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HAZARDOUS AND MIXED WASTE GENERATION AT THE DOE/ORO INSTALLATIONS
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.,
DURING CALENDAR YEARS 1987 AND 1988

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Oak Ridge Y-12 Plant
Oak Ridge National Laboratory
Paducah Gaseous Diffusion Plant
Portsmouth Gaseous Diffusion Plant
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SUMMARY

A data base on hazardous and mixed waste streams generated at the five U.S. Department of Energy/Oak Ridge Operations (DOE/ORO) facilities operated by Martin Marietta Energy Systems, Inc., has been developed and maintained in support of strategic planning for the Hazardous Waste Development, Demonstration, and Disposal (HAZWDDD) Program. This data base contains information concerning all hazardous and mixed (hazardous and low-level radioactive) waste generated, stored, treated, and disposed at the five Energy Systems installations during calendar years (CYs) 1987 and 1988. To facilitate the reporting and to establish waste management needs, a waste categorization scheme has been developed based on the major hazardous component in the particular waste stream. This categorization scheme is consistent with the Environmental Protection Agency's code numbers for hazardous waste, as formulated under the Resource Conservation and Recovery Act.

The waste stream data base for CY 1987 was documented previously in the HAZWDDD Program Plan, submitted to DOE/ORO in December 1988. This report presents an update of the HAZWDDD data base for CY 1988. Where possible, comparisons to the previous calendar year data have been made.

Data on generation rates and inventories for hazardous and mixed waste for each Energy Systems installation are presented. A detailed listing of the waste streams and characterization information is presented in Appendix A. Total waste generation rates and inventories are presented, based on hazardous waste category, in Appendix B. This report functions as an overview on current applications of waste technologies at the Energy Systems installations by presenting a discussion on treatment, storage, and disposal methods presently used for hazardous and mixed waste management.

HAZARDOUS AND MIXED WASTE GENERATION AT THE DOE/ORO INSTALLATIONS
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1. INTRODUCTION AND BACKGROUND

A program plan for the management of mixed and hazardous waste at the five Martin Marietta Energy Systems, Inc. (Energy Systems) installations was submitted to the U.S. Department of Energy/Oak Ridge Operations (DOE/ORO) in December 1988. This program was known as the Hazardous Waste Development, Demonstration, and Disposal (HAZWDDD) Program and was formed to address several waste management issues, with the main objective being to ensure that all Energy Systems treatment, storage, and disposal (TSD) needs for hazardous and mixed waste were identified and planned for properly.¹ In an effort to meet this goal, a data base (HAZWDDD data base) was developed and maintained. This data base contained information concerning all hazardous and mixed waste generated, stored, treated, and/or disposed at the five Energy Systems installations during CY 1987. Presently, the HAZWDDD Program itself is not active; however, the data base work is continuing.

This document presents an update of the HAZWDDD data base for CY 1988. Where possible, comparisons will be made to the previous calendar year data. Summaries and figures concerning the data are presented in the body of the report, and a breakdown of the individual waste streams is presented in Appendix A. The installations' data were obtained primarily from the annual Resource Conservation and Recovery Act (RCRA) state reports.²⁻⁶ Additional input was provided by environmental and waste management personnel at the installations and by other reports.⁷⁻¹⁷

All five installations produce purely hazardous and mixed (low-level radioactive and hazardous) waste. The gaseous diffusion plants and Y-12 produce mixed waste contaminated primarily with uranium

isotopes, while the mixed waste generated at Oak Ridge National Laboratory (ORNL) is contaminated with various radioisotopes. Generation rates of both hazardous and mixed wastes are reported, and inventories of mixed waste are discussed.

2. CATEGORIZATION OF WASTE STREAMS

A categorization for both hazardous and mixed waste streams, based on the major hazardous component in the particular waste stream, was developed in the previous HAZWDDD plan to facilitate the reporting of generation rates and inventories of the wastes. This categorization is based on the U.S. Environmental Protection Agency's (EPA's) code numbers for hazardous wastes, enumerated by the RCRA regulations in the Code of Federal Regulations, Title 40, Part 261.¹⁸ Table 1 presents a short description of the hazardous waste categories defined for the purpose of this data base.

Categories A through D are based on the EPA's "characteristically" hazardous waste definitions and respectively assigned code numbers. Wastes in category A exhibit the characteristic of ignitability (EPA code D001), category B wastes exhibit the characteristic of corrosivity (EPA code D002), wastes in category C exhibit the characteristic of reactivity (EPA code D003), and category D wastes exhibit the characteristic of EP toxicity (EPA codes D004 through D017).

Categories E, F, and G are based on the EPA's "listed" hazardous wastes, specified in 40 CFR 261.¹⁸ EPA listed wastes F001 through F005 are assigned to category E, listed wastes F006 through F028 are assigned to category F, and category G wastes are all of the EPA listed P and U wastes. If a waste, hazardous or mixed, is an EPA listed hazardous waste, it remains a listed waste regardless of the treatment applied to it, whereas a characteristically hazardous waste (categories A through D) may be successfully treated to eliminate the hazardous characteristic. In order for a listed waste to be considered nonhazardous, the waste generator must go through a very involved procedure known as delisting.

Table 1. Categorization of hazardous wastes for the HAZWDDD Program, based on EPA hazardous waste codes

Category	EPA code(s)	Description
<u>Characteristically hazardous wastes</u>		
A	D001	Ignitable - a waste exhibits this characteristic if the waste has a flash point under 60°C, or, as a solid, it is capable of causing fire through friction at standard temperature and pressure (see 40 CFR 261.21).
B	D002	Corrosive - a waste exhibits this characteristic if the pH is <2 or >12.5, or if it corrodes steel at a specified rate (see 40 CFR 261.22).
C	D003	Reactive - a waste exhibits reactivity if it is normally unstable, reacts violently with water, is capable of detonation, or generates toxic gases under certain conditions (see 40 CFR 261.23).
D	D004-D017	EP-toxic - a waste exhibits toxicity if the leachate contains certain constituents (such as arsenic, lead, mercury, and silver) at concentrations equal to or higher than those given in 40 CFR 261.24.
<u>EPA/RCRA listed wastes</u>		
E	F001-F005	Spent solvents - spent halogenated solvents such as trichloroethylene (TCE) and chlorinated fluorocarbons; spent nonhalogenated solvents such as acetone and methanol; also mixtures or blends containing, before use, 10% or more (by volume) of these solvents (see 40 CFR 261.31).
F	F006-F028	Spent sludges - wastewater treatment sludges from electroplating operations, spent solutions from certain electroplating operations and other nonspecific sources, wastes from the production of certain chemicals (see 40 CFR 261.31 for more details).

Table 1. (continued)

Category	EPA code(s)	Description
G	P001-P123 and U001-U359	Discarded commercial chemicals - discarded chemicals as listed in 40 CFR 261.33, such as cyanides, benzene, chloroform, etc.
<u>TSCA-regulated hazard wastes</u>		
J	(none)	PCB wastes - any form of PCB-containing wastes (liquid, solid, etc.).
<u>Other hazardous wastes</u>		
K	(none)	DOT poisons - hazardous wastes identified by DOT numbers but not EPA codes.
L	(none)	Medical/infectious wastes - experimental animal wastes and infectious medical wastes.
M	(none)	Combustibles - materials that have a flash point above 60°C.
U	(none)	Unknown - hazardous constituent not identified (unknown), usually refers to remedial action wastes in which the wastes have not be characterized.
Z	(none)	Other hazardous wastes - hazardous material other than any of those previously mentioned.

Other categories defined for the purpose of the data base are not based on EPA codes. Category J wastes contain polychlorinated biphenyls (PCBs), category K wastes are Department of Transportation- (DOT) defined poisons not included in the EPA's RCRA regulated wastes, category L wastes are infectious medical and animal wastes, category M wastes are combustible wastes, category U wastes contain hazardous components that have not been specifically identified, and category Z wastes are all others outside of the previously mentioned categories.

A few changes have been implemented since the introduction of the HAZWDDD data base last year. Category L, medical and infectious waste, is not included in any of the analyses (tables and graphs) this year, mainly because the installations' records of these wastes are not kept with the records of the other categories of waste. These wastes are not considered hazardous as defined by RCRA (except for some of ORNL's animal waste), and the majority of these wastes are autoclaved and then disposed of on-site and, thus, do not present a problem. The quantities of medical and infectious waste are very small compared with other wastes, and quantities are not expected to change significantly over the years. Appendix A, which contains a listing of all the waste streams, also includes the infectious waste streams from last year's data base.

A few changes or updates were made in the CY 1987 HAZWDDD data base information that appeared in last year's HAZWDDD Program Plan. Several CY 1987 waste streams for the Y-12 installation were modified to reflect the CY 1987 annual report data; however, overall generation rates and inventories for Y-12 were not significantly affected. All other CY 1987 installation data remained the same. Appendix A contains a listing, by waste stream, for each installation with the 1987 and 1988 generation rates and inventories. Note that several waste streams at each installation were introduced in the previous report¹ have been deleted in the CY 1988 data base, and a few waste streams have been added.

3. WASTE GENERATION, STORAGE, TREATMENT, AND DISPOSAL

3.1 WASTE GENERATION

Generation rates of hazardous and mixed wastes at the five installations are summarized in Table 2 for CY 1987. Table 3 contains the CY 1988 generation rates for the installations. Although it appears that, overall, the total generation of hazardous and mixed waste has increased from 1987 to 1988, this is a broad generalization and must be reviewed more closely. Section 4 details the changes in each installation's waste generation, and the reader is referred to that section for a complete explanation of the differences in generation rates.

Figure 1 recaps the generation rates of both hazardous and mixed wastes, by hazardous waste category, for CY 1987, and Fig. 2 shows the categorized generation rates of hazardous and mixed wastes for CY 1988. Comparisons between 1987 and 1988 total waste generation rates and mixed waste inventories are made in Figs. B.1 through B.16 in Appendix B.

3.2 WASTE STORAGE

Inventories for all installations' hazardous wastes are, generally, ambiguous because most purely hazardous wastes are treated and/or disposed of off-site by commercial vendors. Therefore, inventories of hazardous wastes were not tracked in this update of the HAZWDDD data base. Appendix A contains the hazardous waste inventories reported for the CY 1987 data base but does not include CY 1988 inventories for these hazardous wastes. Usually, hazardous wastes are stored on-site temporarily until a sufficient quantity is accumulated and can be disposed of by a commercial vendor.

Table 4 summarizes the inventories at the end of CY 1987 and CY 1988 for all mixed wastes at the installations. Presently, there are no permitted on- or off-site disposal facilities that accept mixed waste. Therefore, all mixed wastes have an "interim" storage status. Figures 3 and 4 show the 1987 and 1988 mixed waste inventories at each installation for each waste category. The major portion of this mixed waste inventory is Oak Ridge Gaseous Diffusion Plant's (ORGDP's) listed

Table 2. Hazardous and mixed waste generation rates for all installations during CY 1987

	Generation rate (kg/year) by installation					
Hazardous waste category	PGDP ^a	ORGDP ^b	PORTS ^c	ORNL ^d	Y-12 ^e	Total
<u>Hazardous waste</u>						
A (ignitable)	2,455	0	3,440	7,835	55,693	69,423
B (corrosive)	1,818	5,760	0	6,188	4,795	18,571
C (reactive)	0	6	0	30	238	274
D (EP toxic)	3,704	11,040	0	173,247	21,169	209,160
E (spent solvents)	6,818	5	3,209	2,950	195,585	208,567
F (sludges)	0	0	0	0	0	0
G (comm. chemicals)	193	460	1,536	1,486	36,009	39,684
J (PCB waste)	272,727	7,200	400	18,711	71,450	370,488
Others	1,487	300	1,980	47,844	1,192	52,803
Subtotal	289,202	24,771	10,565	258,301	386,131	968,970
<u>Mixed waste</u>						
A (ignitable)	136	7,550	0	2,030	2,020	11,736
B (corrosive)	4,999	38,650	4,200	669	701	49,219
C (reactive)	0	0	0	0	0	0
D (EP toxic)	0	700	42,614	0	53,193	96,507
E (spent solvents)	2,727	24,125	4,443	17,511	55,612	104,418
F (sludges)	0	0	0	0	1,849,780	1,849,780
G (comm. chemicals)	0	0	0	606	0	606
J (PCB waste)	45,455	12,700	50,683	1,251	27,625	137,714
Others	0	0	1,618	81,178	348,600	431,396
Subtotal	53,317	83,725	103,558	103,245	2,337,531	2,681,376
Total	342,519	108,496	114,123	361,546	2,723,662	3,650,346

^aPaducah Gaseous Diffusion Plant.^bOak Ridge Gaseous Diffusion Plant.^cPortsmouth Gaseous Diffusion Plant.^dOak Ridge National Laboratory.^eY-12 Plant.

Table 3. Hazardous and mixed waste generation rates for all installations during CY 1988

	Generation rate (kg/year) by installation					
Hazardous waste category	PGDP ^a	ORGDP ^b	PORTS ^c	ORNLD ^d	Y-12 ^e	Total
<u>Hazardous waste</u>						
A (ignitable)	5,719	1,793	8,431	13,912	24,190	54,045
B (corrosive)	119	2,522	249	13,076	4,289	20,255
C (reactive)	0	1,101	0	1,679	65	2,845
D (EP toxic)	3,809	12,403	15,961	40,198	96,949	169,320
E (spent solvents)	8,560	1,797	22,726	4,357	50,610	88,050
F (sludges)	0	0	0	0	0	0
G (comm. chemicals)	3	0	778	810	803	2,394
J (PCB waste)	392,250	22,944	6,745	16,016	557,055	995,010
Others	2	462	0	39,738	412	40,614
Subtotal	410,462	43,022	54,890	129,786	734,373	1,372,533
<u>Mixed waste</u>						
A (ignitable)	226	9,720	3,298	680	2,427	16,361
B (corrosive)	4,482	26,485	752	460	2,235	34,414
C (reactive)	0	0	0	0	0	0
D (EP toxic)	7,204	540	58,802	273	7,168	73,987
E (spent solvents)	5,382	106,600	25,396	11,954	38,652	187,984
F (sludges)	0	2,400	0	0	871,668	874,068
G (comm. chemicals)	0	0	47	3	0	50
J (PCB waste)	324,385	11,742	1,580,075	0	704,736	2,620,938
Others	0	0	0	9,159	348,600	357,759
Subtotal	341,679	157,487	1,668,370	22,539	1,975,486	4,165,561
Total	752,141	200,509	1,723,260	152,325	2,709,859	5,538,094

^aPaducah Gaseous Diffusion Plant.^bOak Ridge Gaseous Diffusion Plant.^cPortsmouth Gaseous Diffusion Plant.^dOak Ridge National Laboratory.^eY-12 Plant.

ORNL DWG 90-9420

Fig. 1. Hazardous and mixed waste generation rates for all installations by hazardous category during CY 1987.

ORNL DWG 90-9421

Fig. 2. Hazardous and mixed waste generation rates for all installations by hazardous category during CY 1988.

Table 4. End-of-year mixed waste inventories for all installations in 1987 and 1988

	Mixed waste inventories (kg) by installation					
Hazardous waste category	PGDP ^a	ORGDP ^b	PORTS ^c	ORNL ^d	Y-12 ^e	Total
<u>CY 1987</u>						
A (ignitable)	618	14,950	0	10,085	11,983	37,636
B (corrosive)	4,091	156,300	4,200	3,327	1,145	169,063
C (reactive)	0	0	0	0	0	0
D (EP toxic)	7,910	127,357	182,031	0	10,763,228	11,080,526
E (spent solvents)	29,545	367,660	10,737	5,333	270,277	683,552
F (sludges)	0	18,513,771	0	0	3,960,642	22,474,413
G (comm. chemicals)	0	18,652	0	649	0	19,301
J (PCB waste)	1,324,636	390,750	96,032	2,751	551,300	2,365,469
Others	2,000	0	706,801	1,055,031	1,220	1,765,052
Total	1,368,800	19,589,440	999,801	1,077,176	15,558,785	38,595,012
<u>CY 1988</u>						
A (ignitable)	844	24,670	3,298	10,775	16,739	56,326
B (corrosive)	4,491	182,785	4,952	3,787	898	196,913
C (reactive)	0	0	0	0	0	0
D (EP toxic)	15,114	120,457	240,833	273	10,764,836	11,141,513
E (spent solvents)	34,927	336,283	2,672,497	7,987	311,729	3,363,423
F (sludges)	0	26,716,171	0	0	4,661,842	31,378,013
G (comm. chemicals)	0	18,652	47	652	0	19,351
J (PCB waste)	1,847,965	1,375,518	192,107	3,312	865,894	4,284,896
Others	0	0	706,801	1,057,090	1,820	1,765,711
Total	1,903,341	28,774,536	3,820,535	1,083,876	16,623,858	52,206,146

^aPaducah Gaseous Diffusion Plant.^bOak Ridge Gaseous Diffusion Plant.^cPortsmouth Gaseous Diffusion Plant.^dOak Ridge National Laboratory.^eY-12 Plant.

ORNL DWG 90-9422

Fig. 3. Mixed waste inventories for all installations by hazardous category during CY 1987.

ORNL DWG 90-9423

Fig. 4. Mixed waste inventories for all installations by hazardous category during CY 1988.

category F sludge (EPA code F006) which resulted from the closure of the 1407-B and 1407-C ponds. About 60% of this sludge is fixed in a concrete matrix; all of the sludge is contained in drums. ORGDP is currently working on delisting this material. Should the delisting procedure be successful, this waste would be reclassified as a low-level waste and disposed of appropriately. Y-12 also has a significant quantity of category F sludge that is in bulk storage at the West Tank Farm. In addition, Y-12 has a large inventory of mixed, category D (EP toxic) material in storage. The majority of this material is nonhomogeneous, mercury-contaminated rubble. Appendix B contains figures showing the mixed waste inventories for all installations in each waste category.

All installations, with the exception of ORNL, have a large quantity of stored PCB-contaminated wastes. Many of these waste stream matrices are soils; about 15 wt% of the waste streams are solvents. In most cases, these wastes are awaiting treatment at the Toxic Substances Control Act (TSCA) Incinerator located at ORGDP.

3.3 WASTE TREATMENT

Treatment capabilities for hazardous and mixed waste streams on-site at the installations are somewhat limited. As mentioned previously, most hazardous waste streams are treated and/or disposed of at off-site commercial facilities. Table 5 gives the quantities, by category, of hazardous wastes that were sent off-site for treatment and disposal in CY 1988. Most of these wastes are incinerated by commercial facilities, but in some cases, the wastes are solidified and/or landfilled.

All sites have wastewater treatment facilities that neutralize and precipitate wastes. The Oak Ridge installations (ORNL, ORGDP, and Y-12) each treat and discharge about 8 to 12 million kg of liquid waste per year at their water treatment facilities. Paducah and Portsmouth treat and discharge less liquid waste than this. These quantities are not included in the data base summaries because the liquids, once treated, are discharged through National Pollutant Discharge Elimination System-

Table 5. Mass quantities (kg) of hazardous wastes shipped off-site for treatment and/or disposal by installations in CY 1988

Hazardous waste category	PGDP ^a	ORGDP ^b	PORTS ^c	ORNL ^d	Y-12 ^e	Total
A	925	9,841	153	9,448	8,552	28,719
B	0	2,831	79	9,458	6,968	19,336
C	0	335	0	1,501	0	1,836
D	0	2,381	11,387	62,884	1,009	77,661
E	6,934	0	165,282	40,875	322,611	535,702
G	0	1,374	200	1,054	5,408	8,036
J	285,781	19,387	13,488	15,980	620,839	935,455
Z	0	236	0	0	1,879	2,115
Total	273,640	36,185	190,569	141,200	887,266	1,608,860

^aPaducah Gaseous Diffusion Plant.

^bOak Ridge Gaseous Diffusion Plant.

^cPortsmouth Gaseous Diffusion Plant.

^dOak Ridge National Laboratory.

^eY-12 Plant.

permitted points. The sludges that are produced as secondary wastes are included in the data base.

Other on-site treatment facilities at the installations include reaction or detonation of reactive (category C, D003) waste facilities; ORGDP's stabilization facility for fixing waste in a concrete matrix; Y-12's sludge-drying facility; ORNL's silver-recovery facility for photographic wastes, which is not currently operating because of permitting difficulties; and the TSCA Incinerator at ORGDP, which is expected to be operating in the near future.

3.4 WASTE DISPOSAL

Disposal of hazardous waste is usually done off-site by commercial vendors. Incineration, which is a treatment step, is the most common means of removing the hazardous characteristics of a waste. Fixation is another common means of reducing or removing the hazardous characteristic of a waste. Landfill of the secondary wastes (ash, in the case of incineration) is the normally practiced disposal technique in these cases.

Presently, there are no disposal facilities permitted to receive mixed waste, and, as discussed in the previous section, mixed wastes are stored awaiting further treatment and/or disposal. One exception is the very low-level mixed waste scintillation fluids that ORNL ships to a commercial facility for processing and incineration.

4. WASTE STREAMS AT INDIVIDUAL INSTALLATIONS

This section contains an analysis of the previous and current waste stream data for each individual installation. Please note that although comparisons are made between 1987 and 1988 data, the majority of these comparisons do not represent a trend in the generation of any of the particular waste categories. Trends in waste generation for these installations must be made with data for more than just 2 years. In addition, trends should be analyzed for a particular waste stream and not the broad categories of waste presented in this section. The frequency of waste stream generation must also be taken into account.

In particular, trends for routine waste generation can be analyzed, however, nonroutine waste generation should be treated separately.

4.1 PADUCAH GASEOUS DIFFUSION PLANT

4.1.1 Hazardous Waste

Over 90 wt% of Paducah's hazardous waste generation is PCB-contaminated liquids and solids. Approximately 289,000 kg of purely hazardous waste were generated during 1987 and 410,000 kg were generated during 1988. The amount of PCB-contaminated wastes (hazardous only) increased by about 120,000 kg from 1987 to 1988. This additional generation of PCB-contaminated waste accounts for the difference in the total waste generation from 1987 and 1988. Figure 5 shows a category breakdown of the waste generation at PGDP for 1987 and 1988.

4.1.2 Mixed Waste

PGDP's generation of mixed waste has increased from a 1987 rate of ~8,000 kg to ~17,000 kg in 1988. This increase is seen mainly in the generation of category D (EP toxic) wastes. The generation of spent solvent mixed wastes also increased from 1987 to 1988. In addition, the PCB-contaminated mixed waste generation for 1988 was 324,000 kg, bringing the 1988 total mixed waste generation to 341,000 kg. PCB-contaminated waste generation for 1987 was reported only for sewage sludge (no change from 1987 to 1988), not for other mixed solid and liquid PCB-contaminated wastes, so a direct comparison between 1987 and 1988 generation rates cannot be made. Figure 5 shows a breakdown of the generation rates for mixed waste as well as hazardous waste for PGDP.

4.2 OAK RIDGE GASEOUS DIFFUSION PLANT

4.2.1 Hazardous Waste

The hazardous waste generation rate for ORGDP in CY 1987 was ~25,000 kg, and the generation rate in CY 1988 was ~43,000 kg. The additional 18,000 kg of hazardous waste generated in CY 1988 were PCB-contaminated liquids and spent solvents, of which the majority was shipped in from other sites for disposal at the TSCA incinerator.

ORNL DWG 90-9424

Fig. 5. Hazardous and mixed waste generation rates, by hazardous category, for Paducah Gaseous Diffusion Plant.

Figure 6 shows ORGDP's generation rates of the various hazardous waste categories for 1987 and 1988.

4.2.2 Mixed Waste

Mixed waste generation at ORGDP during CY 1987 was ~84,000 kg, and the generation rate during CY 1988 was ~157,000 kg. The difference, and more, is the TSCA Incinerator ash that was generated in trial burns, ~87,000 kg more than was generated in the 1987 trial burns. This mixed waste is classified as a spent solvent, category E, listed waste. Figure 6 shows a summary of ORGDP's mixed waste generation rates in 1987 and 1988.

4.3 PORTSMOUTH GASEOUS DIFFUSION PLANT

4.3.1 Hazardous Waste

At PORTS, total hazardous waste generation during CY 1987 was ~11,000 kg, compared with a generation of nearly 55,000 kg for 1988. Approximately one-half of the additional 44,000 kg of hazardous waste generated in 1988 was solvent-contaminated liquids. In addition 15,000 kg of purely hazardous EP toxic wastes were generated in 1988, of which the majority was a chromic cleaning solution spill waste. Figure 7 shows the generation rates of the various categories of waste for 1987 and 1988 for PORTS.

4.3.2 Mixed Waste

During CY 1988, mixed waste generation at the Portsmouth installation was ~1.6 million kg. Ninety-four percent, or 1.5 million kg, of this waste was soil contaminated with PCBs. This waste was transported to ORGDP for storage. Two other contaminated-soil streams, one containing spent solvents and the other contaminated with EP toxic constituents, account for the rest of the increased generation during CY 1988. Again, Fig. 7 shows a breakdown of the generation rates by hazardous waste category for PORTS.

ORNL DWG 90-9425

Fig. 6. Hazardous and mixed waste generation rates, by hazardous category, for Oak Ridge Gaseous Diffusion Plant.

ORNL DWG 90-9426

Fig. 7. Hazardous and mixed waste generation rates, by hazardous category, for Portsmouth Gaseous Diffusion Plant.

4.4 OAK RIDGE NATIONAL LABORATORY

4.4.1 Hazardous Waste

Overall, the generation of hazardous waste at ORNL has decreased from 258,000 kg in 1987 to 130,000 kg in 1988. The decrease is seen in category D, EP toxic, waste generation. In 1987, ~134,000 kg of EP toxic-contaminated soil was generated during remediation activities. Figure 8 shows a category breakdown of the generation of hazardous waste at ORNL for CYs 1987 and 1988.

4.4.2 Mixed Waste

From 1987 to 1988, there was a reduction in total mixed waste generation at ORNL. The 1987 generation rate was ~103,000 kg, and the 1988 generation rate was 22,500 kg. Again, the majority of this reduction was due to one waste stream; 71,000 kg of construction debris was generated in 1987. In addition to the absence of this waste stream in 1988, the spent solvent, category E, wastes were reduced from 1987 to 1988. Figure 8 shows the generation of mixed and hazardous wastes, by hazardous category, from 1987 to 1988. Because of the inability to judge trends of waste generation based on 2 years of data, no more comparisons will be made at this time.

4.5 Y-12 PLANT

4.5.1 Hazardous Waste

The known hazardous waste generation at Y-12 during CY 1987 totalled ~386,000 kg. During CY 1988, Y-12 generated ~734,000 kg of hazardous waste. One waste stream accounted for the major difference in generation rates. In 1988, 410,000 kg of PCB-contaminated transformers and capacitors (category J) were taken out of service and disposed of in CY 1988; while in 1987 a significantly smaller quantity was removed from service. In addition, the amount of liquid PCB-contaminated wastes generated in 1988 was quantified, whereas in 1987 that quantity was not specified. However, assuming that figure did not change significantly, an overall reduction in hazardous waste generation at Y-12 can be noted. Figure 9 shows the breakdown, by category, of waste generation at Y-12 for 1987 and 1988. As seen in the figure, some waste categories'

ORNL DWG 90-9427

Fig. 8. Hazardous and mixed waste generation rates, by hazardous category, for Oak Ridge National Laboratory.

ORNL DWG 90-9428

Fig. 9. Hazardous and mixed waste generation rates, by hazardous category, for Y-12.

generation rates have increased and some have decreased, but as mentioned previously, there was an overall waste reduction.

4.5.2 Mixed waste

The mixed waste generation at Y-12 has decreased in every category with the exception of PCB-contaminated wastes. The total 1987 generation rate of mixed waste at Y-12 was ~2.3 million kg, and the mixed waste generation in 1988 was ~2.0 million kg. The largest reduction in mixed waste generation was the quantity of sludge produced in the West End Treatment Facility, which dropped by ~1 million kg per year. This reduction is the result of an operational change that altered 60% of the produced sludge from a mixed waste to an LLW. The increase in generation of PCB-contaminated mixed waste for 1988 was largely due to the excavation of ~700,000 kg of the Oil Landfarm soils. Figure 9 shows the generation of mixed wastes for 1987 and 1988 by hazardous waste category.

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APPENDIX A

**Listing of Hazardous and Mixed Waste Streams,
by Hazardous Waste Category, in the HAZWDDD Data Base**

KEY FOR TABLES A.1 THROUGH A.5

1. Hazardous Waste Category:
 - A - Ignitable waste
 - B - Corrosive waste
 - C - Reactive waste
 - D - EP Toxic waste
 - E - Spent solvent waste
 - F - Spent solutions or sludges
 - G - Discarded commercial chemicals
 - J - PCB-contaminated waste
 - L - Biological/infectious waste
 - M - Combustible waste
 - U - Unknown
 - Z - Other
2. Waste ID No.: Stream ID number in the data base
3. Waste Type:
 - H - Hazardous waste
 - M - Mixed waste
 - B - Both hazardous and mixed wastes are included in the waste stream.
4. Physical form:
 - G - Gas
 - L - Liquid
 - S - Solid
 - U - Sludge
5. RCRA Annual Report Stream No.: Waste stream number of the stream(s) in the respective installation's annual report.

Table A.1. Waste stream breakdown for F3DP

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
A	901.00	Grout	H	S		75			16
	902.00	Gasahol/water mixture	H	L		1,382			20
	903.00	Miscellaneous chemicals	H	S,L		60			17,18,19
	2.00	Spent laquer thinner	H	L,S	1,273	3,277	864		7
	3.00	Spent mineral spirits	H	L,S	500	0	682		
	4.00	Paint wastes	H	L,S	682	925	427		1
	12.00	O-dichlorobenzene	H	L	0	0	91		
		Subtotal (Category A):			2,455	5,719	2,064		
B	5.00	Waste acids	H	L	1,818	119	0		9,23,24
		Subtotal (Category B):			1,818	119	0		
D	904.00	Miscellaneous chemicals	H	S,L		3			13,14,25
	6.00	Potassium dichromate solution	H	L	3,182	3,081	2,318		10
	7.00	Photographic solutions	H	L	227	146	0		8
	10.00	Cadmium and mercury batteries	H	S	91	3	182		12
	11.00	Mercury-contaminated solids (equipment)	H	S	68	0	455		
	13.00	Lead-contaminated solids (debris)	H	S	45	485	45		15
	36.00	Selenium rectifiers	H	S	91	91	909		22
		Subtotal (Category D):			3,704	3,809	3,909		
E	1.00	Spent trichloroethylene/ethane	H	L	6,818	8,560	2,273		2,3,6
		Subtotal (Category E):			6,818	8,560	2,273		
G	9.00	Mercury	H	L	11	3	136		11
	32.00	Sodium cyanide	H	S,L	0	0	123		
	33.00	Zinc cyanide	H	S	0	0	28		
	34.00	Potassium cyanide	H	S	0	0	5		
	35.00	Silver cyanide	H	L	0	0	91		
	36.00	Cyanide mixtures	H	S,L	0	0	32		
	39.00	Miscellaneous waste chemicals	H	L,S	182	0	2,727		
		Subtotal (Category G):			193	3	3,143		
J	905.00	Liquid PCB wastes	H	L		109,082		12,117	b
	906.00	Solid PCB wastes	H	S		283,168		296,022	b
	37.00	PCB wastes	H	S,L	272,727		272,727		
		Subtotal (Category J):			272,727	392,250	272,727	308,139	
L	51.00	Medical/infectious waste	H	S	114	(deleted)	0		
U	23.00	Scrap batteries	H	S	1,364		Unknown		

Table A.1. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
Z	8.00	Pentachlorophenol solids	H	S	9	2	91		21
		Subtotal (Categories K, L, M, U, and Z):			1,487	2	91		
		Total (Hazardous wastes, all categories):			289,202	410,462	284,207	308,139	
A	907.00	Paint waste related materials	M	L		142		142	31
	15.00	Triethylhexylphosphate solution (IEHP)	M	L	45	43	273	316	27
	16.00	Bibutyl carbitol and xylene	M	L	91	41	345	386	28
		Subtotal (Category A):			136	226	618	844	
B	14.00	Uranium salvage	M	L	4,545	4,082	0	0	26
	17.00	Nickel stripper solution	M	L	227		0		
	18.00	Nickel stripper sludge	M	S	227	400	4,091	4,491	c
		Subtotal (Category B):			4,999	4,482	4,091	4,491	
D	19.00	Cascade vacuum dust	M	S	0	155	182	337	32
	20.00	Barium shot solids	M	S	0	449	455	904	33
	29.00	Ash receivers	M	S	0	6,600	6,818	13,418	c
	31.00	Technetium- & chromium-contaminated waste	M	L,U	0	0	455	455	c
		Subtotal (Category D):			0	7,204	7,910	15,114	
E	30.00	Spent trichloroethylene	M	L	2,727	5,382	29,545	34,927	4,529,30
		Subtotal (Category E):			2,727	5,382	29,545	34,927	
J	908.00	Miscellaneous solids	M	S		273,686	232,727	1,537,900	b
	42.00	Sewage sludge	M	U	45,455	45,455	415,909	278,182	d
	43.00	Dirt	M	S	Unknown	e	218,182		
	44.00	Concrete	M	S	Unknown	e	154,545		
	45.00	Gravel	M	S	Unknown	e	295,455		
	46.00	Rock and soil	M	S	Unknown	e	2,045		
	47.00	Metal pipe	M	S	Unknown	e	5,091		
	48.00	Miscellaneous solids	M	S	Unknown	5,244	682	31,883	b
	49.00	Miscellaneous liquids	M	L	Unknown				
		Subtotal (Category J):			45,455	324,385	1,324,636	1,847,965	
M	26.00	Lapping oil	U	L	Unknown		Unknown		
U	21.00	Cooling-tower redwood	U	S	Unknown	(deleted)	Unknown	(deleted)	
	24.00	Clean waste oil	U	L	Unknown		Unknown		
	25.00	Hydraulic oil	U	L	Unknown		Unknown		
		Waste oil	U	L	Unknown		Unknown		
	50.00	Well waste water	U	L	Unknown		Unknown		

Table A.1. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
Z	22.08	Uranium chips, turnings	U	S	0	0	2,000		
		Subtotal (Categories K, L, M, U, and Z):			0	0	2,000	0	
		Total (Mixed wastes, all categories):			53,317	341,679	1,368,800	1,903,341	

^aInventories are recorded for mixed wastes only because hazardous wastes are frequently shipped off-site.

^bData from RCRA's TSCA Report.

^cData taken from reference 12.

^dData taken from reference 17.

^eData is grouped in first stream of this category (miscellaneous solids).

Table A.2. Waste stream breakdown for ORGDP

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
A	901.00	Gas cylinders	H	G		71			49,95,96,97, 125
	902.00	Flammable liquids, lab packs	H	L		1,390			35,41
	903.00	Flammable solids, lab packs	H	S		332			54
		Subtotal (Category A):			0	1,793	0		
B	904.00	Corrosive liquids, lab packs	H	L		1,400			36,124
	905.00	Corrosive solids, lab packs	H	S		259			37
	15.00	MUA/MUB etchant	H	L	100	0	200		15
	17.00	Timposit	H	L	50	0	100		17
	18.00	Sodium hydroxide solution	H	L	100	71	150		18
	27.00	Ammonium persulfate	H	L	10	73	0		27
	28.00	Hydrochloric acid	H	L	10	226	0		28
	29.00	Catalyst 6F	H	L	100	136	250		29
	30.00	Accelerator	H	L	150	220	150		30
	31.00	Lead bath	H	L	100	0	400		31
	32.00	LAC 41	H	L	20	137	100		32,57
	33.00	Acid copper bath	H	L	100	0	250		33
	55.00	HCl with stannous chloride	H	L	10	0	0		55
	56.00	Sodium hydroxide	H	L	10	0	0		56
	1135.00	Batteries	H	S	5,000	(deleted)	0		
		Subtotal (Category B):			5,760	2,522	1,500		
C	20.00	Sodium metal	H	S	1	0	2		20
	66.00	Reactive and/or shock-sensitive products	H	L,S	5	1,101	0		48,49,66 75-77,123
		Subtotal (Category C):			6	1,101	2		
D	906.00	Lead pipes	H	S		2,039			121
	34.00	Nickel sulfamate	H	L	10	0	100		34
	74.00	Photographic solution for silver recovery	H	L	7,500	10,364	10,000		74
	1136.00	Brass from ammunition (from off-site)	H	S	3,500	0	0		
	1137.00	Film	H	S	30		0		
		Subtotal (Category D):			11,040	12,403	10,100		
E	907.00	Solvents	H	L		1,797			60,61
	84.00	Solvent-contaminated rags	H	S	5	0	10		84
	86.00	Mixtures generated in TSCA minburn	H	L	0	0	54,500		86,87-90,92
		Subtotal (Category E):			5	1,797	54,510		

Table A.2. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
G	75.00	Discarded commercial products	H	L, S	50	0	100		75,82,83,91, 94,98-117
	1138.00	Commercial chemicals, cleaners, inks etc.	H	L, S	400	(deleted)	0		
		Subtotal (Category G):			450	0	100		
J	1131.00	PCB solid	H	S	7,000	638	5,500	6,017	b
	1133.00	PCB liquid	H	L	200	22,306	0	1,311	b
		Subtotal (Category J):			7,200	22,944	5,500	7,328	
K	908.00	DOT poisons, liquid lab packs	H	L		33			38
	909.00	DOT poisons, solid lab packs	H	S		117			39
L	1002.00	Infectious wastes	H	S	300	(deleted)	0		
Z	910.00	Other solid hazardous wastes	H	S		312			122
		Subtotal (Categories K, L, M, U, and Z):			300	462	0		
		Total (Hazardous waste, all categories):			24,771	43,022	71,812	7,328	
A	44.00	Paint waste	M	L, U	5,200	4,594	10,000	14,594	44
	47.00	Gas cylinders	B	G	200	0	300	300	47
	72.00	RMP organics	M	L	2,150	5,126	4,650	9,776	72
		Subtotal (Category A):			7,550	9,720	14,950	24,670	
B	6.00	K-1420 nitric acid	M	L	1,400	0	0	0	6
	8.00	Electroless nickel solution	M	L	13,000	0	0	0	8
	70.00	RMP acids	M	L	12,500	22,913	18,500	41,413	70
	71.00	RMP bases	M	L	4,000	3,572	4,000	7,572	71
	1139.00	Raffinate solutions	M	L	7,500	0	106,500	106,500	
	1140.00	Trapping media (alumina, NaF etc.)	M	S	250		27,300	27,300	
		Subtotal (Category B):			38,650	26,485	156,300	182,785	
D	73.00	RMP sludges	M	U	700	540	1,000	1,540	73
	1141.00	Lead ingots from Y-12	M	S	0	0	39,600	32,160	
	1142.00	Lead slag from Y-12	M	S	0	0	4,000	4,000	
	1143.00	Lead carbonate from Y-12	M	S	0	0	10,200	10,200	
	1147.00	Chromate-contaminated wood, concrete	M	S	Unknown	0	38,412	38,412	
	1148.00	Wood and concrete	M	S	Unknown	0	34,145	34,145	
		Subtotal (Category D):			700	540	127,357	120,457	

Table A.2. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
E	42.00	Spent solvents	M	L	14,000	9,559	200,000	203,617	42,46
	52.00	K-1232 spent carbon filter agent	M	S	0	0	25,500	25,500	52
	85.00	TSCA incinerator ash from minburn	M	S	10,125	97,041	10,125	107,166	85
	1145.00	Perchloroethylene	M	L	Unknown	Unknown	1,035		
	1149.00	Spent solvents	M	L	Unknown	Unknown	131,000		
	1152.00	Remedial action streams	M	S	Unknown	Unknown	0		
Subtotal (Category E):					24,125	106,600	367,660	336,283	
F	911.00	BMP sludges	M	U	0	400	5,200,000	10,500,000	73
	13.00	Scrubber sludge from 1407-B,C (not fixed)	M	U	0	Unknown	13,000,000	15,900,000	13
	13.10	Scrubber sludge from 1407-B,C (fixed)	M	U	0	Unknown	206,000	208,000	64
	64.00	K-1232 centrifuged sludge	M	U	0	2,000	Unknown	0	
	1000.00	K-1407H (CNF) treatment sludge, predicted	M	U	420,000	0	107,771	107,771	
	1144.00	Sludges from Y-12 wastewater treatment	M	U	Unknown	0	Unknown		
	Subtotal (Category F):				420,000	2,400	18,513,771	26,716,171	
G	1146.00	Acetonitrile from Y-12	M	L	Unknown	Unknown	18,652	18,652	
	Subtotal (Category G):				0	0	18,652	18,652	
J	1001.00	Laundry sludge	M	U	Unknown	Unknown	Unknown	Unknown	b
	1132.00	PCB solid	M	S	12,500	10,931	47,000	83,293	b
	1134.00	PCB liquid	M	L	200	811	70,250	186,493	
	1150.00	PCB liquid	M	L	Unknown	(deleted)	43,500	(deleted)	
	1151.00	PCB solid	M	S	Unknown	0	230,000	1,105,732	
	Subtotal (Category J):				12,700	11,742	390,750	1,375,518	
	Total (Mixed waste, all categories):				503,725	157,487	19,589,440	28,774,536	

^aInventories are recorded for mixed wastes only because hazardous wastes are frequently shipped off-site.

^bData taken from ORGDP's TSCA Report.

^cEquipment in the 1988 report.

Table A.3. Waste stream breakdown for PORTS

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
A	901.00	Waste flammable solid	H	S		135			160
	902.00	Waste kerosene	H	L		351			143,151
	1.00	Paint sludges	H	U	210	343	4,930		3,14,175
	2.00	Waste soil/gasoline, diesel, & naphtha	H	S,L	300	5,348	3,600		154,156,168
	3.00	Waste lab chemicals	H	S,L	0	0	1,030		
A	4.00	Waste solvents (paint waste)	H	L	2,000	595	2,940		2,174
	5.00	Waste flammable liquid	H	L	930	1,659	932		138,145,159, 163,167
Subtotal (Category A):					3,440	8,431	13,432		
B	903.00	Acetic Acid	H	L		249			9
	11.00	Nickel plating solution (Pb, acid)	H	L	0	0	255		
	13.00	Waste liquid cleaning compound	H	L	0	0	198		
	14.00	Waste liquid cleaning compound	H	L	0	0	103		
Subtotal (Category B):					0	249	556		
D	904.00	Solidified Hg waste	H	S		1,404			142,152
	905.00	CCS spill	H	S		14,370			17,148
	906.00	Filters	H	S		98			181
	907.00	Water and Hg waste	H	L		89			153
Subtotal (Category D):					0	15,961	0		
E	908.00	Print shop waste solids	H	S		195			15,157,176
	33.00	Waste oil/solvents	H	L	500	0	1,379		
	35.00	Waste TCE	H	L	0	0	209		
	36.00	Waste TCE solution	H	L	20	0	1,252		
	37.00	Waste TCE	H	L	227	0	0		
	38.00	Waste TCE	H	L	200	0	0		
	39.00	Waste oil/solvents	H	L	100	3,804	2,037		16,158,172, 173,176,184
	40.00	Waste TCE	H	L	1,000	0	1,520		
	41.00	Hazardous waste liquid	H	L	0	18,727	2,448		11
	42.00	Hazardous waste liquid	H	L	0	0	2,084		
	43.00	TCE soaked rags	H	S	558	0	93		
	44.00	Solvent from printing press cleaning	H	L	191	0	32		
	45.00	Groundwater cleanup	H	L	Unknown	Unknown	0		
	51.00	Degreasing agents (DAP)	H	L	413	0	1,511		
Subtotal (Category E):					3,209	22,726	12,565		

Table A.3. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
G	61.00	Cresol ink	H	L	0	0	1		
	62.00	Freon	H	L	0	0	0		
	63.00	Lead dust in air filters	H	S	200	0	200		
	64.00	Antifreeze (generators)	H	L	200	0	0		
	65.00	Excess laboratory chemicals	H	L,S	35	0	2,500		
	66.00	Laboratory solvents (acetone)	H	L	1,036	778	9,229		141,144,150
	67.00	Oil and Karl Fischer reagent	H	L	65	0	1,170		
	68.00	Compressed gas cylinder (N ₂ with HCN)	H	G	0	0	9		
		Subtotal (Category G):			1,536	778	13,109		
J	81.00	Solid PCB wastes	H	S	400	6,745	0		b
		Subtotal (Category J):			400	6,745	0		
L	120.00	Medical/infectious waste	H	S	150	(deleted)	0		
M	121.00	Waste oil	H	L	Unknown		Unknown		
	123.00	Waste oil from mobile equipment	H	L	1,000		2,000		
	124.00	Kerosene	H	L	560		600		
	125.00	Waste kerosene	H	L	0		1,082		
	126.00	Waste alcohol	H	L	0		3,396		
U	131.00	Chromium sludge surface impoundment	H	U	Unknown	0	Unknown	10,363,636	c
	132.00	Southeast oil biodegradation plot	H	S	Unknown		Unknown		
	133.00	Southwest oil biodegradation plot	H	S	Unknown		Unknown		
	139.00	Underground storage tanks	H	S	Unknown		Unknown		
Z	141.00	Inorganic fluorides	H	L	400	0	2,267		
	143.00	Empty pesticide & herbicide containers	H	S	20	0	0		
		Subtotal (Category K, L, M, U, and Z):			1,980	0	9,345	10,363,636	
		Total (Hazardous waste, all categories):			10,565	54,890	49,007	10,363,636	
A	909.00	Floor cleaning liquid	M	L		3,062		3,062	180,185
	910.00	Waste flammable liquid	M	L		236		236	187
		Subtotal (Category A):			0	3,298	0	3,298	
B	12.00	Waste liquid cleaning compound	M	L	4,200	752	4,200	4,952	186
		Subtotal (Category B):			4,200	752	4,200	4,952	

Table A.3. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
D	911.00	Soil raffinate spill	M	S		13,309		13,309	169,170,171
	912.00	Metal turnings	M	S		6,164		6,164	6-8,147,149, 162,166,177
	22.00	Chromic acid cleaning solution	M	L	0	0	81,818	81,818	
	23.00	Heavy-metals sludge	M	U	41,870	38,951	92,777	131,728	140,155,165, 183
	24.00	Laboratory acid pit	M	U	744	378	7,436	7,814	c
		Subtotal (Category D):			42,614	58,802	182,031	240,833	
E	913.00	Soil with TCE	M	S		24,875		24,875	13
	914.00	Mixed waste sludge surface impoundment	M	U		0		2,636,364	c
	31.00	Trichloroethylene (TCE)	M	L	0	0	2,680	2,680	
	32.00	Waste oil/solvents	M	L	3,527	521	4,457	4,978	1
	34.00	Trichloroethane	M	L	916	0	3,600	3,600	
		Subtotal (Category E):			4,443	25,396	10,737	2,672,497	
G	915.00	Karl Fischer reagent	M	L		47		47	4
		Subtotal (Category G):			0	47	0	47	
J	916.00	Liquid PCB wastes	M	L	20,137	24,888	36,457	61,345	b
	917.00	Floor sweepings with PCBs	M	S	25,788	64,613	51,500	116,113	b
	918.00	Solid PCB wastes	M	S	4,758	6,574	8,075	14,649	b
	919.00	PCB contaminated soil (in storage at K-25)	M	S		1,484,000		0	b
		Subtotal (Category J):			50,683	1,580,075	96,032	192,107	
M	21.00	Waste oil	M	L	Unknown	0	326	326	
	122.00	Isopropanol	M	L	1,618	0	6,475	6,475	
U	134.00	Holding pond	U	L	Unknown	Unknown	Unknown	Unknown	
	135.00	Contaminated materials disposal facility	U	S	Unknown	Unknown	Unknown	Unknown	
	136.00	Cuttings from monitoring well installation	B	S	Unknown	Unknown	Unknown	Unknown	
	137.00	Water from monitoring well installation	B	L	Unknown	Unknown	Unknown	Unknown	
	138.00	Sludge dredging	M	U	Unknown	Unknown	Unknown	Unknown	
Z	142.00	Thromium sludge detoxified	M	U	Unknown	0	700,000	700,000	
		Subtotal (Category K, L, M, U, and Z):			1,618	0	706,801	706,801	
		Total (Mixed waste, all categories):			103,558	1,668,370	999,801	3,820,535	

^aInventories are recorded for mixed wastes only because hazardous wastes are frequently shipped off-site.^bData taken from Portsmouth's ISCA Report.^cData taken from Portsmouth's RCRA Annual Report.

Table A.4. Waste stream breakdown for ORNL

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
A	204.00	Leaking gas cylinders	H	G	200	0	0	0	54
	210.10	Other liquid flammables	H	L	2,421	11,974	0	0	98
	210.20	Other solid flammables	H	S	4,105	809	0	0	101
	210.30	Other gaseous flammables	H	G	54	4	0	0	97
	212.10	Liquid oxidizing materials	H	L	256	114	0	0	277
	212.20	Solid oxidizing materials	H	S	497	1,011	0	0	121
	217.10	Explosive/shock-sensitive liquids	H	L	65	0	0	0	
	217.20	Explosive/shock-sensitive solids	H	S	37	0	0	0	
	218.00	Ethers, esters, & other peroxide formers	H	L	200	0	0	0	
		Subtotal (Category A):			7,835	13,312	0	0	
B	208.10	Corrosive liquids	H	L	5,462	10,917	0	0	20,78,225
	208.20	Corrosive solids	H	S	661	2,149	0	0	81
	208.30	Corrosive gases	H	G	34	10	0	0	162
	219.00	Nonnitrate bulk acids	H	L	41	0	0	0	
		Subtotal (Category B):			6,198	13,076	0	0	
C	901.00	Explosive/shock-sensitive liquids	H	L,S		204		109	
	203.00	Reactivities, solid	H	S	30	1,475	0	0	282,294
		Subtotal (Category C):			30	1,679	0	0	
D	902.00	Hazardous materials, solid	H	S		3,661			125,126,244, 245,257,259,
	903.00	Hazardous materials, liquid	H	L		323			292, 164,186,193, 236,248
	205.20	Mercury-contaminated batteries	H	S	180		0		
	205.30	Mercury-contaminated materials	H	S	60		0		
	211.00	Lead slag	H	S	9		0		
	222.00	Photographic wastes	H	L	39,024	36,194	0		189
	224.00	Contaminated soil	H	S	133,974		0		
		Subtotal (Category D):			173,247	40,198	0	0	
E	904.00	Solvents, solid	H	S		14			305
	202.90	Solvents	H	L	2,950	4,343	0	0	192,226-235, 252-254,278, 283-288,299, 302,308
		Subtotal (Category E):			2,950	4,357	0	0	

Table A.4. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
G	905.00	Miscellaneous excess chemicals, solids	H	S		12			117,124,127, 131,134
	205.10	Pure mercury	H	L	135	218	98		115
	216.00	Miscellaneous excess chemicals	H	L	1,350	580	0		2,etc.
	Subtotal (Category G):				1,485	810	98		
J	207.10	Liquid PCB wastes	H	L	11,720	6,409	0		
	207.20	Solid PCB wastes	H	S	6,991	9,607	0		
Subtotal (Category J):					18,711	16,016	0		
K	209.10	Liquid poisons	H	L	2,374		0		
	209.20	Solid poisons	H	S	3,351		0		
	209.30	Gaseous poisons	H	G	55		0		
L	223.00	Animal wastes	H	S	12,362		0		
	201.00	Oils (nonPCB)	H	L	22,000	34,564	0		
M	213.10	Combustible liquids	H	L	1,397		0		
	213.20	Combustible solids	H	S	1,177	2,142	0		
Z	906.00	Hazardous wastes	H	L,S		3,032	0		
	214.10	Liquid hazardous wastes	H	L	587		0		
	214.20	Solid hazardous wastes	H	S	2,763		0		
	215.10	DOT listed liquid hazardous substances	H	L	1,461		0		
	215.20	DOT listed solid hazardous substances	H	S	317		0		
Subtotal (Categories K, L, M, U, and Z):					47,844	39,738	0		
Total (Hazardous waste, all categories):					258,301	129,786	98		
A	310.10	Other liquid flammables	M	L	2,028	652	8,486	9,138	148,195
	310.20	Other solid flammables	M	S	0	0	1,592	1,592	196,211
	312.10	Liquid oxidizing materials	M	L	0	0	4	4	198
	312.20	Solid oxidizing materials	M	S	2	38	3	41	199
Subtotal (Category A):					2,030	690	10,085	10,775	
B	308.10	Corrosive liquids	M	L	667	456	3,316	3,772	149,266,281
	308.20	Corrosive solids	M	S	2	4	11	15	212
Subtotal (Category B):					669	460	3,327	3,787	
C	303.00	Water reactives	M	L,S	0	0	0	0	150,213
	Subtotal (Category C):				0	0	0	0	

Table A.4. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
D	907.00	Mixed waste solids and EP toxics	M	S		273		273	216,263,305
	908.00	Mixed waste liquids and EP toxics	M	L		0		0	274
	11.00	Mercury-contaminated soils	M	S	Unknown	(deleted)	Unknown	(deleted)	
	14.00	Solidified sludges	M	S	Unknown	(deleted)	Unknown	(deleted)	
		Subtotal (Category D):			0	273	0	273	
E	302.00	Solvents	M	L	257	2,554	364	7,987	267, etc.
	302.10	Scintillation fluids	M	L	17,254	9,300	4,969	0	b
		Subtotal (Category E):			17,511	11,954	5,333	7,987	
G	23.00	Close-support laboratory liquids	M	L	Unknown	(deleted)	Unknown	(deleted)	
	305.00	Mercury	M	L	606	3	649	552	146
		Subtotal (Category G):			606	3	649	552	
J	307.10	Liquid PCB wastes	M	L	1,251	0	2,740	3,033	c
	307.20	Solid PCB wastes	M	S	0	0	11	279	c
		Subtotal (Category J):			1,251	0	2,751	3,312	
K	309.10	Liquid poisons	M	L	462		1,267	1,267	
	309.20	Solid poisons	M	S	6		146	146	
L	318.00	Biological wastes	M	S	2,715	(deleted)	7,100	(deleted)	
M	301.00	Oils (nonPCB)	M	L	2,196	5,805	48,000	53,805	
	313.00	Combustibles	M	S	682	985	1,002	1,987	
U	12.00	Drill cuttings	M	S	Unknown	(deleted)	Unknown	(deleted)	
	13.00	Dewatered drilling muds/slurries	M	S	Unknown	(deleted)	Unknown	(deleted)	
	15.00	Remote-handled waste	M	S	Unknown	(deleted)	Unknown	(deleted)	
	21.00	Well drilling & development water	M	L	Unknown	(deleted)	Unknown	(deleted)	
	22.00	Well purge water from sampling actions	M	L	Unknown	(deleted)	Unknown	(deleted)	
	24.00	Decontamination liquids	M	L	Unknown	(deleted)	Unknown	(deleted)	
	25.00	Sludge dewatering liquids	M	L	Unknown	(deleted)	Unknown	(deleted)	
	26.00	Brines	M	L	Unknown	(deleted)	Unknown	(deleted)	
	27.00	Tritiated liquids	M	L	Unknown	(deleted)	Unknown	(deleted)	
	304.00	Leaking gas cylinders	M	G	3		1	1	
	316.00	Soil	M	S	Unknown	(deleted)	Unknown	(deleted)	
	317.00	Construction debris	M	S	71,330	Unknown	994,600	994,600	
	319.00	ILW concentrate sludge	M	S	Unknown	Unknown	Unknown	Unknown	

Table A.4. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream No.
Z	314.00	Hazardous wastes (DOT)	M	L	11	2,330	29	29	
	315.10	Liquid hazardous substances	M	L	3,552	39	1,987	4,317	
	315.20	Solid hazardous substances	M	S	221		899	938	
		Subtotal (Categories K, L, M, U, and Z):			81,178	9,159	1,055,031	1,057,090	
		Total (Mixed waste, all categories):			103,245	22,539	1,077,176	1,083,876	

^aInventories are recorded for mixed wastes only because hazardous wastes are frequently shipped off-site.

^bData from ref. 13.

^cPCB waste data from Annual TSCA Report.

Table A.5. Waste stream breakdown for Y-12

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream no.
A	901.00	Gasoline mixture, diesel fuel	H	L		2210			231,234
	3.00	Isopropanol	H	L	30	27	0		3
	21.00	Varsol	H	L	500	350	665		21,130
	26.00	Magnesium chips with water	H	U	600	(deleted)	15,000		26
	33.00	Acetone, toluene, denatured alcohol	H	L	0	17	91		33
	56.00	Acetonitrile	H	L	15,000	0	15,445		56
	57.00	Mineral oil, spirits solution	H	L	600	570	712		57
	97.00	Organic solvents	H	L	5,840	5,690	22,202		97,98,105
	107.00	Kerosene	H	L	96	96	369		107
	119.00	Ethanol	H	L	73	73	0		119
	131.00	Spent paint thinners/paint wastes	H	L	3,000	6,553	860		131,132,186, 197,229,230
	154.00	Methyl ethyl ketone, alcohol	H	L	50	0	0		154
	200.00	Sealing compound	H	S	0	0	100		200
	201.00	Aluminum paste	H	S	0	0	100		201
	203.00	RAM WOLD release 225	H	L	0	0	75		203
	204.00	LUBRIBOND A	H	L	66	0	100		204
	206.00	Lube-lock 5306	H	L	0	9	100		206
	209.00	Special shop material	H	S	300	6,810	208		208
	211.00	Ethyl acetone, xylene, Kel-F mixture	H	L	272	404	472		211
	214.00	Toner	H	L	0	0	50		214
	1005.00	Waste oxidizers (X-10 & Y-12)	H	L	515	177	0		4,11,27
	1007.00	Flammable solids (X-10 & Y-12)	H	S	153	35	0		16
	1008.00	Sodium fluoride (X-10 & Y-12)	H	L	198		0		
	1009.00	Flammable liquids (X-10 & Y-12)	H	L	28,300	1,169	1,000		2,14,15,21, 31
	1113.00	Gas cylinders	H	G	Unknown		0		
Subtotal (Category A):					55,693	24,190	57,341		
B	902.00	Discarded laundry materials	H	L, S		806			222
	903.00	FHB-1 etchant	H	L		8			224,225
	103.00	Organic acids	H	L	75	75	150		103
	111.00	Electroplating sludge/Pb plating solution	H	U	0	(deleted)	818		111
	112.00	Sodium hydroxide	H	L	15	327	570		112
	115.00	Phosphoric, nitric, and sulfuric acids	H	L	382	143	461		115,116,122
	175.00	KJELDAHL waste	H	L	1,400	2,010	2,952		175
	199.00	EPOCAST 202B	H	L	92	8	0		199
	1001.00	Waste corrosive liquid (X-10 & Y-12)	H	L	2,110	743	0		1,8,17,29
	1002.00	Waste corrosive solid (X-10 & Y-12)	H	S	562	175	0		18,22,36
	1006.00	Nitric acid (over 40%) (X-10 & Y-12)	H	L	159	0	0		
Subtotal (Category B):					4,795	4,289	4,951		

Table A.5. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream no.
C	904.00	Cyanide solution	H	L		6			169
	43.00	Nak sludge	H	L	200	26	0		43
	59.00	Nak containers	H	S	30	30	0		59
	82.00	Silicone oil/2,4-dichlorobenzene peroxide	H	U	5	9	12		82
	1118.00	Chemicals	H	L	3		0		
	1119.00	Ammunition and explosives	H	S	Unknown		0		
	Subtotal (Category C):				238	65	12		
	45.00	Spent solutions with cyanide ^a	H	L	300	0	300		45
	77.00	Chromate solutions	H	L	200		395		77
	104.00	Chromium trioxide	H	L	6	6	0		104
D	145.00	Wash waters	H	L	2,000	0	14,800		145
	156.00	Photographic solutions	H	L	5,000	50,000	0		156
	163.00	Sodium cyanide solutions	H	L	6	6	0		163
	189.00	Photographic wastes	H	L	11,850	18,875	0		189-195
	198.00	Cleaning solutions	H	L	190	24,869	0		198
	213.00	Photographic developer	H	L	900		0		213
	1013.00	Hazardous solids (X-10 & Y-12)	H	S	353	111	200		19,24,35
	1016.00	Hazardous waste liquids (X-10 & Y-12)	H	L	364	3,082	0		3,28,34
	Subtotal (Category D):				21,169	96,949	15,795		
E	906.00	Spent solvents (X-10 & Y-12)	H	L		7,759			13,23,33
	907.00	Mixed organics, solvents	H	L	600	5467	1687		33,97,98,99
	908.00	Centrifuged sludge and mixed oils	H	U	9,270	18,175			184
	909.00	Spent freon	H	L	2,075	2,233			207,233
	20.00	Freon 113/degreaser	H	L	800	890	4,648		20
	29.00	Trichloroethane	H	L	13,200	7,672	0		29,141
	101.00	Mixed organics (Freon)	H	L	12,000	(deleted)	38,977		101
	106.00	Isopropanol/freon	H	L	100	100	200		106
	133.00	Mineral oil/trichloroethane	H	L	2,500	8,314	5,806		133
	135.00	Perchloroethylene	H	L	0	(deleted)	3,000		135
	147.00	Rinse waters/trichloroethane	H	L	40	(deleted)	0		147
	1218.00	Groundwater	H	L	Unknown	Unknown	0		
	1301.00	Oil contaminated with chlorinated solvents	H	L	150,000	Unknown	8,000		
	1303.00	Methylene chloride	H	L	5,000	Unknown	2,000		
	Subtotal (Category E):				195,585	50,610	64,318		

Table A.5. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream no.
G	910.00	Commercial chemicals (X-10 & Y-12)	H	L,S		601			5,9,25,26, 30,32
	1022.00	DOT ORM waste (X-10 & Y-12)	H		1,009		200		
	1208.00	VOC-contaminated wastes	H	U	Unknown	Unknown	0		
	1209.00	Beryllium-contaminated wastes	H	S	Unknown	Unknown	Unknown		
	1302.00	Commercial chemicals (lab packs)	H	L,S	35,000	202	0		226,227,228, 232
Subtotal (Category G):					36,009	803	230		
J	911.00	PCB-contaminated solids	H	S		4,090		122,902	b
	912.00	PCB liquids	H	L		142,965			b
	1115.00	Capacitors and transformers	H	S	71,450	410,000	10,909		b
	1207.00	Z-oil-contaminated wastes	H	L,S	Unknown	(deleted)	0		
	1215.00	PCB solids	H	S	0		5,812,560		
	1216.00	PCB-cont. water in oil retention pond 2	H	L	0		75,700		
	1217.00	PCB-cont. water in oil retention pond 1	H	L	0		1,325,000		
Subtotal (Category J):					71,450	557,055	7,223,260	122,902	
K	1014.00	Poisonous solids (X-10 & Y-12)	H	S	544	239	200		10,12,20
	1015.00	Poisonous liquids (X-10 & Y-12)	H	L	198	173	200		6,7
L	1304.00	Medical/infectious wastes	H	S	450	(deleted)	0		
Subtotal (Category K, L, M, U, and Z):					1,192	412	400		
Total (Hazardous waste, all categories):					385,131	734,373	7,366,277	122,902	
A	12.00	Tributyl phosphate/terosene	M	L	159	159	80	1,908	12
	18.00	Methanol/perchloric acid	M	L	18	18	36	54	18
	22.00	Varsol	M	L	225	889	384	1,764	22
	50.00	Organics from dest. distillation of wood	M	L	800	720	200	2,480	50
	174.00	Organics with depleted uranium	M	L	588	650	1,783	2,433	174
	1012.00	Gilstrip (methanol and methylene chlor.)	M	L	0	Unknown	9,000	8,000	0
	1111.00	Heavy metal machine turnings	M	S	230	Unknown	0	(deleted)	0
	1204.00	Corrective Action nonaqueous waste	B	L	Unknown	(deleted)	0		
Subtotal (Category A):					2,020	2,427	11,983	16,739	
B	70.00	Nitric acid bath	M	L	379	2,182	300	0	70
	128.00	Miscellaneous lab chemicals	M	L	322	53	845	898	128
	1202.00	Corrective-action wastewaters	B	L	Unknown	Unknown	0		

Table A.5. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream no.
	1203.00	Corrective Action sludges	B	U	Unknown	Unknown	0		
	1205.00	East Fork Poplar Creek soils/sediment	B	S	Unknown	Unknown	0		
		Subtotal (Category B):			701	2,235	1,145	898	
D	24.00	Uranium-contaminated steel sludge	M	U	36,000	(deleted)	121,500	121,500	24
	24.10	Uranium-contaminated steel sludge	M	U	0	(deleted)	66,000	66,000	
	209.00	Lead chips, carbonate, and oxide	M	S	230	23	457	480	209
	210.00	Lead floor sweepings	M	S	23	5	46	51	210
	1017.00	Metal (lead pigs)	M	S	0	0	0	0	
	1018.00	Lead carbonate powder	M	S	0	0	0	0	
	1019.00	Lead oxide slag	M	S	0	0	0	0	
	1103.00	CPCF filter sand	M	S	2,580	2,580	6,000	8,580	
	1107.00	Sludge, to be generated in future GWTF	B	U	Unknown	Unknown	0	0	
	1108.00	Roofing material contaminated with Hg	M	S	9,800	0	3,209,700	3,209,700	
	1112.00	Future ISCA ash	M	S	Unknown	(deleted)	0	(deleted)	
	1117.00	Hg-contaminated metal	M	S	Unknown	0	6,900,000	6,900,000	
	1122.00	WCF sludge	M	U	4,560	4,560	1,000	0	
	1206.00	Mercury-contaminated waste	B	L,S	Unknown	Unknown	Unknown	Unknown	
	1212.00	Cadmium-contaminated soils	M	S	0	0	458,525	458,525	
	1213.00	Contaminated soils	M	S	0	Unknown	Unknown	Unknown	
		Subtotal (Category D):			53,193	7,168	10,763,228	10,764,836	
E	5.00	Perchloroethylene	M	L	1,900	1,520	1,000	5,320	5
	28.00	Trichloroethane	M	L	3,300	1,968	6,600	8,568	28
	37.00	Trichloroethane	M	L	5,000	(deleted)	22,000	22,000	37
	38.00	Trichloroethane	M	L	5,000	2,500	10,500	13,000	38
	39.00	Perchloroethylene	E	L	12,000	(deleted)	177,300	177,300	39
	84.00	Hydroform oil	M	L	4,200	3,780	11,025	14,805	84
	85.00	Trichloroethane	M	L	800	0	1,630	1,630	85
	134.00	Acetone/furfuryl alcohol/water	M	L	350	280	1,024	1,304	134
	155.00	Coolant biosludge from WCF	M	U	450	3,070	5,576	8,646	155
	170.00	Oil with solvents	M	L	7,727	19,500	9,527	29,027	170
	171.00	Oil with solvents	M	L	4,400	2,124	9,900	12,024	171
	186.00	Freon/contaminated oil	M	L	7,500	3,810	8,225	12,135	186
	1105.00	Oily sludge	M	L	2,985	0	5,970	5,970	
	1201.00	Corrective-action cont. soils/sediments	B	S	Unknown	(deleted)	0	(deleted)	
		Subtotal (Category E):			55,612	38,652	270,277	311,729	

Table A.5. (continued)

Hazardous waste category	Waste ID No.	Waste stream description	Waste type	Physical form	1987 generation rate (kg)	1988 generation rate (kg)	1987 inventory (kg)	1988 inventory (kg) ^a	RCRA annual report stream no.
F	913.00	WET spent carbon (stored at ORGDP)	M	U		39273		0	220
	176.00	CPCF treatment sludges (stored at ORGDP)	M	U	31,180	9,490	31,180	31,180	176
	1101.10	CPCF mopwaters and concentrate wastes	M	U	0	0	100,000	0	
	1101.20	CPCF concentrate wastes and PRIF sludge	M	U	4,200	4,200	2,062	6,262	
	1106.00	WIF metals sludge (biodegraded sludge)	M	U	1,797,000	797,000	3,791,000	4,589,000	47
	1102.00	CPCF spent carbon (stored at ORGDP)	M	S	17,400	21,705	36,400	36,400	219
Subtotal (Category F):					1,849,780	871,668	3,960,642	4,661,842	
J	1114.00	PCB-contaminated solids	M	S	15,312	7,275	135,000	109,669	b
	1121.00	PCB liquids	M	L	12,313	37,961	15,000	96,825	b
	1210.00	PCB-cont. soil from oil pond	M	S	0	659,500	401,300	659,500	b
	1211.00	PCB-cont. soil from landfill	M	S	0	(deleted)		(deleted)	
Subtotal (Category J):					27,625	704,736	551,300	865,994	
M	1104.00	CPCF combustibles	M	S	500	500	1,220	1,820	
U	1108.00	Classified waste	B	U	348,000	348,000	Unknown	Unknown	
	1219.00	Drilling soils	U	U	Unknown	Unknown	0	0	
Subtotal (Category K, L, M, U, and Z):					348,500	348,500	1,220	1,820	
Total (Mixed waste, all categories):					2,337,531	1,975,486	15,559,795	16,622,858	

^aInventories are recorded for mixed wastes only because hazardous wastes are frequently shipped off-site.

^bData taken from Y-12's ISCA report.

APPENDIX B

**Total Waste Generation and Inventories at Energy Systems Installations,
by Waste Category, for Calendar Years 1987 and 1988**

Fig. B.1. Category A (ignitable) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.2. Category A (ignitable) mixed waste inventories during 1987 and 1988 for all installations.

Fig. B.3. Category B (corrosive) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.4. Category B (corrosive) mixed waste inventories during 1987 and 1988 for all installations.

Fig. B.5. Category D (EP toxic) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.6. Category D (EP toxic) mixed waste inventories during 1987 and 1988 for all installations.

Fig. B.7. Category E (spent solvents) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.8. Category E (spent solvents) mixed waste inventories during 1987 and 1988 for all installations.

Fig. B.9. Category F (spent sludges) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.10. Category F (spent sludges) mixed waste inventories during 1987 and 1988 for all installations.

Fig. B.11. Category G (commercial chemical) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.12. Category G (commercial chemical) mixed waste inventories during 1987 and 1988 for all installations.

Fig. B.13. Category J (PCB-contaminated) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.14. Category J (PCB-contaminated) mixed waste inventories during 1987 and 1988 for all installations.

Fig. B.15. "Other" (reactive, combustible, etc.) total waste generation rates during 1987 and 1988 for all installations.

Fig. B.16. "Other" (reactive, combustible, etc.) mixed waste inventories during 1987 and 1988 for all installations.

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