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**OAK RIDGE
NATIONAL
LABORATORY**

**PCB Annual Report for
Oak Ridge National Laboratory - 1985**

MARTIN MARIETTA

B. D. Barkenbus

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
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PCB ANNUAL REPORT FOR
OAK RIDGE NATIONAL LABORATORY-1985

B. D. Barkenbus

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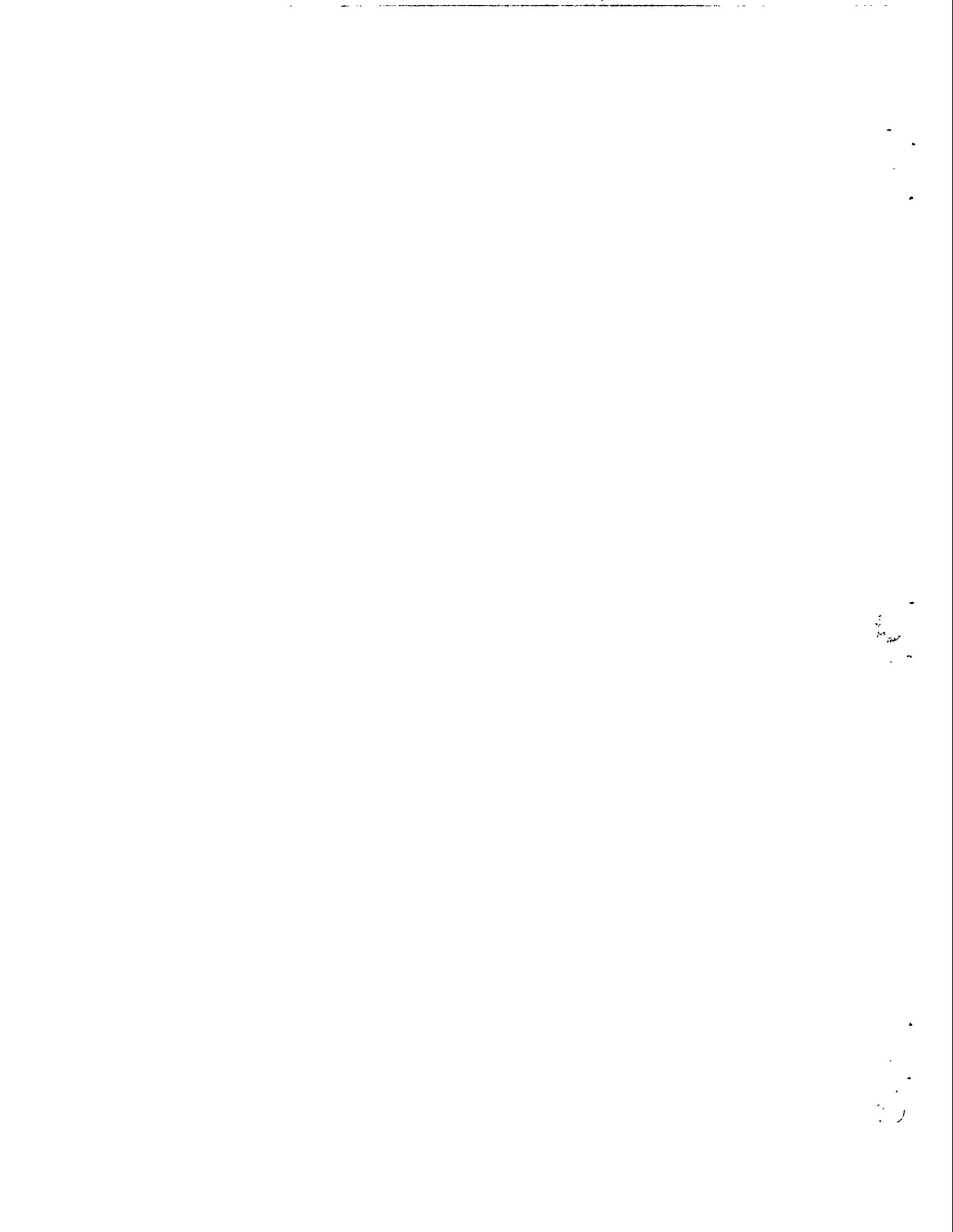
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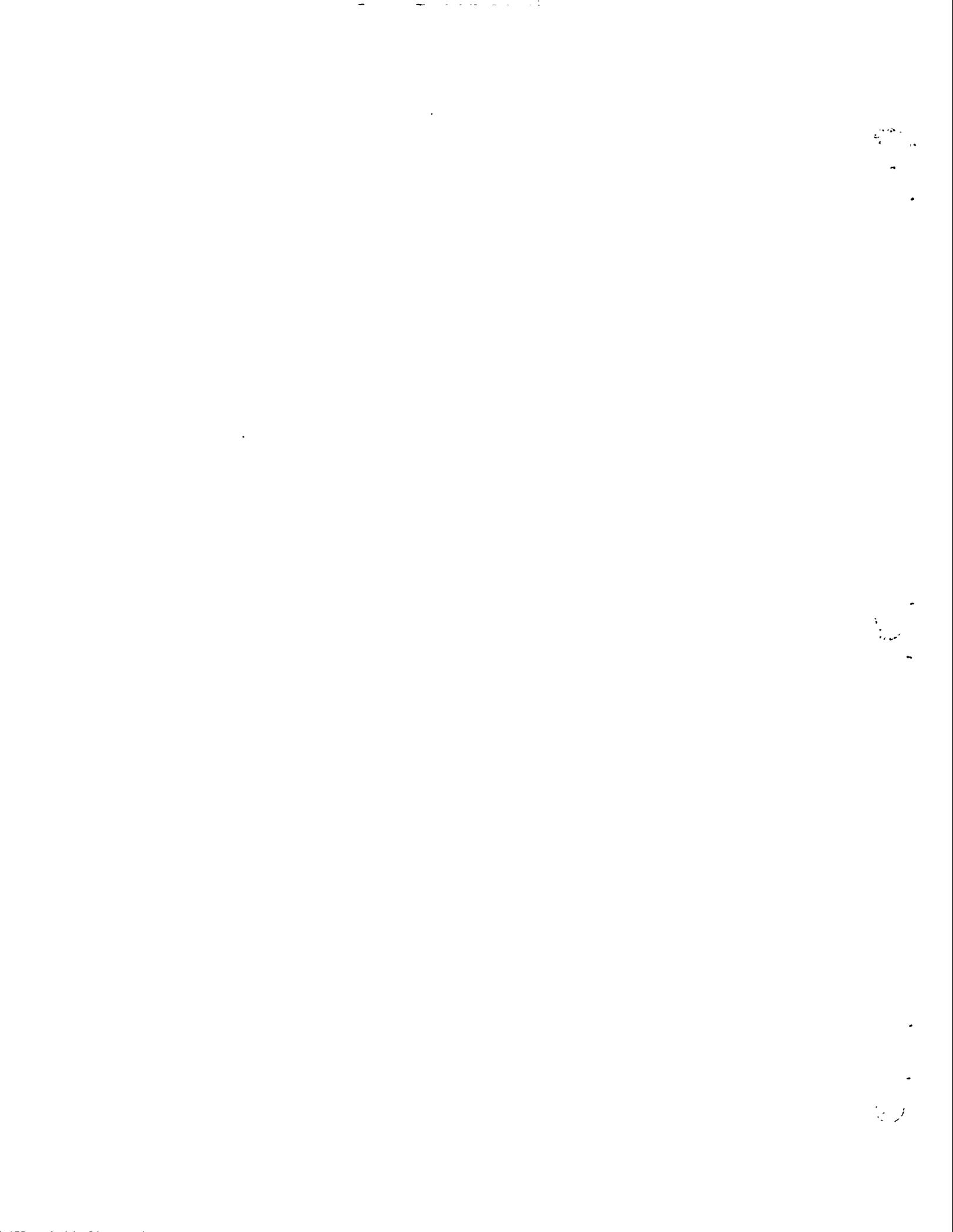
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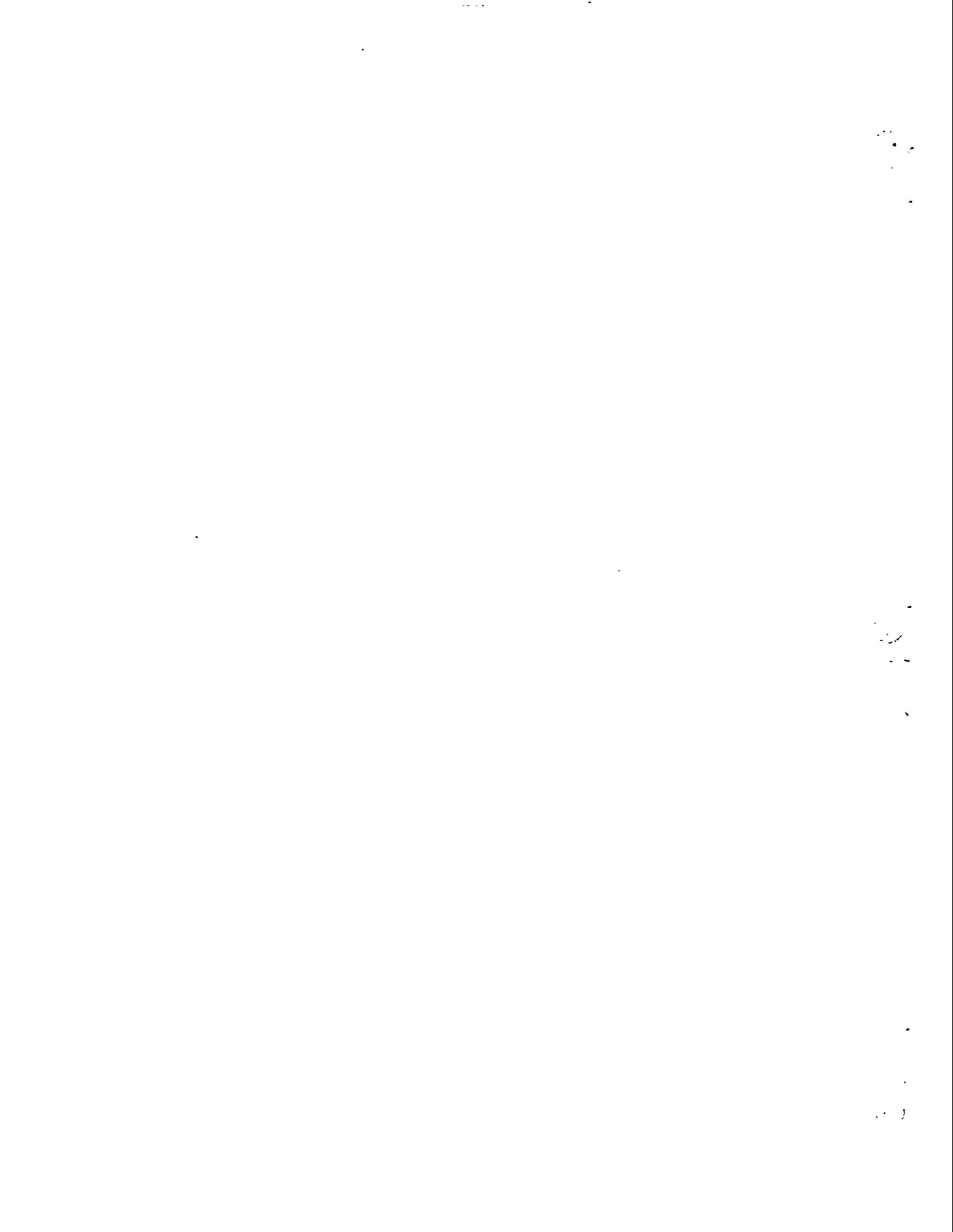
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ABSTRACT

It is the policy of the Oak Ridge National Laboratory (ORNL) to submit a Polychlorinated Biphenyl (PCB) Annual Report as required by the Toxic Substances Control Act (TSCA) and the U.S. Environmental Protection Agency regulations. Stringent government regulations control the use and disposal of PCB materials. These regulations require accurate recordkeeping by the owner/operator of a facility where PCBs are in use. This report details ORNL efforts to comply with the TSCA regulations found in Title 40, Code of Federal Regulations and contains records of: (a) PCB equipment in use and removed from service; and (b) PCB wastes generated, stored, and shipped off-site during calendar year 1985.

1.0 INTRODUCTION

Polychlorinated biphenyls (PCBs) are a family of chlorinated aromatic hydrocarbons. They are used extensively in electrical equipment, such as transformers and capacitors, because of their dielectric properties, chemical stability, and fire resistance. PCBs are also used in industry as fluids for heat transfer systems, fire retardants, and plasticizers.

It is known that PCBs can be detrimental to human and animal health due to their persistent nature in the environment. Because they are relatively insoluble in water and highly soluble in liquids, they can accumulate in body fats of humans and animals. The known toxic effects of PCBs in humans include an acne-like skin eruption, pigmentation of the skin and nails, excessive eye discharge, swelling of eye lids, and distinctive hair follicles. There is also a possible association between occupational exposure to PCBs and cancer in humans (NIOSH, Polychlorinated Biphenyls, Current Intelligence Bulletin 7, November 3, 1975, pp. 51-58).

The control of PCBs was mandated by Congress under the Toxic Substance Control Act (TSCA) of 1976, Public Law 94-469, Section 6 (e). To enforce TSCA, the Environmental Protection Agency (EPA) enacted regulations which are published in the Code of Federal Regulations (CFR) under Title 40, Part 761. Subpart B of 40 CFR 761, outlines requirements pertaining to the manufacture, processing, distribution, and use of PCBs. Marketing and labeling requirements are specified in Subpart C and storage and disposal requirements in Subpart D.

The recordkeeping responsibilities of the owner or operator of a facility using or storing PCBs are detailed in 40 CFR 761.180. In addition to various recordkeeping requirements, an annual report is to be prepared for each facility by July 1, covering the previous calendar year. The Oak Ridge National Laboratory (ORNL) submits a PCB Annual Report as required by the TSCA for each calendar year.

ORNL manages PCB- and PCB-contaminated wastes, which are stored on-site before their disposal at an EPA approved off-site disposal facility. In addition, there are PCB articles, PCB containers, PCB equipment, and PCB-contaminated electrical equipment (see 40 CFR 761.3 for definitions) at ORNL which are still in active use.

On December 16, 1985, an EPA-TSCA Compliance Representative conducted a PCB inspection of ORNL. The audit was very favorable. No record of violation was recorded.

The 1985 annual report includes several additions and changes from the 1984 report. Detailed tables on equipment and waste shipments (as well as PCB wastes remaining in storage) have been inserted in the 1985 report. The inventory list has been expanded to include large high or low voltage capacitors. PCB Information for ORNL facilities located at Y-12 are included in the Y-12 PCB Annual Report for calendar year 1985.

This document includes the following specific information for the PCB-related activities at ORNL:

1. PCB Equipment Summary Report;
2. PCB Transformers (> 500 ppm) In Service;
3. PCB Transformers Removed from Service;
4. PCB Large High or Low Voltage Capacitors In Service;
5. Miscellaneous PCB Equipment > 500 ppm;
6. Liquid PCB Waste Shipped Off-Site for Disposal - CY 85;
7. Solid PCB Waste Shipped Off-Site for Disposal - CY 85; and
8. Solid PCB Waste Inventory in Storage - End of CY 85.

The inventory summary list of PCB transformers < 500 ppm in concentration (PCB-contaminated and non-PCB transformers) is included as Appendix A.

2.0 PCB REGULATIONS

The latest and most encompassing federal law on toxicology and safety with which industry must comply is TSCA. The goal of this act is to provide EPA with the authority to regulate chemical substances and mixtures which present an unreasonable risk of injury to human health or to the environment. To achieve this goal, TSCA implementation activities emphasize not only control of specific problems under TSCA regulatory provisions, but the use of TSCA authorities to support other governmental and nongovernmental programs to control toxic substances.

Perhaps the most significant impact of TSCA on ORNL has been the regulations dealing with PCBs. Section 6 (e) of TSCA requires the EPA to control the manufacture, processing, distribution in commerce, use, and disposal of PCBs. EPA issued a final PCB rule on August 25, 1982, that amended the May 31, 1979, PCB rule. This action authorizes the use of PCBs in capacitors and the use and servicing of PCBs in electromagnets, circuit breakers, voltage regulators, cables, and switches. Transformer use (other than railroad transformers) is also covered by this rule. To implement this PCB-control program, EPA, among other provisions, has:

1. Banned the manufacture, distribution in commerce, and use of PCBs in other than a "totally enclosed manner";
2. Established categories of transformers [e.g., PCB transformers (> 500 ppm), PCB-contaminated electrical equipment (50-500 ppm), and non-PCB transformers (< 50 ppm)];
3. Set a ruling that a PCB transformer may be converted to PCB-contaminated electrical equipment or to non-PCB transformer by draining, refilling, and/or otherwise servicing the transformer;

4. Established criteria for the disposal of PCBs, PCB articles (transformers, PCB capacitors, PCB hydraulic machines, PCB-contaminated electrical equipment, and other PCB articles), PCB containers, and PCBs resulting from the clean-up and removal of spills (40 CFR 761.60);
5. Established standards for the marking (40 CFR 761.40), storage, and spill prevention of PCBs and PCB-contaminated liquids and solids (40 CFR 761.65);
6. Prohibited the use of PCB transformers and PCB-filled electromagnets (with concentrations of 500 ppm or greater) posing an exposure risk to food and feed after October 1, 1985;
7. Authorized the use of all other PCB transformers for the remainder of their useful lives and required a quarterly inspection of this equipment for leaks of dielectric fluids; and
8. Authorized the use of large capacitors that are located in restricted access electrical substations or in contained and restricted indoor installations for the remainder of their useful lives. The use of all other large PCB capacitors after October 1, 1988, however, is prohibited.

On July 17, 1985, EPA published a final rule entitled "Polychlorinated Biphenyls in Electrical Equipment." Through this regulation (50 CFR 29170), EPA took action to reduce fire-related risks posed by the use of PCB transformers (\geq 500 ppm). EPA makes a distinction between "commercial buildings" and "industrial buildings" in interpretation of the rules. In the rules (40 CFR 761.30) EPA:

1. Prohibits further installation of PCB transformers in or near commercial buildings by October 1, 1985;
2. Requires the registration of all PCB transformers with fire response personnel and building owners by December 1, 1985;

3. Requires the removal of stored combustibles located near PCB transformers (within 5 m) by December 1, 1985;
4. Requires marking of the exterior of all PCB transformer locations by December 1, 1985 (40 CFR 761.40);
5. Prohibits the use of higher secondary voltage (480 volts and above) "network" PCB transformers in or near commercial buildings by October 1, 1990;
6. Requires the installation of enhanced electrical protection on lower secondary voltage "network" PCB transformers and higher secondary voltage "radial" PCB transformers in use in or near commercial buildings by October 1, 1990; and
7. Requires the owners of PCB transformers involved in fire-related incidents to immediately notify the National Response Center (1-800-424-8802).

3.0 RECORDS AND REPORTING

Detailed tracking of PCB materials at ORNL is accomplished via the PCB Tracking System (PCBTS), the Hazardous Material Tracking System (HMTS), and the Program Maintenance Report (PMR).

A computer inventory listing of equipment in use is generated via the PCBTS. The PCBTS supplies information such as: equipment serial number, equipment location, concentration (ppm) of PCB, gallon and kilogram capacity, and date removed from service for each piece of equipment. Table 1 is the total listing of PCB equipment at ORNL. Lists of transformers grouped by concentrations of PCB and large capacitors are also available via the PCBTS.

Under the Interim Measures Program, PCB transformers of 500 ppm or greater are to be inspected quarterly. In compliance with this regulation, two types of inspections take place. The Plant and Equipment Division conducts monthly preventive maintenance inspections which are documented in the Program Maintenance Report (PMR) database. This database stores inspection reports on each transformer and includes the inspectors' initials, badge number, date, comments, and action taken. Through this system, a specific transformer can be referenced by program maintenance number and all inspection reports reviewed in chronological order.

Secondly, DEM personnel (ORNL TSCA Coordinator) conduct quarterly audit-type inspections of the PCB transformers. These inspections are utilized to check regulatory compliance requirements.

Records of PCB wastes generated are entered into the HMTS along with records of other wastes handled at ORNL. The PCBTS copies the PCB records from this file and produces various reports. Total solid and liquid wastes shipped off-site and stored during a specific time period can be generated by PCBTS.

Table 1. PCB Equipment Summary Report

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
90201110	Emerg. Generator	0902	49	50.000	189.500
72V9421	Transformer	1504	13	220.000	833.800
8110081	Transformer	2000	14	390.000	1478.100
Siemens 250K	L-Capacitor	2008	1000000	40.000	151.600
Custom Built	L-Capacitor	2008	1000000	80.000	303.200
X117378	Emerg. Generator	2011	49	285.000	1080.000
202600110	Emerg. Generator	2026	49	285.000	1080.000
PE100005	Transformer	2026	1000000	140.000	530.600
X119045	Emerg. Generator	2088	49	285.000	1080.000
2506-098	Twin Mill	2506	19	.500	2.000
2519-002	Air Compressor	2519	31	.250	1.000
2519-003	Air Compressor	2519	49	.250	1.000
X118754	Emerg. Generator	2521	49	285.000	1080.000
2525-032	16" Lathe	2525	49	10.000	37.900
2525-029	Trecker Mill	2525	15	10.000	37.900
2525-028	Grinder	2525	28	3.000	11.370
2525-063	Cut Off Saw	2525	11	5.000	18.950
2525-048	Grinder	2525	7	10.000	37.900
2525-049	Grinder	2525	18	10.000	37.900
2525-705	12" Lathe	2525	19	16.000	60.640
X92876	Emerg. Generator	2572	49	285.000	1080.000
2371106	Transformer	2632	18	1297.000	4915.630
8110079	Transformer	3000	13	1350.000	5116.500
8110080	Transformer	3000	16	1350.000	5116.500
8110078	Transformer	3000	29	1350.000	5116.500
PKR-94711	Transformer	3010	30	260.000	985.400
3012-015	Rollermill	3012	16	5.000	18.950
3012-111213	Turburg Reducer	3012	34	192.000	727.680
X105593A	Hydraulic	3012	950000	150.000	568.500
X105593	Turburg Reducer	3012	454	20.000	75.800
3012-004	Rollermill	3012	49	5.000	18.950

Table 1. (Continued)

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
3012-017	Rollermill	3012	32	400.000	1516.000
X104416	Pump	3012	549	2.000	7.580
3012-016	Rollermill	3012	15	150.000	568.500
X58191	Shear	3012	28	2.000	7.580
X95204	Pump	3012	149	2.500	9.475
2546-1	Transformer	3012	10	80.000	303.200
2546-2	Transformer	3012	39	80.000	303.200
2546-3	Transformer	3012	29	80.000	303.200
X96051	Vacuum Pump	3012	53	1.000	3.790
3019-001	Pipe Threader	3019	49	2.000	7.580
3024-234	12" Lathe	3024	49	15.000	56.850
3024-246	Saw	3024	11	20.000	75.800
3024-194	Mill	3024	49	15.000	56.850
3024-201	Shaper	3024	49	10.000	38.000
3024-238	10" Lathe	3024	49	15.000	56.850
3024-141	Washer	3024	49	20.000	75.800
3024-236	Mill	3024	29	20.000	75.800
3024-269	Grinder	3024	83	3.000	11.370
3024-1101	Thread Grinder	3024	49	150.000	568.500
3024-264	10" Lathe	3024	49	15.000	56.850
3024-260	10" Lathe	3024	49	15.000	56.850
3024-259	10" Lathe	3024	49	15.000	56.850
3024-258	Grinder	3024	1436	1.000	3.790
3024-243	10" Lathe	3024	49	.500	2.000
3024-425	10" Lathe	3024	49	15.000	56.850
3024-240	10" Lathe	3024	49	15.000	56.850
3024-233	12" Lathe	3024	49	.500	2.000
3024-237	10" Lathe	3024	49	15.000	56.850
7910-8480T	L-Capacitor (4)	3025	1000000	1.200	4.548
3025-002	Vacuum Pump	3025	49	.250	1.000
F496875-64P	Transformer	3025	< 5	80.000	303.200

Table 1. (Continued)

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
F497849-64P	Transformer	3025	< 5	80.000	303.200
F497848-64P	Transformer	3025	< 5	80.000	303.200
3025-007	Milling Machine	3025	18	.250	1.000
X51212	Air Monitor	3025	28	.250	1.000
66710	Transformer	3039	29	130.000	492.700
66711	Transformer	3039	10	130.000	492.700
303901020	Sump Pump	3039	49	7.000	27.000
X67432	Vacuum Pump	3044	8	.250	1.000
1814098	Vacuum Pump	3044	36	.500	2.000
3044-365	Elox Machine	3044	6	55.000	208.450
3044-378	Mill	3044	9	2.000	7.580
3044-370	Mill	3044	7	2.000	7.580
3044-360	Centerless Grinder	3044	40	2.000	7.580
3044-358	Surface Grinder	3044	65	15.000	56.850
3044-366	Metal Cut-off Saw	3044	8	2.000	7.580
7351430	Transformer	3047	36	350.000	1326.500
FRT-3	L-Capacitor (4)	3095	1000000	.800	3.032
A17055	L-Capacitor	3500	1000000	3.700	14.023
03646	L-Capacitor	3500	1000000	3.700	14.023
853557	L-Capacitor	3500	1000000	16.000	60.640
9-1502-00092	L-Capacitor	3500	1000000	7.500	28.425
T093119	L-Capacitor (9)	3500	1000000	4.000	15.160
3502-451	10" Lathe	3502	49	15.000	56.850
3502-562	10" Lathe	3502	49	15.500	58.745
3502-450	10" Lathe	3502	49	15.000	56.850
3525-054	12" Lathe	3525	6	.500	2.000
3525-055	Gear Box	3525	49	.250	1.000
410229	L-Capacitor	3525	1000000	5.200	19.708
001	L-Capacitor	3525	1000000	6.200	23.498
59298	Transformer	3525	2	197.000	746.630
3525-023	Waste Press	3525	301	2.000	7.580

Table 1. (Continued)

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
60569	Vacuum Pump	3525	32	.250	1.000
X85102	Air Monitor	3525	28	.250	1.000
X83058	Emerg. Generator	3598	49	400.000	1516.000
4500S-039	Oil Bath	4500S	49	5.000	8.950
B48A	L-Capacitor (6)	4500S	1000000	1.200	4.548
7449T	L-Capacitor (2)	4500S	1000000	1.200	4.548
B54	L-Capacitor (18)	4500S	1000000	1.200	4.548
29A104	L-Capacitor (12)	4500S	1000000	.360	1.364
55069	L-Capacitor (12)	4500S	1000000	.360	1.364
4-760	L-Capacitor	4500S	1000000	.900	3.411
7375505	Transformer	4500S	1000000	829.000	3141.910
7367598	Transformer	4500S	1000000	829.000	3141.910
154363	Transformer	4501	< 5	364.000	1379.560
4501-002	13" Lathe	4501	146	.500	2.000
4501-001	10" Lathe	4501	49	.500	2.000
K0A1104-2-1	L-Capacitor (3)	4501	1000000	.400	1.516
A41482	L-Capacitor (2)	4501	1000000	1.900	7.201
79F204	L-Capacitor (6)	4501	1000000	4.000	15.160
49177	Transformer	4505	4	200.000	758.000
7367553	Transformer	4508	28	500.000	1895.000
19F86	L-Capacitor (10)	4508	1000000	2.500	9.475
7367549	Transformer	4508	26	500.000	1895.000
7367553REG	Transformer	4508	5	112.000	425.000
7367549REG	Transformer	4508	8	112.000	425.000
C297207	L-Capacitor	4508	1000000	6.400	24.256
69-03378-9-0	L-Capacitor (3)	4508	1000000	10.200	38.658
7375507	Transformers	4509	1000000	829.000	3141.910
1902056	Transformers	4509	9	682.000	2584.780
1902057	Transformers	4509	7	682.000	2584.780
1902055	Transformers	4509	17	682.000	2584.780
Y53390	Power Hack	5500	49	.500	2.000

Table 1. (Continued)

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
5500-999	Pump	5500	49	3.000	11.370
X131220	Pump	5500	49	3.000	11.370
D-578512	Transformer	6000	1000000	340.000	1288.910
7375510	Transformer	6000	1000000	829.000	3141.910
6000-077	Vacuum Pump	6000	11	.250	1.000
6000-066	Vacuum Pump	6000	163	.250	1.000
6000-065	Vacuum Pump	6000	163	.250	1.000
6000-064	Vacuum Pump	6000	180	.250	1.000
E-694971	Transformer	6000	1000000	225.000	1004.350
D-554601	Transformer	6000	1000000	800.000	3032.000
12446	Transformer	6000	1000000	375.000	1421.250
7375500	Transformer	6000	1000000	829.000	3141.910
6000-057	Pipe Threader	6000	49	1.000	3.790
6000-052	Oil Reclaimer	6000	96	1500.000	5685.000
6000-063	Oil Reclaimer	6000	247	1500.000	5685.000
FRT6-2	L-Capacitor (4)	6000	1000000	.800	3.032
FRT6-1	L-Capacitor (4)	6000	1000000	.800	3.032
W-1	L-Capacitor (9)	6000	1000000	6.600	25.014
LING-1	L-Capacitor (3)	6000	1000000	1.580	5.988
6010-248	Vacuum Pump	6010	49	.500	2.000
572308L	Air Compressor	6010	49	.500	2.000
6010-037	Hydraulic System	6010	49	40.000	151.600
6010-062	Lathe	6010	49	3.000	11.370
6010-075-1	Power Supply	6010	6	350.000	1326.500
6010-076-2	Power Supply	6010	49	350.000	1326.500
6010-077-3	Power Supply	6010	7	350.000	49.270
6010-078-4	Power Supply	6010	13	350.000	1326.500
6010-079-4	Power Supply	6010	49	300.000	1137.000
6010-080-3	Power Supply	6010	49	300.000	1137.000
6010-082-1	Power Supply	6010	49	300.000	1137.000
F959883	Transformer	6010	< 2	300.000	1137.000

Table 1. (Continued)

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
F643634-67P	Transformer	6010	46	94.000	356.260
F959884	Transformer	6010	2	180.000	682.200
64-5165-01	L-Capacitor (2)	7003	1000000	3.900	14.781
3160686	Transformer	7033	46	110.000	416.900
27140-16	Transformer	7033	18	237.000	898.230
A59465	Transformer	7033	< 5	80.000	303.200
15198	Transformer	7033	13	225.000	890.650
A59466	Transformer	7033	< 5	80.000	303.200
A59469	Transformer	7033	< 5	80.000	303.200
27140-11	Transformer	7033	10	237.000	898.230
8671542	Transformer	7033	5	45.000	170.550
6589125	Transformer	7033	7	50.000	189.500
B339639	Transformer	7033	22	185.000	701.150
B339640	Transformer	7033	13	185.000	701.150
957331	Transformer	7033	10	150.000	568.500
8671187	Transformer	7033	46	50.000	189.500
B339641	Transformer	7033	8	185.000	701.150
6154018	Transformer	7033	43	40.000	151.640
3153348	Transformer	7033	5	55.000	208.450
1901716	Transformer	7033	< 5	210.000	795.900
27140-20	Transformer	7033	19	237.000	898.230
27140-10	Transformer	7033	16	237.000	898.230
MONSON-1	L-Capacitor (4)	7041	1000000	.800	3.032
M9D1623	Transformer	7500	25	145.000	549.550
7500-002-1	Feed Pump	7500	49	3.000	11.370
2P175	Feed Pump	7500	49	10.000	37.900
7500-007	Circulating Pump	7500	49	1.000	3.790
M9D1625	Transformer	7500	3	145.000	549.550
M9D1621	Transformer	7500	28	145.000	549.550
7500-014	Crane	7500	49	1.000	3.790
107182	Vacuum Pump	7505	49	.250	1.000
7506-008	Pipe Threader	7506	49	2.000	7.580

Table 1. (Continued)

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
7506-268	Pipe Threader	7506	49	2.000	7.580
7516-001	Pipe Cutter	7516	49	5.000	18.950
7600-011	Hydraulic Blower	7600	49	10.000	37.900
7603-038	Stock Lift	7603	49	15.000	56.850
X57992	Electric Motor	7605	9	.500	2.000
7603-1096	Pipe Threader	7606	49	2.000	7.580
378584	Pipe Threader	7606	49	2.000	7.580
B5H8007	Transformer	7700	5	145.000	549.550
40101	Air Compressor	7700	38	.250	1.000
T35H8007	Transformer	7700	11	145.000	549.550
A9F1211	Transformer	7700	11	145.000	549.550
A9F1213	Transformer	7700	9	145.000	549.550
756725	Fork Lift	7709	49	1.000	3.790
X56503	Lathe	7710	49	5.000	18.950
X103336	Lathe	7710	49	4.000	15.160
X15523	Lathe	7710	49	4.000	15.160
7731582	Transformer	7710	38	500.000	1895.000
R-3333	Transformer	7901	1000000	31.000	117.490
R-3334	Transformer	7901	1000000	31.000	117.490
7367568REG	Transformer	7901	41	119.000	451.118
2371103	Transformer	7901	< 2	1297.000	4915.630
7731801	Transformer	7901	53	499.000	1891.210
7731581REG	Transformer	7901	10	119.000	451.118
9L18ACE301	L-Capacitor (3)	7901	1000000	.450	1.705
7373793	Transformer	7901	68	500.000	72.027
7731581	Transformer	7901	45	499.000	1891.660
3428808	Transformer	7901	15	200.000	758.000
7367568	Transformer	7901	28	499.000	1891.660
7367568SW	Transformer	7901	42	19.000	72.030
7022144	Transformer	7920	38	275.000	1042.250
7921-001	Emerg. Generator	7921	49	10.000	37.900
7921-003	Crane	7921	49	12.000	45.480
7930-009	Hydraul. Waste Pan	7930	49	.250	1.000

4.0 PCB TRANSFORMERS

During 1985, there were twelve PCB transformers in use at ORNL. All of these transformers are indoors except one (serial number PE 100005). There are plans to replace these transformers with non-PCB transformers in 1986. Table 2 lists these transformers, their location, serial number, PCB concentration, and capacity. Their total capacity is 6,087 gal. and weight is 23221.64 kgs.

There was only one PCB transformer shipped off-site during 1985. This transformer was removed from service in 1984 and kept as a spare; however, later it was drained of its oil and moved to storage for disposal (see Table 3). It was shipped on 10/31/85 to the Rollins facility in Deer Park, Texas.

The July 17, 1985, regulations concerning PCBs in electrical equipment have been implemented vigorously. PCB transformers have been registered by "building owners" who are staff members responsible for the transformers at that location and the ORNL Fire Department. Numerous inspections are conducted to ensure that no combustibles are located near PCB transformers. Classification of ORNL buildings for their "commercial" and "industrial" status are described in an action plan which is included in Appendix B. All ORNL PCB transformers are high voltage radial transformers.

During 1985, sixty-six non-PCB transformers (< 50 ppm) were resampled to check their PCB concentration. These transformers were chemically treated between 1980 and 1984 to decrease their concentration from < 500 ppm to < 50 ppm, thereby converting them to non-PCB transformers. Only two of these transformers have exceeded 50 ppm PCB concentration (one was 53 ppm and the other 68 ppm) during the recent sampling. The list of these transformers are included in Appendix A with the recent concentration figures.

There are three non-PCB transformers (with serial numbers 1901716, 6589125, and 1901716) which are kept as spares.

Table 2. PCB Transformers > 500 PPM

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
PE100005	2026	1000000	140.000	530.600
7375505	4500S-W1	1000000	829.000	3141.910
7367598	4500S-W2	1000000	829.000	3141.910
7375507	4509	1000000	829.000	3141.910
7375500	6000	1000000	829.000	3141.910
12446	6000	1000000	375.000	1421.250
D-554601	6000	1000000	800.000	3032.000
E-694971	6000	1000000	225.000	1004.350
7375510	6000	1000000	829.000	3141.910
D-578512	6000	1000000	340.000	1288.910
R-3333	7901	1000000	31.000	117.490
R-3334	7901	1000000	31.000	117.490
TOTAL NUMBER = 12	TOTAL		6087.000	23221.640

Table 3. PCB Transformers Removed From Service

Serial Number	Location	PCB:PPH	Capacity		Date Removed From Service	Date to Storage	Date Shipped	Manifest	Disposer	Date of Disposal
			Gallons	Kilograms						
H363007P72AA	7033	0 (Drained)	115.000	435.85	10/16/84	7/26/85	10/31/85	00045236	Rollins, Deer Park, TX	12/23/85
TOTAL NUMBER = 1			115.000	435.85						

5.0 PCB CAPACITORS

The ORNL electrical system does not have any PCB large high or low voltage capacitors; however, there are various research related instruments which contain them. A PCB large high voltage capacitor under TSCA means a capacitor which contains 1.36 kg (3 lbs.) or more of dielectric fluid and operates at 2,000 volts or above. PCB low voltage capacitor means a capacitor which contains 1.36 kg (3 lbs.) or more of dielectric fluid and operates below 2,000 volts. A capacitor whose total volume is less than 1,639 cubic centimeters (100 cubic inches) may be considered to contain less than 1.36 kg (3 lbs.) of dielectric fluid. These capacitors were inventoried this year and are included in this annual report. Presently, one hundred and forty-four large capacitors are included in the database system. The weight of these PCBs totals 821.10 kg (216.65 gal). The list of the capacitors is included as Table 4. Identical capacitors at the same location are grouped and a single serial number is assigned to them.

No large PCB capacitors were removed from service in 1985. At ORNL, there are various light ballasts and small PCB capacitors that are packed in DOT drums and shipped off-site in accordance with the EPA/TSCA regulations for disposal. These PCB items are included in tables of Section 8, PCB Waste Totals, as part of the waste inventories.

Table 4. Large High and Low Voltage PCB Capacitors

Serial Number	Quantity	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
CUSTOM BUILT	1	2008	1000000	80.000	303.200
SIEMENS 250KV	1	2008	1000000	40.000	151.600
41061005V-21	4	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.600	2.274
41061005V-21A	4	2525	1000000	.600	2.274
7910-8480T	4	3025	1000000	1.200	4.548
FRT-3	4	3095	1000000	.800	3.032
A17055	1	3500	1000000	3.700	14.023
03646	1	3500	1000000	3.700	14.023
853557	1	3500	1000000	16.000	60.640
9-1502-00092-5	1	3500	1000000	7.500	28.425
T093119	9	3500	1000000	4.000	15.160
001	1	3525	1000000	6.200	23.498
410229	1	3525	1000000	5.200	19.708
B48A	6	4500S	1000000	1.200	4.548
7449T	2	4500S	1000000	1.200	4.548
55069	12	4500S	1000000	.360	1.364
B54	18	4500S	1000000	1.200	4.548
29A104	12	4500S	1000000	.360	1.364
4-760	1	4500S	1000000	.900	3.411
K0A1104-2-1	3	4501	1000000	.400	1.516
A41482	2	4501	1000000	1.900	7.201
79F204	6	4501	1000000	4.000	15.160
19F86	10	4508	1000000	2.500	9.475
C297207	1	4508	1000000	6.400	24.256
69-03378-9-0	3	4508	1000000	10.200	38.658
FRT6-2	4	6000	1000000	.800	3.032
FRT6-1	4	6000	1000000	.800	3.032

Table 4. (Continued)

Serial Number	Quantity	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
LING-1	3	6000	1000000	1.580	5.988
W-1	9	6000	1000000	6.600	25.014
G4-5165-01	2	7003	1000000	3.900	14.781
MONSON-1	4	7041	1000000	.800	3.032
9L18ACE301	3	7901	1000000	.450	1.705
TOTAL NUMBER = 144				TOTAL 216.650	821.103

6.0 PCB EQUIPMENT

In addition to PCB transformers and large PCB capacitors, ORNL has three pieces of PCB equipment (> 500 ppm). These items are summarized in Table 5. Their total PCB capacity is 579.97 kg (153 gal).

Table 5. Miscellaneous PCB Equipment > 500 ppm

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
3024-258	Grinder	3024	1,436	1.000	3.790
X104416	Pump	3012	549	2.000	7.580
X105593A	Hydraulic Unit	3012	950,000	<u>150.000</u>	<u>568.500</u>
TOTAL NUMBER = 3			TOTAL	153.000	579.870

7.0 PCB WASTE CHARACTERIZATION

PCB wastes at ORNL generally consist of contaminated oils, small capacitors, fluorescent light ballasts, contaminated solids, (e.g., rags, papers), and transformer carcasses. There is a very small amount of radioactively contaminated PCB waste which is stored on the 7507 West Pad.

PCB-contaminated oils are classified into oils containing > 2 ppm but < 500 ppm of PCBs and oils with > 500 ppm PCBs. Most of these oils are being used as dielectric fluids for electrical equipment (e.g., transformers and capacitors) or in heat exchange systems. Low concentrations of PCBs (> 2 , < 50 ppm) are frequently detected in waste oils from various sources. Oils with ≥ 500 ppm of PCBs are found primarily in PCB transformers still in use and are potential contamination sources.

Some PCB wastes are also generated due to unintentional spills and releases; for example, transformers rupturing, light ballasts leaking, or PCB oil spills. There have been no known environmental consequences from these incidents. In each case, samples were taken and areas were decontaminated. A history of PCB-related incidents/spills at ORNL, including 1985, has been included as Appendix C.

The PCB-contaminated (> 2 ppm) wastes are shipped off-site for disposal. They are manifested in the same manner as RCRA hazardous wastes and manifest records are kept at the Department of Environmental Management, Environmental and Occupational Safety Division.

8.0 PCB WASTE TOTALS

Annual waste inventories at ORNL are tracked by the use of the HMTS and PCBTS computer database. The HMTS and PCBTS are utilized to generate reports for those materials which are shipped off-site as well as those remaining in storage at the end of the calendar year. These reports are also separated into categories for solid and liquid wastes.

At the end of the 1984 calendar year, there was no PCB waste left in storage at ORNL. Consequently, all the waste shipped off-site was generated during 1985. The total PCB waste generated in 1985 is 2930.94 kg of solid waste and 9285.50 kg (2450 gal) of liquid waste.

In 1985, a total of 2476.31 kg of solid waste and 7409.45 kg (1955 gal) of liquid PCB waste were shipped to an off-site contractor. Two shipments were made to the Rollins Environmental Services Inc. facility in Deer Park, Texas. These shipments were: a) 44 drums of PCB waste shipped on October 31, 1985, and b) 3 drums of PCB waste shipped on February 26, 1985. These wastes were incinerated and/or placed in a landfill. In addition, ORNL shipped 18 drums of waste on October 31, 1985, and 31 drums on February 26, 1985, which were generated at the Y-12 site. The Y-12 PCB Annual Report will provide detailed information on the ORNL wastes generated at the Y-12 site.

Information as to the source of the waste, number of drums generated, weight, concentration groupings, dates of storage, shipments, and disposer also are available from the PCBTS. Thirty-four drums of liquid PCB waste with concentrations of < 500 ppm and three drums of liquid waste with concentrations of > 500 ppm were manifested in 1985 (see Table 6). The PCB concentration of the solid wastes (consisting of oily rags, light ballasts, and small capacitors) has not been determined. There were ten drums of solid waste manifested in 1985 (see Table 7).

At the end of CY 1985, there was no liquid PCB waste left in the Hazardous Waste Storage Facility, Building 7507. A total of four drums of

Table 6. Liquid PCB Waste Shipped Off-Site for Disposal
CY-1985

Disposal Container	Location	Waste Description	Drum Weight in kg	PCB:PPM	Date to Storage	Date Shipped	Disposer
119B	2018	Transformer Oil	208.45	6	7/23/85	10/31/85	Rollins
120B	2018	Transformer Oil	208.45	6	7/23/85	10/31/85	Rollins
121B	2018	Transformer Oil	208.45	6	7/23/85	10/31/85	Rollins
122B	2018	Transformer Oil	208.45	10	7/23/85	10/31/85	Rollins
123B	2018	Transformer Oil	208.45	10	7/23/85	10/31/85	Rollins
124B	2018	Transformer Oil	208.45	10	7/23/85	10/31/85	Rollins
125B	2018	Transformer Oil	208.45	6	7/23/85	10/31/85	Rollins
126B	2018	Transformer Oil	208.45	6	7/23/85	10/31/85	Rollins
127B	2018	Transformer Oil	208.45	6	7/23/85	10/31/85	Rollins
145B	7033	Transformer Oil	208.45	13	7/26/85	10/31/85	Rollins
146B	7033	Transformer Oil	208.45	15	7/26/85	10/31/85	Rollins
147B	7033	Transformer Oil	208.45	15	7/26/85	10/31/85	Rollins
148B	7033	Transformer Oil	208.45	10	7/26/85	10/31/85	Rollins
149B	7033	Transformer Oil	208.45	13	7/26/85	10/31/85	Rollins
150B	7033	Transformer Oil	208.45	10	7/26/85	10/31/85	Rollins
151B	7033	Transformer Oil	208.45	320	7/26/85	10/31/85	Rollins
152B	7033	Transformer Oil	113.70	228	7/26/85	10/31/85	Rollins
153B	7033	Transformer Oil	208.45	59	7/26/85	10/31/85	Rollins
154B	7033	Transformer Oil	208.45	9	7/26/85	10/31/85	Rollins
182B	7033	Transformer Oil	94.75	21	9/11/85	10/31/85	Rollins
208B	4500S	Oil	208.45	31000	10/02/85	10/31/85	Rollins
210B	3012	Oil	208.45	360	10/02/85	10/31/85	Rollins
212B	3012	Oil	208.45	130	10/02/85	10/31/85	Rollins
231B	6010	Oil	208.45	8	10/23/85	10/31/85	Rollins
31B	2018	Transformer Oil	208.45	49	3/19/85	10/31/85	Rollins
32B	2018	Transformer Oil	208.45	499	3/19/85	10/31/85	Rollins
33B	2018	Transformer Oil	208.45	5	3/19/85	10/31/85	Rollins
34B	2018	Transformer Oil	208.45	5	3/19/85	10/31/85	Rollins
35B	2018	Transformer Oil	208.45	5	3/19/85	10/31/85	Rollins
36B	2018	Transformer Oil	208.45	5	3/19/85	10/31/85	Rollins

Table 6. (Continued)
CY-1985

Disposal Container	Location	Waste Description	Drum Weight in kg	PCB:PPM	Date to Storage	Date Shipped	Disposer
37B	2018	Transformer Oil	208.45	9	3/19/85	10/31/85	Rollins
38B	2018	Transformer Oil	113.70	25	3/19/85	10/31/85	Rollins
39B	2018	Transformer Oil	208.45	25	3/19/85	10/31/85	Rollins
79B	7033	Pyranol	208.45	1000000	5/16/85	10/31/85	Rollins
80B	7033	Pyranol	208.45	1000000	5/16/85	10/31/85	Rollins
81B	7033	Kerosene	208.45	47000	5/16/85	10/31/85	Rollins
82B	7033	Kerosene	208.45	47000	5/16/85	10/31/85	Rollins
TOTAL			7409.45				

TOTAL DRUMS = 37
TOTAL GALLONS = 1955.00

Table 7. Solid PCB Waste Shipped Off-Site for Disposal
CY-1985

Disposal Container	Location	Waste Description	Drum Weight in kg	PCB:PPM	Date to Storage	Date Shipped	Disposer
118B	4500S	PCB Ballasts	208.45	-	7/23/85	10/31/85	Rollins
14	4500N	PCB Ballasts	208.45	-	2/26/85	2/26/85	Rollins
155B	7033	PCB Transformer	681.82	-	7/26/85	10/31/85	Rollins
18B	2018	PCB Ballasts	208.45	-	3/05/85	10/31/85	Rollins
207	2018	PCB Ballasts	208.45	-	12/11/84	2/26/85	Rollins
208	2018	PCB Ballasts	208.45	-	12/11/84	2/26/85	Rollins
209B	2018	PCB Ballasts	208.45	-	10/02/85	10/31/85	Rollins
20B	2018	PCB Ballasts	221.65	-	3/05/85	10/31/85	Rollins
211B	3012	PCB Contaminated Solids (Rags, Paper)	113.70	-	10/02/85	10/31/85	Rollins
92B	2018	PCB Ballasts	208.45	-	6/19/85	10/31/85	Rollins

TOTAL DRUMS = 10

TOTAL 2476.3131

Table 8. PCB Solid Waste Inventory in Storage at End of CY-1985

Disposal Container	Location	Waste Description	Drum Weight in kg	PCB:PPM	Date to Storage	Storage Location
255B	3500	PCB Capacitors	35.45	-	11/18/85	7507
256B	4500S	PCB Ballasts	208.45	-	11/20/85	7507
266B	7018	PCB Ballast	208.45	-	12/27/85	7507
322R*	1505	PCB Contaminated Solids	<u>2.27</u>	-	11/25/85	7507W
TOTAL			454.62			

TOTAL DRUMS = 4

*R = Radioactively Contaminated

PCB solid waste remained in storage at the end of CY 1985 (see Table 8). One of these items (drum number 322R) is radioactively contaminated and therefore cannot presently be sent for disposal. In addition to this radioactively contaminated solid PCB waste (2.27 kg), there is also 11.37 kg (3 gal) of radioactively contaminated PCB oil in storage since November 6, 1986.

9.0 SUMMARY

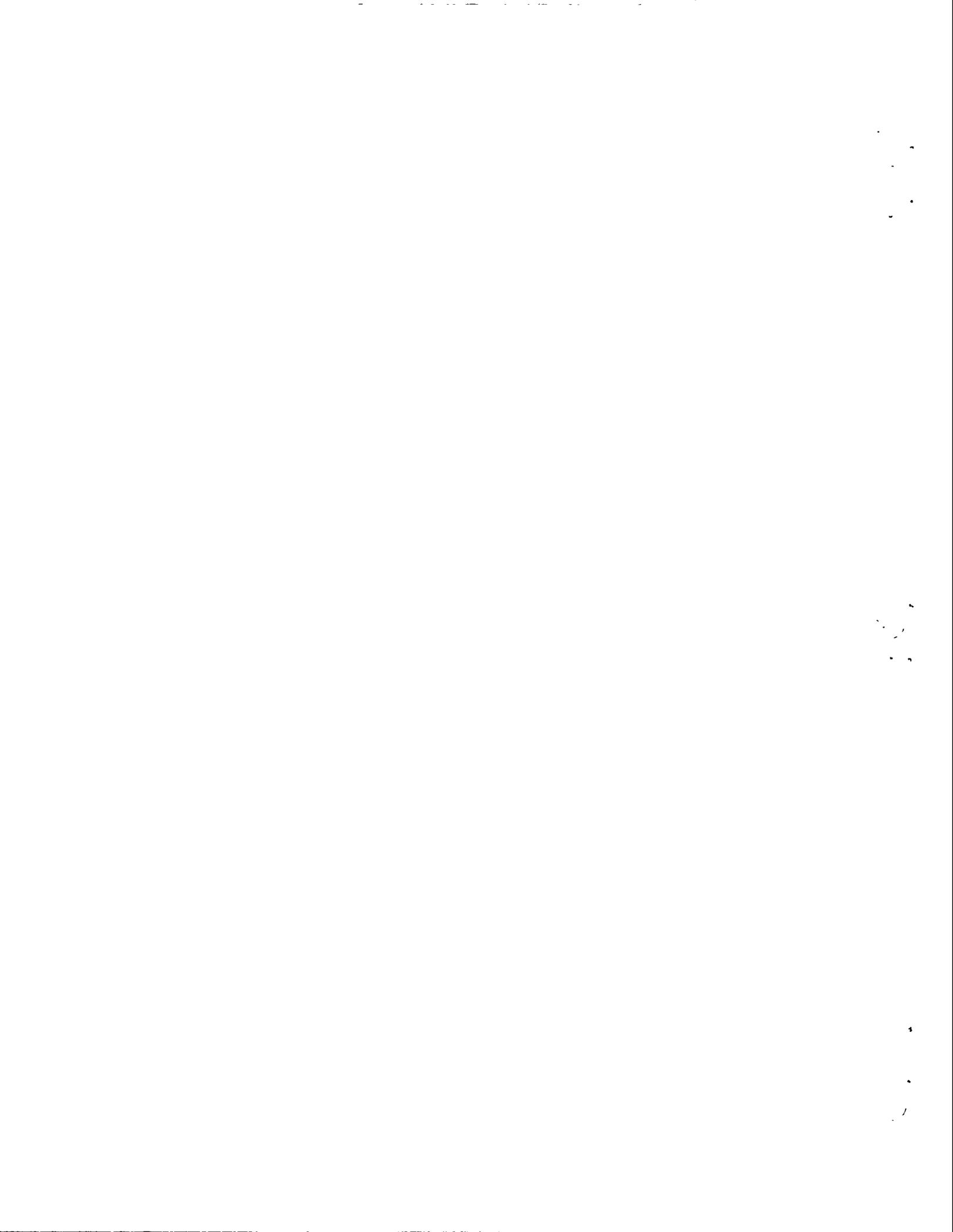
The results of this report may be summarized as follows for ORNL facilities for CY 1985:

- There are 12 PCB transformers containing 23221.64 kg (6087 gal) of PCBs.
- One PCB transformer carcass was shipped off-site for disposal.
- There are 144 PCB large capacitors containing 821.10 kg (216.65 gal) of PCBs.
- There were no PCB large high or low voltage capacitors removed from service during 1985.
- There are 3 pieces of miscellaneous PCB equipment having over 500 ppm concentration which have a total weight of 579.87 kg (115 gal) of liquid PCBs.
- At the end of the 1984 calendar year, there was no PCB waste in storage. Consequently, the waste shipped off-site and that remaining in storage was generated solely in 1985. Totals for waste generated are 2930.94 kg solid waste and 9285.50 kg (2450 gal) liquid waste.
- A total of 2476.31 kg of solid waste and 7409.45 kg (1955 gal) of liquid waste was shipped off-site.
- There are 2.27 kg of radioactively contaminated PCB solid waste in storage, which was generated in 1985. There is also an additional 11.37 kg (3 gal) of contaminated PCB oil in storage since November 6, 1985.

- A total of 454.62 kg of solid waste remained in storage at the end of CY 1985.
- There was no liquid waste in storage at the end of CY 1985.

APPENDIX A

PCB Transformers < 500 PPM



PCB Transformers < 500 PPM

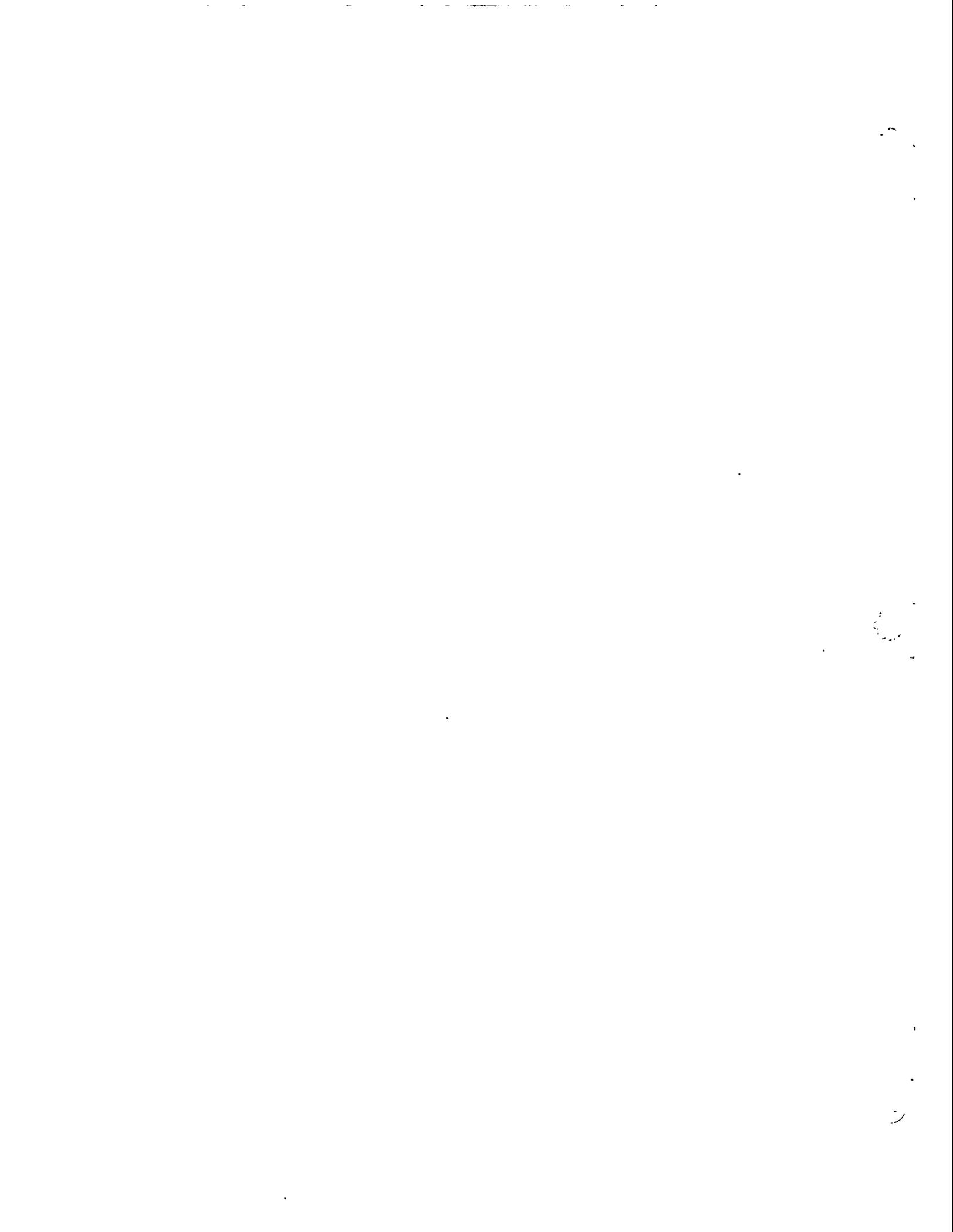
Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
72V9421	1504	13	220.000	833.800
8110081	2000	14	390.000	478.100
2371106	2632	18	1297.000	4915.630
8110080	3000	16	1350.000	5116.500
8110078	3000	29	1350.000	5116.500
8110079	3000	13	1350.000	5116.500
PKR-94711	3010	30	260.000	985.400
2546-3	3012	29	80.000	303.200
2546-2	3012	39	80.000	303.200
2546-1	3012	10	80.000	303.200
F496875-64P	3025	< 5	80.000	303.200
F497849-64P	3025	< 5	80.000	303.200
F497848-64P	3025	< 5	80.000	303.200
66711	3039	10	130.000	492.700
66710	3039	29	130.000	492.700
7351430	3047	36	350.000	1326.500
59298	3525	2	197.000	746.630
154363	4501	5	364.000	1379.560
49177	4505	4	200.000	758.000
7367553	4508	28	500.000	1895.000
7367549REG	4508	8	112.000	425.000
7367549	4508	26	500.000	1895.000
7367553REG	4508	5	112.000	425.000
1902057	4509	7	682.000	2584.780
1902055	4509	17	682.000	2584.780
1902056	4509	9	682.000	2584.780
F643634-67P	6010	46	94.000	356.260
F959884	6010	< 2	180.000	682.200
F959883	6010	< 2	300.000	1137.000
15198	7033	13	225.000	890.650
6154018	7033	43	40.000	151.640
A59466	7033	< 5	80.000	303.200

PCB Transformers < 500 PPM - (Continued)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
A59465	7033	< 5	80.000	303.200
A59469	7033	< 5	80.000	303.200
B339641	7033	8	185.000	701.150
B339640	7033	13	185.000	701.150
27140-16	7033	18	237.000	898.230
27140-10	7033	16	237.000	898.230
27140-20	7033	19	237.000	898.230
3153348	7033	5	55.000	208.450
1901716	7033	< 5	210.000	795.900
8671187	7033	46	50.000	189.500
957331	7033	10	150.000	568.500
3160686	7033	46	110.000	416.900
27140-11	7033	10	237.000	898.230
8671542	7033	5	45.000	170.550
6589125	7033	7	50.000	189.500
B339639	7033	22	185.000	701.150
M9D1623	7500	25	145.000	549.550
M9D1625	7500	3	145.000	549.550
M9D1621	7500	28	145.000	549.550
A9F1211	7700	11	145.000	549.550
A9F1213	7700	9	145.000	549.550
T35H8007	7700	11	145.000	549.550
B5H8007	7700	< 5	145.000	549.550
7731582	7710	38	500.000	1895.000
7731581	7901	45	499.000	1891.660
7373793	7901	68	500.000	72.027
7731581REG	7901	10	119.000	451.118
7731801	7901	53	499.000	1891.210
7367568SW	7901	42	19.000	72.030
7367568	7901	28	499.000	1891.660
7367568REG	7901	41	119.000	451.118

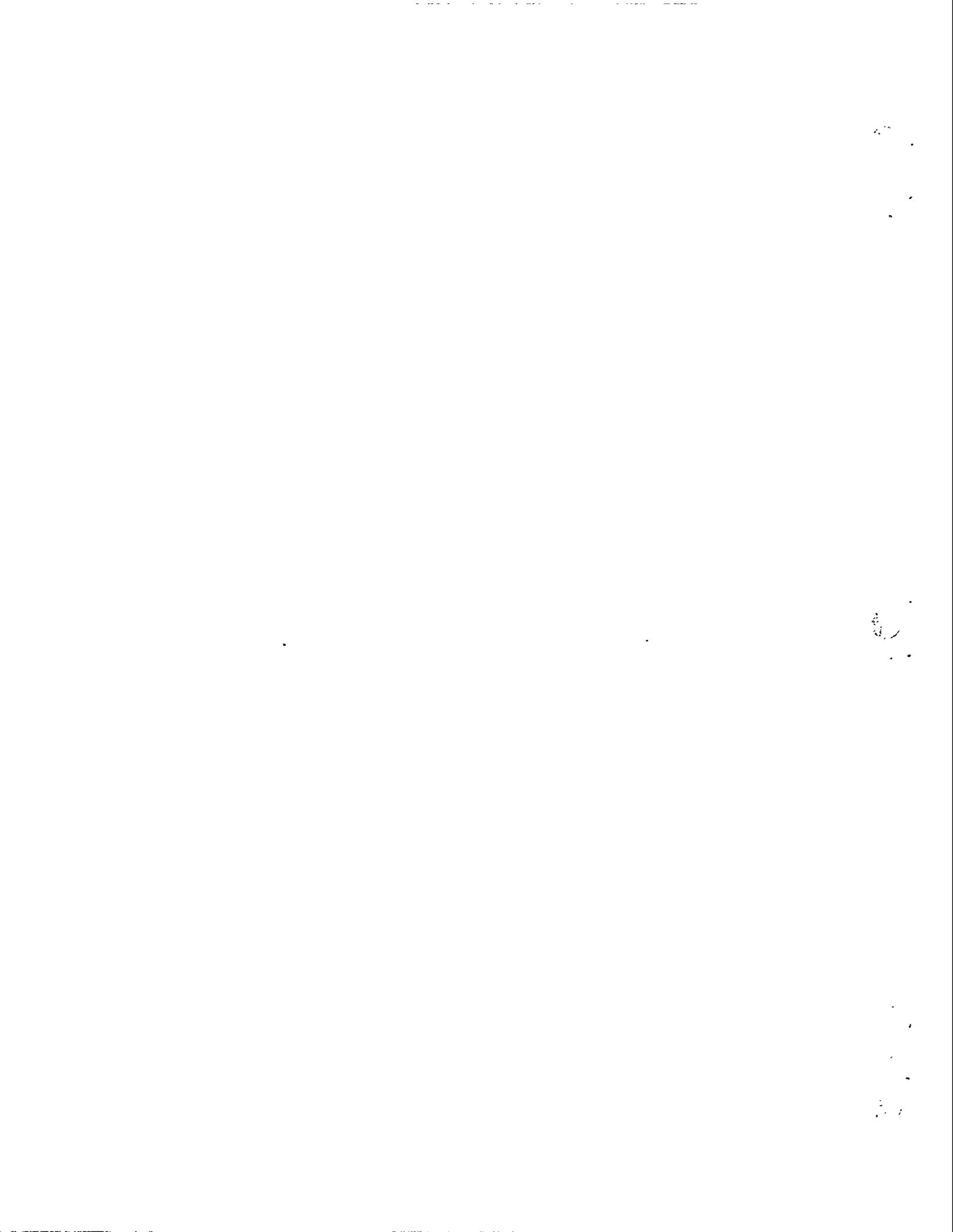
PCB Transformers < 500 PPM - (Continued)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
3428808	7901	15	200.000	758.000
2371103	7901	< 2	1297.000	4915.630
7022144	7920	38	275.000	1042.250
TOTAL NUMBER = 66		TOTAL	20131.000	74513.633



APPENDIX B

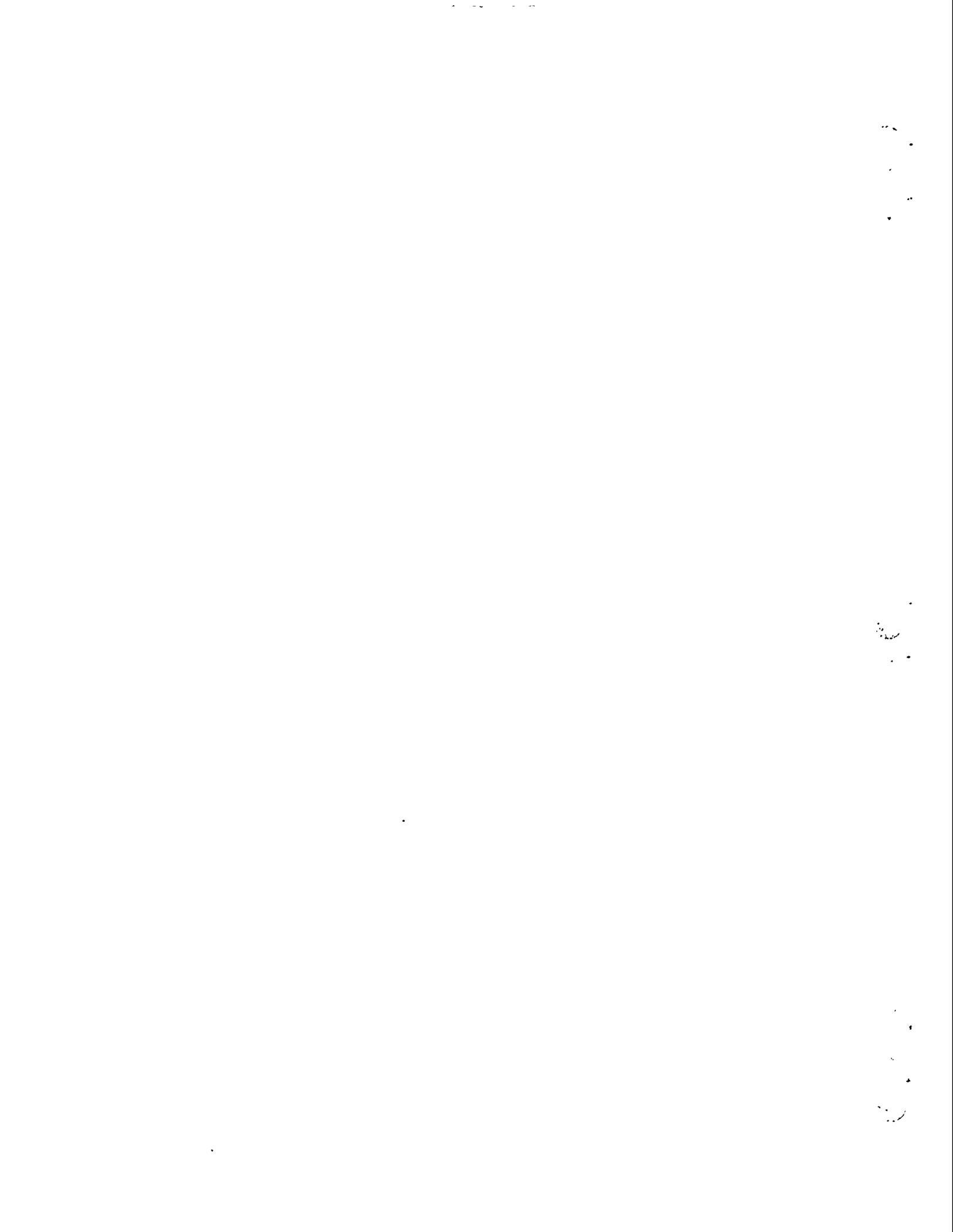
Status, Classification, and Action Plan for PCB Transformers at X-10



ORNL PCB Transformers at X-10

<u>ID #</u>	<u>Use/ Status</u>	<u>Location</u>	<u>Capacity</u>	<u>Concentration</u>	<u>Industrial (I) Commercial (C)</u>	<u>Action</u>	
R-3333	In Service	7901	31.00 gal	117.49 kg	1,000,000 ppm	I	Removal (1986-1987) ^c
R-3334	In Service	7901	31.00 gal	117.49 kg	1,000,000 ppm	I	Removal (1986-1987) ^c
PE-100005	In Service	2026	140.00 gal	530.60 kg	1,000,000 ppm	I ^{a, b}	Removal (1986-1987) ^c
7367598	In Service	4500S-W2	829.00 gal	3141.91 kg	1,000,000 ppm	C	Removal (12/85-7/86)
7375505	In Service	4500S-W1	829.00 gal	3141.91 kg	1,000,000 ppm	C	Removal (12/85-7/86)
7375507	In Service	4509	829.00 gal	3141.91 kg	1,000,000 ppm	I ^b	Removal (1986-1987) ^c
12446	In Service	6000	375.00 gal	1421.25 kg	1,000,000 ppm	C	Removal (1986-1987) ^c
7375500	In Service	6000	829.00 gal	3141.91 kg	1,000,000 ppm	C	Removal (1986-1987) ^c
7375510	In Service	6000	829.00 gal	3141.91 kg	1,000,000 ppm	C	Removal (1986-1987) ^c
D-554601	In Service	6000	800.00 gal	3032.00 kg	1,000,000 ppm	C	Removal (1986-1987) ^c
D-578512	In Service	6000	340.00 gal	1288.91 kg	1,000,000 ppm	C	Removal (1986-1987) ^c
E-694971	In Service	6000	225.00 gal	1004.35 kg	1,000,000 ppm	C	Removal (1986-1987) ^c

- ^a Transformer is located outside.
- ^b Electrician and substation operators are available at all times.
- ^c Replacement contingent upon funding.



APPENDIX C

History of PCB-Related Incidents/Spills at ORNL

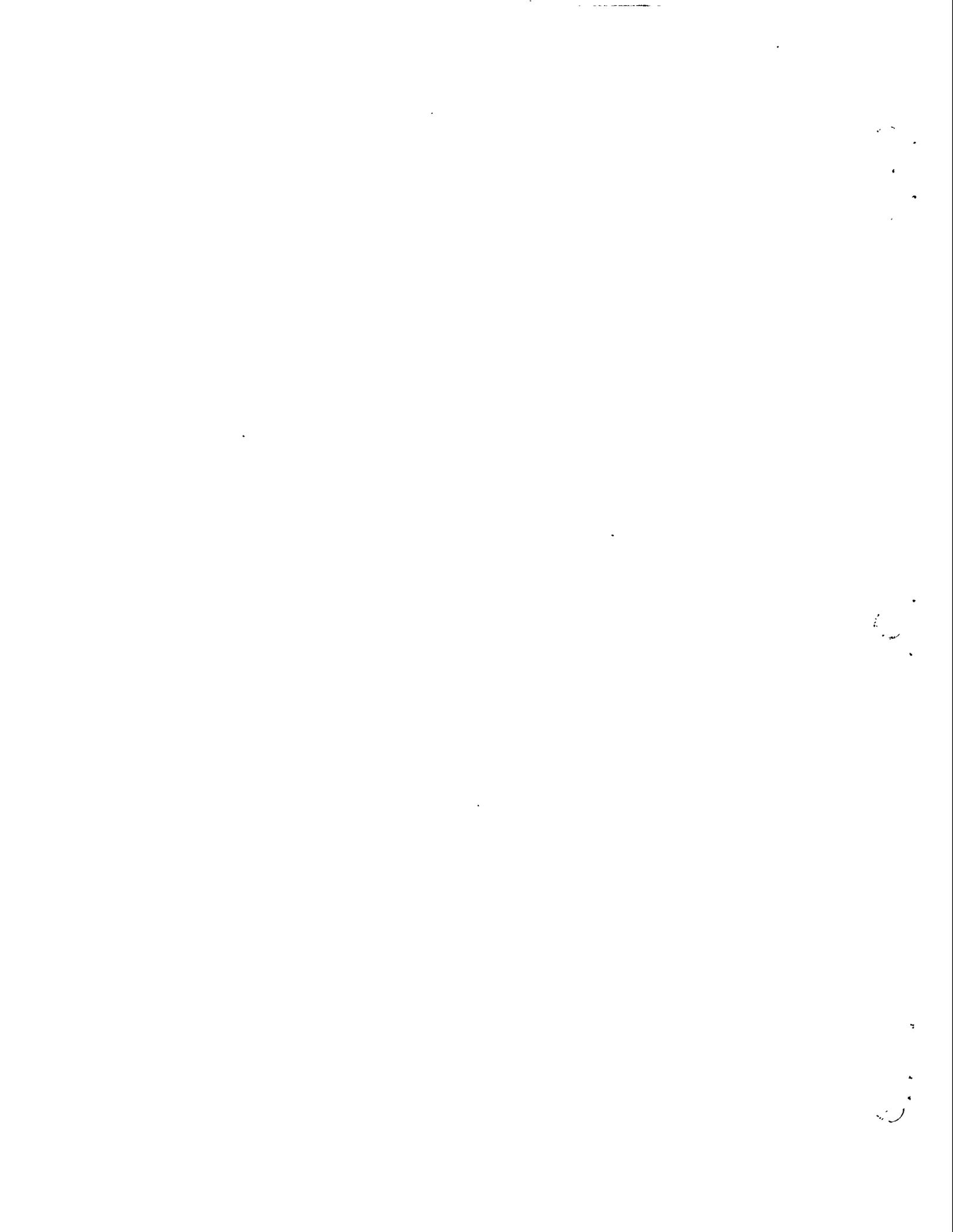
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History of PCB-Related Incidents/Spills at ORNL

<u>Date</u>	<u>Location</u>	<u>Material</u>	<u>Amount</u>
May 6, 1981	3026	PCB Oil (Transformer) < 5 ppm	Small amount
July 27, 1981	3012	PCB Oil	378.5 L (100 gal)
August 3, 1981	6000	PCB Oil	3.78 L (1 gal)
August 12, 1983	4500S, R-211	PCB Oil (light ballast) 480,000 ppm	0.01 L (0.003 gal)
April 4, 1984	3026-D	PCB Oil (transformer) 500 ppm	0.47 L (1 pint)
April 16, 1985	4500S, D-61	PCB Oil (light ballast) 854 ppm	0.01 L (0.003 gal)
September 24, 1985	4500S, G-260	PCB Oil (light ballast) 930,000 ppm	0.01 L (0.003 gal)



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**OAK RIDGE
NATIONAL
LABORATORY**

**PCB Annual Report for
Oak Ridge National Laboratory—1986**

MARTIN MARIETTA

B. D. Barkenbus
T. T. Puett
C. F. Sigmon

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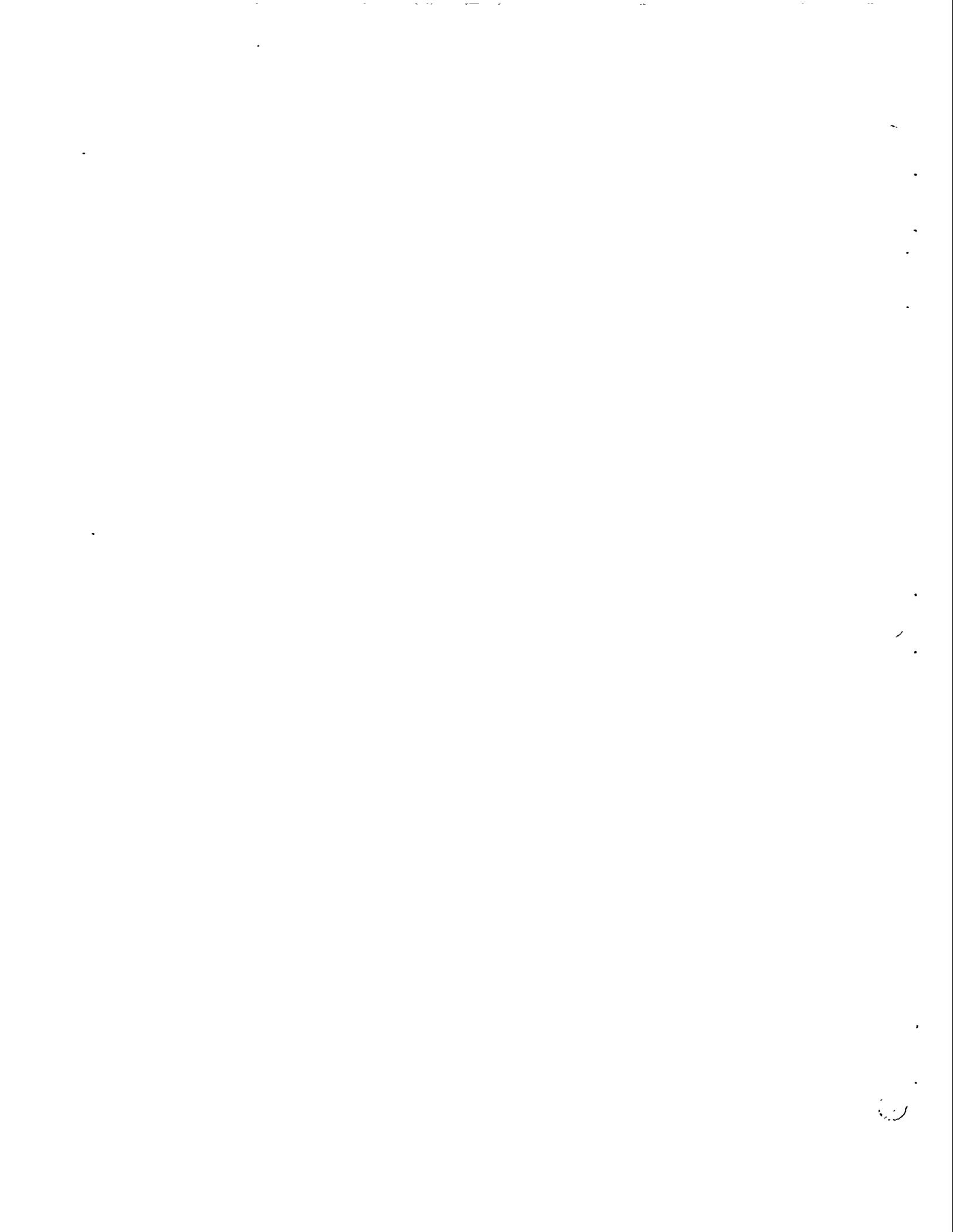
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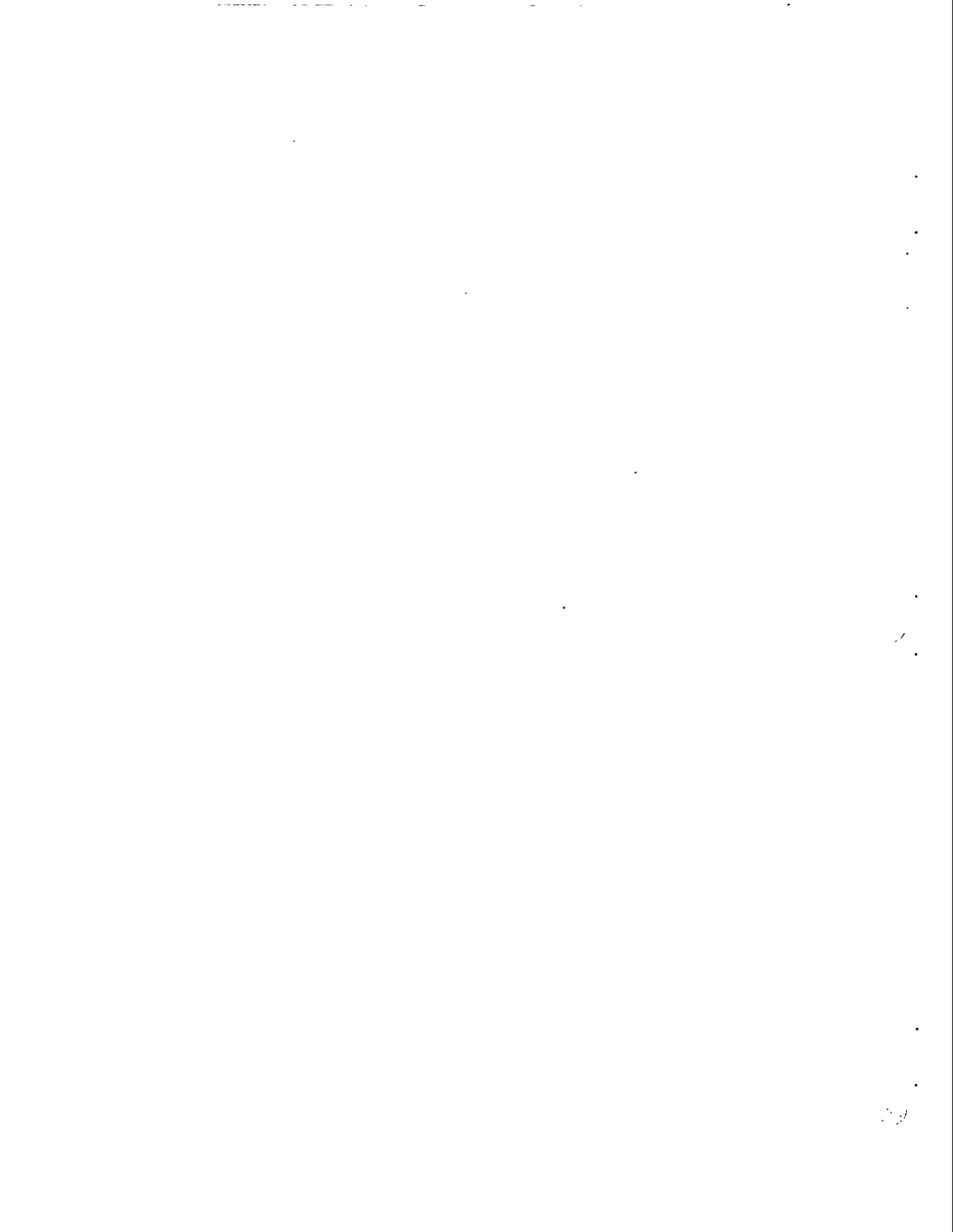
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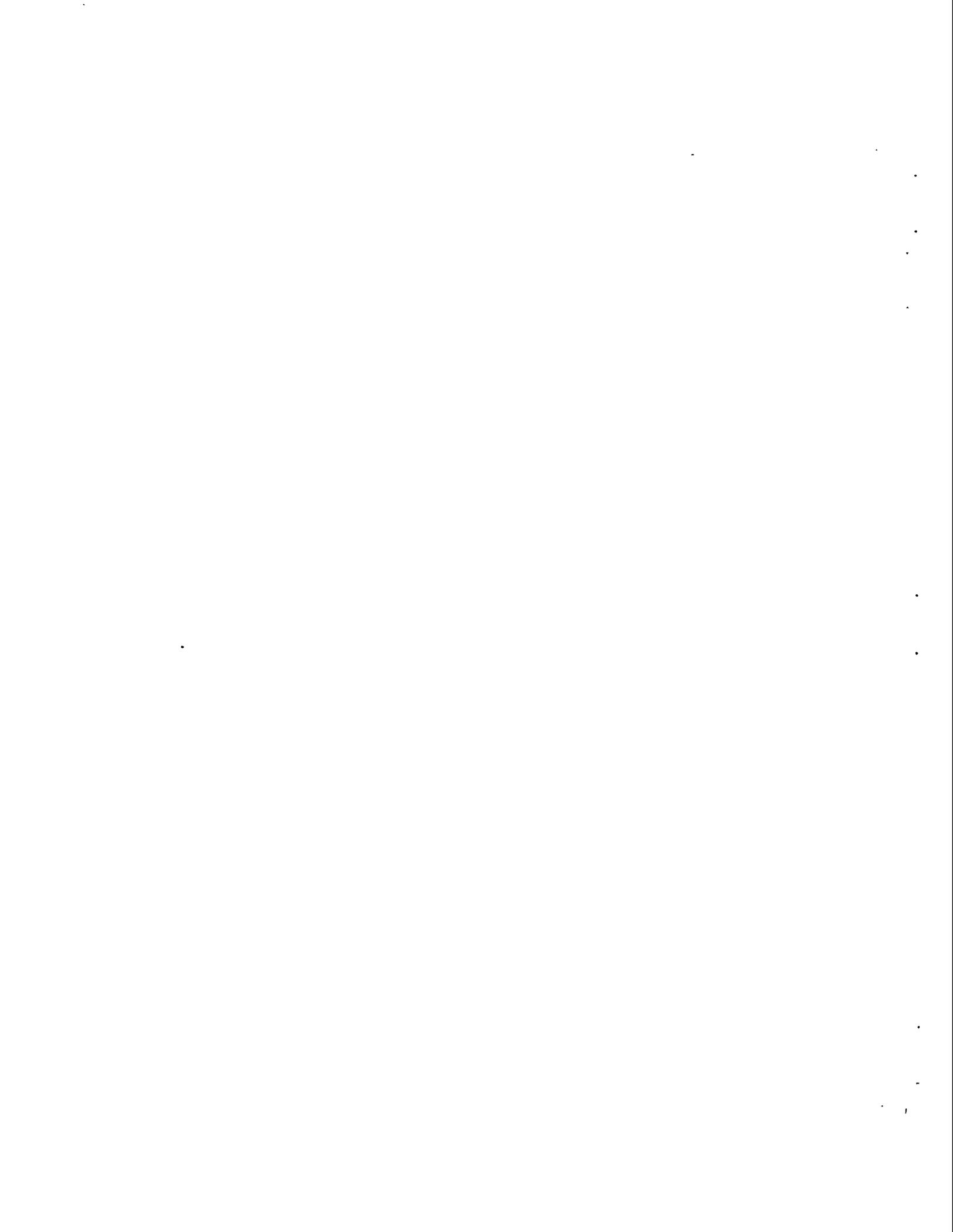
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ABSTRACT

Oak Ridge National Laboratory prepares a report annually as mandated by the Toxic Substances Control Act that summarizes records required of owners/operators of facilities where PCBs are in use. This report provides information on PCB and PCB-contaminated equipment in use and removed from service and PCB wastes generated, stored, and shipped off-site for treatment and disposal during calendar year 1986.

1.0 INTRODUCTION

Polychlorinated biphenyls (PCBs) are a family of chlorinated aromatic hydrocarbons previously used extensively in electrical equipment, heat transfer systems, fire retardants, and plasticizers. PCBs can be detrimental to humans and the environment because of their toxicity, persistence, and tendency to bioaccumulate. Humans exposed to PCBs can develop dermatologic symptoms, follicular keratitis, excessive eye discharge, swelling of the eye lids, and nervous system symptoms (IARC 1978). In addition, available data are sufficient to support the carcinogenicity of PCBs to animals but are inadequate to demonstrate their carcinogenicity to humans (IARC 1982).

Congress mandated the control of PCBs under the Toxic Substances Control Act (TSCA) of 1976, Public Law 94-469, Section 6(e). To enforce TSCA, the Environmental Protection Agency (EPA) promulgated regulations under Title 40 of the Code of Federal Regulations (CFR), Part 761. Subpart B of 40 CFR 761 outlines requirements for the manufacture, processing, distribution, and use of PCBs. Subpart C governs marking and labeling requirements and Subpart D, storage and disposal requirements. Subpart J contains recordkeeping and reporting requirements for owners or operators of facilities using or storing PCBs and includes an annual report to be submitted by July 1, covering the previous calendar year.

Oak Ridge National Laboratory (ORNL) manages PCB- and PCB-contaminated wastes, which are stored on-site before their disposal at EPA-approved facilities. In addition, PCB articles, PCB containers, and PCB-contaminated electrical equipment are in use at ORNL. PCB transformers, however, are no longer in service at the main ORNL site. This document fulfills the reporting requirement for these PCB materials at Oak Ridge National Laboratory.

2.0 PCB REGULATIONS

The Toxic Substances Control Act enables EPA to regulate chemical substances and mixtures that present an unreasonable risk of injury to human health or the environment. The primary impact of TSCA on ORNL is the regulation of PCB and PCB-contaminated equipment and materials. The following are some of the elements EPA promulgated to implement this PCB control program:

1. banned the manufacture, distribution in commerce, and use of PCBs in other than a "totally enclosed manner" (40 CFR Part 761.20);
2. established categories of electrical equipment [e.g., PCB transformer (< 500 ppm), PCB-contaminated electrical equipment (50-500 ppm), and non-PCB transformers (< 50 ppm)] (40 CFR Part 761.3);

3. set rules governing the conversion of PCB transformers to PCB-contaminated electrical equipment or to non-PCB transformers by draining, refilling, and/or otherwise servicing the transformer [40 CFR Part 761.30 (a)(2)(v)];
4. established criteria for the disposal of PCBs, PCB articles (transformers, PCB capacitors, PCB hydraulic machines, PCB-contaminated electrical equipment, and other PCB articles), PCB containers, and PCBs resulting from the clean-up and removal of spills (40 CFR 761.60);
5. established standards for the marking, storage, and spill prevention of PCBs and PCB-contaminated liquids and solids (40 CFR 761.65);
6. prohibited the use of PCB transformers and PCB-filled electromagnets (with concentrations of 500 ppm or greater) posing an exposure risk to food and feed after October 1, 1985, and established regulations to reduce fire-related risks posed by the use of PCB transformers (40 CFR 761.30);
7. authorized the use of all other PCB transformers for the remainder of their useful lives, except for those posing fire-related risks, and required a quarterly inspection of this equipment for leaks of dielectric fluids;
8. authorized the use of large capacitors that are located in restricted access electrical substations or in contained and restricted installations for the remainder of their useful lives. The use of all other large PCB capacitors after October 1, 1988, however, is prohibited [40 CFR 761.30 (1)(1)(ii)].

PCB-contaminated wastes at ORNL are also governed internally through the "Martin Marietta Energy Systems Policy for Use, Storage and Disposal of PCB," which requires management of some materials containing 2 ppm or greater PCBs as PCB wastes.

3.0 RECORDS AND REPORTING

Records are maintained and reporting is accomplished through the PCB Tracking System (PCBTS) and records of the Plant and Equipment Division. The PCBTS includes an inventory of transformers and high and low voltage capacitors and a waste module that receives PCB storage and shipment data from the Hazardous Materials Tracking System.

Regulations regarding reporting (40 CFR Part 761.180) require the dates PCBs and PCB Items are removed from service, are placed into storage for disposal, and are placed into transport for disposal. For PCBs and PCB Items removed from service, the regulations require the location of the initial disposal or storage facility and the name of the owner or operator of the facility. The regulations also require information on PCBs and PCB Items remaining in service at the end of the calendar year including the total weight in kilograms of any PCBs and PCB Items in PCB Containers, total number of PCB transformers and total weight of the PCBs they contain, and the total number of PCB Large High or Low Voltage Capacitors. Storage and disposal facilities have additional reporting requirements including dates and quantities of PCBs and PCB Items transferred into or out of the facility during the year and those retained in storage at the end of the year.

3.1 PCB Transformers

From 1980 to 1984, transformers containing > 50 but < 500 ppm PCBs were chemically treated to decrease their concentrations of PCBs. Only two of these transformers have exceeded 50 ppm (Table 1). Transformers containing < 50 ppm are included in Appendix A. Hence, no PCB transformers (> 500 ppm) and few PCB-contaminated transformers remained in service at ORNL at the end of CY 1986. The required information for the twelve PCB transformers removed from service and disposed of during 1986 is given in Table 2.

3.2 PCB Capacitors

Although the ORNL electrical system does not have any PCB Large High or Low Voltage Capacitors, various research-related instruments contain them. A PCB Large High Voltage Capacitor under TSCA is one that contains 1.36 kg (3 lbs.) or more of dielectric fluid and operates at 2,000 volts or above. PCB low voltage capacitors contain 1.36 (3 lbs.) or more of dielectric fluid and operate below 2,000 volts. A capacitor whose total volume is less than 1,639 cubic centimeters (100 cubic inches) is assumed to contain less than 1.36 kg of dielectric fluid.

Table 1: PCB Contaminated Transformers > 50 PPM

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
7731801	7901	53	499.00	1891.21
7373793	7901	68	500.00	1895.00
		Total	<u>999.00</u>	<u>3786.21</u>

Table 2: PCB Transformers Removed from Service

Serial Number	PCB:PPM	Capacity		Date Removed	Disposer	Date Shipped
		Gal.	Kg			
PE100005	1,000,000	140.0	530.6	6/21/86	Westinghouse	6/21/86
7375505	1,000,000	829.0	3141.9	6/14/86	Westinghouse	6/14/86
7375507	1,000,000	829.0	3141.9	6/17/86	Westinghouse	6/17/86
12446	1,000,000	375.0	1421.3	6/29/86	Westinghouse	6/29/86
D-554601	1,000,000	800.0	3032.0	6/29/86	Westinghouse	6/29/86
E694971	1,000,000	225.0	1004.4	6/26/86	Westinghouse	6/26/86
7375500	1,000,000	829.0	3141.9	6/25/86	Westinghouse	6/25/86
R-3333	1,000,000	31.0	117.5	6/29/86	Westinghouse	6/29/86
D-578512	1,000,000	340.0	1288.9	6/26/86	Westinghouse	6/26/86
7375510	1,000,000	829.0	3141.9	6/24/86	Westinghouse	6/24/86
7367598	1,000,000	829.0	3141.9	6/21/86	Westinghouse	6/21/86
R-3334	1,000,000	31.0	117.5	6/29/86	Westinghouse	6/29/86

Total Number = 12

Total gal. = 6087.00

Total Kg = 23221.7 Kg

The required information on capacitors remaining in service at the end of the calendar year including the total weight in kilograms and the total number of PCB Large High or Low Voltage Capacitors is given in Table 3. Most capacitors at ORNL are small and are packed in DOT-approved drums and shipped off-site in accordance with EPA/TSCA regulations for disposal. These items are included in Section 3.4, Table 6. Capacitors retained in storage at the end of the year are included in Table 8, Section 3.4.

3.3 PCB Equipment

In addition to PCB transformers and large PCB capacitors, ORNL has some equipment containing > 500 ppm PCBs. These items are summarized in Table 4.

3.4 PCB Waste

PCB wastes at ORNL include contaminated oils, small capacitors, fluorescent light ballasts, contaminated solids (e.g. rags, papers), transformer carcasses, and contaminated wastes from unintentional spills and releases. A small amount of radioactively contaminated PCB waste is also stored.

PCB-contaminated oils are classified into oils containing > 2 ppm but < 500 ppm of PCBs and oils with > 500 ppm PCBs. Low concentrations of PCBs (2 to 50 ppm) are frequently detected in waste oils from various sources. Most of the oils containing a high concentration of PCBs were used as dielectric fluids for electrical equipment or in heat exchange systems.

The PCB-contaminated (> 2 ppm) wastes are shipped off-site for disposal. PCB wastes are manifested in the same manner as RCRA-hazardous wastes and copies of the manifests are retained. Some of the wastes shipped off-site for disposal were generated at ORNL facilities located in Building Y9201-2 at the Y-12 plant. Summaries of off-site shipments of liquid wastes > 50 ppm and < 50 ppm PCBs are given in Table 5 and Table 6, respectively. The dates to storage (Tables 5 and 6) are the dates wastes were received at the main ORNL facility (X-10) from the ORNL facilities at Y-12.

The reporting of off-site shipments of liquid wastes containing > 50 ppm PCBs is somewhat confounded by the inadvertent contamination of clean used oils accumulated in a storage tank. These oils were analyzed prior to being added to the tank. Later analysis of the bulk contents of the tank revealed a high PCB concentration. The tank is no longer used. These oils were received from both ORNL facilities at Y-12 and from the X-10 site. Of the total liquid waste containing > 50 ppm PCBs shipped off-site during CY 1986, 20105.95 kg are reported as generated by ORNL

Table 3: ORNL Large High and Low Voltage PCB Capacitors

Serial Number	Quantity	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
CUSTOM BUILT	1	2008	1000000	80.000	303.200
SIEMENS 250KV	1	2008	1000000	40.000	151.600
41061005V-21A	4	2525	1000000	.600	2.274
41061005V-21	4	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.600	2.274
7910-8480T	4	3025	1000000	1.200	4.548
FRT-3	4	3095	1000000	.800	3.032
A17055	1	3500 B50	1000000	3.700	14.023
03646	1	3500 B50	1000000	3.700	14.023
853557	1	3500 C23	1000000	16.000	60.640
9-1502-00092-5	1	3500 D30	1000000	7.500	28.425
T093119	9	3500 R8	1000000	4.000	15.160
R10..840	3	3508 ATT	unknown	3.990	15.122
P68734	3	3508 ATT	unknown	3.990	15.122
R10837	3	3508 ATT	unknown	3.990	15.122
R 10:840	3	3508 att	1000000	3.990	7.201
R 10837	3	3508 att	1000000	3.990	7.428
P 68734	3	3508 att	1000000	3.990	15.122
410229	1	3525	1000000	5.200	19.708
001	1	3525	1000000	6.200	23.498
B48A	6	4500S B4	1000000	1.200	4.548
7449T	2	4500S B4	1000000	1.200	4.548
55069	12	4500S B5	1000000	.360	1.364
29A104	12	4500S B5	1000000	.360	1.364
B54	18	4500S B5	1000000	1.200	4.548
4-760	1	4500S D5	1000000	.900	3.411
KOA1104-2-1	3	4501 B	1000000	.400	1.516
A41482	2	4501 R10	1000000	1.900	7.201
79F204	6	4501 R22	1000000	4.000	15.160
19F86	10	4508	1000000	2.500	9.475
69-03378-9-0	3	4508 226	1000000	10.200	38.658
C297207	1	4508 226	1000000	6.400	24.256
FRT6-2	4	6000 ANN	1000000	.800	3.032
LING-1	3	6000 C30	1000000	1.580	5.988
W-1	9	6000 C30	1000000	6.600	25.014
FRT6-1	4	6000 C30	1000000	.800	3.032
G4-5165-01	2	7003	1000000	3.900	14.781
MONSON-1	4	7041	1000000	.800	3.032
9L18ACE301	3	7901	1000000	.450	1.705
	---			-----	-----
Total Number	162		Total	240.590	896.221

Table 4: Miscellaneous Equipment > 50 ppm

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gal.	Kg.
X104416	Pump	3012	549	2.00	7.58
X105593A	Hydraulic	3012	950,000	150.00	568.50
3024-258	Grinder	3024	1,436	1.00	3.79
3044-358	Surface Grinder	3044	65	15.00	56.85
3525-023	Waste Press	3525	301	2.00	7.58
4501-002	13" Lathe	4501	146	.50	2.00
6000-052	Oil Reclaimer	6000	96	1500.00	5685.00
6000-063	Oil Reclaimer	6000	247	1500.00	5685.00
6000-064	Vac Pump	6000	180	.25	1.00
6000-065	Vac Pump	6000	163	.25	1.00
6000-066	Vac Pump	6000	163	.25	1.00

Total Number = 11

Total gal. = 3171.25

Total Kg = 12019.30

Table 5: ORNL Liquid Waste (>50 PPM PCB's) Shipped Off-site for Disposal in CY-1986

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
TANK	Y9201-2	OIL PCB 5000 PPM	20049.10	5000	4/16/86	10/02/86	CHEM. WASTE
338B	Y9201-2	TRANSFORMER OIL PCB 1200 PPM	56.85	1200	4/17/86	9/18/86	HANG. (SCA) ROLLINS ENV. SER.
359B	4500S	OIL PCB 1400 PPM	9.76	1400	5/08/86	9/18/86	ROLLINS ENV. SER.
461B	3025	VACUUM PUMP OIL PCB 93 PPM	208.45	93	9/02/86	9/18/86	ROLLINS ENV. SER.
465B	2018	OIL PCB 1600 PPM	208.45	1600	9/02/86	9/18/86	ROLLINS ENV. SER.
466B	2018	OIL PCB 540 PPM	208.45	540	9/02/86	9/18/86	ROLLINS ENV. SER.

TOTAL 20741.06

TOTAL DRUMS = 6

TOTAL GALLONS = 5550.00

Table 6: ORNL Liquid Waste (<50 PPM PCB's) Shipped Off-site for Disposal in CY-1986

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
313B	Y9201-2	OIL PCB 2 PPM	208.45	2	3/11/86	9/18/86	ROLLINS ENV. SER.
314B	Y9201-2	OIL PCB 11 PPM	208.45	11	3/11/86	9/18/86	ROLLINS ENV. SER.
315B	Y9201-2	OIL PCB 3 PPM	208.45	3	3/11/86	9/18/86	ROLLINS ENV. SER.
316B	Y9201-2	OIL PCB 11 PPM	208.45	11	3/11/86	9/18/86	ROLLINS ENV. SER.
359B	4500S	OIL PCB 49 PPM	2.80	49	5/08/86	9/18/86	ROLLINS ENV. SER.
363B	EXT.6000	PUMP OIL PCB 30 PPM	208.45	30	5/15/86	9/18/86	ROLLINS ENV. SER.
364B	6010	VACUUM PUMP OIL PCB 24 PPM	208.45	24	5/15/86	9/18/86	ROLLINS ENV. SER.
462B	1505	VACUUM PUMP OIL PCB 19 PPM	208.45	19	9/02/86	9/18/86	ROLLINS ENV. SER.
475B	2018	TRANSFORMER OIL PCB 11 PPM	208.45	11	9/10/86	9/18/86	ROLLINS ENV. SER.
476B	2018	TRANSFORMER OIL PCB 11 PPM	208.45	11	9/10/86	9/18/86	ROLLINS ENV. SER.
TOTAL			1878.85				

TOTAL DRUMS = 10

TOTAL GALLONS = 595.00

facilities at Y-12 during 1986. Of this quantity, only 56.85 kg were originally PCB-contaminated oil. The remainder was clean oil generated at ORNL facilities at Y-12 (20049.10 kg) and X-10 (1895.00 kg) during 1985; thus, the 20049.10 kg was not included in the Y-12 shipment report and the 1895.00 kg was not reported as in storage at year's end in the 1985 annual report for X-10. The computer-generated Table 5 represents both quantities as originating from Y-12 because the bulk of the contents of the tank originated there. A total of 833.80 kg of liquids waste containing < 50 ppm PCBs shipped off-site during CY 1986 was generated at ORNL facilities at Y-12 during CY 1986. No liquid wastes containing < 50 ppm PCBs were carried over from 1985.

Solid wastes containing > 50 ppm PCBs that were shipped off-site are given in Table 7 and those containing < 50 ppm PCBs are presented in Table 8. For wastes containing > 50 ppm PCBs, 634.44 kg were generated by ORNL facilities at Y-12 and of this, 625.35 kg were generated in 1985. The solid wastes generated at Y-12 and in storage at ORNL at the end of CY 1985 were not reported in the 1985 annual report. For wastes containing < 50 ppm, 208.45 kg were generated by ORNL facilities at Y-12 during 1986. No wastes in this category were carried over from CY 1985.

3.5 PCB Waste Inventory in Storage at the End of CY 1986

Liquid wastes in storage at year's end containing > 50 ppm PCBs are shown in Table 9 and those containing < 50 ppm PCBs are given in Table 10. Of the total waste containing > 50 ppm PCBs in storage at the end of CY 1986, 1.36 kg was received from ORNL facilities at Y-12 during 1986. Of the total waste containing < 50 ppm PCBs, 276.67 kg was received from ORNL facilities at Y-12 during 1986. Solid PCB wastes > 50 ppm held in storage at the end of CY 1986 are shown in Tables 11. No solid wastes containing < 50 ppm PCBs were in storage at the end of the year. All solid PCB-contaminated waste in storage at the end of CY 1986 were generated at the X-10 site. A small amount of radioactively contaminated waste, 11.37 kg of liquid wastes and 2.27 kg of solid waste, will not be shipped off-site for treatment but will be retained until an appropriate local treatment facility is available. Only radioactively contaminated PCB-bearing wastes were held in storage over one year. The radioactively contaminated wastes were generated at X-10.

Table 7: ORNL Solid Waste (>50 PPM PCB's) Shipped Off-site for Disposal in CY-1986

Disposal Container	Source Location	Waste Description	Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
251B	Y9201-2	PCB CAPACTIORS	208.45	unknown	11/20/85	9/18/86	ROLLINS ENV. SER.
253B	Y9201-2	PCB CAPACTIORS	208.45	unknown	11/15/85	9/18/86	ROLLINS ENV. SER.
254B	Y9201-2	PCB CAPACTIORS	208.45	unknown	11/15/85	9/18/86	ROLLINS ENV. SER.
255B	3500	PCB CAPACTIORS	44.55	unknown	11/18/85	9/18/86	ROLLINS ENV. SER.
255L	7018	PCB BALLASTS	5.45	unknown	1/29/86	9/18/86	ROLLINS ENV. SER.
256B	4500S	PCB BALLASTS	208.45	unknown	11/20/85	9/18/86	ROLLINS ENV. SER.
266B	7018	PCB BALLAST	208.45	unknown	12/27/85	9/18/86	ROLLINS ENV. SER.
289B	2018	PCB BALLASTS	208.45	unknown	2/13/86	9/18/86	ROLLINS ENV. SER.
290B	2018	PCB BALLASTS	208.45	unknown	2/13/86	9/18/86	ROLLINS ENV. SER.
342B	Y9201-2	PCB CAPACITOR	9.09	unknown	4/17/86	9/18/86	ROLLINS ENV. SER.
357B	4500N	LIGHT BALLAST	208.45	unknown	4/24/86	9/18/86	ROLLINS ENV. SER.
358B	4500S	LIGHT BALLAST	208.45	unknown	4/24/86	9/18/86	ROLLINS ENV. SER.
362B	2018	PCB BALLAST	208.45	unknown	5/15/86	9/18/86	ROLLINS ENV. SER.
412B	1505	PCB LIGHT BALLAST	208.45	unknown	6/26/86	9/18/86	ROLLINS ENV. SER.
463B	4500S	PCB BALLAST	208.45	unknown	9/02/86	9/18/86	ROLLINS ENV. SER.
464B	4500S	PCB BALLAST	208.45	unknown	9/02/86	9/18/86	ROLLINS ENV. SER.
467B	6000	PCB BALLAST	208.45	unknown	9/03/86	9/18/86	ROLLINS ENV. SER.
468B	2018	PCB BALLAST	208.45	unknown	9/03/86	9/18/86	ROLLINS ENV. SER.
469B	2018	PCB BALLAST	208.45	unknown	9/03/86	9/18/86	ROLLINS ENV. SER.
TOTAL DRUMS = 19		TOTAL	3394.29				

Table 8: ORNL Solid Waste (<50 PPM PCB's) Shipped Off-site
for Disposal in CY-1986

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
339B	Y9201-2	ABSORBENT CLEAN UP MATERIAL PCB 39 PPM	208.45	39	4/17/86	9/18/86	ROLLINS ENV. SER.
TOTAL 1 DRUM							

Table 9: ORNL Liquid Waste (>50 PPM PCB's) Inventory
in Storage at End of CY-1986

Disposal Container	Source Location	Waste Description	Drum		Date To Storage	Storage Location
			Weight In KGS	PCB:PPM		
??R		OIL PCB 200 PPM	11.37	200	11/06/84	7651
510B	Y9201-2	PCB OIL	1.36	unknown	10/03/86	7507
TOTAL DRUMS = 2			TOTAL KGS = 12.73		TOTAL GALLONS = 3.39	

Table 10: ORNL Liquid Waste (<50 PPM PCB's) Inventory
in Storage at End of CY-1986

Disposal Container	Source Location	Waste Description	Drum		Date To Storage	Storage Location
			Weight In KGS	PCB:PPM		
517B	2013	OIL PCB 3PPM	208.45	3	10/08/86	7507
518B	Y9201-2	OIL PCB 22 PPM	68.22	22	10/08/86	7507
519B	Y9201-2	OIL PCB 22 PPM	208.45	22	10/08/86	7507

TOTAL DRUMS = 3 TOTAL KGS = 485.12 TOTAL GALLONS = 128.00

Table II: ORNL Solid Waste (>50 PPM PCB's) Inventory
in Storage at End of CY-1986

Disposal Container	Source Location	Waste Description	Drum		Date To Storage	Storage Location
			Weight In KGS	PCB:PPM		
322R	1505	CONTAMINATED SOLIDS	2.27	unknown	11/25/85	7507W
510B	3500	PCB TRANSFORMERS	66.70	unknown	10/09/86	7507
512B	2026	CIRCUIT BOARD PCB 2000 PPM	31.76	2000	10/02/86	7507
512B	2026	CONTAMINATED CLEANER	2.72	unknown	10/02/86	7507
513B	2026	GLASSWARE PCB 2000 PPM	2.27	2000	10/02/86	7507
513B	2026	PCB CONTAMINATED SOLIDS	14.07	unknown	10/02/86	7507

TOTAL DRUMS = 4

TOTAL KGS = 119.790

4.0 SUMMARY

4.1 PCB and PCB-Contaminated Equipment

Twelve transformer carcasses containing 23221.64 kg (6087 gal) of PCBs were shipped off-site for treatment and disposal in CY 1986. No PCB transformers remained in service at the end of CY 1986.

A total of 162 large high and low voltage PCB capacitors were in service at the end of CY 1986. None were removed from service in CY 1986.

4.2 PCB Wastes Shipped Off-Site in CY 1986

At the end of CY 1985, 1895.00 kg of liquid waste that was later found to be PCB-contaminated was in storage. The remainder of the 20741.06 kg (5550.0 gal) of liquid PCB or PCB-contaminated waste shipped off-site during CY 1986 was generated during 1986. Of this amount, 18210.95 kg originated at Y-12 as clean used oil and was inadvertently contaminated while in an accumulation tank at X-10. Of the 1878.85 kg of liquids containing < 50 ppm PCBs shipped off-site for treatment and disposal in CY 1986, 833.80 kg originated at Y-12. All of this waste was generated in 1986.

During 1986, 3401.11 kg of PCB-contaminated (> 50 ppm) solid waste was shipped off-site for disposal. Of this, 634.44 kg originated at Y-12 and 669.90 kg was in storage at the end of 1985. The 208.45 kg of solid waste containing < 50 ppm shipped off-site was generated at Y-12 during 1986.

4.3 PCB Waste in Storage at the End of CY 1986

A total of 12.73 kg of liquid waste (> 50 ppm PCBs) was in storage at the end of CY 1986. Of this, 1.36 kg originated at Y-12 and 11.37 kg was radioactively contaminated. A total of 485.12 kg of liquid waste (< 50 ppm) was in storage at the end of 1986, 276.67 kg of which originated at Y-12.

For solid waste (> 50 ppm PCBs), 119.79 kg was in storage at the end of CY 1986, all from the X-10 site. Of this, 2.27 kg is radioactively contaminated and will not be shipped off-site for disposal. No waste containing < 50 ppm PCBs was in storage at the end of the year.

5.0 REFERENCES

- IARC (International Agency for Research on Cancer). 1982. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Polychlorinated Biphenyls and Polybrominated Biphenyls. Vol. 18. IARC, Lyon.
- IARC (International Agency for Research on Cancer). 1982. Chemicals, Industrial Processes and Industries Associated with Cancer in Humans. Supplement 4. IARC, Lyon.

APPENDIX A: Transformers Containing < 50 ppm PCBs

PCB Contaminated Transformers < 50 PPM

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
73J3182	1000M	unknown	.000	.000
73J3180	1000N	unknown	.000	.000
73J3181	1000S	unknown	.000	.000
72V9421	1504	13	220.000	833.800
81V3323	1505	4	130.000	492.700
77V6955	1505	4	440.000	1667.600
77V6956	1505	4	440.000	1667.600
8110081	2000	14	390.000	1478.100
3160694	2000	4	.000	.000
64011	2000	4	71.000	269.090
7513305	2000	4	59.000	223.610
L723482THNA	2010	unknown	.000	.000
L723483THNA	2010	unknown	.000	.000
L723484THNA	2010	unknown	.000	.000
N18009	2013	unknown	.000	.000
N18013	2013	unknown	.000	.000
N18014	2013	unknown	.000	.000
S11F150	2500	unknown	.000	.000
L243213	2519	4	210.000	795.900
64587	2525	4	125.000	473.750
64586	2525	4	125.000	473.750
64585	2525	4	125.000	473.750
28388	2525	unknown	.000	.000
2371106	2632	18	1297.000	4915.630
8110079	3000	13	1350.000	5116.500
8110080	3000	16	1350.000	5116.500
8110078	3000	29	1350.000	5116.500
80843	3003	4	113.000	428.270
80844	3003	4	113.000	428.270
80845	3003	4	113.000	428.270
PKR-94711	3010	30	260.000	985.400
PKR94711	3010	30	260.000	985.400
57H20430	3012	29	.000	.000
57H20431	3012	39	.000	.000
57H20429	3012	10	.000	.000
70L6659	3017	unknown	.000	.000
78J805241	3019S	unknown	.000	.000
F497848-64P	3025	5	80.000	303.200
F497849-64P	3025	5	80.000	303.200
F496875-64P	3025	5	80.000	303.200
73G1478	3025	unknown	.000	.000
7550039	3025W	4	122.000	462.380
7350044	3025W	4	122.000	462.380
7350043	3025W	4	122.000	462.380
143983	3034	unknown	.000	.000
66710	3039	29	130.000	492.700
66711	3039	10	130.000	492.700
66712	3039M	4	132.000	500.280
83V3577	3042	unknown	450.000	1705.500
7351430	3047	36	350.000	1326.500
76A480016	3085	unknown	.000	.000
77A060099	3085	unknown	.000	.000
77A080395	3085	unknown	.000	.000
70686	3500	4	55.000	206.150

PCB Contaminated Transformers < 50 PPM

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
67632	3500	4	55.000	208.450
70687	3500	4	55.000	208.450
67AH7855	3500	unknown	.000	.000
67AH5687	3500	unknown	.000	.000
67AH5688	3500	unknown	.000	.000
72AB7827	3500	unknown	.000	.000
64AK11441	3503	unknown	.000	.000
64AK12562	3503	unknown	.000	.000
64AL10170	3503	unknown	.000	.000
1988735	3503	unknown	.000	.000
A59467	3508	unknown	55.000	208.450
A59468	3508	unknown	.000	.000
A59470	3508	unknown	.000	.000
54836	3517	unknown	101.000	382.790
54837	3517	unknown	101.000	382.790
54838	3517	unknown	101.000	382.790
59298	3525	2	197.000	746.630
59299	3525	4	197.000	746.630
59297	3525	4	197.000	746.630
5065374	4000E	4	1335.000	5059.650
5065375	4000W	4	1335.000	5059.650
A59181	4500N	33	33.000	125.070
T4528	4500N	unknown	.000	.000
154363	4501	5	364.000	1379.560
49177	4505	4	200.000	758.000
7367553	4508	28	500.000	1895.000
7367549	4508	26	500.000	1895.000
7367549REG	4508	8	112.000	425.000
7367553REG	4508	5	112.000	425.000
1902056	4509	9	682.000	2584.780
1902055	4509	17	682.000	2584.780
1902057	4509	7	682.000	2584.780
F643813-67P	5507	unknown	.000	.000
77V8211	6005	4	535.000	2027.650
F959884	6010	2	180.000	682.200
F959883	6010	2	300.000	1137.000
F643634-67P	6010	46	94.000	356.260
V21808	6025	4	.000	.000
H26N4201	6025	4	160.000	606.400
1337042	7002	4	.000	.000
1337045	7002	4	.000	.000
1331476	7002	4	.000	.000
2546-3	7012	4	120.000	303.200
2546-2	7012	4	120.000	303.200
2546-1	7012	4	120.000	303.200
3153348	7033	5	55.000	208.450
1901716	7033	5	210.000	795.900
A59465	7033	5	80.000	303.200
A59466	7033	5	80.000	303.200
A59469	7033	5	80.000	303.200
27140-16	7033	18	237.000	898.230
27140-10	7033	16	237.000	898.230

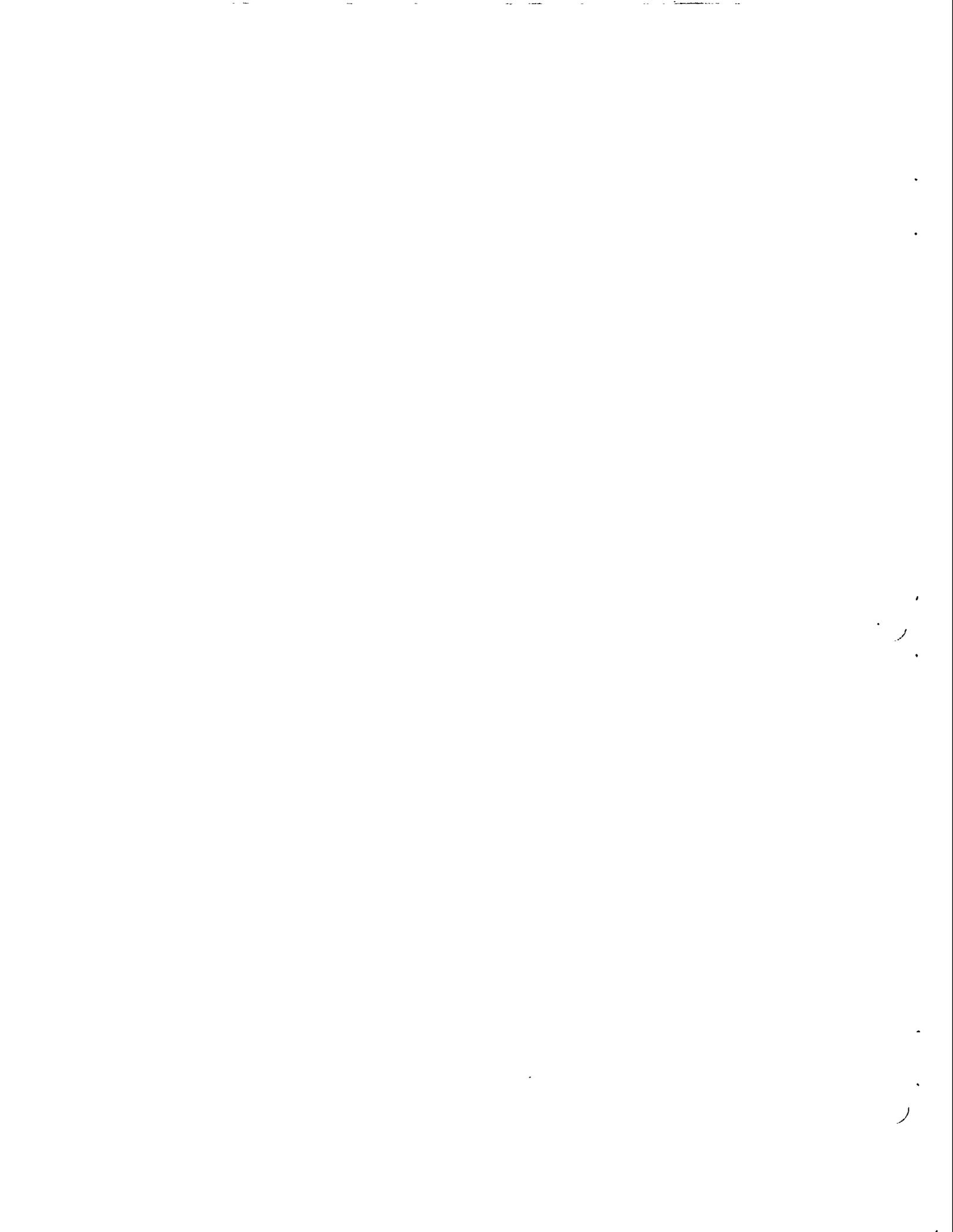
PCB Contaminated Transformers < 50 PPM

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
957331	7033	10	150.000	568.500
3160686	7033	46	110.000	416.900
27140-11	7033	10	237.000	898.230
8671542	7033	5	45.000	170.550
6589125	7033	7	50.000	189.500
B339639	7033	22	185.000	701.150
B339640	7033	13	185.000	701.150
B339641	7033	8	185.000	701.150
6154018	7033	43	40.000	151.640
73955	7033	unknown	59.000	223.610
4589-1	7033	4	53.000	200.870
2410184	7033	4	.000	.000
3160690	7033	4	.000	.000
F9F1056	7033	4	160.000	606.400
F9F1057	7033	4	160.000	606.400
F9F1058	7033	4	160.000	606.400
27140-8	7033	4	237.000	898.230
27140-14	7033	4	237.000	898.230
2620881	7033	4	572.000	2167.880
3694654	7033	unknown	.000	.000
2714016	7033	18	237.000	898.230
2714010	7033	16	237.000	898.230
2714020	7033	19	237.000	898.230
6263930	7033	unknown	5.250	19.898
1733294	7033	unknown	7.500	28.425
77A470017	7033	unknown	.000	.000
77A470019	7033	unknown	.000	.000
77A482448	7033	unknown	.000	.000
75AH10309	7033	unknown	.000	.000
77A100793	7033	unknown	.000	.000
77A160003	7033	unknown	.000	.000
78A020046	7033	unknown	.000	.000
78A020048	7033	unknown	.000	.000
78A020050	7033	unknown	.000	.000
80934-4077	7033	unknown	.000	.000
80935-4077	7033	unknown	.000	.000
80936-4077	7033	unknown	.000	.000
C9G2598	7033	unknown	.000	.000
3245040	7033	unknown	35.000	132.650
3245044	7033	unknown	35.000	132.650
6071564	7033	4	.000	.000
K40108	7033	unknown	.000	.000
K40109	7033	unknown	.000	.000
K40110	7033	unknown	.000	.000
C475272	7033	unknown	.000	.000
6586954	7033	unknown	55.000	208.450
3376-1	7033	4	70.000	265.300
3376-2	7033	4	70.000	265.300
3376-3	7033	4	70.000	265.300
73AK16492	7033	unknown	.000	.000

PCB Contaminated Transformers < 50 PPM

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
1901715	7033	4	210.000	795.900
66563	7033	4	55.000	208.450
66562	7033	4	55.000	208.450
66561	7033	4	55.000	208.450
64012	7033	4	107.000	405.530
3150523	7033	7	.000	.000
K41135	7033	unknown	.000	.000
K41136	7033	unknown	.000	.000
K41137	7033	unknown	.000	.000
G9H1023	7033	4	160.000	606.400
G9H1021	7033	4	160.000	606.400
G9H1022	7033	4	160.000	606.400
79A095663	7033	unknown	.000	.000
1742466	7033	unknown	21.000	79.590
15198	7033	3	225.000	852.750
M9D1621	7500	28	145.000	549.550
M9D1625	7500	3	145.000	549.550
M9D1623	7500	25	145.000	549.550
75474	7503	4	422.000	1599.380
SCV0999-01	7601	4	283.000	1072.570
L246058	7601	4	258.000	977.820
A9F1213	7700	9	145.000	549.550
A9F1211	7700	11	145.000	549.550
B5H8007	7700	5	145.000	549.550
T35H8007	7700	2	145.000	852.750
7731582	7710	38	500.000	1895.000
2384388	7852	unknown	67.000	253.930
2384387	7852	unknown	67.000	253.930
776002228	7860	4	225.000	852.750
7367568REG	7901	41	119.000	451.118
2371103	7901	2	1297.000	4915.630
7731581REG	7901	10	119.000	451.118
3428808	7901	15	200.000	758.000
7367568	7901	28	499.000	1891.660
7367568SW	7901	42	19.000	72.030
7731581	7901	45	499.000	1891.660
R3334	7901	unknown	31.000	117.490
R3333	7901	unknown	31.000	117.490
7022144	7920	38	275.000	1042.250
Total			32112.750	121557.947

unknown = small closed system transformers; not requiring PCB's;
cannot be sampled



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**OAK RIDGE
NATIONAL
LABORATORY**

**PCB Annual Report for
Oak Ridge National Laboratory - 1987**

MARTIN MARIETTA

N. S. Dailey
T. T. Puett

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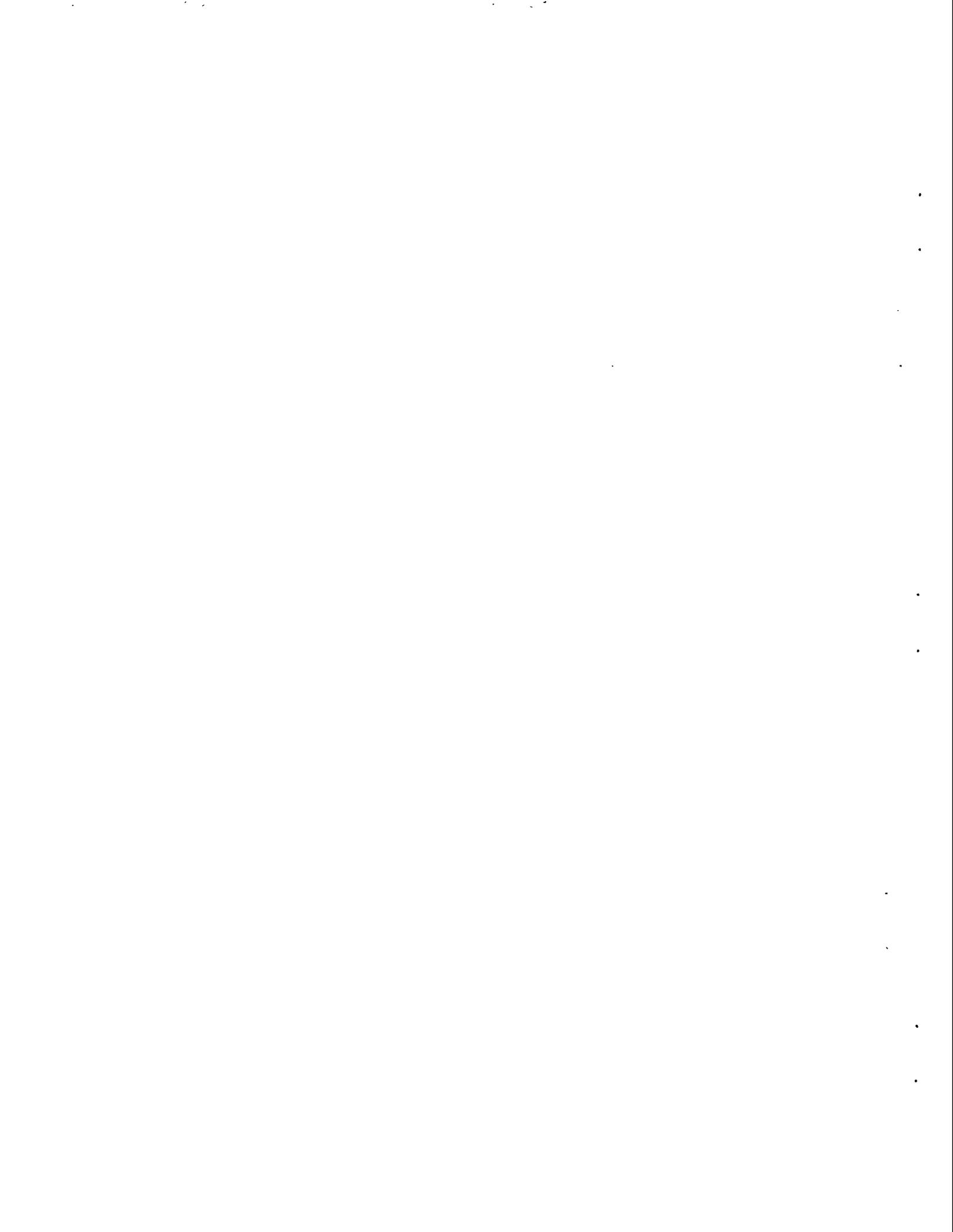
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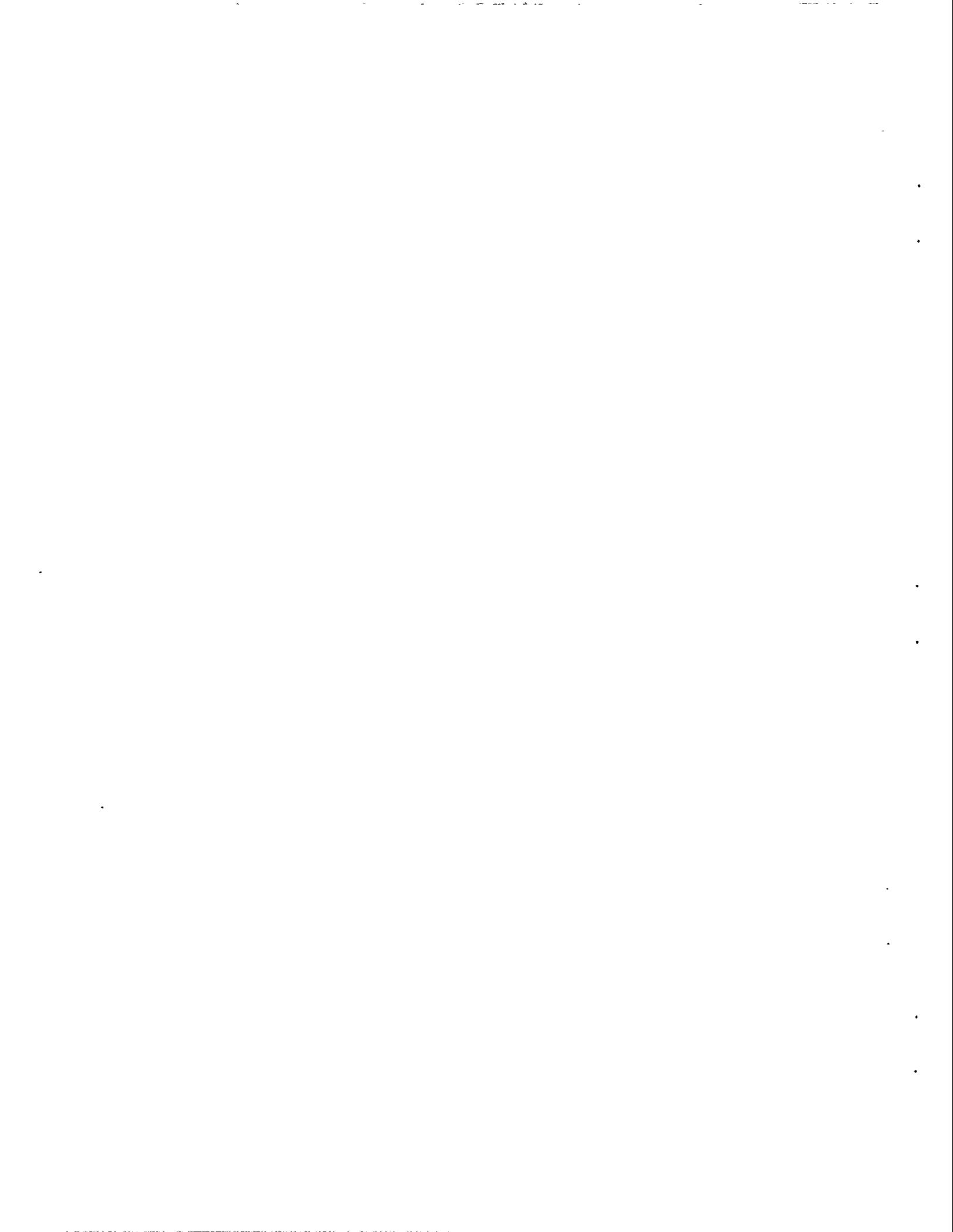
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ABSTRACT

Oak Ridge National Laboratory prepares a report annually as mandated by the Toxic Substances Control Act that summarizes records required of owners/operators of facilities where PCBs are in use. This report provides information on PCB and PCB-contaminated equipment in use or removed from service and PCB wastes generated, stored, and shipped off-site for treatment and disposal during calendar year 1987.

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1.0 INTRODUCTION

Polychlorinated biphenyls (PCBs) are a family of chlorinated aromatic hydrocarbons previously used extensively in electrical equipment, heat transfer systems, fire retardants, and plasticizers. PCBs can be detrimental to humans and the environment because of their toxicity, persistence, and tendency to bioaccumulate. Humans exposed to PCBs can develop dermatologic symptoms, follicular keratitis, excessive eye discharge, swelling of the eye lids, and nervous system symptoms (IARC 1978). In addition, available data are sufficient to support the carcinogenicity of PCBs to animals but are inadequate to demonstrate their carcinogenicity to humans (IARC 1982).

Congress mandated the control of PCBs under the Toxic Substances Control Act (TSCA) of 1976, Public Law 94-469, Section 6(e). To enforce TSCA, the Environmental Protection Agency (EPA) promulgated regulations under Title 40 of the Code of Federal Regulations (CFR), Part 761. Subpart A of 40 CFR 761 provides general information including definitions and references. Subpart B outlines requirements for the manufacture, processing, distribution, and use of PCBs. Subpart C governs marking and labeling requirements and Subpart D identifies storage and disposal requirements. Subpart J contains record-keeping and reporting requirements for owners or operators of facilities using or storing PCBs and includes an annual report to be submitted by July 1, covering the previous calendar year.

Oak Ridge National Laboratory (ORNL) is a multipurpose research and development facility owned and operated by the U. S. Department of Energy (DOE) and managed under subcontract by Martin Marietta Energy Systems, Inc. ORNL operates research laboratories at the main ORNL/X-10 site and at the DOE Y-12 Plant. ORNL manages PCBs and PCB-contaminated wastes that are generated at these sites in a manner that complies with state and federal regulations as well as DOE and Martin Marietta Energy Systems, Inc. (Energy Systems), procedures. These wastes are stored on-site at ORNL prior to their treatment and disposal at EPA-approved facilities. In addition, PCB articles, PCB containers, and PCB-contaminated electrical equipment are in use at ORNL. PCB transformers, however, are no longer in service at the ORNL/X-10 site. Only one PCB transformer was in service at the ORNL/Y-12 site during 1987.

This report summarizes ORNL/X-10's PCBs and PCB items in service or removed from service as well as PCBs or PCB-contaminated wastes generated, stored on-site, and shipped off-site for treatment and disposal during 1987. Also included in this report are PCBs and PCB-contaminated wastes generated at ORNL's Y-12 facilities that are handled by ORNL/X-10. Thus, this document fulfills the reporting requirement (40 CFR 761.80) for these PCB materials at ORNL/X-10 (hereafter referred to as ORNL). Information concerning other PCB wastes and PCB items (including the PCB transformer) at ORNL/Y-12 are addressed in Y-12's annual report.

2.0 REGULATIONS ON PCBs

The Toxic Substances Control Act authorizes EPA to regulate chemical substances and mixtures that present an unreasonable risk of injury to human health or the environment. The primary impact of TSCA on ORNL is the regulation of PCBs and PCB-contaminated equipment and materials. The following are some of the elements EPA promulgated to implement this control program for PCBs:

1. banned the manufacture, distribution in commerce, and use of PCBs in other than a "totally enclosed manner" (40 CFR Part 761.20);
2. established categories of electrical equipment: PCB transformer (≥ 500 ppm), PCB-contaminated electrical equipment (≥ 50 to < 500 ppm), and non-PCB transformers (< 50 ppm) [40 CFR Part 761.3 and 761.30 (a)(2)(v)];
3. set rules governing the conversion of PCB transformers to PCB-contaminated electrical equipment or to non-PCB transformers by draining, refilling, and/or otherwise servicing the transformer [40 CFR Part 761.30 (a)(2)(v)];
4. established criteria for the disposal of PCBs, PCB articles (PCB transformers, PCB capacitors, PCB hydraulic machines, PCB-contaminated electrical equipment, and other PCB articles), PCB containers, and PCBs resulting from the clean-up and removal of spills (40 CFR 761.60);
5. established standards for the marking (40 CFR 761.40 and 761.45) and storing of PCBs and PCB-contaminated liquids and solids (40 CFR 761.65);
6. prohibited the use of PCB transformers and PCB-filled electromagnets (with concentrations of 500 ppm or greater) posing an exposure risk to food and feed after October 1, 1985, and established regulations to reduce fire-related risks posed by the use of PCB transformers (40 CFR 761.30);
7. authorized the use of all other PCB transformers for the remainder of their useful lives, except for those posing fire-related risks, and required a quarterly inspection of this equipment for leaks of dielectric fluids (40 CFR 761.30);
8. authorized the use of large capacitors that are located in restricted access electrical substations or in contained and restricted installations for the remainder of their useful lives. The use of all other large PCB capacitors after October 1, 1988, however, is prohibited [40 CFR 761.30 (1)(1)(ii)];

9. and established standards for recordkeeping and annual reporting for owners or operators of facilities using or storing PCBs or PCB items, as well as facilities storing or disposing of PCBs or PCB items (40 CFR 761.180). PCB items include any PCB articles, PCB article containers, PCB containers, or PCB equipment that deliberately or unintentionally contains PCBs.

Handling of PCBs and PCB-contaminated materials at ORNL are also governed internally under Martin Marietta Energy Systems, Inc., and ORNL policies. These policies ["Martin Marietta Energy Systems Policy for Use, Storage and Disposal of PCB" dated February 23, 1987, and ORNL Environmental Protection Manual Section 4.0 "Polychlorinated Biphenyls (PCB)" dated January 15, 1987] require management of some materials containing 2 ppm or greater PCBs as PCB wastes.

3.0 RECORDS AND REPORTING

Annual reporting is accomplished through a computerized PCB Tracking System (PCBTS), a module within a larger Hazardous Waste Tracking System which runs on ORNL's DECsystem PDP-10 computer with System 1022 as the database management system. The PCBTS is comprised of two submodules: one on equipment inventories and one on waste generation and disposal. The equipment database contains information on inventories of PCB-contaminated transformers (Section 3.1), PCB large high- and low-voltage capacitors (Section 3.2), as well as miscellaneous PCB-contaminated hydraulic equipment (Section 3.3). The records on the PCB-contaminated equipment are maintained by the Environmental Monitoring and Compliance Section (EMC) in the Environmental and Health Protection Division. The data for the equipment database are provided by the laboratory's Environmental Protection Officers for research equipment, Plant and Equipment Division for electrical service transformers, and periodic laboratory-wide surveys.

Records for the second module of the PCBTS, the PCB waste database, cover generation and disposal of both PCBs and PCB-contaminated wastes (refer to Section 3.4). The PCB waste submodule receives storage and shipment data from the larger Hazardous Waste Tracking System. The PCB waste data are compiled by the Waste Operations Group in the Environmental and Health Protection Division.

Regulations regarding reporting (40 CFR Part 761.180) require the dates PCBs and PCB items are removed from service, placed into storage for disposal, and placed into transport for disposal. For PCBs and PCB items removed from service, the regulations require the location of the initial storage or disposal facility and the name of the owner or operator of the facility. The regulations also require information on PCBs and PCB items remaining in service at the end of the calendar year including the total weight in kilograms of any PCBs and PCB items in PCB containers, total number of PCB transformers and total weight of the PCBs they contain, and the total number of PCB large high- or low-voltage capacitors. Storage and disposal facilities have additional reporting requirements including dates and quantities of PCBs and PCB-contaminated wastes transferred into or out of the facility during the year and those retained in storage at the end of the year.

3.1 PCB Transformers

During the 1980s, ORNL undertook a program to reduce levels of PCBs in equipment used in the plant. The last PCB transformers (≥ 500 ppm) were removed from service and disposed of in CY 1986. Between 1980 and 1984, ORNL's transformers containing ≥ 50 but < 500 ppm PCBs were chemically treated to decrease their concentrations of PCBs, where feasible.¹ Hence following the program to reduce PCBs, no PCB transformers (≥ 500 ppm) and

¹ Small closed system transformers (typically pole-mounted units) cannot be sampled and are assumed by EPA to contain ≥ 50 but < 500 ppm PCBs. These PCB-contaminated transformers were not included in ORNL's treatment program to reduce PCB levels.

only two PCB-contaminated transformers (≥ 50 but < 500 ppm PCBs) were in service at ORNL at the end of CY 1987 (Table 1). Untested transformers¹ and non-PCB transformers² are listed in Appendix A. The latter are listed because they are managed as PCB-contaminated transformers under Energy Systems and ORNL policies.

Table 1. PCB-Contaminated Transformers (≥ 50 but < 500 ppm) in Service During CY 1987

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
7731801	7901	53	499.000	1891.210
7373793	7901	68	500.000	1895.000
		Total	999.000	3786.210

3.2 PCB Capacitors

Subpart A of the regulations defines three types of capacitors: small capacitors, large high-voltage capacitors, and large low-voltage capacitors. A small capacitor is a capacitor which contains less than 1.36 kgs (3 lbs) of dielectric fluid. A large high-voltage capacitor contains 1.36 kgs (3 lbs) or more of dielectric fluid and operates at 2,000 volts or above; whereas, a large low-voltage capacitor contains 1.36 kgs (3 lbs) or more of dielectric fluid and operates below 2,000 volts. A capacitor whose total volume is less than 1,639 cubic centimeters (100 cubic inches) is assumed to contain less than 1.36 kgs of dielectric fluid. PCBs were used as the dielectric fluid in most capacitors manufactured between 1920 and 1978. Although the manufacture of capacitors containing PCBs has been banned, their use in a totally enclosed manner is still allowed. The regulations require that all capacitors be considered to be treated as PCB items except when known to contain no PCBs and labeled "No PCBs." Thus, it is assumed that unmarked capacitors (both large and small) contain PCBs.

The majority of PCB capacitors in use at ORNL are small (less than 1.36 kgs of dielectric fluid). The ORNL electrical system does not have any PCB large high- or low-voltage capacitors (as they are referred to in the regulations); however, various research-related instruments do contain them. ORNL and Energy Systems policies concerning handling of PCB capacitors (both large and small) requires that they be collected and stored on-site, and ultimately disposed of in an EPA approved incinerator. This procedure is seemingly more stringent than required under 40 CFR 761.60,

² Those containing < 50 ppm PCBs under the EPA regulations.

which states that small capacitors may be disposed of in municipal landfills. However, EPA has indicated that the disposal of large quantities (greater than 25) of small capacitors by commercial and industrial activities poses a larger environmental risk than that from households or other infrequent disposers. Therefore, EPA encourages companies to voluntarily collect and dispose of small capacitors in a high temperature incinerator. Thus, ORNL and Energy Systems policies are geared toward meeting the letter and the intent of the federal PCB regulations.

During early 1988, EMC staff initiated a laboratory-wide survey of PCB-contaminated equipment, including both large capacitors and other miscellaneous equipment. As of June 1988, the survey was not yet complete but some data were available and are reported here. Where possible the new data are cross-referenced to the data listed in the 1986 report via equipment serial numbers (i.e., current and former numbers).

In all, ORNL had 135 PCB large high- and low-voltage capacitors in service at the end of CY 1987 (Table 2). The information within the equipment database that is provided for large PCB capacitors are: location, serial number, PCB level, weight in kilograms and total number of PCB large high- or low-voltage capacitors. Identical capacitors at the same location are grouped and a single serial number is assigned to them.

Twenty-one large PCB capacitors were removed from service during 1987 (Table 3). Several more are scheduled to be removed in 1988. In general, large and small PCB capacitors are packed in Department of Transportation-approved drums and shipped off-site for incineration in accordance with EPA regulations (refer to Section 3.4 PCB Wastes, Table 8). PCB capacitors remaining in storage at the end of the year are included in Section 3.4, Table 11.

3.3 Miscellaneous PCB-Contaminated Equipment

In addition to PCB-contaminated transformers and large PCB capacitors, ORNL has some miscellaneous equipment contaminated with PCBs. Examples of this miscellaneous equipment are pumps, pipes, electric motors, or other oil-filled equipment that typically contain low levels of PCBs and whose surface(s) has been in direct contact with PCBs. A laboratory-wide survey for these items was initiated in early 1988, in conjunction with the large capacitor survey, to validate information in the PCBTS for those in service during 1987. The initial goals of the survey were to locate items containing PCBs as listed in the database and identify any new items which are now on-site. Based on initial results of the survey, oils from a representative number of these items were sampled and analyzed for PCB levels to see if these concentrations were consistent with that reported earlier. Those items last recorded as having > 50 ppm PCBs were given special attention [refer to Table 4 in the 1986 Annual Report (Barkenbus et al. 1987)]. The inventory is on-going, but some preliminary results are available.

Table 2. PCB Large High- and Low-Voltage Capacitors in Service
During CY 1987

Serial Number	Quantity	Location	PCB:PPM	Capacity ¹	
				Gallons	Kilograms
41061005V-21A	4	2525	1000000	.600	2.274
41061005V-21	4	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.600	2.274
178161	4	3025	1000000	1.200	4.548
FRT-3	4	3095	1000000	.800	3.032
A17055	1	3500 B50	1000000	3.700	14.023
03646	1	3500 B50	1000000	3.700	14.023
853557	1	3500 C23	1000000	16.000	60.640
9-1502-00092-5	1	3500 D30	1000000	7.500	28.425
T093119	9	3500 R8	1000000	4.000	15.160
R10..840	3	3508 ATTIC	unknown	3.990	15.122
P68734	3	3508 ATTIC	unknown	3.990	15.122
R10837	3	3508 ATTIC	unknown	3.990	15.122
R 10:840	3	3508 ATTIC	1000000	3.990	7.201
R 10837	3	3508 ATTIC	1000000	3.990	7.428
P 68734	3	3508 ATTIC	1000000	3.990	15.122
410229	1	3525 119	1000000	5.200	19.708
001	1	3525 119	1000000	6.200	23.498
B48A	6	4500S B48A	1000000	1.200	4.548
7449T	2	4500S B48B	1000000	1.200	4.548
55069	12	4500S B54	1000000	.360	1.364
29A104	12	4500S B54	1000000	.360	1.364
B54	18	4500S B54	1000000	1.200	4.548
X92873	1	4500S D54	1000000	.900	3.411
X88126	1	4500S T14	1000000	.400	1.516
A41482	2	4501 R105	1000000	1.900	7.201
79F204	6	4501 R220	1000000	4.000	15.160
19F86	10	4508	1000000	2.500	9.475
69-03378	3	4508 226	1000000	10.200	38.658
C297207	1	4508 226	1000000	6.400	24.256
G4-5165-01	2	7003	1000000	3.900	14.781
MONSON-1	4	7041	1000000	.800	3.032
Total Number	135		Total	309.48 ²	1127.513 ²

¹ - Per single capacitor

² - Total represents all units

Table 3. PCB Large High- and Low-Voltage Capacitors Removed from Service During CY 1987

Serial Number	Qty	PCB:PPM	Capacity ¹		Date Removed	Disposer	Date Shipped
			Gallons	Kilograms			
9L18ACE301	3	1000000	0.45	1.706	12/31/87	CHEM WASTE MANAGEMENT ²	02/11/87
LING-1	3	1000000	1.58	5.988	9/14/87	CHEM WASTE MANAGEMENT ²	02/11/87
W-1	9	1000000	6.60	25.014	9/24/87	CHEM WASTE MANAGEMENT ²	02/11/87
FRT6-2	4	1000000	.80	3.032	9/24/87	CHEM WASTE MANAGEMENT ²	02/11/87
CUSTOM BUILT	1	4	80.00	303.200	8/17/87	ENSCO ³	8/17/87
SIEMENS #332161	1	58	40.00	151.60	8/17/87	ENSCO ³	8/17/87
Total Number	<u>21</u>	Total	<u>188.69⁴</u>	<u>715.134⁴</u>			

1 - Per single capacitor

2 - Chem Waste Management, Emelle, Al. 35459

3 - Ensco, Inc., White Bluff, Tn. 37187

4 - Total represents all units

These preliminary results indicate that PCB-levels in several pieces of equipment have been reduced by draining the PCB-contaminated oil and refilling the unit with non-PCB oil. The most significant reduction was found in a hydraulic unit which now contains 7500 ppm PCBs compared to 950000 ppm PCBs as reported earlier. Only 5 items identified in the 1986 Annual Report now contain ≥ 50 ppm PCBs (Table 4). Additional information on miscellaneous equipment (< 50 ppm PCBs) removed from service during the year is provided in Appendix B. The latter includes a lathe which is scheduled for transfer to ORNL/Y-12's Fusion Energy Division for their use. Once it has been transferred, all future reporting for this lathe will be carried in Y-12's Annual Report.

Table 4. Miscellaneous PCB-Contaminated Equipment \geq 50 ppm in Service During CY 1987

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
X105593A	Hydraulic Unit	3012	7500	150.000	568.500
X168822	Drive Motor	3012	69	5.000	18.92
3024-269	Grinder	3024	83	3.000	11.370
3044-358	Surface Grinder	3044	65	15.000	56.850
3525-023	Waste Press	3525	301	2.000	7.580
6000-063	Oil Reclaimer	6000 C	94	1500.000	5685.000
Total				1675.000	6348.220

3.4 PCB Wastes

PCB wastes at ORNL include contaminated oils, large capacitors, small capacitors including fluorescent light ballasts, contaminated solids (e.g., rags, papers from spill cleanups), transformer carcasses (i.e., drained units), and contaminated wastes from unintentional spills and releases. The majority of PCB wastes are stored on-site at Building 7507 for under one year and are shipped to an off-site EPA-approved incinerator for disposal. There are two exceptions to this practice. First, drained transformer carcasses can be disposed of at an incinerator or a chemical waste landfill provided they are EPA-approved facilities. Second, PCB wastes that are co-contaminated with radioactive constituents are not subject to off-site disposal and, therefore, require long-term storage on-site. As a result, a small amount of radioactively co-contaminated PCB wastes, primarily oils, are stored on-site at the 7507W Mixed Waste Pad awaiting incineration at the DOE Oak Ridge Gaseous Diffusion Plant (ORGDP) TSCA incinerator (see Wastes in Storage section below).

At ORNL, PCB wastes are classified into two categories: \geq 2 but $<$ 50 ppm (that requiring disposal under ORNL and Energy Systems policies) and \geq 50 ppm PCBs [that requiring disposal under EPA regulations (40 CFR 761.60) as well as ORNL and Energy Systems policies]. Waste oils constitute over two-thirds (70%) of ORNL's total PCB wastes. Low concentrations of PCBs (\geq 2 to $<$ 50 ppm) are frequently detected in waste oils from various sources. Most of the waste oils that contain a high concentration of PCBs (\geq 500 ppm) were used as dielectric fluids in electrical equipment or in heat exchange systems.

Information reported in the PCBTS for PCB wastes include disposal container (drum number), source location, waste description, weight, PCB concentration, disposer, and disposer location. The date to storage is the date wastes were received at the main ORNL storage facility, while date shipped is the date wastes were picked up by the disposer.

Wastes Shipped Off-site

All non-radioactive PCB wastes (≥ 2 ppm) are shipped off-site for disposal at an EPA-approved facility. For these off-site shipments, PCB wastes are manifested in the same manner as RCRA (Resource Conservation and Recovery Act) hazardous wastes and copies of the manifests are retained by the Waste Operations Group. Some of the wastes shipped off-site for disposal are generated at ORNL facilities located in Building 9201-2 at the Y-12 plant.

During 1987, ORNL shipped a total of 12130.47 kgs of liquid PCB wastes for incineration at an off-site facility. This included 8468.76 kgs of waste oils containing < 50 ppm PCBs and 3661.71 kgs of waste oils containing ≥ 50 ppm. Summaries of off-site shipments of these liquid wastes containing < 50 ppm PCBs and ≥ 50 ppm PCBs are given in Tables 5 and 6, respectively. Facilities at ORNL/Y-12 contributed a total of 2570.98 kgs of these liquid PCB wastes. Only 485.12 kgs out of the total 12130.47 kgs of liquid PCB wastes that were shipped off-site were carried over from CY 1986.

Off-site shipments of solid wastes containing < 50 ppm PCBs are listed in Table 7 and those containing ≥ 50 ppm PCBs are presented in Table 8. A total of 625.35 kgs of solid wastes containing < 50 ppm PCBs and 2276.75 kgs of solid wastes containing ≥ 50 ppm PCBs were shipped off-site in CY 1987. Of these amounts, only 638 kgs were generated at ORNL/Y-12. A total of 122.05 kgs of the solid PCB wastes shipped off-site in 1987 were carried over from CY 1986.

Wastes in Storage

Liquid wastes in storage at year's end containing < 50 ppm PCBs are shown in Table 9 and those containing ≥ 50 ppm PCBs are given in Table 10. The current inventory includes 1266.06 kgs of oils containing < 50 ppm PCBs and 72.41 kgs of oils containing ≥ 50 ppm PCBs. The major portion of these wastes are co-contaminated with low levels of radioactivity and as a result are stored on-site at the Mixed Waste Pad at 7507W. These mixed wastes will be incinerated at the DOE ORGDP's TSCA incinerator when it is operational. Only 30.82 kgs of the total waste oils in storage at year end are awaiting treatment and disposal at an off-site commercial facility.

No solid wastes containing < 50 ppm PCBs were in storage at the end of the year. Solid PCB wastes containing ≥ 50 ppm held in storage at the end of CY 1987 are shown in Table 11. All of these wastes were generated at the X-10 site. The solid wastes in storage amounted to 2661.16 kgs. Only 2 kgs of that are co-contaminated with radioactivity and will be held for treatment at the TSCA incinerator at the DOE ORGDP.

Table 5. Liquid PCB Wastes < 50 ppm Shipped Off-Site for Disposal
During CY 1987

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
517B	2013	OIL PCB 3 PPM	208.45	3	10/08/86	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
518B	Y9201-2	OIL PCB 22 PPM	68.22	22	10/08/86	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
519B	Y9201-2	OIL PCB 22 PPM	208.45	22	10/08/86	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
555B	Y9201-2	OIL PCB 22 PPM	208.45	22	1/07/87	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
556B	Y9201-2	OIL PCB 22 PPM	208.45	22	1/07/87	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
557B	Y9201-2	OIL PCB 22 PPM	208.45	22	1/07/87	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
558B	Y9201-2	OIL PCB 22 PPM	208.45	22	1/07/87	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
559B	Y9201-2	OIL PCB 22 PPM	208.45	22	1/07/87	1/15/87	ROLLINS ENVIRONMENTAL SERVICES ¹
586B	2026	OIL PCB 5 PPM	18.95	5	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
587B	2018	OIL PCB 15 PPM	208.45	15	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
588B	2018	OIL PCB 5 PPM	208.45	5	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
589B	2018	OIL PCB 5 PPM	208.45	5	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
590B	2018	OIL PCB 11 PPM	208.45	11	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
591B	2018	OIL PCB 6 PPM	208.45	6	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹

Table 5. Liquid PCB Wastes < 50 ppm Shipped Off-Site for Disposal
During CY 1987 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
592B	2018	OIL PCB 8 PPM	208.45	8	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
593B	2018	OIL PCB 4 PPM	208.45	4	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
594B	2018	OIL PCB 2 PPM	208.45	2	1/28/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
606B	3517	OIL PCB 6 PPM	208.45	6	2/11/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
607B	3517	OIL PCB 6 PPM	208.45	6	2/11/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
608B	3517	OIL PCB 6 PPM	208.45	6	2/11/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
609B	3517	OIL PCB 6 PPM	208.45	6	2/11/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
610B	5505	OIL PCB 6 PPM	208.45	6	2/11/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
624B	3028	OIL PCB 6 PPM	208.45	6	3/04/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
675B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
676B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
677B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
678B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
679B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹

Table 5. Liquid PCB Wastes < 50 ppm Shipped Off-Site for Disposal
During CY 1987 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
680B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
681B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
682B	2525	OIL PCB 3 PPM	178.13	3	4/29/87	5/20/87	ROLLINS ENVIRONMENTAL SERVICES ¹
709B	6010	OIL PCB 4 PPM	208.45	4	5/28/87	8/17/87	ENSCO, INC. ²
720B	6010	OIL PCB 28 PPM	104.23	28	6/02/87	8/17/87	ENSCO, INC. ²
741B	Y9201-2	OIL PCB 12 PPM	208.45	12	6/16/87	8/17/87	ENSCO, INC. ²
742B	Y9201-2	OIL PCB 6 PPM	208.45	6	6/16/87	8/17/87	ENSCO, INC. ²
743B	Y9201-2	OIL PCB 11 PPM	208.45	11	6/16/87	8/17/87	ENSCO, INC. ²
744B	Y9201-2	OIL PCB 23 PPM	208.45	23	6/16/87	8/17/87	ENSCO, INC. ²
745B	Y9201-2	OIL PCB 3 PPM	208.45	3	6/16/87	8/17/87	ENSCO, INC. ²
746B	Y9201-2	OIL PCB 15 PPM	208.45	15	6/16/87	8/17/87	ENSCO, INC. ²
762B	2008	OIL PCB 4 PPM	208.45	4	7/01/87	8/17/87	ENSCO, INC. ²
763B	2008	OIL PCB 4 PPM	181.92	4	7/01/87	8/17/87	ENSCO, INC. ²
794B	3039	OIL PCB 4 PPM	208.45	4	8/17/87	8/17/87	ENSCO, INC. ²
795B	3039	OIL PCB 4 PPM	208.45	4	8/17/87	8/17/87	ENSCO, INC. ²
796B	3525	OIL PCB 12 PPM	208.45	12	8/17/87	8/17/87	ENSCO, INC. ²
TOTAL			8468.76				

TOTAL DRUMS = 44

1 - Rollins Environmental Services, Deer Park, Tx. 77536

2 - Ensco, Inc., El Dorado, Ark. 71730

Table 6. Liquid PCB Wastes \geq 50 ppm Shipped Off-Site for Disposal
During CY 1987

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
510B	Y9201-2	PCB OIL	1.36	unknown	10/03/86	1/15/87	ROLLINS ENVIRON SERVICES ¹
561B	4500S	OIL PCB 220 PPM	3.00	220	1/15/87	1/15/87	ROLLINS ENVIRON SERVICES ¹
707B	4500S	OIL PCB 42000 PPM	208.45	42000	5/28/87	8/17/87	ENSCO ²
708B	4500N	OIL PCB 160 PPM	208.45	160	6/10/87	8/17/87	ENSCO ²
757B	2008	OIL PCB 58 PPM	208.45	58	7/01/87	8/17/87	ENSCO ²
758B	2008	OIL PCB 58 PPM	208.45	58	7/01/87	8/17/87	ENSCO ²
759B	2008	OIL PCB 58 PPM	208.45	58	7/01/87	8/17/87	ENSCO ²
760B	2008	OIL PCB 58 PPM	208.45	58	7/01/87	8/17/87	ENSCO ²
761B	2008	OIL PCB 58 PPM	208.45	58	7/01/87	8/17/87	ENSCO ²
781B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
782B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
783B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
784B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
785B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
786B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
787B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
788B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
789B	2525	OIL PCB 96 PPM	208.45	96	8/17/87	8/17/87	ENSCO ²
790B	2008	OIL PCB 58 PPM	208.45	58	8/17/87	8/17/87	ENSCO ²
791B	2008	OIL PCB 58 PPM	113.70	58	8/17/87	8/17/87	ENSCO ²
TOTAL			3661.71				

TOTAL DRUMS = 20

1 - Rollins Environmental Services, Deer Park, Tx. 77536

2 - Ensco, Inc., El Dorado, Ark. 71730

Table 7. Solid PCB Wastes < 50 ppm Shipped Off-Site for Disposal
During CY 1987

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
669B	2525	CONTAMINATED SOLIDS PCB 13 PPM	208.45	13	4/28/87	5/20/87	ROLLINS ENVIRON SERVICES ¹
670B	2525	CONTAMINATED SOLIDS PCB 13 PPM	208.45	13	4/28/87	5/20/87	ROLLINS ENVIRON SERVICES ¹
671B	2525	CONTAMINATED SOLIDS PCB 13 PPM	208.45	13	4/28/87	5/20/87	ROLLINS ENVIRON SERVICES ¹
TOTAL			<u>625.35</u>				

TOTAL DRUMS = 3

¹ - Rollins Environmental Services, Deer Park, Tx. 77536

Table 8. Solid PCB Wastes \geq 50 ppm Shipped Off-Site for Disposal During CY 1987

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
510B	3500	PCB CONTAMINATED TRANSFORMERS ¹	71.24	unknown	10/09/86	1/15/87	ROLLINS ENVIRON SERVICES ²
512B	2026	CIRCUIT BOARD PCB 2000 PPM	34.48	2000	10/02/86	1/15/87	ROLLINS ENVIRON SERVICES ²
513B	2026	PCB CONTAMINATED SOLIDS	16.33	unknown	10/02/86	1/15/87	ROLLINS ENVIRON SERVICES ²
580B	4500S	LIGHT BALLAST	208.45	unknown	1/20/87	5/20/87	ROLLINS ENVIRON SERVICES ²
581B	4500S	LIGHT BALLAST	208.45	unknown	1/20/87	5/20/87	ROLLINS ENVIRON SERVICES ²
582B	4500S	LIGHT BALLAST	208.45	unknown	1/20/87	5/20/87	ROLLINS ENVIRON SERVICES ²
598B	3500	PCB CONTAMINATED SOLIDS	4.54	unknown	3/16/87	5/20/87	ROLLINS ENVIRON SERVICES ²
637B	Y9201-2	PCB CONTAMINATED ABSORBAL	208.45	unknown	3/25/87	5/20/87	ROLLINS ENVIRON SERVICES ²
639B	Y9201-2	PCB CONTAMINATED SAND COMPOUND ABSORBAL	208.45	unknown	3/26/87	5/20/87	ROLLINS ENVIRON SERVICES ²
640B	Y9201-2	PCB CONTAMINATED SAND COMPOUND ABSORBAL	208.45	unknown	3/26/87	5/20/87	ROLLINS ENVIRON SERVICES ²
641B	Y9201-2	PCB CONTAMINATED SOLIDS	13.61	unknown	4/30/87	5/20/87	ROLLINS ENVIRON SERVICES ²
658B	7710	PCB CAPACITORS	226.86	unknown	4/01/87	5/20/87	ROLLINS ENVIRON SERVICES ²
686B	4500S	PCB BALLASTS	208.45	unknown	5/05/87	5/20/87	ROLLINS ENVIRON SERVICES ²
735B	4500S	PCB CONTAMINATED TRANSFORMERS ¹	19.51	unknown	6/10/87	8/17/87	ENSCO ³
752B	6010	PCB BALLASTS	249.55	unknown	6/23/87	8/17/87	ENSCO ³
792B	2008	PCB CONTAMINATED SOLIDS	90.74	unknown	8/17/87	8/17/87	ENSCO ³
793B	2008	PCB CONTAMINATED SOLIDS	90.74	unknown	8/17/87	8/17/87	ENSCO ³
TOTAL			2276.75				
TOTAL DRUMS = 17							

1 - Small units with no serial numbers.

2 - Rollins Environmental Services, Deer Park, Tx. 77536

3 - Ensco, Inc., El Dorado, Ark. 71730

Table 9. Liquid PCB Wastes Inventory < 50 ppm in Storage
at the End of CY 1987

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date To Storage	Storage Location
555R	2525	OIL PCB 9.9 PPM	208.45	9.9	4/14/87	7507W
556R	2525	OIL PCB 9.9 PPM	208.45	9.9	4/14/87	7507W
557R	2525	OIL PCB 3 PPM	208.45	3	4/14/87	7507W
558R	2525	OIL PCB 3 PPM	208.45	3	4/14/87	7507W
573R	3085	OIL PCB 3 PPM	208.45	3	4/28/87	7507W
598R	6010	OIL PCB 7 PPM	208.45	7	5/28/87	7507W
800B	4500S	OIL PCB 24 PPM	15.36	24	10/01/87	7507
TOTAL			<u>1266.06</u>			

TOTAL DRUMS = 7

Table 10. Liquid PCB Wastes Inventory \geq 50 ppm in Storage
at the End of CY 1987

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date To Storage	Storage Location
800B	4500S	OIL PCB 50 PPM	4.19	50	10/01/87	7507
827B	2018	ASKAREL PCB 1000000 PPM	56.85	1000000	9/25/87	7507
??R	Unknown	OIL PCB 200 PPM	11.37	200	11/06/84	7507W
TOTAL			<u>72.41</u>			

TOTAL DRUMS = 3

Table 11. Solid PCB Wastes Inventory \geq 50 ppm in Storage
at the End of CY 1987

Disposal Container	Source Location	Waste Description	Drum Weight in Kgs	PCB:PPM	Date To Storage	Storage Location
	2018	PCB CONTAMINATED EMPTY DRUM	22.69	unknown	9/25/87	7507
322R	1505	PCB CONTAMINATED SOLIDS	2.27	unknown	11/25/85	7507W
734B	4500S	CONTAMINATED SOLIDS PCB 50 PPM	18.38	50	10/01/87	7507
825B	2018	PCB CONTAMINATED SOLIDS	208.45	unknown	9/25/87	7507
826B	2018	PCB CONTAMINATED SOLIDS	208.45	unknown	9/25/87	7507
837B	6000	PCB CAPACITORS	208.45	unknown	10/13/87	7507
838B	6000	PCB CAPACITORS	208.45	unknown	10/13/87	7507
839B	6000	PCB CAPACITORS	208.45	unknown	10/13/87	7507
840B	6000	PCB CAPACITORS	208.45	unknown	10/13/87	7507
853B	2018	PCB BALLASTS	208.45	unknown	10/29/87	7507
854B	2018	PCB BALLASTS	208.45	unknown	10/29/87	7507
855B	2018	PCB BALLASTS	208.45	unknown	10/29/87	7507
872B	3024	PCB BALLASTS	208.45	unknown	12/09/87	7507
873B	3024	PCB BALLASTS	211.17	unknown	12/09/87	7507
874B	3024	PCB BALLASTS	208.45	unknown	12/09/87	7507
875B	3024	PCB BALLASTS	113.70	unknown	12/09/87	7507
TOTAL			<u>2661.16</u>			
TOTAL DRUMS = 16						

4.0 SUMMARY

ORNL manages PCBs and PCB-contaminated equipment and wastes in compliance with state and federal regulations as well as DOE and Energy Systems procedures. PCB-contaminated equipment include transformers, capacitors, and miscellaneous items (either hydraulic units or those which contain oils). All PCB wastes are collected and stored on-site. All non-radioactive PCB wastes are shipped off-site to an EPA-approved facility for disposal in less than one year. Only radioactively contaminated PCB wastes are stored on-site for longer than one year, awaiting incineration at a DOE-sponsored facility when it is operational. Off-site shipments of PCBs and PCB items are manifested to ensure proper handling and tracking. ORNL reporting of both equipment and wastes is accomplished through a computerized PCB Tracking System. Highlights of ORNL's management of PCBs and PCB-contaminated equipment and wastes are presented below.

4.1 PCB Transformers

No PCB transformers (≥ 500 ppm) have been in service at ORNL since CY 1986. Only two transformers in service still contain ≥ 50 ppm PCBs after servicing to reduce PCB levels. However, 72 untested transformers (assumed to be ≥ 50 but < 500 ppm PCBs under EPA regulations) are also in service at the Laboratory.

4.2 PCB Capacitors

A total of 135 PCB large high- and low-voltage capacitors were in service at the end of CY 1987. Twenty-one large PCB capacitors were removed from service during the year.

4.3 Miscellaneous PCB-Contaminated Equipment

ORNL currently has 5 pieces of equipment that are contaminated with ≥ 50 ppm PCBs. One lathe (49 ppm PCBs) will be transferred to the ORNL's Fusion Energy Division at Y-12. Henceforth, it will be included in Y-12's Annual Reports.

4.4 PCB Wastes

Wastes Shipped Off-Site

A total of 8468.76 kgs of waste oils containing < 50 ppm PCBs and 3661.71 kgs of waste oils containing ≥ 50 ppm PCBs were shipped off-site for incineration and disposal in CY 1987.

During 1987, 2276.75 kgs of PCB-contaminated (≥ 50 ppm) solid wastes were shipped off-site for incineration and disposal. Another 625.35 kgs of solid wastes containing < 50 ppm PCBs were also shipped off-site.

Wastes in Storage

At the end of CY 1987, 72.41 kgs of waste oils (\geq 50 ppm PCBs) were in storage awaiting treatment and disposal. Of this, 11.37 kgs are co-contaminated with radioactivity. In addition, 1266.06 kgs of waste oils ($<$ 50 ppm PCBs) were in storage at the end of 1987. This includes 1250.7 kgs of radioactively co-contaminated waste oils and 15.36 kgs of non-radioactive waste oils. Radioactively co-contaminated waste oils will be sent to the DOE ORGDP's TSCA incinerator when it begins operation. Non-radioactive oils containing PCBs are sent to EPA-approved treatment facilities.

PCB solid wastes (\geq 50 ppm) on-site at year end totaled 2661.16 kgs. All but 2.27 kgs, which are radioactively co-contaminated, will be shipped off-site for treatment and disposal. The radioactive solids will be stored for future treatment at the TSCA incinerator at the DOE ORGDP.

5.0 REFERENCES

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IARC (International Agency for Research on Cancer). 1982. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Polychlorinated Biphenyls and Polybrominated Biphenyls. Vol. 18. IARC, Lyon.

IARC (International Agency for Research on Cancer). 1982. Chemicals, Industrial Processes and Industries Associated with Cancer in Humans. Supplement 4. IARC, Lyon.

Appendix A. Non-PCB Transformers (< 50 ppm) and
PCB-Contaminated Transformers (\geq 50 but < 500 ppm)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
73J3182	1000M	unknown ^a	.000	.000
73J3180	1000N	unknown	.000	.000
73J3181	1000S	unknown	.000	.000
72V9421	1504	13	220.000	833.800
81V3323	1505	4	130.000	492.700
77V6955	1505	4	440.000	1667.600
77V6956	1505	4	440.000	1667.600
8110081	2000	15	390.000	1478.100
36160694	2000	4	110.000 ^b	.000
64011	2000	4	71.000	269.090
7513305	2000	4	59.000	223.610
L723482THNA	2010	unknown	.000	.000
L723483THNA	2010	unknown	.000	.000
L723484THNA	2010	unknown	.000	.000
N18009	2013	unknown	.000	.000
N18013	2013	unknown	.000	.000
N18014	2013	unknown	.000	.000
S11F150	2500	unknown	.000	.000
L243213	2519	4	210.000	795.900
64587	2525	4	125.000	473.750
64586	2525	4	125.000	473.750
64585	2525	4	125.000	473.750
28388	2525	unknown	.000	.000
2371106	2632	4	1297.000	4915.630
8110079	3000	22	1350.000	5116.500
8110080	3000	12	1350.000	5116.500
8110078	3000	32	1350.000	5116.500
80843	3003	4	113.000	428.270
80844	3003	4	113.000	428.270
80845	3003	4	113.000	428.270
PKR94711	3010	30	260.000	985.400
57H20430	3012	29	60.000 ^b	.000
57H20431	3012	39	60.000 ^b	.000
57H20429	3012	10	60.000 ^b	.000
70L6659	3017	unknown	.000	.000
78J805241	3019S	unknown	.000	.000
F497848-64P	3025	4	80.000	303.200
F497849-64P	3025	4	80.000	303.200
F496875-64P	3025	4	80.000	303.200
73G1478	3025	unknown	.000	.000
7550039	3025W	4	122.000	462.380
7350044	3025W	4	122.000	462.380
7350043	3025W	4	122.000	462.380
143983	3034	unknown	.000	.000
66710	3039	29	130.000	492.700

Appendix A. Non-PCB Transformers (< 50 ppm) and
PCB-Contaminated Transformers (\geq 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
66711	3039	10	130.000	492.700
66712	3039M	4	132.000	500.280
83V3577	3042	unknown	450.000	1705.500
7351430	3047	36	350.000	1326.500
76A480016	3085	unknown	.000	.000
77A060099	3085	unknown	.000	.000
77A080395	3085	unknown	.000	.000
70686	3500	4	55.000	208.450
67632	3500	4	55.000	208.450
70687	3500	4	55.000	208.450
67AH7855	3500	unknown	.000	.000
67AH5687	3500	unknown	.000	.000
67AH5688	3500	unknown	.000	.000
72AB7827	3500	unknown	.000	.000
64AK11441	3503	unknown	.000	.000
64AK12562	3503	unknown	.000	.000
64AL10170	3503	unknown	.000	.000
1988735	3503	unknown	.000	.000
A59467	3508	unknown	55.000	208.450
A59468	3508	unknown	.000	.000
A59470	3508	unknown	.000	.000
54836	3517	unknown	101.000	382.790
54837	3517	unknown	101.000	382.790
54838	3517	unknown	101.000	382.790
59298	3525	11	197.000	746.630
59299	3525	4	197.000	746.630
59297	3525	4	197.000	746.630
5065374	4000E	4	1335.000	5059.650
5065375	4000W	4	1335.000	5059.650
A59181	4500N	33	33.000	125.070
T4528	4500N	unknown	.000	.000
154363	4501	5	364.000	1379.560
49177	4505	4	200.000	758.000
7367553	4508	4	500.000	1895.000
7367549	4508	8	500.000	1895.000
7367549REG	4508	8	112.000	425.000
7367553REG	4508	5	112.000	425.000
1902056	4509	9	682.000	2584.780
1902055	4509	17	682.000	2584.780
1902057	4509	7	682.000	2584.780
F643813-67P	5507	unknown	.000	.000
77V8211	6005	4	535.000	2027.650
F959884	6010	2	180.000	682.200
F959883	6010	2	300.000	1137.000
F643634-67P	6010	28	94.000	356.260

Appendix A. Non-PCB Transformers (< 50 ppm) and
PCB-Contaminated Transformers (\geq 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
V21808	6025	4	100.000 ^b	.000
H26N4201	6025	4	160.000	606.400
1337042	7002	4	50.000 ^b	.000
1337045	7002	4	50.000 ^b	.000
1331476	7002	4	50.000 ^b	.000
2546-3	7012	4	120.000	303.200
2546-2	7012	4	120.000	303.200
2546-1	7012	4	120.000	303.200
3153348	7033	4	55.000	208.450
1901716	7033	4	210.000	795.900
A59465	7033	4	80.000	303.200
A59466	7033	4	80.000	303.200
A59469	7033	4	80.000	303.200
27140-16	7033	18	237.000	898.230
27140-10	7033	16	237.000	898.230
27140-20	7033	19	237.000	898.230
8671187	7033	46	50.000	189.500
957331	7033	10	150.000	568.500
3160686	7033	46	110.000	416.900
27140-11	7033	10	237.000	898.230
8671542	7033	5	45.000	170.550
6589125	7033	7	50.000	189.500
B339639	7033	10	185.000	701.150
B339640	7033	6	185.000	701.150
B339641	7033	3	185.000	701.150
6154018	7033	43	40.000	151.640
73955	7033	unknown	59.000	223.610
4589-1	7033	4	53.000	200.870
2410184	7033	4	.000	.000
3160690	7033	4	.000	.000
F9F1056	7033	4	160.000	606.400
F9F1057	7033	4	160.000	606.400
F9F1058	7033	4	160.000	606.400
27140-8	7033	4	237.000	898.230
27140-14	7033	4	237.000	898.230
2620881	7033	4	572.000	2167.880
3694654	7033	unknown	.000	.000
2714016	7033	18	237.000	898.230
2714010	7033	16	237.000	898.230
2714020	7033	19	237.000	898.230
6263930	7033	unknown	5.250	19.898
1733294	7033	unknown	7.500	28.425
77A470017	7033	unknown	.000	.000
77A470019	7033	unknown	.000	.000
77A482448	7033	unknown	.000	.000

Appendix A. Non-PCB Transformers (< 50 ppm) and
PCB-Contaminated Transformers (\geq 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
75AH10309	7033	unknown	.000	.000
77A100793	7033	unknown	.000	.000
77A160003	7033	unknown	.000	.000
78A020046	7033	unknown	.000	.000
78A020048	7033	unknown	.000	.000
78A020050	7033	unknown	.000	.000
80934-4077	7033	unknown	.000	.000
80935-4077	7033	unknown	.000	.000
80936-4077	7033	unknown	.000	.000
C9G2598	7033	unknown	.000	.000
3245040	7033	unknown	35.000	132.650
3245044	7033	unknown	35.000	132.650
6071564	7033	4	.000	.000
K40108	7033	unknown	.000	.000
K40109	7033	unknown	.000	.000
K40110	7033	unknown	.000	.000
C475272	7033	unknown	.000	.000
6586954	7033	unknown	55.000	208.450
3376-1	7033	4	70.000	265.300
3376-2	7033	4	70.000	265.300
3376-3	7033	4	70.000	265.300
73AK16492	7033	unknown	.000	.000
73AK24738	7033	unknown	.000	.000
73AL892	7033	unknown	.000	.000
4789-6	7033	unknown	.000	.000
1901714	7033	4	210.000	795.900
1901715	7033	4	210.000	795.900
66563	7033	4	55.000	208.450
77068	7033	4	55.000	208.450
66561	7033	4	55.000	208.450
64012	7033	4	107.000	405.530
3150523	7033	7	.000	.000
K41135	7033	unknown	.000	.000
K41136	7033	unknown	.000	.000
K41137	7033	unknown	.000	.000
G9H1023	7033	4	160.000	606.400
G9H1021	7033	4	160.000	606.400
G9H1022	7033	4	160.000	606.400
79A095663	7033	unknown	.000	.000
1742466	7033	unknown	21.000	79.590
15198	7033	3	225.000	852.750
M9D1621	7500	28	145.000	549.550
M9D1625	7500	2	145.000	549.550
M9D1623	7500	25	145.000	549.550
75474	7503	4	422.000	1599.380
SCV0999-01	7601	4	283.000	1072.570

Appendix A. Non-PCB Transformers (< 50 ppm) and
PCB-Contaminated Transformers (\geq 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity		
			Gallons	Kilograms	
L246058	7601	4	258.000	977.820	
A9F1213	7700	4	145.000	549.550	
A9F1211	7700	2	145.000	549.550	
B5H8007	7700	5	145.000	549.550	
T35H8007	7700	2	145.000	852.750	
7731582	7710	16	500.000	1895.000	
2384388	7852	unknown	67.000	253.930	
2384387	7852	unknown	67.000	253.930	
776002228	7860	4	225.000	852.750	
7367568REG	7901	41	119.000	451.118	
2371103	7901	6	1297.000	4915.630	
7731581REG	7901	10	119.000	451.118	
3428808	7901	15	200.000	758.000	
7367568	7901	28	499.000	1891.660	
7367568SW	7901	42	19.000	72.030	
7731581	7901	45	499.000	1891.660	
R3334	7901	unknown	31.000	117.490	
R3333	7901	unknown	31.000	117.490	
7022144	7920	38	275.000	1042.250	
			<u>Total</u>	<u>32652.750</u>	<u>121557.947</u>

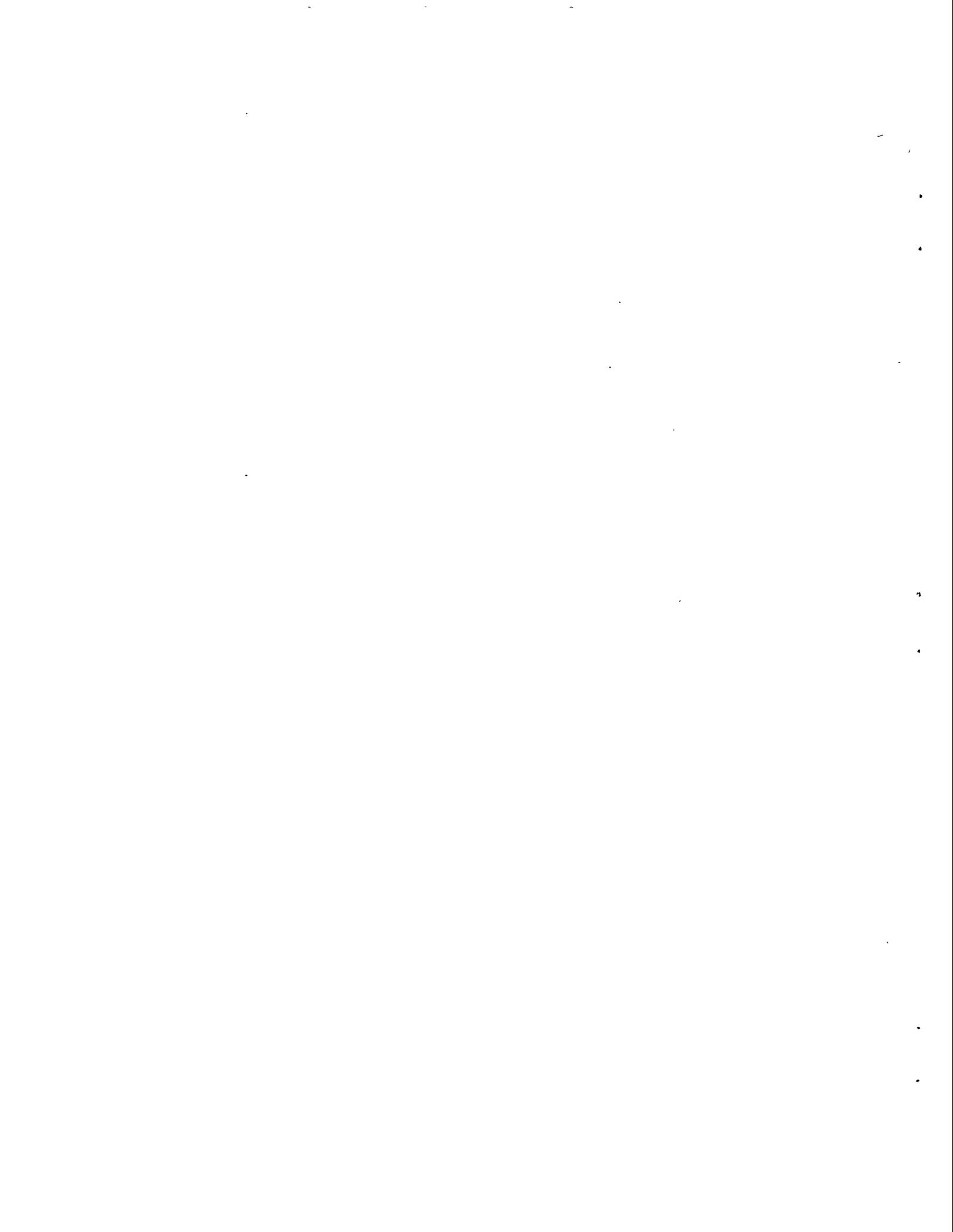
^aUnknown = small closed system transformers which cannot be sampled; assumed to be PCB-contaminated ($750 \leq 500$ ppm).

^bEstimate

Appendix B. Miscellaneous PCB-Contaminated Equipment <50 ppm
Removed from Service During CY 1987

Serial Number	Type	PCB:PPM	Capacity		Date Removed	Disposer
			Gallons	Kilograms		
X165742 (3024-259) ²	Lathe	49	15.00	56.850	12/31/87	ORNL ¹

-
- 1 - Oak Ridge National Laboratory, Oak Ridge, Tn. 37831. In Building 7041
awaiting pickup by Y-12 Plant, Oak Ridge, Tn. 37831.
2 - Identifying number in CY 1986 records.

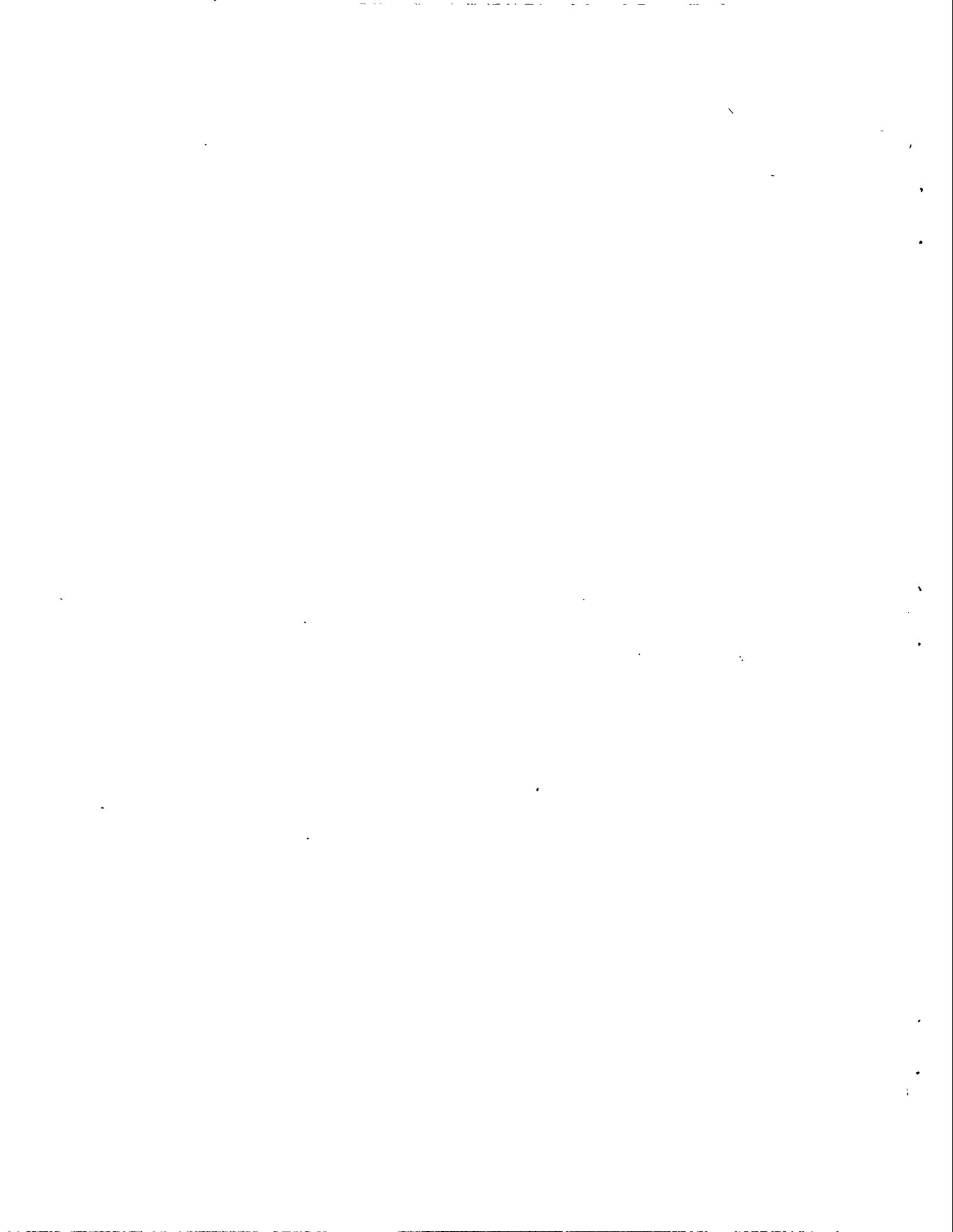


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PCB ANNUAL REPORT FOR
OAK RIDGE NATIONAL LABORATORY - 1988

N. S. Dailey
T. T. Puett
A. R. Witt

Date Published - June 1989

Prepared by the
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831
operated by
Martin Marietta Energy Systems, Inc.
for the
U. S. Department of Energy
under
Contract No. DE-AC05-84OR21400

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ABSTRACT

Oak Ridge National Laboratory prepares a report annually as mandated by the Toxic Substances Control Act that summarizes records required of owners/operators of facilities where PCBs are in use. This report provides information on PCB and PCB-contaminated equipment in use or removed from service and PCB wastes generated, stored, and shipped off-site for treatment and disposal during calendar year 1988.

ACKNOWLEDGMENTS

This report is largely an update of the PCB Annual Report submitted in 1987 prepared by N. S. Dailey and T. T. Puett (ORNL/TM-10858).

1.0 INTRODUCTION

Polychlorinated biphenyls (PCBs) are a family of chlorinated aromatic hydrocarbons previously used extensively in electrical equipment, heat transfer systems, fire retardants, and plasticizers. PCBs can be detrimental to humans and the environment because of their toxicity, persistence, and tendency to bioaccumulate. Humans exposed to PCBs can develop dermatologic symptoms, follicular keratitis, excessive eye discharge, swelling of the eye lids, and nervous system symptoms (IARC 1978). In addition, available data are sufficient to support the carcinogenicity of PCBs to animals but are inadequate to demonstrate their carcinogenicity to humans (IARC 1982).

Congress mandated the control of PCBs under the Toxic Substances Control Act (TSCA) of 1976, Public Law 94-469, Section 6(e). To enforce TSCA, the Environmental Protection Agency (EPA) promulgated regulations under Title 40 of the Code of Federal Regulations (CFR), Part 761. Subpart A of 40 CFR 761 provides general information including definitions and references. Subpart B outlines requirements for the manufacture, processing, distribution, and use of PCBs. Subpart C governs marking and labeling requirements and Subpart D identifies storage and disposal requirements. Subpart E regulates commercial exemptions for the manufacturing, processing, and distribution of PCBs. Subpart G details requirements for spill cleanup policy. Subpart J contains record-keeping and reporting requirements for owners or operators of facilities using or storing PCBs and includes an annual report to be submitted by July 1, covering the previous calendar year.

Oak Ridge National Laboratory (ORNL) is a multipurpose research and development facility owned and operated by the U. S. Department of Energy (DOE) and managed under subcontract by Martin Marietta Energy Systems, Inc. ORNL operates research laboratories at the main ORNL/X-10 site and at the DOE Y-12 Plant. ORNL manages PCBs and PCB-contaminated wastes that are generated at these sites in a manner that complies with state and federal regulations as well as DOE and Martin Marietta Energy Systems, Inc. (Energy Systems), procedures. These wastes are stored on-site at ORNL prior to their treatment and disposal at EPA-approved facilities. In addition, PCB articles, PCB containers, and PCB-contaminated electrical equipment are in use at ORNL. PCB transformers, however, are no longer in service at the ORNL/X-10 site. Only one PCB transformer was in service at the ORNL/Y-12 site during 1988.

This report summarizes ORNL/X-10's PCBs and PCB items in service or removed from service as well as PCBs or PCB-contaminated wastes generated, stored on-site, and shipped off-site for treatment and disposal during 1988. Also included in this report are PCBs and PCB-contaminated wastes generated at ORNL's Y-12 facilities that are handled by ORNL/X-10. Thus, this document fulfills the reporting requirement (40 CFR 761.80) for these PCB materials at ORNL/X-10 (hereafter referred to as ORNL). Information concerning other PCB

wastes and PCB items (including the PCB transformer) at ORNL/Y-12 are addressed in Y-12's annual report.

2.0 REGULATIONS ON PCBs

The Toxic Substances Control Act (TSCA) authorizes EPA to regulate chemical substances and mixtures that present an unreasonable risk of injury to human health or the environment. The primary impact of TSCA on ORNL is the regulation of PCBs and PCB-contaminated equipment and materials. The following are some of the elements EPA promulgated to implement this control program for PCBs:

1. banned the manufacture, distribution in commerce, and use of PCBs in other than a "totally enclosed manner" (40 CFR Part 761.20);
2. established categories of electrical equipment: PCB transformer (≥ 500 ppm), PCB-contaminated electrical equipment (≥ 50 to < 500 ppm), and non-PCB transformers (< 50 ppm) [40 CFR Part 761.3 and 761.30 (a)(2)(v)];
3. set rules governing the conversion of PCB transformers to PCB-contaminated electrical equipment or to non-PCB transformers by draining, refilling, and/or otherwise servicing the transformer [40 CFR Part 761.30 (a)(2)(v)];
4. established criteria for the disposal of PCBs, PCB articles (PCB transformers, PCB capacitors, PCB hydraulic machines, PCB-contaminated electrical equipment, and other PCB articles), PCB containers, and PCBs resulting from the clean-up and removal of spills (40 CFR 761.60);
5. established standards for the marking (40 CFR 761.40 and 761.45) and storing of PCBs and PCB-contaminated liquids and solids (40 CFR 761.65);
6. prohibited the use of PCB transformers and PCB-filled electromagnets (with concentrations of 500 ppm or greater) posing an exposure risk to food and feed after October 1, 1985, and established regulations to reduce fire-related risks posed by the use of PCB transformers (40 CFR 761.30);
7. authorized the use of all other PCB transformers for the remainder of their useful lives, except for those posing fire-related risks, and required a quarterly inspection of this equipment for leaks of dielectric fluids (40 CFR 761.30);
8. authorized the use of large capacitors that are located in restricted access electrical substations or in contained and restricted installations for the remainder of their useful lives. The use of all other large PCB capacitors after October 1, 1988, however, is prohibited [40 CFR 761.30 (1)(1)(ii)];

9. established standards for recordkeeping and annual reporting for owners or operators of facilities using or storing PCBs or PCB items, as well as facilities storing or disposing of PCBs or PCB items (40 CFR 761.180). PCB items include any PCB articles, PCB article containers, PCB containers, or PCB equipment that deliberately or unintentionally contains PCBs.
10. and established standards for spill cleanup in restricted access areas [40 CFR 761.125 (a)(3)], soil decontamination in unrestricted areas [40 CFR 761.125 (a)(4)(v)], and spills of 10 pounds or more of PCBs by weight must be reported to the National Response Center [40 CFR 761.125 (a)(1)(iii)].

EPA has also proposed new requirements for the manifesting and monitoring of PCB wastes by the generator [Federal Register 53(186) Sept. 26, 1988]. Since ORNL already manifests and monitors all PCB wastes, implementation of these proposed regulations under TSCA should not impact ORNL operations.

Handling of PCBs and PCB-contaminated materials at ORNL are also governed internally under Martin Marietta Energy Systems, Inc., and ORNL policies. These policies ["Martin Marietta Energy Systems Environmental, Safety, and Health Standards: Management of PCBs" dated April 4, 1989, and ORNL Environmental Protection Manual Section 4.0 "Polychlorinated Biphenyls (PCB)" dated January 15, 1987] require management of some materials containing 2 ppm or greater PCBs as PCB wastes.

3.0 RECORDS AND REPORTING

Annual reporting is accomplished through a computerized PCB Tracking System (PCBTS), a module within a larger Hazardous Waste Tracking System which runs on ORNL's DEC system PDP-10 computer with System 1022 as the database management system. The PCBTS is comprised of two submodules: one on equipment inventories and one on waste generation and disposal. The equipment database contains information on inventories of PCB-contaminated transformers (Section 3.1), PCB large high- and low-voltage capacitors (Section 3.2), as well as miscellaneous PCB-contaminated hydraulic equipment (Section 3.3). The records on the PCB-contaminated equipment are maintained by the Environmental Monitoring and Compliance Section (EMC) in the Environmental and Health Protection Division (EHP). The data for the equipment database are provided by the laboratory's Environmental Protection Officers for research equipment, Plant and Equipment Division for electrical service transformers, and periodic laboratory-wide surveys.

Records for the second module of the PCBTS, the PCB waste database, cover generation and disposal of both PCBs and PCB-contaminated wastes (refer to Section 3.4). The PCB waste submodule receives storage and shipment data from the larger Hazardous Waste Tracking System. The PCB waste data are compiled by the Waste Operations Group in the Environmental and Health Protection Division.

Regulations regarding reporting (40 CFR Part 761.180) require the dates PCBs and PCB items are removed from service, placed into storage for disposal, and placed into transport for disposal. For PCBs and PCB items removed from service, the regulations require the location of the initial storage or disposal facility and the name of the owner or operator of the facility. The regulations also require information on PCBs and PCB items remaining in service at the end of the calendar year including the total weight in kilograms of any PCBs and PCB items in PCB containers, total number of PCB transformers and total weight of the PCBs they contain, and the total number of PCB large high- or low-voltage capacitors. Storage and disposal facilities have additional reporting requirements including dates and quantities of PCBs and PCB-contaminated wastes transferred into or out of the facility during the year and those retained in storage at the end of the year.

3.1 PCB Transformers

During the 1980s, ORNL undertook a program to reduce levels of PCBs in equipment used in the plant. The last PCB transformers (≥ 500 ppm) were removed from service and disposed of in CY 1986. Between 1980 and 1984, ORNL's transformers containing ≥ 50 but < 500 ppm PCBs were chemically treated to decrease their concentrations of PCBs, where feasible.¹ Following the program to reduce PCBs, no PCB transformers (≥ 500 ppm) and only ~~two PCB-contaminated transformers~~ (≥ 50 but < 500 ppm PCBs) were in service at ORNL at the end of CY 1988 (Table 1). Untested transformers¹ and non-PCB transformers² are listed in Appendix A. The latter are listed because they are managed as PCB-contaminated transformers under Energy Systems and ORNL policies.

Table 1. PCB-Contaminated Transformers (≥ 50 but < 500 ppm) in Service During CY 1988

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
7731801	7901	53	499.000	1891.210
7373793	7901	68	500.000	1895.000
Total			999.000	3786.210

¹ Small closed system transformers (typically pole-mounted units) cannot be sampled and are assumed by EPA to contain ≥ 50 but < 500 ppm PCBs. These PCB-contaminated transformers were not included in ORNL's treatment program to reduce PCB levels.

² Those containing < 50 ppm PCBs under the EPA regulations.

3.2 PCB Capacitors

Subpart A of the regulations defines three types of capacitors: small capacitors, large high-voltage capacitors, and large low-voltage capacitors. A small capacitor is a capacitor which contains less than 1.36 kgs (3 lbs) of dielectric fluid. A large high-voltage capacitor contains 1.36 kgs (3 lbs) or more of dielectric fluid and operates at 2,000 volts or above; whereas, a large low-voltage capacitor contains 1.36 kgs (3 lbs) or more of dielectric fluid and operates below 2,000 volts. A capacitor whose total volume is less than 1,639 cubic centimeters (100 cubic inches) is assumed to contain less than 1.36 kgs of dielectric fluid. PCBs were used as the dielectric fluid in most capacitors manufactured between 1920 and 1978. Although the manufacture of capacitors containing PCBs has been banned, their use in a totally enclosed manner is still allowed. The regulations require that all capacitors be considered to be treated as PCB items except when known to contain no PCBs and labeled "No PCBs." Thus, it is assumed that unmarked capacitors (both large and small) contain PCBs.

The majority of PCB capacitors in use at ORNL are small (less than 1.36 kgs of dielectric fluid). The ORNL electrical system does not have any PCB large high- or low-voltage capacitors (as they are referred to in the regulations); however, various research-related instruments do contain them. ORNL and Energy Systems policies concerning handling of PCB capacitors (both large and small) require that they be collected and stored on-site, and ultimately disposed of in an EPA approved incinerator. This procedure is seemingly more stringent than required under 40 CFR 761.60, which states that small capacitors may be disposed of in municipal landfills. However, EPA has indicated that the disposal of large quantities (greater than 25) of small capacitors by commercial and industrial activities poses a larger environmental risk than that from households or other infrequent disposers. Therefore, EPA encourages companies to voluntarily collect and dispose of small capacitors in a high temperature incinerator. Thus, ORNL and Energy Systems policies are geared toward meeting the letter and the intent of the federal PCB regulations.

During early 1988, EMC staff initiated a laboratory-wide survey of PCB-contaminated equipment, including both large capacitors and other miscellaneous equipment. As of June 1988, the survey was not yet complete but some data were available and are reported here. Where possible the new data are cross-referenced to the data listed in the 1986 report via equipment serial numbers (i.e., current and former numbers). Additional survey work is planned for 1989.

In all, ORNL had 127 PCB large high- and low-voltage capacitors in service at the end of CY 1988 (Table 2). The information within the equipment database that is provided for large PCB capacitors are: location, serial number, PCB level, weight in kilograms and total number of PCB large high- or low-voltage capacitors. Identical

capacitors at the same location are grouped and a single serial number is assigned to them.

Twelve large PCB capacitors were removed from service during 1988 (Table 3). Several more are scheduled to be removed in 1989. In general, large and small PCB capacitors are packed in Department of Transportation-approved drums and shipped off-site for incineration in accordance with EPA regulations (refer to Section 3.4 PCB Wastes, Table 8). One PCB-contaminated transformer (12 ppm) was also shipped off-site during CY 1988.

3.3 Miscellaneous PCB-Contaminated Equipment

In addition to PCB-contaminated transformers and large PCB capacitors, ORNL has some miscellaneous equipment contaminated with PCBs. Examples of this miscellaneous equipment are pumps, pipes, electric motors, or other oil-filled equipment that typically contain low levels of PCBs and whose surface(s) has been in direct contact with PCBs. A laboratory-wide survey for these items was initiated in early 1988, in conjunction with the large capacitor survey, to validate information in the PCBTS for those in service during 1988. The initial goals of the survey were to locate items containing PCBs as listed in the database and identify any new items which are now on-site. Based on initial results of the survey, oils from a representative number of these items were sampled and analyzed for PCB levels to see if these concentrations were consistent with that reported earlier. Those items last recorded as having > 50 ppm PCBs were given special attention [refer to Table 4 in the 1986 Annual Report (Barkenbus et al. 1987)]. The inventory is on-going, but some preliminary results are available.

Table 2. PCB Large High- and Low-Voltage Capacitors in Service
During CY 1988

Serial Number	Quantity	Location	PCB:PPM	Capacity ¹	
				Gallons	Kilograms
41061005V-21A	4	2525	1000000	.600	2.274
41061005V-21	4	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.800	3.032
10C275P59-16	3	2525	1000000	.600	2.274
178161	4	3025	1000000	1.200	4.548
A17055	1	3500 B50	1000000	3.700	14.023
03646	1	3500 B50	1000000	3.700	14.023
853557	1	3500 C23	1000000	16.000	60.640
9-1502-00092-5	1	3500 D30	1000000	7.500	28.425
T093119	9	3500 R8	1000000	4.000	15.160
R10..840	3	3508 ATTIC	unknown	3.990	15.122
P68734	3	3508 ATTIC	unknown	3.990	15.122
R10837	3	3508 ATTIC	unknown	3.990	15.122
R 10:840	3	3508 ATTIC	1000000	3.990	7.201
R 10837	3	3508 ATTIC	1000000	3.990	7.428
P 68734	3	3508 ATTIC	1000000	3.990	15.122
410229	1	3525 119	1000000	5.200	19.708
001	1	3525 119	1000000	6.200	23.498
B48A	6	4500S B48A	1000000	1.200	4.548
7449T	2	4500S B48B	1000000	1.200	4.548
55069	12	4500S B54	1000000	.360	1.364
29A104	12	4500S B54	1000000	.360	1.364
B54	18	4500S B54	1000000	1.200	4.548
X92873	1	4500S D54	1000000	.900	3.411
X88126	1	4500S T14	1000000	.400	1.516
A41482	2	4501 R105	1000000	1.900	7.201
79F204	6	4501 R220	1000000	4.000	15.160
19F86	10	4508	1000000	2.500	9.475
69-03378	3	4508 226	1000000	10.200	38.658
C297207	1	4508 226	1000000	6.400	24.256
G4-5165-01	2	7003	1000000	3.900	14.781
Total Number	127		Total	303.46 ²	1103.257 ²

1 - Per single capacitor

2 - Total represents all units

Table 3. PCB Large High- and Low-Voltage Capacitors Removed from Service During CY 1988

Serial Number	Qty	PCB:PPM	Capacity ¹		Date Removed	Disposer	Date Shipped
			Gallons	Kilograms			
FRT6-1	4	1000000	0.800	3.032	06/16/88	Rollins Env. Ser. ²	12/06/88
FRT-3	4	1000000	0.800	3.032	8/88 10/12/87	Emer. Serv. Alabama	2/11/88
MONSON-1	4	1000000	0.800	3.032	5/04/88	Rollins Env. Ser. ²	12/06/88
Total							
Number	12		9.600 ⁴	36.38 ⁴			

- 1 - Per single capacitor
- 2 - Rollins Environmental Services, Deer Park, TX.
- 3 - Undetermined, see Appendix D
- 4 - Total represents all units

These preliminary results indicate that PCB-levels in several pieces of equipment have been reduced by draining the PCB-contaminated oil and refilling the unit with non-PCB oil. The most significant reduction was found in a hydraulic unit which contained 7500 ppm PCBs compared to 950000 ppm PCBs as reported earlier.³ Only 7 items contain ≥ 50 ppm PCBs during 1988 (Table 4). Additional information on miscellaneous equipment (≥ 50 ppm and < 500 ppm PCBs) removed from service during the year is provided in Appendix B, which includes a vacuum pump with 163 ppm PCBs. In addition, a lathe was transferred to ORNL/Y-12's Fusion Energy Division for their use (Appendix C). All future reporting for this lathe will be carried in Y-12's Annual Report.

³ This unit was drained of all PCB-contaminated oil in May 1989.

Table 4. Miscellaneous PCB-Contaminated Equipment \geq 50 ppm in Service During CY 1988

Serial Number	Type	Location	PCB:PPM	Capacity	
				Gallons	Kilograms
X168820A	HYDRAULIC UNIT	3012	7500	150.000	568.500
X168822	DRIVE MOTOR	3012	69	5.000	18.920
3024-269	GRINDER	3024	83	3.000	11.370
3044-358	SURFACE GRINDER	3044	65	15.000	56.850
3525-023	WASTE PRESS	3525	301	2.000	7.580
6000-063	OIL RECLAIMER	6000	94	1500.000	5685.000
Total				1675.000	6348.220

3.4 PCB Wastes

PCB wastes at ORNL include contaminated oils, large capacitors, small capacitors including fluorescent light ballasts, contaminated solids (e.g., rags, papers from spill cleanups), transformer carcasses (i.e., drained units), and contaminated wastes from unintentional spills and releases. The majority of PCB wastes are stored on-site at Building 7507 for under one year and are shipped to an off-site EPA-approved incinerator for disposal. There are two exceptions to this practice. First, drained transformer carcasses can be disposed of at an incinerator or a chemical waste landfill provided they are EPA-approved facilities. Second, PCB wastes that are co-contaminated with radioactive constituents are not subject to off-site disposal and, therefore, require long-term storage on-site. As a result, a small amount of radioactively co-contaminated PCB wastes, primarily oils, are stored on-site at the 7507W Mixed Waste Pad awaiting incineration at the DOE Oak Ridge Gaseous Diffusion Plant (ORGDG) TSCA incinerator (see Wastes in Storage section below).

At ORNL, PCB wastes are classified into two categories: \geq 2 but $<$ 50 ppm (that requiring disposal under ORNL and Energy Systems policies) and \geq 50 ppm PCBs [that requiring disposal under EPA regulations (40 CFR 761.60) as well as ORNL and Energy Systems policies]. Waste oils constitute over one-half (48%) of ORNL's total PCB wastes. Low concentrations of PCBs (\geq 2 to $<$ 50 ppm) are frequently detected in waste oils from various sources. Most of the waste oils that contain a high concentration of PCBs (\geq 500 ppm) were used as dielectric fluids in electrical equipment or in heat exchange systems.

Information reported in the PCBTS for PCB wastes include disposal container (drum number), source location, waste description, weight, PCB concentration, disposer, and disposer location. The date to storage is the date wastes were received at the main ORNL storage facility, while date shipped is the date wastes were picked up by the disposer.

Wastes Shipped Off-site

All non-radioactive PCB wastes (≥ 2 ppm) are shipped off-site for disposal at an EPA-approved facility. For these off-site shipments, PCB wastes are manifested in the same manner as RCRA (Resource Conservation and Recovery Act) hazardous wastes and copies of the manifests are retained by the Waste Operations Group. Some of the wastes shipped off-site for disposal are generated at ORNL facilities located in Buildings 9201-2 and 9202-2 at the Y-12 plant or from the Oak Ridge Associated Universities (ORAU).

During 1988, ORNL shipped a total of 6613.06 kgs of liquid PCB wastes for incineration at an off-site facility. This included 4608.64 kgs of waste oils containing < 50 ppm PCBs and 2004.42 kgs of waste oils containing ≥ 50 ppm. Summaries of off-site shipments of these liquid wastes containing < 50 ppm PCBs and ≥ 50 ppm PCBs are given in Tables 5 and 6, respectively. Facilities at ORNL/Y-12 contributed a total of 2501.40 kgs of these liquid PCB wastes.

Off-site shipments of solid wastes containing < 50 ppm PCBs are listed in Table 7 and those containing ≥ 50 ppm PCBs are presented in Table 8. A total of 2303.20 kgs of solid wastes containing < 50 ppm PCBs and 7064.02 kgs of solid wastes containing ≥ 50 ppm PCBs were shipped off-site in CY 1988. Of these amounts, only 345.79 kgs were generated at ORNL/Y-12. A total of 2636.65 kgs of the solid PCB wastes shipped off-site in 1988 were carried over from CY 1987.

Wastes in Storage

Liquid wastes in storage at year's end containing < 50 ppm PCBs are shown in Table 9 and those containing ≥ 50 ppm PCBs are given in Table 10. The current inventory includes 2535.71 kgs of oils containing < 50 ppm PCBs and 508.26 kgs of oils containing ≥ 50 ppm PCBs. The major portion of these wastes are co-contaminated with low levels of radioactivity and as a result are stored on-site at the Mixed Waste Pad at 7507W. These mixed wastes will be incinerated at the DOE ORGDP's TSCA incinerator when it is operational. Only 228.00 kgs of the total waste oils in storage at year end are awaiting treatment and disposal at an off-site commercial facility.

Solid PCB wastes containing < 50 ppm, shown in Table 11, held in storage at the end of CY 1988 amounted to 258.359 kgs. Solid PCB wastes containing ≥ 50 ppm held in storage at the end of CY 1988 are shown in Table 12. All of these wastes were generated at the X-10 site. The solid wastes in storage amounted to 869.342 kgs. Only 219.79 kgs of that are co-contaminated with radioactivity and will be held for treatment at the TSCA incinerator at the DOE ORGDP.

Table 5. Liquid PCB Wastes < 50 ppm Shipped Off-site for Disposal
During CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
1073B	Y9201-2	OIL PCB 9 PPM	208.45	9	8/16/88	12/06/88	ROLLINS ENV. SER. 1
1074B	Y9201-2	OIL PCB 9 PPM	208.45	9	8/16/88	12/06/88	ROLLINS ENV. SER. 1
1075B	Y9202-2	OIL PCB 9 PPM	208.45	9	8/16/88	12/06/88	ROLLINS ENV. SER. 1
1110B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
1111B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
1112B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
1113B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
1114B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
1115B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
1116B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
1117B	2525	OIL PCB 13 PPM	208.45	13	9/20/88	12/06/88	ROLLINS ENV. SER. 1
889B	Y9202-2	OIL PCB 16 PPM	208.45	16	1/13/88	2/11/88	ROLLINS ENV. SER. 1
891B	4501	OIL PCB 4 PPM	22.74	4	1/20/88	12/06/88	CHEM WASTE ² MANAGEMENT ²
892B	6010	OIL PCB 3 PPM	208.45	3	1/20/88	2/11/88	ROLLINS ENV. SER. 1
894B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	CHEM WASTE ² MANAGEMENT ²
895B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	CHEM WASTE ² MANAGEMENT ²
896B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	CHEM WASTE ² MANAGEMENT ²
897B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	CHEM WASTE ² MANAGEMENT ²
898B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	CHEM WASTE ² MANAGEMENT ²
899B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	CHEM WASTE ² MANAGEMENT ²

Table 5. Liquid PCB Wastes < 50 ppm Shipped Off-Site for Disposal
During CY 1988 (cont)

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
900B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	CHEM WASTE ²
901B	2525	OIL PCB 32 PPM	208.45	32	2/03/88	2/11/88	MANAGEMENT ²
932B	4501	OIL PCB 4 PPM	208.45	4	3/09/88	12/06/88	CHEM WASTE ²
			TOTAL	4608.64			
TOTAL DRUMS = 23		TOTAL GALLONS =		1216.00			

1 - Rollins Environmental Services, Deer Park, TX 77536

2 - Chemical Waste Management, Emelle, AL 35459

Table 6. Liquid PCB Wastes \geq 50 ppm Shipped Off-Site for Disposal
During CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
1026B	4500N	PCB BALLASTS	204.17	unknown	6/08/88	12/06/88	ROLLINS ENV.SER. 1
1077B	Y9202-2	OIL PCB 67 PPM	208.45	67	8/16/88	12/06/88	ROLLINS ENV.SER. 1
827B	2018	ASKEREL PCB 1000000 PPM	56.85	1000000	9/25/87	2/11/88	CHEM WASTE MANAGEMENT ²
959B	4500S	OIL PCB 250 PPM	75.80	250	3/24/88	12/06/88	ROLLINS ENV.SER. 1
977B	Y9202-2	OIL PCB 63 PPM	208.45	63	4/26/88	12/06/88	ROLLINS ENV.SER. 1
978B	Y9202-2	OIL PCB 63 PPM	208.45	63	4/26/88	12/06/88	ROLLINS ENV.SER. 1
979B	Y9202-2	OIL PCB 67 PPM	208.45	67	4/26/88	12/06/88	ROLLINS ENV.SER. 1
980B	Y9202-2	OIL PCB 67 PPM	208.45	67	4/26/88	12/06/88	ROLLINS ENV.SER. 1
981B	Y9202-2	OIL PCB 67 PPM	208.45	67	4/26/88	12/06/88	ROLLINS ENV.SER. 1
982B	Y9202-2	OIL PCB 67 PPM	208.45	67	4/26/88	12/06/88	ROLLINS ENV.SER. 1
983B	Y9202-2	OIL PCB 67 PPM	208.45	67	4/26/88	12/06/88	ROLLINS ENV.SER. 1
TOTAL			2004.42				
TOTAL DRUMS = 11							
TOTAL GALLONS =				475.00			

TOTAL DRUMS = 11

TOTAL GALLONS = 475.00

1 - Rollins Environmental Services, Deer Park, TX 77536

2 - Chemical Waste Management, Emelle, AL 35459

Table 7. Solid PCB Wastes < 50 ppm Shipped Off-Site for Disposal
During CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
3095		TRANSFORMER #7316054	2302.63	12	11/30/88	12/06/88	ROLLINS
734B	4501	PCB 12 PPM CONTAMINATED SOLIDS	.11	4	1/20/88	2/11/88	ENV.SER. 1 CHEM WASTE
937B	4500S	PCB 4 PPM CONTAMINATED SOLIDS	.45	5	4/19/88	12/06/88	MANAGEMENT ² ROLLINS
							ENV.SER. 1
TOTAL ITEMS = 3							
			TOTAL				
							2303.20

1 - Rollins Environmental Services, Deer Park, TX 77536

2 - Chemical Waste Management, Emelle, AL 35459

Table 8. Solid PCB Wastes \geq 50 ppm Shipped Off-Site for Disposal
During CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
1026B	3130	PCB TRANSFORMER	4.54	unknown	6/23/88	12/06/88	ROL. ENV. SER. 1
1052B	4500S	PCB BALLASTS	208.45	unknown	7/14/88	12/06/88	ROL. ENV. SER. 1
1062B	1506	PCB BALLASTS	208.45	unknown	8/08/88	12/06/88	ROL. ENV. SER. 1
1063B	1506	PCB BALLASTS	208.45	unknown	8/08/88	12/06/88	ROL. ENV. SER. 1
1076B	Y9202-2	CONTAMINATED SOLIDS PCB	208.45	67	8/16/88	12/06/88	ROL. ENV. SER. 1
1078B	Y9202-2	PCB CONTAMINATED CAPACITORS	114.65	unknown	8/16/88	12/06/88	ROL. ENV. SER. 1
1095B	7914	PCB BALLASTS	93.92	unknown	8/25/88	12/06/88	ROL. ENV. SER. 1
1109B	4500S	PCB BALLAST	208.45	unknown	9/20/88	12/06/88	ROL. ENV. SER. 1
1197B	5500	PCB CONTAMINATED TRANSFORMER	226.86	unknown	11/30/88	12/06/88	ROL. ENV. SER. 1
1198B	5500	PCB CONTAMINATED TRANSFORMER	136.12	unknown	11/30/88	12/06/88	ROL. ENV. SER. 1
1199B	2024	PCB CONTAMINATED SOLIDS	215.52	unknown	11/30/88	12/06/88	ROL. ENV. SER. 1
1200B	4501	PCB CONTAMINATED SOLIDS & EQUIPMENT	181.49	unknown	11/30/88	12/06/88	ROL. ENV. SER. 1
1201B	4501	PCB CONTAMINATED SOLIDS & EQUIPMENT	204.17	unknown	11/30/88	12/06/88	ROL. ENV. SER. 1
1202B	4501	PCB CONTAMINATED SOLIDS & EQUIPMENT	181.49	unknown	11/30/88	12/06/88	ROL. ENV. SER. 1
734B	4500S	CONTAMINATED SOLIDS PCB 50 PPM	18.83	50	10/01/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
825B	2018	PCB CONTAMINATED SOLIDS	208.45	unknown	9/25/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
826B	2018	PCB CONTAMINATED SOLIDS	208.45	unknown	9/25/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
837B	6000	PCB CAPACITOR	208.45	unknown	10/13/87	2/11/88	CHEM WASTE ² MANAGEMENT ²

Table 8. Solid PCB Wastes \geq 50 ppm Shipped Off-Site for Disposal
During CY 1988 (cont)

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
838B	6000	PCB CAPACITORS	208.45	unknown	10/13/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
839B	6000	PCB CAPACITOR	208.45	unknown	10/13/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
840B	6000	PCB CAPACITORS	208.45	unknown	10/13/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
853B	2018	PCB BALLAST	208.45	unknown	10/29/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
854B	2018	PCB BALLAST	208.45	unknown	10/29/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
855B	2018	PCB BALLAST	208.45	unknown	10/29/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
872B	3024	PCB BALLASTS	208.45	unknown	12/09/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
873B	3024	PCB BALLASTS	211.17	unknown	12/09/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
874B	3024	PCB BALLASTS	208.45	unknown	12/09/87	2/11/88	CHEM WASTE ² MANAGEMENT ²
875B	3024	PCB BALLASTS	113.70	unknown	12/09/87	2/11/88	CHEM WASTE ² MANAGEMENT ²

Table 8. Solid PCB Wastes \geq 50 ppm Shipped Off-Site for Disposal
During CY-1988 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in Kgs	PCB:PPM	Date to Storage	Date Shipped	Disposer
904B	4500N	PCB BALLASTS	204.17	unknown	2/09/88	2/11/88	CHEM WASTE ²
905B	4500S	PCB BALLASTS	204.17	unknown	2/09/88	2/11/88	MANAGEMENT ²
906B	4500S	PCB BALLASTS	204.17	unknown	2/09/88	2/11/88	CHEM WASTE ²
907B	ORAU	PCB BALLASTS	204.17	unknown	2/10/88	2/11/88	CHEM WASTE ²
920B	YSTAGING	CONTAMINATED SOLIDS	22.69	unknown	2/25/88	12/06/88	MANAGEMENT ²
937B	4501	PCB	12.70	unknown	3/09/88	12/06/88	ROL. ENV. SER. 1
971B	2018	PCB BALLASTS	208.45	unknown	4/13/88	12/06/88	ROL. ENV. SER. 1
972B	2018	PCB BALLASTS	208.45	unknown	4/13/88	12/06/88	ROL. ENV. SER. 1
974B	4500S	PCB BALLASTS	208.45	unknown	4/21/88	12/06/88	ROL. ENV. SER. 1
975B	4500S	PCB BALLASTS	208.45	unknown	4/21/88	12/06/88	ROL. ENV. SER. 1
976B	5500	PCB CAPACITORS	208.45	unknown	4/21/88	12/06/88	ROL. ENV. SER. 1
991B	6000	PCB BALLAST	109.34	unknown	11/29/88	12/06/88	ROL. ENV. SER. 1
992B	6000	PCB BALLAST	208.45	unknown	5/04/88	12/06/88	ROL. ENV. SER. 1
			208.45	unknown	5/04/88	12/06/88	ROL. ENV. SER. 1
		TOTAL	7064.02				

TOTAL DRUMS = 41

1 - Rollins Environmental Services, Deer Park, TX 77536

2 - Chemical Waste Management, Emelle, AL 35459

Table 9. Liquid PCB Wastes Inventory < 50 ppm in Storage
at the End of CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date To Storage	Storage Location
555R	2525	OIL PCB 10 PPM	208.45	10	4/14/87	7507W
556R	2525	OIL PCB 10 PPM	208.45	10	4/14/87	7507W
557R	2525	OIL PCB 3 PPM	208.45	3	4/14/87	7507W
558R	2525	OIL PCB 3 PPM	208.45	3	4/14/87	7507W
573R	3085	OIL PCB 3 PPM	208.45	3	4/28/87	7507W
598R	6010	OIL PCB 7 PPM	208.45	7	5/28/87	7507W
668R	-Y9202-2	OIL PCB 16 PPM	208.45	16	1/13/88	7507W
669R	Y9202-2	OIL PCB 16 PPM	227.40	16	1/13/88	7507W
687R	3001	OIL PCB 12 PPM	9.07	12	5/04/88	7507W
755R	5500	OIL PCB 6 PPM	208.45	6	8/10/88	7507W
762R	4500N	OIL PCB 10 PPM	208.45	10	8/10/88	7507W
793R	2018	OIL PCB 18 PPM	208.45	18	8/26/88	7507W
795R	2018	OIL PCB 4 PPM	208.45	4	8/26/88	7507W
796R	2018	OIL PCB 4 PPM	208.45	4	8/26/88	7507W
789R	4500S	OIL PCB 24 PPM	15.36	24	10/01/87	7507W
TOTAL DRUMS = 15		TOTAL KGS = 2753.2340	TOTAL GALLONS = 779.05000			

Table 10. Liquid PCB Wastes Inventory \geq 50 ppm in Storage
at the End of CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight in kgs	PCB:PPM	Date To Storage	Storage Location
1137B	Y9201-2	OIL PCB 51 PPM	208.45	51	10/18/88	7507
779R	6000	OIL PCB 16000	75.80	unknown	8/17/88	7507W
794R	2018	OIL PCB 59 PPM	208.45	59	8/26/88	7507W
800R	4500S	OIL PCB 50 PPM	4.19	50	10/01/87	7507W
???R	unknown	OIL PCB 200 PPM	11.37	200	11/06/84	7507W
TOTAL DRUMS = 5		TOTAL KGS = 508.26000		TOTAL GALLONS = 134.10000		

Table 11. Solid PCB Wastes Inventory < 50 ppm in Storage
at the End of CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight In kgs	PCB:PPM	Date To Storage	Storage Location
1203B	4508	TRANSFORMER PCB 7 PPM	40.84	7	12/07/88	7507
TOTAL DRUMS = 1		TOTAL KGS = 40.835000				

Table 12. Solid PCB Wastes Inventory \geq 50 ppm in Storage at the End of CY 1988

Disposal Container	Source Location	Waste Description	Drum Weight In kgs	PCB:PPM	Date To Storage	Storage Location
1195B	4508	PCB CONTAMINATED TRANSFORMERS	136.12	unknown	12/01/88	7507
1196B	4508	PCB CONTAMINATED TRANSFORMERS	20.42	unknown	12/01/88	7507
1203B	7018	TRANSFORMER PCB 51 PPM	34.03	51	12/07/88	7507
1216B	6000	PCB BALLASTS	208.45	unknown	12/08/88	7507
1220B	4500S	PCB CONTAMINATED SOLIDS	1.25	unknown	12/15/88	7507
322R	1505	PCB CONTAMINATED SOLIDS	2.27	unknown	11/25/85	7507W
929B	7900	PCB CONTAMINATED SOLIDS	208.45	unknown	3/02/88	7507

TOTAL DRUMS = 7

TOTAL KGS = 610.98300

4.0 SUMMARY

ORNL manages PCBs and PCB-contaminated equipment and wastes in compliance with state and federal regulations as well as DOE and Energy Systems procedures. PCB-contaminated equipment include transformers, capacitors, and miscellaneous items (either hydraulic units or those which contain oils). All PCB wastes are collected and stored on-site. All non-radioactive PCB wastes are shipped off-site to an EPA-approved facility for disposal in less than one year. Only radioactively contaminated PCB wastes are stored on-site for longer than one year, awaiting incineration at a DOE-sponsored facility when it is operational. Off-site shipments of PCBs and PCB items are manifested to ensure proper handling and tracking. ORNL reporting of both equipment and wastes is accomplished through a computerized PCB Tracking System. Highlights of ORNL's management of PCBs and PCB-contaminated equipment and wastes are presented below.

4.1 PCB Transformers

No PCB transformers (\geq 500 ppm) have been in service at ORNL since CY 1986. Only two transformers in service still contain \geq 50 ppm PCBs after servicing to reduce PCB levels. However, 72 untested transformers (assumed to be \geq 50 but $<$ 500 ppm PCBs under EPA regulations) are also in service at the Laboratory.

4.2 PCB Capacitors

A total of 127 PCB large high- and low-voltage capacitors were in service at the end of CY 1988. Twelve large PCB capacitors were removed from service during the year.

4.3 Miscellaneous PCB-Contaminated Equipment

ORNL currently has 7 pieces of equipment that are contaminated with ≥ 50 ppm PCBs. One lathe (49 ppm PCBs) has been transferred to the ORNL's Fusion Energy Division at Y-12. Henceforth, it will be included in Y-12's Annual Reports.

4.4 PCB Wastes

Wastes Shipped Off-Site

A total of 4608.64 kgs of waste oils containing < 50 ppm PCBs and 2004.42 kgs of waste oils containing ≥ 50 ppm PCBs were shipped off-site for incineration and disposal in CY 1988.

During 1988, 7064.02 kgs of PCB-contaminated (≥ 50 ppm) solid wastes were shipped off-site for incineration and disposal. Another 2303.20 kgs of solid wastes containing < 50 ppm PCBs were also shipped off-site.

Wastes in Storage

At the end of CY 1988, 508.26 kgs of waste oils (≥ 50 ppm PCBs) were in storage awaiting treatment and disposal. Of this, 295.62 kgs are co-contaminated with radioactivity. In addition, 2753.234 kgs of waste oils (< 50 ppm PCBs) were in storage at the end of 1988. All of the 2520.35 kgs of the waste oils are co-contaminated with radiation. Radioactively co-contaminated waste oils will be sent to the DOE ORGDP's TSCA incinerator when it begins operation. Non-radioactive oils containing PCBs are sent to EPA-approved treatment facilities.

PCB solid wastes (≥ 50 ppm) on-site at year end totaled 610.983 kgs. All but 2.27 kgs, which are radioactively co-contaminated, will be shipped off-site for treatment and disposal. PCB solid wastes (< 50 ppm) on-site at the end of CY 1988 totaled 40.835 kgs. All of this solid waste (< 50 ppm) will be shipped off-site for treatment and disposal. The radioactive solids will be stored for future treatment at the TSCA incinerator at the DOE ORGDP.

5.0 REFERENCES

Dailey, N. S., T. T. Puett. 1988. PCB Annual Report for Oak Ridge National Laboratory -- 1987. Oak Ridge National Laboratory, Oak Ridge, TN (ORNL/TM-10858).

IARC (International Agency for Research on Cancer). 1978. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Polychlorinated Biphenyls and Polybrominated Biphenyls. Vol. 18. IARC, Lyon.

IARC (International Agency for Research on Cancer). 1982. Chemicals, Industrial Processes and Industries Associated with Cancer in Humans. Supplement 4. IARC, Lyon.

Appendix A. Non-PCB Transformers (< 50 ppm) and
PCB-Contaminated Transformers (≥ 50 and < 500 ppm)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
73J3182	1000M	unknown ^a	.000	.000
73J3180	1000N	unknown	.000	.000
73J3181	1000S	unknown	.000	.000
✓72V9421	1504	13	220.000	833.800
81V3323	1505	4	130.000	492.700
✓77V6955	1505	4	440.000	1667.600
✓77V6956	1505	4	440.000	1667.600
✓8110081	2000	15	390.000	1478.100
✓36160694	2000	4	110.000 ^b	.000
✓64011	2000	4	71.000	269.090
7513305	2000	4	59.000	223.610
L723482THNA	2010	unknown	.000	.000
L723483THNA	2010	unknown	.000	.000
L723484THNA	2010	unknown	.000	.000
N18009	2013	unknown	.000	.000
N18013	2013	unknown	.000	.000
N18014	2013	unknown	.000	.000
S11F150	2500	unknown	.000	.000
L243213	2519	4	.000	.000
64587	2525	4	210.000	795.900
64586	2525	4	125.000	473.750
64585	2525	4	125.000	473.750
28388	2525	4	125.000	473.750
2371106	2632	unknown	.000	.000
8110079	3000	4	1297.000	4915.630
8110080	3000	22	1350.000	5116.500
8110078	3000	12	1350.000	5116.500
80843	3003	32	1350.000	5116.500
80844	3003	4	113.000	428.270
80845	3003	4	113.000	428.270
PKR94711	3010	4	113.000	428.270
57H20430	3012	30	260.000	985.400
57H20431	3012	29	60.000 ^b	.000
57H20429	3012	39	60.000 ^b	.000
70L6659	3017	10	60.000 ^b	.000
78J805241	3019S	unknown	.000	.000
F497848-64P	3025	unknown	.000	.000
F497849-64P	3025	4	80.000	303.200
F496875-64P	3025	4	80.000	303.200
73G1478	3025	4	80.000	303.200
7550039	3025W	unknown	.000	.000
7350044	3025W	4	122.000	462.380
7350043	3025W	4	122.000	462.380
143983	3025W	4	122.000	462.380
66710	3034	unknown	.000	.000
	3039	29	130.000	492.700

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
66711	3039	10	130.000	492.700
66712	3039M	4	132.000	500.280
83V3577	3042	unknown	450.000	1705.500
7351430	3047	36	350.000	1326.500
76A480016	3085	unknown	.000	.000
77A060099	3085	unknown	.000	.000
77A080395	3085	unknown	.000	.000
70686	3500	4	55.000	208.450
67632	3500	4	55.000	208.450
70687	3500	4	55.000	208.450
67AH7855	3500	unknown	.000	.000
67AH5687	3500	unknown	.000	.000
67AH5688	3500	unknown	.000	.000
72AB7827	3500	unknown	.000	.000
64AK11441	3503	unknown	.000	.000
64AK12562	3503	unknown	.000	.000
64AL10170	3503	unknown	.000	.000
1988735	3503	unknown	.000	.000
A59467	3508	unknown	.000	.000
A59468	3508	unknown	55.000	208.450
A59470	3508	unknown	.000	.000
54836	3517	unknown	.000	.000
54837	3517	unknown	101.000	382.790
54838	3517	unknown	101.000	382.790
59298	3525	11	197.000	746.630
59299	3525	4	197.000	746.630
59297	3525	4	197.000	746.630
5065374	4000E	4	1335.000	5059.650
5065375	4000W	4	1335.000	5059.650
A59181	4500N	33	33.000	125.070
T4528	4500N	unknown	.000	.000
154363	4501	5	364.000	1379.560
49177	4505	4	200.000	758.000
7367553	4508	4	500.000	1895.000
7367549	4508	8	500.000	1895.000
7367549REG	4508	8	112.000	425.000
7367553REG	4508	5	112.000	425.000
1902056	4509	9	682.000	2584.780
1902055	4509	17	682.000	2584.780
1902057	4509	7	682.000	2584.780
F643813-67P	5507	unknown	.000	.000
77V8211	6005	4	535.000	2027.650
F959884	6010	2	180.000	682.200
F959883	6010	2	300.000	1137.000
F643634-67P	6010	28	94.000	356.260

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capaci- Gallons
V21808	6025	4	100.000 ^b
H26N4201	6025	4	160.000
1337042	7002	4	50.000 ^b
1337045	7002	4	50.000 ^b
1331476	7002	4	50.000 ^b
2546-3	7012	4	120.000
2546-2	7012	4	120.000
2546-1	7012	4	120.000
3153348	7033	4	55.000
1901716	7033	4	210.000
A59465	7033	4	80.000
A59466	7033	4	80.000
A59469	7033	4	80.000
27140-16	7033	18	237.000
27140-10	7033	16	237.000
27140-20	7033	19	237.000
8671187	7033	46	50.000
957331	7033	10	150.000
3160686	7033	46	110.000
27140-11	7033	10	237.000
8671542	7033	5	45.000
6589125	7033	7	50.000
B339639	7033	10	185.000
B339640	7033	6	185.000
B339641	7033	3	185.000
6154018	7033	43	40.000
73955	7033	unknown	59.000
4589-1	7033	4	53.000
2410184	7033	4	.000
3160690	7033	4	.000
F9F1056	7033	4	160.000
F9F1057	7033	4	160.000
F9F1058	7033	4	160.000
27140-8	7033	4	237.000
27140-14	7033	4	237.000
2620881	7033	4	572.000
3694654	7033	unknown	.000
2714016	7033	18	237.000
2714010	7033	16	237.000
2714020	7033	19	237.000
6263930	7033	unknown	5.250
1733294	7033	unknown	7.500
77A470017	7033	unknown	.000
77A470019	7033	unknown	.000
77A482448	7033	unknown	.000

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
75AH10309	7033	unknown	.000	.000
77A100793	7033	unknown	.000	.000
77A160003	7033	unknown	.000	.000
78A020046	7033	unknown	.000	.000
78A020048	7033	unknown	.000	.000
78A020050	7033	unknown	.000	.000
80934-4077	7033	unknown	.000	.000
80935-4077	7033	unknown	.000	.000
80936-4077	7033	unknown	.000	.000
C9G2598	7033	unknown	.000	.000
3245040	7033	unknown	.000	.000
3245044	7033	unknown	35.000	132.650
6071564	7033	unknown	35.000	132.650
K40108	7033	4	.000	.000
K40109	7033	unknown	.000	.000
K40110	7033	unknown	.000	.000
C475272	7033	unknown	.000	.000
6586954	7033	unknown	.000	.000
3376-1	7033	4	55.000	208.450
3376-2	7033	4	70.000	265.300
3376-3	7033	4	70.000	265.300
73AK16492	7033	4	70.000	265.300
73AK24738	7033	unknown	.000	.000
73AL892	7033	unknown	.000	.000
4789-6	7033	unknown	.000	.000
1901714	7033	4	.000	.000
1901715	7033	4	210.000	795.900
66563	7033	4	210.000	795.900
77068	7033	4	55.000	208.450
66561	7033	4	55.000	208.450
64012	7033	4	55.000	208.450
3150523	7033	4	107.000	405.530
K41135	7033	7	.000	.000
K41136	7033	unknown	.000	.000
K41137	7033	unknown	.000	.000
G9H1023	7033	unknown	.000	.000
G9H1021	7033	4	160.000	606.400
G9H1022	7033	4	160.000	606.400
G9H1022	7033	4	160.000	606.400
79A095663	7033	unknown	.000	.000
1742466	7033	unknown	.000	.000
15198	7033	unknown	21.000	79.590
M9D1621	7500	3	225.000	852.750
M9D1625	7500	28	145.000	549.550
M9D1623	7500	2	145.000	549.550
75474	7500	25	145.000	549.550
SCV0999-01	7503	4	422.000	1599.380
	7601	4	283.000	1072.570

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
L246058	7601	4	258.000	977.820
A9F1213	7700	4	145.000	549.550
A9F1211	7700	2	145.000	549.550
B5H8007	7700	5	145.000	549.550
T35H8007	7700	2	145.000	852.750
7731582	7710	16	500.000	1895.000
2384388	7852	unknown	67.000	253.930
2384387	7852	unknown	67.000	253.930
776002228	7860	4	225.000	852.750
7367568REG	7901	41	119.000	451.118
2371103	7901	6	1297.000	4915.630
7731581REG	7901	10	119.000	451.118
3428808	7901	15	200.000	758.000
7367568	7901	28	499.000	1891.660
7367568SW	7901	42	19.000	72.030
7731581	7901	45	499.000	1891.660
R3334	7901	unknown	31.000	117.490
R3333	7901	unknown	31.000	117.490
7022144	7920	38	275.000	1042.250
Total			32652.750	121557.947

a Unknown = small closed system transformers which cannot be sampled; assumed to be PCB-contaminated (> 50 ≤ 500 ppm).

b Estimate

Appendix B. Miscellaneous PCB-Contaminated Equipment \geq 50 and $<$ 500 ppm
 Removed from Service During CY 1988

Serial Number	Type	Location	PCB:PPM	Capacity		Date Removed	Disposer	Date Shipped
				Gallons	Kilograms			
6000-03550	Vac Pump	6000	163	0.250	1.000	02/29/88	Rollins Env. Ser.	12/06/88

1 - Rollins Environmental Services, Deer Park, TX.

Appendix C. Miscellaneous PCB-Contaminated Equipment < 50 ppm
 Moved Off-Site During CY 1988

Serial Number	Type	PCB:PPM	Capacity		Date	
			Gallons	Kilograms	Removed	Disposer
X165742 (3024-259) ²	Lathe	49	15.00	56.850	12/31/87	ORNL ¹

- 1 - Oak Ridge National Laboratory, Oak Ridge, Tn. 37831.
 Picked up by Y-12 Plant, Oak Ridge, Tn. 37831.
 2 - Identifying number in CY 1986 records.

Appendix D. Actions to Confirm Status of FRT-3 Capacitors

ORNL staff are in the process of confirming the disposal status of the four capacitors removed from the Spark Ion Source Power Supply for the ORIC Cyclotron (designated as FRT-3). In conversations with Gerald D. Mills and Sid W. Mosko, they confirmed the removal of the capacitors but were unable to confirm whether the drummed capacitors were ever picked up by the Hazardous Waste Operations Group. In a subsequent conversation with John Fritts of Plant and Equipment Division, he was unable to confirm the status of the drummed capacitors. At present ORNL's plans are to: (1) locate the electrical work orders for the removal of the capacitors from Physics Division to confirm the date removed from service; (2) locate Physics Division records pertaining to capacitors removed by subcontractors and/or records pertaining to the salvaging of the FRT-3 equipment; (3) survey Physics Division laboratories and storage areas to confirm whether the FRT-3 equipment is still in service and to check for the presence of the drummed capacitors; and (4) canvas drums of capacitors from Physics Division that are in storage at Building 7507. These efforts should confirm the disposal status of the four capacitors. It is anticipated that confirmation will be available in six to eight weeks. The resulting information will be included in final report which will be issued as ORNL/TM-11247.

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ORNL

**OAK RIDGE
NATIONAL
LABORATORY**

ORNL/TM-11665

MARTIN MARIETTA

PCB ANNUAL REPORT FOR
OAK RIDGE NATIONAL LABORATORY
EPA IDENTIFICATION NUMBER - TN 1890090003
JANUARY 1, 1989 - FEBRUARY 5, 1990

J. K. Greer, Jr.
A. R. Witt

Date published - July 1, 1990

Prepared by the
Environmental Compliance Section
Office of Environmental Compliance and Documentation
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37831

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MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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ABSTRACT

Oak Ridge National Laboratory (ORNL) prepares an annual report as mandated by the Toxic Substances Control Act (TSCA) that summarizes records required of owners/operators of facilities where polychlorinated biphenyls (PCBs) are in use. This report provides information on PCB and PCB-contaminated equipment in use or removed from service and PCB wastes generated, stored, and shipped off-site for treatment and disposal during the time period January 1, 1989, through February 5, 1990, as required by the revised TSCA regulations described in the December 21, 1989, Federal Register (54 FR 52716).

ACKNOWLEDGMENTS

This report is largely an update by J. K. Greer and A. R. Witt of the PCB Annual Report submitted in 1988 (prepared by N. S. Dailey, T. T. Puett and A. R. Witt). Special assistance was provided by S. R. Michaud, A. R. Witt, and R. P. Guillory for computer records retrieval and PCB equipment verification at ORNL. Valuable word processing assistance was provided by T. Raby. Also providing assistance were the Environmental Protection Officers and Field Engineers for each of the divisions and buildings at ORNL, and representatives of Hazardous Waste Operations and Environmental Monitoring at ORNL.

1.0 INTRODUCTION

Polychlorinated biphenyls (PCBs) are a family of chlorinated aromatic hydrocarbons used extensively prior to 1979 in electrical equipment, heat transfer systems, fire retardants, and plasticizers. PCBs can be detrimental to humans and the environment because of their toxicity, persistence, and tendency to bioaccumulate. Humans exposed to PCBs can develop dermatologic symptoms, follicular keratitis, excessive eye discharge, swelling of the eyelids, and nervous system symptoms (IARC 1978). In addition, available data are sufficient to support the carcinogenicity of PCBs in animals but are inadequate to demonstrate their carcinogenicity in humans (IARC 1982).

Congress mandated the control of PCBs under the Toxic Substances Control Act (TSCA) of 1976, Public Law 94-469, Section 6(e). To enforce TSCA, the Environmental Protection Agency (EPA) promulgated regulations under Title 40 of the Code of Federal Regulations (CFR), Part 761. Subpart A of 40 CFR 761 provides general information including definitions and references. Subpart B outlines requirements for the manufacture, processing, distribution, and use of PCBs. Subpart C governs marking and labeling requirements, and Subpart D identifies storage and disposal requirements. Subpart E regulates commercial exemptions for the manufacturing, processing, and distribution of PCBs. Subpart G details requirements for spill cleanup policy. Subpart J contains recordkeeping and reporting requirements for owners or operators of facilities using or storing PCBs and includes an annual report to be submitted by July 1 covering the previous calendar year.¹

Oak Ridge National Laboratory (ORNL) is a multipurpose research and development facility owned and operated by the Department of Energy (DOE) and managed under subcontract by Martin Marietta Energy Systems, Inc. (Energy Systems). ORNL operates research laboratories at the main ORNL/X-10 site and at the DOE/Y-12 Plant. ORNL manages PCBs and PCB-contaminated wastes that are generated at these sites in a manner that complies with state and federal regulations, as well as DOE and Energy Systems procedures. These wastes are stored on-site at ORNL prior to their treatment and disposal at EPA-approved facilities. In addition, PCB articles, PCB containers, and PCB-contaminated electrical equipment are in use at ORNL. PCB transformers, however, are no longer in service at the ORNL/X-10 site. Only two PCB-contaminated transformers, (<500 ppm) were in service at ORNL in 1989.

¹ This report includes activities for January 1, 1989 through February 5, 1990 due to the requirements of the December 21, 1989 Federal Register.

This report summarizes ORNL/X-10's PCBs and PCB items in service or removed from service as well as PCBs or PCB-contaminated wastes generated, stored on-site, and shipped off-site for treatment and disposal during 1989. Also included in this report are PCBs and PCB-contaminated wastes generated at ORNL's Y-12 facilities that are handled by ORNL/X-10. Thus, this document fulfills the reporting requirement (40 CFR 761.80) for these PCB materials at ORNL/X-10 (hereafter referred to as ORNL). Information concerning other PCB wastes and PCB items at ORNL/Y-12 is addressed in Y-12's annual report.

2.0 REGULATIONS ON PCBs

TSCA authorizes EPA to regulate chemical substances and mixtures that present an unreasonable risk of injury to human health or the environment. The primary impact of TSCA on ORNL is the regulation of PCBs and PCB-contaminated equipment and materials. The following are some of the elements EPA promulgated to implement this control program for PCBs.

1. Banned the manufacture, distribution in commerce, and use of PCBs in other than a "totally enclosed manner" (40 CFR Part 761.20).
2. Established categories of electrical equipment: PCB transformer (≥ 500 ppm), PCB-contaminated electrical equipment (≥ 50 to < 500 ppm), and non-PCB transformers (< 50 ppm) [40 CFR Part 761.3 and 761.30 (a)(2)(v)].
3. Set rules governing the conversion of PCB transformers to PCB-contaminated electrical equipment or to non-PCB transformers by draining, refilling, and/or otherwise servicing the transformer [40 CFR Part 761.30 (a)(2)(v)].
4. Established criteria for the disposal of PCBs, PCB articles (PCB transformers, PCB capacitors, PCB hydraulic machines, PCB-contaminated electrical equipment, and other PCB articles), PCB containers, and PCBs resulting from the cleanup and removal of spills (40 CFR 761.60).
5. Established standards for the marking (40 CFR 761.40 and 761.45) and storing of PCBs and PCB-contaminated liquids and solids (40 CFR 761.65).
6. Prohibited the use of PCB transformers and PCB-filled electromagnets (with concentrations of 500 ppm or greater) posing an exposure risk to food and feed after October 1, 1985, and established regulations to reduce fire-related risks posed by the use of PCB transformers (40 CFR 761.30).

7. Authorized the use of all other PCB transformers for the remainder of their useful lives, except for those posing fire-related risks, and required a quarterly inspection of this equipment for leaks of dielectric fluids (40 CFR 761.30).
8. Authorized the use of large capacitors that are located in restricted access electrical substations or in contained and restricted installations for the remainder of their useful lives. The use of all other large PCB capacitors after October 1, 1988, however, is prohibited [40 CFR 761.30 (1)(1)(ii)].
9. Established standards for recordkeeping and annual reporting for owners or operators of facilities using or storing PCBs or PCB items, as well as facilities storing or disposing of PCBs or PCB items (40 CFR 761.180 and 761.202). PCB items include any PCB articles, PCB article containers, PCB containers, or PCB equipment that deliberately or unintentionally contains PCBs.
10. Established standards for spill cleanup in restricted access areas [40 CFR 761.125(a)(3)], soil decontamination in unrestricted areas [40 CFR 761.125(a)(4)(v)], and that spills of 10 pounds or more of PCBs by weight must be reported to the National Response Center [40 CFR 761.125(a)(1)(iii)].

EPA has also promulgated new requirements for the manifesting and monitoring of PCB wastes by the generator [Federal Register 54, page 52734, December 21, 1989]. Since ORNL already manifests and monitors all PCB wastes, including wastes containing PCBs between 2 ppm and 50 ppm, implementation of these regulations under TSCA should not impact ORNL operations. The time frame covered by this Annual Report is from January 1, 1989, to February 5, 1990, which coincides the effective date of the revised December 1989 regulations [see 761.180(a)]. Thus, roughly 13 months of generation and storage of wastes are covered in this report and will be designated as report year (RY) 1989.

Handling of PCBs and PCB-contaminated materials at ORNL is also governed internally under Energy Systems and ORNL policies. These policies ["Martin Marietta Energy Systems Environmental, Safety, and Health Standards: Management of PCBs" dated April 4, 1989, and ORNL Environmental Protection Manual Section 4.0 "Polychlorinated Biphenyls (PCB)" dated November 20, 1989] require management of some materials containing 2 ppm to 50 ppm PCBs as wastes destined for incineration.

3.0 RECORDS AND REPORTING

Annual reporting is accomplished through a computerized PCB Tracking System (PCBTS), a module within a larger Hazardous Waste Tracking System which runs on ORNL's DEC system PDP-10 computer with System 1022 as the database management system. The PCBTS is comprised of two submodules: one on equipment inventories and one on waste generation and disposal. The equipment database contains information on inventories of PCB-contaminated transformers (Section 3.1), PCB large high- and low-voltage capacitors (Section 3.2), as well as miscellaneous PCB-contaminated hydraulic equipment (Section 3.3). The records on the PCB-contaminated equipment are by the Environmental Compliance Section (EC) in the Office of Environmental Safety and Health Compliance (ESHC). The data for the equipment database are provided by the Laboratory's Environmental Protection Officers for research equipment, Plant and Equipment Division for electrical service transformers, and periodic laboratory-wide surveys.

Records for the second module of the PCBTS, the PCB waste database, cover generation and disposal of both PCBs and PCB-contaminated wastes (refer to Section 3.4). The PCB waste submodule receives storage and shipment data from the larger Hazardous Waste Tracking System. The PCB waste data are compiled by the Waste Operations Group in the Environmental, Safety and Health Compliance Office.

Regulations regarding reporting (40 CFR Part 761.180 and .202) require the dates PCBs and PCB items are removed from service, placed into storage for disposal, and placed into transport for disposal. For PCBs and PCB items removed from service, the regulations require the location of the initial storage or disposal facility and the name of the owner or operator of the facility. The regulations also require information on PCBs and PCB items remaining in service at the end of the calendar year including the total weight in kilograms of any PCBs and PCB items in PCB containers, total number of PCB transformers and total weight of the PCBs they contain, and the total number of PCB large high- or low-voltage capacitors. Storage and disposal facilities have additional reporting requirements including dates and quantities of PCBs and PCB-contaminated wastes transferred into or out of the facility during the year and those retained in storage at the end of the year.

3.1 PCB Transformers

During the 1980s, ORNL undertook a program to reduce levels of PCBs in equipment used in the plant. The last PCB transformers (≥ 500 ppm) were removed from service and disposed of in CY 1986. Between 1980 and 1984, ORNL's transformers containing ≥ 50 ppm but < 500 ppm PCBs were chemically treated to decrease their

concentrations of PCBs, where feasible.² Following the program to reduce PCBs, no PCB transformers (≥ 500 ppm) and only two PCB-contaminated transformers (≥ 50 ppm but < 500 ppm PCBs) were in service at ORNL at the end of RY 1989 (Table 1). Untested transformers² and non-PCB transformers³ are listed in Appendix A. The latter are listed because they are managed as PCB-contaminated transformers under Energy Systems and ORNL policies.

Table 1. PCB-Contaminated Transformers (≥ 50 ppm but < 500 ppm) in Service During RY 1989

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
7731081	7901 (southside)	53	499	1891.21
7373793	7901 (southside)	68	500	1895.00
Total			999	3786.21

3.2 PCB Capacitors

Subpart A of the regulations defines three types of capacitors: small capacitors, large high-voltage capacitors, and large low-voltage capacitors. A small capacitor contains less than 1.36 kg (3 lb) of dielectric fluid. A large high-voltage capacitor contains 1.36 kg (3 lb) or more of dielectric fluid and operates at 2,000 volts or above; whereas, a large low-voltage capacitor contains 1.36 kg (3 lb) or more of dielectric fluid and operates below 2,000 V. A capacitor whose total volume is less than 1,639 cm³ (100 in.³) is assumed to contain less than 1.36 kg of dielectric fluid. PCBs were used as the dielectric fluid in most capacitors manufactured between 1920 and 1978. Although the manufacture of capacitors containing PCBs has been banned, their use in a totally enclosed manner is still allowed. The regulations require that all capacitors be considered to be treated as PCB items except when known to contain no PCBs and labeled "No PCBs." Thus, it is assumed that unmarked capacitors (both large and small) contain PCBs.

² Small closed system transformers (typically pole-mounted units) cannot be sampled and are assumed by EPA to contain ≥ 50 ppm but < 500 ppm PCBs. These PCB-contaminated transformers were not included in ORNL's treatment program to reduce PCB levels.

³ Those containing < 50 ppm PCBs under the EPA regulations.

The majority of PCB capacitors in use at ORNL are small (less than 1.36 kg of dielectric fluid). The ORNL electrical system does not have any PCB large high- or low-voltage capacitors (as they are referred to in the regulations); however, various research-related instruments do contain them. ORNL and Energy Systems policies concerning handling of PCB capacitors (both large and small) require that they be collected, stored on-site, and ultimately disposed of in an EPA TSCA-approved incinerator. This procedure is seemingly more stringent than required under 40 CFR 761.60 which states that small capacitors may be disposed of in municipal landfills. However, EPA has indicated that the disposal of large quantities (greater than 25) of small capacitors by commercial and industrial activities poses a larger environmental risk than that from households or other infrequent disposers. Therefore, EPA encourages companies to voluntarily collect and dispose of small capacitors in a high temperature incinerator. Thus, ORNL and Energy Systems policies are geared toward meeting the letter and the intent of the federal PCB regulations.

During early 1990, EC staff members initiated a Laboratory-wide survey of PCB-contaminated equipment including both large capacitors and other miscellaneous equipment. As of June 1990, the survey was essentially complete. Some data on untested transformers was not available but will be provided in the Annual Report for CY 1990. Where possible, the new data are cross-referenced to the data listed in the 1988 report via equipment serial numbers (i.e., current and former numbers) (See Appendix B). Surveys from the Environmental Protection Officers at ORNL, plus building inspections and discussions with field engineers, provided information to update the previous year's list of PCB capacitors. Additional survey work is planned for the rest of CY 1990.

In all, ORNL had 49 PCB large high- and low-voltage capacitors of approximately one (1) pound size or larger in service at the end of RY 1989 (Table 2). The information within the equipment database that is provided for PCB capacitors are: location, serial number, PCB level, estimated weight in kilograms and total number of PCB large and small high- or low-voltage capacitors. Identical capacitors at the same location and same piece of equipment are grouped and a single serial number or ORNL X- number is assigned to them.

In general, large and small PCB capacitors are packed in Department of Transportation-approved drums and shipped off-site for incineration in accordance with EPA regulations (refer to Section 3.4 PCB Wastes, Table 6 and 7).

Table 2. PCB Large High-Voltage and Low-Voltage Capacitors in Service During RY 1989

Serial Number	Quantity	Building	Room	PCB:PPM ¹	Capacity ²	
					Gallons	Kilograms
X-152179	2	2026	136	1,000,000	0.2 (Total for 2)	1.8 (Total for 2)
41061005V-21A	6	2525	119	1,000,000	0.5 (Total for 6)	5.4 (Total for 6)
1061005V-21	6	2525	119	1,000,000	0.5 (Total for 6)	5.4 (Total for 6)
10C275PS-16	3	2525	119	1,000,000	0.25 (Total for 3)	2.7 (Total for 3)
10C275PS-16	3	2525	119	1,000,000	0.25 (Total for 3)	2.7 (Total for 3)
X-92718	1	3500	D15	1,000,000	0.25	1.35
X-88068	1	3500	D15	1,000,000	0.25	1.35
Y35636	1	4500N	E-15A	1,000,000	1.2	4.5
A28299	1	4500N	E-15A	1,000,000	1.75	6.7
1C004801	2	4500N	E-15A	1,000,000	0.2 (Total for 2)	1.8 (Total for 2)
X-155876	2	4501	R105	1,000,000	0.2 (Total for 2)	1.8 (Total for 2)
X-157650	6	4501	R220	1,000,000	0.5 (Total for 6)	5.4 (Total for 6)
X-157127	8	4501	Basement	1,000,000	0.7 (Total for 8)	7.2 (Total for 8)
X-159580	1	4501	309	1,000,000	0.25	1.35
69-03378	3	4501	309	1,000,000	0.3 (Total for 3)	2.7 (Total for 3)
C297207	1	4501	309	1,000,000	0.25	1.35
G4-5165-01	2	7003	Main Area	1,000,000	0.25 (Total for 2)	1.35 (Total for 2)
Total = 49					7.8	54.85

¹ Assumed to be pure PCB material, not measured values.

² The capacities are estimated, not measured values.

3.3 Miscellaneous PCB-Contaminated Equipment

In addition to PCB-contaminated transformers and large PCB capacitors, ORNL has some miscellaneous equipment contaminated with PCBs. Examples of this miscellaneous equipment are pumps, pipes, electric motors, or other oil-filled equipment that typically contains low levels of PCBs and whose surface(s) has been in direct contact with PCBs. A Laboratory-wide survey for these items was initiated in early 1990, in conjunction with the capacitor survey, to validate information in the PCBTS for those in service during 1989. The goals of the survey were to locate items containing PCBs as listed in the database and identify any new items which are now on-site. Based on results of the survey, the miscellaneous equipment list has been updated.

Also, during the capacitor survey, large (approximately two to four pounds) light ballasts were identified at many of the high level radiation Hot Cell facilities at ORNL. The light ballasts service the mercury vapor lamps which provide light in the Hot Cells. Currently, the light ballasts are being marked and counted, and it is intended that they will be sent to an EPA incinerator when each light ballast fails or is changed out as part of normal maintenance.

These preliminary results indicate that PCB-levels in several pieces of equipment have been reduced by draining the PCB-contaminated oil and refilling the unit with non-PCB oil. The most significant reduction was found in a hydraulic unit which contained 7500 ppm PCBs compared to 950000 ppm PCBs as reported earlier.⁴ Only eight items contained ≥ 50 ppm PCBs (or previously contained PCB oils) during RY 1989 (Table 3).

3.4 PCB Wastes

PCB wastes at ORNL include contaminated oils, large capacitors, small capacitors including fluorescent light ballasts, contaminated solids (e.g., rags, papers from spill cleanups), transformer carcasses (i.e., drained units), and contaminated wastes from unintentional spills and releases. The majority of PCB wastes are stored on-site at Building 7507 for under one year and are shipped to an off-site EPA-approved incinerator for disposal. There are two exceptions to this practice. Firstly, drained transformer carcasses can be disposed of at an incinerator or a chemical waste landfill provided they are EPA-approved facilities. Secondly, PCB wastes that are co-contaminated with radioactive constituents cannot be sent to off-site disposal (since no commercial incinerator is available for disposal of PCB

⁴ This unit was drained of all PCB-contaminated oil in May 1989.

Table 3. Miscellaneous PCB-Contaminated Equipment \geq 50 ppm in Service During RY 1989

Serial #	Type	Location	PCB:PPM	Gals	KGS
X168820A	Hydraulic Unit, Blaw-Knox	3012, main area	7500 (prior to flushing)	Dry	568.5
X168822	Drive Motor Reservoir for Blaw-Knox	3012, main area	69 (after flushing)	Dry	18.9
X168844	Drive Motor, United	3012, main area	untested (assumed contaminated)	unkn.	unkn.
X168847	Drive Motor, Mesta	3012, main area	untested (assumed contaminated)	unkn.	unkn.
3024-269	Grinder: Removed in 1986, drained, oil in drum at 7507W, rad. contaminated	3024	83	Dry	11.4
3044-358	Surface Grinder: In rad. contaminated area, equipment not used	3044, North end	65	15	56.8
3525	Waste Press: In Hot Cell, rad. contaminated	Hot Cell	301	2	7.6
6000-063	Oil Reclaimer: Drained in 1987, sampled in April 1988, sent to salvage June 1988	6000	94 (prior to flushing)	Dry	unkn.
Total Units = 8					

and radioactive wastes) and, therefore, require long-term storage on-site. As a result, a small amount of radioactively co-contaminated PCB wastes, primarily oils, are stored on-site at the 7507W Mixed Waste Pad awaiting incineration at the DOE Oak Ridge Gaseous Diffusion Plant (ORGDP) TSCA incinerator (see Wastes in Storage Section below).

At ORNL, PCB wastes are classified into two categories: ≥ 2 but < 50 ppm (that requiring disposal under ORNL and Energy Systems policies) and ≥ 50 ppm PCBs (that requiring disposal under EPA regulations [40 CFR 761.60], as well as ORNL and Energy Systems policies). Typically, waste oils constitute over one-half (48 percent) of ORNL's total PCB wastes. Low concentrations of PCBs (≥ 2 to < 50 ppm) are frequently detected in waste oils from various sources. Most of the waste oils that contain a high concentration of PCBs (≥ 500 ppm) were used as dielectric fluids in electrical equipment or in heat exchange systems.

Information reported in the PCBTS for PCB wastes include disposal container (drum number), source location, waste description, weight, PCB concentration, disposer, and disposer location. The date to storage is the date wastes were received at the main ORNL storage facility, while date shipped is the date wastes were picked up by the disposer.

3.4.1 Wastes Shipped Off-Site

All nonradioactive PCB wastes (≥ 2 ppm) are shipped off-site for disposal at an EPA-approved facility. For these off-site shipments, PCB wastes are manifested in the same manner as Resource Conservation and Recovery Act (RCRA) hazardous wastes, and copies of the manifests are retained by the Waste Operations Group. Some of the wastes shipped off-site for disposal are generated at ORNL facilities located in Buildings 9201-2 and 9202-2 at the Y-12 plant or from the Oak Ridge Associated Universities (ORAU).

During RY 1989, ORNL shipped a total of 3713.85 kg of liquid PCB wastes for incineration at an off-site facility. This included 2292.95 kg of waste oils containing < 50 ppm PCBs and 1420.9 kg of waste oils containing ≥ 50 ppm. Summaries of off-site shipments of these liquid wastes containing < 50 ppm PCBs and ≥ 50 ppm PCBs are given in Tables 4 and 5, respectively. Facilities at ORNL/Y-12 contributed a total of 625.35 kg of these liquid PCB wastes.

Off-site shipments of solid wastes containing < 50 ppm PCBs are listed in Table 6, and those containing ≥ 50 ppm PCBs are presented in Table 7. A total of 937.25 kg of solid wastes containing < 50 ppm PCBs and 3961.9 kg of solid wastes containing ≥ 50 ppm PCBs were shipped off-site in RY 1989. Of these amounts, only 1250.7 kg were generated at ORNL/Y-12.

3.4.2 Wastes in Storage

Liquid wastes in storage at the end of the reporting period containing < 50 ppm PCBs are shown in Table 8, and those containing ≥ 50 ppm PCBs are given in Table 9. The current inventory includes 3523.78 kg of oils containing < 50 ppm PCBs and 19491.97 kg of oils and spill cleanup materials containing ≥ 50 ppm PCBs. The major portion of the wastes containing < 50 ppm are co-contaminated with low levels of radioactivity and, as a result, are stored on-site at the Mixed Waste Pad at 7507W. These mixed wastes will be incinerated at the DOE ORGDP's TSCA incinerator when it is operational.

Solid PCB wastes containing < 50 ppm, shown in Table 10, held in storage at the end of RY 1989 amounted to 446.65 kgs. Solid PCB wastes containing ≥ 50 ppm held in storage at the end of RY 1989 are shown in Table 11. The solid wastes ≥ 50 ppm PCBs in storage amounted to 4085.73 kgs. Only 36.30 kgs of 4085.73 kgs are co-contaminated with radioactivity and will be held for treatment at the TSCA incinerator at the DOE ORGDP.

Table 4. Liquid PCB Waste < 50 ppm Shipped Off-Site for Disposal as of February 5, 1990¹

Disposal Container	Source Location	Waste Description	Drum Weight In KGS	PCB:PPM	Date to Storage	Date Shipped	Disposer
1435B	7960	OIL PCB 18 PPM	208.45	18	8/03/89	8/25/89	CWM ²
1436B	7960	OIL PCB 18 PPM	208.45	18	8/03/89	8/25/89	CWM ²
1437B	7960	OIL PCB 18 PPM	208.45	18	8/03/89	8/25/89	CWM ²
1486B	2013	OIL PCB 3 PPM	208.45	3	9/08/89	10/27/89	CWM ²
1560B	4508	OIL PCB 9 PPM	208.45	9	10/18/89	10/27/89	CWM ²
1573B	4511	OIL PCB 5 PPM	208.45	5	10/24/89	10/27/89	CWM ²
1575B	4500N	OIL PCB 12 PPM	208.45	12	10/24/89	10/27/89	CWM ²
1361B	4500N	OIL PCB 10 PPM	208.45	10	8/10/88	8/25/89	CWM ²
1357B	2018	OIL PCB 18 PPM	208.45	18	8/26/88	8/25/89	CWM ²
1360B	2018	OIL PCB 4 PPM	208.45	4	8/26/88	8/25/89	CWM ²
1358B	2018	OIL PCB 4 PPM	208.45	4	8/26/88	8/25/89	CWM ²
Total Drums = 11			Total KGS = 2292.95				

¹ All shipments offsite are nonradioactive during RY 1989
² Chemical Waste Management, Emelle, AL 35459

Table 5. Liquid PCB Waste \geq 50 ppm Shipped Off-Site for Disposal as of February 5, 1990¹

Disposal Container	Source Location	Waste Description	Drum Weight In KGS	PCB:PPM	Date to Storage	Date Shipped	Disposer
1137B	Y9201-2	OIL PCB 51 PPM	208.45	51	10/18/88	8/25/89	CWM ²
1221B	4508	PCB CAPACITORS	6.35	unknown	4/11/89	8/25/89	CWM ²
1241B	6000	PCB CAPACITORS	12.25	unknown	4/18/89	8/25/89	CWM ²
1352B	Y9204-3	PCB CONTAMINATED LIQUID	208.45	unknown	6/02/89	8/25/89	CWM ²
1353B	Y9204-3	PCB CONTAMINATED LIQUID	208.45	unknown	6/02/89	9/20/89	CWM ²
1354B	3012	OIL PCB 7500 PPM	189.50	7500	6/06/89	8/25/89	CWM ²
1355B	3012	OIL PCB 7500 PPM	189.50	7500	6/06/89	8/25/89	CWM ²
1356B	3012	OIL PCB 7500 PPM	189.50	7500	6/06/89	8/25/89	CWM ²
1359B	2018	OIL PCB 59 PPM	208.45	59	8/26/88	8/25/89	CWM ²
Total Drums = 9		Total KGS = 1420.9					

¹ All shipments offsite are nonradioactive during RY 1989

² Chemical Waste Management, Emelle, AL 35459

Table 6. Solid PCB Waste < 50 ppm Shipped Off-Site for Disposal as of February 5, 1990¹

Disposal Container	Source Location	Waste Description	Drum Weight In KGS	PCB:PPM	Date to Storage	Date Shipped	Disposer
1203B	4508	TRANSFORMER PCB 7 PPM	103.45	7	12/07/88	10/27/89	CWM ²
1569B	Y9201-2	CONTAMINATED SOLIDS PCB 9 PPM	208.45	9	11/01/88	8/25/89	CWM ²
1570B	Y9201-2	CONTAMINATED SOLIDS PCB 9 PPM	208.45	9	11/01/88	8/25/89	CWM ²
1571B	Y9201-2	CONTAMINATED SOLIDS PCB 9 PPM	208.45	9	11/01/88	8/25/89	CWM ²
1572B	Y9201-2	CONTAMINATED SOLIDS PCB 9 PPM	208.45	9	11/01/89	8/25/89	CWM ²
Total Drums = 5		Total KGS = 937.25					

¹ All shipments offsite are nonradioactive during RY 1989
² Chemical Waste Management, Emelle, AL 35459

Table 7. Solid PCB Waste \geq 50 ppm Shipped Off-Site for Disposal as of February 5, 1990¹

Disposal Container	Source Location	Waste Description	Drum Weight In KGS	PCB:PPM	Date to Storage	Date Shipped	Disposer
1195B	4508	PCB CONTAMINATED TRANSFORMERS	136.12	unknown	12/01/88	10/27/89	CWM ²
1196B	4508	PCB CONTAMINATED TRANSFORMERS	24.95	unknown	12/01/88	10/27/89	CWM ²
1216B	6000	PCB BALLASTS	208.45	unknown	12/08/88	8/25/89	CWM ²
1220B	4500S	PCB CONTAMINATED SOLIDS	7.73	unknown	4/25/89	8/25/89	CWM ²
1231B	4500S	PCB BALLASTS	208.45	unknown	1/25/89	8/25/89	CWM ²
1232B	4500S	PCB BALLASTS	286.04	unknown	1/25/89	8/25/89	CWM ²
1233B	4500S	PCB BALLASTS	208.45	unknown	1/25/89	8/25/89	CWM ²
1234B	4500S	PCB BALLASTS	224.33	unknown	1/25/89	8/25/89	CWM ²
1241B	7000	PCB CAPACITORS	57.96	unknown	2/01/89	8/25/89	CWM ²
1242B	7000	PCB CAPACITORS	51.72	unknown	2/01/89	8/25/89	CWM ²
1284B	4500S	PCB BALLASTS	208.45	unknown	4/04/89	8/25/89	CWM ²
1350B	Y9204-3	PCB CONTAMINATED SOLIDS	208.45	unknown	6/02/89	8/25/89	CWM ²
1351B	Y9204-3	PCB CONTAMINATED SOLIDS	208.45	unknown	6/02/89	8/25/89	CWM ²
1353B	4500N	PCB BALLASTS	208.45	unknown	8/30/89	10/27/89	CWM ²
1373B	4500S	PCB BALLASTS	214.80	unknown	6/15/89	8/25/89	CWM ²
1389B	3012	PCB CAPACITORS	113.43	unknown	6/28/89	8/25/89	CWM ²
1390B	3012	PCB CAPACITORS	90.74	unknown	6/28/89	8/25/89	CWM ²
1396B	7606	PCB BALLASTS	208.26	unknown	7/13/89	8/25/89	CWM ²
1474B	4500S	PCB BALLASTS	208.45	unknown	8/30/89	10/27/89	CWM ²
1485B	4500S	PCB CAPACITORS	147.46	unknown	9/27/89	10/27/89	CWM ²
1508B	5500	PCB CAPACITORS	90.74	unknown	9/28/89	10/27/89	CWM ²
1509B	5500	PCB CAPACITORS	90.74	unknown	9/28/89	10/27/89	CWM ²
1510B	4500S	PCB TRANSFORMERS	136.12	unknown	9/27/89	10/27/89	CWM ²
1559B	4500S	PCB BALLAST	208.45	unknown	10/17/89	10/27/89	CWM ²
500G	4508	OIL PCB 75 PPM	203.81	75	4/13/89	10/27/89	CWM ²
B030	1505	PCB CONTAMINATED SOIL	.90	75	4/06/89	8/25/89	CWM ²
Total Drums = 26		Total KGS = 3961.9					

¹ All shipments offsite are nonradioactive during RY 1989
² Chemical Waste Management, Emelle, AL 35459

Table 8. Liquid PCB Wastes Inventory < 50 ppm in Storage as of February 5, 1990

Disposal Container	Source Location	Waste Description	Drum Weight In KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1764B	6010	OIL PCB 12 PPM	208.45	12	1/05/90	7507	No
1788B	6000	OIL PCB 6 PPM	293.54	6	7/27/89	7507	No
555R	2525	OIL PCB 10 PPM	208.45	10	4/14/87	7507W	Yes
556R	2525	OIL PCB 10 PPM	208.45	10	4/14/87	7507W	Yes
557R	2525	OIL PCB 3 PPM	208.45	3	4/14/87	7507W	Yes
558R	2525	OIL PCB 3 PPM	208.45	3	4/14/87	7507W	Yes
573R	3085	OIL PCB 3 PPM	208.45	3	4/28/87	7507W	Yes
598R	6010	OIL PCB 7 PPM	208.45	7	5/28/87	7507W	Yes
668R	Y9202-2	OIL PCB 16 PPM	208.45	16	1/13/88	7507W	Yes
669R	Y9202-2	OIL PCB 16 PPM	227.40	16	1/13/88	7507W	Yes
687R	3001	OIL PCB 12 PPM	9.07	12	5/04/88	7507W	Yes
755R	5500	OIL PCB 6 PPM	208.45	6	8/10/88	7507W	Yes
789R	45003	OIL PCB 24 PPM	19.55	24	10/01/87	7507W	Yes
938R	3106	OIL PCB 38 PPM	208.45	38	11/28/89	7507W	Yes
940R	4501	OIL PCB 5 PPM	208.45	5	11/29/89	7507W	Yes
1582R	5500	OIL PCB 6 PPM	240.20	6	10/31/89	7507W	Yes
1583B	4501	OIL PCB 7 PPM	232.62	7	10/31/89	7507	No
948R	6010	OIL PCB 9 PPM	208.45	9	1/05/90	7507W	Yes
TOTAL DRUMS = 18		TOTAL KGS = 3523.78					

¹ Radioactive Contamination

Table 9. Liquid PCB Wastes Inventory ≥ 50 ppm in Storage as of February 5, 1990

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1659B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1660B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1661B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1662B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1663B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1664B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1665B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1666B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1667B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1668B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1669B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1670B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1671B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1672B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1673B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1675B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1676B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1677B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1678B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1679B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1680B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No

Table 9. Liquid PCB Wastes Inventory ≥ 50 ppm in Storage as of February 5, 1990 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1681B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1682B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1683B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1684B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1685B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1686B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1687B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1688B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1689B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1690B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1691B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1692B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1693B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1694B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1695B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1696B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1697B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1698B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1699B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1700B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1701B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No

Table 9. Liquid PCB Wastes Inventory \geq 50 ppm in Storage as of February 5, 1990 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1702B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill reidue	11/10/89	7507	No
1703B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1704B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1574B	4508	OIL PCB 38, 999 PPM	208.45	999	10/24/89	7507	No
1584B	3044	OIL PCB 51 PPM	208.45	51	11/01/89	7507	No
1601B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1602B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1603B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1604B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1605B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1606B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1607B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1608B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1609B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1610B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1611B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1612B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1613B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1614B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1615B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1616B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1617B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No

Table 9. Liquid PCB Wastes Inventory \geq 50 ppm in Storage as of February 5, 1990 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1618B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1619B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1620B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1621B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1622B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1623B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1624B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1625B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1626B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1627B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1628B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1629B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1630B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1631B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1641B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1642B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1643B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1644B	7009	PCB CONTAMINATED MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1645B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1646B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No

Table 9. Liquid PCB Wastes Inventory \geq 50 ppm in Storage as of February 5, 1990 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1647B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1648B	7009	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1649B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1650B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1651B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1652B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1653B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1654B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1655B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1656B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1657B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1658B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1705B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1706B	7002	PCB CONTAMINATED SPILL MATERIAL	208.45	unkn. spill residue	11/10/89	7507	No
1707B	7002	PCB CONTAMINATED KEROSENE	18.95	unkn. spill residue	11/10/89	7507	No
1717B	Y9201-2	OIL PCB 95 PPM	208.45	95	11/29/89	7507	No
1723B	Y9201-2	OIL PCB 86 PPM	208.45	86	11/29/89	7507	No
1726B	Y9204-3	PCB LIQUID	208.45	unkn. spill residue	11/29/89	7507	No
1727B	7009	PCB CONTAMINATED WATER	208.45	unkn. spill residue	11/10/89	7507	No

Table 9. Liquid PCB Wastes Inventory \geq 50 ppm in Storage as of February 5, 1990 (cont.)

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
779R	6000	OIL PCB 16000 PPM	75.80	16,000	8/17/88	7507W	Yes
937R	3106	OIL PCB 127 PPM	208.45	127	11/28/89	7507W	Yes
??R		OIL PCB 200 PPM	11.37	200	11/06/84	7507W	Yes
TOTAL DRUMS = 99		TOTAL KGS = 20117.32					

¹ Radioactive Contamination

Table 10. Solid PCB Wastes Inventory < 50 ppm in Storage as of February 5, 1990

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1598B	4500S	TRANSFORMER PCB 9 PPM	79.40	9	11/07/89	7507	No
1599B	4500S	TRANSFORMER PCB 9 PPM	79.40	9	11/07/89	7507	No
1600B	4500S	TRANSFORMER PCB 9 PPM	79.40	9	11/07/89	7507	No
1777B	Y9201-2	OIL PCB 5 PPM	208.45	5	1/16/90	7507	No
TOTAL DRUMS = 4		TOTAL KGS = 446.65					

¹ Radioactive Contamination

Table 11. Solid PCB Wastes Inventory \geq 50 ppm in Storage as of February 5, 1990

Disposal Container	Source Location	Waste Description	Drum Weight in KGS	PCB:PPM	Date to Storage	Storage Location	Rad ¹ Cont
1524B	7710	PCB BALLAST	1.36	unknown	11/01/89	7507	No
1585B	4500S	PCB CAPACITORS	284.03	unknown	11/01/89	7507	No
1596B	4500S	PCB CONTAMINATED SOLID	195.55	unknown	11/07/89	7507	No
1597B	4500S	PCB CONTAMINATED TRANSFORMER	137.48	unknown	11/07/89	7507	No
1635B	7009	PCB CONTAMINATED SOIL	208.45	unknown	11/10/89	7507	No
1636B	7009	PCB CONTAMINATED SOIL	208.45	unknown	11/10/89	7507	No
1637B	7009	PCB CONTAMINATED SOIL	208.45	unknown	11/10/89	7507	No
1638B	7009	PCB CONTAMINATED SOIL	208.45	unknown	11/10/89	7507	No
1639B	7009	PCB CONTAMINATED SOIL	208.45	unknown	11/10/89	7507	No
1640B	7009	PCB CONTAMINATED SOIL	208.45	unknown	11/10/89	7507	No
1674B	7002	PCB CONTAMINATED SOLIDS	208.45	unknown	11/10/89	7507	No
1718B	Y9201-2	PCB CONTAMINATED SOLIDS	208.45	unknown	11/29/89	7507	No
1719B	Y9201-2	PCB CONTAMINATED SOLIDS	208.45	unknown	11/29/89	7507	No
1720B	Y9201-2	PCB CONTAMINATED SOLIDS	208.45	unknown	11/29/89	7507	No
1721B	Y2901-2	PCB CONTAMINATED SOLIDS	208.45	unknown	11/29/89	7507	No
1722B	Y2901-2	PCB CONTAMINATED SOLIDS	208.45	unknown	11/29/89	7507	No
1724B	Y2901-2	PCB BALLASTS	208.45	unknown	11/29/89	7507	No
1725B	Y9204-3	PCB CAPACITORS	208.45	unknown	11/29/89	7507	No
1759B	7015	PCB CONTAMINATED SOLIDS	79.40	unknown	1/05/90	7507	No
1760B	7015	PCB CONTAMINATED SOLIDS	102.09	unknown	1/05/90	7507	No
1761B	7015	PCB CONTAMINATED SOLIDS	102.09	unknown	1/05/90	7507	No
1762B	7015	PCB CONTAMINATED SOLIDS	47.64	unknown	1/05/90	7507	No
1763B	7015	PCB CONTAMINATED SOLIDS	181.49	unknown	1/05/90	7507	No
322R	1505	PCB CONTAMINATED SOLIDS	2.27	unknown	11/25/89	7507W	Yes
939R	3106	PCB CONTAMINATED SOLIDS	34.03	unknown	11/28/89	7507W	Yes
TOTAL DRUMS = 25		TOTAL KGS = 4085.73					

¹ Radioactive Contamination

4.0 SUMMARY

ORNL manages PCBs and PCB-contaminated equipment and wastes in compliance with state and federal regulations as well as DOE and Energy Systems procedures. PCB-contaminated equipment includes transformers, capacitors, and miscellaneous items (either hydraulic units or those which contain oils). All PCB wastes are collected and stored on-site. All nonradioactive PCB wastes are shipped off-site to an EPA-approved facility for disposal in less than one year. Only radioactively contaminated PCB wastes are stored on-site for longer than one year, awaiting incineration at a DOE-sponsored facility when it is operational. Off-site shipments of PCBs and PCB items are manifested to ensure proper handling and tracking. ORNL reporting of both equipment and wastes is accomplished through the computerized PCBTS. Highlights of ORNL's management of PCBs and PCB-contaminated equipment and wastes are presented below.

4.1 PCB Transformers

No PCB transformers (≥ 500 ppm) have been in service at ORNL since CY 1986. Only two transformers in service still contain ≥ 50 ppm PCBs after servicing to reduce PCB levels. However, 72 untested transformers (assumed to be ≥ 50 but < 500 ppm PCBs under EPA regulations) are also in service at the Laboratory.

4.2 PCB Capacitors

A total of 49 PCB large high- and low-voltage capacitors were in service at the end of RY 1989.

4.3 Miscellaneous PCB-Contaminated Equipment

ORNL currently has eight pieces of equipment that are contaminated with ≥ 50 ppm PCBs.

4.4 PCB Wastes Shipped Off-Site

A total of 2292.95 kgs of waste oils containing < 50 ppm PCBs and 1420.90 kg of waste oils containing ≥ 50 ppm PCBs were shipped off-site for incineration and disposal in RY 1989.

During RY 1989, 3961.90 kg of PCB-contaminated (≥ 50 ppm) solid wastes were shipped off-site for incineration and disposal. Another 937.25 kg of solid wastes containing < 50 ppm PCBs were also shipped off-site.

4.5 PCB Wastes in Storage

At the end of RY 1989, 19491.97 kg of waste oils and wastes with water (≥ 50 ppm PCBs) were in storage awaiting treatment and disposal. Of this, 295.62 kg are co-contaminated with radioactivity. In addition, 3523.78 kg of waste oils (< 50 ppm PCBs) were in storage at the end of RY 1989. All but 501.99 kgs of the waste oils are co-contaminated with radiation. Radioactively co-contaminated waste oils will be sent to ORGDP's TSCA incinerator when it begins operation. Nonradioactive oils containing PCBs are sent to EPA-approved disposal facilities.

PCB solid wastes (≥ 50 ppm) on-site as of February 5, 1990 totaled 4085.73 kg. All but 36.30 kgs, which are radioactively co-contaminated, will be shipped off-site for treatment and disposal. PCB solid wastes (< 50 ppm) on-site as of February 5, 1990 totaled 446.65 kg. All of this solid waste (< 50 ppm) will be shipped off-site for treatment and disposal. The radioactive solids will be stored for future treatment at the TSCA incinerator at ORGDP.

5.0 REFERENCES

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IARC (International Agency for Research on Cancer). 1978. IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans. Polychlorinated Biphenyls and Polybrominated Biphenyls. Vol. 18. IARC, Lyon.

IARC (International Agency for Research on Cancer). 1982. Chemicals, Industrial Processes and Industries Associated with Cancer in Humans. Supplement 4. IARC, Lyon.

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 and < 500 ppm)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
73J3182	1000M	unknown ^a	.000	.000
73J3180	1000N	unknown	.000	.000
73J3181	1000S	unknown	.000	.000
72V9421	1504	13	220.000	833.800
81V3323	1505	4	130.000	492.700
77V6955	1505	4	440.000	1667.600
77V6956	1505	4	440.000	1667.600
8110081	2000	15	390.000	1478.100
36160694	2000	4	110.000 ^b	.000
64011	2000	4	71.000	269.090
7513305	2000	4	59.000	223.610
L723482THNA	2010	unknown	.000	.000
L723483THNA	2010	unknown	.000	.000
L723484THNA	2010	unknown	.000	.000
N18009	2013	unknown	.000	.000
N18013	2013	unknown	.000	.000
N18014	2013	unknown	.000	.000
S11F150	2500	unknown	.000	.000
L243213	2519	4	210.000	795.900
64587	2525	4	125.000	473.750
64586	2525	4	125.000	473.750
64585	2525	4	125.000	473.750
28388	2525	unknown	.000	.000
2371106	2632	4	1297.000	4915.630
8110079	3000	22	1350.000	5116.500
8110080	3000	12	1350.000	5116.500
8110078	3000	32	1350.000	5116.500
80843	3003	4	113.000	428.270
80844	3003	4	113.000	428.270
80845	3003	4	113.000	428.270
PKR94711	3010	30	260.000	985.400
57H20430	3012	29	60.000 ^b	.000
57H20431	3012	39	60.000 ^b	.000
57H20429	3012	10	60.000 ^b	.000
70L6659	3017	unknown	.000	.000
78J805241	3019S	unknown	.000	.000
F497848-64P	3025	4	80.000	303.200
F497849-64P	3025	4	80.000	303.200
F496875-64P	3025	4	80.000	303.200
73G1478	3025	unknown	.000	.000
7550039	3025W	4	122.000	462.380
7350044	3025W	4	122.000	462.380
7350043	3025W	4	122.000	462.380
143983	3034	unknown	.000	.000
66710	3039	29	130.000	492.700

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
66711	3039	10	130.000	492.700
66712	3039M	4	132.000	500.280
83V3577	3042	unknown	450.000	1705.500
7351430	3047	36	350.000	1326.500
76A480016	3085	unknown	.000	.000
77A060099	3085	unknown	.000	.000
77A080395	3085	unknown	.000	.000
70686	3500	4	55.000	208.450
67632	3500	4	55.000	208.450
70687	3500	4	55.000	208.450
67AH7855	3500	unknown	.000	.000
67AH5687	3500	unknown	.000	.000
67AH5688	3500	unknown	.000	.000
72AB7827	3500	unknown	.000	.000
64AK11441	3503	unknown	.000	.000
64AK12562	3503	unknown	.000	.000
64AL10170	3503	unknown	.000	.000
1988735	3503	unknown	.000	.000
A59467	3508	unknown	55.000	208.450
A59468	3508	unknown	.000	.000
A59470	3508	unknown	.000	.000
54836	3517	unknown	.000	.000
54837	3517	unknown	101.000	382.790
54838	3517	unknown	101.000	382.790
59298	3525	11	101.000	382.790
59299	3525	4	197.000	746.630
59297	3525	4	197.000	746.630
5065374	4000E	4	197.000	746.630
5065375	4000W	4	1335.000	5059.650
A59181	4500N	4	1335.000	5059.650
T4528	4500N	33	33.000	125.070
154363	4501	unknown	.000	.000
49177	4505	5	364.000	1379.560
7367553	4505	4	200.000	758.000
7367549	4508	4	500.000	1895.000
7367549REG	4508	8	500.000	1895.000
7367553REG	4508	8	112.000	425.000
1902056	4509	5	112.000	425.000
1902055	4509	9	682.000	2584.780
1902057	4509	17	682.000	2584.780
F643813-67P	5507	7	682.000	2584.780
77V8211	6005	unknown	.000	.000
F959884	6010	4	535.000	2027.650
F959883	6010	2	180.000	682.200
F643634-67P	6010	2	300.000	1137.000
	6010	28	94.000	356.260

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
V21808	6025	4	100.000 ^b	.000
H26N4201	6025	4	160.000	606.400
1337042	7002	4	50.000 ^b	.000
1337045	7002	4	50.000 ^b	.000
1331476	7002	4	50.000 ^b	.000
2546-3	7012	4	120.000	303.200
2546-2	7012	4	120.000	303.200
2546-1	7012	4	120.000	303.200
3153348	7033	4	55.000	208.450
1901716	7033	4	210.000	795.900
A59465	7033	4	80.000	303.200
A59466	7033	4	80.000	303.200
A59469	7033	4	80.000	303.200
27140-16	7033	18	237.000	898.230
27140-10	7033	16	237.000	898.230
27140-20	7033	19	237.000	898.230
8671187	7033	46	50.000	189.500
957331	7033	10	150.000	568.500
3160686	7033	46	110.000	416.900
27140-11	7033	10	237.000	898.230
8671542	7033	5	45.000	170.550
6589125	7033	7	50.000	189.500
B339639	7033	10	185.000	701.150
B339640	7033	6	185.000	701.150
B339641	7033	3	185.000	701.150
6154018	7033	43	40.000	151.640
73955	7033	unknown	59.000	223.610
4589-1	7033	4	53.000	200.870
2410184	7033	4	.000	.000
3160690	7033	4	.000	.000
F9F1056	7033	4	160.000	606.400
F9F1057	7033	4	160.000	606.400
F9F1058	7033	4	160.000	606.400
27140-8	7033	4	237.000	898.230
27140-14	7033	4	237.000	898.230
2620881	7033	4	572.000	2167.880
3694654	7033	unknown	.000	.000
2714016	7033	18	237.000	898.230
2714010	7033	16	237.000	898.230
2714020	7033	19	237.000	898.230
6263930	7033	unknown	5.250	19.898
1733294	7033	unknown	7.500	28.425
77A470017	7033	unknown	.000	.000
77A470019	7033	unknown	.000	.000
77A482448	7033	unknown	.000	.000

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
75AH10309	7033	unknown	.000	.000
77A100793	7033	unknown	.000	.000
77A160003	7033	unknown	.000	.000
78A020046	7033	unknown	.000	.000
78A020048	7033	unknown	.000	.000
78A020050	7033	unknown	.000	.000
80934-4077	7033	unknown	.000	.000
80935-4077	7033	unknown	.000	.000
80936-4077	7033	unknown	.000	.000
C9G2598	7033	unknown	.000	.000
3245040	7033	unknown	35.000	132.650
3245044	7033	unknown	35.000	132.650
6071564	7033	4	.000	.000
K40108	7033	unknown	.000	.000
K40109	7033	unknown	.000	.000
K40110	7033	unknown	.000	.000
C475272	7033	unknown	.000	.000
6586954	7033	unknown	55.000	208.450
3376-1	7033	4	70.000	265.300
3376-2	7033	4	70.000	265.300
3376-3	7033	4	70.000	265.300
73AK16492	7033	unknown	.000	.000
73AK24738	7033	unknown	.000	.000
73AL892	7033	unknown	.000	.000
4789-6	7033	unknown	.000	.000
1901714	7033	4	210.000	795.900
1901715	7033	4	210.000	795.900
66563	7033	4	55.000	208.450
77068	7033	4	55.000	208.450
66561	7033	4	55.000	208.450
64012	7033	4	107.000	405.530
3150523	7033	7	.000	.000
K41135	7033	unknown	.000	.000
K41136	7033	unknown	.000	.000
K41137	7033	unknown	.000	.000
G9H1023	7033	4	160.000	606.400
G9H1021	7033	4	160.000	606.400
G9H1022	7033	4	160.000	606.400
79A095663	7033	unknown	.000	.000
1742466	7033	unknown	21.000	79.590
15198	7033	3	225.000	852.750
M9D1621	7500	28	145.000	549.550
M9D1625	7500	2	145.000	549.550
M9D1623	7500	25	145.000	549.550
75474	7503	4	422.000	1599.380
SCV0999-01	7601	4	283.000	1072.570

Appendix A. Non-PCB Transformers (< 50 ppm) and
 PCB-Contaminated Transformers (≥ 50 but < 500 ppm) (Cont.)

Serial Number	Location	PCB:PPM	Capacity	
			Gallons	Kilograms
L246058	7601	4	258.000	977.820
A9F1213	7700	4	145.000	549.550
A9F1211	7700	2	145.000	549.550
B5H8007	7700	5	145.000	549.550
T35H8007	7700	2	145.000	852.750
7731582	7710	16	500.000	1895.000
2384388	7852	unknown	67.000	253.930
2384387	7852	unknown	67.000	253.930
776002228	7860	4	225.000	852.750
7367568REG	7901	41	119.000	451.118
2371103	7901	6	1297.000	4915.630
7731581REG	7901	10	119.000	451.118
3428808	7901	15	200.000	758.000
7367568	7901	28	499.000	1891.660
7367568SW	7901	42	19.000	72.030
7731581	7901	45	499.000	1891.660
R3334	7901	unknown	31.000	117.490
R3333	7901	unknown	31.000	117.490
7022144	7920	38	275.000	1042.250
Total			<u>32652.750</u>	<u>121557.947</u>

a Unknown = small closed system transformers which cannot be sampled; assumed to be PCB-contaminated (> 50 ≤ 500 ppm).

b Estimate

Appendix B. Revisions From RY 1988 Inventory

- B.2008, Custom built and Siemens 250KV, X-Ray Power Source removed in 1987. Confirmed with building representatives.
- B.2026, Room 136 X-152179, Lepel Power Source discovered during capacitor search. Responsible group is High Radiation Analytical Lab.
- B.3025, #178161 (4) were removed in 1987 removal project by Westinghouse at ORNL. Confirmed with building representatives.
- B.3095, #FRT-3, removed in 1988 from the Spark Ion Source Power Supply for ORIC Cyclotron. Confirmed with Physics Division.
- B.3500, #A17055 (1) and 03646 (1) were removed in 1987 removal project. Confirmed with building representatives.
- B.3500, #T093119 (9) and 853557 (1) were removed in 1987 removal project. Confirmed with building representatives.
- B.3500, room D15 (not D15), two capacitors located in Allis-Chambers Induction Heater (X-92718), and Lepel Induction Heater (X-88068). Small size and assumed to be pre-1978. Responsible group is Instrumentation Controls Division.
- B.3508, Attic area, all capacitors (R10..840, P68734, R10837, R10837, P68734) were removed in 1987 removal project. Confirmed with building representatives.
- B.3525, Room 119, the X-Ray Power Source that contained capacitors was removed in previous year to salvage. No capacitors remaining. Confirmed with building representatives.
- B.4500S, Rooms B48 and D54, capacitors were located and are in Lepel Corp. Induction Heating Equipment. The Metals and Ceramics Division has 19 heaters, with 2 capacitors per heater, which equals 38 capacitors. A letter was obtained from Lepel Corp., dated September 9, 1987, that the induction heaters that Metals and Ceramics owns "do not contain PCB"(s). Serial numbers and locations of machines are kept on file with Metals and Ceramics and in Environmental Compliance.
- B.4500S, Room Y-17 (not T-14), Sorenson A.C. Voltage Regulator was inspected by electrician and contained 2 capacitors, but were smaller than 3 pounds (approximately 1 pound each). Equipment is not in use, is to be sent to salvage, and is responsibility of Nondestructive Testing.

Appendix B. Revisions From RY 1988 Inventory (cont.)

B.4501, basement, four Lepel Power Sources discovered during capacitor search. Responsible group is the Chemical Technology Division.

B.4508, R. 226, #19F86 (X159580) power source equipment moved to 4501 Room 309 in 1988 for storage, confirmed with building representative in the Metals and Ceramics Division. Only one capacitor observed in equipment.

B.6000, C300, W-1, LING-1, FRTG-1, FRT6-2 capacitors were removed in 1987 during Westinghouse cleanout. Confirmed with building representatives.

B.7003, main shop area, #G4-5165-01, 2 capacitors in TOCCO Induction Heater. Responsible group is the Maintenance Section in the Plant and Equipment Division in 7012.

B.7041, Monson-1 capacitor was not found. B.7041 is a storage warehouse, and no equipment was found which would contain 3 kgs of capacitors. It is assumed that the Monson-1 capacitor was removed in 1987 during Westinghouse cleanout.

**Appendix C. Name and Address of PCB Disposal Site
for 1989 Shipments**

Chemical Waste Management, Inc.
Emelle Facility
P.O. Box 55
Emelle, Alabama 35459
(205) 652-9721



HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. TN118910091001031010121315		Manifest Document No.		2. Page 1 of 1		Information in the shaded areas is not required by Federal law.			
3. Generator's Name and Mailing Address Oak Ridge National Laboratory X-10 P.O. Box 2008 Oak Ridge, Tenn 37831-6058 Generator's Phone (615) 574-7467						A. State Manifest Document Number CWMA 512555					
4. Generator's Phone (615) 574-7467						B. State Generator's ID					
5. Transporter 1 Company Name Chemical Waste Management, Inc.						C. State Transporter's ID					
6. US EPA ID Number ILD109920121681						D. Transporter's Phone (205) 652-9721					
7. Transporter 2 Company Name						E. State Transporter's ID					
8. US EPA ID Number						F. Transporter's Phone					
9. Designated Facility Name and Site Address CHEMICAL WASTE MANAGEMENT, INC. Emelle Facility Alabama Highway 17 at Mile Marker 163 Emelle, Alabama 35459						G. State Facility's ID					
10. US EPA ID Number ALD1000622464						H. Facility's Phone 205/652-9721					
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)						12. Containers		13. Total Quantity		14. Unit Wt/Vol	
						No. Type				Waste No.	
a. RQ Waste Flammable liquid, nos (D001) Flammable liquid UN1993 CWM Profile Number MARH62764						0012 DM		1800 P		D001	
b. RQ Waste Flammable liquid, nos (D001) Flammable liquid UN1993 CWM Profile Number MARG13853						0101 DM		1350 P		D001	
c. Waste Flammable solid, nos Flammable solid UN1325 CWM Profile Number MARG35182						0016 DM		11100 P		N/A	
Waste Flammable solid, nos Flammable solid UN1325 CWM Profile Number MARH68213						0017 DM		1350 P		N/A	
J. Additional Descriptions for Materials Listed Above						K. Handling Codes for Wastes Listed Above					
Tenn / Ga						a. DS b. DS					
15. Special Handling Instructions and Additional Information Dike and contain all spills, avoid skin contact, fire; In case of emergency contact Chemtrec at 1-800-424-9300, Haz Sub release: US Coast Guard 1-800-424-8802 C.Y. Horton (615) 574-7467, KG Edgeman (615) 574-1779 or OPLK shift Supr (615) 574-6606 Work Order #: 890425086-30 Purchase Order #:											
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford											
Printed/Typed Name D.M. WALLS FOR P.S. ROHWER						Signature D.M. Walls FOR P.S. ROHWER			Month Day Year 10/8/25/89		
17. Transporter 1 Acknowledgement of Receipt of Materials											
Printed/Typed Name DAVID W. HOPPER						Signature David W. Hopper			Month Day Year 10/8/25/89		
18. Transporter 2 Acknowledgement of Receipt of Materials											
Printed/Typed Name						Signature			Month Day Year		
19. Discrepancy Indication Space											
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.											
Printed/Typed Name Jeff Bonner						Signature Jeff Bonner			Month Day Year 10/8/25/89		

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's US EPA ID No. TN 189 009 0003	Manifest Document No. 00235	22. Page 2	Information in the shaded areas is not required by Federal law.
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23. Generator's Name Oak Ridge National Laboratory X-10 Plant P.O. Box 2008 Oak Ridge, TN 37831-6058	L. State Manifest Document Number: CWMA 51-2555
	M. State Generator's ID:

24. Transporter Company Name Chemical Waste Management, Inc	25. US EPA ID Number ILD 099202681	N. State Transporter's ID:
26. Transporter Company Name	27. US EPA ID Number	O. Transporter's Phone: (205) 652-9721
		P. State Transporter's ID:
		U. Transporter's Phone:

28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	29. Containers		30. Total Quantity	31. Unit Mt/Vol	R. Waste No.
	No.	Type			
a. Waste Combustible liquid, nos Combustible liquid NA1993 CWM Profile Number MARG13868	008	DM	3000	P	N/A
b. Waste Combustible liquid, nos Combustible liquid NA1993 CWM Profile Number MARG13868 ⁶⁸	001	DM	400	P	N/A
c. RQ Waste Corrosive liquid, nos (D002) Corrosive material UN1760 CWM Profile Number MARG13862	002	DM	400	P	D002
d. RQ Waste Corrosive liquid, nos (D002) Corrosive material UN1760 CWM Profile Number MARD34547	009	DM	2075	P	D002
e. Waste Ferric chloride solution Corrosive material UN2582 CWM Profile Number MARG68232	001	DM	450	P	D002
f. RQ Waste Corrosive solid, nos (D002) Corrosive material UN1759 CWM Profile Number MARG13852	003	DM	1100	P	D002
g. RQ Waste Corrosive solid, nos (D002) Corrosive material UN1759 CWM Profile Number MARG62761	002	DM	800	P	D002
h. Waste Poison B solid, nos Poison B UN2811 CWM Profile Number MARG35189	004	DM	1000	P	N/A
i. Waste Poison B solid, nos Poison B UN2811 CWM Profile Number MARG62729	001	DM	150	P	N/A

S. Additional Descriptions for Materials Listed Above	T. Handling Codes for Wastes Listed Above
	a. FB d. ST g. L b. FB e. ST h. L c. ST f. L i. L

32. Special Handling Instructions and Additional Information
 Dike and contain all spills, avoid skin contact, fire; In case of emergency contact chemtec at 1-800-424-9300. Haz sub release, US Coast Guard 1-800-424-8802, OEL shift supr (615) 574-6606

33. Transporter Acknowledgement of Receipt of Materials		Date
Printed/Typed Name DAVID W. HOPPER	Signature <i>David W. Hopper</i>	Month Day Year 10 25 89
34. Transporter Acknowledgement or Receipt of Materials		Date
Printed/Typed Name	Signature	Month Day Year

35. Discrepancy Indication Space
 on H.H. Certs 28b - Charged WPS # 28d1e - Corrected INF # + WPS metals per Volume 9/11/89 JH (28h - Contains no

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's US EPA ID No. TN 189 009 0003	Manifest Document No. 00235	22. Page 3	Information in the shaded areas is not required by Federal law.
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23. Generator's Name Oak Ridge National Laboratory X-10 Plant P.O. Box 2008 Oak Ridge, Tn 37831-6058		L. State Manifest Document Number CWMA 512555
24. Transporter Company Name Chemical Waste Management, Inc		M. State Generator's ID
25. US EPA ID Number ILD 099 202 681	N. State Transporter's ID	
26. Transporter Company Name		O. Transporter's Phone (205) 652-9921
27. US EPA ID Number		P. State Transporter's ID
		Q. Transporter's Phone

28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	29. Containers		30. Total Quantity	31. Unit W/Vol	R. Waste No.
	No.	Type			
a. Waste Poison B solid, nos Poison B UN2811 CWM Profile Number MARG68214	001	DM	200	P	N/A
b. Waste Poison B solid, nos Poison B UN2811 CWM Profile Number MARH62576	001	DM	125	P	N/A
c. RQ Waste Poison B solid, nos (D006) Poison B UN2811 CWM Profile Number MARH62733	001	DM	350	P	D006
d. Waste Poison B liquid nos (F001 F002) Poison B UN2810 CWM Profile Number MARH62732	003	DM	1000	P	F001 F002
e. Waste Poison B liquid, nos (D004) Poison B UN2810 CWM Profile Number MARH62760	001	DM	400	P	D004
f. RQ Hazardous waste solid, nos (D009) ORM-E NA9189 CWM Profile Number MARG13893	001 ^{YH}	DM	75	P	D009
g. Hazardous waste solid, nos ORM-E NA9189 CWM Profile Number MARH62762	001	DM	300	P	N/A
h. RQ Hazardous waste solid, nos (D009) ORM-E NA9189 CWM Profile Number MARG13884	001	DM	200	P	D009
i. Hazardous waste liquid, nos ORM-E NA9189 CWM Profile Number MARG68215	001	DM	200	P	N/A

S. Additional Descriptions for Materials Listed Above	T. Handling Codes for Wastes Listed Above
	a. L d. 507 g. L b. L e. 5T h. L c. L f. L i. 501

32. Special Handling Instructions and Additional Information
Dike and contain all spills, avoid skin contact, fire; In case of emergency contact Chemtrec at 1-800-424-9300. Ho2 sub release: US Coast Guard 1-800-424-8802, ORNL Shift Supr (615) 574-6606

33. Transporter Acknowledgement of Receipt of Materials		Date
Printed/Typed Name DAVID W. HOPPER	Signature David W. Hopper	Month Day Year 08 25 89
34. Transporter Acknowledgement or Receipt of Materials		Date
Printed/Typed Name	Signature	Month Day Year

35. Discrepancy Indication Space

GENERATOR FACILITY TRANSPORTER

1/1

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)		21. Generator's US EPA ID No. TN 189 00 90003	Manifest Document No. 00235	22. Page 4	Information in the shaded areas is not required by Federal law.	
23. Generator's Name Oak Ridge National Laboratory X-10 Plant P.O. Box 2008 Oak Ridge, Tn 37831-6058				L. State Manifest Document Number CWMA 512555		
24. Transporter Company Name Chemical Waste Management, Inc		25. US EPA ID Number ILD 099202681		M. State Generator's ID		
26. Transporter Company Name		27. US EPA ID Number		N. State Transporter's ID		
				O. Transporter's Phone (205) 652-9721		
				P. State Transporter's ID		
				Q. Transporter's Phone		
28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)				29. Containers	30. Total Quantity	31. Unit
				No.	Type	MW/Vol
a. RQ Waste Hazardous substance liq, nos (Zinc bromide)						
ORM-E NA9188		CWM Profile Number MARG35180		002	DM	900 P
b. RQ Waste Hazardous substance solid, nos (PCB)						
ORM-E NA1188		CWM Profile Number MARG 68205		012	DM	5500 P
c. RQ Waste Hazardous substance solid, nos (PCB)						
ORM-E NA9188		CWM Profile Number MARG 68210		010	DM	3750 P
d. RQ Waste Hazardous substance solid, nos (PCB)						
ORM-E NA9188		CWM Profile Number MARG 68206		003	DM	425 P
e. RQ Waste Hazardous substance solid, nos (PCB)						
ORM-E NA9188		CWM Profile Number MARG 68209		003	DM	400 P
f. Non hazardous film						
		CWM Profile Number MARG 13873		001	DM	120 P
g. Hazardous waste solid, nos						
ORM-E NA9189		CWM Profile Number MARG 62767		002	DM	400 P
h. RQ Hazardous waste solid, nos (D006)						
ORM-E NA9189		CWM Profile Number MARG 13893		001	DM	100 P
i.						
				CWM Profile Number		
S. Additional Descriptions for Materials Listed Above				T. Handling Codes for Wastes Listed Above		
				a. ST d. L		
				b. e. L		
				c. L		
32. Special Handling Instructions and Additional Information Dike and contain all spills, avoid skin contact; fire: In case of emergency contact Chemtec at 1-800-424-9300, Haz sub release: US Coast Guard 1-800-424-8502 Cl Horton (615) 574-7467, KG Edgemon (615) 574-1779 or ORNL Shift Supr (615) 574-6606						
33. Transporter Acknowledgement of Receipt of Materials				Date		
Printed/Typed Name DAVID W. HOPPER		Signature <i>David W. Hopper</i>		Month Day Year 08/25/89		
34. Transporter Acknowledgement or Receipt of Materials				Date		
Printed/Typed Name		Signature		Month Day Year		
35. Discrepancy Indication Space						



HAZARDOUS WASTE MANIFEST

(As Required By The Alabama Department of Environmental Management)

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No. TN118910191001030012146		Manifest Document No. 1 of 4		2. Page 1 of 4		Information in the shaded areas is not required by Federal law.							
3. Generator's Name and Mailing Address Oak Ridge National Laboratory P.O. Box 2008 Oak Ridge, TN 37831-6058						A. State Manifest Document Number CWMA 470724									
4. Generator's Phone (615) 574-7467 attn: P.Y. Horton						B. State Generator's ID									
5. Transporter 1 Company Name Chemical Waste Management, Inc						C. State Transporter's ID									
6. US EPA ID Number IL10191201216181						D. Transporter's Phone (205) 652-9721									
7. Transporter 2 Company Name						E. State Transporter's ID									
8. US EPA ID Number						F. Transporter's Phone									
9. Designated Facility Name and Site Address CHEMICAL WASTE MANAGEMENT, INC. Emelle Facility Alabama Highway 17 at Mile Marker 163 Emelle, Alabama 35459						G. State Facility's ID									
10. US EPA ID Number AL1010101612141614						H. Facility's Phone 205/652-9721									
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)						12. Containers No. Type		13. Total Quantity		14. Unit Wt/Vol					
GENERATOR	a. RQ Waste Flammable liquid, nos (D001) Flammable liquid UN1993 CWM Profile Number MARG13853						0, 0, 2 DM		0, 0, 8, 00		P D001				
	b. RQ Waste Flammable liquid, nos (D001) Flammable liquid UN1993 CWM Profile Number MARH 62764						0, 0, 2 DM		0, 0, 4, 5, 0		P D001				
	c. Waste Flammable solid, nos Flammable solid UN1325 CWM Profile Number MARG35182						9, 0, 6 DM		0, 1, 2, 0, 0		P N/A				
	d. Waste Combustible liquid, nos Combustible liquid UN1993 CWM Profile Number MARH 62772						0, 0, 1 DM		0, 0, 4, 0, 0		P N/A				
	J. Additional Descriptions for Materials Listed Above						K. Handling Codes for Wastes Listed Above a. ST b. L c. FB d. ST								
13. Special Handling Instructions and Additional Information State of Origin - TN Dike and contain all spills, avoid skin and fire. Emergency contact na 11a 27 11b 27 11c 32 11d 27 Chemtec at 1-800-424-9300. Haz Sub release: US Coast Guard 1-800-424-8802 CY Horton (615) 574-7467, KG Edgemon (615) 574-1779 or DRUL shift Suprv (615) 574-6606 Work Order #: 891027064-24 Purchase Order #:															
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment. OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.															
Printed/Typed Name H.H. J.H. SWANKS						Signature H.H. Swanks			Month Day Year 11/02/89						
TRANSPORTER	17. Transporter 1 Acknowledgement of Receipt of Materials						Printed/Typed Name RONNY ROBINSON			Signature Ronny Robinson			Month Day Year 11/02/89		
	18. Transporter 2 Acknowledgement of Receipt of Materials						Printed/Typed Name			Signature			Month Day Year		
FACILITY	19. Discrepancy Indication Space Situation: Added state of origin per your letter 10-31-89														
	20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.						Printed/Typed Name J. Smith			Signature J. Smith			Month Day Year 11/02/89		

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's US EPA ID No. TN1890090003	Manifest Document No 00246	22. Page 2	Information in the shaded areas is not required by Federal law.
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23. Generator's Name Oak Ridge National Laboratory P.O. Box 2008 Oak Ridge, TN 37831-6058	L. State Manifest Document Number CWMA 470724
	M. State Generator's ID

24. Transporter Company Name Chemical Waste Management, Inc	25. US EPA ID Number ILD-099202681	N. State Transporter's ID	O. Transporter's Phone (205) 652-9721
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26. Transporter Company Name	27. US EPA ID Number	P. State Transporter's ID	Q. Transporter's Phone
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28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	29. Containers No.	29. Containers Type	30. Total Quantity	31. Unit (M/Vol)	32. R. Waste No.
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a. Waste Combustible liquid, nos Combustible liquid NA1993 CWM Profile Number MARG13868	010	DM	04.250	P	N/A
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b. RQ Waste Corrosive liquid, nos (D002) Corrosive material UN1760 CWM Profile Number MARG13868	007	DM	02.765	P	D002
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c. RQ Waste Corrosive solid, nos (D002) Corrosive material UN1759 CWM Profile Number MARG13852	001	DM	0.0200	P	D002
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d. RQ Waste Corrosive liquid, nos (D002) Corrosive material UN1760 CWM Profile Number MARG13862	003	DM	00.850	P	D002
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e. RQ Waste oxidizer, Corrosive, liquid nos (D001/D002) Oxidizer NA9193 CWM Profile Number MARH62706	002	DM	00.850	P	D001
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f. RQ Waste oxidizing material, nos (D001) Oxidizer UN1479 CWM Profile Number MARH62744	001	DM	00.200	P	D001
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g. Waste Poison B solid, nos Poison B UN2811 CWM Profile Number MARH62704	002	DM	00.400	P	N/A
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h. RQ Waste Poison B solid, nos (D006) Poison B UN2811 CWM Profile Number MARH62733	001	DM		P	D006
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i. Waste Poison B liquid, nos Poison B UN2810 CWM Profile Number MARH62742	002	DM	00.600	P	N/A
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S. Additional Descriptions for Materials Listed Above	T. Handling Codes for Wastes Listed Above
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32. Special Handling Instructions and Additional Information Emergency contact no. 11a 27 11b 60 11c 60 11d 60 11e 45 11f 35 11g 53 11h 53 11i 55 Dike and contain all spills, avoid skin contact, fire In case of emergency contact chemtec at 1-800-424-9300, Haz Sub release US Coast Guard 1-800-424-8802, OR UL Shift supr (615) 574-6606
--

33. Transporter Acknowledgement of Receipt of Materials	Date
---	------

Printed/Typed Name Randy Robinson	Signature Randy Robinson	Month Day Year 10 27 89
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34. Transporter Acknowledgement or Receipt of Materials	Date
---	------

Printed/Typed Name	Signature	Month Day Year
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35. Discrepancy Indication Space Add. pi. Yvonne Horton 12-31-89 added D002 to em 11/15/89 here 38 e - unneeded list replaced. Per Yvonne Horton 11/16/89

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)		21. Generator's US EPA ID No. TN1890090003		Manifest Document No. 00246	22. Page 3	Information in the shaded areas is not required by Federal law.		
		23. Generator's Name Oak Ridge National Laboratory P.O. Box 2008 Oak Ridge, TN 37831-6058			L. State Manifest Document Number CWMA 470724			
24. Transporter Company Name Chemical Waste Management, Inc		25. US EPA ID Number ILD099202681		N. State Transporter's ID		O. Transporter's Phone (205)652-9721		
26. Transporter Company Name		27. US EPA ID Number		P. State Transporter's ID		Q. Transporter's Phone		
28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)				29. Containers		30. Total Quantity	31. Unit	R. Waste No.
				No.	Type		M/Vol	
a. RQ Waste Poison B liquid, nos (D006) Poison B UN2810 CWM Profile Number MARH62740				001	Dm	00400	P	D006
b. RQ Waste Hazardous substance, solid nos (PCB) ORM-E NA9188 CWM Profile Number MARG68205				009	Dm	03555	P	N/A
c. RQ Waste Hazardous substance liquid, nos (PCB) ORM-E NA9188 CWM Profile Number MARG68210				005	Dm	01975	P	N/A
d. RQ Waste Hazardous substance solid, nos (PCB) ORM-E NA9188 CWM Profile Number MARG68209				004	Dm	01580	P	N/A
e. RQ Waste Hazardous substance solid, nos (PCB) ORM-E NA9188 CWM Profile Number MARH62765				001	Dm	00200	P	N/A
f. Hazardous waste solid, nos ORM-E NA9189 CWM Profile Number MARG35188				009	Dm	03555	P	N/A
g. RQ Hazardous waste solid, nos (D009) ORM-E NA9189 CWM Profile Number MARG13884				001	Dm	00200	P	D009
h. Hazardous waste solid, nos ORM-E NA9189 CWM Profile Number MARG62582				001	Dm	00250	P	N/A
i. RQ Hazardous waste solid, nos (D006 D009) ORM-E NA9189 CWM Profile Number MARG13893				001	Dm	00200	P	D006 D009
S. Additional Descriptions for Materials Listed Above contains only D006, D009. no other metals present				T. Handling Codes for Wastes Listed Above				
				a. ST	d. L	g. L		
				b. SO1	e. L	h. L		
				c. PIN	f. L	i. L		
32. Special Handling Instructions and Additional Information Emergency contact no. 11a. 55 11b. 31 11c. 31 11d. 31 11e. 31 Dike and contain all spills, avoid skin contact, fire In case of emergency contact chemtec at 1-800-424-1300. Haz sub release, vs coast Guard 1-800-424-8802 ORNL Shift Supr (615) 574-6606								
33. Transporter Acknowledgement of Receipt of Materials								
Printed/Typed Name Benny Robinson				Signature <i>Benny Robinson</i>		Date 1 02 7 189		
34. Transporter Acknowledgement or Receipt of Materials								
Printed/Typed Name				Signature		Date		
J. Discrepancy Indication Space								

UNIFORM HAZARDOUS WASTE-MANIFEST (Continuation Sheet)		21. Generator's US EPA ID No. TN 189 0090003	Manifest Document No. 00246	22. Page 4	Information in the shaded areas is not required by Federal law.	
23. Generator's Name Oak Ridge National Laboratory P.O. Box 2008 Oak Ridge, TN 37831-6058			L. State Manifest Document Number CWMA 470724		M. State Generator's ID	
24. Transporter Company Name Chemical Waste Management, Inc		25. US EPA ID Number IL00.9.9.202681		N. State Transporter's ID		O. Transporter's Phone (205) 652-4721
26. Transporter Company Name		27. US EPA ID Number		P. State Transporter's ID		Q. Transporter's Phone
28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)			29. Containers	30. Total Quantity	31. Unit Mt/Vol	R. Waste No.
a. RQ Hazardous waste solid, nos (D006) ORM-E NA9189 CWM Profile Number MARG13893			001 DM	00200	P	D006
b. RQ Waste Poison B solid nos (D008) Poison B UN2811 CWM Profile Number MARG35189			004 DM	0.1580	P	D008
c. RQ Waste Poison B solid, nos (D004) Poison B UN2811 CWM Profile Number MARG35189			006 DM	0.2370	P	D004
d. RQ Waste Poison B solid, nos (D006) Poison B UN2811 CWM Profile Number MARG35189			001 DM	00395	P	D006
e. CWM Profile Number						
f. CWM Profile Number						
g. CWM Profile Number						
h. CWM Profile Number						
i. CWM Profile Number						
S. Additional Descriptions for Materials Listed Above			T. Handling Codes for Wastes Listed Above			
a. contains only D006, no other metals present			a. L d. L g.			
b. " " D008, " " " "			b. L e. h.			
c. " " D004, " " " "			c. L f. i.			
d. " " D006, " " " "						
32. Special Handling Instructions and Additional Information Emergency contact no. 11a 31 11b 53 11c 53 11d 53 11e 11f 11g 11h 11i Dike and contain all spills avoid skin contact, fire, in case of emergency contact chemtec 1-800-424-4300 Haz sub release US Coast Guard 1-800-424-8802 OPL Shift Sup (615) 574-6606						
33. Transporter / Acknowledgement of Receipt of Materials			Printed/Typed Name RONNY ROBINSON		Signature Ronny Robinson	
					Date Month Day Year 10 27 89	
34. Transporter / Acknowledgement or Receipt of Materials			Printed/Typed Name		Signature	
					Date Month Day Year	
35. Discrepancy Indication Space						

GENERATOR

TRANSPORTER

RECEIVER