

**This document was too large to scan
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Section 4 of 4

Document Information			
Document #	DOE/RL-2004-85	REV	DFTA
Title	FEASIBILITY STUDY FOR THE 200-PW-2 URANIUM RICH PROCESS WASTE GROUP & 200-PW-4 GENERAL PROCESS CONDENSATE WASTE GROUP OU [DRAFT A]		
Date	05/08/2006		
Originator		ORG CO	DOE-RL
Recipient		Recipient Co.	
References			
Keywords			
Projects			
Other Information			

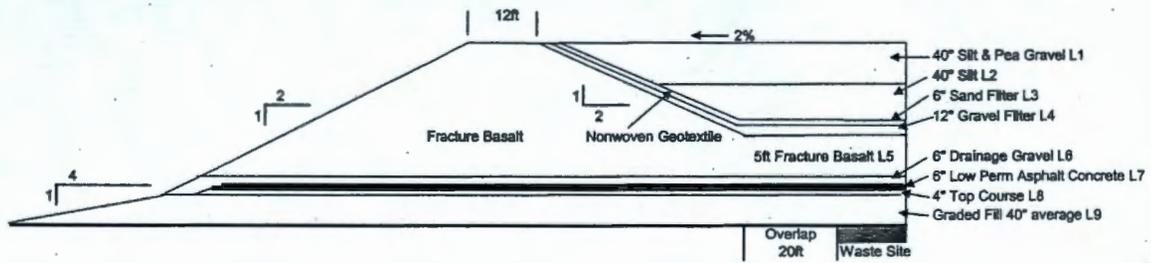
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- Richardson's *Process Plant Construction Estimating Standards*, Richardson Engineering Services, Inc., Mesa, Arizona.
- Site Stabilization Agreement for All Construction Work for the U.S. Department of Energy at the Hanford Site*, 1984, as amended, commonly known as the Hanford Site Stabilization Agreement (original title, *Site Stabilization Agreement, Hanford Site, between J. A. Jones Construction Services Company and Morrison-Knudsen Company, Inc., and the Building and Construction Trades Department of the AFL-CIO and its affiliated international unions, and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen, and Helpers of America*).

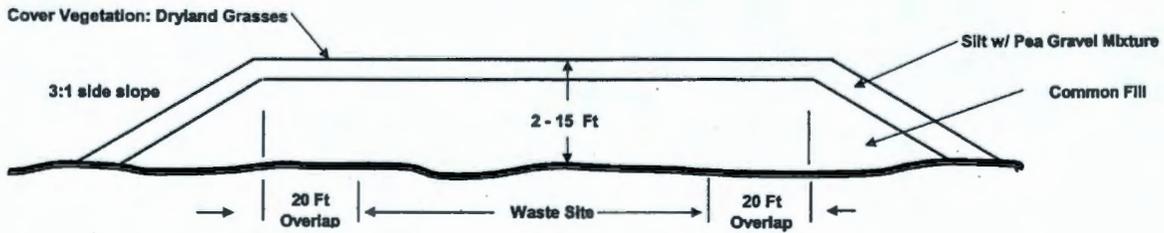
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Figure F-1. Barriers.

Hanford Barrier.



Biological Barrier.



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DOE/RL-2004-85 DRAFT A
Table F-1. Alternatives 2 and 3 Site Information.

Waste Site	Site Description	Alternative 2						Alternative 3								
		Site Dimensions (ft)						Excavation Dimensions (ft)			Contam. Soil Volume (yd ³)	Contam. Debris (yd ³)	Excav. Vol. (yd ³)	Overburden Soil Volume (yd ³)	Backfill (yd ³)	Duration (days)
		Length (Bottom)	Width (Bottom)	Depth (bgs)	Clean Overburden Depth	Side Slope	Area (Ac)	Length (Top)	Width (Top)	Depth						
216-A-19 Trench	Trench	25.0	25.0	15.0	0.0	2.0	0.01	169.0	169.0	36.0	12545	0	12545	0	0	61
216-A-1 Crib	Crib	30.0	30.0	15.0	9.0	2.0	0.02	170.0	170.0	35	6475	0	12963	6488	0	55
216-A-3 Crib	Crib	20.0	20.0	16.0	8.0	2.0	0.01	164.0	164.0	36	5990	0	11285	5295	0	63
216-A-18 Trench	Trench	80.0	80.0	16.0	3.0	2.0	0.15	224.0	224.0	36	26053	0	30805	4752	0	161
216-A-20 Trench	Trench	25.0	25.0	15.0	0.0	1.5	0.01	130.0	130.0	35	7786	0	7786	0	0	46
216-A-20 Trench Overflow	Overflow	100.0	200.0	3.0	0.0	1.5	0.01	130.0	230.0	10	9157	0	9157	0	0	51
216-A-22 French Drain & UPR-200-E-17	French Drain & UPR	6.0	6.0	16.0	0.0	1.5	0.01	114.0	114.0	36	4800	0	4800	0	0	38
216-A-28 French Drain	French Drain	10.0	10.0	11.0	2.0	1.5	0.01	103.0	103.0	31	3074	0	3665	591	0	34
216-S-8 Trench	Trench	100.0	60.0	25.0	0.0	1.5	0.14	235.0	195.0	45	35594	0	35594	0	0	130
216-A-34 Ditch	Ditch	410.0	70.0	6.0	0.0	2.0	0.66	514.0	174.0	26	54265	11.0	54276	0	0	187
UPR-200-E-145	Unplanned Release	40.0	6.0	3.0	3.0	1.5	0.01	58.0	24.0	6	52	0	163	111	0	24
216-B-12 Crib	Crib	160.0	50.0	28.0	14.0	1.5	0.18	894.5	784.5	191.5	52593	0	4507268	4454675	0	481
216-B-60 Crib	Crib	18.0	25.0	40.0	23.0	1.5	0.00	237.0	244.0	73.0	17204	18.0	46365	29143	0	131
216-C-3 Crib	Crib	50.0	10.0	10.0	7.0	1.5	0.01	179.0	139.0	43.0	8875	0	13585	4711	0	59
216-C-5 Crib	Crib	20.0	10.0	16.0	10.0	1.5	0.01	167.0	157.0	49.0	7767	0	14169	6402	0	59
216-C-7 Crib	Crib	20.0	20.0	12.0	7.0	1.5	0.01	155.0	155.0	45.0	8345	0	12760	4416	0	56
216-C-10 Crib	Crib	32.0	5.0	7.0	3.0	1.5	0.01	155.0	128.0	41.0	7766	0	9442	1676	0	50
209-E-WS-3	Hold Up Tank	11.0	5.0	8.0	0.0	1.5	0.01	38.0	32.0	9.0	144	7.0	151	0	0	24
270-E-1	Neutralization Tank	9.0	9.0	20.0	12.0	1.5	0.01	73.5	73.5	21.5	577	22	1355	756	0	27
UPR-200-E-64	Unplanned Release	295.0	295.0	3.0	0.0	1.5	2.00	298.0	298.0	1.0	3256	0	3256	0	0	32
216-S-7 Crib	Crib	50.0	100.0	22.0	15.0	1.5	0.11	906.5	956.5	225.5	38981	0	5813898	5774916	0	613
216-S-1 & 2 Crib & UPR-200-W-36	Crib & UPR	90.0	40.0	35.0	22.0	1.5	0.08	1001.0	951.0	237.0	28667	0	6301045	6272378	0	662
UPR-200-W-36	N/A															
216-S-4 French Drain	French Drain	7.0	5.0	20.0	0.0	1.5	0.01	127.0	125.0	40.0	6452	0	6452	0	0	42
216-S-22 Crib	Crib	100.0	3.5	10.0	6.0	1.5	0.01	190.0	93.5	30.0	4775	0	7814	3039	0	43
216-S-23 Crib	Crib	360.0	10.0	28.0	25.0	1.5	0.08	504.0	154.0	48.0	14951	3	62976	48022	0	161
216-T-20 Trench	Trench	10.0	10.0	4.0	3.0	1.5	0.01	82.0	82.0	24.0	1336	4.0	1881	541	0	28
216-A-10 Crib	Crib	275.0	45.0	45.0	30.0	1.5	0.28	462.5	232.5	62.5	36534	0	118435	81901	0	291
216-A-5 Crib	Crib	35.0	35.0	29.0	22.0	2.0	0.03	219.0	219.0	46.0	6124	0	27479	21355	0	83
216-A-45 Crib	Crib	310.0	60.0	44.5	37.0	1.5	0.43	497.5	247.5	62.5	58628	0	143696	85068	0	364
216-C-1 Crib	Crib	27.0	12.0	13.0	5.0	2.0	0.01	147.0	132.0	30.0	4408	12.0	6960	2514	0	41
200-E-58	Neutralization Tank	11.0	11.0	16.0	6.0	1.5	0.01	63.5	63.5	17.5	547	44	899	308	0	26
216-A-36B Crib	Crib w/oTRU	500.0	11.0	25.0	22.0	1.5	0.13	1669.0	1180.0	303.0	57241	176	8062783	8005543	0	1316
216-A-36B Crib	Crib w/ TRU	500.0	11.0	25.0	22.0	1.5	0.13	1669.0	1180.0	303.0	57241	176	8062783	8005543	0	1316
216-A-36A Crib	Crib w/oTRU	100.0	7.5	22.0	19.0	1.5	0.02	1269.0	1176.5	300.0	7889	0	10111916	1010427	0	1026
216-A-36A Crib	Crib w/ TRU	100.0	7.5	22.0	19.0	1.5	0.02	1269.0	1176.5	300.0	7889	0	10111916	1010427	0	1026
UPR-200-E-39	Unplanned Release	26.0	26.0	3.0	0.0	1.5	0.02	35.0	35.0	3.0	103	0	103	0	0	24
207-A-South Retention Basin	Retention Basin	133.0	95.0	7.5	0.0	1.5	0.29	157.0	119.0	8.0	0	1971.0	1971	0	1971	26
200-W-22															0	
UPR-200-W-22	Unplanned Release	276.0	223.0	3.0	2.0	1.5	1.41	285.0	232.0	3.0	2363	0	7090	4727	0	39
203-S Basin	Sub-grade Basin	30.0	17.0	9.5	0.8	1.5	0.01	58.5	45.5	9.5	448	41	487	38	0	
204-S Basin	Sub-grade Basin	73.0	67.0	7.0	2.0	1.5	0.01	94.0	88.0	7.0	1198	275	1678	479	0	
205-S Building Foundation	Sub-grade Foundation	24.0	18.0	4.0	2.0	1.5	0.01	36.0	30.0	4.0	53	24	107	53	0	
205-S Vault	Sub-grade Vault	20.0	20.0	23.0	2.0	1.5	0.01	89.0	89.0	23.0	2310	170	2530	220	0	
	Demolition Subtotal										4010	510	4801	791	0	52
216-A-37-1 Crib	Crib	700.0	10.0	11.0	6.0	1.5	0.16	775.0	85.0	25.0	24652	0	32436	7785	0	113

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Table F-2. Alternatives 4 and 5 Site Information.

Waste Site	Site Description	Site Dimensions (ft)					Alternative 4					Alternative 5										
		Length (Bottom)	Width (Bottom)	Depth (bgs)	Clean Overburden Depth	Side Slope	Capping Dimensions (ft)		Acres of Capping	Duration	Cap Type	Excavation Dimensions (ft)			Overburden	Contam. Volume (yd ³)	Contam. Debris (yd ³)	Excav. Vol. (yd ³)	Overburden Soil Volume (yd ³)	Backfill (yd ³)	Cap Type	Duration
							Length	Width				Length (Top)	Width (Top)	Depth								
216-A-19 Trench	Trench	25.0	25.0	15.0	0.0	2.0	110.6	110.6	0.28	30	Evapotranspiration	105.0	105.0	20.0	0	3130	0	3130	0	0	Evapotranspiration	37
216-A-1 Crib	Crib	30.0	30.0	15.0	9.0	2.0	115.6	115.6	0.31	30	Evapotranspiration	110.0	110.0	20.0	9	1996	0	3630	1633	0	Evapotranspiration	37
216-A-3 Crib	Crib	20.0	20.0	16.0	8.0	2.0	105.6	105.6	0.26	30	Evapotranspiration	104.0	104.0	21.0	8	1851	0	2990	1139	0	Evapotranspiration	36
216-A-18 Trench	Trench	80.0	80.0	16.0	3.0	2.0	165.6	165.6	0.63	33	N/A	164.0	164.0	21.0	3	9923	0	11576	1654	0	Evapotranspiration	64
216-A-20 Trench	Trench	25.0	25.0	15.0	0.0	1.5					N/A	85.0	85.0	20.0	0	2241	0	2241	0	0	Evapotranspiration	43
Overflow	Overflow	100.0	200.0	3.0	0.0	1.0	185.6	285.6	1.22	40	Evapotranspiration										N/A	
216-A-22 French Drain & UPR-200-E-17	French Drain & UPR	6.0	6.0	16.0	0.0	1.5	91.6	91.6	0.19	29	Evapotranspiration	69.0	69.0	21.0	0	1094	0	1094	0	0	Evapotranspiration	22
216-A-28 French Drain	French Drain	10.0	10.0	11.0	2.0	1.5	95.6	95.6	0.21	29	Evapotranspiration	58.0	58.0	16.0	2	599	0	685	86	0	Evapotranspiration	28
216-S-8 Trench	Trench	100.0	60.0	25.0	0.0	1.5	185.6	145.6	0.62	33	Evapotranspiration	190.0	150.0	30.0	0	16917	0	16917	0	0	Evapotranspiration	83
216-A-34 Ditch	Ditch	410.0	70.0	6.0	0.0	2.0	495.6	155.6	1.77	45	Evapotranspiration	454.0	114.0	11.0	0	16181	11.0	16192	0	0	Evapotranspiration	92
UPR-200-E-145	Unplanned Release	40.0	6.0	3.0	3.0	1.5	125.6	91.6	0.26	30	Evapotranspiration										N/A	
216-B-12 Crib	Crib	160.0	50.0	28.0	14.0	1.5	245.6	135.6	0.76	35	Evapotranspiration	349.0	239.0	63.0	14	66740	0	85809	19069	0	Evapotranspiration	270
216-B-60 Crib	Crib	18.0	25.0	40.0	0.0	1.5	103.6	110.6	0.26	30	Evapotranspiration	168.0	175.0	50.0	0	17204	18	17222	0	0	Evapotranspiration	80
216-C-3 Crib	Crib	50.0	10.0	10.0	7.0	1.5	135.6	95.6	0.30	30	Evapotranspiration	110.0	70.0	20.0	7	1541	0	2370	830	0	Evapotranspiration	34
216-C-5 Crib	Crib	20.0	10.0	16.0	10.0	1.5	105.6	95.6	0.23	29	Evapotranspiration	98.0	88.0	26.0	10	1713	0	2784	1071	0	Evapotranspiration	34
216-C-7 Crib	Crib	20.0	20.0	12.0	7.0	1.5	105.6	105.6	0.26	30	Evapotranspiration	86.0	86.0	22.0	7	1561	0	2289	728	0	Evapotranspiration	34
216-C-10 Crib	Crib	32.0	5.0	7.0	3.0	1.5	117.6	90.6	0.24	29	Evapotranspiration	83.0	56.0	17.0	3	909	0	1104	195	0	Evapotranspiration	31
209-E-WS-3	Hold Up Tank	11.0	5.0	8.0	0.0	1.5					N/A										N/A	
270-E-1	Neutralization Tank	9.0	9.0	20.0	12.0	1.5	94.6	94.6	0.21	31	Evapotranspiration										N/A	
UPR-200-E-64	Unplanned Release	295.0	295.0	3.0	0.0	1.5	345.0	345.0	2.73	38	Bio Barrier										N/A	
216-S-7 Crib	Crib	50.0	100.0	22.0	15.0	1.5	135.6	185.6	0.58	33	Evapotranspiration	131.0	181.0	27.0	15	5651	0	12715	7064	0	Evapotranspiration	61
216-S-1 & 2 Crib & UPR-200-W-36	Crib & UPR	90.0	40.0	35.0	22.0	1.5	175.6	125.6	0.51	32	Evapotranspiration	195.0	145.0	35.0	15	9764	0	17087	7323	0	Evapotranspiration	69
UPR-200-W-36	Unplanned Release										N/A										N/A	
216-S-4 French Drain	French Drain	7.0	5.0	20.0	0.0	1.5	92.6	90.6	0.19	29	Evapotranspiration	82.0	80.0	25.0	0	1751	0	1751	0	0	Evapotranspiration	31
216-S-22 Crib	Crib	100.0	3.5	10.0	6.0	1.5	185.6	89.1	0.38	31	Evapotranspiration	145.0	48.5	15.0	6	1062	0	1769	708	0	Evapotranspiration	33
216-S-23 Crib	Crib	360.0	10.0	28.0	25.0	1.5	445.6	95.6	0.98	37	Evapotranspiration	459.0	109.0	33.0	15	16244	0	29780	13536	0	Evapotranspiration	100
T-20 Trench	Trench	10.0	10.0	4.0	3.0	1.5	95.6	95.6	0.21	29	Evapotranspiration	37.0	37.0	9.0	3	119	4	184	61	0	Evapotranspiration	27
A-10 Crib	Crib	275.0	45.0	45.0	30.0	1.5	360.6	130.6	1.08	38	Evapotranspiration	425.0	195.0	50.0	15	54444	0	77778	23333	0	Evapotranspiration	218
A-5 Crib	Crib	35.0	35.0	29.0	22.0	2.0	120.6	120.6	0.33	30	Evapotranspiration	171.0	171.0	34.0	15	7454	12	13359	5894	0	Evapotranspiration	60
216-A-45 Crib	Crib	310.0	60.0	44.5	37.0	1.5	395.6	145.6	1.32	41	Evapotranspiration	460.0	210.0	50.0	15	67375	0	96250	28875	0	Evapotranspiration	251
216-C-1 Crib	Crib	27.0	12.0	13.0	5.0	2.0	112.6	97.6	0.25	30	Evapotranspiration	99.0	84.0	18.0	5	1412	44	2016	560	0	Evapotranspiration	33
200-E-58	Neutralization Tank	11.0	11.0	16.0	6.0	1.5	96.6	96.6	0.21	31	Evapotranspiration										N/A	
216-A-36B Crib	Crib w/oTRU	500.0	11.0	25.0	22.0	1.5	681.4	192.4	3.01	96	Hanford Barrier										N/A	
216-A-36B Crib	Crib w/ TRU	500.0	11.0	25.0	22.0	1.5					N/A	590.0	101.0	30.0	22	9043	176	33911	24868	0	Evapotranspiration	151
216-A-36A Crib	Crib w/oTRU	100.0	7.5	22.0	19.0	1.5	281.4	188.9	1.22	81	Hanford Barrier										N/A	
216-A-36A Crib	Crib w/ TRU	100.0	7.5	22.0	19.0	1.5					N/A	190.0	97.5	30.0	19	3101	0	8458	5357	0	Evapotranspiration	58
UPR-200-E-39	Unplanned Release	26.0	26.0	3.0	0.0	1.5	111.6	111.6	0.29	36	Evapotranspiration										N/A	
207-A-South Retention Basin	Retention Basin	133.0	95.0	7.5	0.0	1.5	218.6	180.6	0.91	37	Evapotranspiration										N/A	
200-W-22																					N/A	
UPR-200-W-22	Unplanned Release	276.0	223.0	3.0	2.0	1.5	361.6	308.6	2.56	69	Evapotranspiration										N/A	
203-S Basin	Sub-grade Basin	30.0	17.0	9.5	0.8	1.0	115.6	102.6	0.27		See UPR-200-W-22										N/A	
204-S Basin	Sub-grade Basin	73.0	67.0	7.0	2.0	1.0	158.6	152.6	0.56		See UPR-200-W-22										N/A	
205-S Building Foundation	Sub-grade Foundation	24.0	18.0	4.0	2.0	1.0	109.6	103.6	0.26		See UPR-200-W-22										N/A	
205-S Vault	Sub-grade Vault	20.0	20.0	23.0	2.0	1.5	105.6	105.6	0.26		See UPR-200-W-22										N/A	
Demolition Subtotal																					N/A	
216-A-37-1 Crib	Crib	700.0	10.0	11.0	6.0	1.5	785.6	95.6	1.72	52	Evapotranspiration	748.0	58.0	16.0	6	9117	0.0	14587	5470	0	Evapotranspiration	79

Table F-3. Alternative 2 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
216-A-19 Trench	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,995,832	\$4,031,232	\$868,340
216-A-1 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,995,832	\$4,031,232	\$868,340
216-A-3 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-A-18 Trench	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,995,832	\$4,031,232	\$868,340
216-A-20 Trench ¹	N/A	N/A	N/A	N/A	N/A
216-A-20 Trench Overflow	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,995,832	\$4,031,232	\$868,340
216-A-22 French Drain & UPR-200-E-17	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-A-28 French Drain	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-S-8 Trench	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,004,001	\$4,039,401	\$869,787
216-A-34 Ditch	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,995,832	\$4,031,232	\$868,340
UPR-200-E-145	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,995,832	\$4,031,232	\$868,340
216-B-12 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,994,975	\$4,030,375	\$868,188
216-B-60 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,994,975	\$4,030,375	\$868,188
216-C-3 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,042,114	\$4,077,514	\$876,538
216-C-5 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,042,114	\$4,077,514	\$876,538
216-C-7 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,042,114	\$4,077,514	\$876,538
216-C-10 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,042,114	\$4,077,514	\$876,538

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 Table F-3. Alternative 2 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
209-E-WS-3	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,042,114	\$4,077,514	\$876,538
270-E-1	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,994,975	\$4,030,375	\$868,188
UPR-200-E-64	Alt 2 - Maint Existing Cover & IC	\$35,400	\$6,097,944	\$6,133,344	\$1,315,798
216-S-7 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,004,001	\$4,039,401	\$869,787
216-S-1 & 2 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,004,001	\$4,039,401	\$869,787
UPR-200-W-36	N/A	N/A	N/A	N/A	N/A
216-S-4 French Drain	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,042,114	\$4,077,514	\$876,538
216-S-22 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,004,001	\$4,039,401	\$869,787
216-S-23 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,017,304	\$4,052,704	\$872,143
216-T-20 Trench	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,993,349	\$4,028,749	\$867,900
216-A-10 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-A-5 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-A-45 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-C-1 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,042,114	\$4,077,514	\$876,538
200-E-58	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-A-36B Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
216-A-36A Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333

Table F-3. Alternative 2 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
UPR-200-E-39 (150 year)	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333
UPR-200-E-39 (20 year)	Alt 2 - Maint Existing Cover & IC	\$35,400	\$516,868	\$552,268	\$421,403
207-A-South Retention Basin	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,995,832	\$4,031,232	\$868,340
UPR-200-W-22	Alt 2 - Maint Existing Cover & IC	\$35,400	\$4,887,732	\$4,923,132	\$1,057,886
203-S Basin ²	N/A	N/A	N/A	N/A	N/A
204-S Basin ²	N/A	N/A	N/A	N/A	N/A
205-S Building Foundation ²	N/A	N/A	N/A	N/A	N/A
205-S Vault ²	N/A	N/A	N/A	N/A	N/A
Sub Total	N/A	N/A	N/A	N/A	N/A
216-A-37-1 Crib	Alt 2 - Maint Existing Cover & IC	\$35,400	\$3,984,499	\$4,019,899	\$866,333

General Notes:

- 1 Included in 216-A-20 Trench Overflow Site.
- 2 Included in UPR-200-W-22 Site.

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Table F-4. Alternative 2 Capital-Cost Summary.

Site	Description	Alternative	Institutional Controls	Construction Staff	Project Management	Sub Total	Contingency (25%)	Remedial Design	Total Project
216-A-19 Trench	Trench	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-1 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-3 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-18 Trench	Trench	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-20 Trench	Trench	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-20 Trench Overflow	Overflow	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-22 French Drain & UPR-20	French Drain	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
UPR-200-E-17	Unplanned Release	N/A							N/A
216-A-28 French Drain	French Drain	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-S-8 Trench	Trench	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-34 Ditch	Ditch	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
UPR-200-E-145	Unplanned Release	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-B-12 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-B-60 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-C-3 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-C-5 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-C-7 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-C-10 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
209-E-WS-3	Hold Up Tank	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
270-E-1	Neutralization Tank	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
UPR-200-E-64	Unplanned Release	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-S-7 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-S-1 & 2 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
UPR-200-W-36	Unplanned Release	N/A							N/A
216-S-4 French Drain	French Drain	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-S-22 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-S-23 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-T-20 Trench	Trench	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-10 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-5 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-45 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-C-1 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
200-E-58	Neutralization Tank	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-36B Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
216-A-36A Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
UPR-200-E-39	Unplanned Release	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
207-A-South Retention Basin	Retention Basin	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
UPR-200-W-22	Unplanned Release	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400
203-S Basin	Sub-grade Basin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
204-S Basin	Sub-grade Basin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
205-S Building Foundation	Sub-grade Foundation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
205-S Vault	Sub-grade Vault	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sub Total		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
216-A-37-1 Crib	Crib	Alt 2 - Maint Existing Cover & IC	\$20,000	\$1,200	\$2,400	\$23,600	\$5,900	\$5,900	\$35,400

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 Table F-5. Alternative 2 Periodic-Cost Summary (Example: 216-A-19 Trench).

Item	Item Cost																			Per Ten Years	Notes		
	Annually	per 3 Years	per 5 Years	per 30 Years	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	8th Year	10th Year	15th Year	20th Year	25th Year	30th Year	35th Year	40th Year	45th Year	50th Year		50 - 150 Years	
Perform Existing Barrier Cover Inspection	\$781																						Cost is based on a two person crew (8 hours/day @ \$112/hr). It is assumed to require 1 day to inspect sites up to 50,000 ft ² in size. An additional day is required for each additional 50,000 ft ² . The site area - Note 2
Conduct Radiation Survey of Surface Soil	\$8,712																						Cost is based on \$1,000 for every 5,000 square feet. The site area - Note 2
Maintain Existing Barrier Cover	\$5,723																						Cost includes the purchase of soil to repair ruts and holes over 10% of the site area. Refer to the calculation sheet.
Conduct Vadose Zone Monitoring			\$3,473	\$7,130																			Monitoring occurs once every 5 years at a cost of \$75/ft of borehole. Bore hole replacement occurs once every 30 years (refer to calculation sheet, Table D-4).
Prepare and Issue Sampling Reports			\$10,000																				Obtain lab, prepare sampling plan, document sampling event and results.
Conduct Site Reviews			\$20,000																				Prepare Site Condition Report every 5 years.
Construct Decontamination Pad		\$12,913																					Assume all decon pad materials replaced every 3 years.
Perform Ground Water Monitoring				\$9,818																			(*) Includes the installation, maintenance, sampling, and replacement of three monitoring wells.
Quarterly (4 sampling events)					\$182																		Year 1
Semi Annually (2 Sampling Events)						\$91																	Year 2
Annually (3 Sampling Events)								\$45	\$45	\$45													years 3, 4, 5
Every 2 years (3 Sampling Events)											\$136	\$136	\$136										years 6, 8, 10
Every 5 years (8 Sampling Events)														\$363	\$363	\$363	\$363	\$363	\$363	\$363	\$363		years 15, 20, 25, 30, 35, 40, 45, 50
Every 10 years (10 Sampling events)																						\$454	Years 60, 70, 80, 90, 100, 110,120, 130, 140, 150
TOTALS	\$15,216	\$12,913	\$33,473	\$16,948	\$182	\$91	\$45	\$45	\$45	\$136	\$136	\$136	\$363	\$363	\$454								

Table F-6. Alternative 2 Calculation Sheet for Periodic Costs (Example: 216-A-19 Trench).

Item	Quantity	Unit	Unit Cost				Extended Cost				Subtotal
			Subcontract	Material	Labor	Equipment	Subcontract	Material	Labor	Equipment	
Decontamination Pad Construction - Periodic Cost											
Timber Grates	0.402	mbf		\$577.00			\$0	\$232	\$0	\$0	\$232
Install 60 mil LLDPE	1,188	sf		\$0.44		\$0.26	\$0	\$523	\$0	\$309	\$832
3" SCH 80 PVC Pipe	5	lf		\$1.63			\$0	\$8	\$0	\$0	\$8
Sump Pump	1	ea		\$2,005.00			\$0	\$2,005	\$0	\$0	\$2,005
Sump Pump Hoses (50 lf)	1	ea		\$493.00			\$0	\$493	\$0	\$0	\$493
Sump Construction (2)	1	ls		\$74.04		\$1.68	\$0	\$74	\$0	\$2	\$76
Temporary Storage Tank (1,000 gal)	2	ea		\$1,674.00			\$0	\$3,348	\$0	\$0	\$3,348
4 Laborers, 5 days to Build/Remove	5	day			\$1,184.00		\$0	\$0	\$5,920	\$0	\$5,920
Total Cost							\$0	\$6,683	\$5,920	\$311	\$12,913
Barrier Maintenance - Annual Cost											
Area of Cap System	1	Ac									
10% of Cap System requiring repair	484	SY									
Volume of soil required (2ft depth)	323	CY									
Purchase, Deliver, and Place Topsoil											
Subcontractor processed/stockpiled	323.0	cy	8.95				\$2,891	\$0	\$0	\$0	\$2,891
Load at stockpile site - Front End L	3	Hr		\$53.85	\$59.64		\$0	\$0	\$162	\$179	\$340
Haul from stockpile to waste site -fo	3	Hr		\$173.00	\$166.64		\$0	\$0	\$519	\$500	\$1,019
Dust Control - truck/300gal tank	3	Hr		\$43.25	\$49.15		\$0	\$0	\$130	\$147	\$277
Spreading at waste site - LGP Dozer	4	Hr		\$53.85	\$48.20		\$0	\$0	\$215	\$193	\$408
Reseed - tractor drill	1	Hr		\$335.00	\$53.85	\$193.07	\$0	\$335	\$54	\$193	\$582
Supervisor	3	Hr			\$60.10	\$8.44	\$0	\$0	\$180	\$25	\$206
Total Cost							\$2,891	\$335	\$1,260	\$1,237	\$5,723

NOTE:

Assume all decon pad materials replaced every 3 years.

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Table F-7. Alternative 2 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
0	\$35,400	\$0	\$35,400	1.0000	\$35,400
1		\$15,398	\$15,398	0.9699	\$14,934
2		\$15,307	\$15,307	0.9408	\$14,401
3		\$28,175	\$28,175	0.9125	\$25,709
4		\$15,261	\$15,261	0.8850	\$13,506
5		\$48,734	\$48,734	0.8584	\$41,833
6		\$28,266	\$28,266	0.8326	\$23,534
7		\$15,216	\$15,216	0.8076	\$12,288
8		\$15,352	\$15,352	0.7833	\$12,025
9		\$28,129	\$28,129	0.7598	\$21,373
10		\$48,825	\$48,825	0.7369	\$35,979
11		\$15,216	\$15,216	0.7148	\$10,876
12		\$28,129	\$28,129	0.6933	\$19,502
13		\$15,216	\$15,216	0.6724	\$10,231
14		\$15,216	\$15,216	0.6522	\$9,924
15		\$61,966	\$61,966	0.6326	\$39,200
16		\$15,216	\$15,216	0.6136	\$9,336
17		\$15,216	\$15,216	0.5951	\$9,055
18		\$28,129	\$28,129	0.5772	\$16,236
19		\$15,216	\$15,216	0.5599	\$8,519
20		\$49,052	\$49,052	0.5430	\$26,635
21		\$28,129	\$28,129	0.5267	\$14,816
22		\$15,216	\$15,216	0.5109	\$7,774
23		\$15,216	\$15,216	0.4955	\$7,539
24		\$28,129	\$28,129	0.4806	\$13,519
25		\$49,052	\$49,052	0.4662	\$22,868
26		\$15,216	\$15,216	0.4521	\$6,879
27		\$28,129	\$28,129	0.4385	\$12,335
28		\$15,216	\$15,216	0.4254	\$6,473
29		\$15,216	\$15,216	0.4126	\$6,278
30		\$78,914	\$78,914	0.4002	\$31,581
31		\$15,216	\$15,216	0.3881	\$5,905
32		\$15,216	\$15,216	0.3765	\$5,729
33		\$28,129	\$28,129	0.3651	\$10,270
34		\$15,216	\$15,216	0.3542	\$5,389
35		\$49,052	\$49,052	0.3435	\$16,849
36		\$28,129	\$28,129	0.3332	\$9,373
37		\$15,216	\$15,216	0.3232	\$4,918
38		\$15,216	\$15,216	0.3135	\$4,770
39		\$28,129	\$28,129	0.3040	\$8,551
40		\$49,052	\$49,052	0.2949	\$14,466
41		\$15,216	\$15,216	0.2860	\$4,352
42		\$28,129	\$28,129	0.2774	\$7,803
43		\$15,216	\$15,216	0.2691	\$4,095
44		\$15,216	\$15,216	0.2610	\$3,971
45		\$61,966	\$61,966	0.2531	\$15,684
46		\$15,216	\$15,216	0.2455	\$3,735
47		\$15,216	\$15,216	0.2381	\$3,623
48		\$28,129	\$28,129	0.2310	\$6,498
49		\$15,216	\$15,216	0.2240	\$3,408
50		\$49,052	\$49,052	0.2173	\$10,659
51		\$28,129	\$28,129	0.2108	\$5,930
52		\$15,216	\$15,216	0.2044	\$3,110
53		\$15,216	\$15,216	0.1983	\$3,017
54		\$28,129	\$28,129	0.1923	\$5,409
55		\$48,689	\$48,689	0.1865	\$9,080
56		\$15,216	\$15,216	0.1809	\$2,753
57		\$28,129	\$28,129	0.1755	\$4,937
58		\$15,216	\$15,216	0.1702	\$2,590
59		\$15,216	\$15,216	0.1651	\$2,512
60		\$79,005	\$79,005	0.1601	\$12,649
61		\$15,216	\$15,216	0.1553	\$2,363
62		\$15,216	\$15,216	0.1506	\$2,291
63		\$28,129	\$28,129	0.1461	\$4,110
64		\$15,216	\$15,216	0.1417	\$2,156
65		\$48,689	\$48,689	0.1375	\$6,695
66		\$28,129	\$28,129	0.1333	\$3,750
67		\$15,216	\$15,216	0.1293	\$1,967
68		\$15,216	\$15,216	0.1254	\$1,908
69		\$28,129	\$28,129	0.1217	\$3,423
70		\$49,143	\$49,143	0.1180	\$5,799

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Table F-7. Alternative 2 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
71		\$15,216	\$15,216	0.1145	\$1,742
72		\$28,129	\$28,129	0.1110	\$3,122
73		\$15,216	\$15,216	0.1077	\$1,639
74		\$15,216	\$15,216	0.1044	\$1,589
75		\$61,602	\$61,602	0.1013	\$6,240
76		\$15,216	\$15,216	0.0983	\$1,496
77		\$15,216	\$15,216	0.0953	\$1,450
78		\$28,129	\$28,129	0.0924	\$2,599
79		\$15,216	\$15,216	0.0897	\$1,365
80		\$49,143	\$49,143	0.0870	\$4,275
81		\$28,129	\$28,129	0.0843	\$2,371
82		\$15,216	\$15,216	0.0818	\$1,245
83		\$15,216	\$15,216	0.0793	\$1,207
84		\$28,129	\$28,129	0.0770	\$2,166
85		\$48,689	\$48,689	0.0746	\$3,632
86		\$15,216	\$15,216	0.0724	\$1,102
87		\$28,129	\$28,129	0.0702	\$1,975
88		\$15,216	\$15,216	0.0681	\$1,036
89		\$15,216	\$15,216	0.0661	\$1,006
90		\$79,005	\$79,005	0.0641	\$5,064
91		\$15,216	\$15,216	0.0622	\$946
92		\$15,216	\$15,216	0.0603	\$918
93		\$28,129	\$28,129	0.0585	\$1,646
94		\$15,216	\$15,216	0.0567	\$863
95		\$48,689	\$48,689	0.0550	\$2,678
96		\$28,129	\$28,129	0.0534	\$1,502
97		\$15,216	\$15,216	0.0517	\$787
98		\$15,216	\$15,216	0.0502	\$764
99		\$28,129	\$28,129	0.0487	\$1,370
100		\$49,143	\$49,143	0.0472	\$2,320
101		\$15,216	\$15,216	0.0458	\$697
102		\$28,129	\$28,129	0.0444	\$1,249
103		\$15,216	\$15,216	0.0431	\$656
104		\$15,216	\$15,216	0.0418	\$636
105		\$61,602	\$61,602	0.0405	\$2,495
106		\$15,216	\$15,216	0.0393	\$598
107		\$15,216	\$15,216	0.0381	\$580
108		\$28,129	\$28,129	0.0370	\$1,041
109		\$15,216	\$15,216	0.0359	\$546
110		\$49,143	\$49,143	0.0348	\$1,710
111		\$28,129	\$28,129	0.0338	\$951
112		\$15,216	\$15,216	0.0327	\$498
113		\$15,216	\$15,216	0.0318	\$484
114		\$28,129	\$28,129	0.0308	\$866
115		\$48,689	\$48,689	0.0299	\$1,456
116		\$15,216	\$15,216	0.0290	\$441
117		\$28,129	\$28,129	0.0281	\$790
118		\$15,216	\$15,216	0.0273	\$415
119		\$15,216	\$15,216	0.0264	\$402
120		\$79,005	\$79,005	0.0256	\$2,023
121		\$15,216	\$15,216	0.0249	\$379
122		\$15,216	\$15,216	0.0241	\$367
123		\$28,129	\$28,129	0.0234	\$658
124		\$15,216	\$15,216	0.0227	\$345
125		\$48,689	\$48,689	0.0220	\$1,071
126		\$28,129	\$28,129	0.0214	\$602
127		\$15,216	\$15,216	0.0207	\$315
128		\$15,216	\$15,216	0.0201	\$306
129		\$28,129	\$28,129	0.0195	\$549
130		\$49,143	\$49,143	0.0189	\$929
131		\$15,216	\$15,216	0.0183	\$278
132		\$28,129	\$28,129	0.0178	\$501
133		\$15,216	\$15,216	0.0172	\$262
134		\$15,216	\$15,216	0.0167	\$254
135		\$62,057	\$62,057	0.0162	\$1,005
136		\$15,216	\$15,216	0.0157	\$239
137		\$15,216	\$15,216	0.0153	\$233
138		\$28,129	\$28,129	0.0148	\$416
139		\$15,216	\$15,216	0.0144	\$219
140		\$49,143	\$49,143	0.0139	\$683
141		\$28,129	\$28,129	0.0135	\$380

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Table F-7. Alternative 2 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
142		\$15,216	\$15,216	0.0131	\$199
143		\$15,216	\$15,216	0.0127	\$193
144		\$28,129	\$28,129	0.0123	\$346
145		\$48,689	\$48,689	0.0120	\$584
146		\$15,216	\$15,216	0.0116	\$177
147		\$28,129	\$28,129	0.0112	\$315
148		\$15,216	\$15,216	0.0109	\$166
149		\$15,216	\$15,216	0.0106	\$161
150		\$49,143	\$49,143	0.0103	\$506
			TOTAL PRESENT WORTH		\$868,340
TOTAL NON-DISCOUNTED COST			\$4,031,232		

1. Discount rate column is a calculated annual multiplier where discount rate = $(1-e)^n$ where $e = 3.1\%$ and $n = \text{year } (1 - 150)$.

Table F-8. Alternative 3 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
216-A-19 Trench	Alt 3 - Remove & Dispose	\$3,367,977	\$0	\$3,367,977	\$3,367,977
216-A-1 Crib	Alt 3 - Remove & Dispose	\$2,265,185	\$0	\$2,265,185	\$2,265,185
216-A-3 Crib	Alt 3 - Remove & Dispose	\$2,393,780	\$0	\$2,393,780	\$2,393,780
216-A-18 Trench	Alt 3 - Remove & Dispose	\$7,336,043	\$0	\$7,336,043	\$7,336,043
216-A-20 Trench	Alt 3 - Remove & Dispose	\$2,403,530	\$0	\$2,403,530	\$2,403,530
216-A-20 Trench Overflow	Alt 3 - Remove & Dispose	\$2,719,245	\$0	\$2,719,245	\$2,719,245
216-A-22 French Drain & UPR-200-E-17	Alt 3 - Remove & Dispose	\$1,721,735	\$0	\$1,721,735	\$1,721,735
216-A-28 French Drain	Alt 3 - Remove & Dispose	\$1,365,139	\$0	\$1,365,139	\$1,365,139
216-S-8 Trench	Alt 3 - Remove & Dispose	\$8,431,335	\$0	\$8,431,335	\$8,431,335
216-A-34 Ditch	Alt 3 - Remove & Dispose	\$12,565,472	\$0	\$12,565,472	\$12,565,472
UPR-200-E-145	Alt 3 - Remove & Dispose	\$671,413	\$0	\$671,413	\$671,413
216-B-12 Crib	Alt 3 - Remove & Dispose	\$41,860,729	\$0	\$41,860,729	\$41,230,725
216-B-60 Crib	Alt 3 - Remove & Dispose	\$5,432,654	\$0	\$5,432,654	\$5,432,654
216-C-3 Crib	Alt 3 - Remove & Dispose	\$2,717,747	\$0	\$2,717,747	\$2,717,747
216-C-5 Crib	Alt 3 - Remove & Dispose	\$2,621,532	\$0	\$2,621,532	\$2,621,532
216-C-7 Crib	Alt 3 - Remove & Dispose	\$2,681,048	\$0	\$2,681,048	\$2,681,048
216-C-10 Crib	Alt 3 - Remove & Dispose	\$2,470,380	\$0	\$2,470,380	\$2,470,380

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Table F-8. Alternative 3 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
209-E-WS-3	Alt 3 - Remove & Dispose	\$683,722	\$0	\$683,722	\$683,722
270-E-1	Alt 3 - Remove & Dispose	\$823,911	\$0	\$823,911	\$823,911
UPR-200-E-64	Alt 3 - Remove & Dispose	\$1,527,642	\$0	\$1,527,642	\$1,527,642
216-S-7 Crib	Alt 3 - Remove & Dispose	\$47,150,148	\$0	\$47,150,148	\$45,746,645
216-S-1 & 2 Crib	Alt 3 - Remove & Dispose	\$48,140,756	\$0	\$48,140,756	\$46,707,766
UPR-200-W-36	Alt 3 - Remove & Dispose	N/A	N/A	N/A	N/A
216-S-4 French Drain	Alt 3 - Remove & Dispose	\$2,086,294	\$0	\$2,086,294	\$2,086,294
216-S-22 Crib	Alt 3 - Remove & Dispose	\$1,811,768	\$0	\$1,811,768	\$1,811,768
216-S-23 Crib	Alt 3 - Remove & Dispose	\$5,564,275	\$0	\$5,564,275	\$5,564,275
216-T-20 Trench	Alt 3 - Remove & Dispose	\$976,245	\$0	\$976,245	\$976,245
216-A-10 Crib	Alt 3 - Remove & Dispose	\$11,386,645	\$0	\$11,386,645	\$11,215,276
216-A-5 Crib	Alt 3 - Remove & Dispose	\$2,713,917	\$0	\$2,713,917	\$2,713,917
216-A-45 Crib	Alt 3 - Remove & Dispose	\$16,051,122	\$0	\$16,051,122	\$15,809,552
216-C-1 Crib	Alt 3 - Remove & Dispose	\$1,677,217	\$0	\$1,677,217	\$1,677,217
200-E-58	Alt 3 - Remove & Dispose	\$811,635	\$0	\$811,635	\$811,635
216-A-36B Crib (w/o TRU)	Alt 3 - Remove & Dispose	\$94,185,990	\$0	\$94,185,990	\$87,382,622
216-A-36B Crib (w/TRU)	Alt 3 - Remove & Dispose	\$107,861,536	\$0	\$107,861,536	\$100,070,338

Table F-8. Alternative 3 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
216-A-36A Crib (w/o TRU)	Alt 3 - Remove & Dispose	\$65,711,368	\$0	\$65,711,368	\$61,876,452
216-A-36A Crib (w/TRU)	Alt 3 - Remove & Dispose	\$70,124,246	\$0	\$70,124,246	\$66,031,795
UPR-200-E-39	Alt 3 - Remove & Dispose	\$667,401	\$0	\$667,401	\$667,401
207-A-South Retention Basin	Alt 3 - Remove & Dispose	\$723,729	\$0	\$723,729	\$723,729
UPR-200-W-22	Alt 3 - Remove & Dispose	\$1,424,422	\$0	\$1,424,422	\$1,424,422
203-S Basin	Alt 3 - Remove & Dispose				
204-S Basin	Alt 3 - Remove & Dispose				
205-S Building Foundation	Alt 3 - Remove & Dispose				
205-S Vault	Alt 3 - Remove & Dispose				
Foundation Subtotal	Alt 3 - Remove & Dispose	\$2,069,647	\$0	\$2,069,647	\$2,069,647
216-A-37-1 Crib	Alt 3 - Remove & Dispose	\$6,355,160	\$0	\$6,355,160	\$6,355,160

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Table F-9. Alternative 3 Capital-Cost Summary.

Site	Description	Alternative	Mobilization/ Demobilization	Monitoring & Sampling	Site Work	Soil Excavation	Construction Staff	Project Management	Sub Total	Contingency (25%)	Remedial Design	Total Project
216-A-19 Trench	Trench	Alt 3 - TR RTD	\$178,214	\$207,925	\$163,449	\$1,665,526	\$172,792	\$106,892	\$2,494,798	\$623,700	\$249,480	\$3,367,977
216-A-1 Crib	Crib	Alt 3 - RTD	\$178,230	\$205,106	\$139,279	\$902,378	\$156,674	\$96,248	\$1,677,915	\$419,479	\$167,792	\$2,265,185
216-A-3 Crib	Crib	Alt 3 - RTD	\$178,131	\$215,878	\$158,882	\$868,484	\$178,165	\$110,303	\$1,709,843	\$427,461	\$256,476	\$2,393,780
216-A-18 Trench	Trench	Alt 3 - RTD	\$204,688	\$406,308	\$457,463	\$3,646,328	\$441,435	\$277,884	\$5,434,106	\$1,358,527	\$543,411	\$7,336,043
216-A-20 Trench	Trench	Alt 3 - RTD	\$177,569	\$172,769	\$118,133	\$1,034,536	\$132,496	\$81,304	\$1,716,807	\$429,202	\$257,521	\$2,403,530
216-A-20 Trench Overflow	Overflow	Alt 3 - RTD	\$178,395	\$179,742	\$131,517	\$1,216,903	\$145,928	\$89,833	\$1,942,318	\$485,580	\$291,348	\$2,719,245
216-A-22 French Drain & UPR-200-E-17	French Drain	Alt 3 - RTD	\$172,365	\$158,033	\$81,834	\$639,325	\$111,005	\$67,249	\$1,229,811	\$307,453	\$184,472	\$1,721,735
216-A-28 French Drain	French Drain	Alt 3 - RTD	\$171,317	\$159,814	\$68,503	\$414,780	\$100,259	\$60,426	\$975,099	\$243,775	\$146,265	\$1,365,139
216-A-34 Trench	Trench	Alt 3 - RTD	\$201,895	\$362,399	\$381,569	\$4,716,411	\$358,156	\$225,003	\$6,245,433	\$1,561,358	\$624,543	\$8,431,335
216-A-34 Ditch	Ditch	Alt 3 - RTD	\$221,248	\$523,873	\$529,083	\$7,199,627	\$511,282	\$322,644	\$9,307,757	\$2,326,939	\$930,776	\$12,565,472
UPR-200-E-145	Unplanned Release	Alt 3 - RTD	\$170,293	\$143,652	\$37,180	\$11,694	\$73,395	\$43,367	\$479,581	\$119,895	\$71,937	\$671,413
216-B-12 Crib	Crib	Alt 3 - DEEP EX RTD	\$790,653	\$1,706,484	\$9,484,567	\$16,532,148	\$2,214,978	\$864,173	\$31,593,003	\$7,898,251	\$2,369,475	\$41,860,729
216-B-60 Crib	Crib	Alt 3 - RTD	\$201,904	\$392,174	\$366,093	\$2,476,466	\$360,842	\$226,709	\$4,024,188	\$1,006,047	\$402,419	\$5,432,654
216-C-3 Crib	Crib	Alt 3 - RTD	\$178,048	\$201,963	\$152,959	\$1,209,686	\$167,419	\$103,071	\$2,013,146	\$503,287	\$201,315	\$2,717,747
216-C-5 Crib	Crib	Alt 3 - RTD	\$178,098	\$199,267	\$151,122	\$1,073,137	\$167,419	\$103,480	\$1,872,523	\$468,131	\$280,878	\$2,621,532
216-C-7 Crib	Crib	Alt 3 - RTD	\$177,982	\$197,050	\$146,239	\$1,136,449	\$159,360	\$97,954	\$1,915,034	\$478,759	\$287,255	\$2,681,048
216-C-10 Crib	Crib	Alt 3 - RTD	\$177,759	\$186,435	\$126,613	\$1,042,380	\$143,242	\$88,128	\$1,764,557	\$441,139	\$264,684	\$2,470,380
209-E-WS-3	Hold Up Tank	Alt 3 - RTD	\$172,078	\$134,263	\$37,477	\$27,793	\$73,395	\$43,367	\$488,373	\$122,093	\$73,256	\$683,722
270-E-1	Neutralization Tank	Alt 3 - RTD	\$172,714	\$147,929	\$45,360	\$92,566	\$81,454	\$48,485	\$588,508	\$147,127	\$88,276	\$823,911
UPR-200-E-64	Unplanned Release	Alt 3 - RTD	\$177,136	\$235,413	\$92,236	\$434,488	\$94,886	\$57,014	\$1,091,173	\$272,793	\$163,676	\$1,527,642
216-S-7 Crib	Crib	Alt 3 - DEEP EX RTD	\$796,527	\$2,062,542	\$12,111,315	\$16,693,478	\$2,820,383	\$1,100,772	\$35,585,017	\$8,896,254	\$2,668,876	\$47,150,148
216-S-1 & 2 Crib	Crib	Alt 3 - RTD	\$809,956	\$2,274,910	\$13,100,492	\$15,913,571	\$3,045,116	\$1,188,601	\$36,332,646	\$9,083,162	\$2,724,948	\$48,140,756
UPR-200-W-36	Unplanned Release	N/A							\$0	\$0	\$0	\$0
216-S-4 French Drain	French Drain	Alt 3 - RTD	\$172,563	\$166,431	\$97,025	\$858,369	\$121,750	\$74,072	\$1,490,210	\$372,553	\$223,532	\$2,086,294
216-S-22 Crib	Crib	Alt 3 - RTD	\$177,763	\$175,976	\$105,457	\$634,709	\$124,437	\$75,778	\$1,294,120	\$323,530	\$194,118	\$1,811,768
216-S-23 Crib	Crib	Alt 3 - RTD	\$209,172	\$461,120	\$441,253	\$2,290,412	\$441,435	\$278,293	\$4,121,685	\$1,030,421	\$412,169	\$5,564,275
216-T-20 Trench	Trench	Alt 3 - RTD	\$173,251	\$151,415	\$51,567	\$186,754	\$84,140	\$50,191	\$697,318	\$174,330	\$104,598	\$976,245
216-A-10 Crib	Crib	Alt 3 - TR RTD	\$240,395	\$721,374	\$826,543	\$5,355,110	\$790,670	\$500,460	\$8,434,552	\$2,108,638	\$843,455	\$11,386,645
216-A-5 Crib	Crib	Alt 3 - RTD	\$184,845	\$287,283	\$211,764	\$949,694	\$231,894	\$144,829	\$2,010,309	\$502,577	\$201,031	\$2,713,917
216-A-45 Crib	Crib	Alt 3 - RTD	\$265,160	\$877,429	\$1,060,361	\$8,299,339	\$986,779	\$624,986	\$12,114,054	\$3,028,514	\$908,554	\$16,051,122
216-C-1 Crib	Crib	Alt 3 - RTD	\$174,670	\$172,490	\$95,689	\$607,695	\$119,064	\$72,775	\$1,242,383	\$310,596	\$124,238	\$1,677,217
200-E-58	Neutralization Tank	Alt 3 - RTD	\$171,621	\$147,929	\$43,149	\$91,494	\$78,767	\$46,779	\$579,739	\$144,935	\$86,961	\$811,635
216-A-36B Crib	Crib w/o TRU Waste	Alt 3 - DEEP EX RTD	\$875,307	\$4,581,089	\$26,581,513	\$30,640,392	\$6,044,621	\$2,360,844	\$71,083,766	\$17,770,942	\$5,331,282	\$94,185,990
216-A-36B Crib	Crib w TRU Waste	Alt 3 - DEEP EX RTD	\$1,015,591	\$6,090,482	\$26,582,724	\$39,310,671	\$6,044,621	\$2,360,844	\$81,404,933	\$20,351,233	\$6,105,370	\$107,861,536
216-A-36A Crib	Crib w/o TRU Waste	Alt 3 - DEEP EX RTD	\$827,863	\$2,416,429	\$20,763,687	\$19,029,899	\$4,714,565	\$1,841,042	\$49,593,485	\$12,398,371	\$3,719,511	\$65,711,368
216-A-36A Crib	Crib w TRU Waste	Alt 3 - DEEP EX RTD	\$950,085	\$3,684,630	\$20,453,279	\$21,280,358	\$4,714,565	\$1,841,042	\$52,923,959	\$13,230,990	\$3,969,297	\$70,124,246
UPR-200-E-39	Unplanned Release	Alt 3 - RTD	\$170,194	\$134,263	\$37,102	\$18,394	\$73,395	\$43,367	\$476,715	\$119,179	\$71,507	\$667,401
207-A-South Retention Basin	Retention Basin	Alt 3 - RB RTD	\$174,645	\$137,114	\$55,178	\$24,466	\$78,767	\$46,779	\$516,949	\$129,237	\$77,542	\$723,729
UPR-200-W-22	Unplanned Release	Alt 3 - RTD	\$175,618	\$211,258	\$99,683	\$347,422	\$113,691	\$69,772	\$1,017,444	\$254,361	\$152,617	\$1,424,422
203-S Basin	Sub-grade Basin	Alt 3 - RTD							\$0	\$0	\$0	\$0
204-S Basin	Sub-grade Basin	Alt 3 - RTD							\$0	\$0	\$0	\$0
205-S Building Foundation	Sub-grade Foundatio	Alt 3 - RTD							\$0	\$0	\$0	\$0
205-S Vault	Sub-grade Vault	Alt 3 - RTD							\$0	\$0	\$0	\$0
Foundation Subtotal			\$185,164	\$219,578	\$127,362	\$704,836	\$148,614	\$92,765	\$1,478,319	\$369,580	\$221,748	\$2,069,647
216-A-37-1 Crib	Crib	Alt 3 - TR RTD	\$199,078	\$356,620	\$326,295	\$3,316,634	\$312,486	\$196,413	\$4,707,526	\$1,176,882	\$470,753	\$6,355,160

Table F-10. Alternative 4 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
216-A-19 Trench	Alt 4 - ET CAP	\$468,792	\$3,995,832	\$4,464,624	\$1,301,732
216-A-1 Crib	Alt 4 - ET CAP	\$475,883	\$3,995,832	\$4,471,715	\$1,308,823
216-A-3 Crib	Alt 4 - ET CAP	\$461,272	\$3,984,499	\$4,445,771	\$1,292,205
216-A-18 Trench	Alt 4 - ET CAP	\$586,666	\$3,995,832	\$4,582,498	\$1,419,606
216-A-20 Trench	Alt 4 - ET CAP	\$468,792	\$3,995,832	\$4,464,624	\$1,301,732
216-A-20 Trench Overflow	Alt 4 - ET CAP	\$815,319	\$4,511,823	\$5,327,143	\$1,758,086
216-A-22 French Drain	Alt 4 - ET CAP	\$434,272	\$3,984,499	\$4,418,771	\$1,265,204
216-A-28 French Drain	Alt 4 - ET CAP	\$439,418	\$3,984,499	\$4,423,917	\$1,270,351
216-S-8 Trench	Alt 4 - ET CAP	\$584,531	\$4,004,001	\$4,588,532	\$1,418,918
216-A-34 Ditch	Alt 4 - ET CAP	\$1,014,548	\$5,656,653	\$6,671,201	\$2,200,988
UPR-200-E-145	Alt 4 - ET CAP	\$464,475	\$3,995,832	\$4,460,307	\$1,297,415
216-B-12 Crib	Alt 4 - ET CAP	\$637,393	\$3,994,975	\$4,632,368	\$1,470,182
216-B-60 Crib	Alt 4 - ET CAP	\$463,965	\$3,994,975	\$4,458,939	\$1,296,753
216-C-3 Crib	Alt 4 - ET CAP	\$473,684	\$4,042,114	\$4,515,798	\$1,314,821
216-C-5 Crib	Alt 4 - ET CAP	\$447,409	\$4,042,114	\$4,489,523	\$1,288,546
216-C-7 Crib	Alt 4 - ET CAP	\$461,673	\$4,042,114	\$4,503,787	\$1,302,811
216-C-10 Crib	Alt 4 - ET CAP	\$450,998	\$4,042,114	\$4,493,112	\$1,292,136

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Table F-10. Alternative 4 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
209-E-WS-3	N/A	N/A	N/A	N/A	N/A
270-E-1	Alt 4 - ET CAP	\$471,887	\$3,994,975	\$4,466,861	\$1,304,675
UPR-200-E-64	Alt 4 - BioBarrier	\$972,100	\$7,683,015	\$8,655,115	\$2,589,875
216-S-7 Crib	Alt 4 - ET CAP	\$567,192	\$4,004,001	\$4,571,193	\$1,401,579
216-S-1 & 2 Crib	Alt 4 - ET CAP	\$545,750	\$4,004,001	\$4,549,751	\$1,380,137
UPR-200-W-36	N/A	N/A	N/A	N/A	N/A
216-S-4 French Drain	Alt 4 - ET CAP	\$433,070	\$4,042,114	\$4,475,184	\$1,274,207
216-S-22 Crib	Alt 4 - ET CAP	\$503,535	\$4,004,001	\$4,507,536	\$1,337,922
216-S-23 Crib	Alt 4 - ET CAP	\$715,103	\$4,017,304	\$4,732,407	\$1,551,846
216-T-20 Trench	Alt 4 - ET CAP	\$438,744	\$3,993,349	\$4,432,093	\$1,271,244
216-A-10 Crib	Alt 4 - ET CAP	\$747,320	\$4,148,623	\$4,895,943	\$1,613,186
216-A-5 Crib	Alt 4 - ET CAP	\$483,024	\$3,984,499	\$4,467,524	\$1,313,957
216-A-45 Crib	Alt 4 - ET CAP	\$849,650	\$4,685,840	\$5,535,490	\$1,829,861
216-C-1 Crib	Alt 4 - ET CAP	\$459,819	\$4,042,114	\$4,501,933	\$1,300,956
200-E-58	Alt 4 - ET CAP	\$462,892	\$3,984,499	\$4,447,391	\$1,293,825
216-A-36B Crib (w/o TRU)	Alt 4 - Hanford	\$4,259,550	\$4,649,307	\$8,908,857	\$5,231,985

Table F-10. Alternative 4 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
216-A-36A Crib (w/o TRU)	Alt 4 - Hanford	\$3,391,251	\$3,984,499	\$7,375,751	\$4,222,184
UPR-200-E-39	Alt 4 - ET CAP	\$676,843	\$3,984,499	\$4,661,342	\$1,507,775
207-A-South Retention Basin	Alt 4 - ET CAP	\$737,569	\$3,995,832	\$4,733,401	\$1,570,509
UPR-200-W-22	Alt 4 - ET CAP	\$1,829,139	\$7,362,177	\$9,191,317	\$3,378,303
203-S Basin	N/A	N/A	N/A	N/A	N/A
204-S Basin	N/A	N/A	N/A	N/A	N/A
205-S Building Foundation	N/A	N/A	N/A	N/A	N/A
205-S Vault	N/A	N/A	N/A	N/A	N/A
Foundation Subtotal	N/A	N/A	N/A	N/A	N/A
216-A-37-1 Crib	Alt 4 - ET CAP	\$1,028,670	\$5,551,304	\$6,579,974	\$2,193,092

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Table F-11. Alternative 4 Capital-Cost Summary.

Site	Description	Alternative	Mobilization/ Demobilization	Monitoring & Sampling	Site Work	Soil Excavation	Cap	Construction Staff	Project Management	Sub Total	Contingency (25%)	Remedial Design	Total Project
216-A-19 Trench	Trench	Alt 4 - ET CAP	\$61,196	\$3,609	\$19,787	\$0	\$76,300	\$99,412	\$65,812	\$326,116	\$81,529	\$61,147	\$468,792
216-A-1 Crib	Crib	Alt 4 - ET CAP	\$61,310	\$3,609	\$19,787	\$0	\$81,119	\$99,412	\$65,812	\$331,049	\$82,762	\$62,072	\$475,883
216-A-3 Crib	Crib	Alt 4 - ET CAP	\$61,083	\$3,609	\$19,787	\$0	\$71,182	\$99,412	\$65,812	\$320,885	\$80,221	\$60,166	\$461,272
216-A-18 Trench	Trench	Alt 4 - ET CAP	\$62,445	\$4,330	\$26,383	\$0	\$145,347	\$109,353	\$71,189	\$419,047	\$104,762	\$62,857	\$586,666
216-A-20 Trench	Trench	Alt 4 - ET CAP	\$61,196	\$3,609	\$19,787	\$0	\$76,300	\$99,412	\$65,812	\$326,116	\$81,529	\$61,147	\$468,792
216-A-20 Overflow	Overflow	Alt 4 - ET CAP	\$67,001	\$5,052	\$32,979	\$0	\$261,053	\$132,550	\$83,736	\$582,371	\$145,593	\$87,356	\$815,319
216-A-22 French Drain	French Drain	Alt 4 - ET CAP	\$60,765	\$3,609	\$19,787	\$0	\$57,823	\$96,098	\$64,020	\$302,102	\$75,526	\$56,644	\$434,272
UPR-200-E-17	Unplanned Release	N/A								\$0	\$0	\$0	\$0
216-A-28 French Drain	French Drain	Alt 4 - ET CAP	\$60,856	\$3,609	\$19,787	\$0	\$61,312	\$96,098	\$64,020	\$305,682	\$76,421	\$57,315	\$439,418
216-S-8 Trench	Trench	Alt 4 - ET CAP	\$62,445	\$4,330	\$26,383	\$0	\$143,819	\$109,356	\$71,189	\$417,522	\$104,381	\$62,628	\$584,531
216-A-34 Ditch	Ditch	Alt 4 - ET CAP	\$72,820	\$5,774	\$32,979	\$0	\$371,288	\$149,118	\$92,698	\$724,677	\$181,169	\$108,702	\$1,014,548
UPR-200-E-145	Unplanned Release	Alt 4 - ET CAP	\$61,151	\$3,609	\$19,787	\$0	\$73,342	\$99,412	\$65,812	\$323,113	\$80,778	\$60,584	\$464,475
216-B-12 Crib	Crib	Alt 4 - ET CAP	\$63,012	\$4,330	\$26,383	\$0	\$170,801	\$115,981	\$74,774	\$455,281	\$113,820	\$68,292	\$637,393
216-B-60 Crib	Crib	Alt 4 - ET CAP	\$61,117	\$3,609	\$19,787		\$73,021	\$99,412	\$65,812	\$322,758	\$80,690	\$60,517	\$463,965
216-C-3 Crib	Crib	Alt 4 - ET CAP	\$61,310	\$3,609	\$19,787		\$79,589	\$99,412	\$65,812	\$329,519	\$82,380	\$61,785	\$473,684
216-C-5 Crib	Crib	Alt 4 - ET CAP	\$60,969	\$3,609	\$19,787		\$66,758	\$96,098	\$64,020	\$311,241	\$77,810	\$58,358	\$447,409
216-C-7 Crib	Crib	Alt 4 - ET CAP	\$61,083	\$3,609	\$19,787		\$71,461	\$99,412	\$65,812	\$321,164	\$80,291	\$60,218	\$461,673
216-C-10 Crib	Crib	Alt 4 - ET CAP	\$61,049	\$3,609	\$19,787		\$69,175	\$96,098	\$64,020	\$313,738	\$78,435	\$58,826	\$450,998
209-E-WS-3	Hold Up Tank	N/A								\$0	\$0	\$0	\$0
270-E-1	Neutralization Tank	Alt 4 - ET CAP	\$60,833	\$5,052	\$19,787		\$72,267	\$102,726	\$67,604	\$328,269	\$82,067	\$61,550	\$471,887
UPR-200-E-64	Unplanned Release	Alt 4 - ET CAP	\$76,210	\$11,548	\$39,417		\$361,109	\$125,922	\$80,151	\$694,357	\$173,589	\$104,154	\$972,100
216-S-7 Crib	Crib	Alt 4 - ET CAP	\$62,331	\$3,609	\$26,383	\$0	\$132,272	\$109,353	\$71,189	\$405,137	\$101,284	\$60,771	\$567,192
216-S-1 & 2 Crib	Crib	Alt 4 - ET CAP	\$62,104	\$3,609	\$19,787		\$118,715	\$106,040	\$69,397	\$379,652	\$94,913	\$71,185	\$545,750
UPR-200-W-36	Unplanned Release	N/A								\$0	\$0	\$0	\$0
216-S-4 French Drain	French Drain	Alt 4 - ET CAP	\$60,765	\$3,609	\$19,787		\$56,987	\$96,098	\$64,020	\$301,266	\$75,317	\$56,487	\$433,070
216-S-22 Crib	Crib	Alt 4 - ET CAP	\$61,804	\$3,609	\$19,787		\$94,755	\$102,726	\$67,604	\$350,285	\$87,571	\$65,678	\$503,535
216-S-23 Crib	Crib	Alt 4 - ET CAP	\$64,828	\$4,330	\$26,383		\$214,280	\$122,608	\$78,359	\$510,788	\$127,697	\$76,618	\$715,103
216-T-20 Trench	Trench	Alt 4 - ET CAP	\$60,856	\$3,609	\$19,787		\$60,843	\$96,098	\$64,020	\$305,213	\$76,303	\$57,227	\$438,744
216-A-10 Crib	Crib	Alt 4 - ET CAP	\$67,228	\$4,330	\$26,383	\$0	\$229,786	\$125,922	\$80,151	\$533,800	\$133,450	\$80,070	\$747,320
216-A-5 Crib	Crib	Alt 4 - ET CAP	\$61,423	\$3,609	\$19,787		\$85,974	\$99,412	\$65,812	\$336,017	\$84,004	\$63,003	\$483,024
216-A-45 Crib	Crib	Alt 4 - ET CAP	\$67,795	\$5,052	\$32,979		\$279,675	\$135,863	\$85,529	\$606,893	\$151,723	\$91,034	\$849,650
216-C-1 Crib	Crib	Alt 4 - ET CAP	\$61,072	\$3,609	\$19,787		\$70,182	\$99,412	\$65,812	\$319,874	\$79,969	\$59,976	\$459,819
200-E-58	Neutralization Tank	Alt 4 - ET CAP	\$60,879	\$5,052	\$19,787		\$74,589	\$102,726	\$67,604	\$330,637	\$82,659	\$49,596	\$462,892
216-A-36B Crib	Crib	Alt 4 - ET CAP	\$122,358	\$6,994	\$83,946	\$0	\$2,439,693	\$318,120	\$184,111	\$3,155,222	\$788,806	\$315,522	\$4,259,550
216-A-36A Crib	Crib	Alt 4 - ET CAP	\$112,977	\$5,722	\$62,555		\$1,905,146	\$268,413	\$157,225	\$2,512,038	\$628,010	\$251,204	\$3,391,251
UPR-200-E-39	Unplanned Release	Alt 4 - ET CAP	\$63,160	\$4,330	\$26,383		\$193,725	\$119,295	\$76,566	\$483,459	\$120,865	\$72,519	\$676,843
207-A-South Retention Basin	Retention Basin	Alt 4 - ET CAP	\$66,993	\$5,052	\$26,383	\$0	\$227,440	\$122,608	\$78,359	\$526,835	\$131,709	\$79,025	\$737,569
UPR-200-W-22	Unplanned Release	Alt 4 - ET CAP	\$87,654	\$10,105	\$52,766		\$791,639	\$228,648	\$135,716	\$1,306,528	\$326,632	\$195,979	\$1,829,139
203-S Basin	Sub-grade Basin	N/A								\$0	\$0	\$0	\$0
204-S Basin	Sub-grade Basin	N/A								\$0	\$0	\$0	\$0
205-S Building Foundation	Sub-grade Foundation	N/A								\$0	\$0	\$0	\$0
205-S Vault	Sub-grade Vault	N/A								\$0	\$0	\$0	\$0
Subtotal		N/A								\$0	\$0	\$0	\$0
216-A-37-1 Crib	Crib	Alt 4 - ET CAP	\$75,430	\$5,052	\$39,575	\$0	\$372,891	\$149,118	\$92,698	\$734,764	\$183,691	\$110,215	\$1,028,670

Table F-12. Alternative 4 Periodic-Cost Summary (Example: 216-A-19 Trench).

Item	Item Cost																			Per Ten Years	Notes		
	Annually	per 3 Years	per 5 Years	per 30 Years	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	8th Year	10th Year	15th Year	20th Year	25th Year	30th Year	35th Year	40th Year	45th Year	50th Year		60 - 150 Years	
Perform Existing Barrier Cover Inspection	\$781																						Cost is based on a two person crew (8 hours/day @ \$112/hr). It is assumed to require 1 day to inspect sites up to 50,000 ft ² in size. An additional day is required for each additional 50,000 ft ² . The site area - Note 2
Conduct Radiation Survey of Surface Soil	\$8,712																						Cost is based on \$1,000 for every 5,000 square feet. The site area - Note 2
Maintain Existing Barrier Cover	\$5,723																						Cost includes the purchase of soil to repair ruts and holes over 10% of the site area. Refer to the calculation sheet.
Conduct Vadose Zone Monitoring			\$3,473	\$7,130																			Monitoring occurs once every 5 years at a cost of \$75/lf of borehole. Bore hole replacement occurs once every 30 years (refer to calculation sheet, Table D-4).
Prepare and Issue Sampling Reports			\$10,000																				Obtain lab, prepare sampling plan, document sampling event and results.
Conduct Site Reviews			\$20,000																				Prepare Site Condition Report every 5 years.
Construct Decontamination Pad		\$12,913																					Assume all decon pad materials replaced every 3 years.
Perform Ground Water Monitoring				\$9,818																			(*) Includes the installation, maintenance, sampling, and replacement of three monitoring wells.
Quarterly (4 sampling events)					\$182																		Year 1
Semi Annually (2 Sampling Events)						\$91																	Year 2
Annually (3 Sampling Events)							\$45	\$45	\$45														years 3, 4, 5
Every 2 years (3 Sampling Events)										\$136	\$136	\$136											years 6, 8, 10
Every 5 years (8 Sampling Events)													\$363	\$363	\$363	\$363	\$363	\$363	\$363	\$363			years 15, 20, 25, 30, 35, 40, 45, 50
Every 10 years (10 Sampling events)																					\$454		Years 60, 70, 80, 90, 100, 110,120, 130, 140, 150
TOTALS	\$15,216	\$12,913	\$33,473	\$16,948	\$182	\$91	\$45	\$45	\$45	\$136	\$136	\$136	\$363	\$454									

Table F-13. Alternative 4 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
0	\$468,792	\$0	\$468,792	1.0000	\$468,792
1		\$15,398	\$15,398	0.9699	\$14,934
2		\$15,307	\$15,307	0.9408	\$14,401
3		\$28,175	\$28,175	0.9125	\$25,709
4		\$15,261	\$15,261	0.8850	\$13,506
5		\$48,734	\$48,734	0.8584	\$41,833
6		\$28,266	\$28,266	0.8326	\$23,534
7		\$15,216	\$15,216	0.8076	\$12,288
8		\$15,352	\$15,352	0.7833	\$12,025
9		\$28,129	\$28,129	0.7598	\$21,373
10		\$48,825	\$48,825	0.7369	\$35,979
11		\$15,216	\$15,216	0.7148	\$10,876
12		\$28,129	\$28,129	0.6933	\$19,502
13		\$15,216	\$15,216	0.6724	\$10,231
14		\$15,216	\$15,216	0.6522	\$9,924
15		\$61,966	\$61,966	0.6326	\$39,200
16		\$15,216	\$15,216	0.6136	\$9,336
17		\$15,216	\$15,216	0.5951	\$9,055
18		\$28,129	\$28,129	0.5772	\$16,236
19		\$15,216	\$15,216	0.5599	\$8,519
20		\$49,052	\$49,052	0.5430	\$26,635
21		\$28,129	\$28,129	0.5267	\$14,816
22		\$15,216	\$15,216	0.5109	\$7,774
23		\$15,216	\$15,216	0.4955	\$7,539
24		\$28,129	\$28,129	0.4806	\$13,519
25		\$49,052	\$49,052	0.4662	\$22,868
26		\$15,216	\$15,216	0.4521	\$6,879
27		\$28,129	\$28,129	0.4385	\$12,335
28		\$15,216	\$15,216	0.4254	\$6,473
29		\$15,216	\$15,216	0.4126	\$6,278
30		\$78,914	\$78,914	0.4002	\$31,581
31		\$15,216	\$15,216	0.3881	\$5,905
32		\$15,216	\$15,216	0.3765	\$5,729
33		\$28,129	\$28,129	0.3651	\$10,270
34		\$15,216	\$15,216	0.3542	\$5,389
35		\$49,052	\$49,052	0.3435	\$16,849
36		\$28,129	\$28,129	0.3332	\$9,373
37		\$15,216	\$15,216	0.3232	\$4,918
38		\$15,216	\$15,216	0.3135	\$4,770
39		\$28,129	\$28,129	0.3040	\$8,551
40		\$49,052	\$49,052	0.2949	\$14,466
41		\$15,216	\$15,216	0.2860	\$4,352
42		\$28,129	\$28,129	0.2774	\$7,803
43		\$15,216	\$15,216	0.2691	\$4,095
44		\$15,216	\$15,216	0.2610	\$3,971
45		\$61,966	\$61,966	0.2531	\$15,684
46		\$15,216	\$15,216	0.2455	\$3,735
47		\$15,216	\$15,216	0.2381	\$3,623
48		\$28,129	\$28,129	0.2310	\$6,498
49		\$15,216	\$15,216	0.2240	\$3,408
50		\$49,052	\$49,052	0.2173	\$10,659
51		\$28,129	\$28,129	0.2108	\$5,930
52		\$15,216	\$15,216	0.2044	\$3,110
53		\$15,216	\$15,216	0.1983	\$3,017
54		\$28,129	\$28,129	0.1923	\$5,409
55		\$48,689	\$48,689	0.1865	\$9,080
56		\$15,216	\$15,216	0.1809	\$2,753

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Table F-13. Alternative 4 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
57		\$28,129	\$28,129	0.1755	\$4,937
58		\$15,216	\$15,216	0.1702	\$2,590
59		\$15,216	\$15,216	0.1651	\$2,512
60		\$79,005	\$79,005	0.1601	\$12,649
61		\$15,216	\$15,216	0.1553	\$2,363
62		\$15,216	\$15,216	0.1506	\$2,291
63		\$28,129	\$28,129	0.1461	\$4,110
64		\$15,216	\$15,216	0.1417	\$2,156
65		\$48,689	\$48,689	0.1375	\$6,695
66		\$28,129	\$28,129	0.1333	\$3,750
67		\$15,216	\$15,216	0.1293	\$1,967
68		\$15,216	\$15,216	0.1254	\$1,908
69		\$28,129	\$28,129	0.1217	\$3,423
70		\$49,143	\$49,143	0.1180	\$5,799
71		\$15,216	\$15,216	0.1145	\$1,742
72		\$28,129	\$28,129	0.1110	\$3,122
73		\$15,216	\$15,216	0.1077	\$1,639
74		\$15,216	\$15,216	0.1044	\$1,589
75		\$61,602	\$61,602	0.1013	\$6,240
76		\$15,216	\$15,216	0.0983	\$1,496
77		\$15,216	\$15,216	0.0953	\$1,450
78		\$28,129	\$28,129	0.0924	\$2,599
79		\$15,216	\$15,216	0.0897	\$1,365
80		\$49,143	\$49,143	0.0870	\$4,275
81		\$28,129	\$28,129	0.0843	\$2,371
82		\$15,216	\$15,216	0.0818	\$1,245
83		\$15,216	\$15,216	0.0793	\$1,207
84		\$28,129	\$28,129	0.0770	\$2,166
85		\$48,689	\$48,689	0.0746	\$3,632
86		\$15,216	\$15,216	0.0724	\$1,102
87		\$28,129	\$28,129	0.0702	\$1,975
88		\$15,216	\$15,216	0.0681	\$1,036
89		\$15,216	\$15,216	0.0661	\$1,006
90		\$79,005	\$79,005	0.0641	\$5,064
91		\$15,216	\$15,216	0.0622	\$946
92		\$15,216	\$15,216	0.0603	\$918
93		\$28,129	\$28,129	0.0585	\$1,646
94		\$15,216	\$15,216	0.0567	\$863
95		\$48,689	\$48,689	0.0550	\$2,678
96		\$28,129	\$28,129	0.0534	\$1,502
97		\$15,216	\$15,216	0.0517	\$787
98		\$15,216	\$15,216	0.0502	\$764
99		\$28,129	\$28,129	0.0487	\$1,370
100		\$49,143	\$49,143	0.0472	\$2,320
101		\$15,216	\$15,216	0.0458	\$697
102		\$28,129	\$28,129	0.0444	\$1,249
103		\$15,216	\$15,216	0.0431	\$656
104		\$15,216	\$15,216	0.0418	\$636
105		\$61,602	\$61,602	0.0405	\$2,495
106		\$15,216	\$15,216	0.0393	\$598
107		\$15,216	\$15,216	0.0381	\$580
108		\$28,129	\$28,129	0.0370	\$1,041
109		\$15,216	\$15,216	0.0359	\$546
110		\$49,143	\$49,143	0.0348	\$1,710
111		\$28,129	\$28,129	0.0338	\$951
112		\$15,216	\$15,216	0.0327	\$498
113		\$15,216	\$15,216	0.0318	\$484

Table F-13. Alternative 4 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
114		\$28,129	\$28,129	0.0308	\$866
115		\$48,689	\$48,689	0.0299	\$1,456
116		\$15,216	\$15,216	0.0290	\$441
117		\$28,129	\$28,129	0.0281	\$790
118		\$15,216	\$15,216	0.0273	\$415
119		\$15,216	\$15,216	0.0264	\$402
120		\$79,005	\$79,005	0.0256	\$2,023
121		\$15,216	\$15,216	0.0249	\$379
122		\$15,216	\$15,216	0.0241	\$367
123		\$28,129	\$28,129	0.0234	\$658
124		\$15,216	\$15,216	0.0227	\$345
125		\$48,689	\$48,689	0.0220	\$1,071
126		\$28,129	\$28,129	0.0214	\$602
127		\$15,216	\$15,216	0.0207	\$315
128		\$15,216	\$15,216	0.0201	\$306
129		\$28,129	\$28,129	0.0195	\$549
130		\$49,143	\$49,143	0.0189	\$929
131		\$15,216	\$15,216	0.0183	\$278
132		\$28,129	\$28,129	0.0178	\$501
133		\$15,216	\$15,216	0.0172	\$262
134		\$15,216	\$15,216	0.0167	\$254
135		\$62,057	\$62,057	0.0162	\$1,005
136		\$15,216	\$15,216	0.0157	\$239
137		\$15,216	\$15,216	0.0153	\$233
138		\$28,129	\$28,129	0.0148	\$416
139		\$15,216	\$15,216	0.0144	\$219
140		\$49,143	\$49,143	0.0139	\$683
141		\$28,129	\$28,129	0.0135	\$380
142		\$15,216	\$15,216	0.0131	\$199
143		\$15,216	\$15,216	0.0127	\$193
144		\$28,129	\$28,129	0.0123	\$346
145		\$48,689	\$48,689	0.0120	\$584
146		\$15,216	\$15,216	0.0116	\$177
147		\$28,129	\$28,129	0.0112	\$315
148		\$15,216	\$15,216	0.0109	\$166
149		\$15,216	\$15,216	0.0106	\$161
150		\$49,143	\$49,143	0.0103	\$506
			TOTAL PRESENT WORTH		\$1,301,732
TOTAL NON-DISCOUNTED COST			\$4,464,624		

1. Discount rate column is a calculated annual multiplier where discount rate = $(1-e)^n$ where $e = 3.1\%$ and $n =$

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Table F-14. Alternative 5 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
216-A-19 Trench	Alt 5 - RTD/ET CAP	\$1,565,582	\$3,995,832	\$5,561,414	\$2,398,522
216-A-1 Crib	Alt 5 - RTD/ET CAP	\$1,360,869	\$3,995,832	\$5,356,700	\$2,193,809
216-A-3 Crib	Alt 5 - RTD/ET CAP	\$1,283,432	\$3,984,499	\$5,267,931	\$2,114,365
216-A-18 Trench	Alt 5 - RTD/ET CAP	\$3,131,530	\$3,995,832	\$7,127,362	\$3,964,470
216-A-20 Trench	Alt 5 - RTD/ET CAP	\$1,660,907	\$4,511,823	\$6,172,730	\$2,603,674
216-A-20 Trench Overflow	N/A	N/A	N/A	N/A	N/A
216-A-22 French Drain	Alt 5 - RTD/ET CAP	\$1,031,335	\$3,984,499	\$5,015,834	\$1,862,268
216-A-28 French Drain	Alt 5 - RTD/ET CAP	\$947,160	\$3,984,499	\$4,931,659	\$1,778,093
216-S-8 Trench	Alt 5 - RTD/ET CAP	\$4,579,619	\$4,004,001	\$8,583,620	\$5,414,006
216-A-34 Ditch	Alt 5 - RTD/ET CAP	\$4,872,197	\$5,656,653	\$10,528,851	\$6,058,638
UPR-200-E-145	N/A	N/A	N/A	N/A	N/A
216-B-12 Crib	Alt 5 - RTD/ET CAP	\$15,987,571	\$3,995,832	\$19,983,402	\$16,820,511
216-B-60 Crib	Alt 5 - RTD/ET CAP	\$4,556,293	\$3,995,832	\$8,552,125	\$5,389,233
216-C-3 Crib	Alt 5 - RTD/ET CAP	\$1,214,522	\$3,964,971	\$5,179,494	\$2,043,124
216-C-5 Crib	Alt 5 - RTD/ET CAP	\$1,238,266	\$4,042,114	\$5,280,381	\$2,079,404
216-C-7 Crib	Alt 5 - RTD/ET CAP	\$1,206,570	\$4,042,114	\$5,248,685	\$2,047,708
216-C-10 Crib	Alt 5 - RTD/ET CAP	\$1,041,240	\$4,042,114	\$5,083,354	\$1,882,378

Table F-14. Alternative 5 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
209-E-WS-3	N/A	N/A	N/A	N/A	N/A
270-E-1	N/A	N/A	N/A	N/A	N/A
UPR-200-E-64	N/A	N/A	N/A	N/A	N/A
216-S-7 Crib	Alt 5 - RTD/ET CAP	\$2,430,870	\$4,042,114	\$6,472,985	\$3,272,008
216-S-1 & 2 Crib	Alt 5 - RTD/ET CAP	\$2,680,009	\$4,042,114	\$6,722,123	\$3,521,146
UPR-200-W-36	N/A	N/A	N/A	N/A	N/A
216-S-4 French Drain	Alt 5 - RTD/ET CAP	\$1,179,312	\$4,042,114	\$5,221,427	\$2,020,450
216-S-22 Crib	Alt 5 - RTD/ET CAP	\$1,129,365	\$4,004,001	\$5,133,366	\$1,963,752
216-S-23 Crib	Alt 5 - RTD/ET CAP	\$3,377,164	\$4,004,001	\$7,381,165	\$4,211,551
216-T-20 Trench	Alt 5 - RTD/ET CAP	\$860,131	\$3,993,349	\$4,853,480	\$1,692,631
216-A-10 Crib	Alt 5 - RTD/ET CAP	\$9,110,737	\$4,168,125	\$13,278,862	\$9,980,057
216-A-5 Crib	Alt 5 - RTD/ET CAP	\$2,227,949	\$4,004,001	\$6,231,950	\$3,062,336
216-A-45 Crib	Alt 5 - RTD/ET CAP	\$9,130,753	\$4,004,001	\$13,134,755	\$9,965,140
216-C-1 Crib	Alt 5 - RTD/ET CAP	\$1,189,941	\$4,042,114	\$5,232,055	\$2,031,079
200-E-58	N/A	N/A	N/A	N/A	N/A
216-A-36B Crib (w/TRU)	Alt 5 - RTD/ET CAP	\$16,957,271	\$4,649,307	\$21,606,577	\$17,929,705

Table F-14. Alternative 5 Cost-Estimate Summary.

Site	Alternative	Total Capital Cost	Non-Discounted Annual & Periodic Cost	Non-Discounted Cost	Total Present Worth Cost
216-A-36A Crib (w/TRU)	Alt 5 - RTD/ET CAP	\$5,454,300	\$3,984,499	\$9,438,799	\$6,285,233
UPR-200-E-39	N/A	N/A	N/A	N/A	N/A
207-A-South Retention Basin	N/A	N/A	N/A	N/A	N/A
UPR-200-W-22	N/A	N/A	N/A	N/A	N/A
203-S Basin	N/A	N/A	N/A	N/A	N/A
204-S Basin	N/A	N/A	N/A	N/A	N/A
205-S Building Foundation	N/A	N/A	N/A	N/A	N/A
205-S Vault	N/A	N/A	N/A	N/A	N/A
216-A-37-1 Crib	Alt 5 - RTD/ET CAP	\$3,489,380	\$5,551,304	\$9,040,684	\$4,653,802

Table F-15. Alternative 5 Capital-Cost Summary (Example: 216-A-19 Trench).

Site	Description	Alternative	Mobilization/ Demobilization	Monitoring & Sampling	Site Work	Soil Excavation	Cap	Construction Staff	Project Management	Sub Total	Contingency (25%)	Remedial Design	Total Project
216-A-19 Trench	Trench	Alt 5 - RTD/ET CAP	\$244,122	\$152,448	\$58,780	\$418,248	\$69,588	\$108,318	\$66,769	\$1,118,273	\$279,568	\$167,741	\$1,565,582
216-A-1 Crib	Crib	Alt 5 - RTD/ET CAP	\$230,250	\$158,350	\$56,872	\$279,081	\$73,635	\$108,318	\$65,543	\$972,049	\$243,012	\$145,807	\$1,360,869
216-A-3 Crib	Crib	Alt 5 - RTD/ET CAP	\$219,340	\$154,456	\$52,186	\$256,693	\$64,593	\$105,632	\$63,837	\$916,737	\$229,184	\$137,511	\$1,283,432
216-A-18 Trench	Trench	Alt 5 - RTD/ET CAP	\$226,137	\$199,746	\$139,008	\$1,328,358	\$133,950	\$180,852	\$111,601	\$2,319,652	\$579,913	\$231,965	\$3,131,530
216-A-20 Trench	Trench	Alt 5 - RTD/ET CAP	\$226,428	\$146,226	\$69,633	\$301,137	\$242,723	\$124,437	\$75,778	\$1,186,362	\$296,591	\$177,954	\$1,660,907
216-A-20 Trench Overflow	Overflow	N/A								\$0	\$0	\$0	\$0
216-A-22 French Drain	French Drain	Alt 5 - RTD/ET CAP	\$219,109	\$139,888	\$39,026	\$148,898	\$51,024	\$86,827	\$51,896	\$736,668	\$184,167	\$110,500	\$1,031,335
UPR-200-E-17	Unplanned Release	N/A								\$0	\$0	\$0	\$0
216-A-28 French Drain	French Drain	Alt 5 - RTD/ET CAP	\$220,040	\$147,216	\$35,337	\$84,009	\$55,610	\$84,140	\$50,191	\$676,543	\$169,136	\$101,481	\$947,160
216-S-8 Trench	Trench	Alt 5 - RTD/ET CAP	\$231,135	\$223,795	\$199,409	\$2,229,580	\$132,485	\$231,894	\$144,012	\$3,392,310	\$848,078	\$339,231	\$4,579,619
216-A-34 Ditch	Ditch	Alt 5 - RTD/ET CAP	\$240,895	\$253,931	\$198,080	\$2,153,606	\$346,271	\$256,071	\$160,181	\$3,609,035	\$902,259	\$360,904	\$4,872,197
UPR-200-E-145	Unplanned Release	N/A								\$0	\$0	\$0	\$0
216-B-12 Crib	Crib	N/A	\$295,497	\$686,035	\$768,643	\$8,959,536	\$159,122	\$734,255	\$463,003	\$12,066,091	\$3,016,523	\$904,957	\$15,987,571
216-B-60 Crib	Crib	N/A	\$227,601	\$235,144	\$195,126	\$2,289,446	\$64,170	\$223,834	\$139,711	\$3,375,032	\$843,758	\$337,503	\$4,556,293
216-C-3 Crib	Crib	Alt 5 - RTD/ET CAP	\$219,505	\$153,554	\$48,341	\$213,261	\$72,170	\$100,259	\$60,426	\$867,516	\$216,879	\$130,127	\$1,214,522
216-C-5 Crib	Crib	Alt 5 - RTD/ET CAP	\$219,257	\$155,615	\$50,898	\$238,144	\$59,877	\$100,259	\$60,426	\$884,476	\$221,119	\$132,671	\$1,238,266
216-C-7 Crib	Crib	Alt 5 - RTD/ET CAP	\$219,340	\$153,554	\$47,885	\$215,782	\$64,590	\$100,259	\$60,426	\$861,836	\$215,459	\$129,275	\$1,206,570
216-C-10 Crib	Crib	Alt 5 - RTD/ET CAP	\$219,315	\$149,277	\$38,849	\$126,377	\$62,417	\$92,200	\$55,308	\$743,743	\$185,936	\$111,561	\$1,041,240
209-E-WS-3	Hold Up Tank	N/A								\$0	\$0	\$0	\$0
270-E-1	Neutralization Tank	N/A								\$0	\$0	\$0	\$0
UPR-200-E-64	Unplanned Release	N/A								\$0	\$0	\$0	\$0
16-S-7 Crib	Crib	N/A	\$226,054	\$191,582	\$127,914	\$796,511	\$115,000	\$172,792	\$106,483	\$1,736,336	\$434,084	\$260,450	\$2,430,870
16-S-1 & 2 Crib	Crib	N/A	\$226,207	\$206,358	\$144,644	\$912,310	\$110,359	\$194,284	\$120,130	\$1,914,292	\$478,573	\$287,144	\$2,680,009
UPR-200-W-36	Unplanned Release	N/A								\$0	\$0	\$0	\$0
216-S-4 French Drain	French Drain	Alt 5 - RTD/ET CAP	\$219,109	\$143,258	\$45,450	\$236,099	\$50,942	\$92,200	\$55,308	\$842,366	\$210,592	\$126,355	\$1,179,312
216-S-22 Crib	Crib	Alt 5 - RTD/ET CAP	\$219,865	\$150,702	\$44,502	\$148,949	\$86,379	\$97,572	\$58,720	\$806,689	\$201,672	\$121,003	\$1,129,365
216-S-23 Crib	Crib	N/A	\$238,836	\$287,550	\$223,441	\$1,101,898	\$198,487	\$277,563	\$173,828	\$2,501,603	\$625,401	\$250,160	\$3,377,164
216-T-20 Trench	Trench	Alt 5 - RTD/ET CAP	\$215,604	\$145,674	\$38,821	\$22,505	\$61,019	\$81,454	\$49,302	\$614,379	\$153,595	\$92,157	\$860,131
216-A-10 Crib	Crib	N/A	\$269,771	\$435,955	\$573,017	\$4,413,176	\$215,249	\$594,561	\$374,299	\$6,876,028	\$1,719,007	\$515,702	\$9,110,737
216-A-5 Crib	Crib	N/A	\$222,653	\$203,008	\$130,770	\$681,269	\$77,991	\$170,106	\$105,595	\$1,591,392	\$397,848	\$238,709	\$2,227,949
216-A-45 Crib	Crib	N/A	\$277,681	\$692,324	\$656,317	\$3,764,548	\$258,846	\$683,213	\$430,592	\$6,763,521	\$1,690,880	\$676,352	\$9,130,753
216-C-1 Crib	Crib	Alt 5 - RTD/ET CAP	\$216,626	\$153,554	\$53,050	\$207,314	\$63,122	\$97,572	\$58,720	\$849,958	\$212,490	\$127,494	\$1,189,941
200-E-58	Neutralization Tank	N/A								\$0	\$0	\$0	\$0
216-A-36B Crib	Crib	Alt 5 - RTD/ET CAP	\$392,571	\$1,808,845	\$206,543	\$9,446,604	\$267,163	\$414,571	\$261,643	\$12,797,940	\$3,199,485	\$959,846	\$16,957,271
216-A-36A Crib	Crib	Alt 5 - RTD/ET CAP	\$335,725	\$375,830	\$87,193	\$2,884,906	\$90,061	\$164,733	\$101,774	\$4,040,222	\$1,010,056	\$404,022	\$5,454,300
UPR-200-E-39	Unplanned Release	N/A								\$0	\$0	\$0	\$0
207-A-South Retention Basin	Retention Basin	N/A								\$0	\$0	\$0	\$0
UPR-200-W-22	Unplanned Release	N/A								\$0	\$0	\$0	\$0
203-S Basin	Sub-grade Basin	N/A								\$0	\$0	\$0	\$0
204-S Basin	Sub-grade Basin	N/A								\$0	\$0	\$0	\$0
205-S Building Foundation	Sub-grade Foundation	N/A								\$0	\$0	\$0	\$0
205-S Vault	Sub-grade Vault	N/A								\$0	\$0	\$0	\$0
216-A-37-1 Crib	Crib	Alt 5 - RTD/ET CAP	\$236,487	\$228,166	\$173,852	\$1,245,292	\$341,367	\$221,148	\$138,414	\$2,584,726	\$646,182	\$258,473	\$3,489,380

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 Table F-16. Alternative 5 Periodic-Cost Summary (Example: 216-A-19 Trench).

Item	Item Cost		Per Ten Years																	Notes		
	Annually	per 3 Years	per 5 Years	per 30 Years	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	8th Year	10th Year	15th Year	20th Year	25th Year	30th Year	35th Year	40th Year	45th Year		50th Year	50 - 150 Years
Perform Existing Barrier Cover Inspection	\$781																					Cost is based on a two person crew (8 hours/day @ \$112/hr). It is assumed to require 1 day to inspect sites up to 50,000 ft ² in size. An additional day is required for each additional 50,000 ft ² . The site area - Note 2
Conduct Radiation Survey of Surface Soil	\$8,712																					Cost is based on \$1,000 for every 5,000 square feet. The site area - Note 2
Maintain Existing Barrier Cover	\$5,723																					Cost includes the purchase of soil to repair ruts and holes over 10% of the site area. Refer to the calculation sheet.
Conduct Vadose Zone Monitoring			\$3,473	\$7,130																		Monitoring occurs once every 5 years at a cost of \$75/ft of borehole. Bore hole replacement occurs once every 30 years (refer to calculation sheet, Table D-4).
Prepare and Issue Sampling Reports			\$10,000																			Obtain lab, prepare sampling plan, document sampling event and results.
Conduct Site Reviews			\$20,000																			Prepare Site Condition Report every 5 years.
Construct Decontamination Pad		\$12,913																				Assume all decon pad materials replaced every 3 years.
Perform Ground Water Monitoring				\$9,818																		(* Includes the installation, maintenance, sampling, and replacement of three monitoring wells.
Quarterly (4 sampling events)					\$182																	Year 1
Semi Annually (2 Sampling Events)						\$91																Year 2
Annually (3 Sampling Events)							\$45	\$45	\$45													years 3, 4, 5
Every 2 years (3 Sampling Events)										\$136	\$136	\$136										years 6, 8, 10
Every 5 years (8 Sampling Events)													\$363	\$363	\$363	\$363	\$363	\$363	\$363	\$363	\$363	years 15, 20, 25, 30, 35, 40, 45, 50
Every 10 years (10 Sampling events)																					\$454	Years 60, 70, 80, 90, 100, 110,120, 130, 140, 150
TOTALS	\$15,216	\$12,913	\$33,473	\$16,948	\$182	\$91	\$45	\$45	\$45	\$136	\$136	\$136	\$363	\$454								

Table F-17. Alternative 5 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1%	Present Worth
0	\$1,565,582	\$0	\$1,565,582	1.0000	\$1,565,582
1		\$15,398	\$15,398	0.9699	\$14,934
2		\$15,307	\$15,307	0.9408	\$14,401
3		\$28,175	\$28,175	0.9125	\$25,709
4		\$15,261	\$15,261	0.8850	\$13,506
5		\$48,734	\$48,734	0.8584	\$41,833
6		\$28,266	\$28,266	0.8326	\$23,534
7		\$15,216	\$15,216	0.8076	\$12,288
8		\$15,352	\$15,352	0.7833	\$12,025
9		\$28,129	\$28,129	0.7598	\$21,373
10		\$48,825	\$48,825	0.7369	\$35,979
11		\$15,216	\$15,216	0.7148	\$10,876
12		\$28,129	\$28,129	0.6933	\$19,502
13		\$15,216	\$15,216	0.6724	\$10,231
14		\$15,216	\$15,216	0.6522	\$9,924
15		\$61,966	\$61,966	0.6326	\$39,200
16		\$15,216	\$15,216	0.6136	\$9,336
17		\$15,216	\$15,216	0.5951	\$9,055
18		\$28,129	\$28,129	0.5772	\$16,236
19		\$15,216	\$15,216	0.5599	\$8,519
20		\$49,052	\$49,052	0.5430	\$26,635
21		\$28,129	\$28,129	0.5267	\$14,816
22		\$15,216	\$15,216	0.5109	\$7,774
23		\$15,216	\$15,216	0.4955	\$7,539
24		\$28,129	\$28,129	0.4806	\$13,519
25		\$49,052	\$49,052	0.4662	\$22,868
26		\$15,216	\$15,216	0.4521	\$6,879
27		\$28,129	\$28,129	0.4385	\$12,335
28		\$15,216	\$15,216	0.4254	\$6,473
29		\$15,216	\$15,216	0.4126	\$6,278
30		\$78,914	\$78,914	0.4002	\$31,581
31		\$15,216	\$15,216	0.3881	\$5,905
32		\$15,216	\$15,216	0.3765	\$5,729
33		\$28,129	\$28,129	0.3651	\$10,270
34		\$15,216	\$15,216	0.3542	\$5,389
35		\$49,052	\$49,052	0.3435	\$16,849
36		\$28,129	\$28,129	0.3332	\$9,373
37		\$15,216	\$15,216	0.3232	\$4,918
38		\$15,216	\$15,216	0.3135	\$4,770
39		\$28,129	\$28,129	0.3040	\$8,551
40		\$49,052	\$49,052	0.2949	\$14,466
41		\$15,216	\$15,216	0.2860	\$4,352
42		\$28,129	\$28,129	0.2774	\$7,803
43		\$15,216	\$15,216	0.2691	\$4,095
44		\$15,216	\$15,216	0.2610	\$3,971
45		\$61,966	\$61,966	0.2531	\$15,684
46		\$15,216	\$15,216	0.2455	\$3,735
47		\$15,216	\$15,216	0.2381	\$3,623
48		\$28,129	\$28,129	0.2310	\$6,498

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Table F-17. Alternative 5 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
49		\$15,216	\$15,216	0.2240	\$3,408
50		\$49,052	\$49,052	0.2173	\$10,659
51		\$28,129	\$28,129	0.2108	\$5,930
52		\$15,216	\$15,216	0.2044	\$3,110
53		\$15,216	\$15,216	0.1983	\$3,017
54		\$28,129	\$28,129	0.1923	\$5,409
55		\$48,689	\$48,689	0.1865	\$9,080
56		\$15,216	\$15,216	0.1809	\$2,753
57		\$28,129	\$28,129	0.1755	\$4,937
58		\$15,216	\$15,216	0.1702	\$2,590
59		\$15,216	\$15,216	0.1651	\$2,512
60		\$79,005	\$79,005	0.1601	\$12,649
61		\$15,216	\$15,216	0.1553	\$2,363
62		\$15,216	\$15,216	0.1506	\$2,291
63		\$28,129	\$28,129	0.1461	\$4,110
64		\$15,216	\$15,216	0.1417	\$2,156
65		\$48,689	\$48,689	0.1375	\$6,695
66		\$28,129	\$28,129	0.1333	\$3,750
67		\$15,216	\$15,216	0.1293	\$1,967
68		\$15,216	\$15,216	0.1254	\$1,908
69		\$28,129	\$28,129	0.1217	\$3,423
70		\$49,143	\$49,143	0.1180	\$5,799
71		\$15,216	\$15,216	0.1145	\$1,742
72		\$28,129	\$28,129	0.1110	\$3,122
73		\$15,216	\$15,216	0.1077	\$1,639
74		\$15,216	\$15,216	0.1044	\$1,589
75		\$61,602	\$61,602	0.1013	\$6,240
76		\$15,216	\$15,216	0.0983	\$1,496
77		\$15,216	\$15,216	0.0953	\$1,450
78		\$28,129	\$28,129	0.0924	\$2,599
79		\$15,216	\$15,216	0.0897	\$1,365
80		\$49,143	\$49,143	0.0870	\$4,275
81		\$28,129	\$28,129	0.0843	\$2,371
82		\$15,216	\$15,216	0.0818	\$1,245
83		\$15,216	\$15,216	0.0793	\$1,207
84		\$28,129	\$28,129	0.0770	\$2,166
85		\$48,689	\$48,689	0.0746	\$3,632
86		\$15,216	\$15,216	0.0724	\$1,102
87		\$28,129	\$28,129	0.0702	\$1,975
88		\$15,216	\$15,216	0.0681	\$1,036
89		\$15,216	\$15,216	0.0661	\$1,006
90		\$79,005	\$79,005	0.0641	\$5,064
91		\$15,216	\$15,216	0.0622	\$946
92		\$15,216	\$15,216	0.0603	\$918
93		\$28,129	\$28,129	0.0585	\$1,646
94		\$15,216	\$15,216	0.0567	\$863
95		\$48,689	\$48,689	0.0550	\$2,678
96		\$28,129	\$28,129	0.0534	\$1,502
97		\$15,216	\$15,216	0.0517	\$787

Table F-17. Alternative 5 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
98		\$15,216	\$15,216	0.0502	\$764
99		\$28,129	\$28,129	0.0487	\$1,370
100		\$49,143	\$49,143	0.0472	\$2,320
101		\$15,216	\$15,216	0.0458	\$697
102		\$28,129	\$28,129	0.0444	\$1,249
103		\$15,216	\$15,216	0.0431	\$656
104		\$15,216	\$15,216	0.0418	\$636
105		\$61,602	\$61,602	0.0405	\$2,495
106		\$15,216	\$15,216	0.0393	\$598
107		\$15,216	\$15,216	0.0381	\$580
108		\$28,129	\$28,129	0.0370	\$1,041
109		\$15,216	\$15,216	0.0359	\$546
110		\$49,143	\$49,143	0.0348	\$1,710
111		\$28,129	\$28,129	0.0338	\$951
112		\$15,216	\$15,216	0.0327	\$498
113		\$15,216	\$15,216	0.0318	\$484
114		\$28,129	\$28,129	0.0308	\$866
115		\$48,689	\$48,689	0.0299	\$1,456
116		\$15,216	\$15,216	0.0290	\$441
117		\$28,129	\$28,129	0.0281	\$790
118		\$15,216	\$15,216	0.0273	\$415
119		\$15,216	\$15,216	0.0264	\$402
120		\$79,005	\$79,005	0.0256	\$2,023
121		\$15,216	\$15,216	0.0249	\$379
122		\$15,216	\$15,216	0.0241	\$367
123		\$28,129	\$28,129	0.0234	\$658
124		\$15,216	\$15,216	0.0227	\$345
125		\$48,689	\$48,689	0.0220	\$1,071
126		\$28,129	\$28,129	0.0214	\$602
127		\$15,216	\$15,216	0.0207	\$315
128		\$15,216	\$15,216	0.0201	\$306
129		\$28,129	\$28,129	0.0195	\$549
130		\$49,143	\$49,143	0.0189	\$929
131		\$15,216	\$15,216	0.0183	\$278
132		\$28,129	\$28,129	0.0178	\$501
133		\$15,216	\$15,216	0.0172	\$262
134		\$15,216	\$15,216	0.0167	\$254
135		\$62,057	\$62,057	0.0162	\$1,005
136		\$15,216	\$15,216	0.0157	\$239
137		\$15,216	\$15,216	0.0153	\$233
138		\$28,129	\$28,129	0.0148	\$416
139		\$15,216	\$15,216	0.0144	\$219
140		\$49,143	\$49,143	0.0139	\$683
141		\$28,129	\$28,129	0.0135	\$380
142		\$15,216	\$15,216	0.0131	\$199
143		\$15,216	\$15,216	0.0127	\$193
144		\$28,129	\$28,129	0.0123	\$346
145		\$48,689	\$48,689	0.0120	\$584
146		\$15,216	\$15,216	0.0116	\$177

Table F-17. Alternative 5 Present-Worth Analysis (Example: 216-A-19 Trench).

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 3.1% ¹	Present Worth
147		\$28,129	\$28,129	0.0112	\$315
148		\$15,216	\$15,216	0.0109	\$166
149		\$15,216	\$15,216	0.0106	\$161
150		\$49,143	\$49,143	0.0103	\$506
TOTAL PRESENT WORTH					\$2,398,522
TOTAL NON-DISCOUNTED COST			\$5,561,414		

1. Discount rate column is a calculated annual multiplier where discount rate = $(1-e)^n$ where $e = 3.1\%$ and $n =$ year (1 - 150).

APPENDIX G

WASTE SITE EVALUATION

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APPENDIX G**WASTE SITE EVALUATION****G1.0 SHALLOW ANALOGOUS WASTE SITES EVALUATION**

This appendix identifies a methodology for evaluating a potential for human-health and ecological risk at analogous waste sites where the representative waste site human-health and ecological risk assessment may not apply. The detailed shallow-site evaluation is presented in this appendix.

G1.1 BACKGROUND AND SCOPE

The remedial investigation sampled soils within the top 4.6 m (15 ft) (generally at 3.8 to 4.6 m [12.5 to 15 ft] depths) at the seven representative waste sites, as the point of compliance for direct-contact human-health and ecological risk. The sample results were evaluated for human-health and ecological direct-contact risk. For representative waste sites that are 4.6 m (15 ft) deep or less, the first sample was taken at or near the site bottom. Consistent with conceptual contamination models, the site bottom generally is the major zone of contamination, containing the maximum concentrations for all but the more mobile soil contaminants. At these shallow representative waste sites, the human-health and ecological risk assessment based on this sampling is representative of its shallow analogous waste sites or is otherwise bounding with regard to the overall extent of contamination, because the analogous waste sites generally are less contaminated.

At the deeper representative waste sites (e.g., 216-A-10 Crib [13.7 m or 45 ft], 216-B-12 Crib [9 m or 30 ft], 216-A-36B Crib [7.6 m or 25 ft], and 216-S-7 Crib [6.4 m or 21 ft]), the first sample taken at the 4.6 m (15 ft) depth and evaluated for direct contact and ecological exposure risk is from soils above the bottom of the engineered structure and still within the relatively clean backfill. The risk assessment did not identify human-health or ecological exposure risk at these representative waste sites. However, shallower analogous waste sites not having the same deep clean cover could have contamination residing within the top 4.6 m (15 ft), making the representative waste site human-health and ecological risk evaluation not representative of the analogous waste site without further consideration. Surfaces of the otherwise clean 216-A-10 Crib, 216-B-12 Crib, and 216-S-7 Crib backfill material were slightly contaminated, but this contamination was not sufficient to provide human-health or ecological risk and so is not relevant to this evaluation.

Below are the representative waste sites and their analogous waste sites where this concern potentially still could exist:

- 216-A-19 Trench and shallower analogous waste sites 216-A-1 Crib, 216-A-3 Crib, 216-A-18 Trench, 216-A-22 French Drain, 216-A-28 Crib, and 216-A-34 Ditch
- 216-B-12 Crib and shallower analogous waste sites 216-C-3 Crib, 216-C-5 Crib, 216-C-7 Crib, and 216-C-10 Crib

- 216-A-10 Crib and shallower analogous waste site 216-C-1 Crib
- 216-S-7 Crib and shallower analogous waste sites 216-T-20 Trench and 216-S-22 Crib.

Unplanned releases are not engineered disposal sites and are highly bound by their respective representative waste sites regarding contaminant inventory (i.e., they have no developed contaminant inventory for evaluation) and have significantly different configuration (i.e., generally shallower surface contaminations). Consequently, UPR-E-39, UPR-E-64, and UPR-E-145 cannot be evaluated using this process.

G1.2 SHALLOW-SITE EVALUATION METHODOLOGY

This method superimposes contaminant concentrations of deeper, more contaminated surrogate soils of the representative waste sites onto the shallow zone of analogous waste site soil that requires evaluation for potential direct-contact human-health and ecological risk. The evaluation process followed the steps below.

- **Establish surrogate zone of representative waste site soils.** Using analogous waste site depth (feasibility study, Table 2-2), the zone of analogous waste site soil requiring evaluation and the corresponding number of meters (feet) of surrogate representative waste site soils were identified. The analogous waste site zone is the distance from the shallowest point (the site bottom or the shallowest point of waste entry) to the 4.6 m (15 ft) point of compliance. This is the minimum number of meters (feet) of the representative waste site soil column, starting at the bottom of the engineered structure, for which sample results will be evaluated against human-health and terrestrial-wildlife risk-screening levels. This simulates those concentrations existing in the shallower analogous waste site soils.
- **Identify representative waste site human-health and ecological preliminary remediation goal (PRG) exceedances.** The maximum concentrations of representative waste site constituents within this range (feasibility study, Section 2.4.2) are compared to human-health and ecological (terrestrial-wildlife) screening levels found in the feasibility study, Table 3-1; Appendix D of this feasibility study; and/or DOE/RL-2003-23, *Focused Feasibility Study for the 200-UW-1 Operable Unit*. Where representative waste site constituents in the soil range did not exceed PRGs, the generally less contaminated analogous waste site also was presumed not to exceed the PRGs, and the evaluation was considered complete.
- **Establish the PRG exceedance order of magnitude.** Where a representative waste site contaminant within the soil range exceeded a PRG, the exceedance was quantified by order of magnitude. This representative waste site PRG order-of-magnitude exceedance was equated to the representative waste site contaminant inventory (feasibility study, Table 2-2). It can be reasoned that if the representative waste site contaminant inventory were smaller by the specific order-of-magnitude value, the representative waste site would not have exceeded the PRGs. This order-of-magnitude value becomes the

benchmark criterion for comparison of analogous and representative waste site contaminant inventory.

- **Compare representative waste site and analogous waste site contaminant inventories.** The representative waste site contaminant inventory and the analogous waste site contaminant inventory were compared using the representative waste site order-of-magnitude benchmark criterion. The analogous waste site contaminant inventory must be the benchmark order of magnitude smaller than the representative waste site contaminant inventory to show the absence of potential human-health or terrestrial-wildlife risk.

G1.3 EVALUATION RESULTS

The results of the evaluation described above for human-health and ecological risk at the 216-A-19 Trench, 216-B-12 Crib, 216-A-10 Crib, and the 216-S-7 Crib representative waste sites and their shallower analogous waste sites are described below.

G1.3.1 216-A-19 Trench

The 216-A-19 Trench is 4.6 m (15 ft) deep but is evaluated here as a conservative measure, because the first sample could have been taken slightly above the bottom of the engineered structure and therefore in clean soil. The shallower analogous waste sites of the 216-A-19 Trench considered for evaluation included the 216-A-1 Crib, 216-A-3 Crib, 216-A-18 Trench, 216-A-22 French Drain, 216-A-28 Crib, and 216-A-34 Ditch. The 216-A-19 Trench bottom is approximately 4.6 m (15 ft) deep. The shallowest waste entry point of the analogous waste sites is 1.2 m (4 ft) below ground surface (bgs) (216-A-28 Crib), which is approximately 3.4 m (11 ft) to the 4.6 m (15 ft) point of compliance. This 3.4 m (11 ft) range will be evaluated against an equivalent 3.4 m (11 ft) range of soils below the representative waste site bottom. Trench samples representing the 3.4 m (11 ft) range would include samples taken at 4.4, 5.3, 6.9, and 8.4 m (14.5, 17.5, 22.5, and 27.5 ft) bgs (an actual evaluated 4 m (13 ft) range). The first trench sample, taken at 4.4 m (14.5 ft) bgs, underwent human-health and terrestrial-wildlife evaluation. Even though potentially above the site bottom, this sample contained the maximum concentrations for all constituents except Sr-90 (5.3 m [17.5 ft]), manganese (5.3 m [17.5 ft]), uranium (6.9 m [22.5 ft]), and nitrates (8.4 m [27.5 ft]), all of which were included in the evaluation. No concentration exceeded the human-health screening values, so human-health risk is anticipated to exist at the shallower analogous waste sites.

The maximum uranium concentration of 129 pCi/g in shallow soils (4.4 m [14.5 ft bgs]) exceeded the wildlife PRG for uranium of 5.9 pCi/g (feasibility study, Table 3-1), indicating the potential for ecological risk at the representative waste site 216-A-19 Trench and its analogous waste sites. Consequently, the potential for ecological risk from uranium at the analogous waste sites will be evaluated using shallow-site evaluation methodology. The 216-A-19 shallow-soil sample results will be used in this evaluation (instead of a zone of representative waste site surrogate soils), because the maximum uranium concentration actually was found in these shallow-site soils and was used in the representative waste site ecological risk assessment. The 129 mg/kg uranium concentration exceeded the wildlife PRG of 5.9 mg/kg by greater than one

order of magnitude but less than two orders of magnitude. The analogous waste site inventory for uranium must be smaller than the representative waste site inventory for uranium by this order-of-magnitude range to suggest the absence of ecological risk.

216-A-1 Crib, 216-A-3 Crib, 216-A-18 Trench, 216-A-20 Trench, 216-A-22 French Drain, and 216-S-8 Trench. The 216-A-1 Crib, 216-A-3 Crib, 216-A-18 Trench, 216-A-20 Trench, 216-A-22 French Drain, and 216-S-8 Trench analogous waste sites all are at least 4.6 m (15 ft) bgs or deeper, and their uranium inventories either are smaller than or essentially at the order-of-magnitude criterion, suggesting that ecological risk is unlikely at these sites.

UPR-200-E-145, UPR-200-E-17, 216-A-28 Crib, and the 216-A-34 Ditch. The UPR-200-E-145, UPR-200-E-17, 216-A-28 Crib, and the 216-A-34 Ditch are shallow and because all are shallower than the representative waste site, they are considered separately. The 216-A-28 Crib is 3.4 m (11 ft) deep, and its uranium inventory is smaller than the 216-A-19 Trench uranium inventory by at least two orders of magnitude, so ecological risk is not anticipated. The 216-A-34 Ditch is 1.8 m (6 ft) deep, and it fed 241-A-431 Building low-activity contact condenser cooling water to the 216-A-18 and 216-A-20 Trenches. Because no uranium contaminant inventory was developed for this waste stream, ecological risk from uranium is not anticipated. UPR-200-E-145 is a shallow-site release of unknown quantity from sample piping of the low-activity 241-A-431 Building contact condenser cooling water to the 216-A-34 Ditch. Although anticipated to have minimal ecological risk from uranium, the preferred alternative for this site is Alternative 3 – Removal, Treatment, and Disposal (feasibility study, Chapter 8.0), which would eliminate any potential ecological risk at this site. UPR-200-E-17 was a spill of unknown quantity to the surface of the 216-A-22 French Drain, making the risk from this spill indeterminate and, because the site was covered with soil in 1959, an otherwise indeterminate ecological risk was further minimized. Further, because this site is located against the north wall of the 203-A Acid Pump House Building, its location limits wildlife access and provides low-quality habitat and little potential forage for wildlife receptors, suggesting that risk to ecological receptors is unlikely.

G1.3.2 216-B-12 Crib

The 216-B-12 Crib and its shallower analogous waste sites include the 216-C-3 Crib, 216-C-5 Crib, 216-C-7 Crib, and 216-C-10 Crib. The shallowest point for these analogous waste sites was 1.2 m (4 ft) (the waste entry point or the 216-C-10 Crib), making the minimum range of soil to the 4.6 m (15 ft) point of compliance 3.4 m (11 ft). The 216-B-12 Crib is 7.9 m (26 ft) to the bottom of the engineered structure. The representative waste site surrogate soils that included this 3.4 m (11 ft) evaluation range were from the crib bottom (7.9 m [26 ft] to 12.2 m (40 ft) bgs. This range included results from samples taken at 10.8 m (35.5 ft) and 12.2 m (40 ft) bgs. Of the maximum concentrations of contaminants in the representative waste site range (feasibility study, Section 2.4.2), only Sr-90 (12,700 pCi/g) exceeded human-health PRGs and ecological (terrestrial-wildlife) PRGs. The Sr-90 (12,700 pCi/g) exceeded its human-health PRGs (2,250 pCi/g) by just over one-half order of magnitude, and its terrestrial-wildlife PRG (22.5 pCi) by approximately two and one-half orders of magnitude. The analogous waste site Sr-90 contaminant inventory must be approximately two and one-half orders of magnitude smaller than the representative site contaminant inventory to confirm the absence of potential

human-health or terrestrial-wildlife risk. The representative and analogous waste site contaminant inventories for Sr-90 compare as follows.

216-C-3 Crib. The analogous waste site 216-C-3 Crib inventory of Sr-90 (8.04 Ci) is one order of magnitude smaller than the representative waste site Sr-90 contaminant inventory of 80.0 Ci. Because this represents less contamination than the minimum human-health one-half order-of-magnitude value, this site presents no human-health risk. However, because the analogous waste site contaminant inventory is not at least two and one-half orders of magnitude smaller than the representative waste site contaminant inventory, a potential ecological risk exists.

216-C-5 Crib. The analogous waste site 216-C-5 Crib inventory of Sr-90 (4.2 Ci) is approximately one and one-half orders of magnitude smaller than the representative waste site Sr-90 contaminant inventory of 80.0 Ci. Because this represents less contamination than the minimum human-health one-half order-of-magnitude value, this site presents no potential human-health risk. However, because the analogous waste site contaminant inventory is not at least two and one-half orders of magnitude smaller than the representative waste site contaminant inventory, a potential ecological risk exists.

216-C-7 Crib. The analogous waste site 216-C-7 Crib inventory of Sr-90 (0.05 Ci) is more than three orders of magnitude smaller than the representative waste site Sr-90 contaminant inventory of 80.0 Ci. Because this represents less contamination than the minimum human-health one-half order-of-magnitude value or the minimum ecological (terrestrial-wildlife) two and one-half order-of-magnitude range, this site presents no potential human-health or ecological risk.

216-C-10 Crib. The analogous waste site 216-C-10 Crib inventory of Sr-90 (3.5 Ci) is more than one order of magnitude smaller than the representative waste site Sr-90 contaminant inventory of 80.0 Ci. Because this represents less contamination than the minimum human-health one-half order-of-magnitude value, this site presents no potential human-health risk. However, because the analogous waste site contaminant inventory is not at least two and one-half orders of magnitude smaller than the representative waste site contaminant inventory, this site presents a potential ecological risk.

G1.3.3 216-A-10 Crib

The 216-A-10 Crib has only one shallow analogous waste site, the 216-C-1 Crib. The 216-C-1 Crib is 4 m (13 ft) bgs at the bottom but, because waste entered this site at 3 m (10 ft) bgs, the depth to the 4.6 m (15 ft) point of compliance is conservatively identified as 1.5 m (5 ft). The 216-A-10 Crib is 13.7 m (45 ft) deep. The sample taken at 3.8 m (12.5 ft) bgs was evaluated for human-health and ecological risk. However, because this sample was taken in an area of relatively clean backfill, the human-health and ecological risk identified for the representative waste site is not representative of the shallower analogous waste site 216-C-1 Crib. The range of surrogate representative waste site soil that will include this 1.5 m (5 ft) range is the approximate 2.1 m (7 ft) range from the representative waste site crib bottom (13.7 to 15.8 m [45 to 52 ft]) bgs, which will include results of samples taken at 13.7 and 15.8 m (45 and 52 ft) bgs, generally representing the major zone of contamination.

The following contaminants (feasibility study, Section 2.4.2) within this depth range exceeded human-health and/or ecological PRGs at the maximum concentrations by the identified order of magnitude. Plutonium-239/240 (7,110 pCi/g) exceeded its human-health PRG (425 pCi/g) by one and one-half orders of magnitude and exceeded its ecological (terrestrial-wildlife) PRG (6,110 pCi/g) by less than one order of magnitude. Cesium-137 (1,080 pCi/g) exceeded its human-health PRG (23.4 pCi/g) by slightly less than two orders of magnitude and its ecological PRG (115 pCi/g) by one order of magnitude. Americium-241 (1,320 pCi/g) exceeded its human-health PRG (335 pCi/g) by less than one order of magnitude.

216-C-1 Crib. The analogous waste site contaminant inventory for total plutonium (8.0 Ci) is more than one and one-half orders of magnitude smaller than the representative waste site contaminant inventory of 350 Ci. Because this represents less contamination than the minimum plutonium human-health one and one-half order-of-magnitude value or the minimum plutonium ecological (terrestrial-wildlife) PRG of less than one order of magnitude, plutonium presents no discernable potential human-health or ecological risk at this site. This site had no developed Am-241 contaminant inventory and, therefore, no discernable human-health or ecological risk from Am-241. The analogous waste site contaminant inventory for Cs-137 (0.04 Ci) was three orders of magnitude smaller than the representative waste site contaminant inventory of 80.5 Ci. Because this represents less contamination than the minimum Cs-137 human-health two orders-of-magnitude range and the minimum Cs-137 ecological (terrestrial-wildlife) range of one order of magnitude, Cs-137 presents no discernable potential human-health or ecological risk at this site. Given the information above, this analogous waste site has no potential human-health or ecological risk

G1.3.4 216-S-7 Crib

The 216-S-7 Crib has two shallower analogous waste sites, the 216-T-20 Trench and the 216-S-22 Crib. The shallowest point of these analogous waste sites is 1.2 m (4 ft) (216-T-20 Trench), making 3.4 m (11 ft) the range of unevaluated soil to the 4.6 m (15 ft) point of compliance. The 216-S-7 Crib is 6.7 m (22 ft) deep at the bottom. The surrogate representative waste site soil that will be evaluated to address this 3.4 m (11 ft) range is the soil column from 6.7 m (22 ft) (crib bottom) to 9.8 m (32 ft), using results from samples taken at 7.3 to 8 m (24 to 26.5 ft) and at 10.4 to 11 m (34 to 36 ft) bgs. Of the primary contaminants found in this depth range (feasibility study, Section 2.4.2), Am-241, Cs-137, Pu-239/240, and Sr-90 would exceed human-health and/or ecological screening values as follows. Americium-241 (1,900 pCi) would exceed its human-health PRG (335 pCi/g) by one-half order of magnitude. Cesium-137 (20,000 pCi/g) would exceed its human-health PRG (23.4 pCi/g) by almost three orders of magnitude and its ecological PRG (115 pCi/g) by two and one-half orders of magnitude. Plutonium-239/240 (11,000 pCi) would exceed its human-health PRG (425 pCi/g) by one order of magnitude plus and its ecological PRG (6110 pCi/g) by one-half order of magnitude. Strontium-90 (53,000 pCi) would exceed its human-health PRG (2,530 pCi/g) by one plus orders of magnitude and its terrestrial-wildlife PRG (22.5 pCi/g) by two plus orders of magnitude.

216-T-20 Trench. The 216-T-20 Trench had no developed contaminant inventory for Am-241 and Pu-239/240 and therefore has no discernable human-health or ecological risk from these

constituents. The 216-T-20 Trench contaminant inventory for Cs-137 (0.44 Ci) was more than three orders of magnitude smaller than the representative waste site contaminant inventory of 703 Ci. Because this represents less contamination than the Cs-137 human-health and ecological order-of-magnitude values of just less than three orders of magnitude and two and one-half orders of magnitude, respectively, this site has no potential human-health or ecological risk from Cs-137. The 216-T-20 Trench contaminant inventory for Sr-90 (0.39 pCi/g) was more than three orders of magnitude smaller than the representative waste site contaminant inventory for Sr-90 of 1,390 Ci. Because this represents less contamination than the Sr-90 human-health and ecological order-of-magnitude values of one plus order of magnitude and two plus orders of magnitude, respectively, this site has no potential human-health or ecological risk from Sr-90. Given the information above, the 216-T-20 Trench has no potential for human-health and terrestrial-wildlife risk.

216-S-22 Crib. The 216-S-22 Crib has no developed contaminant inventory for Am-241 and therefore has no discernable human-health or ecological risk from Am-241. The 216-S-22 Crib contaminant inventory for Cs-137 (0.48 Ci) was more than three orders of magnitude less than the representative waste site Cs-137 contaminant inventory of 703 Ci. Because this represents less contamination than the Cs-137 human-health and ecological order-of-magnitude values of less than three orders of magnitude and two and one-half orders of magnitude, respectively, this site has no potential human-health or ecological risk from Cs-137. The 216-S-22 Crib contaminant inventory for Sr-90 (0.46 Ci) was more than three orders of magnitude smaller than the representative waste site Sr-90 contaminant inventory of 1,390 Ci. Because this represents less contamination than the Sr-90 human-health and ecological order-of-magnitude values of one plus orders of magnitude and two plus orders of magnitude, respectively, this site has no potential human-health or ecological risk from Sr-90. The 216-S-22 Crib contaminant inventory for total plutonium (0.10 Ci) was more than three orders of magnitude less than the representative waste site total plutonium contaminant inventory of 440 Ci. Because this represents less contamination than the total plutonium human-health and ecological order-of-magnitude values of one plus order of magnitude and one-half order of magnitude, respectively, this site has no potential human-health or ecological risk from plutonium. Given the above information, the 216-S-22 Crib has no potential for human-health and terrestrial-wildlife risk.

G2.0 REFERENCE

DOE/RL-2003-23, 2005, *Focused Feasibility Study for the 200-UW-1 Operable Unit*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

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