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Department of Energy

Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

JAN 22 1996

Mr. Steve M. Alexander  
Perimeter Areas Section Manager  
Nuclear Waste Program  
State of Washington  
Department of Ecology  
1315 W. 4th Avenue  
Kennewick, Washington 99336-6018

Mr. Douglas R. Sherwood  
Hanford Project Manager  
U.S. Environmental Protection Agency  
712 Swift Boulevard, Suite 5  
Richland, Washington 99352



Dear Messrs. Alexander and Sherwood:

CORRECTIONS TO THE PHASE III FEASIBILITY STUDY REPORT FOR THE 300-FF-1 OPERABLE UNIT, REVISION 0 (DOE/RL-94-49) AND THE 300 AREA PROCESS TRENCHES MODIFIED CLOSURE/POSTCLOSURE PLAN, REVISION 1, (DOE/RL-93-73)

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References:

- (1) RL letter to S. M. Alexander, Ecology and D. R. Sherwood, EPA, "The Transmittal of Finalized Phase III Feasibility Study Report for 300-FF-1, Rev. 0, DOE/RL-94-49, Responses to Ecology and EPA Comments," dated November 22, 1995.
- (2) RL and BHI letter to D. R. Sherwood, EPA, "Transmittal of the 300 Area Process Trenches Modified Closure/Post Closure Plan, DOE/RL-93-73 Rev. 1," dated November 21, 1995.
- (3) RL letter to S. M. Alexander, Ecology, and D. R. Sherwood, EPA, "Transmittal of DOE/RL-95-88, Rev. 0, Proposed Plan for the 300-FF-1 and 300-FF-5 Operable Units," dated November 16, 1995.

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The addendum included in the two subject documents transmitted by the U.S. Department of Energy, Richland Operations Office (RL) per references 1 and 2 included cost estimates for the 300-FF-1 Operable Unit remedial alternatives. These tables are incorrect and reflect an earlier version of the cost estimates. The incorrect cost estimates are typically \$1 to 2 million higher for each remedial alternative than the final agreed to estimates. However, the error caused no change in the relative ranking of the remedial alternatives. The 300-FF-1 and 300-FF-5 Proposed Plan transmitted per reference 3 includes the correct cost estimate numbers. The correct cost estimate tables for each alternative are enclosed. Two volume tables which were not included in the addendum are also enclosed.

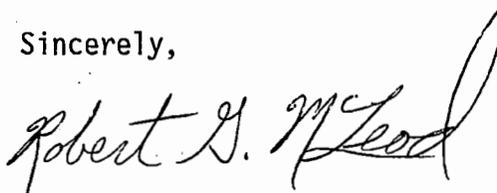
Messrs. Alexander and Sherwood

-2-

JAN 22 1996

If you have any questions regarding volume tables or corrected cost estimate calculations, please contact me on 372-0096.

Sincerely,



Robert G. McLeod, Project Manager  
Remedial Actions Project

RAP:RGM

## Enclosures

## cc w/encls:

D. Bartus, EPA  
M. Bauer, YIN  
L. Block, USFW  
R. Buck, Wanapum  
C. Burford, CTUIR  
J. Carleton, WDFW  
D. Conrad, NPT  
R. Cook, YIN  
P. Danielson, NPT  
D. Dunning, Oregon DOE  
J. Ebaugh, CTUIR  
D. Einan, EPA  
J. Freedman, ATSDR  
S. Hughs, Oregon DOE  
J. Jakobosky, BLM  
M. Janaskie, EM-442  
R. Jim, YIN

J. McConnaughey, WDFW  
D. Powaukee, NPT  
P. Sleeper, DOI  
S. Sobczyk, NPT  
G. Tallent, Ecology  
L. Treichel, EM-442  
J. Wilkinson, CTUIR  
T. Wooley, Ecology

## cc w/o encls:

R. Buck, Jr., Wanapum  
W. Burke, CTUIR  
G. Eidam, BHI  
S. Hajner, BHI  
M. Hughes, BHI  
H. Rueben, NPT

Table AD-2. Estimated Volumes for the Process Waste Units - 15 mrem/yr Cleanup Level.

WASTE UNIT	Figure 6-1 Designation	Length (ft)	Width (ft)	Area (sq.ft.)	Percent Excavated	Depth (ft)	Excavation Volume (cy)	Percent Contaminated	Contaminated Volume (cy)
<b>North Process Pond</b>									
Settling basins	(1)			158,000	70%	6	25,358	100%	25,358
Main pond	(2)			254,000	0%	0	0		0
Interior berms		1,750	12	21,000	100%	10	17,500	50%	8,750
South scraping disposal area	(3)			198,500	100%	10	73,519	20%	14,704
North scraping area (includes Landfill 1a, 1b, 1c and 1d) see note 5.	(4)			256,400	100%	10	93,132	10%	9,313
<b>Waste Unit Totals</b>				<b>887,900</b>			<b>209,509</b>		<b>58,125</b>
<b>South Process Pond</b>									
Settling Basins	(5)			99,000	50%	3	5,500	100%	5,500
Main Pond	(6)			394,000	0%	0	0	0%	0
Ash Pits and filter backwash ponds	(7)			150,000	0%	0	0	0%	0
Interior berms - Settling basin		620	16	9,920	100%	9	6,097	50%	3,048
Interior berms - Settling basin		340	30	10,200	100%	9	4,930	50%	2,465
Interior berms - Main Pond		570	100	57,000	100%	9	21,565	50%	10,783
Scraping disposal areas and perimeter berms	(8)			211,000	100%	8	62,519	10%	6,252
<b>Waste Unit Totals</b>				<b>931,120</b>			<b>100,610</b>		<b>28,048</b>
<b>Process Trenches</b>									
ERA Spoils Area (East)	(9)			0	100%		7,000	30%	2,100
ERA Spoils Area (West)	(9)			0	100%		7,000	100%	7,000
South portion of trenches	(10)	400	113	0		0	0		0
North portion of trenches	(11)	1,130	113	0		0	0		0
Interior Berms		1,530	14	0		0	0		0
Side slope overburden		3,286	45	0		0	0	0%	0
<b>Waste Unit Totals</b>				<b>0</b>			<b>14,000</b>		<b>9,100</b>
<b>Sewers (portions within 300-FF-1)</b>									
Process Sewers	(12)	1,140	5	5,700		2	0		0
Sanitary Sewers	(13)	180	5	900		0	0		0
Overburden		1,320	5	6,600		0	0		0
<b>Waste Unit Totals</b>				<b>13,200</b>			<b>0</b>		<b>0</b>
<b>Sanitary Facilities</b>									
Sanitary Sewer Trenches	(14)	1,350	54	72,900		0	0		0
Septic Tank Area	(15)			14,900		0	0		0
Tile Drain Field	(16)			33,000		0	0		0
<b>Waste Unit Totals</b>				<b>120,800</b>			<b>0</b>		<b>0</b>
<b>WASTE GROUP TOTALS</b>				<b>1,953,000</b>			<b>324,000</b>		<b>95,000</b>
				45	sq. ft ac				

Table AD-3. Estimated Volumes for the Burial Grounds.

WASTE UNIT	Figure 6-1 Designation	Area (sq.ft.)	Percent Excavated	Depth (ft)	Excavation Volume (cy)	Percent Contaminated	Contaminated Volume (cy)
Burial Ground No. 4 (see notes)	(18)	43,720	100%	20	26,222	40%	10,415
Burial Ground No. 5 (see notes)	(19)	99,110	100%	20	86,370	60%	51,472
<b>WASTE GROUP TOTALS</b>					<b>113,000</b>		<b>62,000</b>

**NOTES:**Burial Ground No. 4:

1. The total surface area of 130,000 sf is reduced to 43,720 sf because GPR data suggests that the width of the contaminated area is only 33% of the total burial ground width.
2. Historical data suggests the waste is buried in a V-shaped trench, the deepest section of the trench is 20 feet. For remedial excavation the volume is based upon on a V-shaped trench with 3:1 slopes.
3. The contaminated volume is based on the volume associated with the V-shaped trench dimensions (based on the 1/3 width surface dimension). 90% of this volume is assumed actual waste material after removing 3 feet of the assumed clean overburden.

Burial Ground No. 5:

1. Same as Burial Ground No. 4 footnote #1 except the area of 117,000 sf is reduced to 99,110 sf based on a 15% reduction in the burial ground width using GPR data.
2. A trapezoidal trench configuration is used to calculate the total excavated volume on a 3:1 remediation excavation slope.
3. The contaminated volume is also based on a trapezoidal area with a surface width based on the a 15% width reduction. 90% of the volume is assumed actual waste material after removing 3 feet of assumed clean overburden.

Table AD-4. Cost Estimate for Alternative P-1 - No Action.

Item	Cost <sup>a</sup>	Notes
<b>CAPITAL COSTS (thousands)</b>	\$0	Use existing wells
<b>POST-CLOSURE CARE COSTS</b>		
Present value of monitoring costs	\$1,263	See Table AD-13
Contingency	25% \$316	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>b</sup></b>	<b>\$1,579</b>	
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>c</sup></b>	<b>\$1,579</b>	In thousands
<sup>a</sup> Costs are for mid-1994, in thousands.		
<sup>b</sup> Monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation.		
<sup>c</sup> The sum of capital and operating costs and the net present value of the post-closure care costs.		

Table AD-5. Cost Estimate for Alternative P-2a - Selective Excavation and Soil Cover.

Item	Unit Cost	Units	15 mrem/yr		Notes
			Qty	Cost <sup>b</sup>	
<b>CAPITAL COSTS</b>					
Excavation & pre-screening of soil (red)	\$17.69	cy	7,000	\$124	i
Excavation of soil, no screening (green)	\$3.36	cy	7,000	\$24	i
Weight of contaminated soil		tons	13,500		c
Backfill over-excavated clean soil	\$6.27	cy	14,000	\$88	i
Regrading (w/above)	\$0.00	cy	0	\$0	
Fixation to meet ERDF leachate criteria	varies	ton	0	\$0	n/a
Hauling & ERDF disposal of fixated soil	\$21.65	ton	0	\$0	n/a
Hauling & ERDF disposal of untreated soil	\$21.65	ton	13,500	\$292	e
Silty soil cover	\$55,725	ac	45	\$2,508	n
Fencing	\$15.00	lf	8,400	\$126	
Air monitoring - capital				\$50	
Air monitoring analyses	\$50,000	yr	1.5	\$75	g
Groundwater monitoring wells	\$22,481	well	8	\$180	h
Site preparation (Mob, Demob & Road Maint.)				\$217	i
Subtotal Capital				\$3,684	
Contractor OH&P (RA & Well)	14%	25%		\$536	p
Subtotal				\$4,220	
Engineering and construction surveillance	66%			\$2,785	
Subtotal				\$7,005	
Contingency	25%			\$1,751	
<b>TOTAL CAPITAL COSTS (thousands)</b>				<b>\$8,756</b>	
<b>POST-CLOSURE CARE COSTS</b>					
Soil cover maintenance	\$900	ac-yr	45	\$623	o
Fence maintenance	\$0.50	lf-yr	8,400	\$65	o
Present value of monitoring costs				\$1,263	j
Subtotal post-closure costs (net present value)				\$1,951	
Contingency	25%			\$488	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>l</sup></b>				<b>\$2,439</b>	
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>m</sup></b>				<b>\$11,195</b>	
<sup>a</sup> Excavation and disposal of all contamination <sup>b</sup> Costs are for mid-1994, in thousands. <sup>c</sup> After pre-screening. <sup>e</sup> Unit cost per Table AD-14. <sup>g</sup> During remedial action. <sup>h</sup> For performance monitoring. <sup>i</sup> Rate derived from Pond/Trench MCACES calc. <sup>j</sup> See Table AD-13. <sup>l</sup> Maintenance and monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation. <sup>m</sup> The sum of capital and operating costs and the net present value of the post-closure care costs. <sup>n</sup> See Table AD-14 (excludes sanitary facilities). <sup>o</sup> Present value calculation. <sup>p</sup> Well subcontractors OH&P 25%, remedial activities subcontractor OH&P 14%.					

Table AD-6. Cost Estimate for Alternative P-2b - Consolidation and Soil Cover.

Item	Unit Cost	Units	15 mrem/yr		Notes
			Qty	Cost <sup>b</sup>	
<b>CAPITAL COSTS</b>					
Consolidate contaminated soil	\$10.30	cy	279,000	\$2,874	c
Silty soil cover	\$55,725	ac	14	\$780	e
Fencing	\$15.00	lf	6,000	\$90	
Air monitoring - capital				\$50	
Air monitoring analyses	\$50,000	yr	1	\$50	f
Groundwater monitoring wells	\$22,481	well	8	\$180	g
Site preparation (Mob, Demob & Rd. Maint.)				\$165	h
Subtotal Capital				\$4,189	
Contractor OH&P (RA & Well)	14%	25%		\$606	m
Subtotal				\$4,795	
Engineering and construction surveillance	66%			\$3,165	
Subtotal				\$7,960	
Contingency	25%			\$1,990	
<b>TOTAL CAPITAL COSTS (thousands)</b>				<b>\$9,950</b>	
<b>POST-CLOSURE CARE COSTS</b>					
Soil cover maintenance	\$900	ac-yr	14	\$194	i
Fence maintenance	\$0.50	lf-yr	6,000	\$46	i
Present value of monitoring costs				\$1,263	j
Subtotal post-closure costs (net present value)				\$1,503	
Contingency	25%			\$376	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>k</sup></b>				<b>\$1,879</b>	
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>l</sup></b>				<b>\$11,829</b>	
<sup>a</sup> Not a remediation alternative; provided for comparison. <sup>b</sup> Costs are for mid-1994, in thousands. <sup>c</sup> Includes regrading & compaction. Excludes sanitary facility and process trenches. <sup>d</sup> See Table AD-14. <sup>e</sup> 2 feet of silty soil over contamination to prevent direct contact with residual contamination. <sup>f</sup> During remedial action. <sup>g</sup> For performance monitoring. <sup>h</sup> Average of Pond/Trench and Burial Ground MCACES calc. and 50% of road maintenance (assumed road gets half the traffic). <sup>i</sup> Present value calculation. <sup>j</sup> See Table AD-13. <sup>k</sup> Maintenance and monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation (in thousands). <sup>l</sup> The sum of capital and operating costs and the net present value of the post-closure care costs, in thousands. <sup>m</sup> Well subcontractors OH&P 25%, remedial activities subcontractor OH&P 14%.					

Table AD-7. Cost Estimates for Alternatives P-3 - Selective Excavation and Disposal.

Item	Unit Cost	Units	15 mrem/yr		Notes
			Qty	Cost <sup>b</sup>	
<b>CAPITAL COSTS</b>					
Excavation & pre-screening of soil (red)	\$17.69	cy	257,615	\$4,557	i
Excavation of soil, no screening (green)	\$3.36	cy	66,385	\$223	i
Weight of contaminated soil		tons	137,700		c
Backfill over-excavated clean soil	\$6.27	cy	324,000	\$2,031	i
Regrading (w/above)	\$0.00	cy	0	\$0	
Fixation to meet ERDF leachate criteria	varies	ton	0	\$0	n/a
Hauling & ERDF disposal of fixated soil	\$21.65	ton	0	\$0	n/a
Hauling & ERDF disposal of untreated soil	\$21.65	ton	137,700	\$2,981	e
Silty soil cover	\$55,725	ac	0	\$0	n/a
Air monitoring - capital				\$50	
Air monitoring analyses	\$50,000	yr	1.5	\$75	g
Groundwater monitoring wells	\$22,481	well	0	\$0	n/a
Site preparation (Mob, Demob & Road Maint.)				\$217	i
Subtotal Capital				\$10,134	
Contractor overhead and profit	14%			\$1,419	
Subtotal				\$11,553	
Engineering and construction surveillance	66%			\$7,625	
Subtotal				\$19,178	
Contingency	25%			\$4,795	
<b>TOTAL CAPITAL COSTS (thousands)</b>				<b>\$23,973</b>	
<b>POST-CLOSURE CARE COSTS</b>					
Soil cover maintenance	\$900	ac-yr	0	\$0	n/a
Present value of monitoring costs				\$0	n/a
Subtotal post-closure costs (net present value)				\$0	
Contingency	25%			\$0	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>l</sup></b>				<b>\$0</b>	
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>m</sup></b>				<b>- \$23,973</b>	
<sup>a</sup> Excavation and disposal of all contamination <sup>b</sup> Costs are for mid-1994, in thousands. <sup>c</sup> After pre-screening. <sup>e</sup> Unit cost per Table AD-14. <sup>g</sup> During remedial action. <sup>h</sup> For performance monitoring. <sup>i</sup> Rate derived from Pond/Trench MCACES calc. <sup>l</sup> Maintenance and monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation. <sup>m</sup> The sum of capital and operating costs and the net present value of the post-closure care costs.					

Table AD-8. Cost Estimate for Alternative P-4 - Excavation, Soil Washing, and Fines Disposal.

Item	Unit Cost	Units	15 mrem/yr		Notes
			Qty	Cost <sup>a</sup>	
<b>CAPITAL COSTS</b>					
Excavation and pre-screening of soil	\$17.69	bcy	324,000	\$5,732	h
Weight of contaminated soil		tons	137,700		b
Backfill over-excavated clean soil	\$6.27	bcy	324,000	\$2,031	h
Regrading (w/above)	\$0.00	bcy	0	\$0	n/a
Soil washing	varies	tons	137,700	\$7,436	c
Hauling and ERDF disposal	\$21.65	tons	12,668	\$274	d
Backfill treated coarse soil	\$6.27	bcy	w/above	w/above	e, h
Silty soil cover	\$55,725	ac	0	\$0	n/a
Air monitoring - capital				\$50	
Air monitoring analyses	\$50,000	yr	3.2	\$160	g
Groundwater monitoring wells	\$22,481	well	0	\$0	n/a
Site preparation (Mob, Demob & Road Maint.)				\$217	h
Subtotal Capital				\$15,900	
Contractor overhead and profit (RA & Soil Wash/Well)	14%	25%		\$3,044	n
Subtotal				\$18,944	
Engineering and construction surveillance	66%			\$12,503	
Subtotal				\$31,447	
Contingency	25%			\$7,862	
<b>TOTAL CAPITAL COSTS (thousands)</b>				<b>\$39,309</b>	
<b>POST-CLOSURE CARE COSTS</b>					
Soil cover maintenance	\$900	ac-yr	0	\$0	N/A
Present value of monitoring costs				\$0	N/A
Subtotal post-closure costs (net present value)				\$0	
Contingency	25%			\$0	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>l</sup></b>				<b>\$0</b>	
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>m</sup></b>				<b>\$39,309</b>	
<sup>a</sup> Costs are for mid-1994, in thousands.					
<sup>b</sup> After pre-screening.					
<sup>c</sup> See Table AD-15.					
<sup>d</sup> Dewatered fines after fixation.					
<sup>e</sup> Soil meeting direct exposure remediation goals (assumes 1.61 ton/bcy).					
<sup>g</sup> Wash time + 1 year.					
<sup>h</sup> Rate derived from Pond/Trench MCACES calc.					
<sup>j</sup> Present value calculation.					
<sup>k</sup> See Table AD-13.					
<sup>l</sup> Maintenance and monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation (in thousands).					
<sup>m</sup> The sum of capital and operating costs and the net present value of the post-closure care costs, in thousands.					
<sup>n</sup> Soil washing & well subcontractors OH&P 25%, remedial activities subcontractor OH&P 14%.					

Table AD-9. Cost Estimate for Alternative B-1 - No Action.

Item	Quantity	Units	Unit Cost	Cost <sup>a</sup>	Notes
<b>CAPITAL COSTS</b>					
Groundwater monitoring wells	0	wells	\$22,481	\$0	n/a
Contractor overhead and profit			25%	\$0	
Subtotal				\$0	
Engineering and construction surveillance			66%	\$0	
Subtotal				\$0	
Contingency			25%	\$0	
<b>TOTAL CAPITAL COSTS (thousands)</b>				<b>\$0</b>	
<b>POST-CLOSURE CARE COSTS</b>					
Present value of monitoring costs				\$1,263	See Table AD-13.
Contingency			25%	\$316	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>b</sup></b>				<b>\$1,579</b>	In thousands
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>c</sup></b>				<b>\$1,579</b>	In thousands
<sup>a</sup> Costs are for mid-1994, in thousands. <sup>b</sup> Monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation. <sup>c</sup> The sum of capital and operating costs and the net present value of the post-closure care costs.					

Table AD-10. Cost Estimate for Alternative B-2 - Institutional Controls.

Item	Quantity	Units	Unit Cost	Cost <sup>a</sup>	Notes
<b>CAPITAL COSTS</b>					
Fencing	4,100	lf	\$15	\$62	
Groundwater monitoring wells	8	wells	\$22,481	\$180	For performance monitoring
Subtotal Capital				\$242	
Contractor overhead and profit			25%	\$61	
Subtotal				\$303	
Engineering and construction surveillance			66%	\$200	
Subtotal				\$503	
Contingency			25%	\$126	
<b>TOTAL CAPITAL COSTS (thousands)</b>				<b>\$629</b>	
<b>POST-CLOSURE CARE COSTS</b>					
Present value of monitoring costs				\$1,263	See Table AD-13
Fence maintenance	4,100	lf-yr	\$0.50	\$32	Present value calculation
Subtotal post-closure costs (net present value)				\$1,295	
Contingency			25%	\$324	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>b</sup></b>				<b>\$1,619</b>	In thousands
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>c</sup></b>				<b>\$2,248</b>	In thousands
<sup>a</sup> Costs are for mid-1994, in thousands. <sup>b</sup> Maintenance and monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation. <sup>c</sup> The sum of capital and operating costs and the net present value of the post-closure care costs.					

Table AD-11. Cost Estimate for Alternatives B-3 - 618-4 Excavation &amp; 618-5 Transfer to 300-FF-2.

Item	Unit Cost	Units	B-3		Notes
			Qty	Cost <sup>c</sup>	
<b>CAPITAL COSTS</b>					
Excavation and pre-screening of soil	\$18.36	cy	26,222	\$481	f
Weight of contaminated soil		tons	17,000		
Backfill / Regrading	\$9.86	cy	26,222	\$259	f
Regrading (w/above)	\$0.00	cy	0	\$0	n/a
Fixation to meet ERDF leachate criteria	\$0	ton	0	\$0	n/a
Hauling & ERDF disposal of fixated soil	\$21.65	ton	0	\$0	n/a
Hauling & ERDF disposal of untreated soil	\$21.65	ton	17,000	\$368	g
Silty soil cover (surface barrier)	\$55,725	ac	0	\$0	n/a
Air monitoring - capital				\$50	
Air monitoring analyses	\$50,000	yr	1	\$50	During remedial action
Groundwater monitoring wells	\$22,481	well	0	\$0	n/a
Site preparation (Mob, Demob & Road Maint.)				\$184	Derived from Burial Ground MCACES calc.
Subtotal Capital				\$1,392	
Contractor overhead and profit	14%			\$195	
Subtotal				\$1,587	
Engineering and construction surveillance	66%			\$1,047	
Subtotal				\$2,634	
Contingency	25%			\$659	
<b>TOTAL CAPITAL COSTS (thousands)</b>				<b>\$3,293</b>	
<b>POST-CLOSURE CARE COSTS:</b>					
Soil cover maintenance	\$900	ac-yr	0	\$0	n/a
Present value of monitoring costs				\$0	n/a
Subtotal post-closure costs (net present value)				\$0	Present value calculation, N/A See Table AD-13
Contingency	25%			\$0	
<b>NET PRESENT VALUE COST FOR POST-CLOSURE CARE<sup>d</sup></b>				<b>\$0</b>	In thousands
<b>TOTAL ALTERNATIVE COST (NET PRESENT VALUE)<sup>e</sup></b>				<b>\$3,293</b>	In thousands
<sup>a</sup> Excavation to achieve direct exposure PRGs <sup>c</sup> Costs are for mid-1994, in thousands. <sup>d</sup> Maintenance and monitoring for 30 years; interest (discount) rate of 5 percent, net of inflation. <sup>e</sup> The sum of capital and operating costs and the net present value of the post-closure care costs. <sup>f</sup> Rate derived from MCACES Burial Ground Calc. <sup>g</sup> Unit cost per Table AD-14.					

Table AD-12. Common Factors.

Item	Value	Source/Comments
Interest rate (net of inflation)	5%	EPA value; for present value calculations
Post-closure care period	30 yr	RCRA post-closure care period
Present value factor using above	15.37	Calculated
Contractor overhead & profit (OH&P)	14%	Mid-range value for site remediation (no markup on ERC supplied labor or material) all other work is at 25%
Engineering & construction surveillance (E&CS)	66%	Rounded sum of factors
Definitive design	10%	Average of Pond and Burial Ground (100-BC 1995 Baseline adjusted to 300-FF-1 parameters).
On-site indirects (field non-manual including QA and Safety, training, direct distribs and general indirects).	41%	Average of MCACES Pond & Burial Ground
PM/CM	15%	Average of MCACES Pond & Burial Ground
Contingency	25%	Appropriate for FS



Table AD-14. Derived Unit Costs.

Item	Quantity	Units	Unit Cost	Cost	Notes	
All unit costs used in the cost estimates are base costs ("raw"), before addition of OH&P, E&CS, and contingency. The costs for OH&P, E&CS, and contingency are added as percentages in the costs estimates for each alternative.						
Initial construction plus operations	\$2.2 E+7	lcy	\$50.91	\$1.1 E+9	Total costs include OH&P, E&CS, and contingency WHC budget estimates (verbal communication)	
Modified Hanford Barrier	\$2.8 E+7	lcy	\$7.25	\$2.0 E+8	Total cost from DOE/RL 1994d, Table 9-7	
Post-closure care			\$2.00		Allowance	
Total unit cost for disposal			\$60.16			
Divide by combined factor			/ 2.4		Compounded OH&P, E&CS and Contingency (Table AD-12)	
			\$25.00		Rounded to units	
Transportation (truck @ 48 miles round trip)			\$5.31		Avg. of hauling cost from Pond & Burial Ground MCACES calcs.	
<b>ERDF Disposal Unit Cost (raw)</b>		<b>LCY</b>		<b>\$30.31</b>	Base unit cost (w/o OH&P, E&CS, or contingency)	
		<b>LCY</b>		<b>\$71.69</b>	Fully burdened unit cost (for comparison)	
		<b>TON</b>		<b>\$21.65</b>	Same as above only converted to \$/tn (1.4TN per LCY)	
		<b>TON</b>		<b>\$51.20</b>	Same as above only converted to \$/tn (1.4TN per LCY)	
For groundwater protection						
Silt 2ft/sf	silt cost	3,227	bcy	\$0.00	\$0	No charge for silt from McGee Ranch
	load/haul silt	3,227	bcy	\$13.46	\$43,431	Rate from MCACES calc. (68 miles round trip).
	spread & compact	3,227	bcy	\$3.81	\$12,294	Rate from MCACES Pond/Trench calc.
<b>Soil Cover Unit Cost</b>			<b>ac</b>		<b>\$55,725</b>	

Table AD-15. Estimated Costs for Soil Washing.

Item	Unit	Units	15 mrem/yr		Notes
			Qty	Cost <sup>a</sup>	
<b>DESIGN ASSUMPTIONS:</b>					
Weight of soil treated		tons	137,700		See Table 6-1
Soil processing rate		tons/hr	25		
Operating schedule		hrs/wk	50		
Staffing		hrs/wk	72		
On-line time (calculated)			69%		Operating time / staffing
Treatment period		yr	2.2		Calculated
<b>CAPITAL COSTS:</b>					
Soil washing equipment				\$4,709	See Figure 6-4 and Table AD-16
Depreciated capital for project life				\$1,816	7 yr life; operating time plus 6 mo.
Site preparation				\$231	Grading, utility connections, soil pad
Mobilization and startup				\$529	
Process building	\$27.80	sf	7,200	\$200	
Plant support building	\$47.00	sf		\$150	Decontamination, lab., admin.
<b>TOTAL CAPITAL COST (thousands)</b>				<b>\$2,926</b>	
<b>OPERATING COSTS (for period of operation:</b>					
Labor annual cost				\$932	15 mrem value avg of 10 & 25 values
Labor total cost		yr	2.2	\$2,050	See Table AD-16
Polymers	\$2.00	/ ton	137,700	\$275	For flocculation & filter press
Fixation chemicals (for fines)	\$24	/ ton	12,668	\$304	Per ton of dewatered fines
Power	\$60	1000 kwh	6,500	\$390	
Water	\$7	1000 gal	3,194	\$22	
Personnel protection	\$1.50	/ ton	137,700	\$207	Laundry, monitoring, & expendables
Supplies and miscellaneous	\$1.75	/ ton	137,700	\$241	
Maintenance				\$622	Est. 6% of equipment cost annually
Treatment system air monitoring	\$200	samp	220	\$44	2 per week
Offsite analytical	\$200	samp	1,100	\$220	QA for onsite XRF; 10 per week
Process studies				\$200	To fine-tune processing
<b>TOTAL OPERATING COST (thousands)</b>				<b>\$4,575</b>	
<b>SOIL WASHING BASE UNIT COST</b>		<b>per feed ton</b>		<b>\$54</b>	<b>In whole dollars</b>
<sup>a</sup> Costs are for mid-1994, in thousands.					

Table AD-16. Breakdown of Soil Washing Costs.

Item	Unit Cost	50 ton/hr System		25 ton/hr System		Notes
		Units Qty	Cost <sup>a</sup>	Qty	Cost <sup>a</sup>	
<b>ESTIMATED EQUIPMENT COSTS:</b>						WHC 1994
Feed module			\$575,000		\$448,000	Grizzly, conveyors, apron feeder
Rotary scrubber			\$430,000		\$350,000	
Coarse screen			\$280,000		\$222,000	4 mm screen, water spray, cyclone #1
Screen pumping module			\$295,000		\$243,000	Conveyor, pumping, piping, controls
Flocculation module			\$210,000		\$175,000	Flocculator, tanks, mixers, cyclone #3
Reagent module			\$130,000		\$114,000	For polymer addition
Attrition scrubber			\$465,000		\$365,000	6 attrition cells, 3 pumps, conveyor
Dewatering screen module			\$225,000		\$188,000	vibrating screen, cyclones #2 & #3
Thickener			\$415,000		\$273,000	Lamella thickener, pump, tank
Belt filter press			\$505,000		\$412,000	
Filter support module			\$185,000		\$152,000	Compressor and conveyors for filter press
Electrical controls			\$325,000		\$302,000	Control panel in control room
Water treatment (precipitation / ion exchange)			\$0		\$0	Assume flocculation/settling sufficient
Stabilization equipment			\$400,000		\$300,000	
Air monitoring for treatment system			\$125,000		\$125,000	
Sampling equipment and XRF			\$150,000		\$150,000	
Front-end loader			\$150,000		\$150,000	
Plant engineering by supplier			\$300,000		\$300,000	
Freight, assembly and startup			\$475,000		\$440,000	By equipment vendor
<b>TOTAL SOIL EQUIPMENT COST</b>			<b>\$5,640,000</b>		<b>\$4,709,000</b>	
<b>ESTIMATED LABOR COSTS:</b>						WHC 1994
			<b>2 shifts (72 hr/wk)</b>		<b>1 shift (40 hr/wk)</b>	
Plant manager	\$101,500	ea/yr	1	\$101,500	1	\$101,500
Plant engineer	\$72,500	ea/yr	1	\$72,500	1	\$72,500
Plant operators	\$50,750	ea/yr	10	\$507,500	5	\$253,750
Equipment operators	\$43,500	ea/yr	2	\$87,000	1	\$43,500
Laborers	\$36,250	ea/yr	2	\$72,500	3	\$108,750
Radiation / Health & safety officer	\$72,500	ea/yr	2	\$145,000	1	\$72,500
Health physics technicians	\$50,750	ea/yr	2	\$101,500	1	\$50,750
Clerical	\$36,250	ea/yr	1	\$36,250	1	\$36,250
<b>TOTAL SOIL WASHING LABOR</b>				<b>\$1,123,750</b>		<b>\$739,500</b>
Costs are for mid-1994.						