CHAPTER 2

Summary Data

In Section 2.1, this chapter provides summary data on the quantity of the SNF, radioactive waste [HLW, TRU waste (including previously-disposed TRU-contaminated waste), LLW, MLLW], 11e(2) byproduct material, contaminated media, and non-radioactive waste that are within the scope of this report. Section 2.2 provides summary radioactivity data for HLW, TRU waste (including previously-disposed TRU-contaminated waste – i.e., buried TRU waste), and previously-disposed LLW. Finally, Section 2.3 lists the DOE and commercial sites that are referred to throughout this report, and summarizes the types of SNF, radioactive waste, media, etc., associated with these sites.

Because the data in this report vary from one chapter to another, it is not possible to accurately provide the same types of summary data from each chapter. Data are summarized in this chapter according to the content of the individual chapters and are grouped where appropriate and possible.

Common Abbreviations Used Throughout This Report

Spent nuclear fuel	SNF
High-level waste	HLW
Transuranic waste	TRU waste
Contact-handled TRU waste	CH TRU waste
Remote-handled TRU waste	RH TRU waste
Low-level waste	LLW
Mixed low-level waste	MLLW
11e(2) byproduct material	11e(2)

2.1 Summary Quantity Data

The following tables and figures provide summary quantity data. The past "actuals" summary data are shown first and are followed by the summary data for projected quantities between FY 2000 - FY 2070. For most waste/material types, the FY 1999 (and, in some cases, FY 1998) data are summarized in Tables 2-1 and 2-2 and shown graphically in Figure 2-1; the projected quantities are summarized in Tables 2-6 and 2-7. Summary data are provided for buried TRU waste (Table 2-3); in-situ contaminated media (Table 2-4); non-radioactive waste (Table 2-5); and TRU waste[1] (Table 2-8).

The waste water and ground/surface water associated with LLW, MLLW, 11e(2), and contaminated media are not included in the following summary data, but can be found in the applicable chapters that cover these topics. (There are no water volumes associated with SNF, HLW, or TRU waste).

[1] Some information on TRU waste is also provided in Table 2-1.

Table 2-1 and Figure 2-1 summarize the quantities of waste and other materials in inventory and currently managed by the DOE.

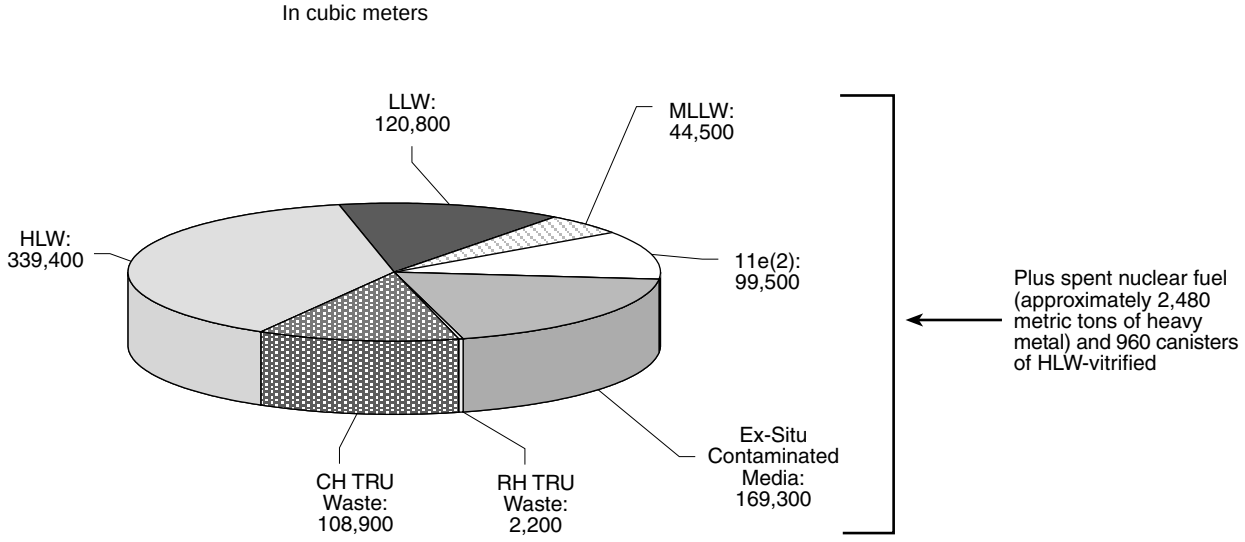
Table 2-1
Summary of Total SNF, Radioactive Waste, 11e(2) Byproduct Material, and Ex-Situ Contaminated Media in Inventory

Type	Units	Amount
SNF	metric tons of heavy metal	2,480
HLW	cubic meters	339,419
HLW-Vitrified	number of canisters	960
CH TRU	cubic meters	108,884
RH TRU	cubic meters	2,246
LLW[a]	cubic meters	120,846
MLLW[a]	cubic meters	44,455
11e(2)[b]	cubic meters	99,450
Ex-Situ Contaminated Media[c]	cubic meters	169,311

Notes:
• Data reflect end-of-FY 1999 inventories except for the TRU waste (CH and RH) volumes, which reflect end-of-FY 2000 inventories.

[a] Includes all physical forms except waste water.
[b] Includes all physical forms except ground/surface water.
[c] Includes all physical forms except waste water and ground/surface water.

Figure 2-1
Summary of Inventories by Type



Notes:
• Data are rounded to the nearest hundred.
• See Table 2-1 for more information.
• Data reflect end-of-FY 1999 inventories except for the TRU waste (CH and RH) volumes, which reflect end-of-FY 2000 inventories.

Table 2-2
Summary of Total SNF, Radioactive Waste, 11e(2) Byproduct Material, and Ex-Situ Contaminated Media by Management Activity as Reported by Sites: FY 1998 and FY 1999 Actuals

FY 1998

Type	Units	New Generation	Treatment	Receipts	Disposal
SNF	metric tons of heavy metal	1	-	1	-
HLW	cubic meters	14,278[a]	2,516	-	-
HLW-Vitrified	number of canisters	n/a	n/a	-	-
LLW[b]	cubic meters	29,506	5,191	15,093	22,514
MLLW[b]	cubic meters	2,954	6,112	3,885	3,712
11e(2)[c]	cubic meters	890,148[d]	68,400	-	1,383,334
Ex-Situ Contaminated Media[e]	cubic meters	412,481	1,588	16,762	402,143

FY 1999

Type	Units	New Generation	Treatment	Receipts	Disposal
SNF	metric tons of heavy metal	0.2	2	1	-
HLW	cubic meters	16,053[a]	5,095	-	-
HLW-Vitrified	number of canisters	n/a	n/a	-	-
LLW[b]	cubic meters	34,824	7,724	25,765	37,461
MLLW[b]	cubic meters	2,968	4,160	16,576	16,410
11e(2)[c]	cubic meters	636,465[d]	46,360	-	915,295
Ex-Situ Contaminated Media[e]	cubic meters	606,885	45,859	42,699	517,788

Notes:
• Hyphens indicate quantities of zero.
• This report does not include FY 1998 or FY 1999 data for CH TRU waste or RH TRU waste. The total amount of TRU waste disposed of as of the end of FY 2000 was 939 cubic meters (all of which was CH TRU waste).

[a] Most of this volume results from treatment and cleanup processes, not from the activities that have historically resulted in the new generation of HLW (i.e., the reprocessing of SNF).
[b] Includes all physical forms except waste water.
[c] Includes all physical forms except ground/surface water.
[d] These data represent 11e(2) new additions, which are comprised of new generation and process outputs.
[e] Includes all physical forms except waste water and ground/surface water.

Table 2-3
Summary of Total Volume of Previously-Disposed TRU-Contaminated Waste

In cubic meters

	TRU	αLLW
Buried TRU Waste	126,000	313,000
Waste Disposed of at Intermediate Depths	11,000	3,200
Contaminated Soil	32,000	12,000

Notes:
• Data are given to three significant digits.
• Additional information on these data can be obtained from Chapter 6 and the source identified below.

Source: U.S. Department of Energy, *Buried Transuranic-Contaminated Waste Information for U.S. Department of Energy Facilities*, (June 2000).

Table 2-4
Summary of Total Volume of In-Situ Contaminated Media[a]
(Includes all physical forms except ground/surface water)

In cubic meters

Type	Total Volume
LLW	25,798,617
MLLW	2,217,343
TRU	282,340
Unspecified	267,985
Total	**28,566,285**

Notes:
[a] Estimated in-situ contaminated media volumes as of FY 1999. For in-situ contaminated media, DOE sites are requested to report the current year's total estimated volume (entered as an average or a range). For these quantities, DOE sites are also requested to report one or more management activities for the entire quantity, not for specific future years or year ranges.

Table 2-5
Summary of Total Volumes of Non-Radioactive Waste Newly-Generated as Reported by Sites:
FY 1998 and FY 1999 Actuals

In cubic meters

Type	FY 1998	FY 1999
Non-Routine RCRA Waste	7,449	4,368
Non-Routine State Waste	4,219	9,964
Non-Routine TSCA Waste	1,597	7,803
Routine RCRA Waste	1,149	558
Routine State Waste	813	454
Routine TSCA Waste	105	79
Non-Routine Sanitary Waste	36,200	69,233
Routine Sanitary Waste	40,414	47,524

Notes:
• RCRA: Resource Conservation and Recovery Act.
• TSCA: Toxic Substances Control Act.

Summary of Projected Quantities for FY 2000 - FY 2070:

Table 2-6
Total Projected Inventories of SNF, Radioactive Waste, 11e(2) Byproduct Material, and Ex-Situ Contaminated Media as Reported by Sites:
FY 2000 - FY 2070

Type	Units	FY 2000	FY 2010	FY 2020	FY 2030	FY 2040	FY 2050	FY 2060	FY 2070
SNF	metric tons of heavy metal	2,465	2,445	2,093	1,034	-	-	-	-
HLW	cubic meters	354,729	317,634	87,421	2,274	822	822	822	822
HLW-Vitrified	number of canisters	1,215	3,815	10,702	14,772	6,095	653	653	-
LLW[a]	cubic meters	118,194	19,711	7,671	7,023	8,188	7,241	8,431	9,561
MLLW[a]	cubic meters	38,848	5,991	2,225	1,545	797	794	791	791
11e(2)[b]	cubic meters	1,001	39,901	41,801	-	-	-	-	-
Ex-Situ Contaminated Media[c]	cubic meters	150,870	3,106	See footnote d					

Notes:
• Hyphens indicate quantities of zero.
• Data reflect end-of-year inventories.
• The projected amounts of CH TRU waste and RH TRU waste are provided in Table 2-8.

[a] Includes all physical forms except waste water.
[b] Includes all physical forms except ground/surface water.
[c] Includes all physical forms except waste water and ground/surface water.
[d] Because contaminated media projections are particularly subject to change due to changing site assumptions, this report does not include contaminated media projections past FY 2010.

Table 2-7
Total Projected SNF, Radioactive Waste, 11e(2) Byproduct Material, and Contaminated Media by Management Activity as Reported by Sites: FY 2000 - FY 2070

New Generation

Type	Units	FY 2000[a]	FY 2001-2010	FY 2011-2020	FY 2021-2030	FY 2031-2040	FY 2041-2050	FY 2051-2060	FY 2061-2070
SNF	metric tons of heavy metal	0.3	7	2	4	0.6	-	-	-
HLW-Vitrified	number of canisters	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LLW[b]	cubic meters	28,197	324,774	261,892	158,363	137,546	132,935	127,270	127,336
MLLW[b]	cubic meters	5,424	19,094	25,594	27,925	7,198	5,787	5,718	5,718
11e(2)[c]	cubic meters	1,498[d]	39,825[d]	27,499[d]	-	-	-	-	-
Ex-Situ Contaminated Media[e]	cubic meters	511,799	6,356,245	See footnote f					

Treatment

Type	Units	FY 2000[a]	FY 2001-2010	FY 2011-2020	FY 2021-2030	FY 2031-2040	FY 2041-2050	FY 2051-2060	FY 2061-2070
SNF	metric tons of heavy metal	16	33	-	-	-	-	-	-
HLW	cubic meters	5,011	76,306	361,399	320,515	34,342	-	-	-
HLW-Vitrified	number of canisters	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
LLW[b]	cubic meters	12,183	136,213	108,833	154,174	114,482	83,147	77,438	77,461
MLLW[b]	cubic meters	6,615	31,570	13,124	9,022	2,979	931	908	908
11e(2)[c]	cubic meters	-	-	-	-	-	-	-	-
Ex-Situ Contaminated Media[e]	cubic meters	151,928	1,066,983	See footnote f					

Receipts

Type	Units	FY 2000[a]	FY 2001-2010	FY 2011-2020	FY 2021-2030	FY 2031-2040	FY 2041-2050	FY 2051-2060	FY 2061-2070
SNF	metric tons of heavy metal	1	69	374	1,081	1,035	-	-	-
HLW	cubic meters	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
HLW-Vitrified	number of canisters	-	105	2,050	2,050	8,893	5,442	-	653
LLW[b]	cubic meters	26,231	552,812	213,347	140,563	137,519	134,178	114,547	112,971
MLLW[b]	cubic meters	12,332	76,979	9,750	8,856	6,909	5,714	5,703	5,701
Ex-Situ Contaminated Media[e]	cubic meters	119,263	887,272	See footnote f					

Disposal

Type	Units	FY 2000[a]	FY 2001-2010	FY 2011-2020	FY 2021-2030	FY 2031-2040	FY 2041-2050	FY 2051-2060	FY 2061-2070
SNF	metric tons of heavy metal	-	-	352	1,062	1,034	-	-	-
HLW	cubic meters	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
HLW-Vitrified	number of canisters	-	105	2,050	2,050	8,893	5,442	-	653
LLW[b]	cubic meters	38,045	531,245	627,967	294,848	115,525	102,022	87,433	85,913
MLLW[b]	cubic meters	11,230	84,689	29,977	27,870	7,205	5,659	5,589	5,587
11e(2)[c]	cubic meters	99,947	925	67,400	-	-	-	-	-
Ex-Situ Contaminated Media[e]	cubic meters	472,706	5,937,422	See footnote f					

Notes:
• Hyphens indicate quantities of zero.
• The projected amounts of CH TRU waste and RH TRU waste are provided in Table 2-8.

[a] These annual data reflect the total volume projected by sites for FY 2000. All data reported for the post-FY 2000 time periods reflect the total summary volume projected for the specific five-year time period.
[b] Includes all physical forms except waste water.
[c] Includes all physical forms except ground/surface water.
[d] These data represent 11e(2) new additions, which are comprised of new generation and process outputs.
[e] Includes all physical forms except waste water and ground/surface water.
[f] Because contaminated media projections are particularly subject to change due to changing site assumptions, this report does not include contaminated media projections past FY 2010.

Table 2-8
Summary of Total Projected CH and RH TRU Waste Volumes:
FY 2001 - FY 2034

In cubic meters

	Generation	Projected Disposal[a]
CH TRU Waste	58,528	106,623
RH TRU Waste	1,782	1,816
Total	**60,310**	**108,439**

Notes:
• See Chapter 5 (TRU Waste) for more information about these data.

[a] Volume projected to be disposed of at the Waste Isolation Pilot Plant between FY 2001 and FY 2034.

2.2 Summary Radioactivity Data

The following figures and tables provide summary data on the approximate radioactivity (in curies) of HLW, TRU waste, buried TRU waste, and previously-disposed LLW. National-level radioactivity data were not available for SNF, MLLW, 11e(2) byproduct material, or contaminated media (with the exception of LLW-contaminated media). The approximate radioactivity data are provided at the aggregate summary levels by the estimated number of curies. This chapter also provides summary volume data to enable a limited quantity-to-curie comparison. This chapter provides only national-level (i.e. DOE-level) summary data: Site-level summary data are provided in the applicable chapters.

2.2.1 Radioactivity Data Included (and Not Included) in This Report

Included in this report

HLW: The HLW curie data are based upon the amount of HLW (both HLW and HLW-vitrified) in inventory at the end of FY 1999. Because no HLW has been permanently disposed of to date, the current data on HLW in inventory realistically reflects the total radioactivity of HLW managed by the DOE.

TRU waste: The TRU waste curie data are based upon the TRU waste in inventory at the end of FY 1996. Radiological data are not routinely collected at the DOE or waste type level. The last comprehensive DOE-wide summary was prepared in 1996. Since that time, the estimate of retrievably stored TRU waste has increased by approximately 15 percent.

Previously-disposed TRU-contaminated waste (i.e., "buried TRU waste"): The buried TRU waste curie data are based upon the volume of buried TRU waste.

LLW: The DOE has already disposed of over 98 percent of the LLW (both LLW-radioactive waste and LLW-contaminated media) it has historically managed, leaving less than two percent in the current inventory. This is not the case for HLW, TRU waste[2], or SNF, which have not yet been permanently disposed of and are, with only a few exceptions, still in inventory. Therefore, in order to provide the most comprehensive "picture" of LLW radioactivity, this report provides data on the cumulative amounts of previously-disposed LLW (radioactive waste and contaminated media). These LLW volume and radioactivity (curie) data provide a sound approximation of the total LLW radioactivity that can be generally compared to the data on radioactivity of high-level waste and transuranic waste also provided in this report. The LLW radioactivity data account for approximately 90 percent of the volume of previously-

[2] This statement refers to TRU waste that has not been previously-disposed (i.e., buried TRU waste) or the relatively small amount of TRU waste that has already been disposed of at the Waste Isolation Pilot Plant.

disposed LLW (because information on the radioactivity of LLW disposed of at commercial sites was not available in all instances).

Not included in this report

This report does not include data on the radioactivity of SNF, MLLW, 11e(2) byproduct material, or contaminated media, these data are not available on a nation-wide basis.

Table 2-9
Summary of Radioactive Waste Volumes and Approximate Radioactivity

Type	Quantity	Units	Total Radioactivity (in curies)
HLW[a]	339,419	cubic meters	2,434,058,692
HLW-Vitrified[a]	960	number of canisters	
LLW[b]	5,806,784	cubic meters	49,366,238
TRU Waste[c]	95,500	cubic meters	2,599,127
Buried TRU Waste[d]	497,000	cubic meters	439,000

Notes:
• Not all of the curie data have been decay-corrected to the same time period. Therefore, the curie data presented here do not allow for a direct comparison between waste types, but rather allow for approximate comparison of total radioactivity.
• More information about these data is provided in Chapter 1 and in the chapters that cover each of these waste types.

[a] Total volume of HLW in inventory at the end of FY 1999. Curies are decayed to end of FY 1999.
[b] LLW volume consists of LLW disposed of through the end of FY 1999 and includes LLW-contaminated media. Curies are based on the radionuclides present at the time of disposal and have not been decay-corrected. (The DOE does not centrally compile information on the current and projected decayed radionuclides for disposed-of LLW.)
[c] Volume of TRU waste in inventory at the end of FY 2000. Curies are decayed to FY 1996.
[d] Volume of previously-disposed TRU-contaminated waste (buried TRU waste). Curies are decayed to 2006.

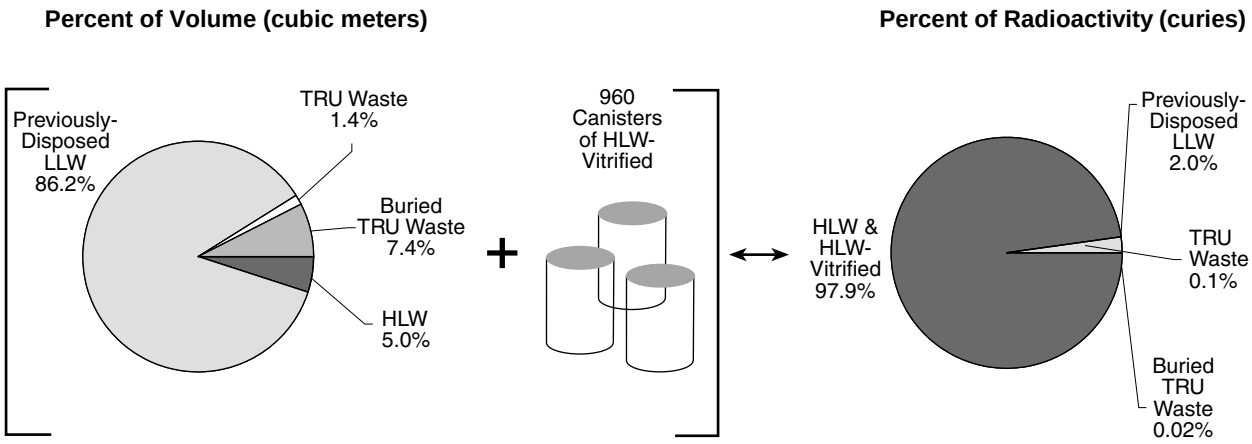
Table 2-10
Approximate Percent of Total Quantity Accounted for by Curie Data

Type	Approximate %
SNF	0
HLW[a]	99+
HLW-Vitrified[a]	99+
TRU Waste[b]	85
Buried TRU Waste[c]	100
LLW[d]	90
MLLW	0
11e(2)	0
Contaminated Media	see footnote e

Notes:
• See also Section 2.2 and the chapters that cover each of the waste types for which radioactivity data are provided in this report.

[a] Total volume of HLW (HLW and HLW-vitrified) in inventory at the end of FY 1999.
[b] Comparison of FY 1996 TRU waste inventory volume (for which curie data are applicable) to end-of-FY 2000 TRU waste inventory volume.
[c] Volume of previously-disposed TRU-contaminated waste (i.e., buried TRU waste).
[d] LLW volume consists of LLW disposed of through the end of FY 1999 and includes LLW-contaminated media.
[e] The LLW volume in this table includes LLW-contaminated media.

Figure 2-2
Quantities Versus Radioactivity (in Curies)
(Includes quantities for which this report provides corresponding curie data)



Notes:
• The total quantity for these wastes is approximately 6,700,000 cubic meters plus 960 canisters (of HLW-vitrified). The total number of curies is approximately 2,486,500,000.
• See Tables 2-9 and 2-10 for more information.

2.3 Sites Within the Scope of This Report

Table 2-11 identifies the sites for which data are provided in this report. Figure 2-4 shows the sites' geographic location.

Table 2-11
DOE and Commercial Sites Within the Scope of This Report
(by State, Site, and Type of Waste/Material Managed)

State	Site	Site Code	HLW	SNF	TRU	LLW	MLLW	11e(2)	CM[a]	Non-Rad. Waste	Buried TRU Waste
AK	Amchitka Island[b]	AINP							X		
CA	Energy Technology Engineering Center	ETEC			X	X			X	X	
	General Atomics	GEAT				X	X		X		
	General Electric-Vallecitos Nuclear Center	GE-VNC			X						
	Laboratory for Energy-Related Health Research	LEHR				X	X		X		
	Lawrence Berkeley National Laboratory	LABL			X	X	X		X	X	
	Lawrence Livermore National Laboratory - Main Site	LLMS			X	X	X			X	
	Mare Island Naval Shipyard	MINS					X				
	Sandia National Laboratories-CA	SNLC								X	
	Stanford Linear Accelerator Center	SLAC				X				X	
CO	Cheney Disposal Cell	CHEN						X			
	Fort St. Vrain	FSV		X							
	Grand Junction Office	GJPO						X	X	X	
	Rio Blanco Site[b]	PRBS							X		
	Rocky Flats Environmental Technology Site	RFTS			X	X	X		X	X	
	Rulison Site[b]	PRRS							X		
	Western Area Power Administration									X	
CT	Knolls Atomic Power Laboratory - Windsor	KWIN					X				
HI	Pearl Harbor Naval Shipyard	PHNS					X				
IA	Ames Laboratory	AMES				X	X			X	
ID	Argonne National Laboratory - West[b]	ANLW		X	X	X	X		X	X	
	Idaho National Engineering and Environmental Laboratory[b]	INEEL	X	X	X	X	X		X	X	X
	Naval Reactor Facility	NAVY		X		X	X				
IL	Argonne National Laboratory - East	ANLE			X	X	X		X	X	
	Fermi National Accelerator Laboratory	FNAL				X				X	
	U.S. Army Material Command[c]	ARMY			X						

Notes:
[a] Contaminated Media (CM)
[b] Sites managing in-situ contaminated media
[c] Commercial or non-DOE site

(continued…)

Table 2-11 (cont'd)
DOE and Commercial Sites Within the Scope of This Report
(by State, Site, and Type of Waste/Material Managed)

State	Site	Site Code	HLW	SNF	TRU	LLW	MLLW	11e(2)	CM[a]	Non-Rad. Waste	Buried TRU Waste
OK	Southwestern Power Administration									X	
OR	Albany Research Center	AMRC								X	
PA	ARCO Medical Products Company[c]	ARCO			X						
	Bettis Atomic Power Laboratory	BAPL			X		X				
SC	Savannah River Site[b]	SARS	X	X	X	X	X		X	X	X
TN	Diversified Scientific Services, Inc.[c]	DSSI				X	X				
	East TN Materials and Energy/Waste Control Spec.[c, f]	MEWC					X				
	GTS Duratek[c]	SEG				X	X				
	Knolls Atomic Power Laboratory-Nuclear Fuel Services	KAPL-NFS			X						
	Nuclear Fuel Services	NFS					X				
	Oak Ridge Associated Universities	ORAU								X	
	Oak Ridge Reservation[b,d]	ORTN		X	X	X	X		X	X	X
	Office of Scientific and Technical Information[c]	OSTI								X	
	U.S. Ecology[c]	ECTN					X				
TX	Nuclear Sources and Services, Inc.[c]	NSSI					X				
	Pantex Plant	PAPL				X	X		X	X	
UT	Envirocare[c]	ENVR				X	X		X		
	Monticello Remedial Action Project	MRAP						X			
VA	Babcock & Wilcox-NES[c]	B&W-NES			X						
	Norfolk Naval Shipyard	NNS					X				
	Thomas Jefferson National Accelerator Facility									X	
WA	Hanford Site[b]	HASI	X	X	X	X	X		X	X	X
	Pacific Northwest National Laboratory	PNNL								X	
	Puget Sound Naval Shipyard	PSNS					X				
WV	National Energy Technology Laboratory									X	
NA	Geologic Repository[e]		X	X							
NA	Waste Control Specialists[f]	WCS					X				

Notes:
• NA=not available

[a] Contaminated Media (CM)
[b] Sites managing in-situ contaminated media.
[c] Commercial or non-DOE site.
[d] Oak Ridge Reservation includes sites Y-12, Oak Ridge Reservation Offsites, East Tennessee Technology Park (K-25), and Oak Ridge National Laboratory.
[e] The Geologic Repository site location has not been finalized, but is projected to handle HLW and SNF.
[f] Waste Control Specialists has locations in NM, TN, and TX.

Figure 2-3
Department of Energy and Commercial Sites Covered Within the Scope of This Report

Notes:
• Map does not include all DOE and commercial sites. Sites shown are those that are within the scope of this report.
• "o" denotes commercial sites.
• The Geologic Repository site location has not been finalized, but is projected to handle HLW and SNF.

[a] Oak Ridge Reservation includes sites Y-12, Oak Ridge Reservation Offsites, East Tennessee Park (K-25), and Oak Ridge National Laboratory.