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**APPLICATION FOR LICENSE TO AUTHORIZE NEAR-SURFACE
LAND DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE**

Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations

**APPENDIX 12.1.4-3
GROWTH OF FINANCIAL ASSURANCE
NEED WITH YEARS OF OPERATIONS**

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1.0 INTRODUCTION

Cost estimates for the Post-Closure and Institutional Control periods presented in Sections 7.1.3 and 7.2.3 of this LA are based on the assumption that the proposed facility operates as planned for the full proposed 35 years. For the purposes of determining the levels of financial assurances that WCS must provide, it is reasonable and appropriate to acknowledge that the costs of conducting these activities could be significantly less than projected in Section 7 if the need for these funds occurs prior to planned closure.

The purpose of this appendix is to describe and justify the basis WCS has used in developing the change of needed financial assurances with time shown in Table 12.1.4-2. The general methodology used in developing Table 12.1.4-2 is described in Section 2.0 below. Results of these analyses are included in Table A-1 through A-6 attached to this appendix.

2.0 METHODOLOGY

The costs were estimated as though the facility is fully developed at the time the financial assurance funds are required. That is, the facility was assumed to operate for its full planned lifetime of 35 years. These estimates of annual costs during the Post Closure and Institutional Control periods are presented in Appendices 7.1.3 and 7.2.3 of this LA and are replicated in Attachment A to this appendix.

Each component in each estimated direct cost (not including any markups) was designated as either fixed (independent of waste volume disposed of to date) or variable (proportional to waste volume disposed of to date). These designations are shown in Column E (headed “F/V”) in Table A-1 and A-2. For example, all “General Support” costs are considered fixed and not dependent upon the time at which unplanned closure might occur. “Sample Collection & Preparation/Erosion Pins” and “Sample Analysis at Off Site Lab” costs are considered variable since the number of samples that must be taken change over time, as described in Appendix 2.10.2-1.

The totals of all direct costs designated fixed (Cell F94 in Table A-1 and A-2) and all designated variable (Cell G94 in Table A-1 and A-2) were determined and increased by the overall markups (refer to Cell C3 in Tables A-1 and A-2) to account for overhead and profit, price escalation from 2005, and contingency. These burdened total fixed and variable costs were used together with the rates at which LLRW is projected to be disposed to estimate the respective costs in any year after the facility commences operations.

Tables A-3 and A-4 show the fraction of total volume projected to be disposed of in each year of facility life (Lines 5, 10, 15, and 20 headed “Fraction” beginning in Column E). The burdened total fixed and total variable costs (total annual amounts) are shown in Cells B6 and C6, respectively. The disposal rates by year are taken for the schedules shown in Appendices 8.0-1 and 8.0-2 and are replicated in Table A-5.

The Post Closure or Institutional Control cost in any year when unplanned closure might occur was next estimated. This was done by adding the total fixed annual cost to the product of the total variable annual cost and the cumulative fraction (Lines 6, 11, 16, and 21 in Table A-3 and A-4, headed (“Cum Frac”). This sum is the estimated annual cost to conduct post-closure or

institutional control activity, should closure occur unplanned in the year shown (Lines .7, 12, 17, and 22 headed “AnnCost” in Tables A-3 and A-4).

The estimated post closure and institutional control costs resulting from unplanned closure were then summarized for every fifth year and apportioned between the CWF and FWF facilities as shown in Table A-6. The apportioning is necessary since the post closure period is only five years where hazardous waste are not involved (i.e., for the CWF), whereas it is 30 years for the FWF disposal units.

The sharing of costs between the FWF and CWF was determined on the basis of either area or number of samples attributable to the facility. As shown in Table A-7, 19 acres and 79 acres area associated with the CWF and FWF, respectively. Approximately 100 and 300 environmental samples were assumed to be shared between the CWF and the FWF respectively. The apportionment of cost categories is shown in Table A-6 for Post closure and Institutional costs. Approximately 22 percent of post-closure costs are attributable to the CWF for both Post Closure and Institutional Control costs. The remaining 78 percent of costs is attributable to the FWF.

The apportionment of costs (22 percent for CWF and 78 percent for FWF) is also shown in Table A-6. The totals shown in Line 19 of Table A-6 for the CWF will be incurred for only 5 years since at that time the license will be terminated and responsibility for the facility transferred to the custodial agency. In contrast, the totals in Line 20 of Table A-6 for the FWF are for post-closure activities that will continue for 30 years following closure. The totals for 100 years of institutional control for both the CWF and FWF are shown in Lines 28 and 29 of Table A-6. No account of the time value of money is taken in presenting the growth of financial assurance requirements shown in Table A-6.

3.0 SUMMARY

Finally, the total financial assurances that should be provided for the Post Closure and Institutional Control periods are shown in Table A-6 in Line 33. At the initial licensing, a reasonable amount for Post Closure and Institutional Control periods, with no allowance for the time value of money, is about \$30.6 million. This amount will grow with time as shown in Table A-6.

Applicable regulations require annual review of financial assurances to ensure that they are adequate, considering recent changes in conditions at the facility, inflation, and technology. Thus, TCEQ will have continuing opportunities to ensure that adequate levels of financial assurance are provided for all potential costs.

ATTACHMENT A: CALCULATION OF FINANCIAL ASSURANCE GROWTH

**APPLICATION FOR LICENSE TO AUTHORIZE NEAR-SURFACE
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Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations

Table A-1. Post-Closure Costs

		POST CLOSURE TOTAL (\$000)	\$1,062.06	Okay				
		Overall Markup	57.9%					
		Burdened Total	\$1.68					
Source: Appendix 7.1.3								
	A	B	C	D	E	F	G	H
7	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
8	General Support					\$0.00	\$0.00	\$0.00
9	TEMPORARY FACILITS&CONTROLS					\$0.00	\$0.00	\$0.00
10	Office trailer, furnished, no hookups, 50' x 12', rent per month	12	mo	\$3	F	\$3.43	\$0.00	\$0.00
11	Office, storage boxes, 20' x 8', rent per month	12	mo	\$1	F	\$0.89	\$0.00	\$0.00
12	Field office equipment work stations, computer, software & misc equip.	12	mo	\$7	F	\$7.20	\$0.00	\$0.00
13	Field office expense, telephone bill, avg bill/month incl long dist	12	mo	\$2	F	\$2.45	\$0.00	\$0.00
14	Field office expense, field office lights & HVAC	12	mo	\$1	F	\$1.18	\$0.00	\$0.00
15	Field office expense, water bill, avg bill/month	12	mo	\$2	F	\$1.92	\$0.00	\$0.00
16	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
17	Post Closure Manager	2080	hr	\$83	F	\$82.99	\$0.00	\$0.00
18	Secretary/Data Entry Clerk	2080	hr	\$17	F	\$16.64	\$0.00	\$0.00
19	Security Guard	8760	hr	\$78	F	\$77.96	\$0.00	\$0.00
20	Pickup Truck, 1-Ton	12	mo	\$8	F	\$7.80	\$0.00	\$0.00
21	Office Equipment, Copy, Fax, Telephones, etc.	12	mo	\$2	F	\$2.10	\$0.00	\$0.00
22	Office Supplies	12	mo	\$1	F	\$1.02	\$0.00	\$0.00
23	Walkover					\$0.00	\$0.00	\$0.00
24	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
25	CHP/Environmental Scientist	192	hr	\$7	V	\$0.00	\$6.73	\$0.00
26	Environmental Technician	192	hr	\$5	V	\$0.00	\$5.16	\$0.00
27	Pickup Truck, 1-Ton	12	mo	\$8	V	\$0.00	\$7.80	\$0.00
28	Sample Collection & Preparation/Erosion Pins					\$0.00	\$0.00	\$0.00

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Source: Appendix 7.1.3								
	A	B	C	D	E	F	G	H
7	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
29	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
30	CHP/Environmental Scientist	1551	hr	\$54	V	\$0.00	\$54.36	\$0.00
31	Environmental Technician	1551	hr	\$42	V	\$0.00	\$41.71	\$0.00
32	Geotechnical Technician	40	hr	\$1	V	\$0.00	\$1.08	\$0.00
33	Pickup Truck, 1-Ton	12	mo	\$8	V	\$0.00	\$7.80	\$0.00
34	Sampling Supplies	2383	ea	\$12	V	\$0.00	\$11.92	\$0.00
35	Sample Analysis Interpretation					\$0.00	\$0.00	\$0.00
36	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
37	CHP/Environmental Scientist	114	hr	\$4	V	\$0.00	\$4.00	\$0.00
38	Civil/Geotechnical Engineer	114	hr	\$4	V	\$0.00	\$4.00	\$0.00
39	Sample Analysis at Off Site Lab					\$0.00	\$0.00	\$0.00
40	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
41	Sampling Analysis, Offsite Lab	1135	ea	\$297	V	\$0.00	\$297.37	\$0.00
42	Leachate Monitoring, Pumping, Treatment					\$0.00	\$0.00	\$0.00
43	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
44	CHP/Environmental Scientist	208	hr	\$7	V	\$0.00	\$7.29	\$0.00
45	Environmental Technician	416	hr	\$11	V	\$0.00	\$11.19	\$0.00
46	Leachate Pump & Treat	75000	gal	\$4	V	\$0.00	\$4.28	\$0.00
47	Meteorological Data Collection & Interpretation					\$0.00	\$0.00	\$0.00
48	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
49	CHP/Environmental Scientist	240	hr	\$8	F	\$8.41	\$0.00	\$0.00
50	Environmental Technician	192	hr	\$5	F	\$5.16	\$0.00	\$0.00
51	Infiltration Data Collection & Interpretation					\$0.00	\$0.00	\$0.00
52	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
53	CHP/Environmental Scientist	240	hr	\$8	V	\$0.00	\$8.41	\$0.00
54	Environmental Technician	192	hr	\$5	V	\$0.00	\$5.16	\$0.00

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Table A-1. Post-Closure Costs

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		Overall Markup	57.9%					
		Burdened Total	\$1.68					
Source: Appendix 7.1.3								
	A	B	C	D	E	F	G	H
7	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
55	Annual Report Preparation					\$0.00	\$0.00	\$0.00
56	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
57	CHP/Environmental Scientist	80	hr	\$3	V	\$0.00	\$2.80	\$0.00
58	Civil/Geotechnical Engineer	80	hr	\$3	V	\$0.00	\$2.80	\$0.00
59	Environmental Technician	80	hr	\$2	V	\$0.00	\$2.15	\$0.00
60	Conduct Land Survey					\$0.00	\$0.00	\$0.00
61	SUMMARY					\$0.00	\$0.00	\$0.00
62	Surveying, conventional, topographical, average (max-min)	90	acre	\$153	V	\$0.00	\$153.00	\$0.00
63	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
64	Civil/Geotechnical Engineer	160	hr	\$6	V	\$0.00	\$5.61	\$0.00
65	Survey Settlement Monitors					\$0.00	\$0.00	\$0.00
66	SUMMARY					\$0.00	\$0.00	\$0.00
67	Surveying, crew for layout bldg, trenching pipe laying, 2 person crew	3	day	\$2	V	\$0.00	\$1.81	\$0.00
68	Maintenance					\$0.00	\$0.00	\$0.00
69	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
70	Civil/Geotechnical Engineer	480	hr	\$17	V	\$0.00	\$16.82	\$0.00
71	Equipment Operator, Light	480	hr	\$16	V	\$0.00	\$16.28	\$0.00
72	Laborer	960	hr	\$14	V	\$0.00	\$13.95	\$0.00
73	Front End Loader/Backhoe	3	mo	\$1	V	\$0.00	\$1.38	\$0.00
74	Farm Tractor with Implements	3	mo	\$1	V	\$0.00	\$0.55	\$0.00
75	Pickup Truck, 1-Ton	3	mo	\$2	V	\$0.00	\$1.95	\$0.00
76	Utility Truck, Flat Bed/Dump Bed	3	mo	\$1	V	\$0.00	\$0.97	\$0.00
77	Power & Hand Tools	3	mo	\$1	V	\$0.00	\$0.60	\$0.00
78	WCS Oversight					\$0.00	\$0.00	\$0.00
79	TEMPORARY FACILITS&CONTROLS					\$0.00	\$0.00	\$0.00
80	Office trailer, furnished, no hookups, 50' x 12', rent per month	12	mo	\$3	F	\$3.43	\$0.00	\$0.00

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		Overall Markup	57.9%					
		Burdened Total	\$1.68					
	Source: Appendix 7.1.3							
7	A	B	C	D	E	F	G	H
	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
81	Office, storage boxes, 20' x 8', rent per month	12	ea	\$1	F	\$0.89	\$0.00	\$0.00
82	Field office equipment work stations, computer, software & misc equip.	12	mo	\$7	F	\$7.20	\$0.00	\$0.00
83	Field office expense, telephone bill, avg bill/month incl long dist	12	mo	\$2	V	\$0.00	\$2.45	\$0.00
84	Field office expense, field office lights & HVAC	12	mo	\$1	V	\$0.00	\$1.18	\$0.00
85	Field office expense, water bill, avg bill/month	12	mo	\$2	V	\$0.00	\$1.92	\$0.00
86	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
87	Regulatory Agency: Scientist	1040	hr	\$32	V	\$0.00	\$31.82	\$0.00
88	Regulatory Agency: Engineer	1040	hr	\$32	V	\$0.00	\$31.82	\$0.00
89	Regulatory Agency: Procurement	1040	hr	\$14	V	\$0.00	\$14.01	\$0.00
90	Regulatory Agency: Manager	1040	hr	\$37	V	\$0.00	\$37.02	\$0.00
91	Regulatory Agency: Secretary	1040	hr	\$8	V	\$0.00	\$8.32	\$0.00
92	Pickup Truck, 1-Ton	6	mo	\$4	V	\$0.00	\$3.90	\$0.00
93								
94						TOTAL FIXED (\$000)	TOTAL VARBL (\$000)	TOTAL UNASSGD (\$000)
95						\$230.69	\$831.37	\$0.00

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Table A-2. Institutional Control Costs; Assignment of Fixed and Variable Costs

		PHASE TOTAL (\$MM)	\$462.21	Okay				
		Overall Markup	57.4%					
		Burdened Total	\$0.73					
	Source: Appendix 7.2.3							
	A	B	C	D	E	F	G	H
7	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
8	General Support					\$0.00	\$0.00	\$0.00
9	TEMPORARY FACILITS&CONTROLS					\$0.00	\$0.00	\$0.00
10	Office trailer, furnished, incl. hookups, 50' x 12', rent per month	12	mo	\$3	F	\$3.43	\$0.00	\$0.00
11	Office, storage boxes, 20' x 8', rent per month	12	mo	\$1	F	\$0.89	\$0.00	\$0.00
12	Field office equipment work stations, computer, software & misc equip.	12	mo	\$7	F	\$7.20	\$0.00	\$0.00
13	Field office expense, telephone bill, avg bill/month incl long dist	12	mo	\$2	F	\$2.45	\$0.00	\$0.00
14	Field office expense, field office lights & HVAC	12	mo	\$1	F	\$1.18	\$0.00	\$0.00
15	Field office expense, water bill, avg bill/month	12	mo	\$2	F	\$1.92	\$0.00	\$0.00
16	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
17	Post Closure Manager	2080	hr	\$83	F	\$82.99	\$0.00	\$0.00
18	Secretary/Data Entry Clerk	416	hr	\$3	F	\$3.33	\$0.00	\$0.00
19	Security Guard	0	hr	\$0	F	\$0.00	\$0.00	\$0.00
20	Pickup Truck, 1-Ton	12	mo	\$8	F	\$7.80	\$0.00	\$0.00
21	Office Equipment, Copy, Fax, Telephones, etc.	12	mo	\$2	F	\$2.10	\$0.00	\$0.00
22	Office Supplies	12	mo	\$1	F	\$0.51	\$0.00	\$0.00
23	Walkover					\$0.00	\$0.00	\$0.00
24	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
25	CHP/Environmental Scientist	96	hr	\$3	V	\$0.00	\$3.37	\$0.00
26	Environmental Technician	96	hr	\$3	V	\$0.00	\$2.58	\$0.00
27	Pickup Truck, 1-Ton	12	mo	\$8	V	\$0.00	\$7.80	\$0.00
28	Sample Collection & Preparation/Erosion Pins					\$0.00	\$0.00	\$0.00
29	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00

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Table A-2. Institutional Control Costs; Assignment of Fixed and Variable Costs

		PHASE TOTAL (\$MM)	\$462.21	Okay				
		Overall Markup	57.4%					
		Burdened Total	\$0.73					
	Source: Appendix 7.2.3							
	A	B	C	D	E	F	G	H
7	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
30	CHP/Environmental Scientist	1110	hr	\$39	V	\$0.00	\$38.91	\$0.00
31	Environmental Technician	1110	hr	\$30	V	\$0.00	\$29.85	\$0.00
32	Geotechnical Technician	40	hr	\$1	V	\$0.00	\$1.08	\$0.00
33	Pickup Truck, 1-Ton	12	mo	\$8	V	\$0.00	\$7.80	\$0.00
34	Sampling Supplies	1942	ea	\$10	V	\$0.00	\$9.71	\$0.00
35	Sample Analysis Interpretation					\$0.00	\$0.00	\$0.00
36	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
37	CHP/Environmental Scientist	41	hr	\$1	V	\$0.00	\$1.44	\$0.00
38	Civil/Geotechnical Engineer	41	hr	\$1	V	\$0.00	\$1.44	\$0.00
39	Sample Analysis at Off Site Lab					\$0.00	\$0.00	\$0.00
40	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
41	Sampling Analysis, Offsite Lab	407	ea	\$112	V	\$0.00	\$111.52	\$0.00
42	Leachate Monitoring, Pumping, Treatment					\$0.00	\$0.00	\$0.00
43	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
44	CHP/Environmental Scientist	0	hr	\$0	V	\$0.00	\$0.00	\$0.00
45	Environmental Technician	0	hr	\$0	V	\$0.00	\$0.00	\$0.00
46	Leachate Pump & Treat	0	gal	\$0	V	\$0.00	\$0.00	\$0.00
47	Meteorological Data Collection & Interpretation					\$0.00	\$0.00	\$0.00
48	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
49	CHP/Environmental Scientist	120	hr	\$4	F	\$4.21	\$0.00	\$0.00
50	Environmental Technician	96	hr	\$3	F	\$2.58	\$0.00	\$0.00
51	Infiltration Data Collection and Interpretation					\$0.00	\$0.00	\$0.00
52	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
53	CHP/Environmental Scientist	120	hr	\$4	V	\$0.00	\$4.21	\$0.00

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		PHASE TOTAL (\$MM)	\$462.21	Okay				
		Overall Markup	57.4%					
		Burdened Total	\$0.73					
	Source: Appendix 7.2.3							
	A	B	C	D	E	F	G	H
7	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
54	Environmental Technician	96	hr	\$3	V	\$0.00	\$2.58	\$0.00
55	Annual Report Preparation					\$0.00	\$0.00	\$0.00
56	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
57	CHP/Environmental Scientist	40	hr	\$1	V	\$0.00	\$1.40	\$0.00
58	Civil/Geotechnical Engineer	40	hr	\$1	V	\$0.00	\$1.40	\$0.00
59	Environmental Technician	40	hr	\$1	V	\$0.00	\$1.08	\$0.00
60	Conduct Land Survey					\$0.00	\$0.00	\$0.00
61	SUMMARY					\$0.00	\$0.00	\$0.00
62	Surveying, conventional, topographical, maximum	90	acre	\$31	V	\$0.00	\$30.60	\$0.00
63	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
64	Civil/Geotechnical Engineer	80	hr	\$3	V	\$0.00	\$2.80	\$0.00
65	Survey Settlement Monitors					\$0.00	\$0.00	\$0.00
66	SUMMARY					\$0.00	\$0.00	\$0.00
67	Surveying, crew for layout bldg, trenching pipe laying, 2 person crew	3	day	\$2	V	\$0.00	\$1.81	\$0.00
68	Maintenance					\$0.00	\$0.00	\$0.00
69	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
70	Civil/Geotechnical Engineer	160	hr	\$6	V	\$0.00	\$5.61	\$0.00
71	Equipment Operator, Light	160	hr	\$5	V	\$0.00	\$5.43	\$0.00
72	Laborer	320	hr	\$5	V	\$0.00	\$4.65	\$0.00
73	Front End Loader/Backhoe	1	mo	\$0	V	\$0.00	\$0.46	\$0.00
74	Farm Tractor with Implements	1	mo	\$0	V	\$0.00	\$0.18	\$0.00
75	Pickup Truck, 1-Ton	1	mo	\$1	V	\$0.00	\$0.65	\$0.00
76	Utility Truck, Flat Bed/Dump Bed	1	mo	\$0	V	\$0.00	\$0.32	\$0.00

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		Burdened Total	\$0.73					
	Source: Appendix 7.2.3							
	A	B	C	D	E	F	G	H
7	COMPONENT	QUANTITY	UNITS	COST	F/V	ΣF	ΣV	Not Assgd
77	Power & Hand Tools	1	mo	\$0	V	\$0.00	\$0.20	\$0.00
78	Custodial Agency (TCEQ / DOE) Oversight					\$0.00	\$0.00	\$0.00
79	TEMPORARY FACILITS&CONTROLS					\$0.00	\$0.00	\$0.00
80	Office trailer, furnished, no hookups, 50' x 12', rent per month	3	mo	\$1	V	\$0.00	\$0.86	\$0.00
81	Field office equipment work stations, computer, software & misc equip.	3	mo	\$2	V	\$0.00	\$1.80	\$0.00
82	Field office expense, telephone bill, avg bill/month incl long dist	3	mo	\$1	V	\$0.00	\$0.61	\$0.00
83	Field office expense, field office lights & HVAC	3	mo	\$0	V	\$0.00	\$0.29	\$0.00
84	Field office expense, water bill, avg bill/month	3	mo	\$0	V	\$0.00	\$0.48	\$0.00
85	SITE MANAGEMENT					\$0.00	\$0.00	\$0.00
86	Regulatory Agency: Scientist	480	hr	\$15	V	\$0.00	\$14.69	\$0.00
87	Regulatory Agency: Engineer	480	hr	\$15	V	\$0.00	\$14.69	\$0.00
88	Regulatory Agency: Procurement	480	hr	\$6	V	\$0.00	\$6.47	\$0.00
89	Regulatory Agency: Manager	480	hr	\$17	V	\$0.00	\$17.09	\$0.00
90	Regulatory Agency: Secretary	480	hr	\$4	V	\$0.00	\$3.84	\$0.00
91	Pickup Truck, 1-Ton	3	mo	\$2	V	\$0.00	\$1.95	\$0.00
92								
93						TOTAL FIXED (\$000)	TOTAL VARBL (\$000)	TOTAL UNASSGD (\$000)
94						\$120.59	\$341.62	\$0.00

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Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations**

Table A-3. Annual Fractional Volume and Post-Closure coSts from Year of Unplanned Closure

	A	B	C	D	E	F	G	H	I	J	K	L	M
				Closure Year	1	2	3	4	5	6	7	8	9
		Fixed	Variable	Fraction	0.029	0.029	0.029	0.028	0.028	0.028	0.028	0.028	0.028
	Total (\$MM)	\$0.36	\$1.31	Cum Frac	0.029	0.058	0.087	0.115	0.143	0.171	0.199	0.227	0.255
	Percent	34%	124%	AnnCost	\$0.40	\$0.44	\$0.48	\$0.51	\$0.55	\$0.59	\$0.62	\$0.66	\$0.70
				Closure Year	10	11	12	13	14	15	16	17	18
		Fixed	Variable	Fraction	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
	Total (\$MM)	\$0.36	\$1.31	Cum Frac	0.282	0.310	0.338	0.366	0.393	0.421	0.449	0.477	0.504
	Percent	34%	124%	AnnCost	\$0.73	\$0.77	\$0.81	\$0.84	\$0.88	\$0.92	\$0.95	\$0.99	\$1.03
				Closure Year	19	20	21	22	23	24	25	26	27
		Fixed	Variable	Fraction	0.031	0.031	0.031	0.032	0.032	0.031	0.031	0.028	0.028
	Total (\$MM)	\$0.36	\$1.31	Cum Frac	0.535	0.566	0.597	0.628	0.660	0.692	0.723	0.751	0.779
	Percent	34%	124%	AnnCost	\$1.07	\$1.11	\$1.15	\$1.19	\$1.23	\$1.27	\$1.31	\$1.35	\$1.39
				Closure Year	28	29	30	31	32	33	34	35	
		Fixed	Variable	Fraction	0.028	0.028	0.027	0.027	0.027	0.027	0.027	0.027	0.027
	Total (\$MM)	\$0.36	\$1.31	Cum Frac	0.808	0.836	0.863	0.891	0.918	0.945	0.973	1.000	
	Percent	34%	124%	AnnCost	\$1.42	\$1.46	\$1.50	\$1.53	\$1.57	\$1.60	\$1.64	\$1.68	

APPLICATION FOR LICENSE TO AUTHORIZE NEAR-SURFACE
LAND DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE
Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations

Table A-4. Annual Fractional Volume and Institutional Control Costs from Year of Unplanned Closure

3	A	B	C	D	E	F	G	H	I	J	K	L	M
4				Closure Year	1	2	3	4	5	6	7	8	9
5		Fixed	Variable	Fraction	0.029	0.029	0.029	0.028	0.028	0.028	0.028	0.028	0.028
6	Total (\$MM)	\$0.19	\$0.54	Cum Frac	0.029	0.058	0.087	0.115	0.143	0.171	0.199	0.227	0.255
7	Percent	41%	116%	AnnCost	\$0.21	\$0.22	\$0.24	\$0.25	\$0.27	\$0.28	\$0.30	\$0.31	\$0.33
8													
9				Closure Year	10	11	12	13	14	15	16	17	18
10		Fixed	Variable	Fraction	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028
11	Total (\$MM)	\$0.19	\$0.54	Cum Frac	0.282	0.310	0.338	0.366	0.393	0.421	0.449	0.477	0.504
12	Percent	41%	116%	AnnCost	\$0.34	\$0.36	\$0.37	\$0.39	\$0.40	\$0.42	\$0.43	\$0.45	\$0.46
13													
14				Closure Year	19	20	21	22	23	24	25	26	27
15		Fixed	Variable	Fraction	0.031	0.031	0.031	0.032	0.032	0.031	0.031	0.028	0.028
16	Total (\$MM)	\$0.19	\$0.54	Cum Frac	0.535	0.566	0.597	0.628	0.660	0.692	0.723	0.751	0.779
17	Percent	41%	116%	AnnCost	\$0.48	\$0.49	\$0.51	\$0.53	\$0.54	\$0.56	\$0.58	\$0.59	\$0.61
18													
19				Closure Year	28	29	30	31	32	33	34	35	
20		Fixed	Variable	Fraction	0.028	0.028	0.027	0.027	0.027	0.027	0.027	0.027	
21	Total (\$MM)	\$0.19	\$0.54	Cum Frac	0.808	0.836	0.863	0.891	0.918	0.945	0.973	1.000	
22	Percent	41%	116%	AnnCost	\$0.62	\$0.64	\$0.65	\$0.67	\$0.68	\$0.70	\$0.71	\$0.73	

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Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations**

Table A-5. Volume (m3) Disposed Annually BY Wcs Facility

Sources: Appendices 8.0-1 and 8.0-2

	A	B	C	D	E	F	G	H	I	J	K	
3	VOLUME BY YEAR (cubic meters)											
4			YEAR									
5	FACILITY	35-YEAR TOTAL	1	2	3	4	5	6	7	8	9	
6	CWF by yr	76,866	2,697	2,697	2,697	1,220	1,220	1,220	1,220	1,220	1,220	
7	CWF Cum	76,866	2,697	5,394	8,091	9,311	10,531	11,751	12,971	14,191	15,411	
8	CWF 5-yr Cums	76,866					10,531					
9												
10	FWF-CDU by yr	689,500	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	
11	FWF-CDU Cum	689,500	19,700	39,400	59,100	78,800	98,500	118,200	137,900	157,600	177,300	
12	FWF-CDU 5-yr cums	689,500					98,500					
13												
14	FWF-NCDU by yr	924,000	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	
15	FWF-NCDU Cum	924,000	26,400	52,800	79,200	105,600	132,000	158,400	184,800	211,200	237,600	
16	FWF-NCDU 5-yr cums	924,000					132,000					
17												
18	Annual Vol All Facilities		48,797	48,797	48,797	47,320	47,320	47,320	47,320	47,320	47,320	430,311
19	Annual Fract all Facilities		0.0289	0.0289	0.0289	0.0280	0.0280	0.0280	0.0280	0.0280	0.0280	0.2546
20												
21			YEAR									
22	FACILITY	35-YEAR TOTAL	10	11	12	13	14	15	16	17	18	
23	CWF by yr	76,866	828	828	828	828	828	828	828	828	828	
24	CWF Cum	76,866	16,240	17,068	17,896	18,724	19,552	20,380	21,208	22,036	22,864	
25	CWF 5-yr Cums	76,866	4,880					4,141				
26												
27	FWF-CDU by yr	689,500	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	
28	FWF-CDU Cum	689,500	197,000	216,700	236,400	256,100	275,800	295,500	315,200	334,900	354,600	

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Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations**

Table A-5. Volume (m3) Disposed Annually BY Wcs Facility

Sources: Appendices 8.0-1 and 8.0-2

	A	B	C	D	E	F	G	H	I	J	K	
3	VOLUME BY YEAR (cubic meters)											
4				YEAR								
29	FWF-CDU 5-yr cums	689,500	78,800					98,500				
30												
31	FWF-NCDU by yr	924,000	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	
32	FWF-NCDU Cum	924,000	264,000	290,400	316,800	343,200	369,600	396,000	422,400	448,800	475,200	
33	FWF-NCDU 5-yr cums	924,000	105,600					132,000				
34												
35	Annual Vol All Facilities		46,928	46,928	46,928	46,928	46,928	46,928	46,928	46,928	46,928	422,353
36	Annual Fract all Facilities		0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.2499
37												
38												
39				YEAR								
		35- YEAR TOTAL										
40	FACILITY		19	20	21	22	23	24	25	26	27	
41	CWF by yr	76,866	5,958	5,958	5,958	7,372	7,372	7,117	7,117	1,563	1,563	
42	CWF Cum	76,866	28,823	34,781	40,739	48,111	55,483	62,600	69,717	71,280	72,843	
43	CWF 5-yr Cums	76,866		2,484					34,936			
44												
45	FWF-CDU by yr	689,500	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	
46	FWF-CDU Cum	689,500	374,300	394,000	413,700	433,400	453,100	472,800	492,500	512,200	531,900	
47	FWF-CDU 5-yr cums	689,500		59,100					98,500			
48												
49	FWF-NCDU by yr	924,000	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	
50	FWF-NCDU Cum	924,000	501,600	528,000	554,400	580,800	607,200	633,600	660,000	686,400	712,800	
51	FWF-NCDU 5-yr cums	924,000		79,200					132,000			
52												
53	Annual Vol All Facilities		52,058	52,058	52,058	53,472	53,472	53,217	53,217	47,663	47,663	464,879

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Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations**

Table A-5. Volume (m3) Disposed Annually BY Wcs Facility

Sources: Appendices 8.0-1 and 8.0-2

A	B	C	D	E	F	G	H	I	J	K	
VOLUME BY YEAR (cubic meters)											
		YEAR									
Annual Fract all Facilities		0.0308	0.0308	0.0308	0.0316	0.0316	0.0315	0.0315	0.0282	0.0282	0.2750
		YEAR									
	35- YEAR TOTAL	28	29	30	31	32	33	34	35		
CWF by yr	76,866	1,563	1,563	150	150	150	150	150	150	150	
CWF Cum	76,866	74,406	75,969	76,119	76,268	76,418	76,567	76,717	76,866		
CWF 5-yr Cums	76,866			3,126					748		
FWF-CDU by yr	689,500	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	19,700	
FWF-CDU Cum	689,500	551,600	571,300	591,000	610,700	630,400	650,100	669,800	689,500		
FWF-CDU 5-yr cums	689,500			39,400					98,500		
FWF-NCDU by yr	924,000	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	
FWF-NCDU Cum	924,000	739,200	765,600	792,000	818,400	844,800	871,200	897,600	924,000		
FWF-NCDU 5-yr cums	924,000			52,800					132,000		
Annual Vol All Facilities		47,663	47,663	46,250	46,250	46,250	46,250	46,250	46,250	372,823	1,690,366
Annual Fract all Facilities		0.0282	0.0282	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.2206	1.0000

APPLICATION FOR LICENSE TO AUTHORIZE NEAR-SURFACE
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Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations

Table A-6. Summary -- Financial Assurance Requirement Versus Time

	A	B	C	D	E	F	G	H	I	J
			YEAR							
	Phase	Facility	1	6	11	16	21	26	31	
3										
4										
5										
18	Post-Closure	Annual Total	\$0.40	\$0.59	\$0.77	\$0.96	\$1.15	\$1.35	\$1.54	
19		CWF Total	\$0.45	\$0.66	\$0.86	\$1.07	\$1.28	\$1.51	\$1.72	
20		FWF Total	\$9.41	\$13.74	\$18.01	\$22.25	\$26.78	\$31.52	\$35.78	
21		Total All Facilities	\$9.9	\$14.4	\$18.9	\$23.3	\$28.1	\$33.0	\$37.5	\$165.0
22										
27	Institutional Control	Annual Total	\$0.21	\$0.28	\$0.36	\$0.43	\$0.51	\$0.60	\$0.67	
28		CWF Total	\$4.63	\$6.33	\$8.01	\$9.68	\$11.47	\$13.34	\$15.01	
29		FWF Total	\$16.09	\$22.02	\$27.85	\$33.65	\$39.86	\$46.36	\$52.18	
30		Total All Facilities	\$20.7	\$28.4	\$35.9	\$43.3	\$51.3	\$59.7	\$67.2	\$306.5
31										
32										
33		Grand Total	\$30.6	\$42.8	\$54.7	\$66.6	\$79.4	\$92.7	\$104.7	\$471.5
34										

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Appendix 12.1.4-3: Growth of Financial Assurance Need with Years of Operations**

Table A-7. Apportionment of Costs Between CWF and FWF					
	A	B	C	D	E
3	Facility	Land Area	Samples		
4	CWF	19	100		
5	FWF	71	300		
6	Totals	90	400		
7	CWF Factor	21%	25%		
8	FWF Factor	79%	75%		
9					
10	POST CLOSURE COSTS				
11	Activity Category	Allocate by	Total Estimated PC Direct Cost (\$000/yr)	CWF PC Direct Cost (\$000/yr)	FWF PC Direct Cost (\$000/yr)
12	General Support	Area	\$407	\$86	\$321
13	Walkover	Area	\$26	\$6	\$21
14	Sample Collection and Preparation	Samples	\$190	\$47	\$142
15	Sample Analysis at Off-Site Lab	Samples	\$297	\$74	\$223
16	Sample Analysis Interpretation	Samples	\$15	\$4	\$12
17	Leachate Monitoring, Pumping, and Treatment	Area	\$32	\$7	\$26
18	Meteorological Data Collection and Interpretation	Area	\$22	\$5	\$18
19	Infiltration Data Collection and Interpretation	Area	\$22	\$5	\$18
20	Annual Report Preparation	Area	\$14	\$3	\$11
21	Land Survey	Area	\$164	\$35	\$129
22	Settlement Monitor Surveys	Area	\$2	\$0	\$1
23	Maintenance	Area	\$68	\$14	\$54
24	Custodial Agency Oversight	Area	\$355	\$75	\$280
25					
26	Total		\$1,616	\$361	\$1,255
27	Percent			22.3%	77.7%
28					
29					

**APPLICATION FOR LICENSE TO AUTHORIZE NEAR-SURFACE
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Table A-7. Apportionment of Costs Between CWF and FWF					
	A	B	C	D	E
3	Facility	Land Area	Samples		
30	INSTITUTIONAL CONTROL COSTS				
31	Activity Category	Allocate by	Total Estimated IC Cost (\$000/yr)	CWF IC Cost (\$000/yr)	FWF IC Cost (\$000/yr)
32	General Support	Area	\$223	\$47	\$176
33	Walkover	Area	\$18	\$4	\$14
34	Sample Collection and Preparation	Samples	\$132	\$33	\$99
35	Sample Analysis at Off-Site Lab	Samples	\$6	\$1	\$4
36	Sample Analysis Interpretation	Samples	\$112	\$28	\$84
37	Leachate Monitoring, Pumping, and Treatment	Area	\$18	\$4	\$15
38	Meteorological Data Collection and Interpretation	Area	\$11	\$2	\$9
39	Infiltration Data Collection and Interpretation	Area	\$11	\$2	\$9
40	Annual Report Preparation	Area	\$7	\$1	\$5
41	Land Survey	Area	\$36	\$8	\$28
42	Settlement Monitor Surveys	Area	\$2	\$0	\$1
43	Maintenance	Area	\$22	\$5	\$18
44	Custodial Agency Oversight	Area	\$147	\$31	\$116
45					
46	Total		\$745	\$167	\$578
47	Percent			22.4%	77.6%