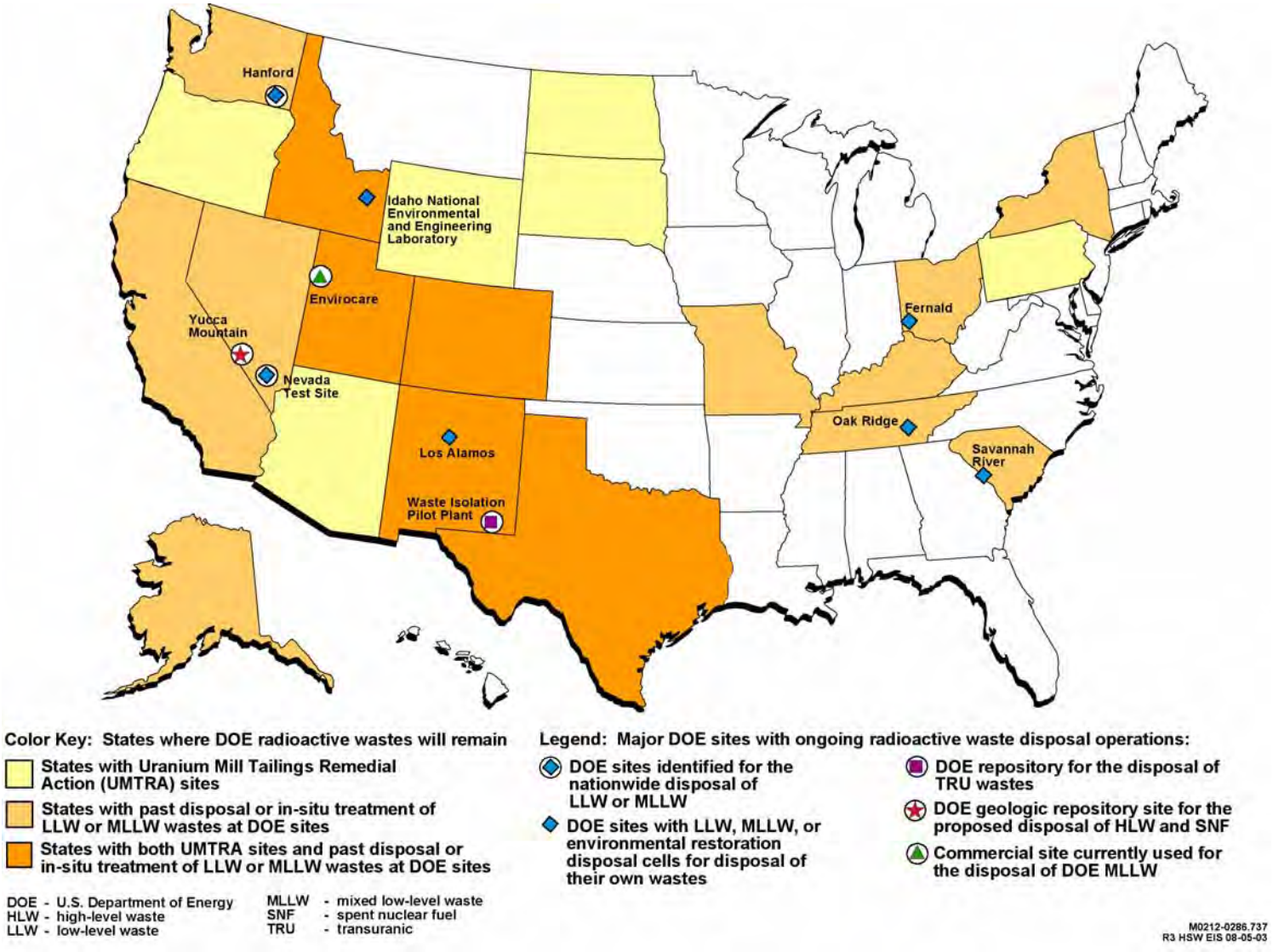


Figure 1.2. States with Radioactive Waste Disposal Activities

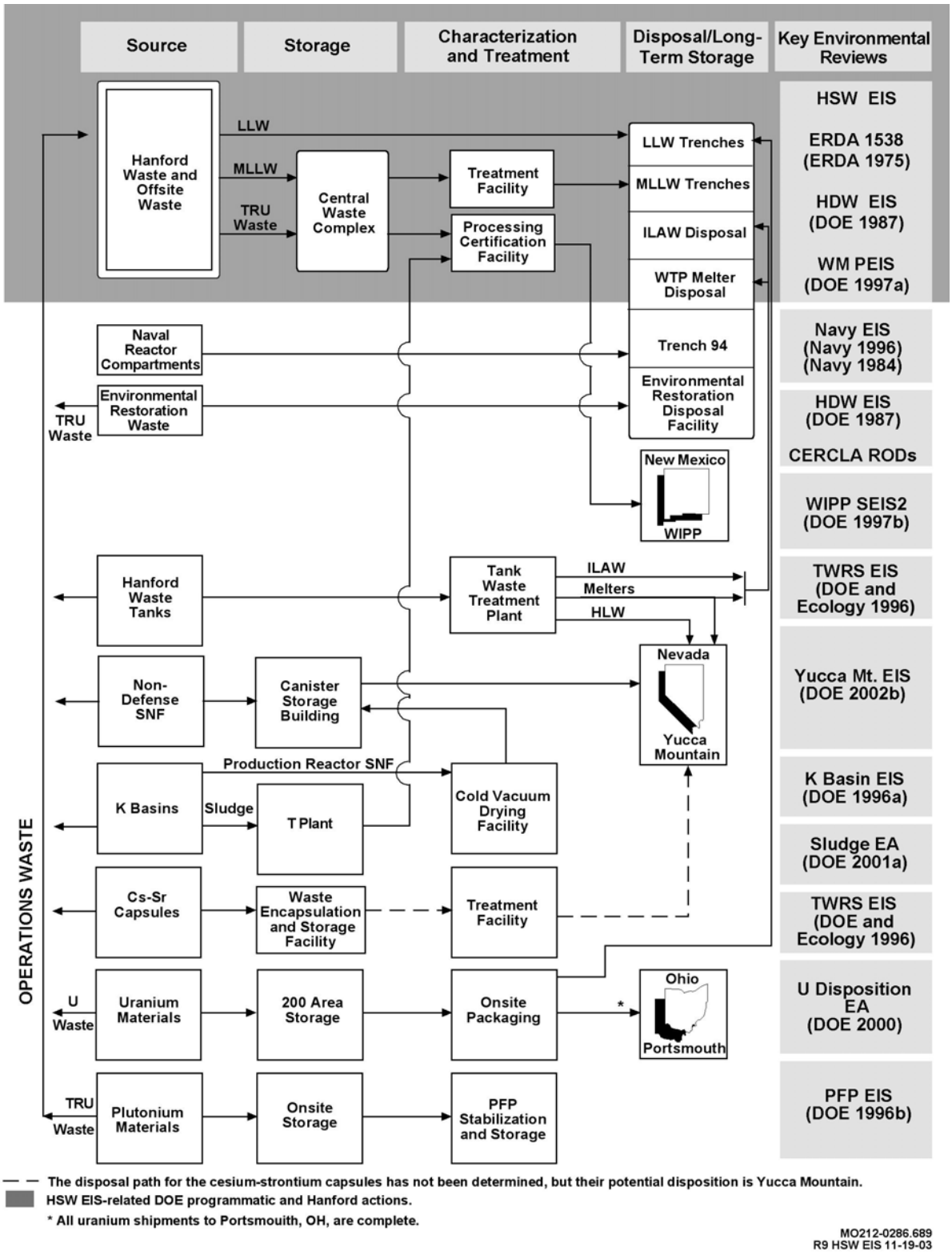


Figure 1.3. Relationship of the HSW EIS to Other Hanford Cleanup Operations, Material Management Activities, and Key Environmental Reviews

M0212-0286.11
HSW EIS 12-10-02

Figure 2.6. Waste Receiving and Processing Facility

M0212-0286.12
HSW EIS 12-10-02

Figure 2.7. X-Ray Image of Transuranic Waste Drum Contents

M0212-0286.11
HSW EIS 12-10-02

Figure 2.6. Waste Receiving and Processing Facility

M0212-0286.12
HSW EIS 12-10-02

Figure 2.7. X-Ray Image of Transuranic Waste Drum Contents

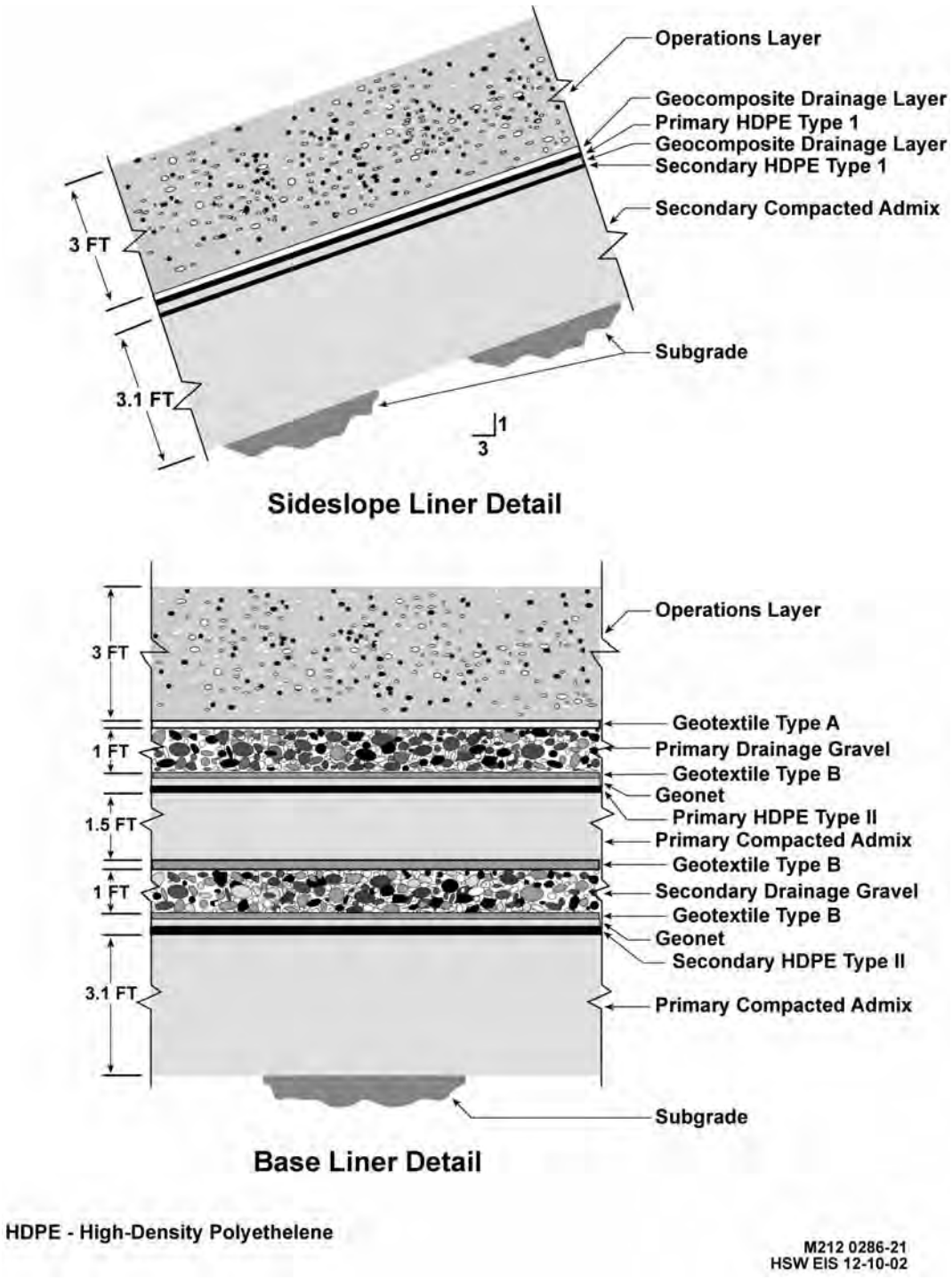


Figure 2.18. Typical Liner System

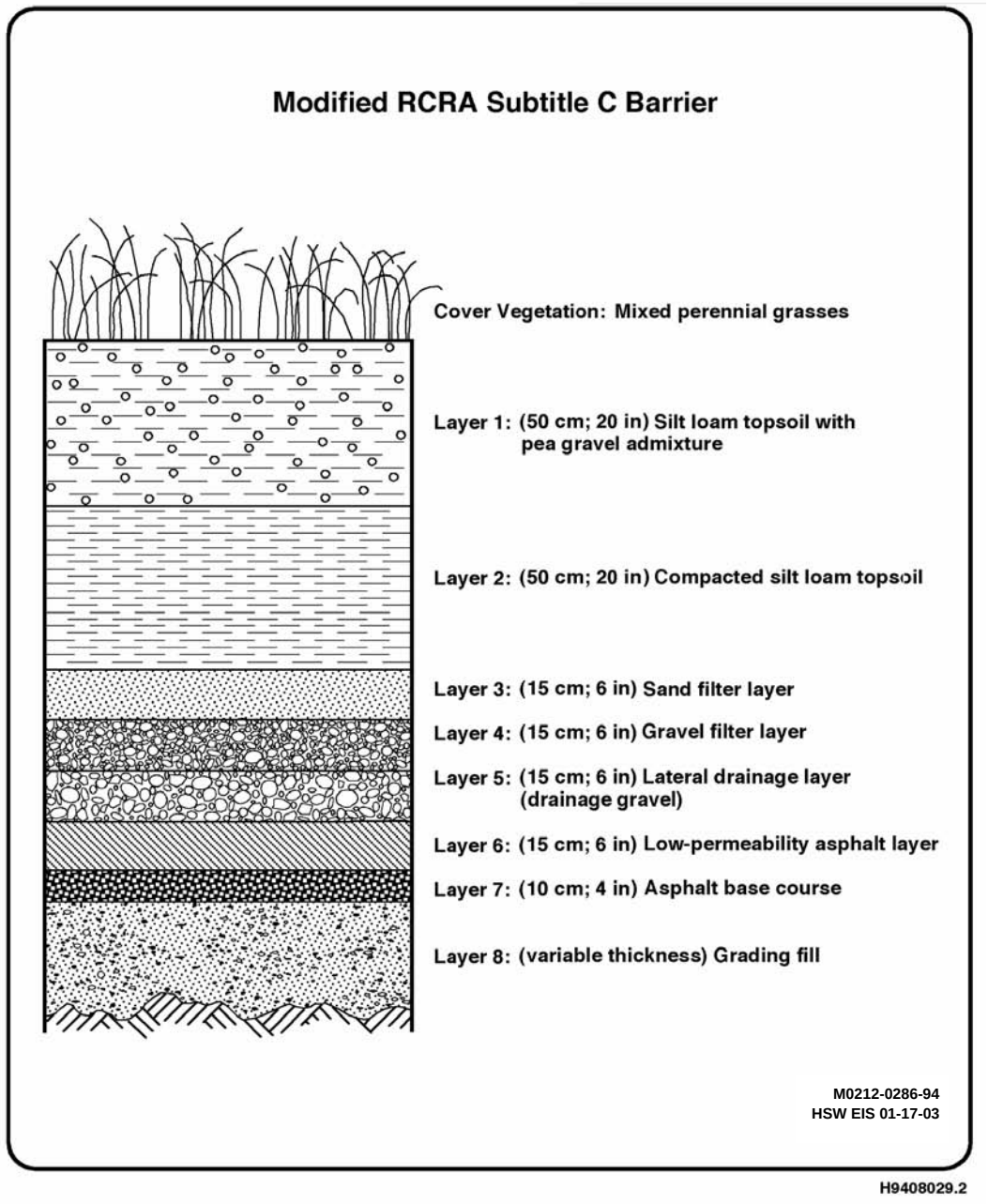


Figure 2.19. Modified RCRA Subtitle C Barrier for Mixed Low-Level Waste Trenches and the Low Level Burial Grounds

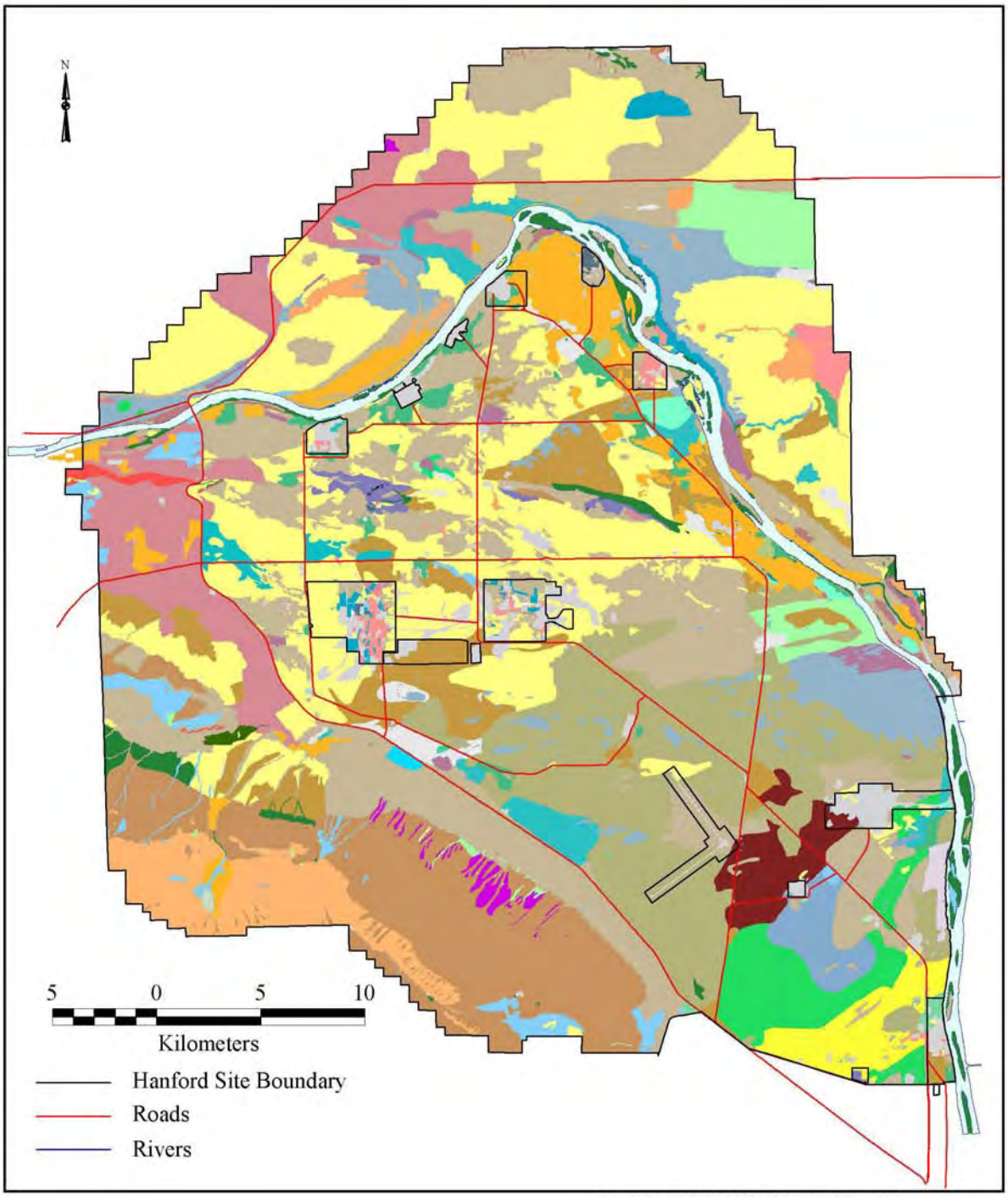


Figure 4.21. Distribution of Vegetation Types and Land Use Areas on the Hanford Site Prior to the *24 Command Fire* of 2000 (Neitzel 2002a). Legend on following page.

Figure 4.21. (contd) Legend for Figure 4.21

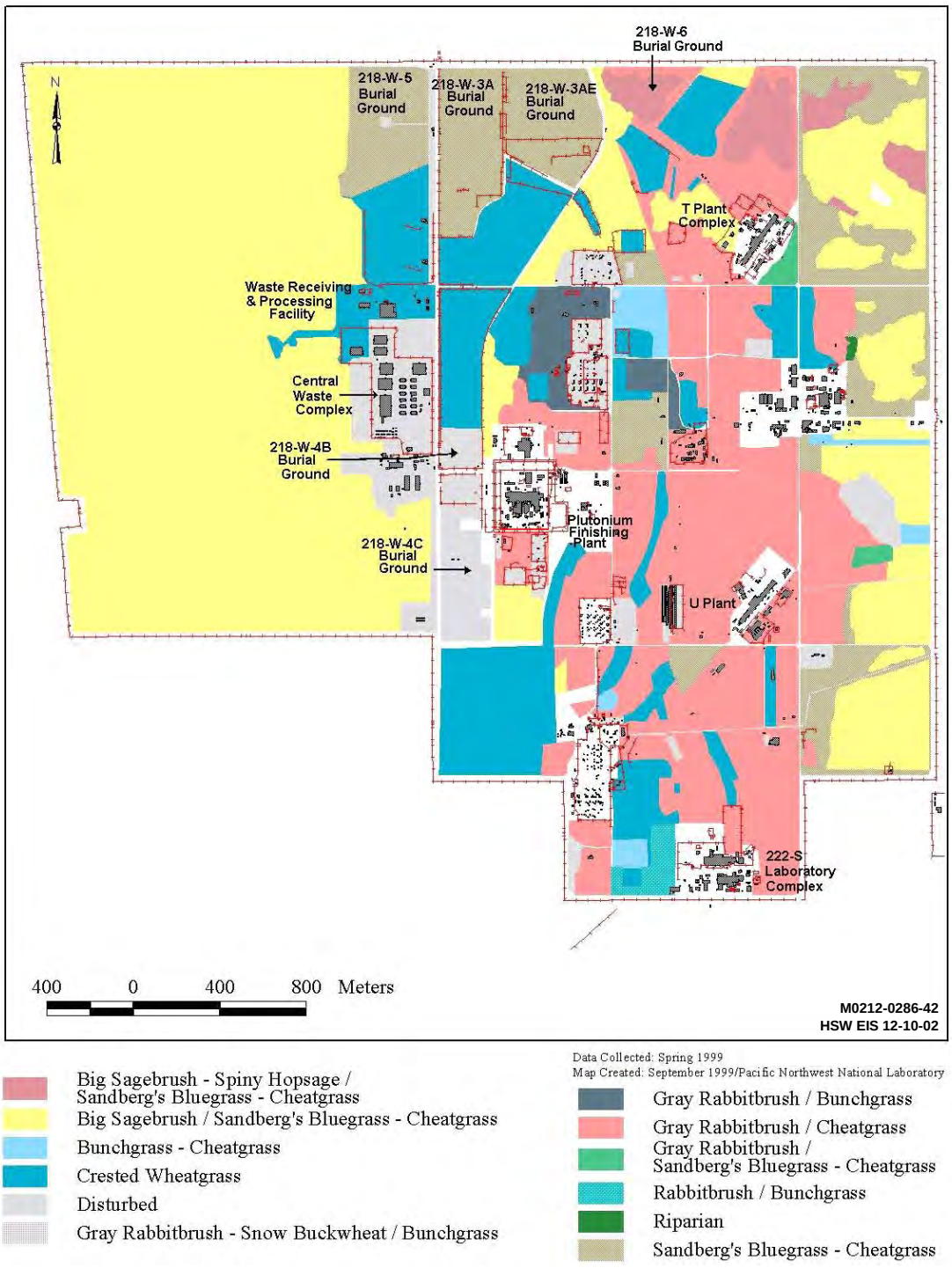


Figure 4.22. Distribution of Vegetation Types and Land Use Areas in the 200 West Area Prior to the *24 Command Fire* (DOE-RL 2001)

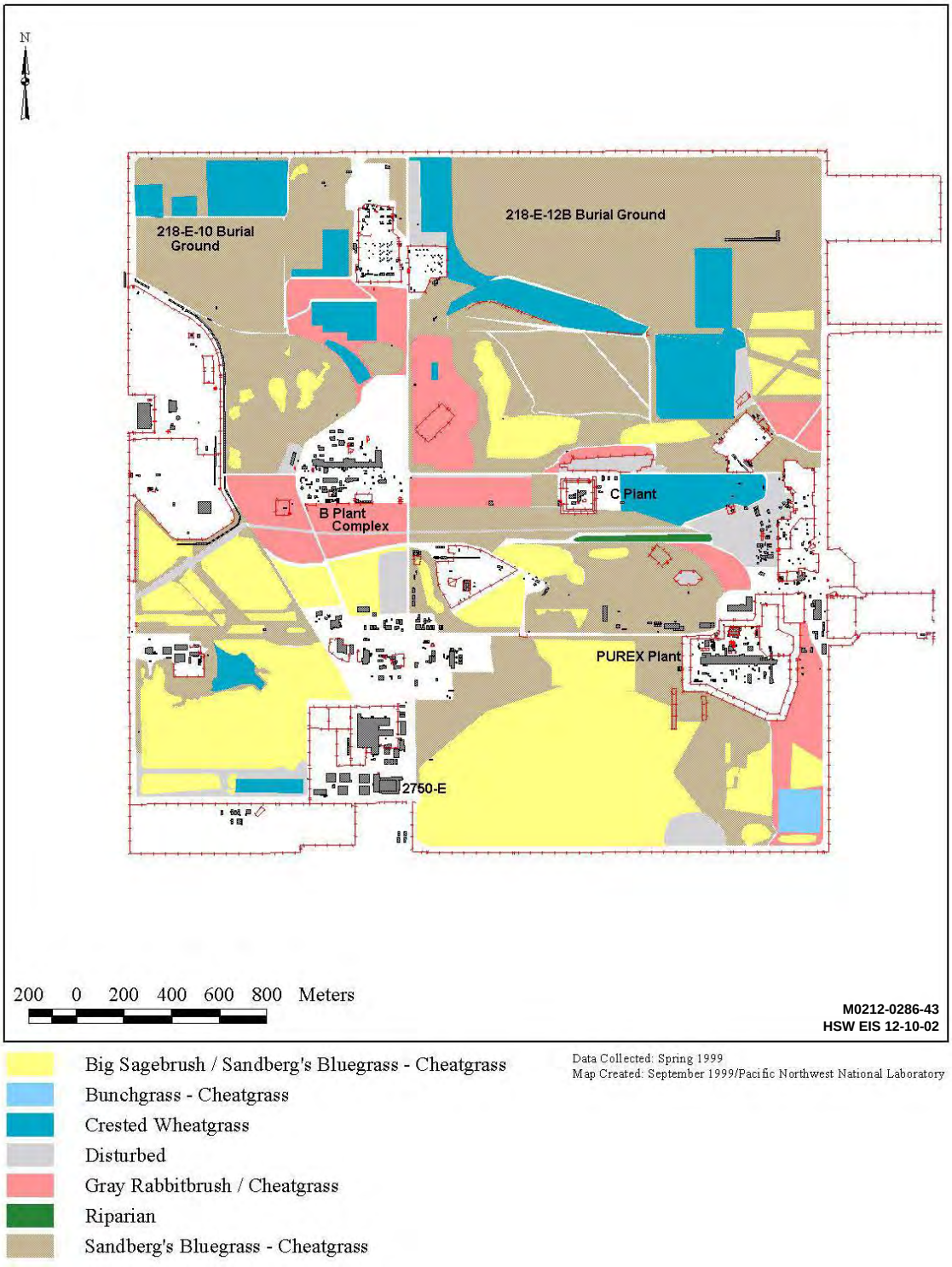
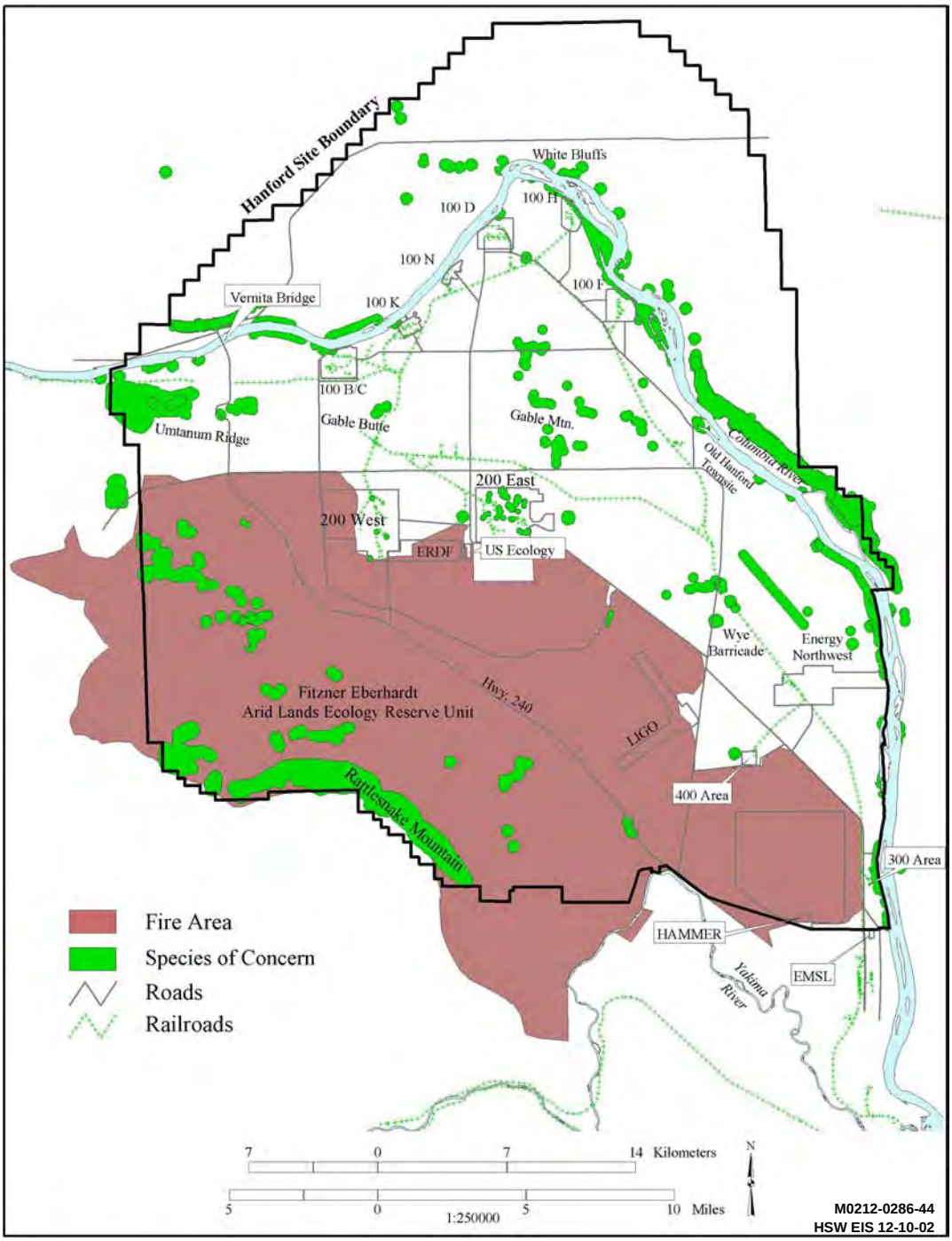


Figure 4.23. Distribution of Vegetation Types and Land Use Areas in the 200 East Area Prior to the *24 Command Fire* (DOE-RL 2001)



EMSL – Environmental and Molecular Sciences Laboratory
ERDF – Environmental Restoration Disposal Facility
HAMMER – Hazardous Materials Management and Emergency Response
mtn. - mountain

Figure 4.24. Species of Concern on the Hanford Site and the *24 Command Fire* Area (after DOE-RL 2001 and BAER 2000)

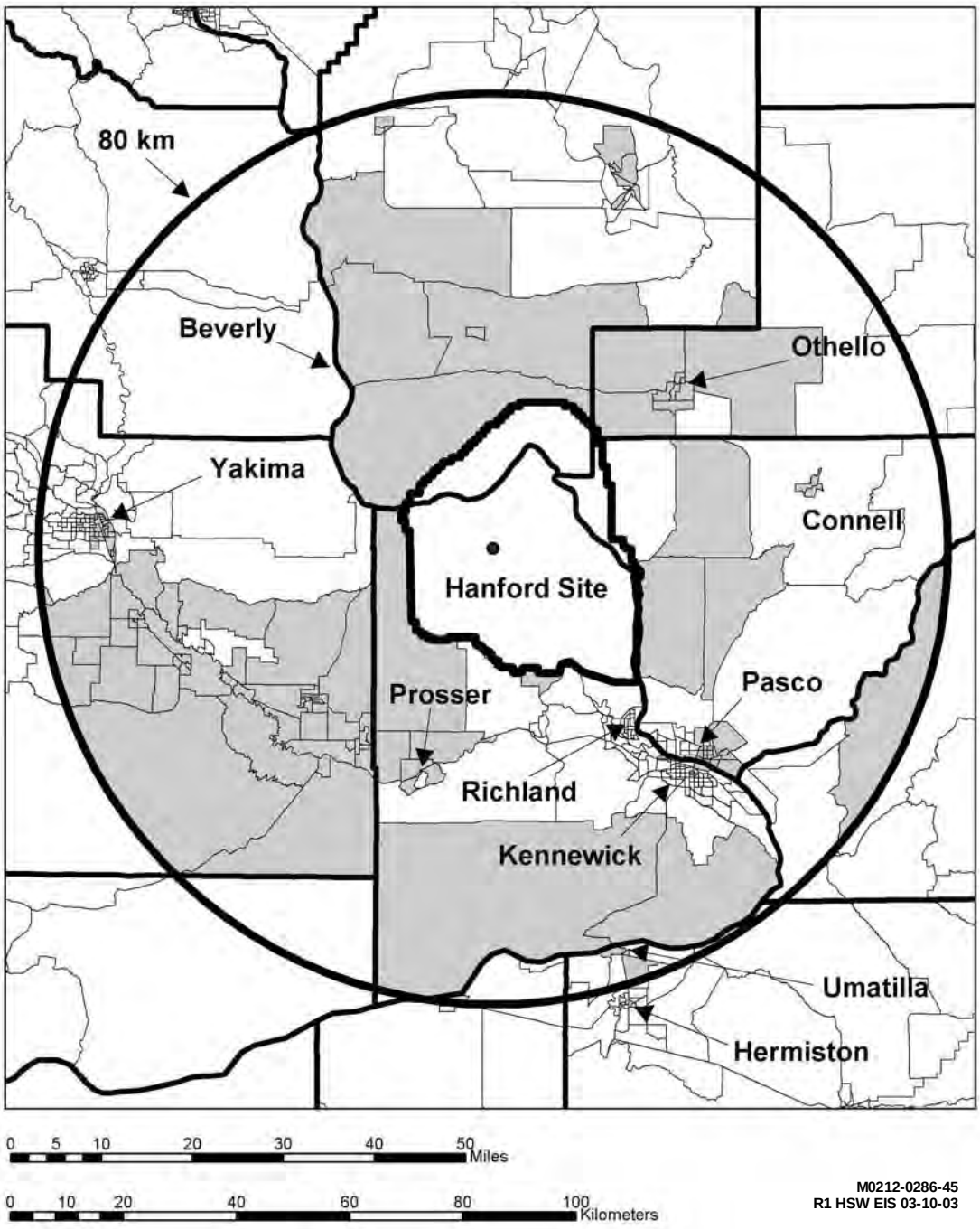


Figure 4.25. Location of Asian, Black, Hispanic, Native American, Pacific Islander, and Overall Minority Populations Near the Hanford Site. (Shading denotes block groups with potential environmental justice concerns).

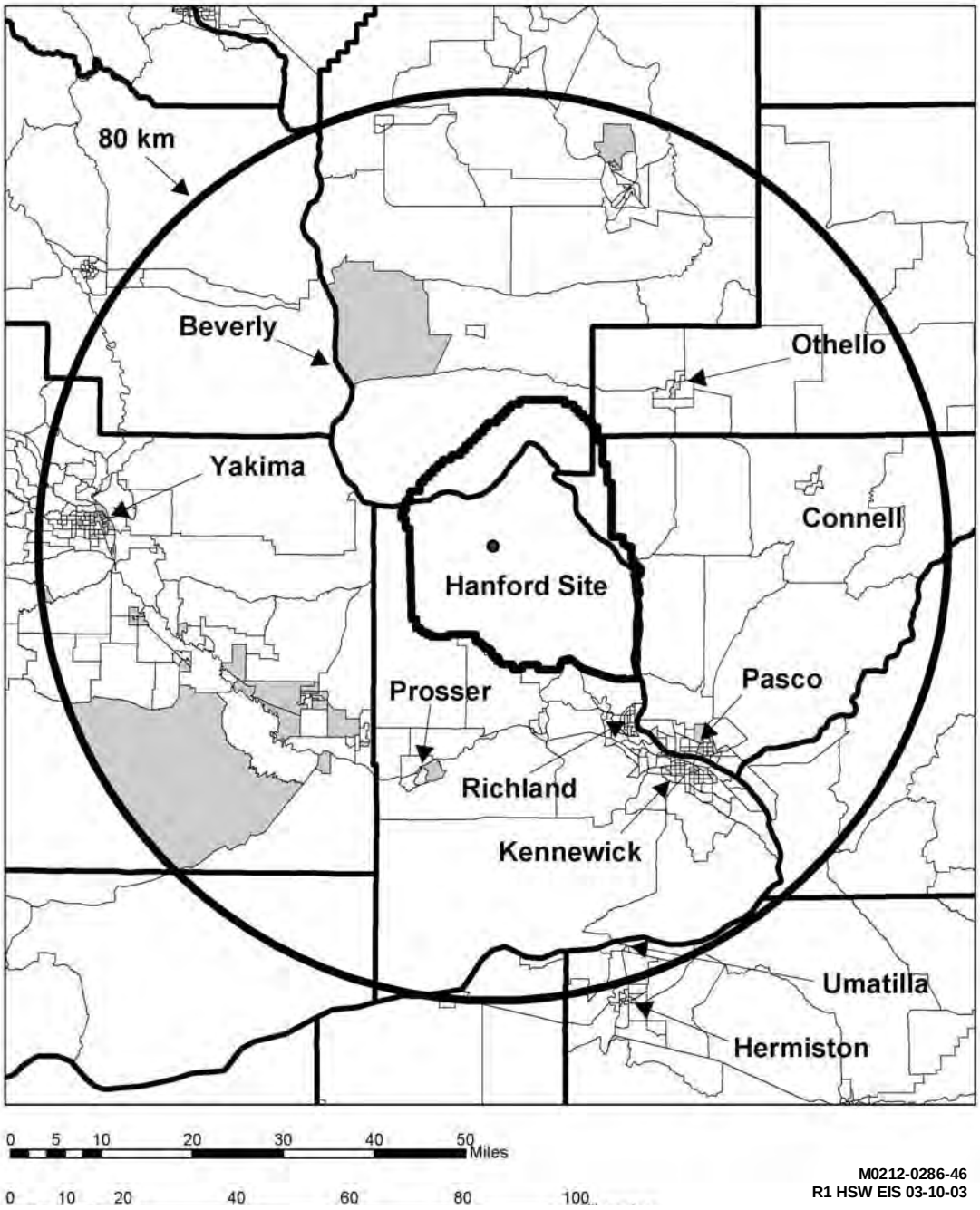


Figure 4.26. Location of Low-Income Populations Near the Hanford Site. (Shading denotes block groups with potential environmental justice concerns).

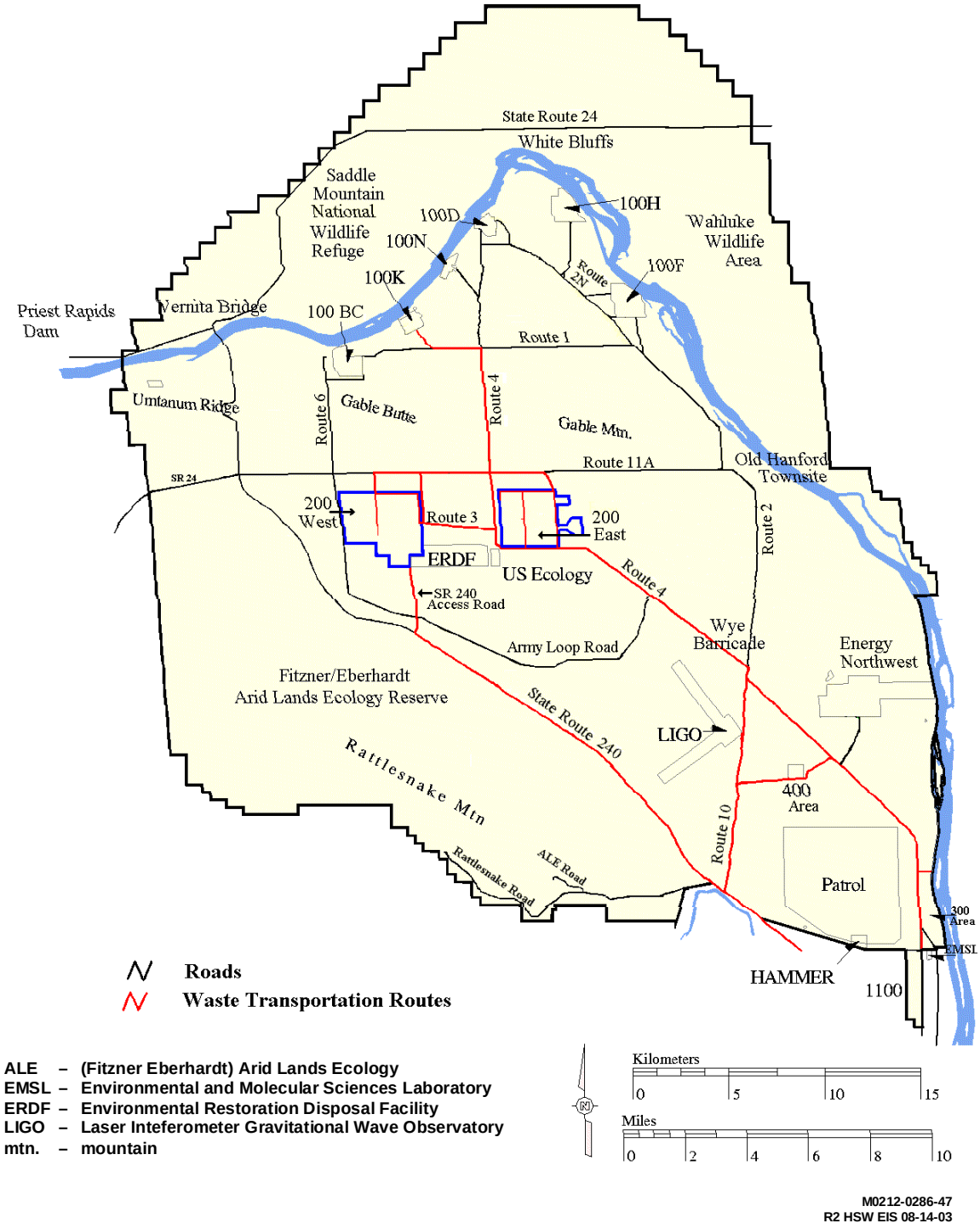


Figure 4.28. Transportation Routes on the Hanford Site

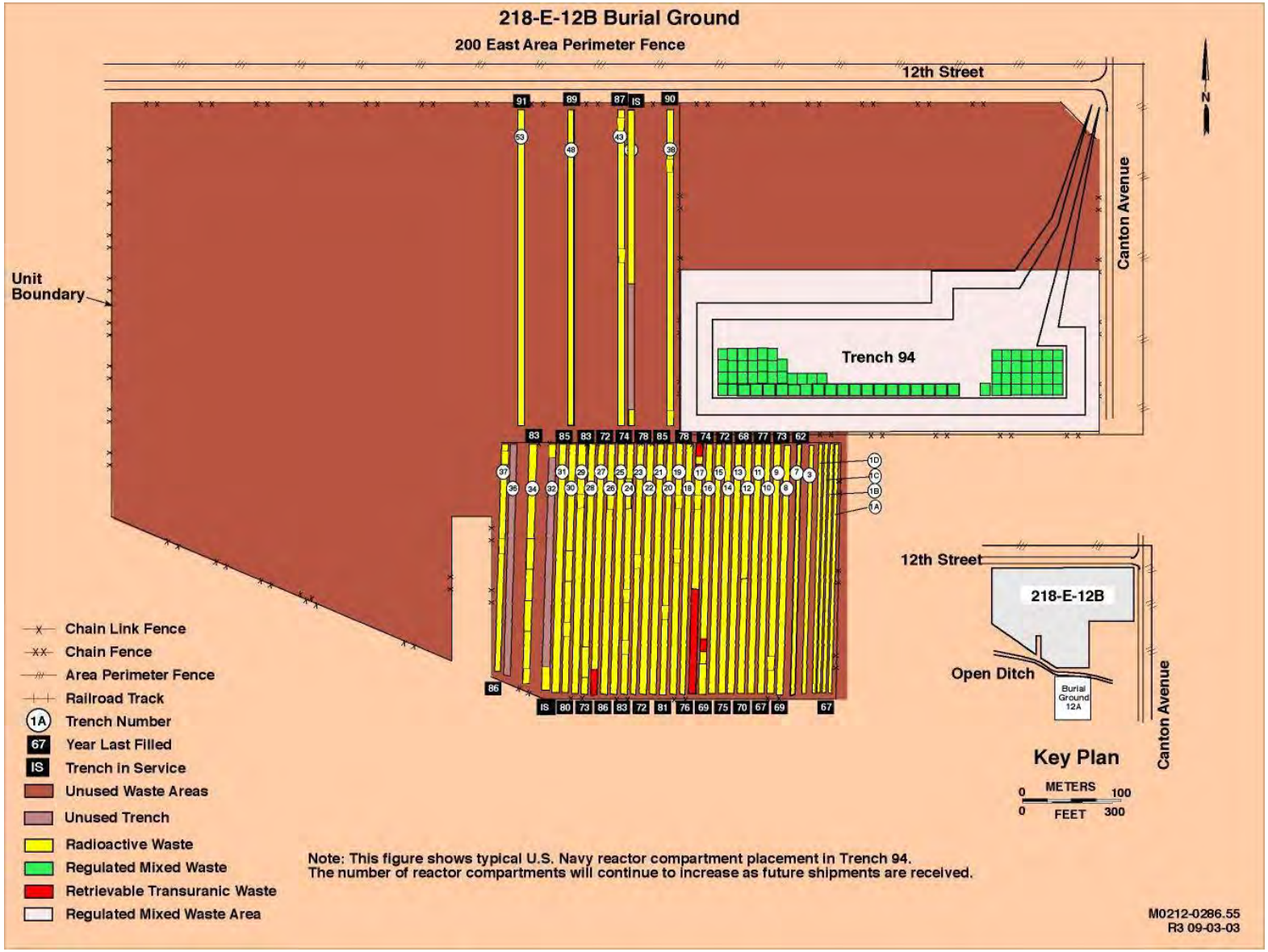


Figure D.1. 218-E-12B Burial Ground

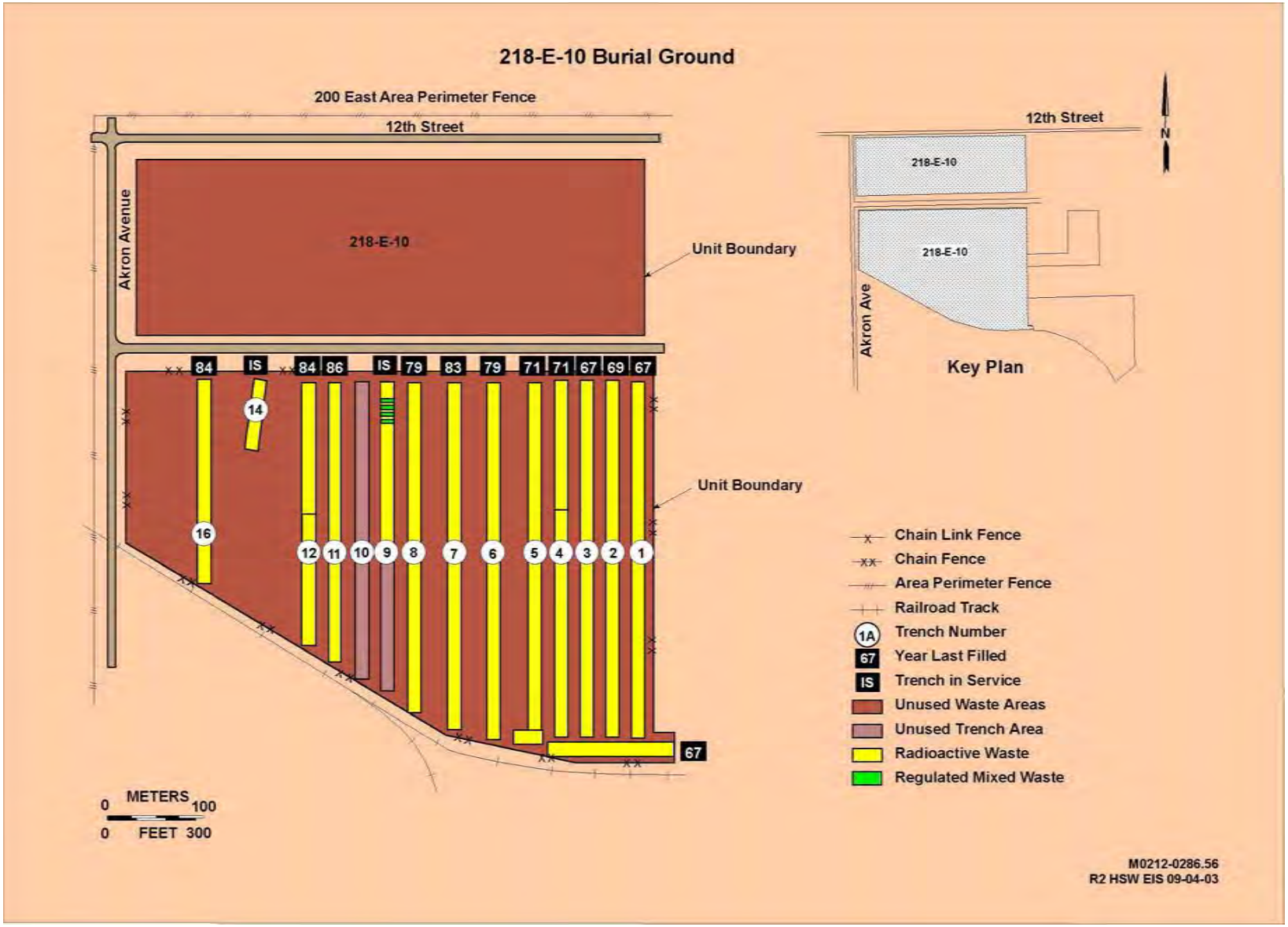


Figure D.2. 218-E-10 Burial Ground

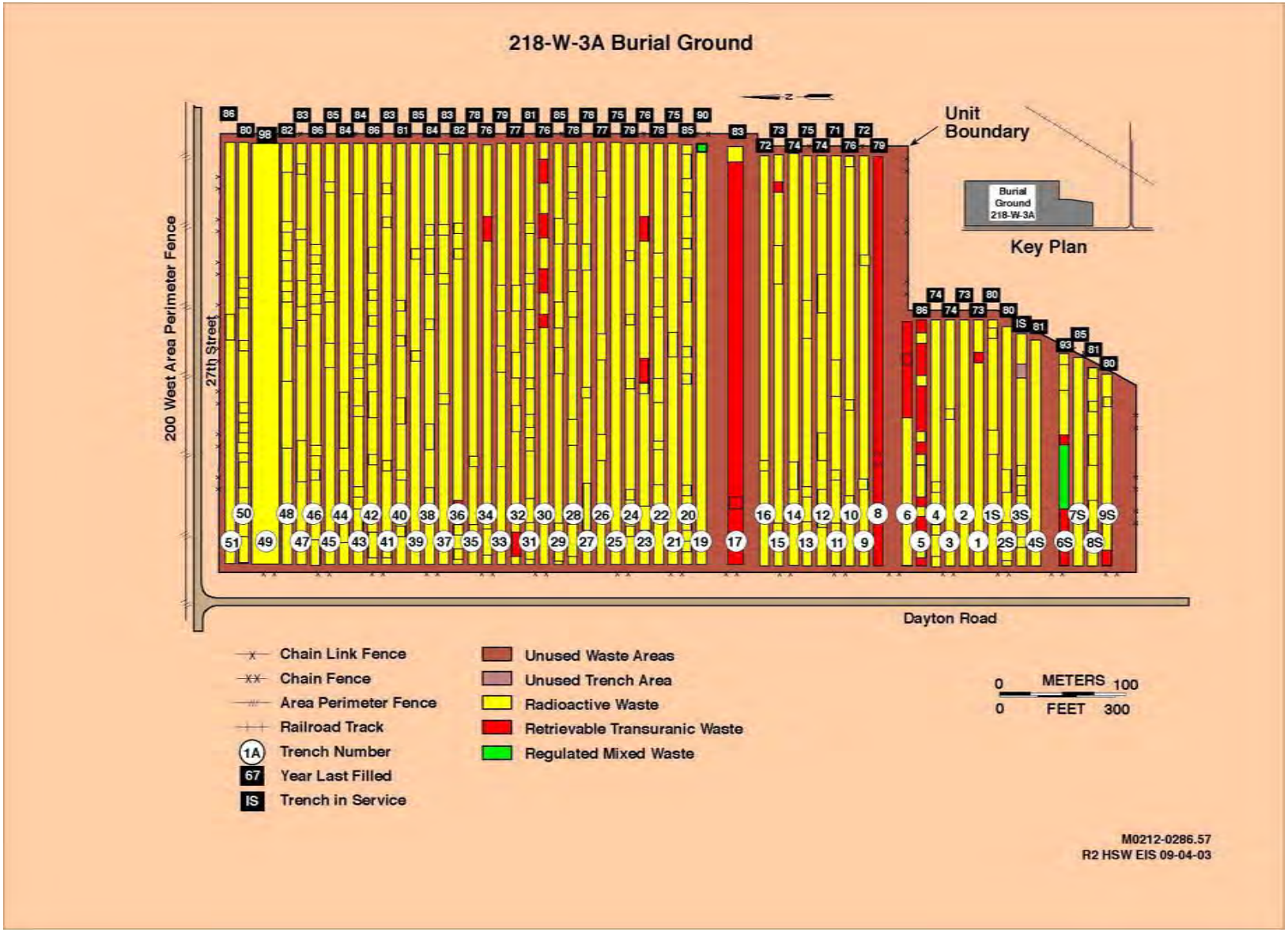


Figure D.3. 218-W-3A Burial Ground

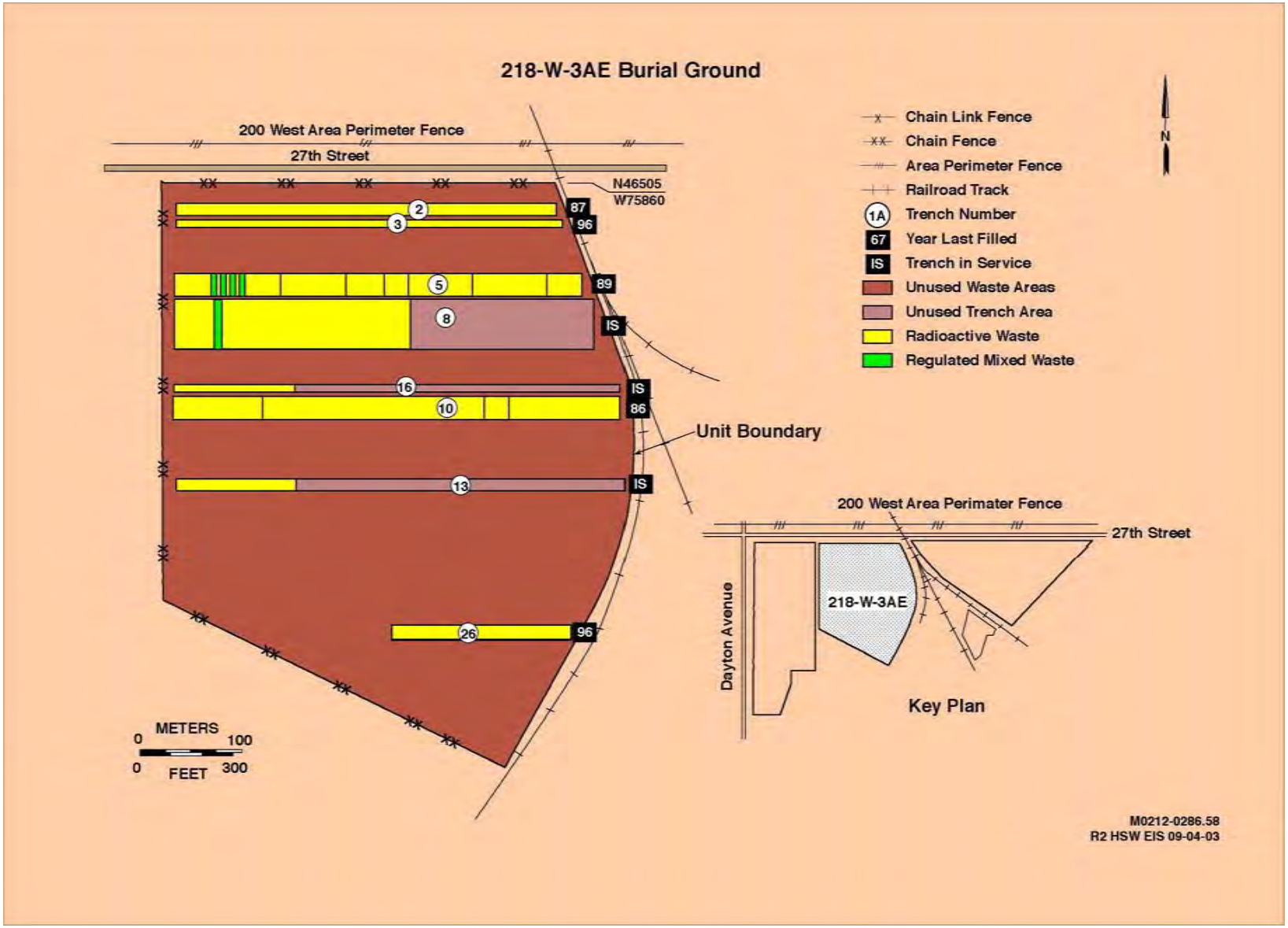


Figure D.4. 218-W-3AE Burial Ground

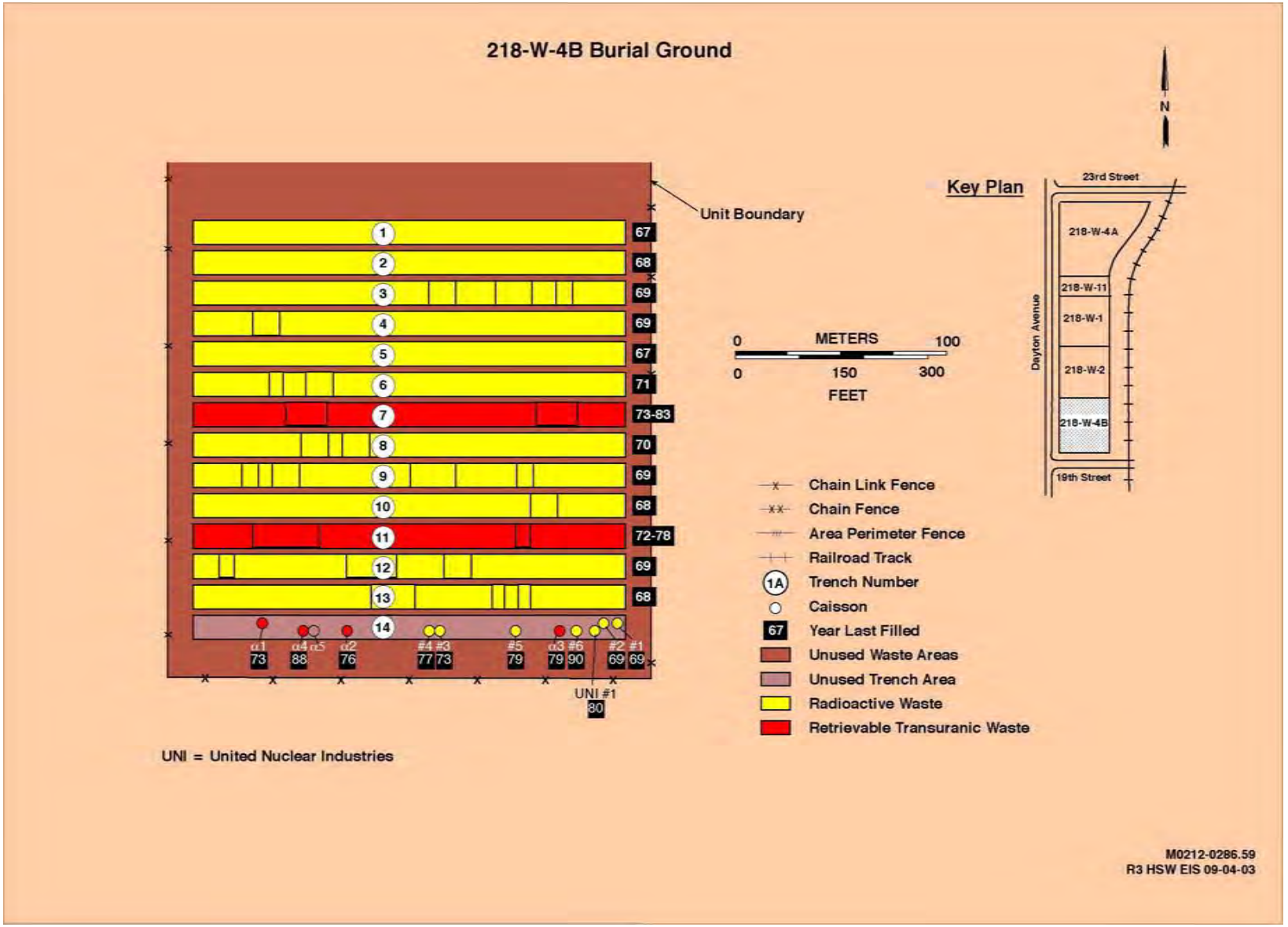


Figure D.5. 218-W-4B Burial Ground

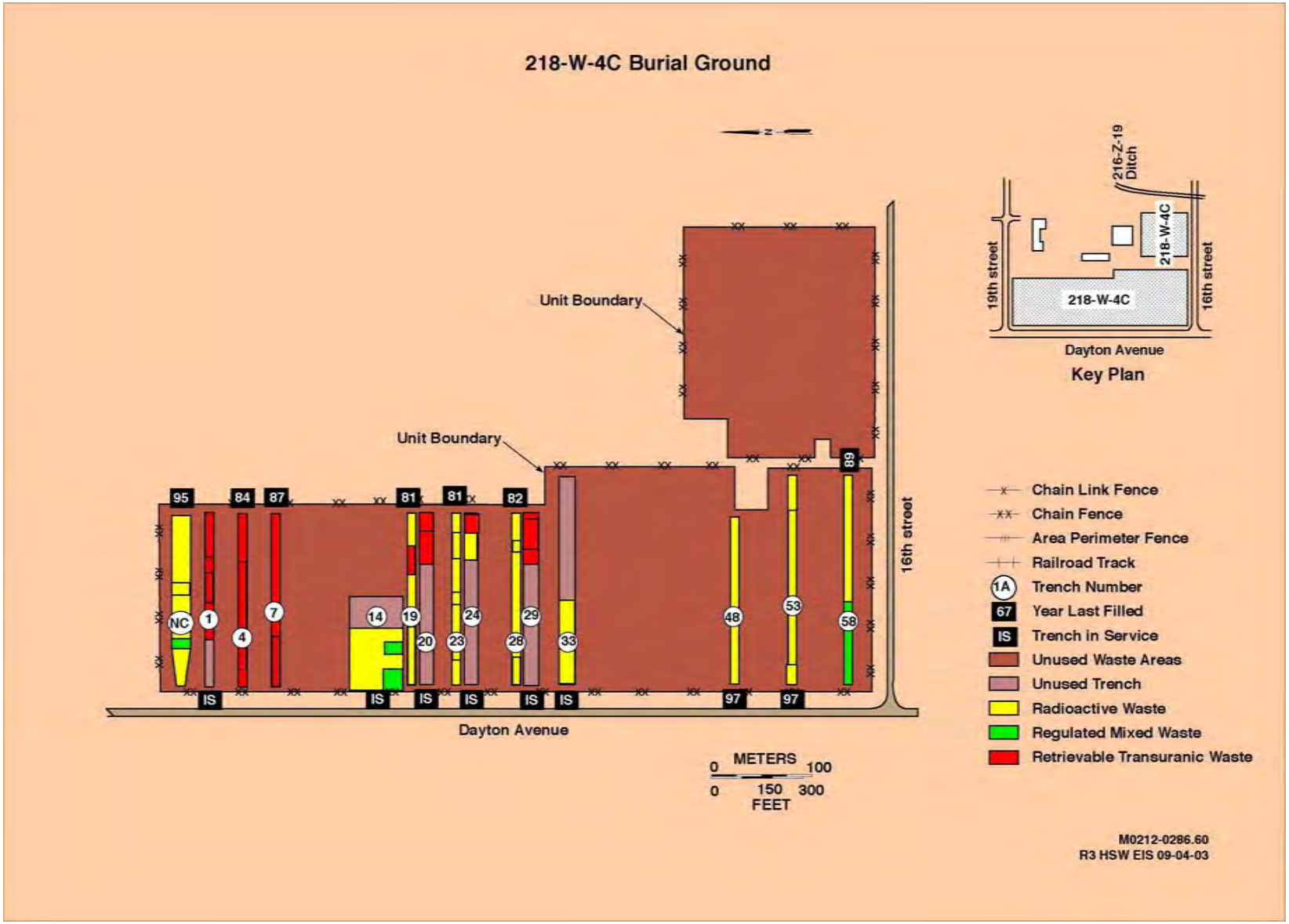


Figure D.6. 218-W-4C Burial Ground

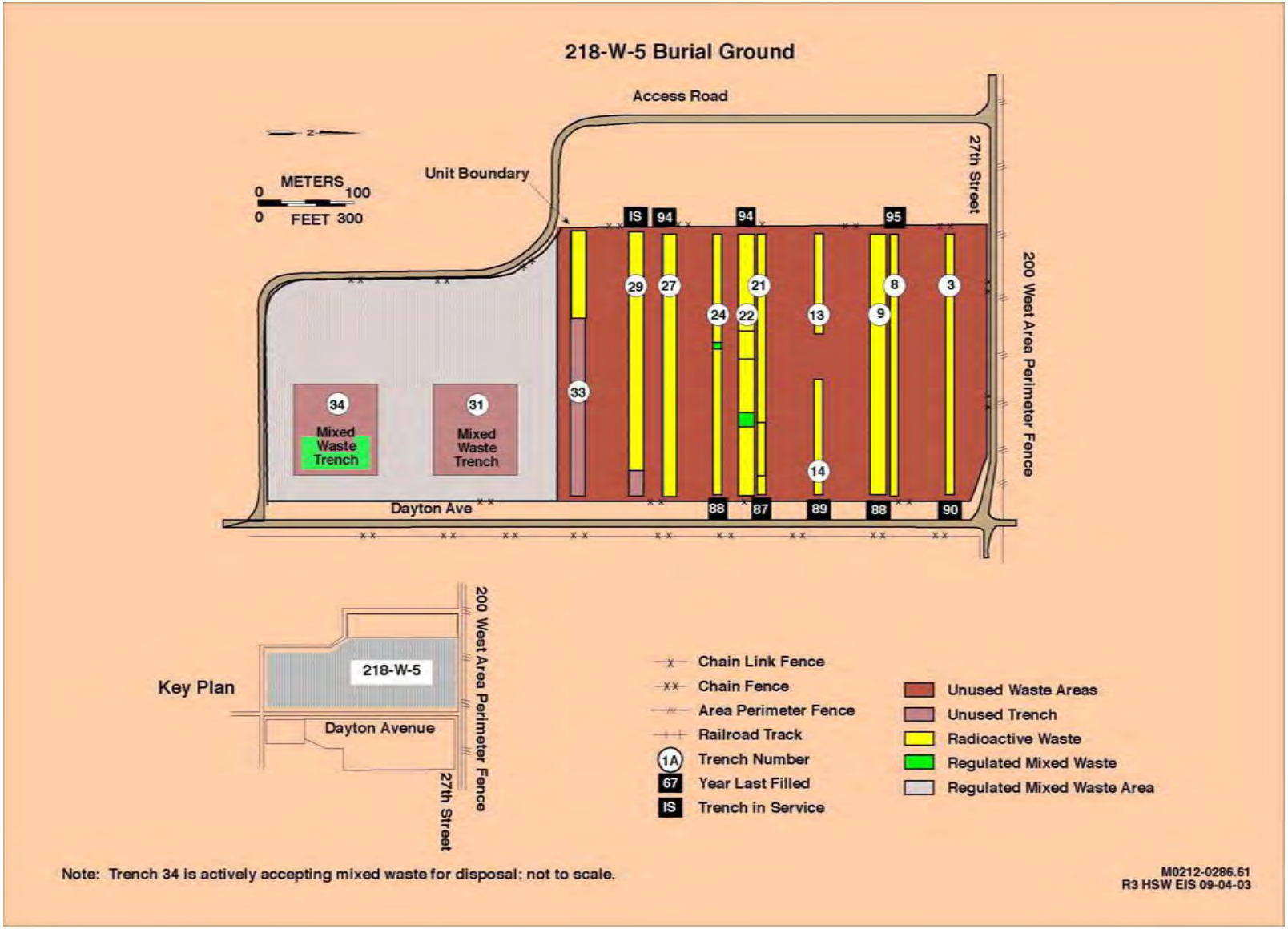


Figure D.7. 218-W-5 Burial Ground

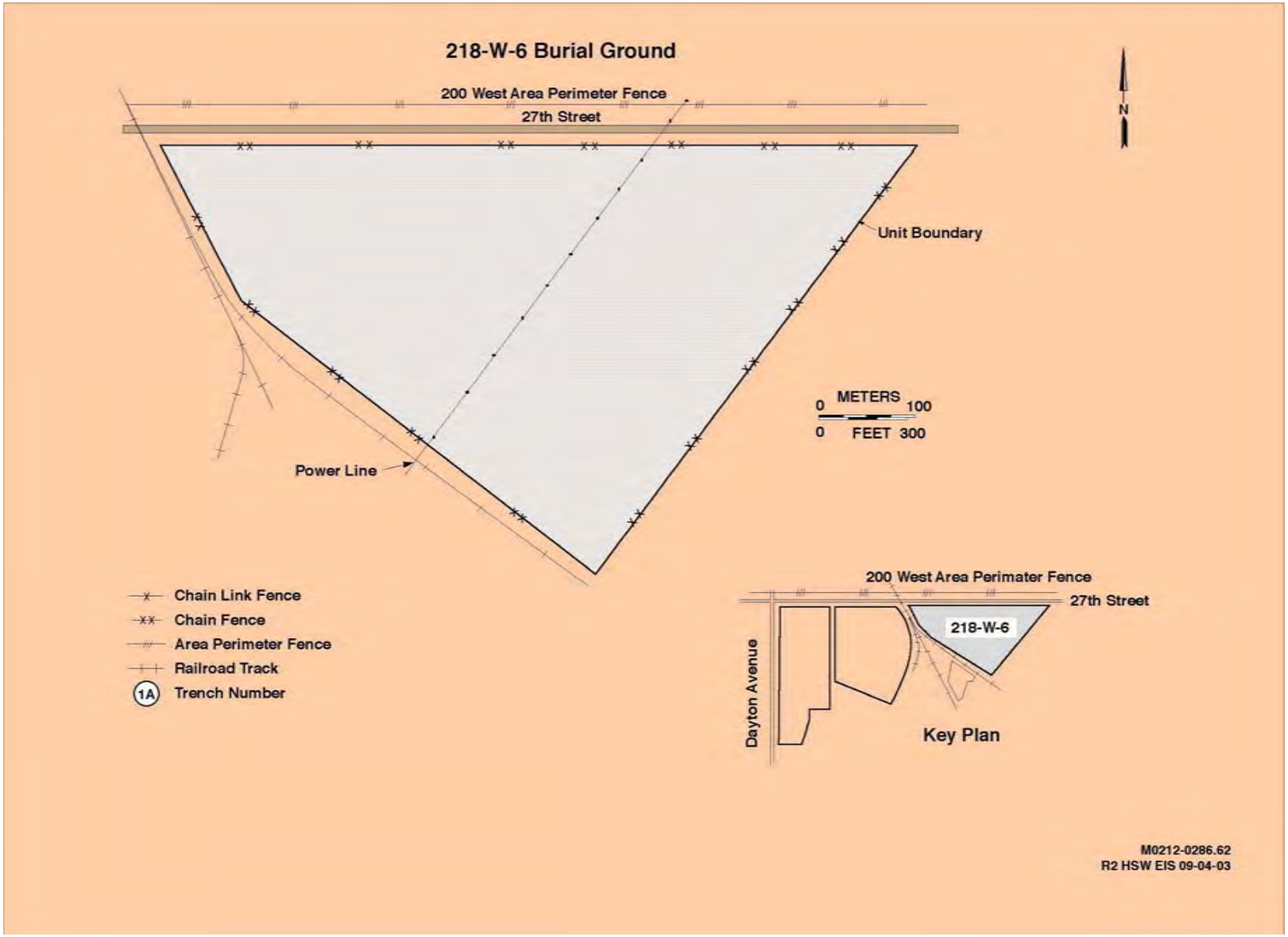


Figure D.8. 218-W-6 Burial Ground

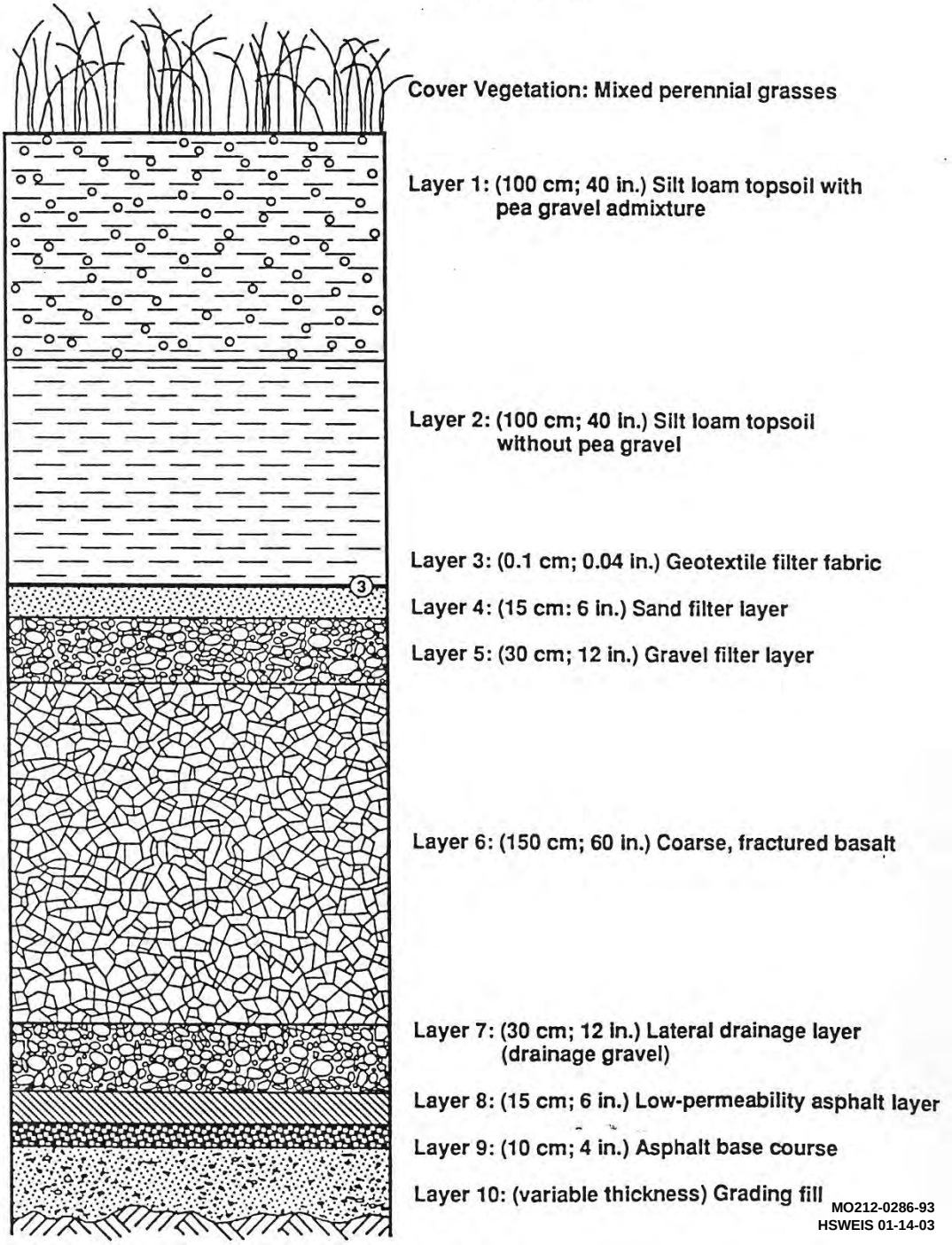
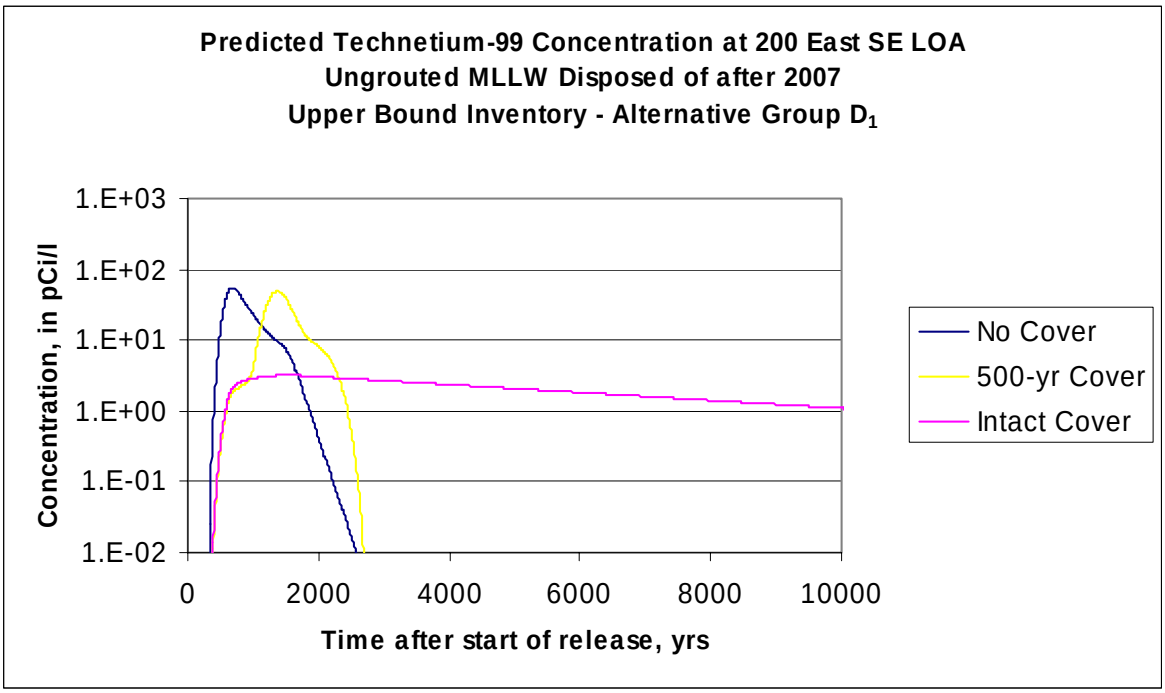


Figure D.12. Hanford Barrier



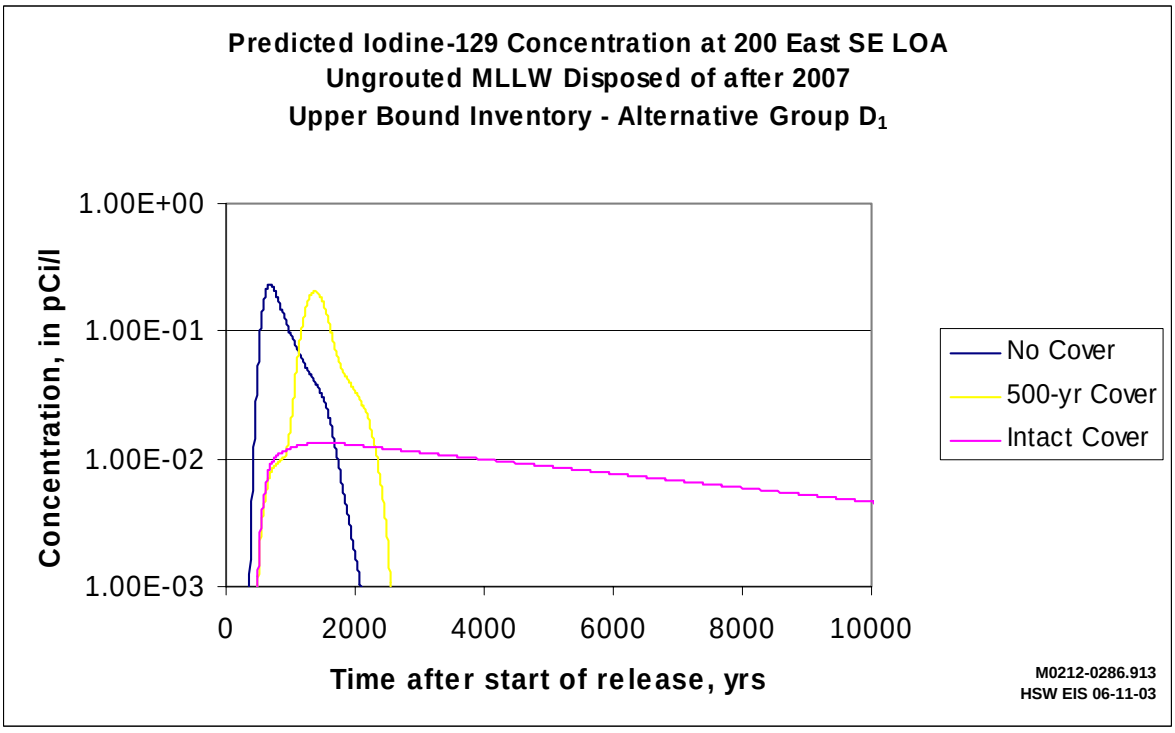
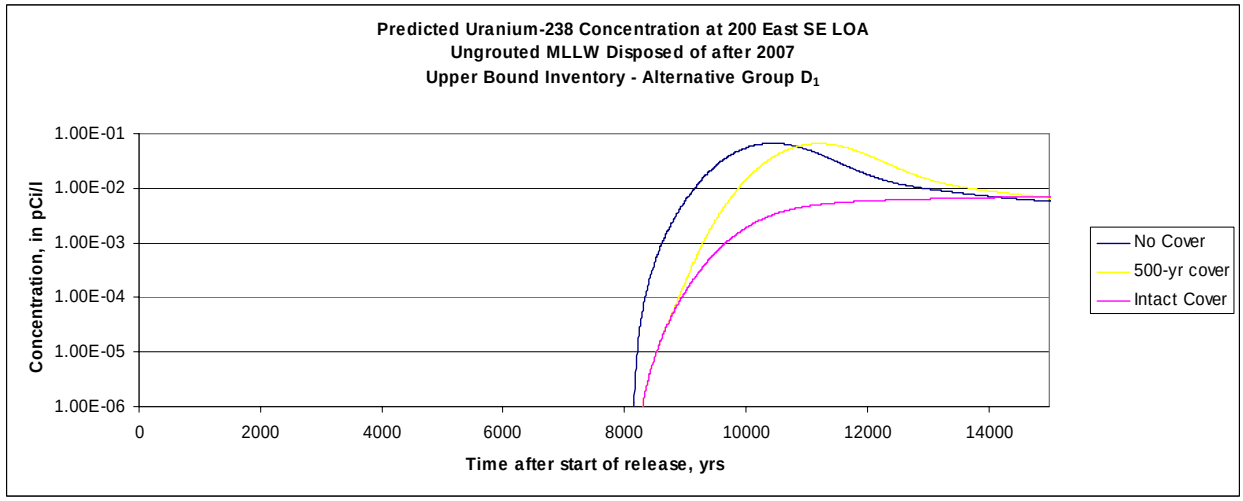


Figure G.97. Comparison of Predicted Peak Concentrations of Technetium-99 and Iodine-129 at 200 East SE LOA from Upper Bound Inventories in Ungrouted MLLW Disposed of After 2007



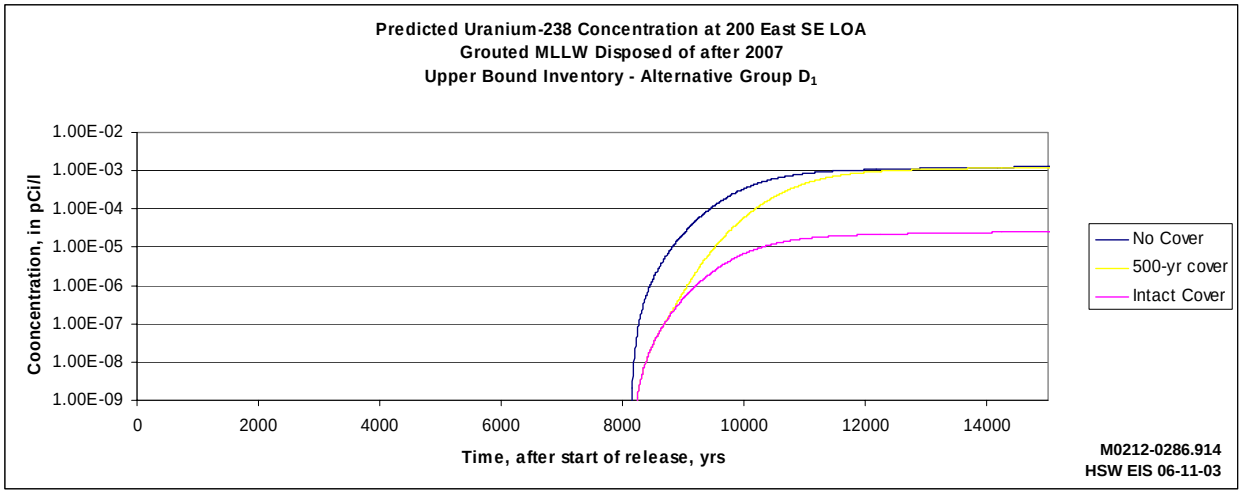


Figure G.98. Comparison of Predicted Peak Concentrations of Uranium-238 at the 200 East SE LOA from Upper Bound Inventories in Ungrouted and Grouted MLLW Disposed of After 2007

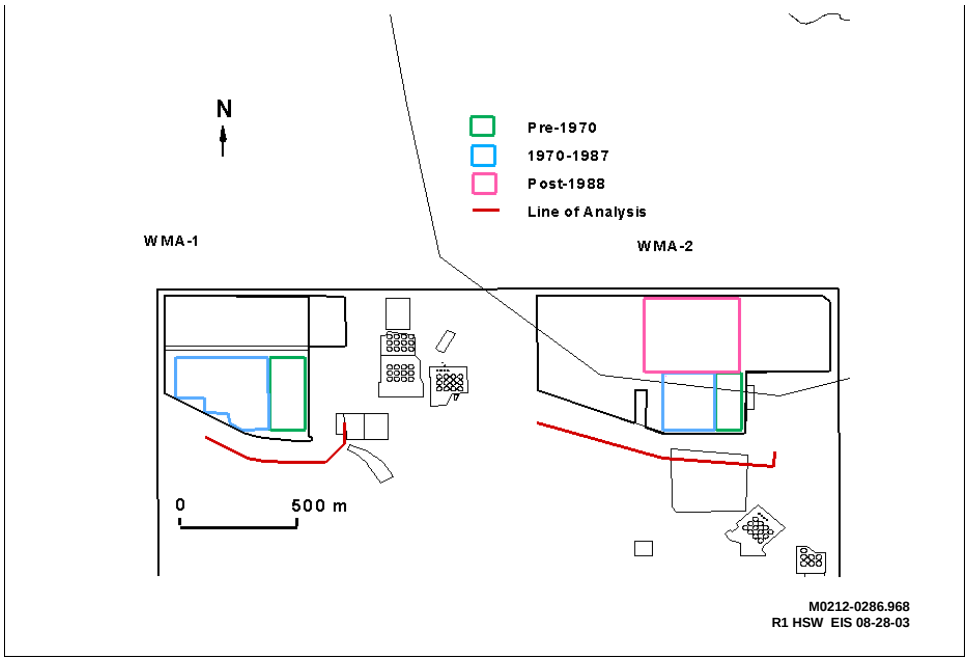


Figure G.104. Approximate Disposal Area Footprint Used in the 200 East Area to Represent Waste Disposed of Before 2008 in the Unit-Release Calculation in Groundwater

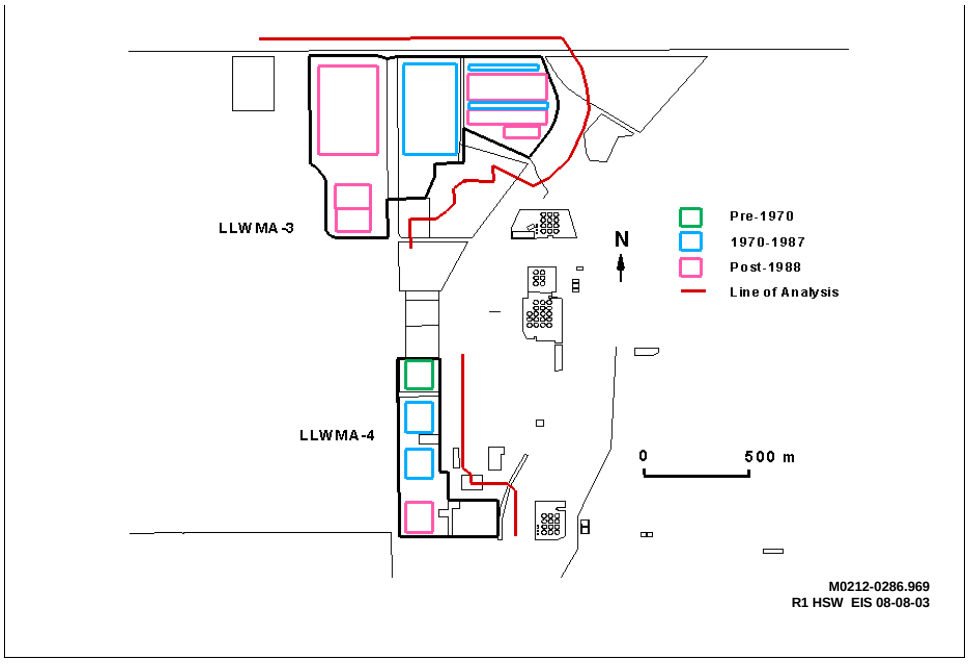


Figure G.105. Approximate Disposal Area Footprint Used in the 200 West Areas to Represent Waste Disposed of Before 2008 in the Unit-Release Calculation in Groundwater

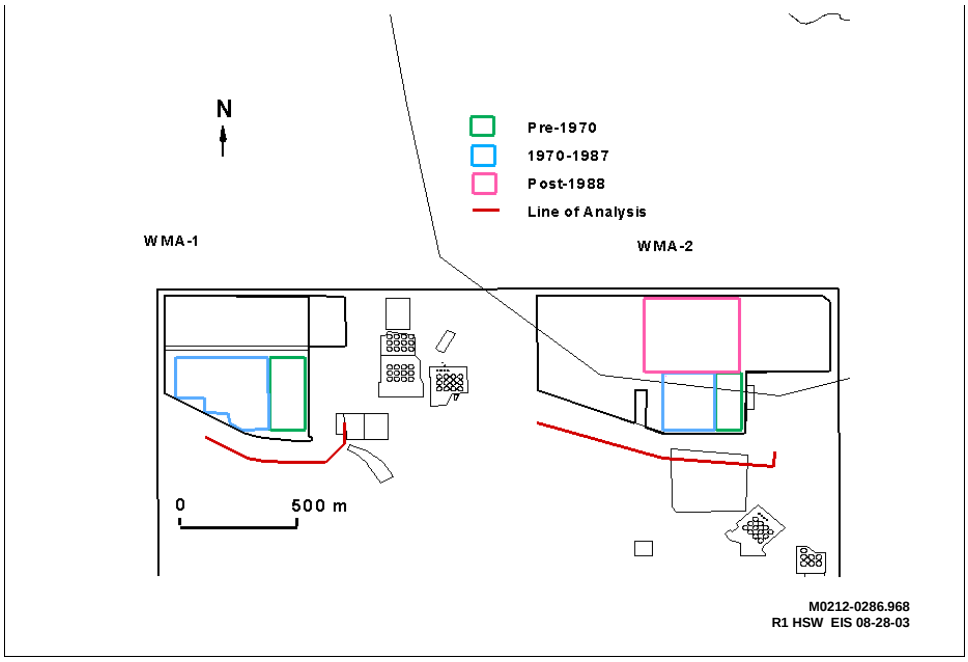


Figure G.104. Approximate Disposal Area Footprint Used in the 200 East Area to Represent Waste Disposed of Before 2008 in the Unit-Release Calculation in Groundwater

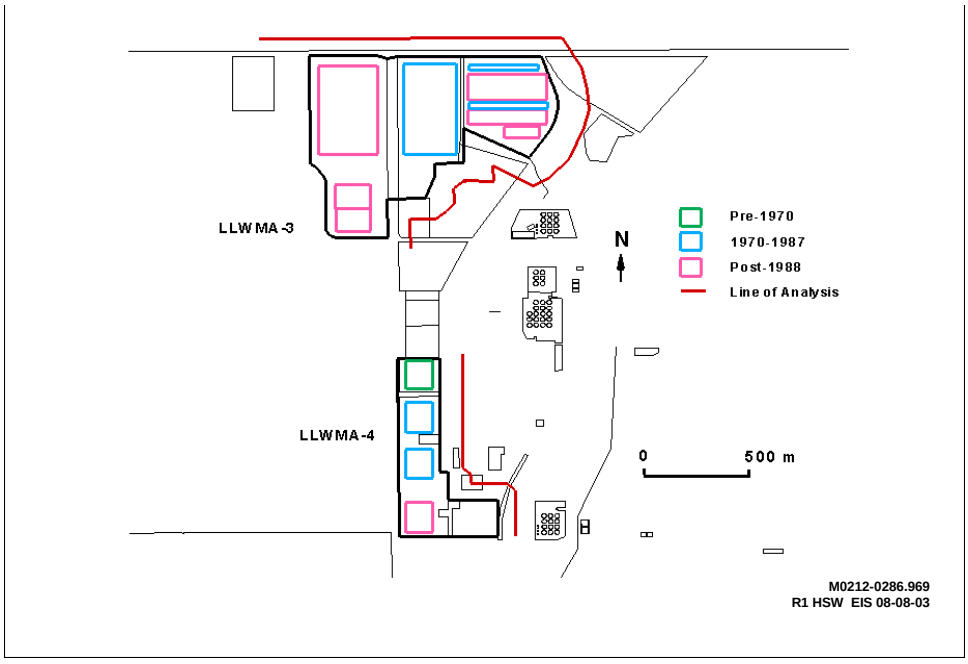


Figure G.105. Approximate Disposal Area Footprint Used in the 200 West Areas to Represent Waste Disposed of Before 2008 in the Unit-Release Calculation in Groundwater

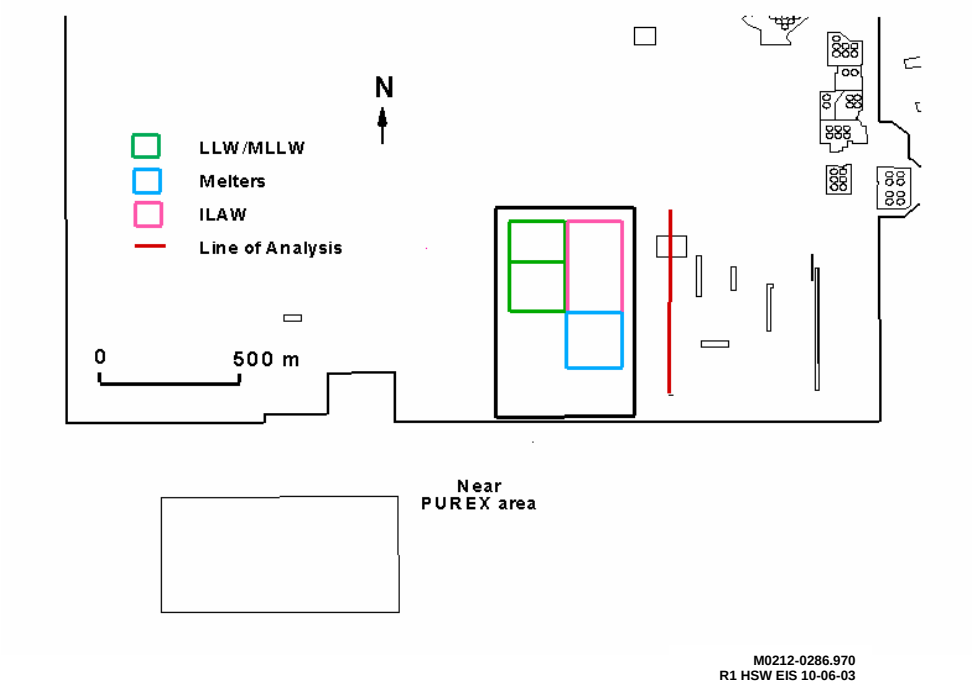


Figure G.106. Approximate Disposal Area Footprint Used in Alternative Group D_1 (Near the PUREX Plant) to Represent Waste Disposed of After 2007 in the Unit-Release Calculation in Groundwater

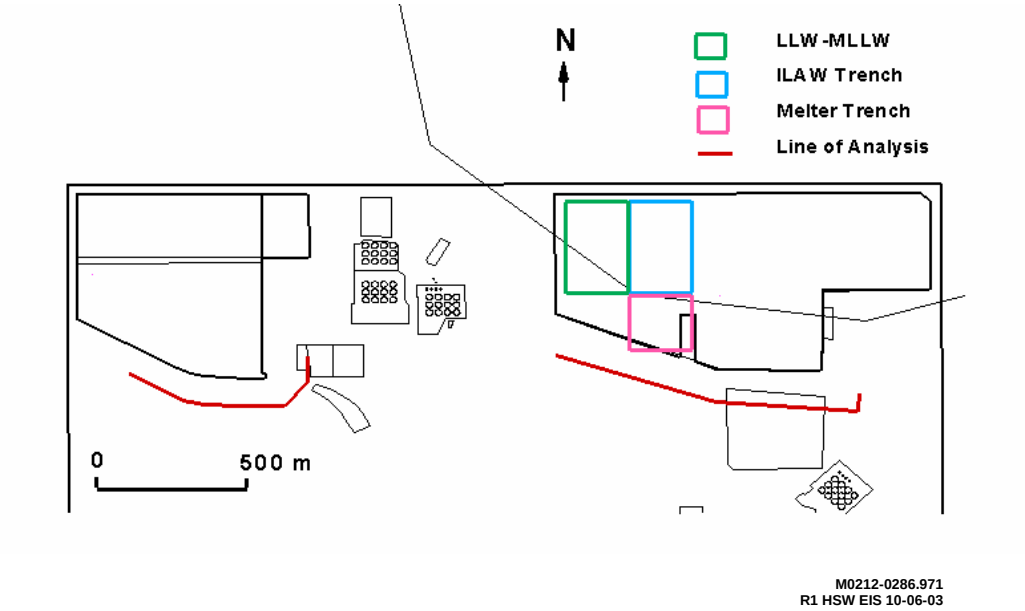


Figure G.107. Approximate Disposal Area Footprint Used in Alternative Group D_2 (218-E-12B LLBG) to Represent Waste Disposed of After 2007 in the Unit-Release Calculation in Groundwater

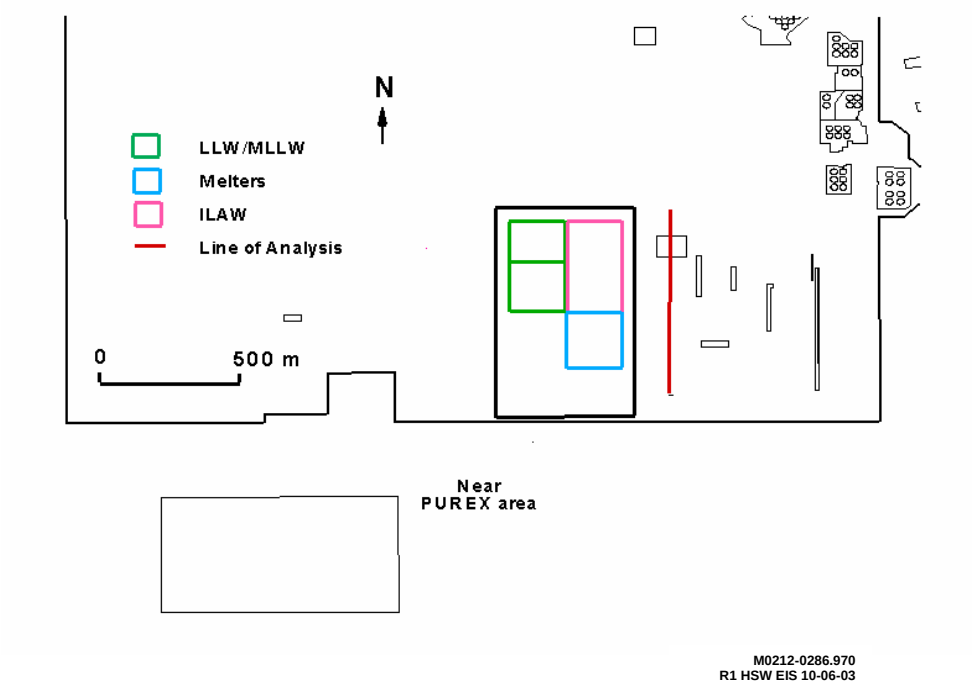


Figure G.106. Approximate Disposal Area Footprint Used in Alternative Group D_1 (Near the PUREX Plant) to Represent Waste Disposed of After 2007 in the Unit-Release Calculation in Groundwater

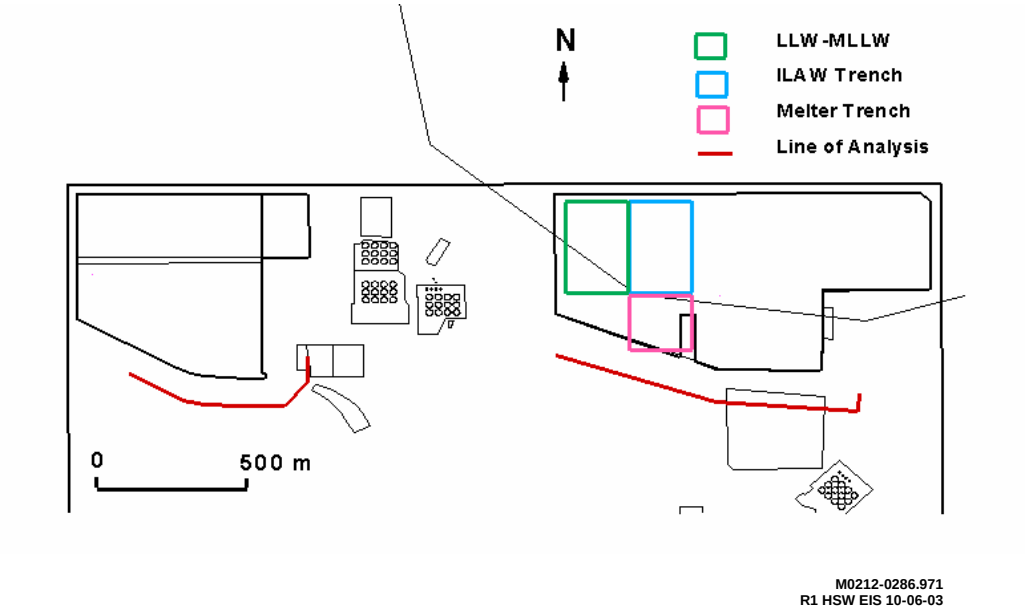


Figure G.107. Approximate Disposal Area Footprint Used in Alternative Group D_2 (218-E-12B LLBG) to Represent Waste Disposed of After 2007 in the Unit-Release Calculation in Groundwater

Table G.42. Predicted Peak Concentrations of Key Constituents from Waste Disposed of Before 2008 at Aggregate LLW Management Area Boundaries, Alternative Groups D_1, D_2, and D_3

Constituent	Benchmark MCL (pCi/L)	Hanford Only Volume			Lower Bound Volume			Upper Bound Volume		
		Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)
Pre-1970 LLW										
200 East Area										
C-14	2,000									
Tc-99	900	5.16E-01	3.29E+02	90	5.16E-01	3.29E+02	90	5.16E-01	3.29E+02	90
Grouted Tc-99	900									
I-129	1	1.24E-03	7.90E-01	90	1.24E-03	7.90E-01	90	1.24E-03	7.90E-01	90
Grouted I-129	1									
U-233	(a)	1.03E+01	5.45E+00	9,880	1.03E+01	5.45E+00	9,880	1.03E+01	5.45E+00	9,880
U-234	(a)	3.68E-01	1.95E-01	9,880	3.68E-01	1.95E-01	9,880	3.68E-01	1.95E-01	9,880
U-235	(a)	1.12E-02	5.93E-03	9,880	1.12E-02	5.93E-03	9,880	1.12E-02	5.93E-03	9,880
U-236	(a)	7.53E-03	3.99E-03	9,880	7.53E-03	3.99E-03	9,880	7.53E-03	3.99E-03	9,880
U-238	(a)	2.69E-01	1.42E-01	9,880	2.69E-01	1.42E-01	9,880	2.69E-01	1.42E-01	9,880
200 West Area										
C-14	2,000	0.00E+00			0.00E+00			0.00E+00		
Tc-99	900	1.30E-01	2.99E+01	140	1.30E-01	2.99E+01	140	1.30E-01	2.99E+01	140
Grouted Tc-99	900	0.00E+00			0.00E+00			0.00E+00		
I-129	1	1.70E-04	3.92E-02	140	1.70E-04	3.92E-02	140	1.70E-04	3.92E-02	140
Grouted I-129	1	0.00E+00			0.00E+00			0.00E+00		
U-233	(a)	0.00E+00			0.00E+00			0.00E+00		
U-234	(a)	1.45E+00	0.00E+00	10,000	1.45E+00	0.00E+00	10,000	1.45E+00	0.00E+00	10,000
U-235	(a)	4.38E-02	0.00E+00	10,000	4.38E-02	0.00E+00	10,000	4.38E-02	0.00E+00	10,000
U-236	(a)	2.95E-02	0.00E+00	10,000	2.95E-02	0.00E+00	10,000	2.95E-02	0.00E+00	10,000
U-238	(a)	1.06E+00	0.00E+00	10,000	1.06E+00	0.00E+00	10,000	1.06E+00	0.00E+00	10,000
1970–1987 LLW										
200 East Area										
C-14	2,000	2.15E+02	5.06E+01	10,000	2.15E+02	5.06E+01	10,000	2.15E+02	5.06E+01	10,000
Tc-99	900									
Grouted Tc-99	900									
I-129	1	1.87E-02	7.24E+00	80	1.87E-02	7.24E+00	80	1.87E-02	7.24E+00	80
Grouted I-129	1									
U-233	(a)									
U-234	(a)	3.08E-02	9.62E-03	9,850	3.08E-02	9.62E-03	9,850	3.08E-02	9.62E-03	9,850
U-235	(a)	2.61E-03	8.15E-04	9,850	2.61E-03	8.15E-04	9,850	2.61E-03	8.15E-04	9,850
U-236	(a)		0.00E+00	9,850		0.00E+00	9,850		0.00E+00	9,850
U-238	(a)	6.28E-02	1.96E-02	9,850	6.28E-02	1.96E-02	9,850	6.28E-02	1.96E-02	9,850
200 West Area										
C-14	2,000	3.92E+02	0.00E+00	10,000	3.92E+02	0.00E+00	10,000	3.92E+02	0.00E+00	10,000
Tc-99	900									
Grouted Tc-99	900									
I-129	1	1.77E-03	4.93E-02	170	1.77E-03	4.93E-02	170	1.77E-03	4.93E-02	170
Grouted I-129	1									
U-233	(a)									
U-234	(a)	3.94E+01	0.00E+00	10,000	3.94E+01	0.00E+00	10,000	3.94E+01	0.00E+00	10,000
U-235	(a)	3.33E+00	0.00E+00	10,000	3.33E+00	0.00E+00	10,000	3.33E+00	0.00E+00	10,000
U-236	(a)		0.00E+00	10,000		0.00E+00	10,000		0.00E+00	10,000
U-238	(a)	2.82E+01	0.00E+00	10,000	2.82E+01	0.00E+00	10,000	2.82E+01	0.00E+00	10,000

Table G.42. (contd)

Constituent	Benchmark MCL (pCi/L)	Hanford Only Volume			Lower Bound Volume			Upper Bound Volume		
		Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)
1988–1995 LLW										
200 East Area										
C-14	2,000	5.11E+00	2.08E-01	10,000	5.11E+00	2.08E-01	10,000	5.11E+00	2.08E-01	10,000
Tc-99	900	1.39E-01	8.64E+01	80	1.39E-01	8.64E+01	80	1.39E-01	8.64E+01	80
Grouted Tc-99	900									
I-129	1	9.45E-05	5.88E-02	80	9.45E-05	5.88E-02	80	9.45E-05	5.88E-02	80
Grouted I-129	1									
U-233	(a)	2.09E-05	6.53E-06	9,850	2.09E-05	6.53E-06	9,850	2.09E-05	6.53E-06	9,850
U-234	(a)	1.85E-03	5.78E-04	9,850	1.85E-03	5.78E-04	9,850	1.85E-03	5.78E-04	9,850
U-235	(a)	4.29E-04	1.34E-04	9,850	4.29E-04	1.34E-04	9,850	4.29E-04	1.34E-04	9,850
U-236	(a)	1.85E-06	5.78E-07	9,850	1.85E-06	5.78E-07	9,850	1.85E-06	5.78E-07	9,850
U-238	(a)	1.93E-02	6.03E-03	9,850	1.93E-02	6.03E-03	9,850	1.93E-02	6.03E-03	9,850
200 West Area										
C-14	2,000	9.29E+00	0.00E+00	10,000	9.29E+00	0.00E+00	10,000	9.29E+00	0.00E+00	10,000
Tc-99	900	4.71E-01	6.75E+01	160	4.71E-01	6.75E+01	160	4.71E-01	6.75E+01	160
Grouted Tc-99	900									
I-129	1	3.06E-02	4.38E+00	160	3.06E-02	4.38E+00	160	3.06E-02	4.38E+00	160
Grouted I-129	1									
U-233	(a)	6.54E-02	0.00E+00	10,000	6.54E-02	0.00E+00	10,000	6.54E-02	0.00E+00	10,000
U-234	(a)	5.77E+00	0.00E+00	10,000	5.77E+00	0.00E+00	10,000	5.77E+00	0.00E+00	10,000
U-235	(a)	1.34E+00	0.00E+00	10,000	1.34E+00	0.00E+00	10,000	1.34E+00	0.00E+00	10,000
U-236	(a)	5.77E-03	0.00E+00	10,000	5.77E-03	0.00E+00	10,000	5.77E-03	0.00E+00	10,000
U-238	(a)	6.03E+01	0.00E+00	10,000	6.03E+01	0.00E+00	10,000	6.03E+01	0.00E+00	10,000
1996–2007 Cat 1 LLW										
200 East Area (218-E-12B)										
C-14	2,000									
Tc-99	900									
Grouted Tc-99	900									
I-129	1									
Grouted I-129	1									
U-233	(a)									
U-234	(a)									
U-235	(a)									
U-236	(a)									
U-238	(a)									
200 West Area (218-W-5)										
C-14	2,000	3.33E+00	0.00E+00	>10,000	4.06E+00	0.00E+00	>10,000	5.21E+00	0.00E+00	>10,000
Tc-99	900	3.00E-01	1.75E+01	1,000	3.66E-01	2.13E+01	1,000	3.99E-01	2.32E+01	1000
Grouted Tc-99	900									
I-129	1	2.62E-03	1.53E-01	1,000	3.20E-03	1.86E-01	1,000	3.20E-03	1.86E-01	1000
Grouted I-129	1									
U-233	(a)	1.03E-01	0.00E+00	>10,000	1.25E-01	0.00E+00	>10,000	1.25E-01	0.00E+00	>10,000
U-234	(a)	1.70E-01	0.00E+00	>10,000	2.07E-01	0.00E+00	>10,000	9.01E-01	0.00E+00	>10,000
U-235	(a)	3.56E-02	0.00E+00	>10,000	4.34E-02	0.00E+00	>10,000	8.86E-02	0.00E+00	>10,000
U-236	(a)	4.03E-03	0.00E+00	>10,000	4.92E-03	0.00E+00	>10,000	4.92E-03	0.00E+00	>10,000
U-238	(a)	4.06E-01	0.00E+00	>10,000	4.95E-01	0.00E+00	>10,000	1.66E+00	0.00E+00	>10,000

Table G.42. (contd)

Constituent	Benchmark MCL (pCi/L)	Hanford Only Volume			Lower Bound Volume			Upper Bound Volume		
		Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)
1996–2007 Cat 3 LLW										
200 East Area (218-E-12B)										
C-14	2,000									
Tc-99	900									
Grouted Tc-99	900									
I-129	1									
Grouted I-129	1									
U-233	(a)									
U-234	(a)									
U-235	(a)									
U-236	(a)									
U-238	(a)									
200 West Area (218-W-5)										
C-14	2,000	1.48E-01	0.00E+00	>10,000	1.54E-01	0.00E+00	>10,000	3.50E-01	0.00E+00	>10,000
Tc-99	900									
Grouted Tc-99	900	7.20E+01	2.46E+01	1,040	7.20E+01	2.46E+01	1,040	7.20E+01	2.46E+01	1040
I-129	1	3.39E-07	1.97E-05	1,000	3.53E-07	2.06E-05	1,000	3.53E-07	2.06E-05	1000
Grouted I-129	1									
U-233	(a)	9.79E-02	0.00E+00	>10,000	1.02E-01	0.00E+00	>10,000	2.32E-01	0.00E+00	>10,000
U-234	(a)	1.24E+02	0.00E+00	>10,000	1.29E+02	0.00E+00	>10,000	2.94E+02	0.00E+00	>10,000
U-235	(a)	3.54E+00	0.00E+00	>10,000	3.69E+00	0.00E+00	>10,000	8.39E+00	0.00E+00	>10,000
U-236	(a)	1.60E+01	0.00E+00	>10,000	1.67E+01	0.00E+00	>10,000	3.80E+01	0.00E+00	>10,000
U-238	(a)	1.99E+02	0.00E+00	>10,000	2.07E+02	0.00E+00	>10,000	4.72E+02	0.00E+00	>10,000
1996–2007 MLLW										
200 East Area (218-E-12B)										
C-14	2,000							2.50E-01	3.45E-02	10,000
Tc-99	900							1.43E+00	2.45E+02	590
Grouted Tc-99	900									
I-129	1							6.03E-03	1.03E+00	590
Grouted I-129	1									
U-233	(a)							8.23E-04	1.92E-04	10,000
U-234	(a)							9.32E-01	2.17E-01	10,000
U-235	(a)							1.49E-02	3.47E-03	10,000
U-236	(a)							1.74E-02	4.05E-03	10,000
U-238	(a)							2.33E-01	5.43E-02	10,000
200 West Area (218-W-5)										
C-14	2,000	6.00E-01	0.00E+00	>10,000	6.01E-01	0.00E+00	>10,000	3.66E-01	0.00E+00	>10,000
Tc-99	900	3.43E+00	1.90E+02	960	3.44E+00	1.90E+02	960	2.09E+00	1.16E+02	960
Grouted Tc-99	900					0.00E+00				
I-129	1	1.45E-02	8.01E-01	960	1.45E-02	8.03E-01	960	8.81E-03	4.88E-01	960
Grouted I-129	1					0.00E+00				
U-233	(a)	1.96E-03	0.00E+00	>10,000	1.96E-03	0.00E+00	>10,000	1.18E-03	0.00E+00	>10,000
U-234	(a)	2.24E+00	0.00E+00	>10,000	2.24E+00	0.00E+00	>10,000	1.37E+00	0.00E+00	>10,000
U-235	(a)	3.58E-02	0.00E+00	>10,000	3.59E-02	0.00E+00	>10,000	2.18E-02	0.00E+00	>10,000
U-236	(a)	4.19E-02	0.00E+00	>10,000	4.20E-02	0.00E+00	>10,000	2.55E-02	0.00E+00	>10,000
U-238	(a)	5.60E-01	0.00E+00	>10,000	5.61E-01	0.00E+00	>10,000	3.41E-01	0.00E+00	>10,000

Table G.42. (contd)

Constituent	Benchmark MCL (pCi/L)	Hanford Only Volume			Lower Bound Volume			Upper Bound Volume		
		Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)
Grouted 1996–2007 MLLW										
200 East Area (218-E-12B)										
C-14	2,000							1.35E+00	1.87E-01	10,000
Tc-99	900									
Grouted Tc-99	900							1.23E+02	2.96E+01	600
I-129	1									
Grouted I-129	1							1.07E-02	8.14E-04	600
U-233	(a)							1.40E-03	5.56E-09	10,000
U-234	(a)							2.24E+02	8.90E-04	10,000
U-235	(a)							9.95E+00	3.95E-05	10,000
U-236	(a)							3.12E-02	1.24E-07	10,000
U-238	(a)							2.33E+02	9.26E-04	10,000
200 West Area (218-W-5)										
C-14	2,000	8.58E-01	0.00E+00	>10,000	8.60E-01	0.00E+00	>10,000	7.64E-01	0.00E+00	>10,000
Tc-99	900		0.00E+00			0.00E+00			0.00E+00	
Grouted Tc-99	900	4.91E+00	1.55E+00	990	4.92E+00	1.55E+00	990	5.96E+01	1.88E+01	990
I-129	1					0.00E+00			0.00E+00	
Grouted I-129	1	2.06E-02	2.05E-03	990	2.06E-02	2.05E-03	990	8.03E-03	8.01E-04	990
U-233	(a)	2.67E-03	0.00E+00	>10,000	2.68E-03	0.00E+00	>10,000	1.04E-03	0.00E+00	>10,000
U-234	(a)	3.19E+00	0.00E+00	>10,000	3.20E+00	0.00E+00	>10,000	1.07E+02	0.00E+00	>10,000
U-235	(a)	5.08E-02	0.00E+00	>10,000	5.09E-02	0.00E+00	>10,000	4.76E+00	0.00E+00	>10,000
U-236	(a)	5.97E-02	0.00E+00	>10,000	5.98E-02	0.00E+00	>10,000	2.33E-02	0.00E+00	>10,000
U-238	(a)	7.93E-01	0.00E+00	>10,000	7.95E-01	0.00E+00	>10,000	1.11E+02	0.00E+00	>10,000

(a) The benchmark MCL for uranium is 30 μg/L expressed as total uranium. To convert isotope specific concentrations from pCi/L to μg/L, use following conversion factors:

- Uranium-233 - 1.05E-04
- Uranium-234 - 1.62E-04
- Uranium-235 - 4.66E-01
- Uranium-236 - 1.58E-02
- Uranium-238 - 3.00E+00.

Table G.44. Predicted Peak Concentrations of Key Constituents by from Wastes Disposed of After 2007 at Aggregate LLW Management Area Boundaries, Alternative Group D_2

Constituent	Benchmark MCL (pCi/L)	Hanford Only Volume			Lower Bound Volume			Upper Bound Volume		
		Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)
Projected Cat 1 LLW After 2007										
200 East Area (218-E-12B)										
C-14	2,000	1.28E+01	1.03E-01	10,000	1.56E+01	1.25E-01	10,000	1.59E+01	1.28E-01	10,000
Tc-99	900	1.08E+00	2.92E+01	1,300	1.32E+00	3.56E+01	1,300	1.33E+00	3.59E+01	1,300
Grouted Tc-99	900									
I-129	1	3.01E-03	8.12E-02	1,300	3.67E-03	9.90E-02	1,300	3.67E-03	9.90E-02	1,300
Grouted I-129	1									
U-233	(a)	3.71E-01	1.79E-02	10,000	4.52E-01	2.12E-02	10,000	4.52E-01	2.87E-02	10,000
U-234	(a)	6.13E-01	2.95E-02	10,000	7.47E-01	3.50E-02	10,000	9.21E-01	5.86E-02	10,000
U-235	(a)	1.29E-01	6.21E-03	10,000	1.57E-01	7.35E-03	10,000	1.68E-01	1.07E-02	10,000
U-236	(a)	1.46E-02	7.04E-04	10,000	1.78E-02	8.34E-04	10,000	1.78E-02	1.13E-03	10,000
U-238	(a)	1.47E+00	7.08E-02	10,000	1.79E+00	8.38E-02	10,000	2.08E+00	1.32E-01	10,000
Projected Cat 3 LLW After 2007										
200 East Area (218-E-12B)										
C-14	2,000	4.44E-01	3.55E-03	10,000	4.62E-01	3.70E-03	10,000	1.45E+02	1.16E+00	10,000
Tc-99	900									
Grouted Tc-99	900	3.23E+03	7.77E+02	600	3.23E+03	7.77E+02	600	3.23E+03	7.77E+02	600
I-129	1	1.96E-06	5.28E-05	1,300	2.04E-06	5.50E-05	1,300	2.04E-06	5.50E-05	1,300
Grouted I-129	1	5.00E+00	3.80E-01	600	5.00E+00	3.80E-01	600	5.00E+00	3.80E-01	600
U-233	(a)	2.98E-01	1.47E-07	10,000	3.10E-01	1.70E-07	10,000	1.80E-01	2.54E-07	10,000
U-234	(a)	3.73E+02	1.84E-04	10,000	3.89E+02	2.14E-04	10,000	3.11E+02	4.39E-04	10,000
U-235	(a)	1.07E+01	5.25E-06	10,000	1.11E+01	6.10E-06	10,000	1.20E+01	1.70E-05	10,000
U-236	(a)	4.82E+01	2.38E-05	10,000	5.02E+01	2.76E-05	10,000	2.89E+01	4.08E-05	10,000
U-238	(a)	5.99E+02	2.95E-04	10,000	6.24E+02	3.43E-04	10,000	5.04E+02	7.12E-04	10,000
Projected MLLW After 2007										
200 East Area (218-E-12B)										
C-14	2,000	1.46E+00	1.17E-02	10,000	1.46E+00	1.17E-02	10,000	1.45E+00	1.16E-02	10,000
Tc-99	900	8.34E+00	2.25E+02	1,300	8.36E+00	2.26E+02	1,300	8.27E+00	2.23E+02	1,300
Grouted Tc-99	900									
I-129	1	3.50E-02	9.45E-01	1,300	3.51E-02	9.47E-01	1,300	3.48E-02	9.39E-01	1,300
Grouted I-129	1									
U-233	(a)	4.67E-03	1.17E-04	10,000	4.68E-03	1.17E-04	10,000	4.64E-03	2.56E-04	10,000
U-234	(a)	5.44E+00	1.36E-01	10,000	5.45E+00	1.37E-01	10,000	5.40E+00	2.98E-01	10,000
U-235	(a)	8.67E-02	2.18E-03	10,000	8.69E-02	2.18E-03	10,000	8.61E-02	4.75E-03	10,000
U-236	(a)	1.02E-01	2.55E-03	10,000	1.02E-01	2.56E-03	10,000	1.01E-01	5.57E-03	10,000
U-238	(a)	1.36E+00	3.41E-02	10,000	1.36E+00	3.41E-02	10,000	1.35E+00	7.45E-02	10,000
Projected Grouted 1996-2007 MLLW										
200 East Area (218-E-12B)										
C-14	2,000	2.86E+00	2.30E-02	10,000	2.87E+00	2.30E-02	10,000	4.25E+00	3.41E-02	10,000
Tc-99	900									
Grouted Tc-99	900	1.57E+02	3.77E+01	600	1.57E+02	3.78E+01	600	3.34E+02	8.04E+01	600
I-129	1									

Table G.44 (contd)

Constituent	Benchmark MCL (pCi/L)	Hanford Only Volume			Lower Bound Volume			Upper Bound Volume		
		Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)	Inventory (Ci)	Maximum Concentration Within 10,000 yrs (pCi/L)	Approx. Peak Arrival Time (yrs)
Grouted I-129	1	6.87E-02	5.22E-03	600	6.88E-02	5.24E-03	600	7.06E-02	5.37E-03	600
U-233	(a)	8.91E-03	4.12E-07	10,000	8.93E-03	4.13E-07	10,000	9.20E-03	1.11E-07	10,000
U-234	(a)	1.07E+01	4.94E-04	10,000	1.07E+01	4.95E-04	10,000	3.35E+02	4.05E-03	10,000
U-235	(a)	1.70E-01	7.85E-06	10,000	1.70E-01	7.86E-06	10,000	1.47E+01	1.78E-04	10,000
U-236	(a)	2.00E-01	9.24E-06	10,000	2.00E-01	9.25E-06	10,000	2.05E-01	2.48E-06	10,000
U-238	(a)	2.64E+00	1.22E-04	10,000	2.65E+00	1.23E-04	10,000	3.42E+02	4.13E-03	10,000
Projected Melter Waste										
200 East Area (218-E-12B)										
C-14	2,000									
Tc-99	900									
Grouted Tc-99	900	3.89E+01	1.23E+01	600	3.89E+01	1.23E+01	600	3.89E+01	1.23E+01	600
I-129	1									
Grouted I-129	1									
U-233	(a)	8.49E-01	1.32E-05	10,000	8.49E-01	1.32E-05	10,000	8.49E-01	1.32E-05	10,000
U-234	(a)	4.60E-01	7.16E-06	10,000	4.60E-01	7.16E-06	10,000	4.60E-01	7.16E-06	10,000
U-235	(a)	1.90E-02	2.96E-07	10,000	1.90E-02	2.96E-07	10,000	1.90E-02	2.96E-07	10,000
U-236	(a)	1.70E-02	2.65E-07	10,000	1.70E-02	2.65E-07	10,000	1.70E-02	2.65E-07	10,000
U-238	(a)	4.10E-01	6.38E-06	10,000	4.10E-01	6.38E-06	10,000	4.10E-01	6.38E-06	10,000

(a) The benchmark MCL for uranium is 30 μg/L expressed as total uranium. To convert isotope specific concentrations from pCi/L to μg/L, use following conversion factors:

- Uranium-233 - 1.05E-04
- Uranium-234 - 1.62E-04
- Uranium-235 - 4.66E-01
- Uranium-236 - 1.58E-02
- Uranium-238 - 3.00E+00.

Table G.47. Sums of MCL Fractions and Drinking Water Doses from Maximum Potential Concentrations for Technetium-99 and Iodine-129 for Waste Buried After 2007 at Facility Boundaries

Primary Contributing Waste Category	Ratios of Maximum Potential Concentrations to Benchmark MCL			Estimated Dose (mrem/yr)
	Technetium-99	Iodine-129	Sum-of-Fractions	
Near the PUREX Plant (Alternative Group D_1)				
Cat 3 LLW				
Hanford Only	0.21	0.09	0.3	0.22
Upper Bound	0.21	0.09	0.3	0.22
MLLW				
Hanford Only	0.06	0.22	0.28	0.01
Upper Bound	0.06	0.22	0.28	0.01
Overall Totals				
Hanford Only	0.27	0.31	0.58	0.23
Upper Bound	0.27	0.31	0.58	0.23
218-E-12B LLBG (Alternative Group D_2)				
Cat 3 LLW				
Hanford Only	0.81	0.36	0.21	0.91
Upper Bound	0.81	0.36	0.21	0.91
MLLW				
Hanford Only	0.25	0.95	0.28	0.43
Upper Bound	0.25	0.95	0.28	0.43
Overall Totals				
Hanford Only	1.06	1.31	2.37	1.34
Upper Bound	1.06	1.31	2.37	1.34
At ERDF (Alternative Group D_3)				
Cat 3 LLW				
Hanford Only	0.86	0.38	1.24	0.68
Upper Bound	0.86	0.38	1.24	0.68
MLLW				
Hanford Only	0.25	0.93	1.18	1.1
Upper Bound	0.25	0.93	1.18	1.1
Overall Totals				
Hanford Only	1.11	1.21	2.32	1.8
Upper Bound	1.11	1.21	2.32	1.8

Table G.49. Constituents Categorized by Mobility (K_d) Classes

Mobility Class 1 (K_d = 0.0 mL/g)		
Constituent	**K_d Estimate**	**Reference**
Chromium	0.0	Strenge and Peterson (1989)
Fluoride	0.0	Strenge and Peterson (1989)
Nitrate	0.0	Strenge and Peterson (1989)
1,1,1-tetrachloroethane	0.09–0.13	Derived for K_{oc} using methods in Strenge and Peterson (1989). K_{oc} Properties from Mabey et al. 1982
Xylene	0.18–0.21	Derived for US EPA GEMS, VP-1,2, K_d methods
Toluene	0.14–0.26	Derived for K_{oc} using methods in Strenge and Peterson (1989). Properties from Mabey et al. 1982
Methylene chloride	0.005–0.007	Derived for K_{oc} using methods in Strenge and Peterson (1989). Properties from Mabey et al. 1982
Mobility Class 2 (K_d = 0.6mL/g)		
There are no constituents in this mobility class.		
Mobility Class 3 (K_d = 1.0 mL/g)		
Diesel fuel	2.7–3.95	Derived for K_{oc} using methods in Strenge and Peterson (1989). Physical properties are set to those for 2-methyl napththalene[(a)] – U.S. EPA GEMS, VP-1,2, K_d methods
Hydraulic fluid	8.4–12.4	Derived for K_{oc} using methods in Strenge and Peterson (1989). Physical properties are set to those of anthracene (Radding et al. 1976).
Oil	8.4–12.4	Derived for K_{oc} using methods in Strenge and Peterson (1989). Physical properties are set to those of anthracene (Radding et al. 1976).
Mobility Class 4 (K_d = 10.0 mL/g)		
There are no constituents in this mobility class.		
Mobility Class 5 (K_d = 40.0 mL/g)		
Lead	234	Strenge and Peterson (1989)
Mercury	322	Strenge and Peterson (1989)
PCB	369–539	Derived for K_{oc} using methods in Strenge and Peterson (1989)

(a) unknown.
PCB = polychlorinated biphenyl.

Table G.50. Degradation Rates of Selected Organic Chemicals Hypothetically Associated with Waste Disposed of Before 1988

Chemical	Biotic ($t_{1/2}$) Days (Soil)	Abiotic ($_{1/2}$) Days
1,1,1-trichloroethane	140 to 273[(a)] No observed degradation in 189 days[(b)]	180 (hydrolysis)[(b)]
Dichloromethane (methylene chloride)	7 to 28[(a)]	Not important because of volatility[(b)]
Xylene	7 to 28[(a)] 70% degradation at 10 days (aerobic), > 180 days (anaerobic)	Resistant to hydrolysis[(b)]
Toluene	4 to 22[(a)] < 2 to < 10 (aerobic)[(c)]	No significant hydrolysis under normal environmental conditions[(b)]
PCBs	>50 (Arochlor 1016)[(c)] >50 (Arochlor 1254)[(c)]	Arochlor 1016 and 1254 hydrolysis (not environmentally significant)[(c)]
Total petroleum hydrocarbons (TPH)[(d)]	5 to 16 (benzene)[(a)] benzo[(a)] pyrene (57 to 530)[(a)]	Not a significant process (benzene)[(b)] No hydrolyzable groups (benzo(a)pyrene[(a)]

(a) Howard et al. (1991).
(b) Howard (1990).
(c) Mackay et al. (1992).
(d) TPH is a bulk measurement made on the quantity of petroleum present in an environmental sample. Petroleum consists of thousands of individual aliphatic and aromatic compounds. Therefore, assessing its degradation rate in soil is not possible. The values listed in the table is an effort to bound the degradation rate of petroleum using two known constituents of petroleum (that is, benzene and benzo [a] pyrene) that are at opposite ends of the spectrum with respect to physical-chemical properties.

Table G.51. Degradation Rates Due to Volatilization of Selected Organic Chemicals Hypothetically Associated with Waste Disposed of Before 1988 Using Methods by Strenge and Peterson (1989)[(a)]

Chemical	Degradation Due to Volatization Expressed as a Half-Life ($t_{1/2}$), in Days (Soil)
1,1,1-trichloroethane	233
Methylene chloride	842
Xylene	220
Toluene	267
PCBs	43800
Diesel fuel	24600
Hydraulic fluid	8700

(a) The escape of volatile chemicals from farmland soil following deposition from irrigation water is accounted for using a volatilization half time. The MEPAS volatilization source model has been used to estimate the initial rate of release of volatile chemicals from a uniformly contaminated layer of soil 15 cm thick (plow depth). The initial release rate (expressed as g/day) divided by the total amount in the soil (g) provides an effective removal rate constant (per day). This rate constant is then converted to an effective volatilization removal half time, which is entered into the database as the soil removal half time for the chemical of interest (from Strenge and Peterson [1989], p. 2.28).

Table G.50. Degradation Rates of Selected Organic Chemicals Hypothetically Associated with Waste Disposed of Before 1988

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