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**1992 ANNUAL REPORT ON WASTE GENERATION
AND WASTE MINIMIZATION PROGRESS AS
REQUIRED BY SEN-37-92 AND ORDER 5400.1**

03/05/93

**DOE-FN/DOE-HQ
15
REPORT**

**1992 Annual Report on Waste
Generation and Waste Minimization
Progress
as Required by SEN-37-92
and
DOE Order 5400.1**

**Feed Materials Production Center
OH**

Prepared for:

**U. S. Department of Energy
Fernald Site**

Prepared by:

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FERMCO**

March 05, 1993

I. Executive Summary

The mission of Fernald has changed from production to environmental restoration and waste management. Along with this change has come an expected increase in waste generation due to the removal actions performed as a result of the Consent Agreement with US EPA. Although there is an increase in the amounts of waste generated in 1992, there are positive waste minimization activities that have taken place which have reduced the POTENTIAL amounts that would have been generated if these activities had not been implemented.

Five key initiatives at Fernald have highlighted the Waste Minimization Program:

- 1) Recycling/reuse of approximately 557 tons of non-contaminated metal materials and 105 tons of non-contaminated graphite materials from the safe-shutdown activities.
- 2) Issuance of the Waste Minimization and Pollution Prevention Plan Update which sets clear, measurable waste reduction goals that were approved by Staff Managers and set forth as commitments to be met within the next year.
- 3) Completion of a Process Waste Assessment (PWA) on the contaminated, dry compactible wastestream and setting a goal of 30% reduction of this wastestream. The assessment led to initiating a reusable container and repackaging program at receiving and a trash segregation policy in the contaminated area. To date, approximately 3,600 cubic feet of dry compactible waste has been diverted from becoming low-level waste (LLW).
- 4) Creation of a CERCLA Waste Minimization Committee which performed qualitative waste assessments on current removal actions and is charged with performing quantitative assessments on all future removal and remedial actions using waste life-cycle cost analysis.
- 5) Initiation of a site-wide Pollution Prevention and Waste Minimization (PP/WM) Awareness Program which included the development of a site-specific PP/WM video, publication of waste minimization articles, sponsorship of "Reuse Days", Earth Week activities, employee awards, and video conference training. The PP/WM program also participated in numerous community outreach programs to heighten public knowledge of waste minimization concepts.

The challenge at Fernald is to minimize waste at a site whose mission is to remediate the legacy waste left from years of uranium processing. The challenge lies in the ability to include waste minimization planning and concepts into each activity and minimize any secondary wastes resulting from remediation. In 1992, a step was made towards this goal by initiating waste segregation and beneficial reuse activities and promoting a conscious effort to practice waste minimization during each site activity. The awareness has enabled the program to set goals for actual, measurable reductions in waste generation that will continue in 1993.

II. General Site Information

General Site Mission

The mission is to complete the remediation of the FEMP in the most cost effective, timely, and safe manner practical. Waste minimization plays a vital role in the remediation of the FEMP by providing cost avoidance options for waste management by reducing the amount of waste generated as well as leading to reduced liabilities associated with waste.

Mailing Address

P.O. Box 398704
Cincinnati, Ohio 45239-8704

Program Secretarial Officers (PSOs) which are currently involved in activities at this site are as follows:

Lead PSO

EM

Additional PSOs

AD	CE	DP	EM	ER	FE	NE	NP	RW

Point of Contact (DOE)

Behram Shroff
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Point of Contact (Contractor)

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FERMCO
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Site Size (acres)

1050

Number of Employees

DOE

58

Contractor

2088

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Feed Materials Production Center

03/05/93

III. Site Generation Data

No input provided.

III. Site Generation Data (cont.)

Table 1.0. Total Waste Generated.

Waste Type	1991	1992	Percentage Change
High-Level Waste	(L)	(L)	0.0
	m ³	m ³	0.0
Transuranic Waste (TRU)	(L)	(L)	0.0
	m ³	m ³	0.0
TRU-Mixed	(L)	(L)	0.0
	m ³	m ³	0.0
Low-Level Waste (LLW)	(L)	(L)	0.0
	6,669.80 m ³	12,571.00 m ³	88.5
LLW-Mixed	(L)	(L)	0.0
	81.00 m ³	141.00 m ³	74.1
Hazardous	RCRA Kg	4,031.00 Kg	0.0
	non-RCRA Kg	Kg	0.0
TSCA	638.00 Kg	1,372.90 Kg	115.2
Sanitary	4,510.00 tons	3,374.00 tons	-25.2

Total waste generated at the site during calendar years 1991 and 1992; a sum of all wastes which were generated on the site, regardless of source or activity.

IV. Site-Wide WMin Accomplishments

The following sections provide detailed information on different aspects of site-wide Waste Minimization Program initiatives. These site-wide efforts are directed at all employees on the site, and are therefore not limited to specific PSO programs and/or operations.

Training:

Video: A Pollution Prevention and Waste Minimization Awareness Video was developed in 1992. The video describes PP/WM activities that are taking place or are planned onsite and accomplishments that have been made in the areas of PP/WM. The video explains what waste minimization is and what part the front-line personnel play in the program. The video is shown at New Employee Orientation and RCRA 8-hour Refresher Courses. The video has also been shown in numerous off-site training courses and seminars. See Appendix.

Incentives:

Employee Recognition Awards: The Pollution Prevention and Waste Minimization (PP/WM) Team awards individuals the "Golden Leaf Award" on a monthly basis for contributions to the waste minimization effort. The personalized "golden leaves" are placed on the Earth Saving Tree in the cafeteria.

Employee Suggestion Program: Suggestion boxes have been placed around the site for the collection of waste minimization ideas, which are reviewed by the PP/WM Team for implementation. See Appendix.

Employee Awareness/Outreach:

Awareness Video: The PP/WM Awareness Video developed in 1992 was shown to site-wide personnel on Employee Appreciation Day and also was included in one segment of the Waste Minimization and Pollution Prevention Video Conference Training Series.

Site Presentations: PP/WM presentations were made to numerous groups on and off-site to explain PP/WM concepts and to encourage the inclusion of waste minimization principles in every activity. Presentations were made to the DOE Staff, CERCLA organization, Contractor Staff Managers, Total Quality Council, and various local schools.

See Appendix.

Tracking/Reporting/Planning Systems:

Chemical Tracking System: A Chemical Tracking System called HAZTRACK has been developed which will track newly purchased chemicals from procurement through use and dispositioning. Current chemical information has been entered into the system with start-up expected in 1993. Duplicate chemicals will be eliminated and non-hazardous substitutes will be sought for hazardous chemicals.

See Appendix.

IV. Site-Wide WMin Accomplishments (cont.)

Recycling/Reuse Programs:

Lead Acid Battery Recycling: A program has been developed to free-release batteries generated on-site for offsite recycling. This activity will prevent the generation of a mixed waste.

Scrap Metal Recycling: A program was developed and a contract awarded to beneficially reuse 2,210 tons of scrap steel and 1,350 tons of scrap copper from past production activities.

Recycling Team: The team initiated a "co-mingled" recycling effort to include glass, polystyrene, bimetal, and cardboard into the recycling stream. The team also collected nearly 2 tons of phone books for recycling.

See Appendix.

Table 2.0. Site-Wide Recycling Activities

Material	1991	1992
Office Paper	29.50	33.50
Aluminum	2.00	2.30
Glass		*
Plastic		*
Cardboard		*
Scrap Metals	485.00	557.00

Total amounts of recyclable materials collected during calendar years 1991 and 1992. All units are in tons.

* Glass, plastic, and cardboard were collected and recycled as part of a "co-mingled" collection effort begun in 1992. 2010.50 cubic meters of glass, plastic, and cardboard was collected for recycling.

V. EM Specific Information

EM Summary Statement Of Operational Status And Its Effect On Waste Generation.

Fernald's site mission is to achieve environmental compliance and restoration. The site is regulated under CERCLA and has made agreements with US EPA to perform numerous removal actions. In accordance with the Consent Agreement, four removal actions were performed in 1992 and generated LLW, mixed, TSCA, and sanitary waste greater than what was generated in the past. Generation rates could have been much higher if segregation and reuse options were not utilized.

Table 3.1. EM Waste Generation.

Waste Type	1991	1992	Percentage Change
High-Level Waste	N/A (L)	N/A (L)	0.0
	N/A m ³	N/A m ³	0.0
Transuranic Waste (TRU)	N/A (L)	N/A (L)	0.0
	N/A m ³	0.00 m ³	0.0
TRU-Mixed	N/A (L)	N/A (L)	0.0
	N/A m ³	N/A m ³	0.0
Low-Level Waste (LLW)	(L)	(L)	0.0
	6,669.80 m ³	12,571.00 m ³	88.5
LLW-Mixed	(L)	(L)	0.0
	81.00 m ³	141.00 m ³	0.0
Hazardous	RCRA N/A Kg	4,031.00 Kg	0.0
	non-RCRA N/A Kg	N/A Kg	0.0
TSCA	638.00 Kg	1,372.90 Kg	115.2

Waste generated by EM operations at the site during calendar years 1991 and 1992.

Table 4.1. EM Waste Reduction Activities That Resulted In A Change In Waste Generation Rates Between 1991 and 1992.

Waste Type								Activity	
HLW	TRU	TRU Mixed	LLW	LLW Mixed	HAZ RCRA	HAZ Non-RCRA	TSCA		
			10	10			10	(A)	Source
			10					(B)	
					80			(C)	Reduction
			10	10				(D)	
							10	(E)	Recycling
			50	80	20		80	(F)	Status
			20					(G)	Treatment

This table links changes in waste generation rates to specific activities and/or changes in operational status. Source reduction, recycling activities, and treatment generally result in less waste generation; changes in operational status may result in either an increase or decrease in waste generation rates.

The percentage of total waste change resulting from specific activities are estimated in 10% increments, using the following activity descriptions:

- A. Good Operating Practices (e.g., Management and personnel practices; Material handling and inventory practices; Waste segregation; Cost accounting practices; Production scheduling);
- B. Technology Changes (e.g., Process changes; Equipment, piping, or layout changes; Additional automation; Changes in operational settings; Energy conservation; Water conservation);
- C. Input Material Change (e.g., Material purification; Material substitution);
- D. Product Change (e.g., Product Substitution; Product Conservation; Change in product composition);
- E. Waste Avoidance Due to Recycling/Reuse (e.g., Solvent recycling; Oil recycling; Silver capture and reuse; Chemical exchange and reuse; Packaging material reuse);
- F. Change in Operations Status (e.g., Process interruptions; Work stoppages; Mission changes; New Processes); Report as (+/-) change.
- G. Treatment (e.g., Compaction; Distillation; Removal of hazardous constituents)

For example, the number in the HAZ column, line (E) indicates the percentage of the total change in Hazardous Waste Generation that was due to recycling/reuse activities.

PSO Specific WMin Accomplishments

The following section provides detailed information on EM-specific WMin initiatives.

No Work For Others was performed at Fernald.

A Waste Assessment was performed on the dry compactible waste generated in the radiologically controlled area. The purpose was to identify ways to limit the entry of dry compactible waste into the controlled area where it becomes low-level waste and reduce this amount by 30%. Several pilot activities were initiated to address the issue.

A pilot project was performed at the receiving building where incoming packages designated for the controlled area are repackaged for delivery in reusable plastic containers that can be decontaminated. See Appendix.

TECHNOLOGY TRANSFER:

Sponsored a field trip for DOE and contractor personnel to a local manufacturing company. Representatives demonstrated CO2 cryogenics/abrasive blasting cleaning technology.

Participated in the Super Science Saturday Workshop for local graduating high school seniors and discussed waste minimization and career opportunities. See Appendix.

Waste Change Comments (By Waste Type)

Low-Level Waste (LLW)

The increase in the generation rate of LLW at the Fernald Site is due to Removal Actions being performed in accordance with the Consent Agreement with the US EPA. Four major removal actions were performed in 1992 and generated approximately 5,550 cubic meters of LLW.

The increase in LLW generation can also be attributed to the generation of wooden pallets from the replacement of wood with metal pallets for indoor drum storage. Salvageable wooden pallets were retained and reused for outdoor drum storage.

Low-Level Mixed (LLMIX)

Fernald has initiated several renovation activities to prepare for future remediation activities. These renovation activities (the laboratory upgrade project, in particular) have generated approximately 11.40 cubic yards of mixed waste.

Four major removal actions were performed in 1992 in accordance with the Consent Agreement with US EPA. These four removal actions generated approximately 56.80 cubic yards of mixed waste.

Haz: RCRA-regulated (HAZRCRA)

All RCRA Regulated waste generated prior to 1992 was considered mixed waste. Segregation activities (administrative controls to segregate radioactively contaminated materials from non-contaminated materials) have generated the 946 Kg of RCRA regulated material (spent photo developer with trace silver) which was considered mixed waste in the past.

Solvent cleaning was eliminated in the garage in order to keep solvents from contaminating the used oils, this reduced RCRA regulated waste by 6,800 pounds in 1992.

TSCA

Laboratory renovation activities have generated light ballasts and capacitors, which account for the increase in PCB generation in 1992.

Appendix

Training continued:

Videoconference: Sponsored the 8-part Videoconference Training Series entitled, "Waste Minimization and Pollution Prevention". Key personnel from waste generating organizations were in attendance.

Incentives continued:

Management Commitment: Updated the Waste Minimization and Pollution Prevention Awareness Plan which identified a set of sitewide PP/WM goals. The goals were reviewed and accepted by staff level managers and became commitments to DOE with due dates within the following calendar year.

Recycling Team: Recognized employee participation in recycling activities by awarding T-shirts.

Employee Awareness/Outreach continued:

Earth Week Activities: Co-sponsored Earth Week activities which included speakers from NOAA, Parks and Recreation, USGS, and the Cincinnati Zoo. Presenters spoke on recycling, pollution prevention, reuse, and earth-saving themes. Story boards, hand-outs, and booths were used during the week to enhance employee awareness of PP/WM goals and how each employee can contribute.

Videoconference: Sponsored the 8-part Videoconference Training Series entitled "Waste Minimization and Pollution Prevention".

Newsletter Articles: Placed numerous articles and features in the site weekly and monthly newsletter regarding PP/WM accomplishments and activities. Coordinated a site-wide effort to encourage double-sided copies, limited distribution lists, and use of electronic mail.

Outreach: Participated in the Super Science Saturday Workshop for local graduating high school seniors. Discussed waste minimization at Fernald and career opportunities.

Organized numerous Partnership In Education programs for the local schools discussing recycling opportunities.

Tracking/Reporting/Planning continued:

PP/WM Team: Continued to hold biweekly meetings of the PP/WM Team which discusses and evaluates sitewide PP/WM activities and initiates potential PP/WM actions.

PP/WM Plan: Updated the Waste Minimization and Pollution Prevention Awareness Plan to include a specified set of sitewide PP/WM goals.

CERCLA WMin Committee: Created a subcommittee of the PP/WM Team called the CERCLA Waste Minimization Committee which was charged with reviewing all CERCLA Removal and Remedial Actions for waste minimization opportunities. Please see the waste assessment section of this report for information on assessments.

Recycle/Reuse Programs continued:

Safe-Shutdown: Transferred approximately 557 tons of non-contaminated recyclable metal materials to the private sector for recycling and sold approximately 105 tons of non-contaminated graphite materials for reuse. Salvaged for reuse three stainless steel vats from production days for pilot scale vitrification processes and a HEPA filter for reuse in the updated laundry area.

Reusable Containers: Purchased reusable plastic containers for use in the receiving building for repackaging of incoming boxes in order to divert the cardboard and packing materials from becoming low-level waste. The cardboard and polystyrene are then recycled.

CFC Recycling: Purchased a CFC Recovery Unit and began recovery/recycle of freon from mobile units in

July, 1992. A CFC Recycling Team was formed to begin implementing the recovery and recycle/reuse of all freon on-site.

Metal Pallets: Purchased metal pallets for use in drum storage areas to replace wooden pallets. Metal pallets are decontaminable and have a life expectancy of 5 times that of wooden pallets.

Wood Pallet Segregation: Segregated approximately 600 wooden pallets for reuse instead of disposing as LLW. Cost avoidance of approximately \$90,000.

Procurement: Established a procurement program for the purchase of recovered materials. Recycled copier paper is routinely being purchased with specifications being written for the purchase of retreaded tires, lubricating oils, cement/concrete containing flyash, and building and insulation products.

Please see next two pages for the remainder of the Appendix.

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Reuse Day: Held three "Reuse Days" in 1992 where old, unused, or extra office supplies were displayed in the cafeteria for employees to "swap" and trade for reuse. The effort yielded over 80 boxes of supplies that were reused instead of being thrown away or ordering new items.

Technology Transfer/Information Exchange:

Attended the Pollution Prevention Practical Management Strategies and Regulatory Update Workshop.

Participated in the development of life-cycle costing guidelines for the Westinghouse GOCO Subcommittee on Waste Minimization.

Assisted in the development of the Westinghouse GOCO Pollution Prevention Implementation Guidance Manual.

Met periodically with Waste Minimization Coordinators from ORNL and Mound to discuss common waste minimization issues.

WMin Opportunity Assessment continued:

The second initiative was a trash segregation policy implemented in a building on the controlled side to prevent the office waste generated in the building from becoming low-level waste. Administrative controls were established for the collection of office trash and a radiological control procedure written to implement the program. Approximately 140 cubic feet per month is disposed as sanitary waste instead of LLW.

The third initiative involved the use of a radiologically clean truck for the delivery of supplies and equipment to the controlled area. Boxes were unpackaged inside the truck and the boxes and packing materials were taken back to Receiving for recycling. In October, 1992, 6,080 pounds of cardboard and 352 cubic feet of styrofoam was diverted from becoming LLW by this method.

A waste assessment was performed on the flyash generated from the boiler plant. The flyash is radiologically clean and is non-hazardous, but was routinely disposed on a flyash pile onsite, which is considered a Hazardous Waste Management Unit. Segregation was recommended in order to dispose of this waste in a local sanitary landfill.

A procedure was written and segregation was initiated. 420 cubic yards of flyash per week is now sent to a sanitary landfill instead of becoming hazardous waste.

Another wastestream was assessed for the same segregation opportunity. Radiologically clean asbestos which was generated from demolition activities was packaged and stored in the radiologically controlled area for dispositioning, thus becoming labeled as LLW. In order to divert the asbestos from the controlled area and send the waste to a sanitary landfill, a procedure was written and administrative controls were applied to the wastestream. The first shipment of asbestos to a sanitary landfill was made in December, 1992, where 444 cubic feet of asbestos was segregated. The procedure will be routinely implemented in all future asbestos abatement actions.

Environmental Restoration and Waste Management is the driving force at Fernald. Assessments will need to be made on each Removal and Remedial Action in order to incorporate waste minimization opportunities.

A CERCLA Waste Minimization Committee was formed with the intention of performing on-going assessments of each CERCLA activity. Qualitative waste assessments were made in October, 1992 for on-going Removal and Remedial Actions. Quantitative waste assessments will be performed for future Removal and Remedial Actions at the draft Work Plan phase for Removal Actions and at the Feasibility Study/Conceptual Design phase for Remedial Actions. The assessments will be performed using life-cycle costing data planned to be applied to FEMP wastestreams within the next year.

Waste Generation Data Notes:

RCRA Regulated Waste was not tracked separately in 1991, it was included in the mixed waste generation inventory.

Hazardous, non-RCRA Waste is not currently being tracked separately, but is included in the mixed waste generation inventory.

Sanitary Waste disposed in 1991 was tracked in volume only. The number recorded in mass is an estimated value.

The amount of materials recycled in 1992 does not include the 71,000 cubic feet (uncompacted) of material that was sent for recycling. This material is collected in co-mingled dumpsters and included cardboard, bimetal cans, polystyrene, and office paper. This program began in September, 1992 and weights have not been recorded, only volumes.