

APPENDIX C
COST ESTIMATE SUMMARY TABLES

**NO ACTION
SUMMARY OF SIGNIFICANT COSTS**

Components:

I. Five-Year Review

FIVE-YEAR REVIEWS

Staff Scientist	1	hour	40	\$65	\$2,600 BRE/URS Experience
Project Scientist	1	hour	80	\$96	\$7,680 BRE/URS Experience
Principal (Peer Review)	1	hour	16	\$135	\$2,160 BRE/URS Experience
Administrative/Graphics Support	1	hour	32	\$40	\$1,280 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$800	\$800 BRE/URS Experience
				Subtotal =	\$14,520

Five-Year Review Total = \$14,520.00 years 5, 10, 15, 20, 25 & 30

Present Worth Analysis			
Year	\$	P/F (7%)	Present Worth
5	\$14,520	0.71	\$10,353
10	\$14,520	0.51	\$7,381
15	\$14,520	0.36	\$5,262
20	\$14,520	0.26	\$3,752
25	\$14,520	0.18	\$2,675
30	\$14,520	0.13	\$1,908
TOTAL			\$31,330

GRAND TOTAL (PRESENT WORTH)

FIVE-YEAR REVIEWS \$31,330

GRAND TOTAL, NO ACTION \$31,330

Assumptions:

Reporting requirements remain unchanged from current levels

7-Percent interest reflects effective rate of return including inflation

Alternative: Alternative 2A - Monitored Natural Attenuation

1. Monitoring of Natural Attenuation Processes
2. Five Year Review

Item	Quantity	Units	Number of Units	Unit Cost	Extended Cost	Cost Basis
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GROUNDWATER MONITORING PROGRAM - NATURAL ATTENUATION MONITORING/POST-REMEDIAL MONITORING

Perform existing long-term groundwater monitoring program (semiannual sampling of 45 monitoring well locations) for 30 year time-frame. Assume analytical suite will be for TAL Metals and VOC only.

Mobilization/Demobilization	32	hour	2	\$65	\$4,160	BRE/URS Experience
Travel To/From Site	36	hour	2	\$55	\$3,960	BRE/URS Experience
Sampling Labor	300	hour	2	\$55	\$33,000	BRE/URS Experience
Per Diem	26	day	2	\$125	\$6,500	BRE/URS Experience
Vehicle/Gas	5	week	2	\$430	\$4,300	Enterprise/Gas URS Experience
Vehicle/Gas	0	day	2	\$60	\$0	Enterprise/Gas URS Experience
subcontractor handling fees	1	mult.	0.1	\$36,942	\$3,694	
Grundfos Pump with Control Box	4	week	2	\$247	\$1,972	Pine Environmental
YSI Water Quality Meter	4	week	2	\$383	\$3,060	Pine Environmental
Water Level Meter	4	week	2	\$43	\$340	Pine Environmental
HDPE Discharge Tubing	1	foot	5000	\$0	\$800	Pine Environmental
Generator	15	day	2	\$25	\$750	All Around Power
Miscellaneous Supplies	1	Lump Sum	2	\$450	\$900	BRE/URS Experience
Laboratory Analysis (VOCs)	61	sample	2	\$105	\$12,810	Columbia Analytical Laboratories
Laboratory Analysis (TAL Metals)	58	sample	2	\$125	\$14,500	Columbia Analytical Laboratories
Carbon Treatment Drum (one per event)	1	unit	2	\$800	\$1,600	Redhawk Env.
Testing effluent for Breakthrough (VOCs)	1	drum	2	\$105	\$210	Columbia Analytical Laboratories
Data Validation (Staff Scientist)	80	hour	2	\$65	\$10,400	BRE/URS Experience
Data Validation (Project Scientist)	100	hour	2	\$96	\$19,200	BRE/URS Experience
Data Validation Peer Review (Principal)	8	hour	2	\$135	\$2,160	BRE/URS Experience
Data Validation (Administrative Support)	60	hour	2	\$60	\$7,200	BRE/URS Experience
Annual Report (Staff Scientist)	80	hour	1	\$65	\$5,200	BRE/URS Experience
Annual Report (Project Scientist)	80	hour	1	\$96	\$7,680	BRE/URS Experience
Annual Report Peer Review (Principal)	16	hour	1	\$135	\$2,160	BRE/URS Experience
Annual Report (Administrative Support/Graphics)	60	hour	1	\$60	\$3,600	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$500	\$500	BRE/URS Experience
Subtotal =					\$150,656	

Present Worth Analysis

Year	\$	P/A (%)	Present Worth
1 - 30	\$150,656	12.41	\$1,869,493
TOTAL			\$1,869,493

FIVE-YEAR REVIEWS

Staff Scientist	1	hour	40	\$65	\$2,600	BRE/URS Experience
Project Scientist	1	hour	80	\$96	\$7,680	BRE/URS Experience
Principal (Peer Review)	1	hour	16	\$135	\$2,160	BRE/URS Experience
Administrative/Graphics Support	1	hour	32	\$40	\$1,280	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$800	\$800	BRE/URS Experience
Subtotal =					\$14,520	

Five-Year Review Total = \$14,520.00 years 5, 10, 15, 20, 25 & 30

Present Worth Analysis

Year	\$	P/F (%)	Present Worth
5	\$14,520	0.71	\$10,353
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15	\$14,520	0.36	\$5,262
20	\$14,520	0.26	\$3,752
25	\$14,520	0.18	\$2,675
30	\$14,520	0.13	\$1,908
TOTAL			\$31,330

GRAND TOTAL (PRESENT WORTH)

LTMP POST-REMEDIAL GROUNDWATER MONITORING PROGRAM	\$1,869,493
FIVE-YEAR REVIEWS	\$31,330
GRAND TOTAL, ALTERNATIVE 2	\$1,900,823

ASSUMPTIONS

- Site Conditions do not change appreciably, level of effort in field tasks remain commensurate with existing activities.
- Reporting requirements remain unchanged from current levels
- Sample collection methods and procedures remain unchanged from current requirements
- Sample analytical requirements remain unchanged as to level of effort/associated costs
- 7-Percent interest reflects effective rate of return including inflation

**ALTERNATIVE 4A
PERMEABLE REACTIVE BARRIER, SOURCE AREA
SUMMARY OF SIGNIFICANT COSTS**

Components:

1. Pre-Design Investigation
2. Bench Scale Testing
3. Full-Scale Implementation
4. Iron Regeneration
5. Post Application Monitoring Program
6. Five-Year Review

Item	Quantity	Units	Number of Units	Unit Cost	Extended Cost	Cost Basis
PRE-DESIGN INVESTIGATION						
Install up to twenty-five shallow overburden monitoring wells (average depth of 45 feet, ten individual locations) to characterize concentrations of organic compounds and hydraulic conductivities in areas targeted for treatment. Sample groundwater to characterize VOC concentrations in area downgradient of IWS-3.						
<i>Develop Workplan</i>						
Develop Workplan (Project Scientist/Engineer)	1	hours	40	\$96.00	\$3,840	BRE/URS Experience
Graphics/Administrative Support	1	hours	10	\$40.00	\$400	BRE/URS Experience
Peer Review (Principal)	1	hours	2	\$135.00	\$270	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$200.00	\$200	BRE/URS Experience
<i>Drilling Services</i>						
Mobilization and Demobilization of Drill Rig	1	per rig	1	\$2,100.00	\$2,100	Contractor Estimate
Temporary decon pad	1	lump sum	1	\$200.00	\$200	Contractor Estimate
6" diameter temporary surface casing installed	25	linear foot	10	\$30.00	\$7,500	Contractor Estimate
4-1/4" ID hollow stem auger drilling with continuous split spoon sampling	10	linear foot	55	\$20.00	\$11,000	Contractor Estimate
4-1/4" ID hollow stem auger drilling- no sampling	15	linear foot	40	\$12.00	\$7,200	Contractor Estimate
2" PVC well installed	25	linear foot	45	\$18.00	\$20,250	Contractor Estimate
2" diameter split spoon samples (0-50')	7	each	27	\$20.00	\$3,780	Contractor Estimate
2" diameter split spoon samples (50-75')	3	each	6	\$35.00	\$630	Contractor Estimate
4" diameter locking protective casing & concrete pad	25	each	1	\$175.00	\$4,375	Contractor Estimate
Additional driller to assist with well development	1	per day	7	\$600.00	\$4,200	Contractor Estimate
Well Development	1	hour	40	\$55.00	\$2,200	Contractor Estimate
55-gallon drums staged onsite (containerize purge water)	1	each	25	\$40.00	\$1,000	Contractor Estimate
Decontamination, waste handling	1	hour	16	\$190.00	\$3,040	Contractor Estimate
Provide Loader to move drums	1	day	35	\$250.00	\$8,750	Contractor Estimate
Driller Per Diem	3	day	35	\$175.00	\$18,375	Contractor Estimate
Geotechnical Laboratory Analyses	1	sample	12	\$330.00	\$3,960	BRE/URS Experience
subcontractor handling fee	1	multi.	0.1		\$9,856	
URS Oversight	1	day	35	\$942.00	\$32,970	BRE/URS Experience
<i>Hydraulic Conductivity Testing of new Monitoring wells</i>						
Hermi/Data Logger	1	day	3	\$85.00	\$255	Pine Environmental
subcontractor handling fee	1	multi.	0.1		\$9	
Setup/Office Analysis	1	day	3	\$88.00	\$264	BRE/URS Experience
URS Oversight	2	day	3	\$942.00	\$5,652	BRE/URS Experience
<i>Sampling of new Monitoring Wells</i>						
Office Field Prep	1	hour	24	\$88.00	\$2,112	BRE/URS Experience
Laboratory Analysis (VOCs)	1	sample	25	\$105.00	\$2,625	Columbia Analytical Laboratories
YSI flow-through cell	1	day	7	\$85.00	\$595	Pine Environmental
Grundfos Pump/Controller	1	day	7	\$80.75	\$565	Pine Environmental
Tubing	1	500 feet	2	\$75.00	\$150	Pine Environmental
Water level	1	day	7	\$25.50	\$179	Pine Environmental
Generator	1	day	7	\$50.00	\$350	Local Equipment Rental Rate
Gloves	1	box	2	\$110.00	\$220	Pine Environmental
PID	1	day	7	\$80.75	\$565	Pine Environmental
Deionized Water	1	gallon	200	\$1.30	\$260	Hampshire Purified Water
FedEx/ice	1	cooler	7	\$60.00	\$420	BRE/URS Experience
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$75.00	\$75	BRE/URS Experience
subcontractor handling fee	1	multi.	0.1	\$83.63		
URS Oversight	2	day	7	\$942.00	\$13,188	BRE/URS Experience
<i>Reporting/Data Analysis</i>						
Data Validation (Administrative Support)	1	hour	8	\$40	\$320	BRE/URS Experience
Data Validation (Staff Scientist)	1	hour	24	\$65	\$1,560	BRE/URS Experience
Data Validation (Project Scientist)	1	hour	10	\$96	\$960	BRE/URS Experience
Data Validation Peer Review (Principal)	1	hour	2	\$135	\$270	BRE/URS Experience
Pre-Design Study Report (Staff Scientist)	1	hour	40	\$65	\$2,600	BRE/URS Experience
Pre-Design Study Report (Project Scientist)	1	hour	160	\$96	\$15,360	BRE/URS Experience
Pre-Design Report (Graphics/Administrative Support)	1	hour	16	\$40	\$640	BRE/URS Experience
Pre-Design Report Peer Review (Principal)	1	hour	4	\$135	\$540	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$400	\$400	BRE/URS Experience
Pre-Design Subtotal:					\$196,230	

BENCH SCALE TESTING

Bench Scale Testing	1	each	1	\$25,000	\$25,000	Envirometal Technologies
Office Field Prep	1	hour	2	\$88.00	\$176	BRE/URS Experience
YSI flow-through cell	1	day	1	\$85.00	\$85	Pine Environmental
Grundfos Pump/Controller	1	day	1	\$80.75	\$81	Pine Environmental
Tubing	1	500 feet	0.5	\$75.00	\$38	Pine Environmental
Water level	1	day	1	\$25.50	\$26	Pine Environmental
Generator	1	day	1	\$50.00	\$50	Local Equipment Rental Rate
Gloves	1	box	1	\$110.00	\$110	Pine Environmental
PID	1	day	1	\$80.75	\$81	Pine Environmental
Deionized Water	1	gallon	15	\$1.30	\$20	Hampshire Purified Water
FedEx/Ice	1	cooler	1	\$60.00	\$60	BRE/URS Experience
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$50.00	\$50	BRE/URS Experience
subcontractor handling fee	1	multi.	0.1		\$25,775	
Sample Collection	1	day	2	\$942	\$1,884	BRE/URS Experience
URS Oversight/Project Management	1	hour	8	\$96	\$768	BRE/URS Experience
				Bench Scale Subtotal:	\$54,202	

FULL-SCALE IMPLEMENTATION

Develop Design

Topographic Map (Survey Crew)	2	Days	3	\$987.48	\$5,925	URS
Develop Design (Project Scientist/Engineer)	1	hour	600	\$96.00	\$57,600	BRE/URS Experience
Graphics/Administrative Support	1	hour	80	\$40.00	\$3,200	BRE/URS Experience
Peer Review Design (Principal)	1	hour	40	\$135.00	\$5,400	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$600.00	\$600	BRE/URS Experience
Address Comments (Project Scientist/Engineer)	1	hour	40	\$96.00	\$3,840	BRE/URS Experience
Peer Review Comment Responses (Principal)	1	hour	16	\$135.00	\$2,160	BRE/URS Experience

Layout (Survey) Grid for PRB/Monitoring Well Locations (3-Man Crew)

	2	Day	2	\$987.48	\$1,600	URS
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Site Preparation for Construction Access/Activities

Mobilization and Demobilization - dozer and excavator	1	lump sum	1	\$1,500.00	\$1,500	Contractor Estimate
Mobilization and Demobilization - operator and laborer	1	lump sum	1	\$1,500.00	\$1,500	Contractor Estimate
Clearing site with chain saws	1	day	2	\$1,200.00	\$2,400	Contractor Estimate
Excavator and operator	1	day	90	\$1,200.00	\$108,000	Contractor Estimate
Dozer and operator	1	day	90	\$800.00	\$72,000	Contractor Estimate
Relocation of overhead power transmission lines	1	each	1	\$25,000.00	\$25,000	Lyndonville Electric estimate
Temporary Construction Office 20' x 8' with air conditioning	1	month	4	\$195.59	\$782	Means Environmental Restoration Co
Temporary Electrical Power and Lighting per month average	1	CSF	16	\$85.78	\$1,372	Means Environmental Restoration Co
Temporary Heat	1	CSF	320	\$1.40	\$448	Means Environmental Restoration Co
Portable Toilets	1	month	4	\$78.31	\$313	Means Environmental Restoration Co
subcontractor handling fee	1	multi.	0.1		\$21,332	

Construction Activities

BP Polymer Mixing Facility	1	week	8	\$4,500.00	\$36,000	URS experience
Normal Soil, 26-75' Slurry Wall Excavation with BP Polymer	1	SF	20500	\$5.00	\$102,500	URS experience
Iron	1	ton	1000	\$700.00	\$700,000	Supplier estimate
Sand for Iron/Sand Blend	1	ton	2000	\$10.00	\$20,000	URS experience
Place Blended Iron/Sand in Trench	1	ton	3000	\$20.00	\$60,000	URS experience
Low permeability cap (between top of PRB and ground surface)	1	CY	100	\$50.00	\$5,000	URS experience
Backfill Trench	1	CY	700	\$20.00	\$14,000	URS experience
Regrade Working Surface	1	SF	40000	\$0.06	\$2,400	Means Environmental Restoration Co
Silt fences, Vinyl, 3' High with 7.7' posts	1	LF	500	\$1.86	\$930	Means Environmental Restoration Co
Culvert Installation for unnamed stream	1	LF	160	\$200.00	\$32,000	URS experience
6 - 2" PVC monitoring wells installed within PRB during construction	6	linear foot	50	\$10.00	\$3,000	Contractor Estimate
subcontractor handling fee	1	multi.	0.1		\$97,583	
Air Monitoring for Fugitive Emissions (particulate only)	1	lump sum	1	\$5,000.00	\$5,000	URS experience
ETI Royalties	1	%	1	\$0.15	\$146,375	Envirometal Technologies

Waste handling and Disposal (e.g., well development water, soil cuttings)

Soil disposal - assumes non-hazardous - from trench and frac tank.	1	ton	3000	\$60.00	\$180,000	Contractor Estimate
Waste disposal - assumes non-hazardous - from frac tank - \$1.00 per gallon	1	gallon	250000	\$1.00	\$250,000	Contractor Estimate
Frac- tank drop and pick up fee (with cleanout charge)	1	tank	4	\$2,500.00	\$10,000	Contractor Estimate
Frac-tank rental	4	month	12	\$300.00	\$14,400	Contractor Estimate
subcontractor handling fee	1	multi.	0.1		\$45,440	
URS Oversight	1	day	100	\$942.00	\$94,200	BRE/URS Experience

Site Restoration

Place Top Soil In Six-Inch Lift Over Disturbed Area)	1	cubic yards	800	\$24.82	\$19,856	Means Environmental Restoration Co
Hydroseed Top Soil	1	acre	2	\$493.50	\$987	Means Environmental Restoration Co
Compensatory Wetland Creation	1	acre	1	\$20,000.00	\$20,000	BRE/URS Experience
subcontractor handling fee	1	multi.	0.1		\$4,084	
URS Oversight	1	day	10	\$942.00	\$9,420	BRE/URS Experience

Install ten 2-inch PVC monitoring wells (average depth of 50 feet). 10-screen installed in shallow overburden

Mobilization and Demobilization	1	per rig	1	\$2,100.00	\$2,100	Contractor Estimate
Temporary decon pad	1	lump sum	1	\$200.00	\$200	Contractor Estimate
6" diameter temporary surface casing installed	10	linear foot	10	\$30.00	\$3,000	Contractor Estimate
4-1/4" ID hollow stem auger drilling with continuous split spoon sampling	10	linear foot	50	\$25.00	\$12,500	Contractor Estimate
2" PVC well installed	10	linear foot	50	\$18.00	\$9,000	Contractor Estimate
4" diameter locking protective casing & concrete pad	10	each	1	\$175.00	\$1,750	Contractor Estimate
Additional driller for well development	1	day	3	\$600.00	\$1,800	Contractor Estimate
subcontractor handling fee	1	multi.	0.1		\$3,035	
URS Oversight	1	day	1	\$942	\$942	BRE/URS Experience

Hydraulic Conductivity Testing of new Monitoring wells

Hermi/Data Logger	1	day	2	\$85	\$170	Pine Environmental
subcontractor handling fee	1	multi.	0.1		\$17	
Setup/Office Analysis	1	day	2	\$88	\$176	BRE/URS Experience
URS Oversight	2	day	2	\$942	\$3,768	BRE/URS Experience

Sampling of Monitoring wells

Office Field Prep	1	hour	8	\$88.00	\$704	BRE/URS Experience
Laboratory Analysis (includes duplicates/equipment blanks)	1	sample	15	\$550.00	\$8,250	Columbia Analytical Laboratories
YSI flow-through cell	1	day	3	\$85.00	\$255	Pine Environmental
Grundfos Pump/Controller	1	day	3	\$80.75	\$242	Pine Environmental
Tubing	1	500 feet	2	\$75.00	\$150	Pine Environmental
Water level	1	day	3	\$25.50	\$77	Pine Environmental
Generator	1	day	3	\$50.00	\$150	Local Equipment Rental Rate
Gloves	1	box	1	\$110.00	\$110	Pine Environmental
PID	1	day	3	\$80.75	\$242	Pine Environmental
Deionized Water	1	gallon	20	\$1.30	\$26	Hampshire Purified Water
FedEx/Ice	1	cooler	3	\$60.00	\$180	BRE/URS Experience
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$50.00	\$50	BRE/URS Experience
subcontractor handling fee	1	multi.	0.1		\$1,044	
URS Oversight	2	day	3	\$942.00	\$5,652	BRE/URS Experience

Construction Completion Reporting

Data Validation (Administrative Support)	1	hour	4	\$40.00	\$160	BRE/URS Experience
Data Validation (Staff Scientist)	1	hour	10	\$65.00	\$650	BRE/URS Experience
Data Validation (Project Scientist)	1	hour	4	\$96.00	\$384	BRE/URS Experience
Data Validation Peer Review (Principal)	1	hour	1	\$135.00	\$135	BRE/URS Experience
Completion Report (Staff Scientist)	1	hour	40	\$65.00	\$2,600	BRE/URS Experience
Completion Report (Project Scientist)	1	hour	240	\$96.00	\$23,040	BRE/URS Experience
Completion Report (Graphics/Administrative Support)	1	hour	60	\$40.00	\$2,400	BRE/URS Experience
Completion Report Peer Review (Principal)	1	hour	4	\$135.00	\$540	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$500.00	\$500	BRE/URS Experience

Full Scale Implementation Subtotal: \$2,268,221.09

POST APPLICATION MONITORING PROGRAM

Sample ten monitoring wells monthly for the following parameters: (sulfate, chloride, bromide, fluoride, total dissolved solids, total suspended solids, dissolved organic content, total organic carbon, potassium, sodium, calcium, magnesium, iron, aluminum, manganese, barium, nitrate, alkalinity)

Weekly water level collection (six months (18 trips, 6 coincide with monthly sampling)

Office Field Prep	18	hour	1	\$88.00	\$1,584	BRE/URS Experience
Water level	18	day	1	\$25.50	\$459	Pine Environmental
Gloves	18	box	0.25	\$110.00	\$495	Pine Environmental
PID	18	day	1	\$80.75	\$1,454	Pine Environmental
subcontractor handling fee	18	multi.	0.1		399.15	
URS Oversight	18	day	1	\$942.00	\$16,956	BRE/URS Experience
Subtotal:					\$21,347	

Assume construction occurs during year 0, monitoring begins following year

Present Worth Analysis			
Year	\$	P/F (7%)	Present Worth
1	\$21,347	0.93	\$19,852
TOTAL			\$19,852

Monthly sampling (first year)

Office Field Prep	12	hour	8	\$88.00	\$8,448 BRE/URS Experience
Laboratory Analysis (includes duplicates/equipment blanks)	12	sample	15	\$550.00	\$99,000 Columbia Analytical Laboratories
YSI flow-through cell	12	day	3	\$85.00	\$3,060 Pine Environmental
Grundfos Pump/Controller	12	day	3	\$80.75	\$2,907 Pine Environmental
Tubing	12	500 feet	2	\$75.00	\$1,800 Pine Environmental
Water level	12	day	3	\$25.50	\$918 Pine Environmental
Generator	12	day	3	\$50.00	\$1,800 Local Equipment Rental Rate
Gloves	12	box	1	\$110.00	\$1,320 Pine Environmental
PID	12	day	3	\$80.75	\$2,907 Pine Environmental
Deionized Water	12	gallon	20	\$1.30	\$312 Hampshire Purified Water
FedEx/Ice	12	cooler	3	\$60.00	\$2,160 BRE/URS Experience
subcontractor handling fee	12	multi.	0.1		\$12,463
URS Oversight (2 people, 12 events, 3 days each)	24	day	3	\$942.00	\$67,824 BRE/URS Experience
					Subtotal: \$204,919

Present Worth Analysis			
Year	\$	P/F (7%)	Present Worth
1	\$204,919	0.93	\$190,575
TOTAL			\$190,575

Monthly water level collection (8 trips, 4 coincide with quarterly sampling)(second year only)

Office Field Prep	8	hour	1	\$88.00	\$704 BRE/URS Experience
Water level	8	day	1	\$25.50	\$204 Pine Environmental
Gloves	8	box	0.25	\$110.00	\$220 Pine Environmental
PID	8	day	1	\$80.75	\$646 Pine Environmental
subcontractor handling fee	8	multi.	0.1		177.4
URS Oversight	8	day	1	\$942.00	\$7,536 BRE/URS Experience
					Subtotal: \$9,487

Present Worth Analysis			
Year	\$	P/F (7%)	Present Worth
2	\$9,487	0.87	\$8,254
TOTAL			\$8,254

Quarterly water level/monitoring well sampling (3-5 years)

Office Field Prep	4	hour	8	\$88.00	\$2,816 BRE/URS Experience
Laboratory Analysis (includes duplicates/equipment blanks)	4	sample	15	\$550.00	\$33,000 Columbia Analytical Laboratories
YSI flow-through cell	4	day	3	\$85.00	\$1,020 Pine Environmental
Grundfos Pump/Controller	4	day	3	\$80.75	\$969 Pine Environmental
Tubing	4	500 feet	2	\$75.00	\$600 Pine Environmental
Water level	4	day	3	\$25.50	\$306 Pine Environmental
Generator	4	day	3	\$50.00	\$600 Local Equipment Rental Rate
Gloves	4	box	1	\$110.00	\$440 Pine Environmental
PID	4	day	3	\$80.75	\$969 Pine Environmental
Deionized Water	4	gallon	20	\$1.30	\$104 Hampshire Purified Water
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$50.00	\$50 BRE/URS Experience
FedEx/Ice	4	cooler	3	\$60.00	\$720 BRE/URS Experience
subcontractor handling fee	4	multi.	0.1		\$4,159
URS Oversight	8	day	3	\$942.00	\$22,608 BRE/URS Experience
					Subtotal: \$68,361

Present Worth Analysis			
Year	\$	P/F (7%)	Present Worth
3	\$68,361	0.82	\$56,056
4	\$68,361	0.76	\$51,955
5	\$68,361	0.71	\$48,537
TOTAL			\$156,548

Semiannual water level/monitoring well sampling (5-30 years)

Office Field Prep	2	hour	8	\$88.00	\$1,408 BRE/URS Experience
Laboratory Analysis (includes duplicates/equipment blanks)	2	sample	15	\$550.00	\$16,500 Columbia Analytical Laboratories
YSI flow-through cell	2	day	3	\$85.00	\$510 Pine Environmental
Grundfos Pump/Controller	2	day	3	\$80.75	\$485 Pine Environmental
Tubing	2	500 feet	2	\$75.00	\$300 Pine Environmental
Water level	2	day	3	\$25.50	\$153 Pine Environmental
Generator	2	day	3	\$50.00	\$300 Local Equipment Rental Rate
Gloves	2	box	1	\$110.00	\$220 Pine Environmental
PID	2	day	3	\$80.75	\$485 Pine Environmental
Deionized Water	2	gallon	20	\$1.30	\$52 Hampshire Purified Water
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$50.00	\$50 BRE/URS Experience
FedEx/Ice	2	cooler	3	\$60.00	\$360 BRE/URS Experience
subcontractor handling fee	2	multi.	0.1		\$2,082
URS Oversight	4	day	3	\$942.00	\$11,304 BRE/URS Experience
					Subtotal: \$34,208

Present Worth Analysis

Year	\$	P/F (7%)	Present Worth
5-30	\$34,208	9.02	\$308,558
TOTAL			\$308,558

Annual Reporting over 30 year period

Data Validation (Staff Scientist)	1	hour	40	\$65	\$2,600 BRE/URS Experience
Data Validation (Project Scientist)	1	hour	15	\$96	\$1,440 BRE/URS Experience
Data Validation Peer Review (Principal)	1	hour	5	\$135	\$675 BRE/URS Experience
Data Validation Administrative Support	1	hour	8	\$40	\$320 BRE/URS Experience
Performance Monitoring Report (Staff Scientist)	1	hour	120	\$65	\$7,800 BRE/URS Experience
Performance Monitoring Report (Project Scientist)	1	hour	20	\$96	\$1,920 BRE/URS Experience
Performance Monitoring Report Peer Review (Principal)	1	hour	8	\$135	\$1,080 BRE/URS Experience
Performance Monitoring Report (Graphics/Administrative Support)	1	hour	24	\$40	\$960 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$500	\$500 BRE/URS Experience
				Subtotal:	\$17,295

Present Worth Analysis

Year	\$	P/A (7%)	Present Worth
1 - 30	\$17,295	12.41	\$214,614
TOTAL			\$214,614

IRON REGENERATION

Rejuvenation of PRB	1	lump sum	1	\$150,000	\$150,000 BRE/URS Experience.
subcontractor handling fee	1	multi.	0.1		\$15,000
URS Oversight	10	day	1	\$942.00	\$9,420 BRE/URS Experience
				Subtotal:	\$174,420

Present Worth Analysis

Year	\$	P/F (7%)	Present Worth
20	\$174,420	0.26	\$45,349
30	\$174,420	0.13	\$22,675
TOTAL			\$68,024

LTMP POST-REMEDIATION GROUNDWATER MONITORING PROGRAM

Perform existing long-term groundwater monitoring program (semiannual sampling of 45 monitoring well locations) for 30 year time-frame. Assume analytical suite will be for TAL Metals and VOCs only.

Mobilization/Demobilization	32	hour	2	\$65	\$4,160 BRE/URS Experience
Travel To/From Site	36	hour	2	\$55	\$3,960 BRE/URS Experience
Sampling Labor	300	hour	2	\$55	\$33,000 BRE/URS Experience
Per Diem	26	day	2	\$125	\$6,500 BRE/URS Experience
Vehicle/Gas	5	week	2	\$430	\$4,300 Enterprise/Gas URS Experience
subcontractor handling fees	1	mult.	0.1	\$36,942	\$3,694
Grundfos Pump with Control Box	4	week	2	\$247	\$1,972 Pine Environmental
YSI Water Quality Meter	4	week	2	\$383	\$3,060 Pine Environmental
Water Level Meter	4	week	2	\$43	\$340 Pine Environmental
HDPE Discharge Tubing	1	foot	5000	\$0	\$800 Pine Environmental
Generator	15	day	2	\$25	\$750 Local Equipment Rental Rate
Miscellaneous Supplies	1	Lump Sum	2	\$450	\$900 BRE/URS Experience
Laboratory Analysis (VOCs)	61	sample	2	\$105	\$12,810 Columbia Analytical Laboratories
Laboratory Analysis (TAL Metals)	58	sample	2	\$125	\$14,500 Columbia Analytical Laboratories
Carbon Treatment Drum (one per event)	1	unit	2	\$800	\$1,600 BRE/Redhawk
Testing effluent for Breakthrough (VOCs)	1	drum	2	\$105	\$210 Columbia Analytical Laboratories
Data Validation (Staff Scientist)	80	hour	2	\$65	\$10,400 BRE/URS Experience
Data Validation (Project Scientist)	100	hour	2	\$96	\$19,200 BRE/URS Experience
Data Validation Peer Review (Principal)	8	hour	2	\$135	\$2,160 BRE/URS Experience
Data Validation (Administrative Support)	60	hour	2	\$60	\$7,200 BRE/URS Experience
Annual Report (Staff Scientist)	80	hour	1	\$65	\$5,200 BRE/URS Experience
Annual Report (Project Scientist)	80	hour	1	\$96	\$7,680 BRE/URS Experience
Annual Report Peer Review (Principal)	16	hour	1	\$135	\$2,160 BRE/URS Experience
Annual Report (Administrative Support/Graphics)	60	hour	1	\$60	\$3,600 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$500	\$500 BRE/URS Experience
				Subtotal =	\$150,656

Present Worth Analysis

Year	\$	P/A (7%)	Present Worth
1 - 30	\$150,656	12.41	\$1,869,493
TOTAL			\$1,869,493

FIVE-YEAR REVIEWS

Staff Scientist	1	hour	40	\$65	\$2,600 BRE/URS Experience
Project Scientist	1	hour	80	\$96	\$7,680 BRE/URS Experience
Principal (Peer Review)	1	hour	16	\$135	\$2,160 BRE/URS Experience
Administrative/Graphics Support	1	hour	32	\$40	\$1,280 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$800	\$800 BRE/URS Experience
				Subtotal =	\$14,520

Five-Year Review Total = \$14,520.00 years 5, 10, 15, 20, 25 & 30

Present Worth Analysis

Year	\$	P/F (7%)	Present Worth
5	\$14,520	0.71	\$10,353
10	\$14,520	0.51	\$7,381
15	\$14,520	0.36	\$5,262
20	\$14,520	0.26	\$3,752
25	\$14,520	0.18	\$2,675
30	\$14,520	0.13	\$1,908
TOTAL			\$31,330

GRAND TOTAL (PRESENT WORTH)

PRE-DESIGN INVESTIGATION	\$196,230
BENCH SCALE TESTING	\$54,202
FULL-SCALE IMPLEMENTATION	\$2,268,221
IRON REGENERATION	\$68,024
POST APPLICATION MONITORING PROGRAM	\$898,401
LTMP POST-REMEDIAL GROUNDWATER MONITORING PROGRAM	\$1,869,493
FIVE-YEAR REVIEWS	\$31,330
GRAND TOTAL, ALTERNATIVE 4A	\$5,385,899

Assumptions:

Monitoring requirements as specified by *Regulatory Guidance for Permeable Reactive Barriers Designed to Remediate Chlorinated Solvents*, December 1999

Area to be treated encompasses area of impacted shallow overburden groundwater downgradient of IWS-3 that contains exceedances of halogenated volatile organic compounds

Target mass reduction in treatment area is 99 percent.

Site Conditions do not change appreciably, level of effort in field tasks remain commensurate with existing activities.

Reporting requirements remain unchanged from current levels

Sample collection methods and procedures remain unchanged from current requirements

Sample analytical requirements remain unchanged as to level of effort/associated costs

7-Percent interest reflects effective rate of return including inflation

ALTERNATIVE 5B

BIO-ENHANCED ATTENUATION, SOURCE AND DOWNGRADIENT AREA
SUMMARY OF SIGNIFICANT COSTS

Components:

1. Pre-Design Investigation
2. Pilot Testing (Deep Overburden Groundwater)
3. Full-Scale Implementation
4. Post Application Monitoring Program
5. Five-Year Review

Item	Quantity	Units	Number of Units	Unit Cost	Extended Cost	Cost Basis
PRE-DESIGN INVESTIGATION						
Install up to seven top-of-rock monitoring wells (average depth of 150 feet) to characterize concentrations of organic compounds and hydraulic conductivities in areas targeted for treatment. Sample groundwater to characterize VOC concentrations in downgradient areas.						
<i>Develop Workplan</i>						
Develop Workplan (Project Scientist/Engineer)	1	hours	35	\$96	\$3,360	BRE/URS Experience
Graphics/Administrative Support	1	hours	6	\$40	\$240	BRE/URS Experience
Peer Review (Principal)	1	hours	2	\$135	\$270	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	lump sum	1	\$200	\$200	BRE/URS Experience
<i>Drilling Services</i>						
Mobilization and Demobilization of Drill Rig	1	per rig	1	\$2,100	\$2,100	Contractor Estimate
Temporary decon pad	1	lump sum	1	\$200	\$200	Contractor Estimate
6" diameter temporary surface casing installed	7	linear foot	10	\$30	\$2,100	Contractor Estimate
6" fluid rotary drilling in overburden (10-150')	7	linear foot	140	\$25	\$24,500	Contractor Estimate
2" PVC well installed	7	linear foot	150	\$18	\$18,900	Contractor Estimate
2" diameter split spoon samples (0-50')	7	each	25	\$20	\$3,500	Contractor Estimate
2" diameter split spoon samples (50-75')	7	each	12	\$35	\$2,940	Contractor Estimate
2" diameter split spoon samples (75'-100')	7	each	12	\$50	\$4,200	Contractor Estimate
2" diameter split spoon samples (100'-150')	7	each	25	\$75	\$13,125	Contractor Estimate
4" diameter locking protective casing & concrete pad	7	each	1	\$175	\$1,225	Contractor Estimate
Additional driller to assist with well development	7	per day	0.5	\$600	\$2,100	Contractor Estimate
Well Development	7	hour	4	\$55	\$1,540	Contractor Estimate
55-gallon drums staged onsite	7	each	6	\$40	\$1,680	Contractor Estimate
Decontamination, waste handling	7	hour	4	\$190	\$5,320	Contractor Estimate
HQ Rock Core	7	linear foot	10	\$225	\$15,750	Contractor Estimate
Bentonite Backfill for Corehole	7	linear foot	10	\$20	\$1,400	Contractor Estimate
Water Usage	7	1000 gallon	2.2	\$39	\$593	Contractor Estimate
Hauling water from offsite as needed	7	hour	4	\$190	\$5,320	Contractor Estimate
Provide Loader to move drums	7	day	6	\$250	\$10,500	Contractor Estimate
Driller Per Diem (3-man crew)(6 days per well)	7	day	18	\$175	\$22,050	Contractor Estimate
subcontractor handling fee	1	multi.	0.1		\$139,043	
URS Oversight	7	day	6	\$942	\$39,564	BRE/URS Experience
<i>Hydraulic Conductivity Testing of new Monitoring wells</i>						
Hermit/Data Logger	1	day	2	\$85	\$170	Pine Environmental
subcontractor handling fee	1	multi.	0.1		\$17	
Setup/Office Analysis	1	day	2	\$88	\$176	BRE/URS Experience
URS Oversight	2	day	2	\$942	\$3,768	BRE/URS Experience

Sampling of new Monitoring Wells

Office Field Prep	1	hour	12	\$88	\$1,056 BRE/URS Experience
Laboratory Analysis (VOCs)	1	sample	10	\$105	\$1,050 Columbia Analytical Laboratories
YSI flow-through cell	1	day	3	\$85	\$255 Pine Environmental
Grundfos Pump/Controller	1	day	3	\$81	\$242 Pine Environmental
Tubing	1	500 feet	3	\$75	\$225 Pine Environmental
Water level	1	day	3	\$26	\$77 Pine Environmental
Generator	1	day	3	\$50	\$150 Hampshire Purified Water
Gloves	1	box	1	\$110	\$110 Pine Environmental
PID	1	day	2	\$81	\$162 Pine Environmental
Deionized Water	1	gallon	50	\$1	\$65 Hampshire Purified Water
FedEx/Ice	1	cooler	3	\$60	\$180 BRE/URS Experience
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$50	\$50 BRE/URS Experience
Subcontractor Handling fee	1	multi.	0.1		\$2,565
URS Oversight	3	day	2	\$942	\$5,652 BRE/URS Experience

Reporting/Data Analysis

Data Validation (Administrative Support)	1	hour	8	\$40	\$320 BRE/URS Experience
Data Validation (Staff Scientist)	1	hour	24	\$65	\$1,560 BRE/URS Experience
Data Validation (Project Scientist)	1	hour	10	\$96	\$960 BRE/URS Experience
Data Validation Peer Review (Principal)	1	hour	2	\$135	\$270 BRE/URS Experience
Pre-Design Report (Staff Scientist)	1	hour	40	\$65	\$2,600 BRE/URS Experience
Pre-Design Report (Project Scientist)	1	hour	120	\$96	\$11,520 BRE/URS Experience
Pre-Design Report (Graphics/Administrative Support)	1	hour	30	\$40	\$1,200 BRE/URS Experience
Pre-Design Report Peer Review (Principal)	1	hour	6	\$135	\$810 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	lump sum	1	\$800	\$800 BRE/URS Experience

Subtotal: \$357,729

PILOT TESTING (DEEP OVERBURDEN)

Perform Pilot Test (One Injection) using an existing monitoring well installed during pre-design activities. Conduct Performance Monitoring on a weekly basis for the first two months, monthly thereafter for four months.

Develop Workplan/Test Design (Project Scientist/Engineer)	1	hour	120	\$96	\$11,520 BRE/URS Experience
Graphics/Administrative Support	1	hour	24	\$40	\$960 BRE/URS Experience
Peer Review Workplan (Principal)	1	hour	5	\$135	\$675 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	lump sum	1	\$250	\$250 BRE/URS Experience
Address Comments (Project Scientist/Engineer)	1	hour	10	\$96	\$960 BRE/URS Experience
Peer Review Comment Responses (Principal)	1	hour	2	\$135	\$270 BRE/URS Experience

Pilot Injection

60% Sodium Lactate	1	drum	2	\$75	\$150 Purac
Ammonium Phosphate Monobasic	1	500 grams	1	\$50	\$50 Fisher
Ammonium Bromide Powder	1	500 grams	1	\$65	\$65 Fisher
Ammonium Carbonate	1	3 kg	1	\$84	\$84 Fisher
Flow Meter	1	each	1	\$470	\$470 Davis Inotek Instrument
Tubing	1	500 feet	1	\$75	\$75 Pine Environmental
Balance	1	each	1	\$320	\$320 Itin Scale, Inc
Miscellaneous Laboratory Supplies (graduated cylinders, scoopula)	1	each	1	\$200	\$200 Cole Parmer
Miscellaneous Plumbing Fitting	1	each	1	\$100	\$100 Cole Parmer
Miscellaneous Field Supplies (heater, collapsible tent)	1	each	1	\$500	\$500
Metering Pumps	1	each	2	\$370	\$740 Tri-State Pump, Inc.
Generator	1	each	1	\$25	\$25 Local Equipment Rental Rate
subcontractor handling fee	1	multi.	0.1		\$277.90
URS Oversight	2	day	4	\$942	\$7,536 BRE/URS Experience

Pilot Sampling (10 sampling events total)

Office Field Prep	10	hour	2	\$88	\$1,760 BRE/URS Experience
Laboratory Analysis	10	sample	2	\$485	\$9,700 Columbia Analytical Laboratories
YSI flow-through cell	10	day	1	\$85	\$850 Pine Environmental
Grundfos Pump/Controller	10	day	1	\$81	\$808 Pine Environmental
Water level	10	day	1	\$26	\$255 Pine Environmental
Generator	10	day	1	\$50	\$500 Hampshire Purified Water
Gloves	1	box	1	\$110	\$110 Pine Environmental
PID	10	day	1	\$81	\$808 Pine Environmental
Deionized Water	10	gallon	10	\$1	\$130 Hampshire Purified Water
FedEx/Ice	10	cooler	1	\$60	\$600 BRE/URS Experience
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$50	\$50 BRE/URS Experience
subcontractor handling fee	1	multi.	0.1		\$1,557
URS Oversight	10	day	2	\$942	\$18,840 BRE/URS Experience

Reporting/Data Analysis

Data Validation (Administrative Support)	1	hour	8	\$40	\$320 BRE/URS Experience
Data Validation (Staff Scientist)	1	hour	24	\$65	\$1,560 BRE/URS Experience
Data Validation (Project Scientist)	1	hour	10	\$96	\$960 BRE/URS Experience
Data Validation Peer Review (Principal)	1	hour	2	\$135	\$270 BRE/URS Experience
Pilot Study Report (Staff Scientist)	1	hour	40	\$65	\$2,600 BRE/URS Experience
Pilot Study Report (Project Scientist)	1	hour	120	\$96	\$11,520 BRE/URS Experience
Pilot Study Report (Graphics/Administrative Support)	1	hour	30	\$40	\$1,200 BRE/URS Experience
Pilot Study Report Peer Review (Principal)	1	hour	6	\$135	\$810 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	lump sum	1	\$800	\$800 BRE/URS Experience

Subtotal: \$81,235

FULL-SCALE IMPLEMENTATION

Develop Workplan/Test Design (Project Scientist/Engineer)	1	hour	200	\$96	\$19,200	BRE/URS Experience
Graphics/Administrative Support	1	hour	40	\$40	\$1,600	BRE/URS Experience
Peer Review Workplan (Principal)	1	hour	8	\$135	\$1,080	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	lump sum	2	\$250	\$500	BRE/URS Experience
Address Comments (Project Scientist/Engineer)	1	hour	12	\$96	\$1,152	BRE/URS Experience
Peer Review Comment Responses (Principal)	1	hour	2	\$135	\$270	BRE/URS Experience
Layout (Survey) Grid for Injection Well Locations (3-Man Crew)	2	Day	3	\$987	\$1,600	URS
				Subtotal:	\$25,402	

Site Preparation for Drill rig access

Access Road Construction

Mobilization and Demobilization - dozer and excavator	1	lump sum	1	\$1,500	\$1,500	Contractor Estimate
Mobilization and Demobilization - operator and laborer	1	lump sum	1	\$1,500	\$1,500	Contractor Estimate
Clearing site with chain saws	1	day	5	\$1,200	\$6,000	Contractor Estimate
Excavator and operator	1	day	5	\$1,200	\$6,000	Contractor Estimate
Dozer and operator	1	day	5	\$800	\$4,000	Contractor Estimate
Driller per diem (3-man crew)	10	day	3	\$175	\$5,250	
subcontractor handling fee	1	multi.	0.1		\$2,425	
URS Oversight	1	day	10	\$942	\$9,420	
				Subtotal:	\$26,675	

Miscellaneous Drilling Costs

Mobilization and Demobilization	1	per rig	2	\$4,000	\$8,000	Contractor Estimate
Temporary decon pad	1	lump sum	1	\$200	\$200	Contractor Estimate
subcontractor handling fee	1	multi.	0.1		\$820	
				Subtotal:	\$9,020	

Install thirty 2-inch stainless steel injection wells across the width of the plume (assume 150' deep). 40-foot screen interval from top-of-rock.

6" diameter temporary surface casing installed	25	linear foot	10	\$30	\$7,500	Contractor Estimate
6" fluid rotary drilling in overburden (0-150')	25	linear foot	140	\$25	\$87,500	Contractor Estimate
2" by 10' stainless steel screen installed (150-110')	25	each	4	\$400	\$40,000	Contractor Estimate
2" by 10' stainless steel riser installed (110-0')	25	each	11	\$300	\$82,500	Contractor Estimate
4" diameter locking protective casing & concrete pad	25	each	1	\$175	\$4,375	Contractor Estimate
Well development	25	hour	4	\$75	\$7,500	Contractor Estimate
Decontamination - after last well	1	lump sum	1	\$600	\$600	Contractor Estimate
Driller per diem (2) 3-man crew	25	day	6	\$175	\$26,250	
subcontractor handling fee	1	multi.	0.1		\$25,623	
URS Oversight	25	day	2	\$942	\$47,100	
				Subtotal:	\$328,948	

Install ten PVC 2-inch monitoring wells (150' deep). 10-screen installed at top-or-rock.

6" diameter temporary surface casing installed	10	linear foot	10	\$30	\$3,000	Contractor Estimate
6" fluid rotary drilling in overburden (20-150')	10	linear foot	140	\$25	\$35,000	Contractor Estimate
2" PVC well installed	10	linear foot	150	\$18	\$27,000	Contractor Estimate
4" diameter locking protective casing & concrete pad	10	each	1	\$175	\$1,750	Contractor Estimate
3rd man for well development	10	day	1	\$600	\$6,000	Contractor Estimate
Driller per diem (2) 3-man crew	10	day	6	\$175	\$10,500	
subcontractor handling fee	1	multi.	0.1		\$8,325	
URS Oversight	10	day	2	\$942	\$18,840	
				Subtotal:	\$110,415	

Install two 2-inch stainless steel extraction wells (130' deep). Screen entire length of water table.

8" diameter temporary surface casing installed	2	linear foot	20	\$40	\$1,600	Contractor Estimate
8" fluid rotary drilling in overburden (20-150')	2	linear foot	110	\$30	\$6,600	Contractor Estimate
4" by 10' stainless steel screen installed (130-20')	2	each	11	\$550	\$12,100	Contractor Estimate
4" by 10' stainless steel riser installed (20-0')	2	each	2	\$350	\$1,400	Contractor Estimate
4" by 10' PVC riser installed - if required	2	each		\$200	\$0	Contractor Estimate
8" diameter locking protective casing & concrete pad	2	each	1	\$250	\$500	Contractor Estimate
Drill rig and crew for well development	2	day	1	\$1,500	\$3,000	Contractor Estimate
3" Grundfos Pumps (purchase)	1	each	2	\$1,575	\$3,150	
Driller per diem	3	day	6	\$175	\$3,150	
subcontractor handling fee	1	multi.	0.1		\$3,150	
URS Oversight	3	day	2	\$942	\$5,652	
				Subtotal:	\$40,302	

Present Worth Analysis (pump replacement)

Year	\$	P/F (7%)	Present Worth
5	\$3,150	0.71	\$2,246
10	\$3,150	0.51	\$1,601
15	\$3,150	0.36	\$1,142
20	\$3,150	0.26	\$814
25	\$3,150	0.18	\$580
30	\$3,150	0.13	\$414
TOTAL			\$6,797

Waste handling and Disposal (e.g., well development water, drilling fluids)

Waste disposal - assumes non-hazardous - from frac tank - \$1.00 per gallon	1	gallon	25000	\$1	\$25,000 Contractor Estimate
Frac- tank drop and pick up fee (with cleanout charge)	1	tank	1	\$2,500	\$2,500 Contractor Estimate
Frac-tank rental - 4 months @ \$300 per month	4	month	1	\$300	\$1,200 Contractor Estimate
Water Usage for full scale well installation activities	1	1000 gallons	19.5	\$38.50	\$751
subcontractor handling fee	1	multi.	0.1		\$2,945
				Subtotal:	\$32,396

Hydraulic Conductivity Testing of new Monitoring wells

Hermi/Data Logger	1	day	2	\$85	\$170 Pine Environmental
subcontractor handling fee	1	multi.	0.1		\$17.00
Setup/Office Analysis	1	day	2	\$88	\$176 BRE/URS Experience
URS Oversight	2	day	2	\$942	\$3,768 BRE/URS Experience
				Subtotal:	\$4,131

Full Scale Sampling of Monitoring wells

Office Field Prep	1	hour	8	\$88	\$704 BRE/URS Experience
Laboratory Analysis	1	sample	15	\$485	\$7,275 Columbia Analytical Laboratories
YSI flow-through cell	1	day	3	\$85	\$255 Pine Environmental
Grundfos Pump/Controller	1	day	3	\$81	\$242 Pine Environmental
Tubing	1	500 feet	3	\$75	\$225 Pine Environmental
Water level	1	day	3	\$26	\$77 Pine Environmental
Generator	1	day	3	\$50	\$150 Local Equipment Rental Rate
Gloves	1	box	2	\$110	\$220 Pine Environmental
PID	1	day	3	\$81	\$242 Pine Environmental
Deionized Water	1	gallon	50	\$1	\$65 Hampshire Purified Water
FedEx/Ice	1	cooler	3	\$60	\$180 BRE/URS Experience
Decon Supplies (incl. tubs, brushes, spray bottles)	1	--	1	\$50	\$50 BRE/URS Experience
subcontractor handling fee	1	multi.	0.1		\$968.50
URS Oversight	3	day	2	\$942	\$5,652 BRE/URS Experience
				Subtotal:	\$16,306

Full Scale Injection (four applications per year for thirty years)

Delivery system	1	each	1	\$20,000	\$20,000 BRE/URS Experience
				Subtotal:	\$20,000

Present Worth Analysis (delivery system replacement)

Year	\$	P/F (7%)	Present Worth
5	\$0	0.71	\$0
10	\$0	0.51	\$0
15	\$20,000	0.36	\$7,248
20	\$0	0.26	\$0
25	\$0	0.18	\$0
30	\$20,000	0.13	\$2,628
TOTAL			\$9,876

60% Sodium Lactate	2	drum	38	\$75	\$5,700 Purac
Ammonium Phosphate Monobasic	2	500 grams	1	\$50	\$100 Fisher
Ammonium Bromide Powder	2	500 grams	1	\$65	\$130 Fisher
Ammonium Carbonate	2	3 kg	1	\$84	\$168 Fisher
Flow Meter	1	each	1	\$470	\$470 Davis Inotek Instruments
Tubing	2	500 feet	1	\$75	\$150 Pine Environmental
Miscellaneous Laboratory Supplies (graduated cylinders, scoopulas)	1	each	1	\$200	\$200 Cole Parmer
Miscellaneous Field Supplies	1	each	1	\$200	\$200
Generator	2	each	2	\$25	\$100 Local Equipment Rental Rate
subcontractor handling fee	1	multi.	0.1		\$0
URS Oversight (1-person crew, 10 days per application)	10	day	2	\$942	\$18,840 BRE/URS Experience
				Subtotal:	\$55,934 279537

Present Worth Analysis

Year	\$	P/A (7%)	Present Worth
1 - 30	\$55,934	12.409	\$694,085
TOTAL			\$694,085

Reporting

Data Validation (Administrative Support)	1	hour	4	\$40	\$160 BRE/URS Experience
Data Validation (Staff Scientist)	1	hour	10	\$65	\$650 BRE/URS Experience
Data Validation (Project Scientist)	1	hour	4	\$96	\$384 BRE/URS Experience
Data Validation Peer Review (Principal)	1	hour	1	\$135	\$135 BRE/URS Experience
Pre-Design Report (Staff Scientist)	1	hour	40	\$65	\$2,600 BRE/URS Experience
Pre-Design Report (Project Scientist)	1	hour	240	\$96	\$23,040 BRE/URS Experience
Pre-Design Report (Graphics/Administrative Support)	1	hour	60	\$40	\$2,400 BRE/URS Experience
Pre-Design Report Peer Review (Principal)	1	hour	4	\$135	\$540 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	lump sum	1	\$500	\$500 BRE/URS Experience
				Subtotal =	\$30,409

Site Restoration

Place Top Soil In Six-Inch Lift Over Disturbed Area (Approximately 3.5 acres)	1	cubic yards	34000	\$25	\$843,880	Means Environmental Restoration Cost
Hydroseed Top Soil	1	acre	3.5	\$494	\$1,727	Means Environmental Restoration Cost
subcontractor handling fee	1	multi.	0.1		\$84,560.73	
URS Oversight	1	day	35	\$942	\$32,970	BRE/URS Experience
				Subtotal:	\$963,138	

POST APPLICATION MONITORING PROGRAM

Sample 10 monitoring wells monthly for the following parameters: (volatile organic compounds, ethene, ethane, bromide, sulfate, alkalinity, total organic carbon, ammonia, chloride, total phosphorus, speciated volatile fatty acids, total volatile fatty acids) over a thirty year period

Office Field Prep	12	hour	8	\$88	\$8,448	BRE/URS Experience
Laboratory Analysis	12	sample	15	\$485	\$87,300	Columbia Analytical Laboratories
YSI flow-through cell	12	day	3	\$85	\$3,060	Pine Environmental
Grundfos Pump/Controller	12	day	3	\$81	\$2,907	Pine Environmental
Tubing	2	500 feet	3	\$75	\$450	Pine Environmental
Water level	12	day	3	\$26	\$918	Pine Environmental
Generator	12	day	3	\$50	\$1,800	Local Equipment Rental Rate
Gloves	12	box	2	\$110	\$2,640	Pine Environmental
PID	12	day	3	\$81	\$2,907	Pine Environmental
Deionized Water	12	gallon	50	\$1	\$780	Hampshire Purified Water
FedEx/Ice	12	cooler	3	\$60	\$2,160	BRE/URS Experience
Decon Supplies (incl. tubs, brushes, spray bottles)	2	--	1	\$50	\$100	BRE/URS Experience
subcontractor handling fee	12	multi.	0.1		\$11,347.00	
URS Oversight	36	day	2	\$942	\$67,824	BRE/URS Experience
				Subtotal:	\$192,641	

Present Worth Analysis

Year	\$	P/A (7%)	Present Worth
1 - 30	\$192,641	12.409	\$2,390,482
TOTAL			\$2,390,482

Annual Reporting over 30 year period

Data Validation (Staff Scientist)	1	hour	40	\$65	\$2,600	BRE/URS Experience
Data Validation (Project Scientist)	1	hour	15	\$96	\$1,440	BRE/URS Experience
Data Validation Peer Review (Principal)	1	hour	5	\$135	\$675	BRE/URS Experience
Data Validation Administrative Support	1	hour	8	\$40	\$320	BRE/URS Experience
Performance Monitoring Report (Staff Scientist)	1	hour	120	\$65	\$7,800	BRE/URS Experience
Performance Monitoring Report (Project Scientist)	1	hour	20	\$96	\$1,920	BRE/URS Experience
Performance Monitoring Report Peer Review (Principal)	1	hour	8	\$135	\$1,080	BRE/URS Experience
Performance Monitoring Report (Graphics/Administrative Support)	1	hour	24	\$40	\$960	BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	lump sum	1	\$500	\$500	BRE/URS Experience
				Subtotal =	\$17,295	

Present Worth Analysis

Year	\$	P/A (7%)	Present Worth
1 - 30	\$17,295	12.409	\$214,614
TOTAL			\$214,614

LTMP POST-REMEDIAL GROUNDWATER MONITORING PROGRAM

Perform existing long-term groundwater monitoring program (semiannual sampling of 45 monitoring well locations) for 30 year time-frame. Assume analytical suite will be for TAL Metals and VOCs only.

Mobilization/Demobilization	32	hour	2	\$65	\$4,160 BRE/URS Experience
Travel To/From Site	36	hour	2	\$55	\$3,960 BRE/URS Experience
Sampling Labor	300	hour	2	\$55	\$33,000 BRE/URS Experience
Per Diem	26	day	2	\$125	\$6,500 BRE/URS Experience
Vehicle/Gas	5	week	2	\$430	\$4,300 Enterprise/Gas URS Experience
subcontractor handling fees	1	mult.	0.1	\$36,942	\$3,694
Grundfos Pump with Control Box	4	week	2	\$247	\$1,972 Pine Environmental
YSI Water Quality Meter	4	week	2	\$383	\$3,060 Pine Environmental
Water Level Meter	4	week	2	\$43	\$340 Pine Environmental
HDPE Discharge Tubing	1	foot	5000	\$0	\$800 Pine Environmental
Generator	15	day	2	\$25	\$750 Local Equipment Rental Rate
Miscellaneous Supplies	1	Lump Sum	2	\$450	\$900 BRE/URS Experience
Laboratory Analysis (VOCs)	61	sample	2	\$105	\$12,810 Columbia Analytical Laboratories
Laboratory Analysis (TAL Metals)	58	sample	2	\$125	\$14,500 Columbia Analytical Laboratories
Carbon Treatment Drum (one per event)	1	unit	2	\$800	\$1,600 BRE/Redhawk
Testing effluent for Breakthrough (VOCs)	1	drum	2	\$105	\$210 Columbia Analytical Laboratories
Data Validation (Staff Scientist)	80	hour	2	\$65	\$10,400 BRE/URS Experience
Data Validation (Project Scientist)	100	hour	2	\$96	\$19,200 BRE/URS Experience
Data Validation Peer Review (Principal)	8	hour	2	\$135	\$2,160 BRE/URS Experience
Data Validation (Administrative Support)	60	hour	2	\$60	\$7,200 BRE/URS Experience
Annual Report (Staff Scientist)	80	hour	1	\$65	\$5,200 BRE/URS Experience
Annual Report (Project Scientist)	80	hour	1	\$96	\$7,680 BRE/URS Experience
Annual Report Peer Review (Principal)	16	hour	1	\$135	\$2,160 BRE/URS Experience
Annual Report (Administrative Support/Graphics)	60	hour	1	\$60	\$3,600 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$500	\$500 BRE/URS Experience
				Subtotal =	\$150,656

Present Worth Analysis

Year	\$	P/A (7%)	Present Worth
1 - 30	\$150,656	\$12,409	\$1,869,493
TOTAL			\$1,869,493

FIVE-YEAR REVIEWS

Staff Scientist	1	hour	40	\$65	\$2,600 BRE/URS Experience
Project Scientist	1	hour	80	\$96	\$7,680 BRE/URS Experience
Principal (Peer Review)	1	hour	16	\$135	\$2,160 BRE/URS Experience
Administrative/Graphics Support	1	hour	32	\$40	\$1,280 BRE/URS Experience
Reproduction/Communication/Courier Expenses	1	Lump Sum	1	\$800	\$800 BRE/URS Experience
				Subtotal =	\$14,520

Five-Year Review Total = \$14,520 years 5, 10, 15, 20, 25 & 30

Present Worth Analysis

Year	\$	P/F (7%)	Present Worth
5	\$14,520	0.71	\$10,353
10	\$14,520	0.51	\$7,381
15	\$14,520	0.36	\$5,262
20	\$14,520	0.26	\$3,752
25	\$14,520	0.18	\$2,675
30	\$14,520	0.13	\$1,908
TOTAL			\$31,330

GRAND TOTAL (PRESENT WORTH)

ALTERNATIVE 5A	\$6,054,345
PREDESIGN INVESTIGATION	\$357,729
PILOT TESTING (DEEP OVERBURDEN GROUNDWATER)	\$81,235
FULL-SCALE IMPLEMENTATION	\$2,317,899
POST APPLICATION MONITORING PROGRAM	\$2,605,096
LTMP POST-REMEDIAL GROUNDWATER MONITORING PROGRAM	\$1,869,493
FIVE-YEAR REVIEWS	\$31,330
GRAND TOTAL, ALTERNATIVE 5B	\$13,317,126

Assumptions:

Area to be treated encompasses area of impacted shallow overburden groundwater downgradient of IWS-3 that contains exceedances of halogenated volatile organic compounds.

Approximately 2 acres will require tree/brush removal and stumping and 2.8 acres will require brush hogging.

Target mass reduction in treatment area is 80 percent.

Site Conditions do not change appreciably, level of effort in field tasks remain commensurate with existing activities.

Reporting requirements remain unchanged from current levels

Sample collection methods and procedures remain unchanged from current requirements

Sample analytical requirements remain unchanged as to level of effort/associated costs

7-Percent interest reflects effective rate of return including inflation