1 Site WMin/PP Awareness Plans DOE-wide Implementation Guidance-Update* (Table A-6)

- December 1993 DOE *Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan* (Table A-7)

- 1996 DOE *Pollution Prevention Program Plan* (Table A-8)

- February 1997 DOE *Guidance for Preparation of Site Pollution Prevention Plans* (Table A-9).

The following compliance matrices (Tables A-2 through A-9) summarize compliance of the Program Plan with these plan-based requirements.

Table A-2
The FFCA for the ORR Addressing Storage of Radioactive Mixed Waste Subject to LDR under RCRA Compliance Matrix for the Program Plan

Requirement of FFCA	Section of Plan
V. Compliance Requirements, 1., Page 12: DOE shall submit to EPA for review a plan for a waste minimization program at DOE-ORR. The waste minimization program must provide for the segregation of Hazardous Waste from Radioactive Mixed Wastes, the substitution of nonhazardous solvents for hazardous solvents where technically practicable, and the minimization of the generation of Hazardous Waste throughout DOE-ORR."	5.3 RELEVANT SITE DIRECTIVES OR GUIDANCE 6.4 SITE-WIDE IMPLEMENTATION 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY 6.5.3.3 RESEARCH AND DEVELOPMENT 6.5.4 DESIGN CONSIDERATIONS APPENDIX C: ORNL POLLUTION PREVENTION GOALS APPENDIX D: ORNL POLLUTION PREVENTION PROGRAM FUNDING (INCLUDING ACTIVITY DATA SHEETS) APPENDIX E: DETAILED SCHEDULE FOR THE ORNL POLLUTION PREVENTION PROGRAM ACTIVITIES (In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)
The FFCA also required the submittal of an annual report as described in this appendix, with the first report due March 31, 1993. This report is listed in the Program Plan in the schedule in Appendix E. Pollution prevention goals are listed in Appendix C of the Program Plan. The requirements of this agreement have been met and have essentially been replaced by the *Federal Facility Compliance Act* (FFC Act) of 1992.	

DOE - U.S. Department of Energy
EPA - U.S. Environmental Protection Agency
FFCA - Federal Facilities Compliance Agreement
LDR - land disposal restrictions
ORNL - Oak Ridge National Laboratory
ORR - Oak Ridge Reservation
Program - Pollution Prevention Program
RCRA - Resource Conservation and Recovery Act

Table A-3
Tennessee Hazardous Waste Reduction Act of 1990
Compliance Matrix for the Program Plan

Section of Act	Section of Plan
Section 68-212-305: (a) "A hazardous waste reduction plan shall include at least the following:" (1) "A dated and signed written policy articulating management support for the generator's hazardous waste reduction plan;"	Signature Page 2.0 POLICY 3.0 ORGANIZATION AND STAFF RESPONSIBILITIES APPENDIX B: ORNL POLLUTION PREVENTION POLICY
(2) "The scope and objectives of the plan, including the evaluation of technologies, procedures and personnel training programs to ensure that unnecessary waste is not generated and to encourage hazardous waste reduction. Specific goals shall be set for hazardous waste reduction, as described in subsections (b)-(d);"	1.0 INTRODUCTION/BACKGROUND 2.0 POLICY 4.0 PROGRAM GOALS 6.2.2 EMPLOYEE INVOLVEMENT AND PARTICIPATION 6.2.3 PROGRAM EVALUATION 6.3 REPORTING 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY 6.5.2 TRAINING 6.5.3 INFORMATION AND TECHNOLOGY EXCHANGE APPENDIX C: ORNL POLLUTION PREVENTION GOALS

Table A-3

(Page 2 of 6)

Section of Act	Section of Plan
Section 68-212-305 (a): (3) "A description of technically and economically practical hazardous waste reduction options to be implemented and a planned schedule for implementation. These options shall be based on an internal analysis of hazardous waste streams conducted to review individual processes or facilities and other activities where waste may be generated and identify opportunities to reduce or eliminate waste generation. Such analysis shall evaluate data on the types, amount, and hazardous constituents of waste generated, where and why that waste was generated within the production process or other operations, and potential hazardous waste reduction and recycling techniques applicable to those wastes;"	6.3 REPORTING 6.4 SITE-WIDE IMPLEMENTATION 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY APPENDIX B: ORNL POLLUTION PREVENTION POLICY APPENDIX C: ORNL POLLUTION PREVENTION GOALS APPENDIX E: DETAILED SCHEDULE FOR THE ORNL POLLUTION PREVENTION PROGRAM ACTIVITIES (In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)
(4) "A description of the hazardous waste accounting systems that identify waste management costs and factor in liability, compliance, and oversight costs to the extent feasible;"	6.0 POLLUTION PREVENTION ACTIVITIES AND RESOURCE REQUIREMENTS 6.3 REPORTING APPENDIX D: ORNL POLLUTION PREVENTION PROGRAM FUNDING (INCLUDING ACTIVITY DATA SHEETS)
(5) "A description of the employee awareness and training programs designed to involve employees to the maximum extent feasible in hazardous waste reduction planning and implementation;"	6.2.2 EMPLOYEE INVOLVEMENT AND PARTICIPATION 6.5.2 TRAINING 6.5.3 INFORMATION AND TECHNOLOGY EXCHANGE

Table A-3

(Page 3 of 6)

Section of Act	Section of Plan
Section 68-212-305(a): (6) "A description of how the plan has been or will be incorporated into management practices and procedures so as to ensure an ongoing effort;" and	1.0 INTRODUCTION/BACKGROUND 2.0 POLICY 3.0 ORGANIZATION AND STAFF RESPONSIBILITIES 4.0 PROGRAM GOALS 5.3 RELEVANT SITE DIRECTIVES OR GUIDANCE 6.1 PROGRAM ORGANIZATION AND INFRASTRUCTURE 6.2.2 EMPLOYEE INVOLVEMENT AND PARTICIPATION 6.2.3 PROGRAM EVALUATION 6.3 REPORTING 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY 6.5.2 TRAINING
(7) "Other information about generation of hazardous waste not requiring disclosure of proprietary information as the board may require by regulation."	Not applicable or required at this time. However, a compilation of classified pollution prevention information may be required sometime in the future.
Section 68-212-305(b): "As part of each plan developed under this part, a generator shall establish specific performance goals for the source reduction of each hazardous waste stream."	1.0 INTRODUCTION/BACKGROUND 4.0 PROGRAM GOALS 6.2 PROGRAM DEVELOPMENT APPENDIX C: ORNL POLLUTION PREVENTION GOALS APPENDIX E: DETAILED SCHEDULE FOR THE ORNL POLLUTION PREVENTION PROGRAM ACTIVITIES

Table A-3

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Section of Act	Section of Plan
Section 68-212-305(c): "The specific performance goals established under subsection (b) shall be quantitative goals, expressed in numeric terms. Whenever possible, the units of measurement should be in pounds (or tons) of waste generated per standards unit of production, as defined by the generator. If the establishment of numeric performance goals is not practical, the performance goals shall include a clearly stated list of actions designed to lead to the establishment of numeric goals as soon as practical."	3.0 ORGANIZATION AND STAFF RESPONSIBILITIES 4.0 PROGRAM GOALS 6.3 REPORTING 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY 6.5.3.3 RESEARCH AND DEVELOPMENT APPENDIX C: ORNL POLLUTION PREVENTION GOALS
Section 68-212-305(d): "As part of each plan developed under this act, each generator shall explain the rationale for each performance goal. Acts of God or other unforeseeable events beyond the control of the generator do not have to be considered in setting goals. The rationale for a particular performance goal shall address any impediments to hazardous waste reduction, including but not limited to the following:"	4.0 PROGRAM GOALS 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY APPENDIX C: ORNL POLLUTION PREVENTION GOALS
(1) "The availability of technically practical hazardous waste reduction methods, including any anticipated changes in the future;"	6.3 REPORTING 6.4 SITE-WIDE IMPLEMENTATION 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY 6.5.3.3 RESEARCH AND DEVELOPMENT (In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)

Table A-3

(Page 5 of 6)

Section of Act	Section of Plan
(2) "Previously implemented reductions of hazardous waste;"	6.3 REPORTING (In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)
Section 68-212-305(d): (3) "The economic practicality of available hazardous waste reduction methods, including any anticipated changes in the future. Examples of situations where hazardous waste reduction may not be economically practical include, but are not limited to:"	6.3 REPORTING 6.4 SITE-WIDE IMPLEMENTATION 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY APPENDIX C: ORNL POLLUTION PREVENTION GOALS APPENDIX D: ORNL POLLUTION PREVENTION PROGRAM FUNDING (INCLUDING ACTIVITY DATA SHEETS)
(A) "For valid reasons of prioritization, a particular company has chosen first to address other more serious hazardous waste reduction concerns; (B) Necessary steps to reduce hazardous waste are likely to have significant adverse impacts on product quality; or (C) Legal or contractual obligations interfere with the necessary steps that would lead to hazardous waste reduction."	(In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)

Table A-3

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Section of Act	Section of Plan
Section 68-212-305(e): (1) "The board, by rule, may provide for modifications and exclusions for small quantity generators related to the kind of information to be included in the plan." (2) "The board may provide for exception by rule for generators whose hazardous waste streams fluctuate widely due to contract work or manufacturing orders."	Not applicable; the primary ORNL site is a large quantity generator. ORNL also has two sites that currently are conditionally exempt small quantity generators. One of these conditionally exempt small quantity generators at one time was a small quantity generator and compiled a separate plan to comply with this Act. However, no modifications or exclusions have impacted this site.
Section 68-212-305(f): "A generator required to complete a hazardous waste reduction plan under subsection (a) may include as a preface to its initial plan:"	
Section 68-212-305(f): (1) "An explanation and documentation regarding hazardous waste reduction efforts completed or in progress before the first reporting date; and	(In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)
(2) An explanation and documentation regarding impediments to hazardous waste reduction specific to the individual facility."	5.0 SITE-WIDE ANALYSIS APPENDIX C: ORNL POLLUTION PREVENTION GOALS APPENDIX D: ORNL POLLUTION PREVENTION PROGRAM FUNDING (INCLUDING ACTIVITY DATA SHEETS)

ORNL - Oak Ridge National Laboratory
Program - Pollution Prevention Program

Table A-4
TOA Compliance Matrix for the Program Plan

Requirement in TOA	Section of Plan
Attachment B, B.4 Waste Minimization Plan, Page 16: "DOE will complete facility-wide waste minimization plans for ORNL, Y-12, and ORGDP, in accordance with the Tennessee Hazardous Waste Management Rule 1200-1-11-06(5)3(d)2(IX) and DOE Orders 5400.1 and 5820.2A, that recommend how the use and volume of existing hazardous and radioactive materials can be reduced or eliminated from plant operations."	All sections of the Plan, which is based on DOE guidance for compiling a plan to comply with DOE Order 5400.1. Sections specifically addressing the reduction or elimination of waste include: 5.3 RELEVANT SITE DIRECTIVES OR GUIDANCE 6.4 SITE-WIDE IMPLEMENTATION 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY 6.5.3.3 RESEARCH AND DEVELOPMENT (In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.) Note that DOE Order 5820.2A does not specifically require a waste minimization/pollution prevention plan, but it does require that waste minimization/pollution prevention be addressed within the waste management plan required by the order.
As detailed in this appendix, the TOA also requires that a pilot waste assessment be completed and has been completed by ORNL. Finally, the TOA requires the completion of a comprehensive waste tracking system, a major supporting element to the Program. As specified in this appendix, this tracking activity is performed by the Document Management Center in the Waste Management and Remedial Action Division, but the ORNL Program supports this effort as needed and appropriate.	

DOE - U.S. Department of Energy
ORGDP - Oak Ridge Gaseous Diffusion Plant [previously referred to as the K-25 Site; now referred to as the East Tennessee Technology Park (ETTP)]
ORNL - Oak Ridge National Laboratory
Program - Pollution Prevention Program
TOA - Tennessee Oversight Agreement

Table A-5
DOE Order 5400.1 Compliance Matrix for the Program Plan
(Waste Minimization and Pollution Prevention Awareness Program Plans)

(Page 1 of 2)

Requirement of Order 5400.1	Section of Plan
Chapter III, 4. Special Program Planning Requirements, b., Pages II-2 and III-3: Waste Minimization Program Plan: "Goals for minimizing the volume and toxicity of all wastes that are generated, with annual reductions if programmatic requirements allow." "Changes in waste quantity, volume and toxicity that are achieved shall be compared with quantities generated in the previous year."	All sections of the Plan, which is based on DOE guidance for compiling a plan to comply with DOE Order 5400.1. 4.0 PROGRAM GOALS 6.3 REPORTING APPENDIX C: ORNL POLLUTION PREVENTION GOALS APPENDIX E: DETAILED SCHEDULE FOR THE ORNL POLLUTION PREVENTION PROGRAM ACTIVITIES (Reported and compared based on previous years in DOE annual waste reduction report)
"The proposed methods of treatment, storage, and disposal that accomplish waste minimization that are technically and economically practicable shall be reported as appropriate."	6.3 REPORTING 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY APPENDIX E: DETAILED SCHEDULE FOR THE ORNL POLLUTION PREVENTION PROGRAM ACTIVITIES (Reported in DOE annual waste reduction report) (In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)
"Waste minimization plans required by specific legislation, such as RCRA, shall be included as part of this Program plan."	1.0 INTRODUCTION/BACKGROUND 5.0 SITE-WIDE ANALYSIS 6.3 REPORTING APPENDIX A: BACKGROUND AND COMPLIANCE OF THE ORNL POLLUTION PREVENTION PROGRAM AND PROGRAM PLAN (Remaining matrices and text in this appendix)

Table A-5

(Page 2 of 2)

Requirement of Order 5400.1	Section of Plan
Pollution Prevention Awareness Program Plan: Program will "be specifically identified in site's environmental protection statement."	All sections of the Plan, which is based on DOE guidance for compiling a plan to comply with DOE Order 5400.1. 2.0 POLICY APPENDIX B: ORNL POLLUTION PREVENTION POLICY
"All mission statements and project plans shall recognize a requirement for pollution prevention, where appropriate."	1.0 INTRODUCTION/BACKGROUND 6.2.2 EMPLOYEE INVOLVEMENT AND PARTICIPATION 6.5.1 OPPORTUNITY ASSESSMENTS AND POLLUTION PREVENTION TERMINOLOGY 6.5.4 DESIGN CONSIDERATIONS APPENDIX B: ORNL POLLUTION PREVENTION POLICY
Program implementation will include "elements for employee awareness through specific training, special awareness campaigns, and incentives and award programs."	6.2.2 EMPLOYEE INVOLVEMENT AND PARTICIPATION 6.5.2 TRAINING APPENDIX E: DETAILED SCHEDULE FOR THE ORNL POLLUTION PREVENTION PROGRAM ACTIVITIES (In previous versions of the plan, Appendix B summarized examples of ORNL pollution prevention projects. ORNL currently tracks and reports pollution prevention projects using an electronic tracking system.)

DOE - U.S. Department of Energy
ORNL - Oak Ridge National Laboratory
Program - Pollution Prevention Program
RCRA - Resource Conservation and Recovery Act

Table A-6
March 1994 DOE Order 5400.1 Site WMin/PP Awareness Plans DOE-wide Implementation Guidance-Update Compliance Matrix for the Program Plan (Environmental Management [EM])

(Page 1 of 2)

Section of DOE-EM Guidance	Section of Plan
I. Introduction	1.0 Introduction/Background 4.2 Program Objectives
II. Policy	2.0 Policy
III. Organization	3.0 Organization and Staff Responsibilities
IV. Goals	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
V. WMin/PP Activities and Resource Requirements	5.0 Site-Wide Analysis 5.5 Planning Assumptions 6.0 Pollution Prevention Activities and Resource Requirements Appendix D: ORNL Pollution Prevention Program Funding (Including Activity Data Sheets)
VI. Site-wide Analysis	5.0 Site-Wide Analysis
VII. Program Status	5.1 Current Situation 7.0 Program Status Summary
Attachment - Site-wide Program Elements	
1. WMin/PP Organization and Infrastructure	6.1 Program Organization and Infrastructure
2. Program Development	6.2 Program Development
3. Employee Involvement	6.2.2 Employee Involvement and Participation 6.5.2 Training
4. Tracking	6.3 Reporting
5. Reporting	6.3 Reporting
6.a Establish Site-Wide Source Reduction Programs for Hazardous, Radioactive, and Mixed Waste Streams	6.4.1 Site-Wide Source Reduction Programs for Hazardous, Radioactive, and Mixed Waste Streams
6.b Establish Site-Wide Recycling Programs for Hazardous, Radioactive, and Mixed Waste Streams	6.4.2 Site-Wide Recycling Programs for Hazardous, Radioactive, and Mixed Waste Streams
6.c Establish Site-Wide Source Reduction and Recycling Programs for Sanitary Waste Streams	6.4.3 Site-Wide Source Reduction and Recycling Programs for Industrial Waste Streams
7. Technical Assistance	6.5 Technical Assistance

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(Page 2 of 2)

Section of DOE-EM Guidance	Section of Plan
Attachment - Site-wide Program Elements (continued)	
8. Information and Technology Exchange	6.5.3 Information and Technology Exchange
9. Program Evaluation	6.2.3 Program Evaluation
Attachment - WMin/PP Generator Implementation Program Elements	
1. Organization and Infrastructure	3.0 Organization and Staff Responsibilities
2. Site/Facility Program Development	6.2 Program Development
3. Site-Wide Program Participation	6.2.2 Employee Involvement and Participation 6.3 Reporting 6.4 Site-Wide Implementation 6.5.2 Training 6.5.3 Information and Technology Exchange
4. Site/Facility Training	6.2.2 Employee Involvement and Participation 6.5.2 Training
5. Opportunity Assessments	6.5.1 Opportunity Assessments and Pollution Prevention Terminology
6.a Implement Source Reduction Opportunities for Hazardous, Radioactive, and Mixed Waste Streams	6.4.1.1 Source Reduction Opportunities Implementation for Hazardous, Radioactive, and Mixed Waste Streams
6.b Implement Recycling Opportunities for Hazardous, Radioactive, and Mixed Waste Streams	6.4.2.1 Recycling Opportunities Implementation for Hazardous, Radioactive, and Mixed Waste Streams
6.c Implement Source Reduction and Recycling Opportunities for Sanitary Waste Streams	6.4.3.1 Source Reduction and Recycling Opportunities Implementation for Industrial Waste Streams
7. Design Considerations	6.5.4 Design Considerations
8. Program Evaluation	6.2.3 Program Evaluation

ADS - Activity Data Sheet
DOE- U.S. Department of Energy
EM - Environmental Management
ORNL - Oak Ridge National Laboratory
Program - Pollution Prevention Program
WMin/PP - Waste Minimization/Pollution Prevention

Table A-7
DOE December 1993 Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan Compliance Matrix for the Program Plan (Defense Programs [DP])

(Page 1 of 2)

Section of DOE-DP Guidance		Section of Plan	
1.0	Introduction	1.0	Introduction/Background
1.1	Purpose of Plan	1.1	Purpose of Plan
2.0 2.1 2.2	Policy Policy Statement Statement of Management Commitment	2.0 2.1 2.2	Policy Policy Statement Statement of Management Commitment
3.0	Organization and Staff Responsibilities	3.0	Organization and Staff Responsibilities
4.0	Goals	4.0	Program Goals
5.0	Situation Analysis	5.0	Site-Wide Analysis
5.1	Current Situation	5.1 7.0	Current Situation Program Status Summary
5.2	Program Directives	5.2	Program Directives
5.3	Relevant Site Directives or Guidance	5.3	Relevant Site Directives or Guidance
5.4	Barrier Analysis	5.4	Barrier Analysis
5.5	Planning Assumptions	5.5	Planning Assumptions
5.6	Strengths and Weaknesses	5.6	Strengths and Weaknesses
6.0	Site-Wide Program Elements	6.0	Pollution Prevention Activities and Resource Requirements
6.1	WMin/PP Organization and Infrastructure	6.1	Program Organization and Infrastructure
6.2	Program Development	6.2	Program Development
6.3	Employee Involvement	6.2.2 6.5.2	Employee Involvement and Participation Training
6.4	Tracking	6.3	Reporting
6.5	Reporting	6.3	Reporting
6.6a	Establish Site-Wide Source Reduction Programs for Hazardous, Radioactive, and Mixed Waste Streams	6.4.1	Site-Wide Source Reduction Programs for Hazardous, Radioactive, and Mixed Waste Streams
6.6b	Establish Site-Wide Recycling Programs for Hazardous, Radioactive, and Mixed Waste Streams	6.4.2	Site-Wide Recycling Programs for Hazardous, Radioactive, and Mixed Waste Streams

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Section of DOE-DP Guidance		Section of Plan	
6.6c	Establish Site-Wide Source Reduction and Recycling Programs for Sanitary Waste Streams	6.4.3	Site-Wide Source Reduction and Recycling Programs for Industrial Waste Streams
6.7	Technical Assistance	6.5	Technical Assistance
6.8	Information and Technology Exchange	6.5.3	Information and Technology Exchange
6.9	Program Evaluation	6.2.3	Program Evaluation
7.0	Generator Program Elements	6.0	Pollution Prevention Activities and Resource Requirements
7.1	Organization and Infrastructure	6.1	Program Organization and Infrastructure
7.2	Facility Program Development	6.2	Program Development
7.3	Site-Wide Program Participation	6.2.2 6.3 6.4 6.5.2 6.5.3	Employee Involvement and Participation Reporting Site-Wide Implementation Training Information and Technology Exchange
7.4	Facility Training	6.2.2 6.5.2	Employee Involvement and Participation Training
7.5	Opportunity Assessments	6.5.1	Opportunity Assessments and Pollution Prevention Terminology
7.6a	Implement Source Reduction Opportunities for Hazardous, Radioactive, and Mixed Waste Streams	6.4.1.1	Source Reduction Opportunities Implementation for Hazardous, Radioactive, and Mixed Waste Streams
7.6b	Implement Recycling Opportunities for Hazardous, Radioactive, and Mixed Waste Streams	6.4.2.1	Recycling Opportunities Implementation for Hazardous, Radioactive, and Mixed Waste Streams
7.6c	Implement Source Reduction and Recycling Opportunities for Sanitary Waste Streams	6.4.3.1	Source Reduction and Recycling Opportunities Implementation for Industrial Waste Streams
7.7	Design Considerations	6.5.4	Design Considerations
7.8	Program Evaluation	6.2.3	Program Evaluation
8.0	Summary		Executive Summary

DOE - U.S. Department of Energy
DP - Defense Programs
ORNL - Oak Ridge National Laboratory
Program - Pollution Prevention Program
WMin/PP - Waste Minimization/Pollution Prevention

Table A-8
DOE 1996 Pollution Prevention Program Plan
Compliance Matrix for the Program Plan

(Page 1 of 5)

Section of 1996 DOE Program Plan	Section of Plan
1.2 Pollution Prevention Goals The Secretary of Energy has committed the Department to the following pollution prevention goals to be achieved complex-wide by December 31, 1999, using calendar year (CY) 1993 as a baseline:	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• Reduce total releases and offsite transfers for treatment and disposal of EPCRA 313 toxic chemicals from routine operations 50 percent.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• Reduce the generation of low-level radioactive waste from routine operations 50 percent.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• Reduce the generation of low-level mixed waste from routine operations 50 percent.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• Reduce the generation of hazardous waste from routine operations 50 percent.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• Reduce the generation of sanitary waste (after recycling) from routine operations 33 percent.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• Divert for recycling 33 percent of sanitary waste from all operations.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• Increase the affirmative procurement of EPA-designated recycled products to 100 percent.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
Individual sites are encouraged to develop their own goals that meet or exceed the above complex-wide goals, against which DOE must report.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals

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Section of 1996 DOE Program Plan	Section of Plan
3.0 Implementation Guidance All DOE sites should perform the activities outlined in the Activity Plan...18 key activities to be completed by CY 2000...Figure 3.1 shows the work breakdown structure of the Activity Plan (See Figure A-2.).	Plan in General Specifically: 5.8 Pollution Prevention Priorities and Out-Year Activities
APPENDIX D Pollution Prevention Activity Plan Implementation of the pollution prevention activities described below is essential to meeting goals for reducing waste generation. [See Figure A-2 for 18 key activities. Figure D.3.1 (Figure A-3) is specifically referenced under Compliant Site Programs, and Figure D-3.2 (Figure A-4) is specifically referenced under Generator Specific Programs.]	Plan in General Specifically: 5.8 Pollution Prevention Priorities and Out-Year Activities Appendix A: Background and Compliance of the ORNL Pollution Prevention Program and Program Plan, Tables A-6 and A-7
Note: The 18 key activities have been grouped two different ways in this DOE plan. First they were grouped by general category, policy direction, infrastructure development, and program implementation (See Figure A-2). Secondly, the 18 key activities were grouped based on immediate priorities, new-term priorities, and out-year activities. The 18 key activities are presented based on the priority-based grouping with the numerical indicators in Figure A-2 listed for each activity.	
<u>Immediate Priorities</u> (to be accomplished by FY 1998)	
Priority One: Establish Senior Management Commitment (Activity 1.2 in Figure A-2)	2.0 Policy 5.8 Pollution Prevention Priorities and Out-Year Activities 6.2.2.1.3 Incentive Awards and Recognition Appendix B: ORNL Pollution Prevention Policy
Priority Two: Set Quantitative Source Reduction and Recycling Goals (Activity 1.1 in Figure A-2)	4.0 Program Goals 5.8 Pollution Prevention Priorities and Out-Year Activities Appendix C: ORNL Pollution Prevention Goals

Table A-8

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Section of 1996 DOE Program Plan	Section of Plan
Priority Three: Institute Performance Measures (Activity 2.1 in Figure A-2)	4.4 Pollution Prevention Performance Measures 5.8 Pollution Prevention Priorities and Out-Year Activities
Priority Four: Implement Cost-Saving Pollution Prevention Projects (Activity 3.3 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.3.1.2.5 Program Activity Tracking 6.4 Site-Wide Implementation Appendix D: ORNL Pollution Prevention Program Funding (Including Activity Data Sheets)
Priority Five: Design Pollution Prevention into New Products, Processes and Facilities (Activity 3.4 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.5.4 Design Considerations
Priority Six: Ensure that Programs Comply with Federal, State, and Departmental Directives (Activity 3.1 in Figure A-2)	5.2 Program Directives 5.8 Pollution Prevention Priorities and Out-Year Activities Appendix A: Background and Compliance of the ORNL Pollution Prevention Program and Program Plan
Near-Term Priorities (to be completed by FY 1999)	
Priority One: Implement Generator-Specific Pollution Prevention Programs (Activity 3.2 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.2 Program Development 6.3.1.2.5 Program Activity Tracking 6.4 Site-Wide Implementation 6.5 Technical Assistance (Specifically, as discussed in Section 6.5, each of the waste generating organizations has established Pollution Prevention Representatives Handbooks, which include organization-specific plans, as applicable.)
Priority Two: Reduce Releases of Toxic Chemicals (Activity 3.7 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.3.1.2.5 Program Activity Tracking 6.4 Site-Wide Implementation Appendix C: ORNL Pollution Prevention Goals

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Section of 1996 DOE Program Plan	Section of Plan
Priority Three: Establish Pollution Prevention Budgets Based Upon Activity Data Sheets (Activity 1.3 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities Appendix D: ORNL Pollution Prevention Program Funding (Including Activity Data Sheets)
Priority Four: Perform Pollution Prevention Cost/Benefit Analysis (Activity 2.2 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.3.1.1 Cost Accounting 6.4 Site-Wide Implementation
Priority Five: Facilitate Technology Transfer and Information Exchange (Activity 2.3 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.5.3 Information Exchange and Outreach Appendix E: Detailed Schedule for the ORNL Pollution Prevention Program Activities
Priority Six: Implement Pollution Prevention Employee Training and Awareness Programs (Activity 2.5 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.2.2 Employee Involvement and Participation 6.5.2 Training Appendix E: Detailed Schedule for the ORNL Pollution Prevention Program Activities
<u>Out-Year Activities</u> (to be completed by FY 2000)	
Activity One: Implement Environmentally Sound Pollution Prevention Procurement Practices (Activity 3.6 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.3.1.2.2 Hazardous Material Procurement Control 6.3.1.2.4 Procurement of Recycled Products Appendix C: ORNL Pollution Prevention Goals
Activity Two: Integrate Pollution Prevention into Research, Development, Demonstration, Test, and Evaluation Programs (Activity 3.5 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.4 Site-Wide Implementation 6.5.3.3 Research and Development

Table A-8

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Section of 1996 DOE Program Plan	Section of Plan
Activity Three: Make All DOE Policies, Orders, and Procedures Consistent with Regard to Pollution Prevention (Activity 1.5 in Figure A-2)	4.0 Program Goals 5.8 Pollution Prevention Priorities and Out-Year Activities Appendix C: ORNL Pollution Prevention Goals (When requested, ORNL also reviews and comments DOE pollution prevention-related documents, but only DOE has the authority to modify these documents to make them consistent.)
Activity Four: Implement Pollution Prevention Outreach and Public Involvement Programs (Activity 2.6 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.5.3 Information and Technology Exchange Appendix E: Detailed Schedule for the ORNL Pollution Prevention Program Activities
Activity Five: Develop Pollution Prevention Incentives Programs (Activity 2.4 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities 6.2.2.1.3 Incentive Awards and Recognition Appendix E: Detailed Schedule for the ORNL Pollution Prevention Program Activities Appendix F: ORNL Pollution Prevention Awards Summary
Activity Six: Promote Regulatory Review and Reform (Activity 1.4 in Figure A-2)	5.8 Pollution Prevention Priorities and Out-Year Activities (When requested, ORNL reviews and comments proposed regulations but does not have the authority to promote regulatory review or reform.)

D&D - Decontamination and Decommissioning
EPA - U.S. Environmental Protection Agency
ORNL - Oak Ridge National Laboratory
PPOA - Pollution Prevention Opportunity Assessment
RCRA - Resource Conservation and Recovery Act
TSCA - Toxic Substances Control Act
DOE - U.S. Department of Energy
FY - Fiscal Year
Program - Pollution Prevention Program
R&D - Research and Development
ROI - Return-on-Investment
TSD - Treatment Storage and Disposal

Note: The 18 key activities of the work breakdown structure of DOE's Pollution Prevention Program, which are to be reflected in site plans, are depicted in Figure A-2. The key elements of the site and generator-specific pollution prevention programs are shown in Figures A-3 and A-4, respectively.

Figure A-2
Work Breakdown Structure of DOE's Pollution Prevention Program

TM-11853/R7

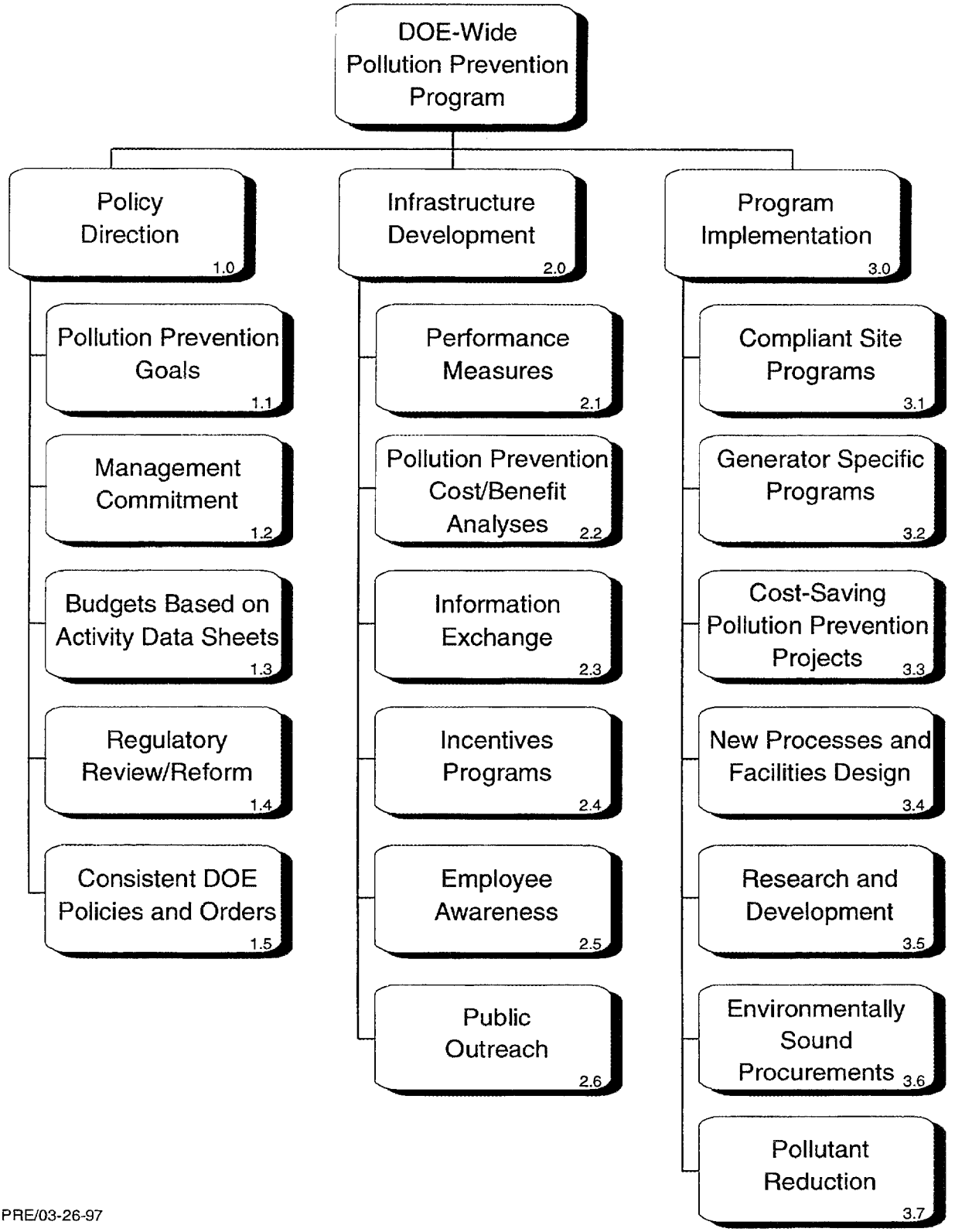

Fig-A-2.PRE/03-26-97

Figure A-3
Key Elements of a Compliant Site Pollution Prevention Program

TM-11853/R7

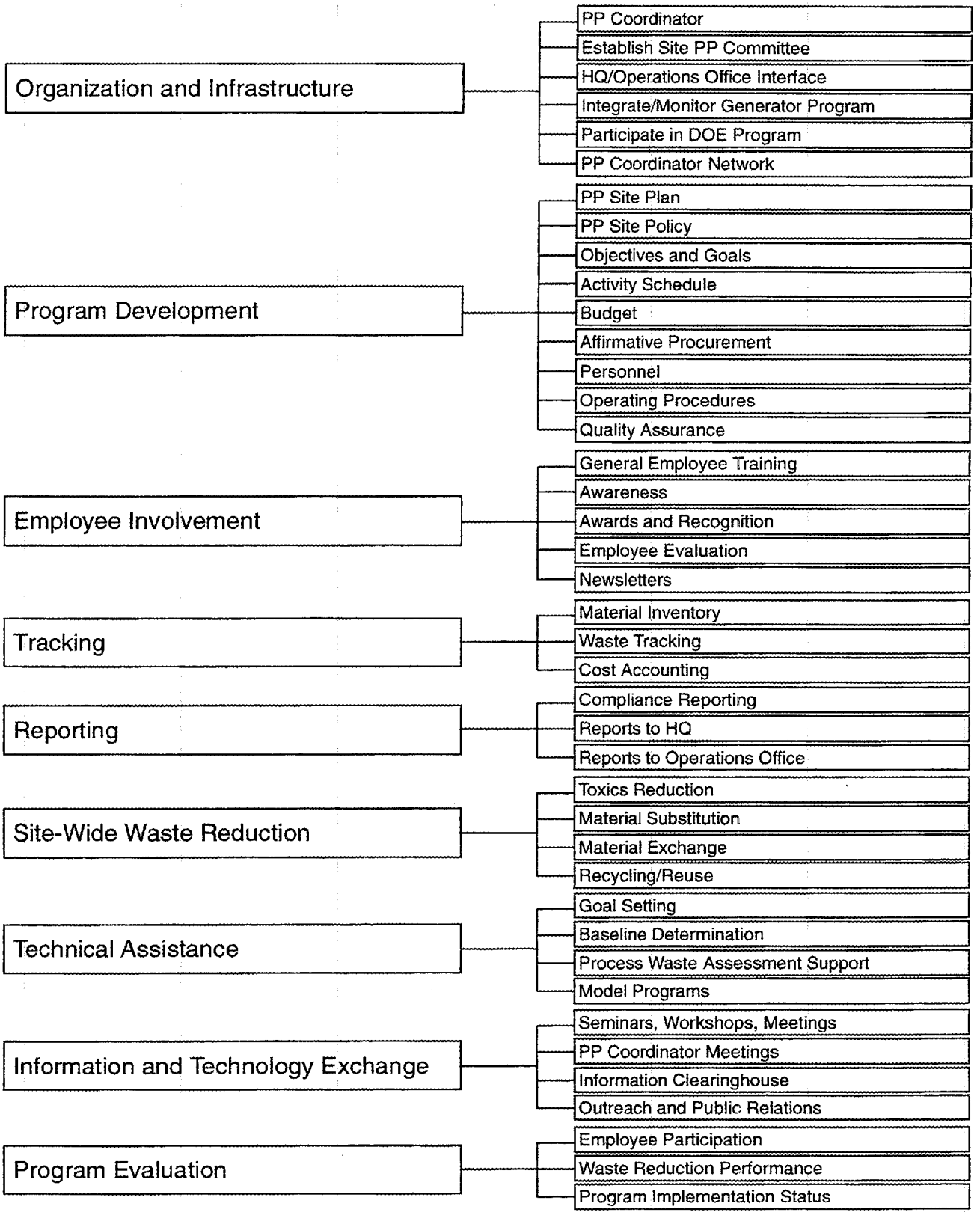

Fig-A-3.PRE/03-26-97

Figure A-4
Key Elements of a Generator Specific Pollution Prevention Program

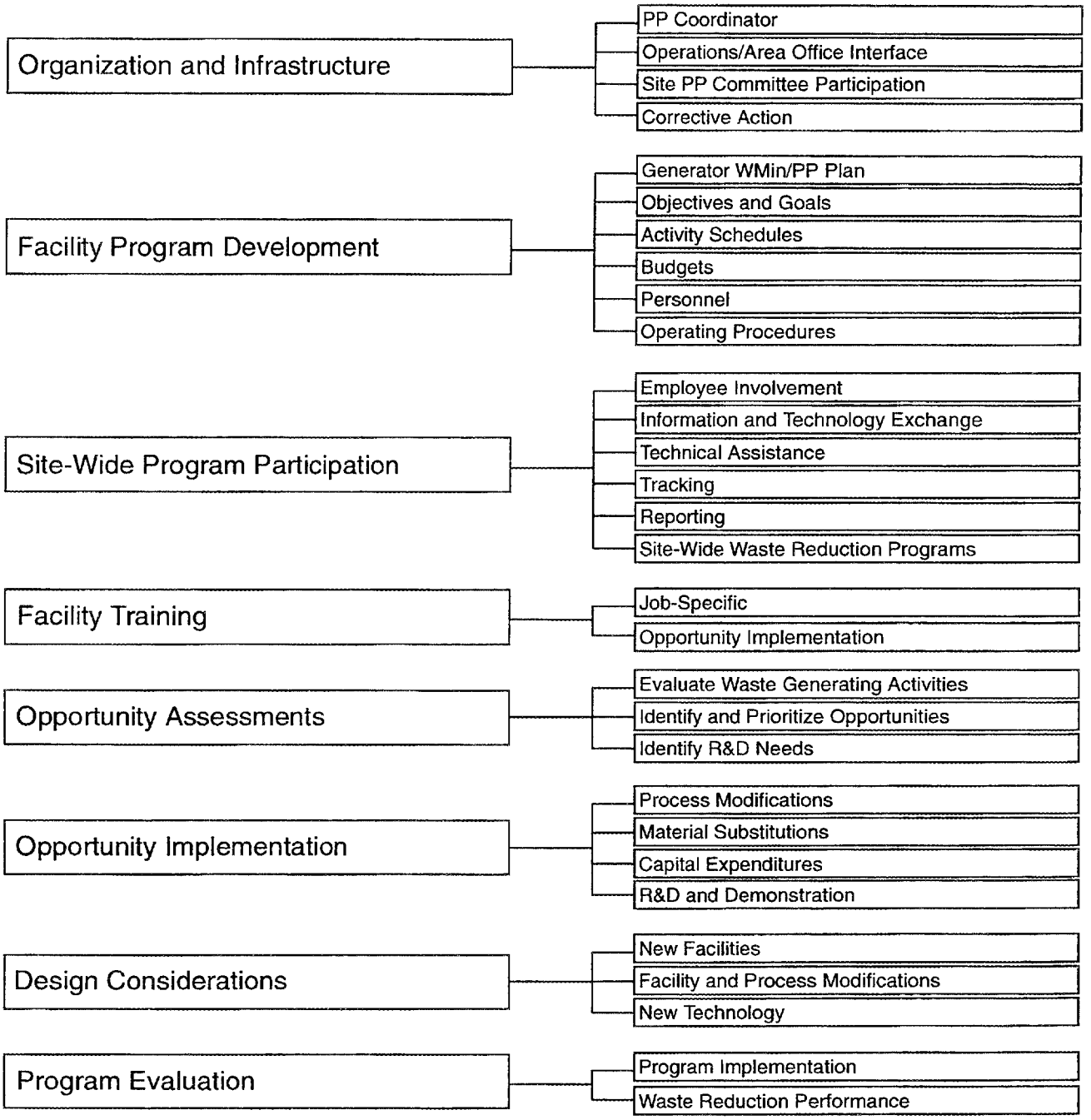

Table A-9
DOE February 1997 Guidance for Preparation of Site Pollution Prevention Plans Compliance Matrix for the Program Plan (Environmental Management Programs [EM])

Section of 1997 DOE-EM Guidance	Section of Plan
Attachment 1A **Site Pollution Prevention Plan Outline** Sites may formulate their plans as appropriate, but all plans must include, at a minimum, the following elements:	Plan in General
I. Goals All sites shall set aggressive waste reduction, recycling, and affirmative procurement goals. The 1996 Pollution Prevention Program Plan and accompanying Secretarial Goals Memorandum, issued on May 3, 1996, set the following Department-wide goals for routine laboratory and production operations, to be achieved by December 31, 1999, using 1993 as a baseline year:	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• A 50 percent reduction in the generation of low-level radioactive waste	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• A 50 percent reduction in the generation of hazardous waste	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• A 50 percent reduction in the generation of low-level mixed waste	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• A 33 percent reduction in the generation of sanitary waste (each year)	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
• A 50 percent reduction in the total releases and offsite transfers for treatment and disposal of toxic chemicals	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
Sites are also encouraged to set additional goals for site-specific problem waste streams, for example, 50 percent reductions in the generation of TRU waste and/or high-level waste.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals

Table A-9

(Page 2 of 7)

Section of 1997 DOE-EM Guidance	Section of Plan
The Secretary also established an annual 33 percent sanitary waste recycling goal for all operations, including cleanup/stabilization activities, and	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
a goal of increasing procurement of EPA-designated, recycled items to 100 percent, except where they are not commercially available at a competitive price, or when they do not meet performance standards.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
Each site is required to use Table 2 (See Figure A-5.), attached to this guidance, to indicate their pollution prevention goals.	4.0 Program Goals Appendix C: ORNL Pollution Prevention Goals
Sites should use the following guidance when establishing goals by each waste generating organization for aggregation within the site pollution prevention plan as site-wide goals.	4.0 Program Goals 6.3 Reporting Appendix C: ORNL Pollution Prevention Goals
For Routine Operations: • Annual reduction goals are required for Calendar Years 1997, 1998, and 1999. • Quantitative goals include at a minimum, radioactive (low-level), hazardous (including RCRA-, State-, and TSCA-regulated wastes), mixed (low-level), TRI-listed chemicals, and sanitary, and should be - provided as a percentage reduction from the 1993 baseline quantities (as reported in the 1994 Annual Report) and should be based upon achievement by December 31, 1999; - shown as the aggregate of individual waste generator goals; - established for newly generated wastes from ongoing, routine production and R&D operations.	4.0 Program Goals 6.3 Reporting Appendix C: ORNL Pollution Prevention Goals

Table A-9

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Section of 1997 DOE-EM Guidance	Section of Plan
For Cleanup/Stabilization Operations: • Goals should be established for cleanup activities such as weapons dismantlement, decontamination and decommissioning, legacy wastes, and contaminated site cleanup. For example, by not commingling retrieved waste with newly generated wastes, sites could set a percentile goal that no more than "X" percent of newly generated waste will be added to the cleanup activity. Sites could also evaluate innovative technologies to reduce secondary waste generation from such activities as site characterization. • Sites should explore mechanisms to quantify and report waste minimization progress for the reduction of newly generated secondary wastes from primary (already generated) wastes. • Cleanup and stabilization sites must evaluate methods to reduce secondary waste generation and reduce, by recycling or reuse, the amount of waste requiring disposal. Sites are encouraged to set waste segregation goals to keep waste disposal costs as low as possible. Mixed wastes are to be carefully avoided due to the high life cycle cost to dispose of this waste type.	4.0 Program Goals 6.3 Reporting Appendix C: ORNL Pollution Prevention Goals
For All Operations (Routine and Cleanup/Stabilization): • Recycling goals apply to sanitary waste generated from all operations. This is an opportunity for environmental restoration sites to set release and/or recycling goals for radioactively contaminated carbon steel, concrete, and asphalt to promote DOE's efforts to minimize the volume of waste requiring disposal.	4.0 Program Goals 6.3 Reporting Appendix C: ORNL Pollution Prevention Goals

Table A-9

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Section of 1997 DOE-EM Guidance	Section of Plan
II. Major Program Activities/Initiatives to Achieve Goals Sites must include in their plans the activities and initiative they plan to undertake to achieve their waste reduction, recycling, and affirmative procurement goals by December 31, 1999. Please use this section to outline planned activities and initiatives, using the Department's 1996 Pollution Prevention Program Plan (Chapter 3 and Appendix D) as a guide.	Plan in General Specifically: 6.4 Site-Wide Implementation 5.8 Pollution Prevention Priorities and Out-Year Activities Appendix A: Background and Compliance of the ORNL Pollution Prevention Program and Program Plan, Table A-8 Appendix D: ORNL Pollution Prevention Program Funding (Including Activity Data Sheets) Appendix E: Detailed Schedule for the ORNL Pollution Prevention Program Activities
III. Resources To achieve cost savings from pollution prevention, sites may have to make an initial investment in personnel and monetary resources. By submitting its Pollution Prevention Plan, each site affirms its commitment to achieve annual reduction targets set forth in this plan. This will be accomplished using the resources requested in the Activity Data Sheets for the year in which the reduction targets are to be achieved.	4.0 Program Goals 6.3 Reporting Appendix C: ORNL Pollution Prevention Goals Appendix D: ORNL Pollution Prevention Program Funding (Including Activity Data Sheets)
Attachment 2 **Code of Environmental Management Principles (CEMP) For Federal Agencies** Five Principles:	Plan in General (This attachment encompasses several areas that are beyond the scope of the Pollution Prevention Program. However, these areas are included in other site programs. The areas supported by the Pollution Prevention Program are indicated in this table.)

Table A-9

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Section of 1997 DOE-EM Guidance	Section of Plan
1. Management Commitment Performance Objectives: 1.1 Obtain Management Support 1.1.1 Policy Development 1.1.2 System Integration 1.2 Environmental Stewardship and Sustainable Development	2.0 Policy 5.8 Pollution Prevention Priorities and Out-Year Activities 4.0 Program Goals 6.2.2 Employee Involvement and Participation 6.4 Site-Wide Implementation Appendix B: ORNL Pollution Prevention Policy Appendix C: ORNL Pollution Prevention Goals Appendix D: ORNL Pollution Prevention Program Funding (Including Activity Data Sheets)
2. Compliance Assurance and Pollution Prevention Performance Objectives: 2.1 Compliance Assurance 2.2 Emergency Preparedness 2.3 Pollution Prevention and Resource Conservation	Plan in General Specifically: 3.0 Organization and Staff Responsibilities 4.0 Program Goals 5.2 Program Directives 5.8 Pollution Prevention Priorities and Out-Year Activities 6.2.3 Program Evaluation 6.4 Site-Wide Implementation Appendix A: Background and Compliance of the ORNL Pollution Prevention Program and Program Plan Appendix C: ORNL Pollution Prevention Goals

Table A-9

(Page 6 of 7)

Section of 1997 DOE-EM Guidance	Section of Plan
3. Enabling Systems Performance Objectives: 3.1 Training 3.2 Structural Supports 3.3 Information Management, Communication, Documentation	Plan in General Specifically: 3.0 Organization and Staff Responsibilities 4.0 Program Goals 5.2 Program Directives 5.3 Relevant Site Directives and Guidance 5.8 Pollution Prevention Priorities and Out-Year Activities 6.2.2 Employee Involvement and Participation 6.2.3 Program Evaluation 6.3 Reporting 6.4 Site-Wide Implementation 6.5.2 Training 6.5.3 Information and Technology Exchange Appendix A: Background and Compliance of the ORNL Pollution Prevention Program and Program Plan Appendix C: ORNL Pollution Prevention Goals Appendix D: ORNL Pollution Prevention Program Funding (Including Activity Data Sheets) Appendix E: Detailed Schedule for the ORNL Pollution Prevention Program Activities
4. Performance and Accountability Performance Objectives: 4.1 Responsibility, Authority, and Accountability 4.2 Performance Standards	3.0 Organization and Staff Responsibilities 4.0 Program Goals 5.8 Pollution Prevention Priorities and Out-Year Activities 6.2.2 Employee Involvement and Participation 6.2.3 Program Evaluation 6.3 Reporting 6.4 Site-Wide Implementation Appendix C: ORNL Pollution Prevention Goals

Table A-9

(Page 7 of 7)

Section of 1997 DOE-EM Guidance	Section of Plan
5. Measurement and Improvement Performance Objectives: 5.1 Evaluate Performance 5.1.1 Gather and Analyze Data 5.1.2 Institute Benchmarking 5.2 Continuous Improvement	4.0 Program Goals 5.2 Program Directives 5.3 Relevant Site Directives and Guidance 5.8 Pollution Prevention Priorities and Out-Year Activities 6.2.2 Employee Involvement and Participation 6.2.3 Program Evaluation 6.3 Reporting 6.4 Site-Wide Implementation 6.5.3 Information and Technology Exchange Appendix A: Background and Compliance of the ORNL Pollution Prevention Program and Program Plan Appendix C: ORNL Pollution Prevention Goals

D&D - Decontamination and Decommissioning
EPA - U.S. Environmental Protection Agency
ORNL - Oak Ridge National Laboratory
PPOA - Pollution Prevention Opportunity Assessment
RCRA - Resource Conservation and Recovery Act
TSCA - Toxic Substances Control Act
DOE - U.S. Department of Energy
FY - Fiscal Year
Program - Pollution Prevention Program
R&D - Research and Development
ROI - Return-on-Investment
TSD - Treatment Storage and Disposal

Note: Tabulated guidance for goals is presented in Figure A-5, which depicts Table 2 from the guidance document.

Figure A-5

Table 2

Pollution Prevention Waste Reduction Goals
from Calendar Years 1997-1999
Using 1993 Quantities as a Baseline

Site _____

EXAMPLE

Category	Goal	1993 (Baseline)*	Projected CY 1997 Goals		Projected CY 1998 Goals		Projected CY 1999 Goals		By 12-31-99
		Qty**	Qty**	% Reduction	Qty**	% Reduction	Qty**	% Reduction	DOE Reduction Goals
Routine Operation	Reduction of Toxic Chemical Release Inventory								50%
	Reduction of Low-level Radioactive Waste Generation								50%
	Reduction of Low-level Mixed Waste Generation								50%
	Reduction of Hazardous Waste Generation								50%
	Reduction of Sanitary Waste Generation								33%
All Operations	Increase Sanitary Waste Recycling % = Recycled Amount x 100 / San. Waste + Recycled								33%
	Increase Affirmative Procurement of EPA-Designated Recycled Products								100%

* From 1994 Annual Report on Waste Generation and Waste Minimization Progress
** Rad and mixed wastes are in cu. meters and hazardous and sanitary wastes are in metric tons

APPENDIX B

Oak Ridge National Laboratory (ORNL) Pollution Prevention Policy

Appendix B

Oak Ridge National Laboratory (ORNL) Pollution Prevention Policy

This appendix contains the current Oak Ridge National Laboratory (ORNL) Pollution Prevention Policy, which supports the ORNL Pollution Prevention Program at ORNL, Oak Ridge, Tennessee.

Oak Ridge National Laboratory Pollution Prevention Policy

It is the policy of Oak Ridge National Laboratory to protect the environment and human health by the safe use and management of its resources. To this end, all forms of pollution will be prevented at the source whenever and wherever feasible. Waste materials that cannot be eliminated by source reduction will be minimized to the extent feasible; waste that still exists will be recycled, reused or reclaimed. Waste that is nevertheless generated will be treated to reduce the volume, toxicity or mobility prior to disposal. Reducing or eliminating the generation of waste will be given prime consideration in research, process design and facility operations.

This policy will be implemented by all Laboratory employees and coordinated by the Pollution Prevention Program in the Waste Management and Remedial Action Division (WMRAD), as documented in the *Oak Ridge National Laboratory Pollution Prevention Program Plan*. The goal of the program will be to systematically eliminate or reduce the generation of waste from site operations. The program will seek to make source reduction and environmentally sound recycling an integral part of the philosophy and operations of this organization. It will also seek to develop in all employees, an awareness of environmental problems and encourage their participation in minimizing the generation of waste and responsibly using resources.

Richard K. Genung

Richard K. Genung
Deputy Director,
Oak Ridge National Laboratory

31 MAR 97
Date

APPENDIX C

Oak Ridge National Laboratory (ORNL) Pollution Prevention Goals

Appendix C

Oak Ridge National Laboratory (ORNL) Pollution Prevention Goals

The Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee must comply with goal-based requirements from several regulatory and U.S. Department of Energy (DOE) sources. Therefore, the goals described and listed in this appendix for the ORNL Pollution Prevention Program (Program) Plan are divided into the following three sections:

- Goals under the Tennessee Hazardous Waste Reduction Act (THWRA)
- Goals per DOE guidance
- Other directly related goals.

C.1 Goals under Tennessee Hazardous Waste Reduction Act

Numeric goals have been established by ORNL for hazardous wastes as defined under the Resource Conservation and Recovery Act (RCRA) and covered by THWRA. Baseline generation rates, standard production units (SPU), and baseline ratios for these goals are listed in Table C-1. The specific goals, goal years, and impediments to reaching the goals are listed in Table C-2. The goals listed in Table C-2 are based on reduction by mass.

The following waste streams are not covered under the THWRA: (1) wastewater streams containing hazardous wastes that are collected and treated in on-site wastewater treatment systems before discharge to an outfall permitted under the National Pollutant Discharge Elimination System (NPDES), and/or (2) wastes which result from the cleanup of contaminated sites or spills of hazardous material. Therefore, these waste streams are exempt from the reporting requirements of the THWRA. The wastewater stream information is listed at the bottom of the tables. In some cases, waste streams listed in Tables C-1 and C-2 may contain spill and remediation wastes. ORNL has established goals for many streams containing spill and remediation wastes because the data for these waste streams are usually consolidated and categorized with other wastes for reporting purposes. The calculation methodology and details associated with these goals are outlined in the following paragraphs.

ORNL's rationale for these aggressive percent reduction goals assigned to each waste stream is based on the site's waste stream prioritization activity, completed pollution prevention opportunity assessments (PPOA), scheduled pollution prevention projects and activities, and past experience in reducing hazardous and mixed waste at ORNL.

The goal ratios shown in Table C-2 are based on a SPU that has been established for ORNL. Because ORNL is a diversified research and development facility, it does not produce a specific "product" whose production rate could be used as a SPU. Therefore, ORNL selected the number of personnel on site on December 31 of each year as its SPU. This SPU should be somewhat proportional to the quantity of hazardous waste generated.

As shown in the following equation, the actual ratio for a given year is calculated by dividing the total amount generated during that year by the SPU and then multiplying this value by a range factor of 100 to adjust this value to within the Tennessee Department of Environment and Conservation (TDEC) guideline.

$$\text{Actual Ratio} = \frac{\text{Generation Amount}_{(year)}, \text{ kg} * \text{Range Factor}}{\text{SPU}_{(year)}}$$

where:

Generation $\text{Amount}_{(year)}$	= Stream generation amount in current reporting year in kilograms (kg)
$\text{SPU}_{(year)}$	= SPU in current reporting year
Range Factor	= Multiplication factor of 100 required to adjust ratio for TDEC-specified range of 0.0001 to 1000. The TDEC has since reset the lower limit to 0.001.

The goal ratio is determined by taking the anticipated new generation rate for the goal year and dividing it by the SPU and adjusting it with the same range factor to ensure that the value is within TDEC guidelines. The goal ratios were calculated as follows:

$$\text{Goal Ratio} = \frac{\text{Baseline Generation Amount}_{(year)}, \text{ kg} * [1-(\%R/100)] * \text{Range Factor}}{\text{SPU}_{(year)}}$$

where:

Baseline Generation $\text{Amount}_{(year)}$	= Stream generation amount in baseline year
%R	= Reduction goal percentage
1-(%R/100)	= Anticipated portion of waste stream remaining
$\text{SPU}_{(year)}$	= SPU in baseline year

Range Factor	=	Multiplication factor of 100 required to adjust ratio for TDEC-specified range of 0.0001 to 1000. The TDEC has since reset the lower limit to 0.001.

Because waste generation is not directly and totally reliant on the population-based SPU value, variations in the actual ratio may not necessarily reflect improvements or declines in pollution prevention activities. For instance, a hazardous waste stream may actually be reduced from the previous year, but the actual ratio calculated for this stream may not reflect this reduction because the general ORNL population also decreased, resulting in a lower SPU.

C.2 Goals per DOE Guidance

DOE's December 1993 *Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan*, the March 1994 DOE Order 5400.1 *Site WMin/PP Awareness Plans DOE-Wide Implementation Guidance-Update*, and the February 1997 DOE *Guidance for Preparation of Site Pollution Prevention Plans* require ORNL to establish goals for material usage, waste generation, and other environmental releases. Specifically, ORNL has established the following goals:

- Reduce the release and off-site transfer of Emergency Planning and Community Right-to-Know Act (EPCRA), Section 313 toxic chemicals by 30 percent by 1996 and 50 percent by 1999 based on 1988 levels reported in 1989, the first year in which ORNL releases and off-site transfers were publicly reported. The 1988 level reported in 1989 was 50,658 pounds or 22,973 kg. ORNL's pollution prevention efforts and a varying level of operations using these materials across the site have already impacted the amount of chemicals reported.

- Reduce the generation of hazardous, radioactive, and mixed wastes as summarized in Table C-3.

- Reduce pollutant releases other than toxic chemicals as noted and scheduled in Table C-3.

- Recycle hazardous wastes and solid industrial wastes (DOE waste type, sanitary wastes), which are included in the goals in Table C-3.

- Two ORNL PPOAs will be completed by 1998. Funding has been requested for PPOAs, as listed in Appendix D.

- Support procurement of recovered materials by participating in the Lockheed Martin Energy Systems, Inc. (Energy Systems) affirmative procurement program, including encouraging that (1) documents be transferred electronically, (2) all documents printed internally be printed double-sided, and (3) outside ORNL contracts, grants, and cooperative agreements issued through central procurement

include provisions that require documents to be printed double-sided on recycled paper meeting or exceeding established standards.

- When ORNL performs cleanup activities, such as weapons dismantlement, decontamination and decommissioning, management of legacy wastes, and environmental restoration, ORNL will integrate pollution prevention concepts such as material substitution and segregation into these activities when possible to minimize the volume and toxicity of any waste generated during these activities. Waste category goals, which include some of these waste types, are included in Table C-3.

- ORNL will continue to integrate pollution prevention techniques such as material substitution, process modification, and segregation into its processes that generate "secondary wastes" (such as from treatment, storage, and disposal activities). Waste category goals are listed in Table C-3.

Waste stream category goals and impediments are presented in Table C-3. These goals are based on DOE requirements. The rationale for the goals is based on a review, which indicates that several of the plant's waste streams have potential for the application of successful pollution prevention techniques. The listed goals may be revised based on the PPOA activities discussed in Chapter 6.0 of the Program Plan, and may be modified to a different unit basis if the ORNL Program determines that a more appropriate unit exists for ORNL. These goals apply to ORNL as a site, as well as separately to each waste-generating division supported by DOE Cognizant Secretarial Office (CSO) funding, such as DOE Energy Research, Defense Programs, or Environmental Management. The PPOA activities that may impact ORNL pollution prevention goals are scheduled in Appendix E.

In addition to the DOE-based goals established by ORNL and listed in this section and in Table C-3, goals listed in DOE's 1996 *Pollution Prevention Program Plan* and in the 1997 DOE *Guidance for Preparation of Site Pollution Prevention Plans* are required to be supported. Therefore, ORNL compiled correlating goals in Table C-4. Note that while some of these goals are the same as goals previously established by ORNL, others are not. Therefore, a separate listing was created to show that ORNL supports these goals but wishes to continue to list goals already established for continuity.

C.3 Other Indirectly Related Goals

In support of directly and indirectly related requirements and programs, Energy Systems and ORNL have established goals.

The Energy Systems August 1993 *Environment, Safety, and Health* (ES&H) *Strategic Plan* includes specific environmental goals and objectives, as well as related strategies. This plan states the following with specific pollution prevention references in bold type:

- Achieve and maintain excellence through protection of the environment and full compliance with applicable environmental laws, regulations, orders, and agreements.

- Achieve and maintain a status of no National Pollutant Discharge Elimination System (NPDES) or other environmental noncompliances.

- Build a stronger, more effective partnership with DOE that will enable us to jointly pursue issues with regulators.

- Anticipate forthcoming changes in environmental requirements and orders to effect efficient implementation.

- Develop and implement innovative, cost-effective compliance approaches.

- Include planning for environmental compliance and **pollution prevention (e.g., waste minimization, recycling)** in all new projects and programs initiated by Energy Systems.

- Establish and maintain configuration management for permitted facilities.

- By 1995, appropriately implement Energy Systems' quality requirements in all environmental activities.

- Over the long term, achieve a minimum discharge operation in which raw and used materials are reduced at the source, reused, or recycled. Ensure that any remaining discharges to the air, water, or land are minimal and are not considered harmful to people or the environment.

- Conduct a comprehensive self-examination of waste generation processes to identify **pollution prevention opportunities**.

- Establish priorities (for each chemical and process) for **reduction of chemical releases** based on the relative risk to the public and the environment.

- Establish specific targets annually that clearly communicate our commitment to **reduce wastes by source reduction, recycling, and reusing materials**.

- Establish specific targets annually that clearly communicate our commitment to energy conservation.

- By 2005, ensure that Energy Systems has the necessary capability for long-term storage of all waste types and the ability to dispose of all waste types generated (i.e., radioactive, mixed, sanitary/industrial, special/other, and hazardous).

- Continue to incorporate environmental protection concepts - such as the purchase of environmentally sound **(including recycled and recyclable)** materials - into the Energy Systems materials procurement process.

- By 1995, incorporate environmental protection concepts - such as the identification of vendors and suppliers who are actively protecting the environment and who share Energy Systems' values and objectives in the environmental area - into the Energy Systems materials and services procurement process.

- Ensure that risks to the environment and human health posed by past operations are either eliminated or reduced to prescribed levels through cost-effective cleanup or containment.

- Participate effectively with DOE and other stakeholders in the environmental restoration program, with plans and schedules determined by program-wide prioritization.

- Work jointly with DOE and stakeholders to maintain a mutually accepted basis for balancing risk and cost in evaluating and prioritizing environmental cleanup.

- Work with DOE and state and federal regulators to decrease the average time elapsed for each phase of environmental restoration projects by 50 percent while still maintaining high quality.

- Minimize environmental impacts from inactive facilities.

- Ensure that environmental requirements are met and appropriate actions are taken to minimize future risks when placing facilities in standby and/or shutdown mode.

- Incorporate **pollution prevention** concepts into all environmental restoration activities.

- Enlist, empower, and support all Energy Systems personnel in the challenge of protecting the environment, **conserving natural resources, preventing pollution,** and complying with applicable environmental laws, regulations, orders, and agreements.

- Maintain a clear definition and understanding of roles, responsibilities, and interfaces in all environmental activities.

- Increase awareness of the environmental responsibility of all personnel in Energy Systems.

- Provide training specific to the different needs of all Energy Systems personnel.

- Provide positive reinforcement through innovative rewards and recognition programs.

- Have in place sufficient (breadth and depth) technical personnel in staff and line positions in all environmental areas, including environmental restoration and waste management, to (1) respond to line organization needs for technical service and support; (2) interact productively with DOE, regulators, and the public; and (3) build and maintain an exemplary record of environmental performance by Energy Systems.

- Develop agreements to share environmental expertise and resources across Energy Systems.

- Increase the satisfaction of our customers and stakeholders and their confidence in Energy Systems in managing the DOE facilities. Clearly understand their requirements and desires and strive to meet them.

- Communicate more effectively with our external stakeholders so that they understand the risks associated with these operations and support DOE and Energy Systems' initiatives to manage the risks.

- Provide a mechanism with DOE to solicit input from external stakeholders in the identification and prioritization of concerns relative to our operations.

- Improve relationships with state oversight personnel by continuing to decrease barriers to open communication and access to facilities and information.

- Establish an outreach program that effectively communicates DOE and Energy Systems' progress and success in environmental areas.

- Respond within 24 hours to any complaints from neighbors living near these facilities, using senior managers as spokespersons.

- Develop and maintain an Energy Systems-wide management system for environmental information.

- By the end of 1994, conduct an overall analysis of Energy Systems' environmental information management needs.

- By the end of 1994, benchmark several of the best environmental information systems in both DOE contractor companies and in private industry.

- By 1996, integrate **pollution prevention** information into the integrated systems.

- By 1996, integrate and compile all environmental compliance and restoration data for near-real-time retrieval and use by stakeholders.

- By the end of 1997, integrate the Hazardous Materials Inventory System (HMIS) information into the waste tracking system.

- Continually improve the self-assessment process to identify issues, determine root causes, develop and validate corrective action plans, monitor progress, verify completion, identify trends, and document lessons learned.

- Continually enhance the Energy Systems checklist process to delineate current environmental compliance requirements. Have fully comprehensive management plans in place for conducting regular self-assessments.

- Be so effective in self-assessment activities that Energy Systems will be continually audit-ready, thus reducing the need for multiple audits. (Audit-ready means a robust compliance program that precludes substantive findings from audits and self-assessments.)

- Develop performance measures for excellence to guide continuous improvement of the environmental program.

- Periodically evaluate progress toward strategic goals and objectives and update the Energy System's ES&H strategic plan as necessary.

- Help DOE ensure adequate environmental protection programs in all of its activities.

- Incorporate environmental protection standards and requirements into all work with other DOE prime contractors and Energy System's subcontractors.

- Provide environmental oversight for all DOE activities within Energy Systems' responsibilities in accordance with contractual agreements.

- Improve systems for the dissemination of requirements by identifying needs for policies and procedures to implement applicable laws, regulations, orders, and agreements.

- Achieve consistent environmental programs by using common policies and procedures, sharing resources, and maintaining multisite, multiprogram task teams.

- Support the Energy Systems initiative to reduce the complexity and number of levels of Energy Systems procedures.

- Become recognized as an innovator in research and development, testing, demonstrating, and transferring new environmental science and technologies.

- Using the Center for Environmental Technology, the Center for Waste Management, and other Energy Systems resources, become the DOE model contractor for new technology and technology transfer.

- Provide environmental project leadership and technology to DOE and other federal agencies.

- Take full advantage of the capabilities of the private sector and other government entities in the execution of DOE and Energy Systems' programs.

Table C-1
Oak Ridge National Laboratory (ORNL) Hazardous Waste Baseline Generation Rates, SPUs, and Ratios
(Page 1 of 2)

Waste Stream Number	Waste Stream Description	Base Year	Base Year Generation (kg)	Base Year Ratio	Base Year SPU	Range Factor
1	Flammable Liquid, Radioactive	1996	104	1.8297	5684	100
2	Lab Pack Poisons	1992	917	13.26	6913	100
9	Lab Pack Reactives	1992	41	0.59	6913	100
10	Lab Pack Oxidizers	1992	475	6.87	6913	100
19	Lab Pack Corrosives	1992	908	13.13	6913	100
20	Inorganic Acids	N/A	N/A	N/A	N/A	N/A
21	Lab Pack Flammables	1992	716	10.36	6913	100
22	Leachings from Tin/Lead Plating Tanks	1993	2	0.0275	7266	100
26	Lab Pack Spent Solvents	1992	799	11.56	6913	100
40	Plating Shop Waste (Chromic/Sulfuric)	1996	1195	21.0239	5684	100
41	Plating Shop Waste (Hydrochloric Acid)	1996	229	4.02885	5684	100
42	Plating Shop Waste (Acid Dip)	N/A	N/A	N/A	N/A	N/A
43	Plating Shop Waste (Nitric/Hydrofluoric Acid)	N/A	N/A	N/A	N/A	N/A
44	Plating Shop Waste (Cadmium Solution)	N/A	N/A	N/A	N/A	N/A
45	Plating Shop Waste (Preplate Silver/Cyanide)	N/A	N/A	N/A	N/A	N/A
46	Plating Shop Waste (Silver/Cyanide)	N/A	N/A	N/A	N/A	N/A
47	Plating Shop Waste (Nickel)	N/A	N/A	N/A	N/A	N/A
48	Plating Shop Waste (Gold/Cyanide Solution)	1994	219	3.1	7030	100
49	Plating Shop Waste	1996	17	0.29909	5684	100
50	Plating Shop Waste (Copper/Acid)	N/A	N/A	N/A	N/A	N/A
51	Plating Shop Waste	N/A	N/A	N/A	N/A	N/A
74	Lab Pack EP Toxic/TCLP Wastes	1992	349	5.05	6913	100
78	Corrosive Liquid	1992	3312	47.9	6913	100
81	Corrosive Solid	1992	40	0.58	6913	100
98	Flammable Liquid	1992	11021	159.43	6913	100
101	Flammable Solid	1992	670	9.69	6913	100
107	EP Toxic/TCLP Liquids	1992	16908	244.58	6913	100
112	Lead Metal	1992	9	0.13	6913	100
121	Oxidizing Material	1992	1989	28.77	6913	100
131	Bulk Poisons	1992	640	9.26	6913	100
146	Lab Pack Poison, Radioactive	1992	438	6.34	6913	100
148	Radioactive Waste Oils-TCLP	1992	1017	14.71	6913	100
149	Corrosive Liquid, Radioactive	1992	236	3.41	6913	100
150	Reactives, Radioactive	1992	3	0.0434	6913	100
151	Spent Solvents, Radioactive	1992	1428	20.66	6913	100
189	Photographic Waste	1992	14438	208.85	6913	100
191	Combustible Liquid	N/A	N/A	N/A	N/A	N/A
195	Flammable Liquid/Solid Radioactive	1992	4620	66.83	6913	100
197	EP Toxic/TCLP Radioactive	1992	2858	41.34	6913	100
198	Oxidizing Material, Radioactive	1992	15	0.22	6913	100
228	Flammable Liquid	1992	667	9.65	6913	100
242	EP Toxic/TCLP Solids	1992	14738	213.19	6913	100
244	Hazardous Waste Solid	1992	315	4.56	6913	100
254	PCB Liquid	1992	1042	15.07	6913	100
267	Flammable Liquid, Radioactive	N/A	N/A	N/A	N/A	N/A
282	Reactive Material Solid	1992	1	0.0145	6913	100
289	Flammable Solids	1992	112	1.62	6913	100
313	Hazardous Substance Liquid	1995	56	0.85	6583	100
314	PCB-Contaminated Solids	N/A	N/A	N/A	N/A	N/A
315	Radioactive Waste Oily Solids-TCLP	1992	2099	30.36	6913	100
316	Waste Oily Solids TCLP	1992	401	5.80	6913	100
317	PCB-Contaminated Liquids	N/A	N/A	N/A	N/A	N/A
320	Hazardous Substance Liquid	1992	475	6.87	6913	100
321	Poisons PCB	N/A	N/A	N/A	N/A	N/A
322	Solvents PCB	1992	3	0.0434	6913	100
323	Flammables PCB	1992	2139	30.94	6913	100
324	Transuranic Mixed Waste	1992	2948	42.64	6913	100
326	Treatability Study Residues	1996	39	0.68614	5684	100

Table C-1
Oak Ridge National Laboratory (ORNL) Hazardous Waste Baseline Generation Rates, SPUs, and Ratios
(Page 2 of 2)

EP - Extraction Procedure
kg - kilogram
N/A - not applicable
ORNL - Oak Ridge National Laboratory
PCB - polychlorinated biphenyls
SPU - Standard Production Unit
TCLP - toxicity characteristic leaching procedure

Note:

General pollution prevention impediments such as radiation control issues, contamination concerns, lack of appropriate substitutes, and irregular generation may impact hazardous waste streams depending on the activities performed at ORNL in the future.
Due to the variety of research and development work that is performed at ORNL, several waste streams are reported that have had zero generation rates for the past 5 years. If waste is generated in these waste streams in the future, baseline and goal values will be determined as applicable and needed.

The following wastes are wastewater or from closure activities and are not covered by the Tennessee Hazardous Waste Reduction Act:

Waste Description	Waste Stream Number
Low-level Mixed Wastewater	145
Rinsate Generated During Closure of Tank 7075	325

Table C-2
Oak Ridge National Laboratory (ORNL) Hazardous Waste Reduction Goals, Goal Years, Goal-Year Ratios, and Impediments
(Page 1 of 2)

Waste Stream Number	Waste Stream Description	Percent Reduction Using Base Year Data (%)	Goal Year	Goal Year Ratio	Impediments
1	Flammable Liquid, Radioactive	10	2006	1.65	A3,B3,C2,D2,E3,F3,G2,H1,I2
2	Lab Pack Poisons	10	2004	11.93	A3,B3,C2,D2,E3,F3,G2,H1,I2
9	Lab Pack Reactives	10	2004	0.53	A3,B3,C2,D2,E3,F3,G2,H1,I2
10	Lab Pack Oxidizers	10	2004	6.18	A3,B3,C2,D2,E3,F3,G2,H1,I2
19	Lab Pack Corrosives	10	2004	11.82	A3,B3,C2,D2,E3,F3,G2,H1,I2
20	Inorganic Acids	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
21	Lab Pack Flammables	10	2004	9.32	A3,B3,C2,D2,E3,F3,G2,H1,I2
22	Leachings from Tin/Lead Plating Tanks	10	2004	0.025	A3,B3,C2,D2,E3,F3,G2,H1,I2
26	Lab Pack Spent Solvents	10	2004	10.40	A3,B3,C2,D2,E3,F3,G2,H1,I2
40	Plating Shop Waste (Chromic/Sulfuric)	10	2006	18.922	A3,B3,C2,D2,E3,F3,G2,H1,I2
41	Plating Shop Waste (Hydrochloric Acid)	10	2006	3.626	A3,B3,C2,D2,E3,F3,G2,H1,I2
42	Plating Shop Waste (Acid Dip)	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
43	Plating Shop Waste (Nitric/Hydrofluoric Acid)	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
44	Plating Shop Waste (Cadmium Solution)	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
45	Plating Shop Waste (Preplate Silver/Cyanide)	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
46	Plating Shop Waste (Silver/Cyanide)	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
47	Plating Shop Waste (Nickel)	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
48	Plating Shop Waste (Gold/Cyanide Solution)	10	2005	2.8	A3,B3,C2,D2,E3,F3,G2,H1,I2
49	Plating Shop Waste	10	2006	0.269	A3,B3,C2,D2,E3,F3,G2,H1,I2
50	Plating Shop Waste (Copper/Acid)	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
51	Plating Shop Waste	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
74	Lab Pack EP Toxic/TCLP Wastes	10	2004	4.55	A3,B3,C2,D2,E3,F3,G2,H1,I2
78	Corrosive Liquid	10	2004	43.11	A3,B3,C2,D2,E3,F3,G2,H1,I2
81	Corrosive Solid	10	2004	0.52	A3,B3,C2,D2,E3,F3,G2,H1,I2
98	Flammable Liquid	50	1996	79.72	A3,B3,C2,D2,E3,F3,G2,H1,I2
101	Flammable Solid	10	2004	8.72	A3,B3,C2,D2,E3,F3,G2,H1,I2
107	EP Toxic/TCLP Liquids	50	1996	122.3	A3,B3,C2,D2,E3,F3,G2,H1,I2
112	Lead Metal	10	2004	0.12	A3,B3,C2,D2,E3,F3,G2,H1,I2
121	Oxidizing Material	10	2004	25.89	A3,B3,C2,D2,E3,F3,G2,H1,I2
131	Bulk Poisons	10	2004	8.33	A3,B3,C2,D2,E3,F3,G2,H1,I2
146	Lab Pack Poison, Radioactive	10	2004	5.70	A3,B3,C2,D2,E3,F3,G2,H1,I2
148	Radioactive Waste Oils-TCLP	50	1996	7.36	A3,B3,C2,D2,E3,F3,G2,H1,I2
149	Corrosive Liquid, Radioactive	10	2004	3.07	A3,B3,C2,D2,E3,F3,G2,H1,I2
150	Reactives, Radioactive	10	2004	0.039	A3,B3,C2,D2,E3,F3,G2,H1,I2
151	Spent Solvents, Radioactive	10	2004	18.59	A3,B3,C2,D2,E3,F3,G2,H1,I2
189	Photographic Waste	90	1995	20.89	A3,B3,C2,D2,E3,F3,G2,H1,I2
191	Combustible Liquid	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
195	Flammable Liquid/Solid, Radioactive	50	1996	33.42	A3,B3,C2,D2,E3,F3,G2,H1,I2
197	EP Toxic/TCLP Radioactive	10	2004	37.21	A3,B3,C2,D2,E3,F3,G2,H1,I2
198	Oxidizing Material, Radioactive	10	2004	0.2	A3,B3,C2,D2,E3,F3,G2,H1,I2
228	Flammable Liquid	10	2004	8.68	A3,B3,C2,D2,E3,F3,G2,H1,I2
242	EP Toxic/TCLP Solids	50	1996	106.6	A3,B3,C2,D2,E3,F3,G2,H1,I2
244	Hazardous Waste Solid	10	2004	4.1	A3,B3,C2,D2,E3,F3,G2,H1,I2
254	PCB Liquid	10	2004	13.56	A3,B3,C2,D2,E3,F3,G2,H1,I2
267	Flammable Liquid, Radioactive	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
282	Reactive Material Solid	10	2004	0.013	A3,B3,C2,D2,E3,F3,G2,H1,I2
289	Flammable Solids	10	2004	1.46	A3,B3,C2,D2,E3,F3,G2,H1,I2
313	Hazardous Substance Liquid	10	2004	0.765	A3,B3,C2,D2,E3,F3,G2,H1,I2
314	PCB-Contaminated Solids	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
315	Radioactive Waste Oily Solids-TCLP	50	1996	15.18	A3,B3,C2,D2,E3,F3,G2,H1,I2
316	Waste Oily Solids TCLP	50	1996	2.9	A3,B3,C2,D2,E3,F3,G2,H1,I2
317	PCB-Contaminated Liquids	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
320	Hazardous Substance Liquid	10	2004	6.18	A3,B3,C2,D2,E3,F3,G2,H1,I2
321	Poisons PCB	N/A	N/A	N/A	A3,B3,C2,D2,E3,F3,G2,H1,I2
322	Solvents PCB	10	2004	0.039	A3,B3,C2,D2,E3,F3,G2,H1,I2
323	Flammables PCB	10	2004	27.85	A3,B3,C2,D2,E3,F3,G2,H1,I2
324	Transuranic Mixed Waste	10	2004	38.38	A3,B3,C2,D2,E3,F3,G2,H1,I2
326	Treatability Study Residues	10	2006	0.62	A3,B3,C2,D2,E3,F3,G2,H1,I2

Table C-2
Oak Ridge National Laboratory (ORNL) Hazardous Waste Reduction Goals, Goal Years, Goal-Year Ratios, and Impediments
(Page 2 of 2)

EP - Extraction Procedure
kg - kilogram
N/A - not applicable
ORNL - Oak Ridge National Laboratory
PCB - polychlorinated biphenyls
TCLP - toxicity characteristic leaching procedure

The letters designating waste reduction activities are as follows:
a = a. Reformulation/redesign of product
b = b. In process recycling
c = c. Equipment/technology modification
d = d. Substituting raw materials
e = e. Improving operations
f = f. Reduction research/planning
g = g. No effort
h = h. Other

Note: General pollution prevention impediments such as radiation control issues, contamination concerns, lack of appropriate substitutes, and irregular generation may impact hazardous waste streams depending on the activities performed at ORNL in the future.
Due to the variety of research and development work that is performed at ORNL, several waste streams are reported that have had zero generation rates for the past 5 years. If waste is generated in these waste streams in the future, baseline and goal values will be determined as applicable and needed.

The following wastes are wastewater or from closure activities and are not covered by the Tennessee Hazardous Waste Reduction Act:

Waste Description	Waste Stream Number
Low-level Mixed Wastewater	145
Rinsate Generated During Closure of Tank 7075	325

Table C-3

Oak Ridge National Laboratory Category-Based Waste Generation Rates and Reduction Goals per DOE Guidance for Newly Generated Wastes from Ongoing, Routine Production, and R&D Operations

(Page 1 of 3)

DOE Waste Type[a]	Routine or Nonroutine Waste[b]	Baseline Year (CY)	Baseline Year Generation Rate (kg)	CY-96 Cumulative Reduction Goal (% and kg)	CY-97 Cumulative Reduction Goal (% and kg)	CY-98 Cumulative Reduction Goal (% and kg)	CY-99 Cumulative Reduction Goal (% and kg)
Radioactive Transuranic Waste (TRU) Liquid	Routine	TBD	TBD	-	-	-	-
	Nonroutine	1993	0				
TRU Solid	Routine	1993	10,908	4 (436)	6 (654)	8 (873)	10 (1,091)
	Nonroutine	1993	0				
Mixed-TRU Solid	Routine	TBD	TBD	-	-	-	-
	Nonroutine	1993	0				
Radioactive Low-Level Waste (LLW) Liquid	Routine	1994	1,090,000	10 (109,000)	15 (163,500)	20 (218,000)	25 (272,500)
	Nonroutine	1993	0				
LLW Solid	Routine	1993	473,355	10 (47,336)	15 (71,003)	20 (94,671)	25 (118,339)
	Nonroutine	1993	0				
LLW Process Wastewater	Routine	1993	159,000	-	-	-	-
	Nonroutine	1993	0				
Mixed-LLW Liquid[c]	Routine	1993	4,503	20 (901)	30 (1,351)	40 (1,801)	50 (2,252)
	Nonroutine	1993	245				

Table C-3

(Page 2 of 3)

DOE Waste Type[a]	Routine or Nonroutine Waste[b]	Baseline Year (CY)	Baseline Year Generation Rate (kg)	CY-96 Cumulative Reduction Goal (% and kg)	CY-97 Cumulative Reduction Goal (% and kg)	CY-98 Cumulative Reduction Goal (% and kg)	CY-99 Cumulative Reduction Goal (% and kg)
Mixed-LLW Solid[c]	Routine	1994	3,300	20 (660)	30 (990)	40 (1,320)	50 (1,650)
	Nonroutine	1993	0				
Mixed-LLW Process Wastewater[c]	Routine	1993	262,000,000	-	-	-	-
	Nonroutine	1993	0				
Resource Conservation and Recovery Act (RCRA) Regulated Waste[c]	Routine	1993	59,061	20 (11,812)	30 (17,718)	40 (23,624)	50 (29,531)
	Nonroutine	1993	264				
RCRA Regulated Process Wastewater[c]	Routine	1993	231,000,000	-	-	-	-
	Nonroutine	1993	0				
Toxic Substance Control Act (TSCA) Regulated Waste[c]	Nonroutine	1993	19,796				
Mixed-TSCA[c]	Nonroutine	1993	12,294				
Industrial Waste Solid	Routine	1993	1,730,000	Source Reduction 4 Recycle 4 (69,200)	Source Reduction 6 Recycle 6 (103,800)	Source Reduction 8 Recycle 8 (138,400)	Source Reduction 10 Recycle 10 (173,000)
	Nonroutine	1993	0				
Industrial Process Wastewater	Routine	1993	33,400,000	Source Reduction - Recycle -	Source Reduction - Recycle -	Source Reduction - Recycle -	Source Reduction - Recycle -
	Nonroutine	1993	0				

Table C-3

(Page 3 of 3)

[a] The DOE waste types are based on those listed in the DOE *Annual Report on Waste Generation and Waste Minimization Progress* (SEN-37 Report) and the March 1994 *DOE Order 5400.1 Site WMin/PP Awareness Plans DOE-Wide Implementation Guidance-Update*. The *Tennessee Hazardous Waste Reduction Act* (THWRA) and DOE guidance both require the establishment of goals for wastes defined as hazardous under RCRA. However, DOE requires goals to be set for overall waste types, not individual waste streams. In contrast, the THWRA requires waste stream-specific goals and only includes wastes defined as hazardous under RCRA and specifically exempts wastes from RA and D&D activities. Therefore, separate goals have been established in Tables C-1 and C-3 to meet both sets of requirements. The goals listed for each waste type apply to wastes currently being generated by ongoing, routine production and research and development operations and any newly generated wastes (routine wastes) from these operations. For consistency with various reporting requirements, waste generation information is also listed for nonroutine wastes for the baseline year. Qualitative pollution prevention goal information related to nonroutine wastes is included in the text of this appendix. Additionally, ORNL does not generate the following DOE waste types: High Level Radioactive Wastes, Transuranic Wastewater, TSCA (PCB Waste), TSCA (PCB Waste) Process Wastewater, or TSCA-M (Mixed PCB Waste) Process Wastewater. ORNL currently does not generate any nonroutine Sanitary (Solid Industrial Waste) or nonroutine Sanitary Process Wastewater (Industrial Wastewater). DOE-based goals for process wastewaters are currently still optional. The baseline for LLW liquid and LLW Solid (Mixed) is 1994 because no waste was generated in 1993. The waste types with baselines listed as TBDs will be determined in the future.

[b] Shaded areas indicate that the goals were only established for routine wastes per DOE guidance (*Order 5400.1 Site WMin/PP Awareness Plans DOE-Wide Implementation Guidance-Update*).

[c] The DOE guidance requires source reduction and recycling goals for hazardous waste. However, ORNL manages all hazardous waste as mixed waste. Therefore, source reduction goals were established, but not recycling goals. Also, wastes regulated under RCRA or TSCA that are generated by Oak Ridge National Laboratory (ORNL) facilities located at Y-12 are reported in the ORNL SEN-37 Report to DOE and in the Y-12 regulatory-based reporting.

[d] Per the March 1994 DOE Guidance, separate goals have been provided for source reduction and recycling activities for industrial waste (sanitary waste).

CY - Calendar Year
D&D - Decontamination and Decommissioning
DOE - U.S. Department of Energy
kg - Kilogram
ORNL - Oak Ridge National Laboratory
PCB - Polychlorinated biphenyls
RA - Remedial Actions
R&D - Research and Development
RCRA - Resource Conservation and Recovery Act
SEN - Secretary of Energy Notice
TBD - To be determined
THWRA - Tennessee Hazardous Waste Reduction Act
TRU - Transuranic
TSCA - Toxic Substance Control Act
WMin/PP - Waste Minimization/Pollution Prevention
% - Percent

Note:
These goals may be reevaluated once the pollution prevention opportunity assessment activities discussed in Chapter 6.0 and Appendix E of this plan are completed.

Table C-4

Oak Ridge National Laboratory
Pollution Prevention Waste Reduction Goals for Calendar Years 1997-1999 Using 1993 Quantities as a Baseline per the DOE 1996 *Pollution Prevention Program Plan* and the 1997 DOE *Guidance for Preparation of Site Pollution Prevention Plans*

(Page 1 of 2)

Routine or All Operations Category	Goal Category[a]	1993 (Baseline Year) Generation Rate	CY-97 Reduction Goal		CY-98 Reduction Goal		CY-99 Reduction Goal		By 12/31/99
		(m^3 or mt)	(m^3 or mt)	(%)	(m^3 or mt)	(%)	(m^3 or mt)	(%)	DOE Reduction Goals (%)
Routine	Total Releases of Off-Site Transfers of Toxic Chemicals Reduction	173.805 mt	52.141 mt	30	69.522 mt	40	86.902 mt	50	50
Routine	Low-Level Radioactive Waste Reduction[b]	1,654.680 m^3 473.355 mt	496.404 m^3 142.006 mt	30	661.872 m^3 189.342 mt	40	827.340 m^3 236.677 mt	50	50
Routine	Low-Level Mixed Waste[c] (RCRA-, State-, and TSCA-Regulated)	19.857 m^3 4.503 mt	5.957 m^3 1.351 mt	30	7.943 m^3 1.801 mt	40	9.928 m^3 2.251 mt	50	50
Routine	Hazardous Waste (RCRA-, State-, and TSCA-Regulated) Reduction[d]	59.061 mt	17.718 mt	30	23.624 mt	40	29.530 mt	50	50
Routine	Industrial Waste Reduction[e]	1,730 mt	173 mt	10	346 mt	20	570 mt	33	33
All	Industrial Waste Recycling[f] $\% = \frac{\text{Recycled Amount} \times 100}{\text{Industrial Waste + Recycled}}$	N/A	N/A	10	N/A	20	N/A	33	33
N/A	Performance of Affirmative Procurement of EPA-Designated Recycled Products[f]	N/A	N/A	30	N/A	60	N/A	100	100

Table C-4

(Page 2 of 2)

[a] Categories are based on those listed in the DOE 1996 *Pollution Prevention Program Plan* (previously referred to as the DOE "Crosscut Plan") and the February 1997 DOE *Guidance for Preparation of Site Pollution Prevention Plans.* No goals were required for transuranic (TRU) or mixed TRU wastes. The baseline and goal values for Total Releases of Off-Site Transfers of Toxic Chemicals Reduction Goal Category are based on the amount used, but none was released.

[b] The low-level radioactive waste (LLW) category baseline includes 473,355 kg of solid LLW. (No liquid LLW was generated in 1993.) LLW process wastewater (159,000 kg) was not included in this table.

[c] The low-level mixed waste category baseline includes 4,503 kg of liquid low-level mixed waste. (No solid low-level mixed waste was generated in 1993.) Low-level mixed process wastewater (262,000,000 kg) was not included in this table.

[d] The hazardous waste category baseline includes 59,061 kg of RCRA hazardous waste. RCRA regulated process wastewater (231,000,000 kg) was not included in this table.

[e] The industrial waste category baseline includes 1,730,000 kg of solid industrial waste. Industrial process wastewater (33,400,000 kg) was not included in this table. ORNL's solid industrial waste category correlates to DOE's sanitary waste category.

[f] Recycling and affirmative procurement baselines are established annually. ORNL is located in Oak Ridge, Tennessee.

CY - Calendar Year
DOE - U.S. Department of Energy
EPA - U.S. Environmental Protection Agency
kg - Kilogram
m^3 - cubic meter
N/A - Not Applicable
ORNL - Oak Ridge National Laboratory
RCRA - Resource Conservation and Recovery Act
SEN - Secretary of Energy Notice
TSCA - Toxic Substances Control Act
% - Percent

APPENDIX D

Oak Ridge National Laboratory (ORNL) Pollution Prevention Program Funding (Including Activity Data Sheets)

Appendix D

Oak Ridge National Laboratory (ORNL) Pollution Prevention Program Funding (Including Activity Data Sheets)

This appendix details the funding requested for the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program (Program) at ORNL, Oak Ridge, Tennessee. This appendix also contains the Activity Data Sheets (ADS) and budget estimates which support the following:

- The ORNL Pollution Prevention Program funded through the U.S. Department of Energy (DOE) Assistant Secretary for Environmental Management (EM)
- The waste generators' pollution prevention activities funded through the DOE Assistant Secretary for Energy Research (Energy Research).

The resources listed in Tables D-1 and D-2 specify the requested funding for fiscal year (FY) 1997 and for subsequent years as of March 4, 1997 and March 23, 1997 respectively. Table D-1 lists the funding levels for supporting the ORNL Program, which is funded through EM. Table D-2 summarizes funding levels for waste generating organizations' pollution prevention activities funded through DOE Energy Research. The requested funding is detailed in the ADS included in this appendix. A Field Work Proposal (FWP) was also compiled and reflects the funding listed in this ADS. Table D-3 lists ORNL's Return on Investment (ROI) Program projects, which are funded through DOE's ROI Program. In the past, additional funding and personnel resources have been provided by ORNL organizations to participate in pollution prevention activities when required.

Table D-1

Oak Ridge National Laboratory (ORNL)
Pollution Prevention Program Requested Funding (EM Funded)
(Dollars)

Category[a,b]	Requested					
	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002
Organization and Infrastructure	45,158	45,158	45,158	45,158	45,158	45,158
Program Development	229,759	229,759	229,759	229,759	229,759	229,759
Reporting	127,299	127,299	127,299	127,299	127,299	127,299
Site-Wide Source Reduction and Recycling[c]	185,404	185,404	158,404	185,404	185,404	185,404
Site-Wide Source Reduction Programs for Hazardous, Radioactive, and Mixed Wastes[d]						
Site-Wide Recycling Programs for Hazardous Radioactive and Mixed Wastes[d]						
Site-Wide Source Reduction and Recycling Programs for Industrial Wastes (DOE Waste Type: Sanitary Waste)[d]						
Technical Assistance	270,380	270,380	270,380	270,380	270,380	270,380
Pollution Prevention Program, Total (requested for FY 1997 through 2002)[e]	858,000	858,000	858,000	858,000	858,000	858,000

Notes:

[a] Additional funding and personnel resources are provided by the ORNL organizations to participate in pollution prevention activities when required.
[b] The work breakdown structure has only been used to develop the FY 1997 budget request, which also includes estimates for FY 1998 and 1999. Only a total budget for FY 2000 through 2002 was prepared for the FY 1997 Activity Data Sheet (ADS). To develop the breakdown for these years, the fraction of each element for FY 1997 was applied across the other years. Each year, based on the requirements of ORNL and the ORNL Pollution Prevention Program activities, the proportion of funding in each element of the breakdown will be reviewed and modified as required.
[c] Grand total for source reduction and recycling opportunities implementation.
[d] Funding levels for specific site-wide programs that impact specific waste types are listed when applicable and appropriate.
[e] Funding levels for FY 1998 through FY 2002 represent the amounts requested and are only estimates of funding that may be received.

ADS - Activity Data Sheet
DOE - U.S. Department of Energy
EM - Assistant Secretary for Environmental Management
FY - Fiscal year
ORNL - Oak Ridge National Laboratory

Table D-2

Oak Ridge National Laboratory (ORNL) Generator Pollution Prevention Program Requested Funding (DOE Energy Research Funded)

(Dollars in Thousands)

Category	Requested		
	FY 1997	FY 1998	FY 1999
Organization and Infrastructure[a]			
Program Development[a]			
Site-Wide Program Participation[a]			
Site/Facility Training			
Opportunity Assessments			
Generator Source Reduction and Recycling Opportunities - Total[b]	0	229	283
Implement Source Reduction Opportunities for Hazardous, Radioactive, and Mixed Wastes[c]			
Implement Recycling Opportunities for Hazardous Radioactive and Mixed Wastes[c]			
Implement Source Reduction and Recycling Opportunities for Industrial Wastes (DOE Waste Type: Sanitary Waste)[c]			
Design Considerations[a]			
Program Evaluation[a]			
Generator Pollution Prevention Program, Total (requested for FY 1997 through FY 2003)[d]	0	229	283

Notes:

[a] Additional funding and personnel resources are provided by the ORNL organizations to participate in pollution prevention activities when required. The waste generating organizations fund the following elements:

- Organization and Infrastructure
- Organization Program Development
- Organization Program Participation
- Design Considerations
- Program Evaluation.

This funding is requested by each organization based on the level of effort required to support pollution prevention in the organization's specific areas of responsibility.

[b] Grand total for generator source reduction and recycling opportunities implementation.

[c] Funding for implementation only broken out for general plant projects when applicable and appropriate.

[d] Funding levels for FY 1998 through FY 1999 represent the amounts requested and are only estimates of funding that may be received.

DOE - U.S. Department of Energy
Energy Research - Assistant Secretary for Energy Research
FY - Fiscal Year
ORNL - Oak Ridge National Laboratory

Table D-3

Oak Ridge National Laboratory (ORNL) Return on Investment (ROI) Program Projects[a]

Project Name	Status	Scheduled Completion Date
Waste Building Exhaust Filter Reduction - Building 4500S	Ongoing	5/30/97

Note: [a] Data in this table were compiled in March 1997. Current ORNL pollution prevention project information, including information related to this ROI Program project, is tracked and reported using the Pollution Prevention Information Management System (P2IMS) database maintained by the ORNL Pollution Prevention Program (Program). ORNL pollution prevention projects that are not funded through the ROI Program, may receive funding through the Lockheed Martin Energy Systems, Inc. High Implementation Value (HiVal) Program, the Generator Set Aside Fund (GSAF) Program, or ORNL organizations.

Environmental Management
FY98 Field Submission
Activity Data Sheet

Database: AD6HOR

OR-8999- -

Date: 03/04/1997 Page: 1 Time: 16:24

Operations Office: OR ID No.: 8999- - Revision Date: 04/03/1996
ADS Title: Pollution Prevention

WBS No.: 1. 7. 6. 2. 3.
WBS Title: Pollution Prevention
Installation: OAK RIDGE OPERATIONS
Line Item Number: N/A
TEC: 0

Category: SO
Facility/WAG: ORNL/Y-12/K-25/PORTS/PAD/WS/FUSR
CID: OR21400
TPC: 0
A-106 Project: NO S&H: DIRECT

O.O. Manager: KAREN CATLETT Phone: 423-241-2224
H.Q. Manager: KENT HANCOCK Phone: 301-903-1380
S&H Manager: Phone:
Auxiliary Fields: 1. J. S. SUFFERN 2. 3.

Estimated ADS Cost

EXPENDITURE TO-DATE (THRU FY1995):	16,000	7 YEAR TARGET FUNDING TOTAL (FY 1996 - FY 2002):	35,718	ESTIMATED COST TO COMPLETION (COST BEYOND FY 2002, IF ANY):	47,07
				TOTAL COST:	98,79

ACTIVITY SUMMARY

This activity provides for the management of P2 at the ORR; at Environmental Restoration (ER) facilities at OR, Portsmouth (PORTS), and Paducah (PAD), and at the Weldon Springs Site Remedial Action Program (WSSRAP) and the Formerly Utilized Sites Remedial Action Program (FUSRAP). It provides for Site-Wide Activities and Implementation. The FY 1998 Planning budget for Site-Wide Activities is $3,658K for ORR; $1,200K for ER at OR, PORTS, and PAD; $471K for WSSRAP and FUSRAP. The Planning budget for Implementation is $320K at WSSRAP and FUSRAP, and $1,176K at ORR, PORTS, and PAD.

Note: In FY 1996, P2 budget execution was carried out in ADS 8204 at Oak Ridge. Environmental Restoration activities were supported by ADS 8350 in Oak Ridge and ADS 6201 at Portsmouth.

See narrative portion of the ADS for further work description.

BUDGET IMPACTS

If Planning funding is not received, there will be fewer P2 projects implemented with subsequent reduced opportunities for generating less pollution and waste and corresponding lost opportunity for cost avoidance. In addition, the following impacts will result: all program elements will be carried out; however, available resources will result in occasional degradation in deliverable quality. Quality assurance checks will be truncated.

If Target funding is not received, the following impacts result: lack of support for an effective communication network within the sites and between the sites. The cost-effectiveness, coordination, and consistency of the P2 activities at ORO will be seriously impaired. Duplication of effort will increase costs, and inconsistency will generate difficulty with state and federal regulatory agencies. Coordination with the DOE P2 initiative and achievement of DOE goals will be reduced.

Failure to prepare updated plans or the annual report for the Tennessee Hazardous Waste Reduction Act carries a fine of $10,000/day. Insufficient

BUDGET IMPACTS Continued

BUDGET IMPACTS Continued

effort expended in the development of programmatic goals and objectives will cause adverse regulatory action on the part of the State of Tennessee. Similiar regulatory penalties exist in Kentucky and Ohio.

A lack of funding for P2 project implementation will result in the unnecessary generation of waste and will deprive ORO of cost savings and operational liability reduction that would accompany progress in waste reduction.

Failure to support recycling programs will result in the unnecessary treatment, storage, and disposal of wastes with a corresponding increase in waste management costs.

For discussion of additional impacts, see narrative portion of ADS.

ADS SUMMARY FUNDING PROFILE ($000)

B&R Cat.	FY96APPR	FY97PRES	FY97APPR	FY98 DECREMENT	FY98 TARGET	FY98 PLANNING
OE	3,265	2,921	2,921	3,775	4,529	5,329
CE	400	132	132	0	1,271	1,496
GPP	0	0	0	0	0	0
LI	0	0	0	0	0	0
TOTAL	3,665	3,053	3,053	3,775	5,800	6,825

S&H FUNDING PROFILE ($000)

B&R Cat.	FY96	FY97	FY98 DECREMENT	FY98 TARGET	FY98 PLANNING
OE	0	0	0	0	0
CE	0	0	0	0	0
GPP	0	0	0	0	0
LI	0	0	0	0	0
TOTAL	0	0	0	0	0

FY98 DRIVER CATEGORY ($000)

	DECREMENT	TARGET	PLAN	IMM RISK
A Compliance Agreement	0	0	0	0
B Court Order or Consent Decree	0	0	0	0
C Fed. Statute or Regulation	3,775	5,800	6,825	0
D State or Local Statute or Reg.	0	0	0	0
E DOE Order - Safety & Health	0	0	0	0
F DOE Order - Management & Other	0	0	0	0
G Agreement in Principle	0	0	0	0
H Proposed Compliance Agreement	0	0	0	0
I Other Essential Mgmt Function	0	0	0	0
TOTAL	3,775	5,800	6,825	0

Database: AD6HOR

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ADS TARGET LEVEL ($000)

B&R Cat.	FY99	FY00	FY01	FY02
OE	4,529	4,529	4,529	4,529
CE	1,271	1,271	1,271	1,271
GPP	0	0	0	0
LI	0	0	0	0
TOTAL	5,800	5,800	5,800	5,800

S&H TARGET LEVEL ($000)

B&R Cat.	FY99	FY00	FY01	FY02
OE	0	0	0	0
CE	0	0	0	0
GPP	0	0	0	0
LI	0	0	0	0
TOTAL	0	0	0	0

ADS PLANNING LEVEL ($000)

B&R Cat.	FY99	FY00	FY01	FY02
OE	5,329	5,329	5,329	5,329
CE	1,496	1,496	1,496	1,496
GPP	0	0	0	0
LI	0	0	0	0
TOTAL	6,825	6,825	6,825	6,825

S&H PLANNING LEVEL ($000)

B&R Cat.	FY99	FY00	FY01	FY02
OE	0	0	0	0
CE	0	0	0	0
GPP	0	0	0	0
LI	0	0	0	0
TOTAL	0	0	0	0

Database: AD6HOR

Environmental Management
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BUDGET DETAIL PROFILE ($000)

DESC: OFFICE OF SITE OPERATIONS APPR: SUB-DESC:
PROGRAM: EM TITLE: Pollution Prevention (EM 70)

B&R CODE	FY96 APPR	FY97 PRES	FY97 APPR	FY98 DECREMENT	FY98 TARGET	FY98 PLANNING
EW8000000	3,265	2,921	2,921	3,775	4,529	5,329
	400	132	132	0	1,271	1,496
	0	0	0	0	0	0
	0	0	0	0	0	0
TOTAL	3,665	3,053	3,053	3,775	5,800	6,825

FY98 DRIVER CATEGORY

	DECREMENT	TARGET	PLAN	IMM RISK
A Compliance Agreement	0	0	0	0
B Court Order or Consent Decree	0	0	0	0
C Fed. Statute or Regulation	3,775	5,800	6,825	0
D State or Local Statute or Reg.	0	0	0	0
E DOE Order - Safety & Health	0	0	0	0
F DOE Order - Management & Other	0	0	0	0
G Agreement in Principle	0	0	0	0
H Proposed Compliance Agreement	0	0	0	0
I Other Essential Mgmt Function	0	0	0	0
TOTAL	3,775	5,800	6,825	0

ADS TARGET LEVEL ($000)

B&R CODE	FY 99	FY 00	FY 01	FY 02
EW8000000	4,529	4,529	4,529	4,529
	1,271	1,271	1,271	1,271
	0	0	0	0
	0	0	0	0
TOTAL	5,800	5,800	5,800	5,800

ADS PLANNING LEVEL ($000)

B&R CODE	FY99	FY00	FY01	FY02
EW8000000	5,329	5,329	5,329	5,329
	1,496	1,496	1,496	1,496
	0	0	0	0
	0	0	0	0
TOTAL	6,825	6,825	6,825	6,825

REGULATORY REQUIREMENTS

Primary Regulatory Driver: RCRA

CAA: N CWA: N SDWA: N RCRA: Y R3004U: N TSCA: N CERCLA: N NEPA: N
DOE: Y IAG: N OSHA: N ORD : N ST : Y TRI : N FED : N FFCA: N
OTHER 1: N OTHER 2: N OTHER 3: N

Description

None

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MILESTONES (With a plan date of 10/01/1995 or beyond)

NONE

NARRATIVE

Activities Completed to Date/Current Year (FY 1996) Description:

Activities for ORNL, Y-12, and K-25 in FY 1996:

Performance measures for the P2 program were developed and implemented. A methodology for calculating avoided costs associated with P2 was developed. Oak Ridge competed for and won substantial support from EM77 for P2 implementation projects. Five major PPOAs were completed. Site waste streams were prioritized for future PPOA conduct. All identified but unfunded PPOA options were compiled. A mechanism to incorporate P2 into waste certification procedures was developed. All required reporting was accomplished on schedule. Substantial contributions were made to the production of the annual waste generation graphs for ORR and the LDR report. Awards and awareness programs were conducted. The DOE P2 Conference XI was hosted by ORO and the M&O contractor. The OR P2 Information Management System was developed. The High Implementation Value System was developed. The generator set-aside (Chargeback) program was developed, piloted, and operated.

Activities as reported in ADS 8350 and 6201 (the ADSs for P2 in Environmental Restoration in FY 1996):

Environmental Restoration P2 Program Plan was developed for the five sites and implementation was initiated. All required reporting was accomplished on schedule. Site P2 Plans at Portsmouth and Paducah were updated and a Site P2 Plan for Environmental Restoration at the Oak Ridge Site was developed. The OR P2 Information Management System database was incorporated into the Environmental Restoration program and was used to track Environmental Restoration projects. Projects from Paducah were submitted to both the DOE-HQ sponsored High-ROI program and the HiVal System for funding. One of the Paducah projects was selected for funding by HiVal. The five sites participated in the pilot generator set-aside (chargeback) program. Recycling programs, as well as affirmative procurement programs, are on-going at Portsmouth.

Budget Year (FY 1997) Description:

ORO and Site (ORNL, Y-12 Plant, and K-25 Site) P2 committees will facilitate P2 application across ORR. P2 plans will be updated; these plans will articulate P2 goals. The Oak Ridge P2 awards programs will be conducted. All required reporting will be carried out. ORR personnel will participate in the Headquarters-sponsored High-ROI program. The HIVal system will be operated; P2 projects will be evaluated, funded, and tracked. PPOAs will be carried out on prioritized processes/waste streams. Program personnel will participate in national P2 conferences and information exchange media. P2 performance will be evaluated using the performance measures developed during FY95 and piloted in FY96. The P2IMS and Set-Aside Program will be operated.

For ADSs 8350 and 6201:

Within Environmental Restoration, ORO, and Site (ORNL, Y-12, K-25, Portsmouth, and Paducah) P2 committees will facilitate P2 applications. Environmental Restoration P2 plans will be updated, these plans will articulate P2 goals. P2 Awards programs will be developed. P2 Awareness training and PPOA training for Environmental Restoration P2 Coordinators will be conducted as required. All required reporting will be carried out. Environmental Restoration will participate in teh DOE-HQ sponsored High-ROI program. Projects will be submitted for funding by the HiVal System. Program personnel will participate in National P2 Conferences and information exchange media. Environmental Restoration P2 performance measures will be developed. The P2IMS database will be utilized for project tracking. The generator set-aside program will be operated.

Planning Year (FY 1998) Description:

NARRATIVE Continued

NARRATIVE Continued

Decrement Case $3,775

1) P2 plans will be updated; these plans will articulate P2 goals.
2) All required reporting will be carried out.
3) Program personnel will participate in the Headquarters-sponsored High-ROI program. No P2 projects will be locally evaluated, funded or tracked.
4) Set-aside program will be operated.

Target Case $5,800

No changes in scope (There will be; however, degradation in deliverable quality.) from planning case except that the number of P2 projects implemented will be 85% of planning case.

Planning Case (Prioritized) $6,825

1) All required reporting will be carried out.
2) Program personnel will participate in the Headquarters-sponsored High-ROI program. The HIVal system will be operated; P2 projects will be implemented.
3) Operate Generator Set-Aside Fee Program.
4) P2 plans will be updated; these plans will articulate P2 goals.
5) PPOAs will be carried out on prioritized processes/waste streams.
6) P2 performance will be evaluated using the performance measures developed during FY95.
7) ORR program and Site P2 committees will facilitate P2 application across the program.
8) Program personnel will participate in local, regional, and national P2 conferences and information exchange media.

S&H Narrative:
None

Outyears (FY 1999 - FY 2002) Description:

Target Level Funding: Same as for Target in FY 1998.

Planning Level Funding: Same as for Planning in FY 1998.

Additional Impacts Not Described in Budget Impacts:

None.

Supporting Documents:

Cost Estimates

Pollution Prevention Opportunity Assessments

A:

Percentage of FY 1998 Request for TSD

Waste Minimization = 100%

B:
C:
D:

Database: AD6HOR

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Date: 03/04/1997

PRIOR YEAR ADS CROSS REFERENCES

Prior Year ADS #: OR-8204- -
Prior Year ADS Title: Waste Minimization Planning

Effective Date of Transfer: 10/01/1996
Transferred in its entirety: Y
Explanation of Change:
Scope Change: All scope transferred from EM30 to EM70

Dollar Change: All funding transferred from EM30 to EM70

User Defined Worksheet

	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00

Database: AD6HOR
($000)

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Waste Management Base Program	HLW		TRU	MLLW	LLW	HAZ	Solid SAN	Indust. Wastewatr	Sanitary Wastewatr	SNF	Special Case	Non-Specific	Total
Storage		**********					**********	**********	**********				
Treatment	**********	**********	**********	**********	**********		**********			**********	**********	**********	
Disposal	**********	**********	**********	**********	**********			**********	**********	**********	**********	**********	
Surveil & Maint of Treat&Disposl		**********						**********	**********			**********	
WM BASE PROGRAM TOTAL		**********											

Waste Management Functions	HLW		TRU	MLLW	LLW	HAZ	Solid SAN	Indust. Wastewatr	Sanitary Wastewatr	SNF	Special Case	Non-Specific	Total
Treatment		**********				**********	**********	**********	**********				
Disposal		**********				**********	**********	**********	**********				
Technology Development		**********											
Waste Minimization		**********										3,665	3,665
Fixed Program Management	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********		
Fixed Infrastructure	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********		
WM FUNCTION TOTAL		**********										3,665	3,665
GRAND TOTAL		**********										3,665	3,665

Environmental Management
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($000)

Waste Management Base Program	HLW		TRU	MLLW	LLW	HAZ	Solid SAN	Indust. Wastewatr	Sanitary Wastewatr	SNF	Special Case	Non-Specific	Total
Storage		**********					**********	**********	**********				
Treatment	**********	**********	**********	**********	**********		**********			**********	**********	**********	
Disposal	**********	**********	**********	**********	**********			**********	**********	**********	**********	**********	
Survail & Maint of Treat&Disposl		**********						**********	**********			**********	
WM BASE PROGRAM TOTAL		**********											

Waste Management Functions	HLW		TRU	MLLW	LLW	HAZ	Solid SAN	Indust. Wastewatr	Sanitary Wastewatr	SNF	Special Case	Non-Specific	Total
Treatment		**********				**********	**********	**********	**********				
Disposal		**********				**********	**********	**********	**********				
Technology Development		**********											
Waste Minimization		**********										3,053	3,053
Fixed Program Management	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********		
Fixed Infrastructure	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********		
WM FUNCTION TOTAL		**********										3,053	3,053
GRAND TOTAL		**********										3,053	3,053

Environmental Management
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Database: AD6HOR
($000)

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Waste Management Base Program	HLW		TRU	MLLW	LLW	HAZ	Solid SAN	Indust. Wastewatr	Sanitary Wastewatr	SNF	Special Case	Non-Specific	Total
Storage		**********					**********	**********	**********				
Treatment	**********	**********	**********	**********	**********		**********			**********	**********	**********	
Disposal	**********	**********	**********	**********	**********			**********	**********	**********	**********	**********	
Surveil & Maint of Treat&Disposl		**********						**********	**********			**********	
WM BASE PROGRAM TOTAL		**********											

Waste Management Functions	HLW		TRU	MLLW	LLW	HAZ	Solid SAN	Indust. Wastewatr	Sanitary Wastewatr	SNF	Special Case	Non-Specific	Total
Treatment		**********				**********	**********	**********	**********				
Disposal		**********				**********	**********	**********	**********				
Technology Development		**********											
Waste Minimization		**********										5,879	5,879
Fixed Program Management	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********		
Fixed Infrastructure	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********	**********		
WM FUNCTION TOTAL		**********										5,879	5,879
GRAND TOTAL		**********										5,879	5,879

Database: AD6HOR

Environmental Management
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Date: 03/04/1997 Time: 16:26

Risk Summary Data
RDS SUMMARY
"BEFORE" CASE

CONSQ. LEVEL	PUBLIC S&H				SITE PERSONNEL S&H				ENVIRONMNTL IMPACT				COMPLIANCE				MISSION IMPACT				COST EFFECTIVENESS				SOCIAL/CULT ECON			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1)																												
2)																												
3)																												
4)																												

ES&H Management Plan Information System
Activity Data Sheet

ADS Identification Section

1. Facility Code: ORNL 2. Name: OAK RIDGE NATIONAL LABORATORY
   ADS Number: C94D0002 3. Title: POLLUTION PREVENTION IMPLEMENTATION - OE

4. Data Sheet Status Cd.: OPEN
5. Budget Identifier....: ERKCL15
6. Original Identifier..:
7. Work Package Number..:
8. Account Number.....: 3325-1016
9. Work Breakdown Struc.:
10. Reference ADS Number.: C96D0005
11. Responsible SO Code..: ER-ENERGY RESEARCH
12. Resp. Contractor Code: LMERC-LOCKHEED MARTIN ENERGY RESEARCH CORP.
13. Contractor Division..: 27
14. Contractor Department: 3325
15. Contractor Manager...: MICHAUD SR 16. Phone: (423) 576-1562
17. DOE Manager.....: BELVIN WM 18. Phone: (423) 576-7321
    Open Codes.....: (1) SPLIT (2) (3)PP

ADS Category Section

Cost Category: 12 - Environment, Safety and Health

19. A-106 Activity: YES 21. Percentage of Costs to Training...: 0
20. Functional Area Breakdown: 22. Percentage of Costs to Maintenance: 0

FA.SA	Pct	Functional Area/Sub-Area Title
PP.01	12	Program Development & Management
PP.05	88	Reduction/Reuse/Recycle - Toxic

ADS Type Section

23. ADS Type: 2 - Compliance
24. Drivers:

P/S	Typ	Driver Code	Driver Title
Sec	EO	ACQUISITION	EO 12873, Federal Aquisition, Recycling, and Waste Prevention
Sec	EO	RIGHT-TO-KNOW	EO 12856, Right to Know and PPA Compliance
Sec	LAW	CWA	Clean Water Act (CWA*)
Sec	LAW	FFCA	Federal Facilities Compliance Act
Sec	LAW	HAZARDOUS WASTE	Hazardous and Solid Waste Act Amendments of 1984 (RCRA Amend)
Sec	LAW	NEPA	National Environmental Policy Act (NEPA*)
Sec	LAW	POLLUTION PREVENTION	Pollution Prevention Act
Pri	LAW	RCRA	Resource Conservation and Recovery Act (RCRA*)
Sec	LAW	[OTHER]	Other Law - Specify
Sec	ORD	DOE 5400.01	General Environmental Protection Program
Sec	ORD	DOE 5820.02A	Radioactive Waste Management
Sec	ORD	[OTHER]	Other DOE Order - Specify
Sec	REG	40CFR240-299	EPA - Solid Waste

25. Compliance Comments

"Other" Law refers to THWRA, The Tennessee Hazardous Waste Reduction Act.
"Other" Order refers to DOE 5400.03, The Hazardous and Radioactive Mixed Waste Program.

All of the activities undertaken in this ADS will reduce compliance requirements and liability and will significantly reduce costs associated with Laboratory operations. Demonstrated support of pollution prevention regulations improves relations with regulators and potentially reduces the rigor of audits and inspections.

26. ADS Description

Activities in 1998 will provide follow-up work to assessments and investigations completed in 1994 through 1996: the establishment of Between Use Storage Areas in three research divisions, the establishment of additional recycling programs such as batteries, project management for option implementation, the installation of cooling water recirculation equipment, and opportunity implementation funds for purchasing equipment such as in-place lubrication fluid filters, pilot automated radiological monitor (to support recycling activities such as fluorescent bulbs and batteries), dewatering equipment, and distillation equipment.

Activities in FY 1999 will include the management of sanitary and hazardous recycling programs, project management for option implementation, investigation of reusability of roofing material, and opportunity implementation funds for purchasing equipment such as in-place lubrication fluid filters, pilot automated radiological monitor (to support

ES&H Management Plan Information System
Activity Data Sheet

recycling activities such as fluorescent bulbs and batteries), dewatering equipment, and distillation equipment.

All activities will support the Laboratory's established goals to reduce waste generation and reduce overhead costs.

Waste Stream	1991 Generation	95 Goal	98 Goal	02 Goal
Hazardous/Mixed	85,916 kg	25%	70%	75%
Transuranic	15 cubic meters	10%	15%	20%
Solid Low-Level	1,200 cubic meters	25%	50%	60%
Liquid Low-Level	2,050 cubic meters	30%	60%	70%
Process Waste	284,000 cubic meters	25%	50%	75%
Industrial/Sanitary	15,000 cubic meters	50%	75%	80%

27. ADS Milestones and Accomplishments

Task	Milestone	Date
Task 98-1	Establish 3 BUS areas for laboratory chemicals	7/98
Task 98-2	Establish hazardous recycling programs	7/98
Task 98-3	Document implemented pollution prevention programs	8/98
Task 98-4	Install cooling water recirculating equipment	9/98
Task 98-5	Document and report on implementation equipment purchased and installed	9/98
Task 99-1	Prepare summary report of sanitary and hazardous waste recycled	9/99
Task 99-2	Document implemented pollution prevention programs	8/99
Task 99-3	Perform PPOA on roofing material	9/99
Task 99-4	Document and report on implementation equipment purchased and installed waste recycled	9/99

28. ADS Appraisal

Public Safety and Health: It is possible, but not likely, that public safety and health would be adversely impacted by excessive generation of waste (because waste is managed properly once generated); however, reduced risk is associated with reduced generation of waste.

Site Personnel Safety and Health: In contrast to public safety and health, site personnel are directly impacted by waste generation rates. By not reducing waste generation, employees will continue to be exposed to both chemicals and radiation during the transportation and management of waste. Reducing the quantity and toxicity of waste generated will reduce employee exposure and support "as low as reasonably achievable" initiatives.

Compliance: As noted in the "External Drivers" section, pollution prevention activities are required by a number of laws, executive and DOE Orders, agreements, and policies. Progress made in pollution prevention enables ORNL to demonstrate continued compliance with these regulatory drivers.

Mission Impact: Minimization of waste and protection of the environment are specifically addressed in ORNL's mission statement. Not performing these activities will result in reduced support of the Laboratory's overall mission. Additionally, by supporting the activities in this ADS, especially the DOE and industry needs survey attempting to match ORNL research capabilities with external needs to reduce wastes, this activity will not only support ES&H goals, but also the overall goal to conduct research.

Investment Impact: There is probably little adverse effect of not performing these activities. However, by reducing costs associated with waste generation (see "Environmental Impact") through pollution prevention, the Laboratory may see an improvement in its competitiveness and increased ability to allocate personnel time to research.

Environmental Impact: The risks associated with not performing the requested activities are unnecessarily generating excessively toxic or voluminous waste, which increases costs associated with waste generation (local storage and personnel time logging waste generation, training, and documentation), waste management costs, and increased environmental liability associated with spills and releases. Reducing waste will result in lower management costs and decreased liability.

29. ADS Scoring Section

Attribute	Cons	Mult	Prob	BEFORE VAL	Cons	Mult	Prob	AFTER VAL
Public S&H	30	1.0	0.1000	3.0000	30	1.0	0.0100	0.3000
Site S&H	10	1.0	0.1000	1.0000	10	1.0	0.0100	0.1000
Compliance	75	1.0	1.0000	75.0000	0	1.0	1.0000	0.0000
Mission	150	1.0	1.0000	150.0000	75	1.0	0.1000	7.5000
Cost-Effective	40	1.0	1.0000	40.0000	40	1.0	0.1000	4.0000
Environmental	20	1.0	1.0000	20.0000	20	1.0	0.0100	0.2000

30. Net Score (before - after): 276.9000
+ Contractor Adjustment...: 0.0000
+ Ops. Office Adjustment..: 0.0000
+ Secr. Office Adjustment.: 0.0000
= Total Adjusted Score....: 276.9000

ES&H Management Plan Information System
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31. Other (non-RPM) Score.....: 0.0000 32. Project Priority: 2.0

33. Scored by: ES&H SCORING TEAM 34. Date Scored: 03/01/1997

35. Scoring Comments
Score based on reporting requirements for pollution prevention activities to assure continued compliance.

Resource Data Section

36. Budget Year Funding Case: 2 - Unfunded
37. Resource Structure Code.: YA1601
Allocable Cost Pool ID..:
Source of Funding.....: 1 - Direct
38. Budget & Reporting Code.: KC0300000
39. Outside Funding Source..:

40. Start Year: 41. End Year:

FY	OE	CE	GPP	LIP	TOTAL	FED.	CONTR.
1996	0.0	0.0	0.0	0.0	0.0	0.00	0.00
1997	0.0	0.0	0.0	0.0	0.0	0.00	0.00
1998	229.0	0.0	0.0	0.0	229.0	0.00	1.10
1999	283.0	0.0	0.0	0.0	283.0	0.00	1.10
2000	0.0	0.0	0.0	0.0	0.0	0.00	0.00
2001	0.0	0.0	0.0	0.0	0.0	0.00	0.00
2002	0.0	0.0	0.0	0.0	0.0	0.00	0.00
2003	0.0	0.0	0.0	0.0	0.0	0.00	0.00
2004	0.0	0.0	0.0	0.0	0.0	0.00	0.00
TOT	512.0	0.0	0.0	0.0	512.0	0.00	2.20

Costs are escalated?: NO

45. Cost Estimate Notes
Assumes 1996 is fully funded. Outyears escalated at 3%.
46. Management Approval: YES 47. Activity In-Process: NO

Status Remarks

59. ADS Reviewed by: _____ Date: _____

60. ADS Approved by: _____ Date: _____

APPENDIX E

Detailed Schedule for the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program Activities

Appendix E

Detailed Schedule for the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program Activities

This appendix contains a tabulation of scheduled activities related to the Oak Ridge National Laboratory (ORNL) Pollution Prevention Program (Program) for ORNL, Oak Ridge, Tennessee. This listing is found in Table E-1.

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities

(Page 1 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
I. Organization and Infrastructure																	
A. Management Support																	
1. Pollution Prevention Representatives Meeting (Quarterly)	PPC																
2. Management Briefing Meetings(a)	PPC																
3. ORR Pollution Prevention Program Team and Energy Systems Central Environmental Compliance Pollution Prevention Task Team Meetings Participation	PPC																
4. DOE/ORNL Briefing/Meetings (when appropriate)(a)	PPC																
II. Program Development																	
A. Policy and Plans																	
1. If Required, Update and Publish Pollution Prevention Policy(a)	PPC																
2. Review Pollution Prevention Plan	PPC																
3. Publish Pollution Prevention Plan(a) (minimum update every 3 years)	PPC																
4. Update PPR Handbooks and Support Waste Generating Organizations' Pollution Prevention Plans, when applicable	PPRs and Org. Mgrs.																

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities
(Page 2 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
B. Goals																	
1. Review and Update Waste Stream and Category Goals and Program Objectives	PPC and PPRs																
2. Compare Trends to Established Goals	PPC																
3. Select 3 New Pollution Prevention Goals for ORNL Managers	PPC																
4. Monitor/Update Division Pollution Prevention Milestones	PPC and Org. Mgrs.																
C. Budget/Funding																	
1. Complete Pollution Prevention Program Budget(b)																	
EM	WMRAD Mgr. and PPC																
ER	PPRs and Org. Mgrs.																
2. Review/Develop Generator Set Aside Fund Program (Chargeback Program)	Org. Mgrs. and PPC																
3. Solicit/Prepare Funding Proposals (HiVal, ROI, etc.)	PPC and Org. Mgrs.																

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities

(Page 3 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
D. Procedures and Practices																	
1. Review and Modify Administrative and Operating Procedures(a)	PPC, Org. Mgrs., and PPRs																
2. Review Scheduling, Procurement, Maintenance, and Storage Practices(a)	PPC, Org. Mgrs., and PPRs																
3. Review and Update NEPA Procedures, if Required(a)	PPC																
E. Employee Awareness																	
1. Develop and Conduct Earth Day and Pollution Prevention Awareness Month Activities	PPC and PPRs																
2. Ridgeline Article	PPC																
3. ORNL Today Highlight	PPC																

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities

(Page 4 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
F. Employee Achievements and Incentives(c)																	
1. Issue Letters of Appreciation(d)	ORNL Mgt.																
2. Submit Projects for Award of Excellence (d)	Org. Mgrs.																
3. Submit Projects for Significant Event Award(e)	Org. Mgrs.																
4. Submit Projects for Energy Systems Awards Night(f)	Org. Mgrs.				—				—				—				—
5. Submit Projects for President's Award for Continuous Improvement	Org. Mgrs.																
6. Submit Projects for DOE-ORO Pollution Prevention Award	PPRs and PPC	—				—				—				—			
7. Submit Projects for Other Pollution Prevention-Related Awards Available (when applicable and appropriate)(a)	PPC																
8. Review Performance Objectives and Include/Update Pollution Prevention Goals as Measure of Job Performance	Org. Mgrs. and PPC				—				—				—				—

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities

(Page 5 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
G. Program Evaluation																	
1. Review and Update Self-Assessment Methodology if Required(a)	PPC and/or Org. Mgrs.																
2. Complete Program Self-Assessment	PPC																
3. Complete Generator Self-Assessment (a)	PPRs and/or Org. Mgrs.																
4. Report Results to ORNL Management	Org. Mgrs. and PPC																

Table E-1
Detailed Schedule of Pollution Prevention Program and Related Program Activities
(Page 6 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
III. Reporting																	
A. Tracking and Reporting																	
1. Submittal of ORNL Annual Waste Reduction Report to DOE (per DOE Order 5820.2A, SEN-37, and associated guidance)	PPC																
2. Submittal of Tennessee Annual Generator Report, Also Referred to as the RCRA Annual Report (Waste Minimization Information Summary)	PPC and Environmental Compliance Group																
3. Compilation and Maintenance of Annual Hazardous Waste Reduction Progress Report	PPC																
4. Submittal of Pollution Prevention Information for Pollution Prevention Act Report (on Form R under SARA)	PPC and Environmental Compliance Group																
5. Submittal of Pollution Prevention Information/ Report Required by DOE-ORO FFCA (LDR-FFCA) or FFC Act (if required)	PPC and WMRAD Mgr.																
6. Update of Site Environmental Compliance Profiles/ORR Annual Site Environmental Report	PCC																
7. Publish ORNL Recycler Newsletter	PPC																
8. Update of Pollution Prevention Project Reports and Database	PPC and PPRs																
9. Prepare PEC/PMT/PTS/Weekly Reports	PPC																
10. Compilation and Distribution of Report to PPRs, as needed	PPC and WMRAD Mgr.																

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities
(Page 7 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
B. Waste Generation Baseline																	
1. Review Data from Assessments and Waste Tracking System	PPC and PPRs		—				—				—				—		
2. Update Waste Type Baseline Values per DOE Guidance as Needed	PPC		—				—				—				—		
C. Certifications																	
1. Waste Minimization Program Certification on all Manifests	WMRAD Mgr. or Safety and Health Director																
2. Annual TSDF Waste Minimization Program Certification (if no Manifests are Signed During the Calendar Year)	WMRAD Mgr. and Environmental Compliance Group				—				—				—				—
IV. Site-Wide Implementation																	
See reports on waste generating organizations' Pollution Prevention Representatives Handbooks and the database and reports referenced under III. Reporting.																	

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
V. Technical Assistance																	
A. PPOA/Project Screening/Prioritization																	
1. Perform Level I/II/III PPOAs (as appropriate)	PPC and Org. Mgrs.																
2. Request Funding for Projects (See Items under Budget)	Org. Mgrs. and PPC																
B. Training																	
1. Perform/Attend PPOA Training, as applicable	PPC and PPRs																
2. Attend GET or GERT, as applicable	ORNL Employees																
3. Continue to Attend Certification Training, as applicable	ORNL Waste Generators																
4. Conduct Stormwater Pollution Prevention Training as necessary(g)	PPRs, Org. Mgrs., and Environmental Compliance Group																

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities

(Page 9 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
C. Information Exchange																	
1. General Commercial/EPA Seminars(a)	PPC																
2. Topic Specific Speakers(a)	Org. Mgrs. and PPC																
3. DOE Contractor Waste Reduction Workshop	PPRs, Org. Mgrs., and PPC																
4. EM Conference	PPC																
5. DOE Contractor Committees(a)	PPC and Org. Mgrs.																
6. Literature Circulation	PPC																
7. NEPA Documentation Review (a)	PPC																

Table E-1
Detailed Schedule of
Pollution Prevention Program and Related Program Activities
(Page 10 of 10)

Elements	Responsibility	Schedule															
		1997 by Quarter				1998 by Quarter				1999 by Quarter				2000 by Quarter			
		First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth
D. Technology Transfer																	
1. Visit Industrial and R&D Facilities(a)	PPC																

Legend:
(a) Scheduled as needed.
(b) Additional budget/funding information is submitted upon request as needed.
(c) Nominations for all awards listed may be submitted throughout the year if received before the deadline.
Also, pollution prevention-based activities also may be nominated for other awards such as the following:
- DOE Award of Excellence
- Tennessee Governor's Award of Excellence
- Tennessee Association of Business Corporation Awards
- Tennessee Quality Award
- Path Finder Assessment and Award
- Technical Communication Award
- White House Closing the Circle Award.

(d) Nominations may be submitted at any time.
(e) Nominations submitted on a monthly basis as applicable.
(f) All Energy Systems' Awards Night Recipients are automatically eligible for the Jefferson Cup Award.
(g) Central Training is responsible for training modules after they are developed.

Note:
Technically and economically feasible pollution prevention options have been scheduled by the ORNL waste generating organizations and are tracked in the Pollution Prevention Information Management System maintained by the ORNL Pollution Prevention Program.

DOE = U.S. Department of Energy
EM = Environmental Management
Energy Systems = Lockheed Martin Energy Systems, Inc.
EPA = U.S. Environmental Protection Agency
ER = Energy Research
FFCA = Federal Facility Compliance Agreement
FFC Act = Federal Facilities Compliance Act
GERT = General Employee Refresher Training
GET = General Employee Training
HiVal = High Implementation Value
LDR = land disposal restrictions
NEPA = National Environmental Policy Act
Org. Mgrs. = ORNL Organization Managers
ORNL = Oak Ridge National Laboratory
ORNL Mgt. = All ORNL Managers
ORO = Oak Ridge Operations
ORR = Oak Ridge Reservation
PEC = Performance Evaluation Criteria
PMT = Performance Measurement Team
PPC = Pollution Prevention Coordinator
PPOA = pollution prevention opportunity assessment
PPRs = Pollution Prevention Representatives
PTS = Performance Tracking System
R&D = Research and Development
RCRA = Resource Conservation and Recovery Act
ROI = Return on Investment
SARA = Superfund Amendments and Reauthorization Act
SEN = Secretary of Energy Notice
TSDF = treatment, storage, and disposal facility
WMRAD Mgr. = Waste Management and Remedial Action Division Manager

APPENDIX F

Oak Ridge National Laboratory (ORNL) Pollution Prevention Awards Summary

Appendix F

Oak Ridge National Laboratory (ORNL) Pollution Prevention Awards Summary

This appendix summarizes awards received by Oak Ridge National Laboratory (ORNL) personnel for projects and activities related to pollution prevention. ORNL is located in Oak Ridge, Tennessee.

Recycled Computer Output Paper. Within the Environmental Sciences Division (ESD), a Performance Improvement Process (PIP) Project Team investigated, pilot tested, and successfully implemented the substitution of recycled paper in place of virgin paper. This project helped create a market for recycled paper, conserved natural resources, protected the environment through reduced pollution generation, and resulted in a cost savings because the recycled paper cost about one third as much as the virgin paper. This PIP Project Team received the Martin Marietta Energy Systems, Inc. (Energy Systems) President's Award for Performance Improvement. (Lockheed Martin Energy Systems, Inc. was previously known as Martin Marietta Energy Systems, Inc.)

Elimination Treatment of Cooling Water. The cooling water from Building 3001 required no treatment prior to release to the environment but was discharged to the process waste system. Maintenance and surveillance personnel suggested and implemented valuing changes that diverted this cooling water and eliminated the treatment of 100,000 gallons per year (gal/yr). This project helped relieve the hydraulic loading on the treatment system and resulted in an approximate cost savings of $8,000 annually. This project received the U.S. Department of Energy- (DOE) Oak Ridge (OR) Waste Minimization Award for 1989.

Liquid Low-Level Waste (LLLW) Generation Reduction. Radiochemical Engineering Development Center (REDC) received the 1991 DOE-OR Waste Minimization Award and the Energy Systems President's Award for continuous improvement through the evaluation and reduction of LLLW generated from the off-gas caustic scrubber system.

Paint Wastes Reduction. The ORNL Paint Department received the Energy Systems President's Award and the DOE-OR Waste Minimization Award for the minimization of

waste paint by limiting color selection available and by recycling wasted solvent using gravity to settle out paint solids.

Surface Modification and Characterization (SMAC) Chlorinated Water Minimization. Four ion accelerators in the SMAC facility were removed from once-through process water cooling and will be placed on recirculating water heat exchangers that are connected to the building air conditioning chilled water system. This project will eliminate the release of 50 gallons per minute of chlorinated process water and will reduce water use and emissions by 100,000,000 kg/hr (26 million gallons/year). This effort received the Large Quantity Generator Award for 1993, during the ORNL Pollution Prevention Awards Ceremony in 1994.

Digital Conversion in Materials Analysis Labs. Traditionally, electron microscopy has used photographic film as the recording medium and photographic enlargements as the reporting medium. By installing charge-coupled device-based cameras with digital output and digital frame capture/instrument control modules, the five primary microscopes were converted to digital. Digital images are now passed to a large capacity disc server for storage and archive or on to other computers for image processing and incorporation into documents. One hundred percent of the photographic waste or 227 kg/yr was reduced at an estimated savings of $629,000 over 10 years. This effort received the Small Quantity Generator Award for 1993, during the ORNL Pollution Prevention Awards Ceremony in 1994.

Photographic Water Silver Recovery in Instrumentation and Controls Division. Bill Koch, Pollution Prevention Representative for the Instrumentation and Controls (I&C) Division, investigated various alternatives for reduction of division hazardous waste. He coordinated division efforts to reduce photographic waste by desilvering which resulted in a 30 percent reduction of division RCRA wastes. Mr. Koch also coordinated the transfer of a Cold Evaporator from a division that no longer needed it to the I&C Division for volume reduction of electroplating waste. This individual received the Pollution Prevention Promoter Award for 1993, during the ORNL Pollution Prevention Awards Ceremony in 1994.

Lab Renovation for Federal Facilities Compliance Agreement (FFCA) Treatability Studies. Minimization of contaminated waste and rubble was accomplished by cleaning hoods, floors, and benches of contaminated spots, including cutting out spots of fixed contamination to minimize contaminated waste volume. Six labs were renovated in this way and would have required several B-25 boxes for contaminated lab benches and large pieces of sheet metal. Instead, much smaller volumes were disposed of as contaminated waste with the remaining material recycled or salvaged, saving 3 or 4 B-25 boxes or 300 to 400 cubic feet of contaminated waste. This effort received the Common Sense Award for 1993, during the ORNL Pollution Prevention Awards Ceremony in 1994.

Metal and Ceramics Division's Commitment to Pollution Prevention. The ORNL Metals and Ceramics (M&C) Division, through its director, D.F. Craig, has recognized that "mission success" is directly related to proficiency in environmental, safety, and health, and specifically in the area of pollution prevention. Pollution prevention is directly tied to wise management of resources and to overall productivity. The realization of the importance of pollution prevention has been demonstrated by the division's management goals that have led to a continuous reduction in hazardous waste generation over the past several years. Between 1991 and 1993 the division's efforts have resulted in more that a 50 percent reduction in hazardous waste generation. In April 1994, ORNL M&C Division received a DOE-OR Waste Minimization Award for Commitment/Participation for 1993. This division also received an honorable mention during the DOE-Headquarters Pollution Prevention Awards Ceremony in May 1994 for source reduction performed in replacing refractory ceramic fibers.

Solid Waste Recycling. In April 1994, ORNL received a DOE-OR Waste Minimization Award for Solid Waste Recycling for the diversion of coal ash from the landfill to cement manufacture in 1993. Some 2,000 tons per year of coal ash from ORNL's Steam Plant was diverted from a sanitary landfill to a cement manufacturing plant. This activity eliminates reliance on a commercial landfill and reduces disposal costs by $50,000 per year. This project also received an honorable mention during the DOE-Headquarters Pollution Prevention Awards Ceremony in May 1994.

Crane and Hoist Hydraulic and Gear Box Oil Reduction. Hydraulic and gear box waste oils were greatly reduced by utilizing filtration units that reduced the need for oil changes. This effort received the Large Quantity Generator Award for 1994, during the ORNL Pollution Prevention Awards Ceremony in 1995.

Hydraulic Oil Reduction in the Mechanical Properties Laboratory of the Metals and Ceramics Division. This team identified a combination of successful source reduction techniques to reduce the use of hydraulic oils in their area. The techniques included consolidation of four systems into one unit and enhancing the filtration systems for the oils (to allow a four-fold extension of the fluid's life). They sought out funding assistance and pursued the project because of their desire to improve operational efficiency. The improvements reduce energy consumption, the risk of accidental oil spills, and occupational risks (noise and heat). An estimated 2,700 kg/yr or 75 percent of the waste oils generated in their area will be eliminated at an annual savings of $24,000. This effort received the Small Quantity Generator Award for 1994, during the ORNL Pollution Prevention Awards Ceremony in 1995.

Sustained Performance in Metals and Ceramics Division's Proactive Pollution Prevention Program. These M&C managers have recognized the importance of pollution prevention to the future of the M&C Division, as well as to the future of ORNL. All have worked internally and externally to promote pollution prevention. All three have been strong advocates as shown by their willingness to work with management of other divisions/organizations to share their positive experiences. They have successfully utilized internal and external funding sources to accelerate the division's reduction in waste.

Internally, Dr. Craig has supplied vision, people, and money to support reductions in hazardous and nonhazardous waste. Hazardous waste generation by the division was reduced by more than 85 percent between 1991 and 1994. Installation of enhanced recycling centers and EtherNet for paperless communications has also greatly reduced nonhazardous waste generation. This effort received the Pollution Prevention Promoter Award for 1994, during the ORNL Pollution Prevention Awards Ceremony in 1995.

Reduction in the Volume of Hazardous Waste Acids in Iridium Processing Project. Waste acids, as RCRA waste, were totally eliminated from M&C Iridium Processing in 1994. An M&C Division Empowered Team studied waste acid generation in the Division in 1993. It was found that approximately 90 percent of the Division's waste acid came from the processing of Iridium. Although the customer's quality requirements made process modification difficult, the M&C people reduced acid usage as much as possible through good work practices. Additionally, the team found an alternative method for reducing the remaining volume of hazardous waste generated by the project. It was deter-

mined that the most practical, "common sense" disposition for the remaining waste was to perform elementary neutralization and disposal to the process waste stream. It is also noteworthy that all 1994 acid reductions were accomplished using "used" basic materials from the Swap Shop. The value placed on the Swap Shop material was $18,000. The team uncovered a common sense solution with essentially no cost to ORNL or DOE to eliminate, by neutralization, approximately 680 kg of RCRA waste acids. This effort received the Common Sense Award for 1994, during the ORNL Pollution Prevention Awards Ceremony in 1995.

HEPA Filter Reduction in ORNL Building 4508. A team of personnel from M&C, the Plant and Equipment (P&E) Division, and the Office of Environmental Compliance Documentation (OECD) determined that changes in the use of Building 4508 meant that certain High Efficiency Particulate Air (HEPA) filters may no longer be needed. The team suggested that success in reducing the number and type of filters would not only result in savings of waste disposal costs but could lead to greater savings in building energy consumption. An extensive study was initiated to determine how much waste, energy, and money could be saved by eliminating unnecessary building exhaust filters. The team verified that 85 percent of the HEPA filters in the building's exhaust system could be safely removed. Recommendations by the team were finalized and implemented in 1994. It was estimated that a minimum of $67,000 a year would be saved by avoiding replacement of unnecessary filters and in reduced waste handling and disposal activities. It was estimated that the energy savings opportunity created by this project could be on the order of one million dollars per year. To realize these gains it would be necessary to redesign the exhaust system and replace the current exhaust fans with smaller units. This effort received the Suggestion Award for 1994, during the ORNL Pollution Prevention Awards Ceremony in 1995.

Zero Generation by Constructed Wetlands Treatment within the Area of Contamination. This team, made up of representatives from DOE, Jacobs Engineering, ORNL, Oak Ridge Institute for Science and Education (ORISE), and the Atmospheric Turbulence and Diffusion Laboratory, developed an innovative on-site treatment to degrade groundwater contamination. The use of constructed wetlands will eliminate the need to remove 36,000 square feet of soil and 100,000 gallons of groundwater for off-site treatment or storage and will degrade the contamination to carbon dioxide and water leaving no residual waste to manage. The work has led to similar proposals at other sites. This project received the DOE Oak Ridge Operations Award in 1994, during the Awards Ceremony in 1995.

Non-Lead Environmentally Safe Projectiles. Security guards, law enforcement officials, and sports shooting result in millions of rounds of lead bullets being deposited into shooting ranges and public lands and lakes. Because lead is hazardous, cleanup of shooting ranges alone may cost millions of dollars not to mention the damage to wildlife and fish exposed to the lead. DOE alone expends 17 million rounds of small arms ammunition at its shooting ranges each year and estimates that for each dollar spent on ammunition, $100 is spent for cleanup and reclamation; DOE's use is dwarfed by the U.S. Department of Defense (DoD) and public agency use. This project team developed a lead-free bullet that has the same density and projectile as lead bullets which makes it possible to switch between the two bullet types without retraining. As shooting ranges and clubs switch to this type of bullet, lead introduction into the environment will be drastically decreased, significantly reducing future cleanup requirements and costs. The team... "is honored for contributing to a program that made an outstanding contribution to the development and transfer of pollution prevention technology." This project received the DOE Oak Ridge Operations Award in 1994, during the Awards Ceremony in 1995.

Cost Analysis Associated with the Generation and Handling of Hazardous Waste. Organizations that generate waste are responsible for managing that waste until the Waste Management and Remedial Action Division (WMRAD) picks it up. Investigations into the costs of managing M&C Division waste prior to turning it over to WMRAD revealed that these costs were much greater than realized and are associated with items or events rather than mass and volume of waste. While the M&C Division had already significantly reduced their waste generation, this investigation identified previously unrecognized pollution prevention opportunities and provided increased incentive to reduce waste generated by the division in order to reduce budget requirements. This information will be very valuable in educating other organizations in how they can reduce their costs by reducing the amount of waste generated. This project received the DOE Oak Ridge Operations Award in 1994, during the Awards Ceremony in 1995.

ORNL Lead Shipment to CEBAF. A total of 120 tons of lead that was not being used at ORNL was shipped as a material to another DOE facility, the Continuous Electron Beam Accelerator Facility (CEBAF), for use as shielding. This project, along with a Lead Management Plan, showed that lead is being handled as a resource at ORNL instead of as a hazardous waste. This effort received the 1995 ORNL Large Quantity Generator Pollution Prevention Award, during the ORNL Pollution Prevention Awards Ceremony in 1996.

TCLP Extraction Process Modification. A process modification reduces the sample size and thus the waste by 90 percent. This process modification is used in about 400 screening tests a year. This effort received the 1995 ORNL Small Quantity Generator Pollution Prevention Award, during the ORNL Pollution Prevention Awards Ceremony in 1996.

REDC Iodine Off-Gas Retention System. An alternate solution was used to trap radioactive iodine after determining it met performance criteria. By removing mercury from the sorbant, they eliminated the creation of a mixed waste. This effort received the Common Sense Award for 1995, during the ORNL Pollution Prevention Awards Ceremony in 1996.

Pollution Prevention Promoter. Jerry L. Hammontree, Division Director of Plant and Equipment, received the ORNL Pollution Prevention Promoter Award for 1995, during the ORNL Pollution Prevention Awards Ceremony in 1996, based on the many pollution prevention efforts of his division and his contributions to them.

Metals & Ceramics Division, BUS AREA, Maximizing the Use of R&D Chemicals. Through an in-depth study, this team determined the costs of R&D waste directly related to the number of items of individual chemicals in the waste stream. The team conceptualized a project to ensure that individual chemicals received maximum use, after their initial use in research. Chemicals were held in a safely maintained, Between-Use-Storage (BUS) Area. During 8 months of operation in 1995, the BUS Area saved 708 chemicals from premature disposal and recirculated 93 chemicals into use. The project cost $32,000, but yielded a total benefit of $136,000 in direct savings (procurement of chemicals) and cost avoidance. This project received the DOE Oak Ridge Operations 1995 Pollution Prevention Award in 1996.

High Quality, Complex-Shaped Ceramic Parts with Improved Safety & No Hazardous Waste. Improved ceramics processing methodology was first investigated to improve production of complex-shaped parts such as turbine rotors. Gelcasting unites techniques from ceramics with polymer chemistry to allow for formation of complex shapes that require little if any machining and as a result produce little waste. The nominated team of researchers integrated industrial hygiene and pollution prevention into their project. Specifically, they chose to substitute relatively non-toxic monomers and reagents for previously used highly toxic chemicals. The result has been a superior, award winning process (e.g., in 1995 it received a R&D 100 Award) that has maximized safety and pollution prevention. This project received the DOE Oak Ridge Operations 1995 Pollution Prevention Award in 1996.

Preparation and Distribution of the Pollution Prevention Guide for Oak Ridge Reservation Employees. The East Tennessee Technology Park Pollution Prevention Office took the lead and funded the development of the publication "Pollution Prevention Guide for Oak Ridge Reservation Employees." Representatives of the Pollution Prevention Offices of the other Energy Systems sites assisted in developing and reviewing the pollution prevention handbook for personnel assigned to the three Oak Ridge Reservation (ORR) sites. The handbook includes general information that is applicable to both work and home environments. It was designed to introduce the reader to what pollution prevention is and what prevention means, as well as to the recycling efforts that are taking place at the ORR sites. This project received the DOE Oak Ridge Operations 1995 Pollution Prevention Award in 1996.

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