CHAPTER 9

11e(2) Byproduct Material

9.1 Introduction

This chapter describes the volume and location of 11e(2) byproduct material at DOE sites. The data cover the following reported volumes: inventory (storage), additions,[1] treatment, and disposal. Receipts data, which mirror disposal data, are not included as a separate section. Throughout the chapter, the data summarize the volume of 11e(2) managed during 1998 and 1999 fiscal years (FY) and provide the most current DOE projections for 11e(2) reported inventories and management activities through FY 2070.

This chapter includes:

The reported volumes of 11e(2) byproduct material at the site, state, and DOE-wide levels. Ground/surface water volumes are excluded from all totals except those in Section 9.7, which provides the reported volumes of 11e(2) ground/surface water in inventory and managed across the DOE complex.

Table 9-1
Summary of Total 11e(2) Volume by Inventory and Management Activity as Reported by Sites: FY 1998 and FY 1999 Actuals
(Includes all physical forms except ground/surface water)

In cubic meters

	FY 1998 Total	FY 1999 Total
Inventory (Storage)	424,640	99,450
Additions	890,148	636,465
Treatment	68,400	46,360
Disposal	1,383,334	915,295

[1] In this chapter, the volume data refer to "additions" instead of “new generation.” The additions data include new generation (which is defined in the FY 2000 EM Corporate Database as “new additions”) and process outputs.

9.1.1 11e(2) Definition and Explanation

11e(2) is defined as:

> Tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material (i.e., uranium or thorium) content. 11e(2) byproduct material is defined by law, under Section 11e(2) of the Atomic Energy Act as amended by Title II of the Uranium Mill Tailings Radiation Control Act of 1978. There are two types of byproduct material defined in subpart C of Section 11, referred to as 11e(1) byproduct material and 11e(2) byproduct material.[2]

As defined in the Atomic Energy Act, 11e(1) is any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material. This chapter only includes data on 11e(2).

Most 11e(2) volumes result from the initial milling and refining of uranium ore. The residual waste (mill tailings) generated from the ore processes are composed of homogeneous sand- or clay-like particles. After the recoverable uranium is collected, the tailings typically will contain between 50 and 86 percent of the original radioactivity from the ores depending on the proportion of radon lost during the mining operation.[3] Radioactivity is in the form of alpha-emitting uranium, thorium-230, radium-226, and daughter products of radium-226 decay. The radionuclides present may both emit radon gas and contain toxic heavy metals (e.g., chromium, lead, molybdenum, and vanadium), presenting concern for both health and the environment.[4]

In uranium milling activities, water is added to the tailings to create a slurry. The slurry is then disposed of in large tailings impoundments that are equipped with impermeable liners. Leachate collection systems monitor and detect liquid migration from the impoundments. Managers remove materials that have dried in the impoundments for stabilization and dry storage in above-ground capped cells.[5]

The mining, milling, and uranium refining activities that have resulted in the generation of 11e(2) served multiple purposes, such as the development of: atomic weapons; nuclear power plants; copper, nickel, and steel alloys; and fuel for naval, research, and plutonium and tritium production reactors. Nearly all 11e(2) materials are located in the states where the uranium mills were located: Arizona, Colorado, New Mexico, South Dakota, Texas, Utah, Washington, and Wyoming.[6]

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 assigned the DOE responsibility for the stabilization and control of mill tailings from specifically designated inactive uranium milling sites in a manner that is both safe for the environment and for public health. As a result of UMTRCA, the DOE put together the Uranium Mill Tailings Remedial Action (UMTRA) program to address and administer environmental restoration at 24 abandoned uranium milling sites, as well as their vicinity properties, that processed uranium for the U.S. government. Because the uranium mill tailings that the DOE manages under UMTRA have the same physical and radioactive properties as 11e(2) byproduct materials, they are included in this report.

9.1.2 Organization of 11e(2) Data

This chapter summarizes the 11e(2) volume data by site for the reported inventory and three management activities: additions, treatment, and disposal. Because receipts data mirror disposal data, a

[2] U.S. Department of Energy, Office of Environmental Management, *Linking Legacies: Connecting the Cold War Nuclear Weapons Production Processes to Their Environmental Consequences,* DOE-EM-0319 (January 1997).
[3] U.S. Environmental Protection Agency, Office of Solid Waste, "Uranium." *Technical Resource Document: Extraction and Beneficiation of Ores and Minerals,* Volume 5 (January 1995).
[4] U.S. Department of Energy, Office of Environmental Management, *Linking Legacies: Connecting the Cold War Nuclear Weapons Production Processes to Their Environmental Consequences,* DOE-EM-0319 (January 1997).
[5] Environmental Protection Agency, Office of Solid Waste, "Uranium." *Technical Resource Document: Extraction and Beneficiation of Ores and Minerals,* Volume 5 (January 1995).
[6] Ibid.

separate receipts section is not provided. The data exclude the totals associated with ground/surface water because these volumes are large relative to the non-ground/surface water volumes in some cases. Ground/surface water represented approximately 80 percent of the 11e(2) treatment volume in FY 1998 and 84 percent in FY 1999 (see Table 9-15 for more detail). Excluding the ground/surface water volumes allows for more direct analysis of the data.

The chapter also provides information on the physical form of 11e(2) inventory and generation volumes. For inventory and the three management activities, the chapter provides actual data for fiscal years 1998 and 1999 and projection data from FY 2000 - FY 2070. Sites did not report projections for 11e(2) inventory or management activities beyond FY 2020; projection tables and figures therefore only include data through FY 2020.

About the Data in This Chapter

- The FY 2000 DOE Environmental Management (EM) Corporate Database provided the data for this chapter. The data in the EM Corporate Database are available through the Central Internet Database (CID), located at http://cid.em.doe.gov. (Please see Chapter 1 for more information on both the EM Corporate Database and the CID.)

- The 11e(2) quantity data in this report are presented according to various categories, i.e., the amount in inventory, generated, treated, etc. When considered across these categories, the data are not necessarily mutually exclusive. In other words, a particular amount of 11e(2) may be generated, treated, and disposed of – all during the same fiscal year. The same holds true for data on projected 11e(2). For these reasons, this report does not provide data summaries across the different data categories that would misleadingly suggest data exclusivity.
- The 11e(2) quantity data in this report are rounded to the nearest whole number except for volumes less than one: in which case they are rounded to one significant digit.
- The data in this report are in a summary format (i.e., by site rather than by waste stream). The CID offers additional details (e.g., stream level data, or comprehensive data about a specific site or activity).
- The CID currently provides incomplete data on radioactivity and constituent types at the stream level. This report does not include 11e(2) radioactivity data because the DOE has not compiled data for all 11e(2) radionuclides on a nationwide basis (see U.S. Department of Energy, Office of Environmental Management, *Linking Legacies: Connecting the Cold War Nuclear Weapons Production Processes to Their Environmental Consequences,* DOE-EM-0319, January 1997).

9.1.3 Summary of Total Projected 11e(2) Volumes by Inventory and Management Activity: FY 2000 - FY 2070

The tables and figure in this section provide data on site-reported 11e(2) projections. Table 9-2 summarizes the cumulative projected volume of 11e(2) byproduct material according to various management activities for the time period FY 2000 - FY 2070. These projections are broken down by year in Table 9-3, which also includes projections for 11e(2) inventory. Figure 9-1 presents the total projected volume of 11e(2) that DOE sites will store or manage from FY 2000 through FY 2070.

Table 9-2
Summary of Cumulative Projected 11e(2) Volumes by Management Activity as Reported by Sites: FY 2000 - FY 2070[a]
(Includes all physical forms except ground/surface water)

In cubic meters

	FY 2000 - 2070 Total
Additions	68,822
Treatment	-
Disposal	168,272

Notes:
• Hyphens indicate volumes of zero.

[a] Sites did not report management activity volumes past FY 2020.

Table 9-3
Summary of Total Projected 11e(2) Volumes by Inventory and Management Activity: FY 2000 - FY 2070[a]
(Includes all physical forms except ground/surface water)

In cubic meters

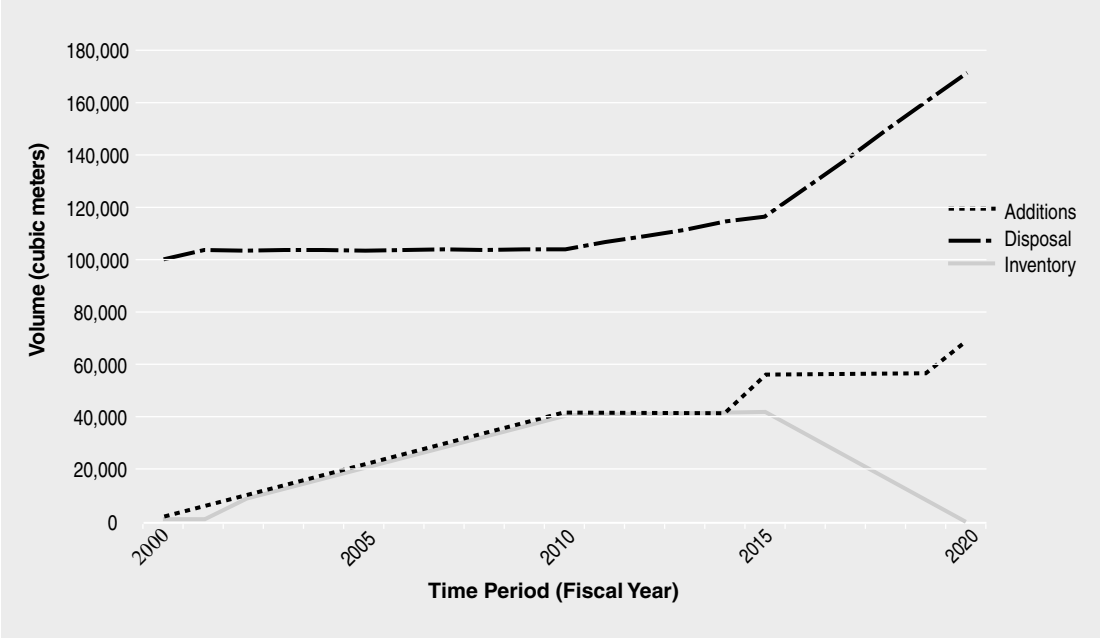
	FY 2000[b]	FY 2001[b]	FY 2002[b]	FY 2003[b]	FY 2004[b]	FY 2005[b]	FY 2006[b]
Inventory (Storage)	1,001	3,721	7,741	11,761	15,781	19,801	23,821
Additions	1,498	3,645	4,020	4,020	4,020	4,020	4,020
Treatment	-	-	-	-	-	-	-
Disposal	99,947	925	-	-	-	-	-

	FY 2007[b]	FY 2008[b]	FY 2009[b]	FY 2010[b]	FY 2011-2015	FY 2016-2020
Inventory (Storage)	27,841	31,861	35,881	39,901	41,801	-
Additions	4,020	4,020	4,020	4,020	14,900	12,599
Treatment	-	-	-	-	-	-
Disposal	-	-	-	-	13,000	54,400

Notes:
• Hyphens indicate volumes of zero.

[a] Sites did not report inventory or management activity past FY 2020.
[b] These data reflect the annual volume projected by sites for FY 2000 - FY 2010. All data (other than inventory data) reported for the post-FY 2010 time periods reflect the total volume projected for the specific five-year time periods. The post-FY 2010 inventory data reflect the total volume projected for the end of each five-year time period.

Figure 9-1
Summary of Total Projected 11e(2) Volumes by Inventory and Management Activity: FY 2000 - FY 2070[a]
(Includes all physical forms except ground/surface water)



Notes:
• Inventory data in this chart reflect annual inventory projections between FY 2000 and FY 2010. After FY 2010, the inventories shown for each year reflect an annual average inventory based on the totals projected for the end of each specific five-year time periods (see totals in Table 9-3).
• Management activity data are shown as cumulative volumes over time.

[a] Sites did not report inventory or management activity past FY 2020.

9.2 11e(2) Inventory as Reported by Sites

Inventory is defined as the material that is in storage at a facility or site at a given time. This section provides data on sites' end-of-year inventories. All of the 11e(2) in inventory at the end of FY 1998 and FY 1999 was located at Weldon Spring Site in Missouri. The DOE reported inventory projections through FY 2015, with all inventory expected at UMTRA sites.

This section also includes information about the physical forms of 11e(2) in inventory.

9.2.1 11e(2) Inventory Data by Site and State

The following table and figure detail the actual volumes of 11e(2) in inventory as reported by DOE sites. Table 9-4 provides volumes at the only site reporting 11e(2) at the end of FY 1998 and FY 1999. Figure 9-2 shows the geographic location of the FY 1999 inventory.

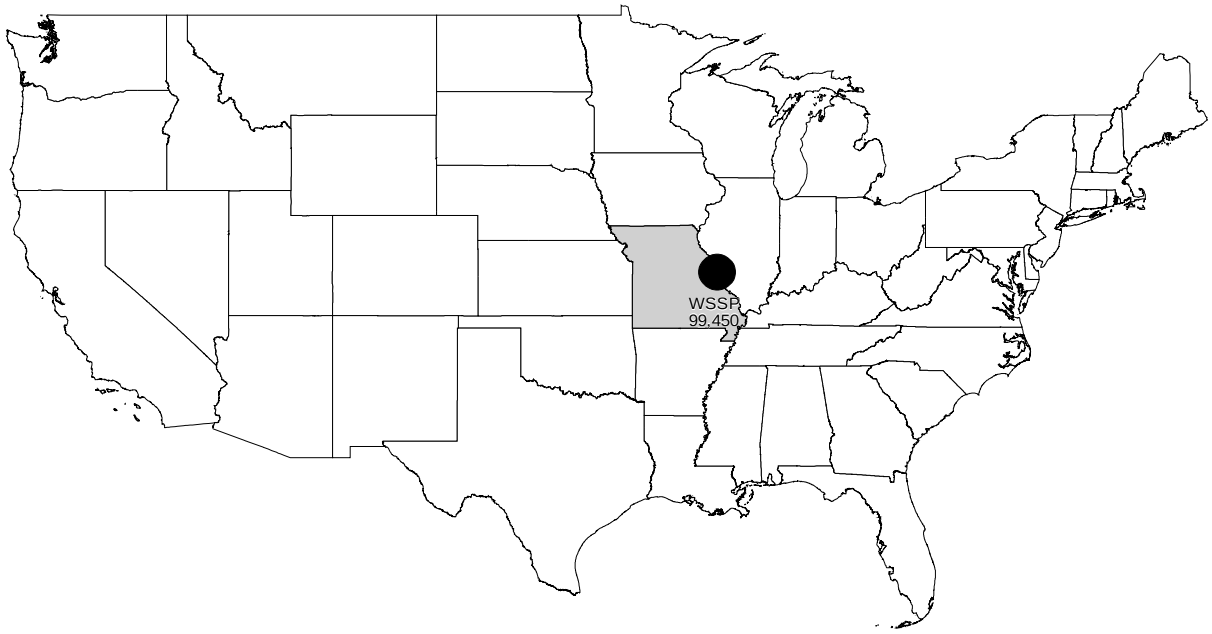
Table 9-4
Total Volume of 11e(2) in Inventory as Reported by Sites:

FY 1998 and FY 1999 Actuals

In cubic meters

State	Site	Site Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
MO	Weldon Spring Site	WSSP	424,640	100	99,450	100
Total			**424,640**	**100**	**99,450**	**100**

Figure 9-2
Total Volume of 11e(2) in Inventory as Reported by Sites: FY 1999 Actuals



Notes:
• Volumes shown in cubic meters.
• Volumes include all physical forms except ground/surface water.
• While the actual site volumes are labeled numerically on the map, the volume *icons* are based on a logarithmic scale to differentiate more easily between the sites' relative inventories.

11e(2) Inventory Site Projection Data:

A yearly account of the total projected inventory of 11e(2) is presented in Table 9-5. The last time period for which projections are available is FY 2011 - FY 2015.

Table 9-5
Total Projected Volume of 11e(2) Inventories as Reported by Sites: FY 2000 - FY 2070[a]

In cubic meters

State	Site	Site Code	FY 2000[c]	FY 2001[c]	FY 2002[c]	FY 2003[c]	FY 2004[c]	FY 2005[c]
n/a	UMTRA[b]	UMGW	1,001	3,721	7,741	11,761	15,781	19,801
	Total		1,001	3,721	7,741	11,761	15,781	19,801

State	Site	Site Code	FY 2006[c]	FY 2007[c]	FY 2008[c]	FY 2009[c]	FY 2010[c]	FY 2011-2015
n/a	UMTRA[b]	UMGW	23,821	27,841	31,861	35,881	39,901	41,801
	Total		23,821	27,841	31,861	35,881	39,901	41,801

Notes:
[a] Sites did not report inventory activity past FY 2015.
[b] UMTRA sites are located in multiple states.
[c] These annual data reflect the projected end-of-year inventory for FY 2000 - FY 2010. Post-FY 2010 data reflect the projected inventory for the last year in each five-year time period.

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9.2.2 11e(2) Inventory Data by Physical Form

Table 9-6 details the physical form of the 11e(2) in inventory at the end of FY 1998 and FY 1999. The percentage of the total volume in inventory in each physical form is shown in Figure 9-4. Sites did not report ground/surface water inventory volumes of 11e(2).

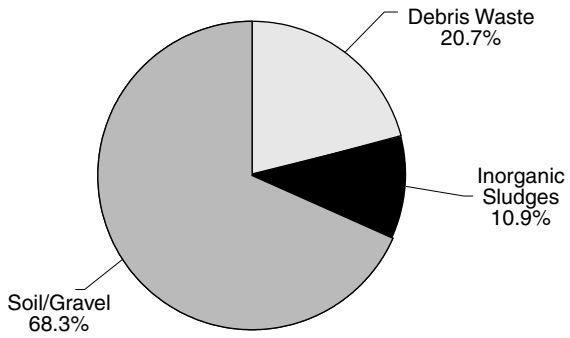
Table 9-6
Total Volume of 11e(2) in Inventory by Physical Form as Reported by Sites: FY 1998 and FY 1999 Actuals

In cubic meters

Physical Form	Form Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Debris Waste	S5000	88,057	20.7	-	-
Inorganic Sludges	S3120	46,360	10.9	-	-
Soil/Gravel	S4000	290,223	68.3	99,450	100
Total		**424,640**	**100**	**99,450**	**100**

Note:
• Hyphens indicate volumes of zero.

Figure 9-3
Sites' Relative Contributions to the Volume of 11e(2) in Inventory by Physical Form as Reported by Sites: FY 1998 Actuals



Notes:
• At the end of FY 1998, the total reported volume of 11e(2) in inventory was approximately 424,640 cubic meters. See Table 9-6 for further details.
• Percentages may not add to exactly 100% due to rounding.
• A separate figure for FY 1999 physical form data is not provided because 100% of the volume was soil/gravel. See Table 9-6 for further details.

9.3 11e(2) Additions[7] as Reported by Sites

Additions include new generation volumes plus process output volumes. New generation encompasses the origination of new 11e(2) byproduct material from various facility operations including production, rework, and decontamination and decommissioning.[8] 11e(2) generation also includes recovering the dispersed tailings from the impoundments and above-ground piles by natural forces, by humans for construction purposes, and on-site remediation.[9] Process outputs, also called secondary waste, are created by treatment processes or other management activities. The CID distinguishes these amounts from quantities of waste that are newly generated from ongoing program activities.

Sites have projected 11e(2)-new generation volumes through FY 2001. Process outputs are projected through the FY 2016 - 2020 time period.

9.3.1 11e(2) Additions Data by Site and State

This section provides 11e(2) additions data for FY 1998 and FY 1999. Table 9-7 provides data on new generation, process outputs, and total additions (the sum of new generation and process outputs). Figures 9-4 and 9-5 show sites' relative contributions to the total volume of 11e(2) additions.

[7] In this chapter, "additions" is used instead of "new generation." The "additions" category includes process outputs and new generation.
[8] U.S. Department of Energy, Office of Environmental Management, *Integrated Data Base Report—1996: U.S. Spent Nuclear Fuel and Radioactive Waste Inventories, Projections, and Characteristics*, DOE/RW-006, Rev. 13 (December 1997).
[9] U.S. Environmental Protection Agency, Office of Solid Waste, "Uranium," *Technical Resource Document: Extraction and Beneficiation of Ores and Minerals,* Volume 5 (January 1995).

Table 9-7
Total Volume of 11e(2) Additions as Reported by Sites: FY 1998 and FY 1999 Actuals
(Includes all physical forms except ground/surface water)

In cubic meters

New Generation

State	Site	Site Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
CO	Grand Junction Office	GJPO	-	-	860	<1
MO	Weldon Spring Site	WSSP	-	-	98,612	17.4
UT	Monticello Remedial Action Project	MRAP	792,736	100	466,839	82.4
	Total		**792,736**	**100**	**566,311**	**100**

Process Outputs

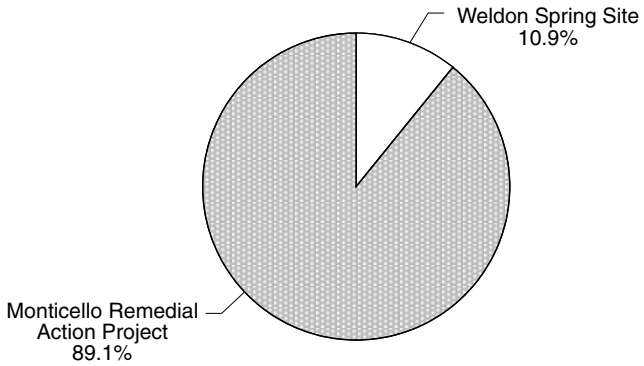
State	Site	Site Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
CO	Grand Junction Office	GJPO	-	-	-	-
MO	Weldon Spring Site	WSSP	97,412	100	70,154	100
UT	Monticello Remedial Action Project	MRAP	-	-	-	-
	Total		**97,412**	**100**	**70,154**	**100**

Additions (New Generation + Process Outputs)

State	Site	Site Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
CO	Grand Junction Office	GJPO	-	-	860	<1
MO	Weldon Spring Site	WSSP	97,412	10.9	168,766	26.5
UT	Monticello Remedial Action Project	MRAP	792,736	89.1	466,839	73.3
	Total		**890,148**	**100**	**636,465**	**100**

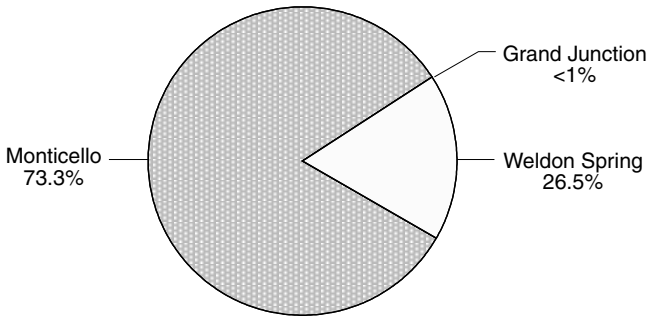
Note:
• Hyphens indicate volumes of zero.

Figure 9-4
Sites' Relative Contributions to Volume of 11e(2) Additions as Reported by Sites: FY 1998
(Includes all physical forms except ground/surface water)



Note:
• The total reported volume of 11e(2) additions in FY 1998 was approximately 890,148 cubic meters. See Table 9-7 for further details.

Figure 9-5
Sites' Relative Contributions to the Volume of 11e(2) Additions as Reported by Sites: FY 1999
(Includes all physical forms except ground/surface water)



Notes:
• The total reported volume of 11e(2) additions in FY 1999 was approximately 636,465 cubic meters. See Table 9-7 for further details.
• Percentages may not add to exactly 100% due to rounding.

11e(2) Additions Site Projection Data:

The following table provides projection data for FY 2000 - FY 2020. (Sites reported 11e(2) additions projections only through FY 2020.) Table 9-8 contains data on new generation, process outputs, and total additions (the sum of new generation and process outputs).

Table 9-8
Total Projected Volume of 11e(2) Additions as Reported by Sites:
FY 2000 - FY 2070[a]
(Includes all physical forms except ground/surface water)

In cubic meters

New Generation

State	Site	Site Code	FY 2000[b]	FY 2001-2005	FY 2006-2010	FY 2011-2015	FY 2016-2020	Site Total	% Total
CO	Grand Junction Office	GJPO	445	873	-	-	-	1,318	100
n/a	UMTRA	UMGW	-	-	-	-	-	-	-
MO	Weldon Spring Site	WSSP	-	-	-	-	-	-	-
	Total		**445**	**873**	**0**	**0**	**0**	**1,318**	**100**

Process Outputs

State	Site	Site Code	FY 2000[b]	FY 2001-2005	FY 2006-2010	FY 2011-2015	FY 2016-2020	Site Total	% Total
CO	Grand Junction Office	GJPO	-	-	-	-	-	-	-
n/a	UMTRA	UMGW	1,001	18,800	20,100	14,900	12,599	67,400	99.8
MO	Weldon Spring Site	WSSP	52	52	-	-	-	104	<1
	Total		**1,053**	**18,852**	**20,100**	**14,900**	**12,599**	**67,504**	**100**

Additions (New Generation + Process Outputs)

State	Site	Site Code	FY 2000[b]	FY 2001-2005	FY 2006-2010	FY 2011-2015	FY 2016-2020	Site Total	% Total
CO	Grand Junction Office	GJPO	445	873	-	-	-	1,318	1.9
n/a	UMTRA	UMGW	1,001	18,800	20,100	14,900	12,599	67,400	97.9
MO	Weldon Spring Site	WSSP	52	52	-	-	-	104	<1
	Total		**1,498**	**19,725**	**20,100**	**14,900**	**12,599**	**68,822**	**100**

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, totals in this table may not equal the exact sums of the site-specific data.

[a]Sites did not report new-generation activity beyond FY 2020.
[b]These annual data reflect the total volume projected by sites for FY 2000. All post-FY 2000 data reflect the total summary volume projected for the specific five-year time period.

9.3.2 11e(2) Additions Data by Physical Form

Table 9-9 details the physical form of the 11e(2) additions in FY 1998 and FY 1999. It contains data on new generation, process outputs, and total additions (the sum of new generation and process outputs). Figure 9-6 presents the percentage contribution of each type of physical form to the total volume of 11e(2) in FY 1999.

Table 9-9
Total Volume of 11e(2) Additions by Physical Form as Reported by Sites: FY 1998 and FY 1999 Actuals
(Includes all physical forms except ground/surface water)

In cubic meters

New Generation

Physical Form	Form Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Cement Forms	Z1110	97,280	10.9	69,920	11.0
Inorganic Debris	S5100	-	-	850	<1
Inorganic Sludge	S3120	132	<1	234	<1
Soil	S4100	-	-	10	<1
Soil/Gravel	S4000	792,736	89.1	565,451	88.8
Total		**792,736**	**100**	**566,311**	**100**

Process Outputs

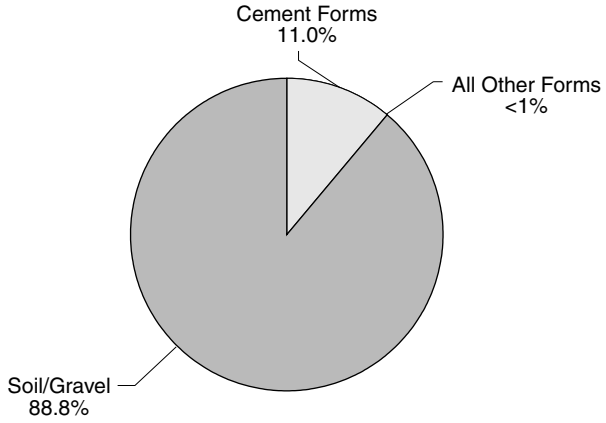
Physical Form	Form Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Cement Forms	Z1110	97,280	99.9	69,920	99.7
Inorganic Debris	S5100	-	-	-	-
Inorganic Sludge	S3120	132	<1	234	<1
Soil	S4100	-	-	-	-
Soil/Gravel	S4000	-	-	-	-
Total		**97,412**	**100**	**70,154**	**100**

Additions (New Generation + Process Outputs)

Physical Form	Form Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Cement Forms	Z1110	97,280	10.9	69,920	11.0
Inorganic Debris	S5100	-	-	850	<1
Inorganic Sludge	S3120	132	<1	234	<1
Soil	S4100	-	-	10	<1
Soil/Gravel	S4000	792,736	89.1	565,451	88.8
Total		**890,148**	**100**	**636,465**	**100**

Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sums of the form-specific data.

Figure 9-6
Sites' Relative Contributions to the Volume of 11e(2) Additions by Physical Form as Reported by Sites: FY 1999 Actuals
(Includes all physical forms except ground/surface water)



Notes:
• The total reported volume (excluding ground/surface water) of 11e(2) additions in FY 1999 was approximately 636,465 cubic meters.
• Percentages may not add to exactly 100% due to rounding.
• A separate figure for FY 1998 is not provided because FY 1998 data are nearly identical to the FY 1999 data. See Table 9-9 for further details.

9.4 11e(2) Treatment as Reported by Sites

Treatment is defined as any method, technique, or process designed to change the physical or chemical character of waste to: render the waste less hazardous; make the waste safer to transport, store, or dispose; or reduce the volume of the waste.

The Weldon Spring Site in Missouri conducted on-site treatment for all of the DOE's 11e(2) byproduct material in both FY 1998 and FY 1999.

Sites reported only ground/surface water volumes for projected (post FY 2000) 11e(2) treatment. Therefore, projection data are not included in this section.

9.4.1 11e(2) Treatment Data by Site and State

Table 9-10 provides data for all 11e(2) treated in FY 1998 and FY 1999.

Table 9-10
Total Volume of 11e(2) Treated as Reported by Sites:
FY 1998 and FY 1999 Actuals
(Includes all physical forms except ground/surface water)

In cubic meters

State	Site	Site Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
MO	Weldon Spring Site	WSSP	68,400	100	46,360	100
	Total		**68,400**	**100**	**46,360**	**100**

9.5 11e(2) Receipts as Reported by Sites

Because all reported transfers of 11e(2) between sites are shipments to the Cheney Disposal Cell for disposal, this chapter does not provide a separate section on 11e(2) receipts and shipments.

9.6 11e(2) Disposal as Reported by Sites

Disposal is a management activity where waste is emplaced in a manner that ensures protection of human health and the environment within prescribed limits for the near future.

From FY 2000- FY 2020, the Cheney Disposal Cell is scheduled to receive approximately 69,000 cubic meters of 11e(2): approximately 1,300 cubic meters from the Grand Junction Office (in FY 2000 - FY 2001) and approximately 67,000 cubic meters from the UMTRA sites (between FY 2011 - FY 2020). These data are "captured" in the Cheney Disposal Cell's projected disposal totals, shown in Table 9-12.

There are no ground/surface water disposal volumes associated with on-site disposal of 11e(2).

9.6.1 11e(2) Disposal Data by Site and State

The following table and figures present FY 1998 and FY 1999 actuals data. Table 9-11 reports the disposal volumes by site. Figures 9-7 and 9-8 show the percentage of total 11e(2) disposal volume at each site at the end of FY 1998 and FY 1999, respectively. The Weldon Spring Site and the Monticello Remedial Action Project conducted significant amounts of on-site disposal in FY 1998 and FY 1999.

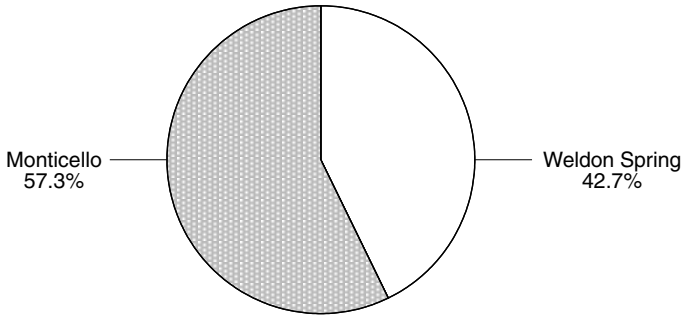
Table 9-11
Total Volume of 11e(2) Disposal as Reported by Sites: FY 1998 and FY 1999 Actuals

In cubic meters

State	Site	Site Code	FY 1998	% 1998 Total	FY 1999	% 1999 Total
CO	Cheney Disposal Cell	CHEN	-	-	860	<1
MO	Weldon Spring	WSSP	590,598	42.7	447,596	48.9
UT	Monticello Remedial Action Project	MRAP	792,736	57.3	466,839	51.0
	Total		**1,383,334**	**100**	**915,295**	**100**

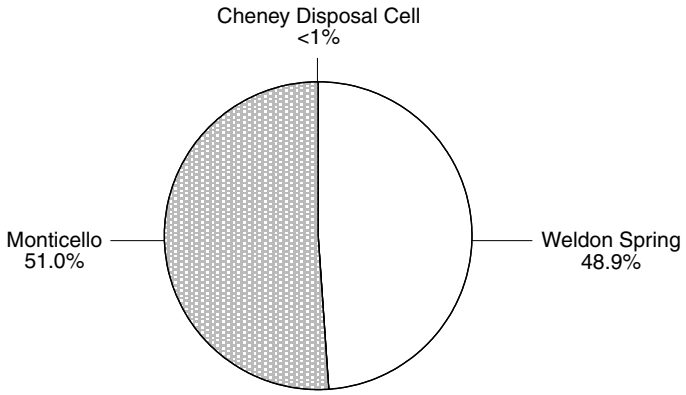
Notes:
• Hyphens indicate volumes of zero.
• Due to data rounding, the totals in this table may not equal the exact sums of the site-specific data.

Figure 9-7
Sites' Relative Contributions to the Volume of 11e(2) Disposal as Reported by Sites: FY 1998 Actuals



Note:
• The total reported volume of 11e(2) disposal in FY 1998 was approximately 1,383,334 cubic meters. See Table 9-13 for further details.

Figure 9-8
Sites' Relative Contributions to the Volume of 11e(2) Disposal as Reported by Sites: FY 1999 Actuals



Note:
• The total reported volume of 11e(2) disposal in FY 1999 was approximately 915,295 cubic meters. See Table 9-13 for further details.

11e(2) Disposal Site Projection Data:

Projections for 11e(2) disposal volumes are provided in the following table and figure. Table 9-12 provides site projections by year or time period through FY 2020. The total projected disposal for all sites in each time period is given in Figure 9-9.

Table 9-12
Total Projected Volume of 11e(2) Disposal as Reported by Sites: FY 2000 - FY 2070[a]

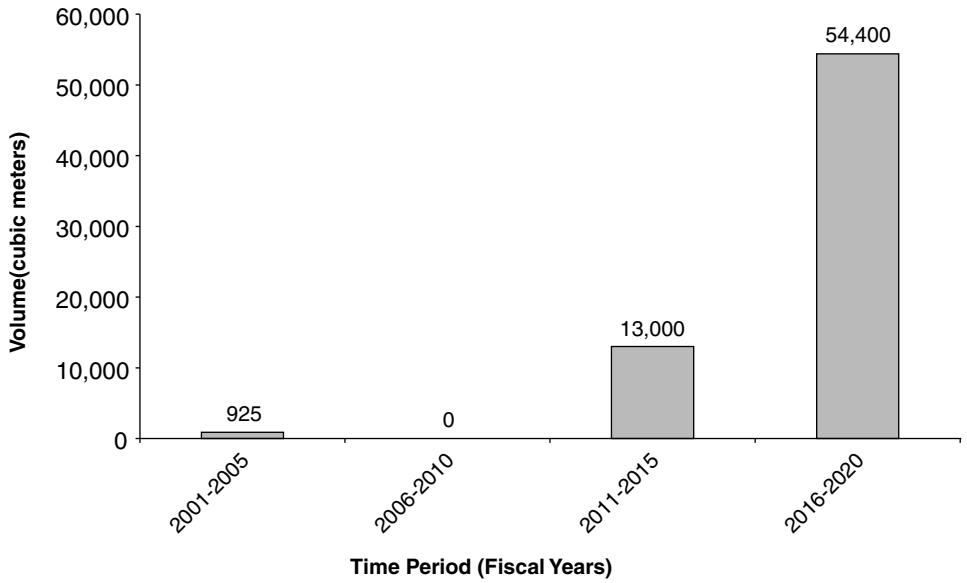
In cubic meters

State	Site	Site Code	FY 2000[b]	FY 2001 - 2005	FY 2006 - 2010	FY 2011 - 2015	FY 2016 - 2020	Site Total	% Total
CO	Cheney Disposal Cell	CHEN	445	873	-	13,000	54,400	68,718	40.8
MO	Weldon Spring Site	WSSP	99,502	52	-	-	-	99,554	59.2
	Total		**99,947**	**925**	**0**	**13,000**	**54,400**	**168,272**	**100**

Notes:
• Hyphens indicate volumes of zero.

[a] Sites did not report disposal activity past FY 2020.
[b] These annual data reflect the projected end-of-year volumes for FY 2000. Post-FY 2010 data reflect the projected disposal volumes for the last year in each five-year time period.

Figure 9-9
Total Projected Volume of 11e(2) Disposal as Reported by Sites: FY 2001- FY 2070[a]



Note:
[a] Sites did not report disposal activity past FY 2020.

9.7 11e(2) Ground/Surface Water Summary

This section provides information on 11e(2) ground/surface water volumes as reported by sites. All 11e(2) volumes previously shown in this chapter have excluded the volume of ground/surface water to allow for a more direct interpretation of all other physical forms that comprise 11e(2). Sites reported ground/surface water volumes for new generation[10] and treatment of 11e(2). As shown in Table 9-13, the volume of ground/surface water comprised approximately 25 percent of the 11e(2) newly-generated in FY 1998, and approximately 29 percent in FY 1999. Ground/surface water accounted for the majority of 11e(2) treated in both years (approximately 80 percent in FY 1998 and 84 percent in FY 1999).

Table 9-13
Contribution of Ground/Surface Water to Total Volume of 11e(2): FY 1998 and FY 1999 Actuals

In cubic meters

Inventory

Physical Form	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Ground/Surface Water	-	-	-	-
All Other Physical Forms (Excluding Ground/Surface Water)	424,640	100	99,450	100
Total (All Physical Forms)	**424,640**	**100**	**99,450**	**100**

New Generation

Physical Form	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Ground/Surface Water	265,344	25.1	234,277	29.3
All Other Physical Forms (Excluding Ground/Surface Water)	792,736	74.9	566,311	70.7
Total (All Physical Forms)	**1,058,080**	**100**	**800,588**	**100**

Treatment

Physical Form	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Ground/Surface Water	265,344	79.5	234,277	83.5
All Other Physical Forms (Excluding Ground/Surface Water)	68,400	20.5	46,360	16.5
Total (All Physical Forms)	**333,744**	**100**	**280,637**	**100**

Disposal

Physical Form	FY 1998	% 1998 Total	FY 1999	% 1999 Total
Ground/Surface Water	-	-	-	-
All Other Physical Forms (Excluding Ground/Surface Water)	1,383,334	100	915,295	100
Total (All Physical Forms)	**1,383,334**	**100**	**915,295**	**100**

Note:
• Hyphens indicate volumes of zero.

[10] There were no ground/surface water volumes associated with process outputs.