

Alternative 2 - Ground Water Extraction with Blending

COST ESTIMATE SUMMARY ²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Ground Water Containment by Extraction and Blending
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 100,470
Project Management	\$ 8,038
Design	\$ 15,071
Construction Management	\$ 15,071
Subcontractor General Requirements	\$ 5,024
G&A	\$ 20,114
Overhead	\$ 7,184
Tax	\$ 10,237
Contingency	\$ 35,918
Bonding& Insurance	\$ 4,342
Fee	\$ 17,370
Total Capital Cost	\$ 238,837
Year 1 Operations and Maintenance	
System Startup	\$ -
Routine System O&M	\$ 114,235
Reporting (4 Qtrly Reports NOT incl. Construction Completion Report)	\$ 61,500
Professional Services ¹	\$ 40,419
Subcontractor General Requirements	\$ 8,787
G&A	\$ 31,492
Overhead	\$ 11,247
Tax	\$ 16,027
Contingency	\$ 56,235
Bonding& Insurance	\$ -
Fee	\$ 27,195
Total Year 1 Operations and Maintenance	\$ 367,137
Annual Operations and Maintenance Cost: Years 2-5	
Routine System O&M	\$ 97,018
Reporting (2 Semiannual Reports)	\$ 36,750
Professional Services ¹	\$ 30,767
Subcontractor General Requirements	\$ 6,688
G&A	\$ 23,971
Overhead	\$ 8,561
New Mexico Gross Receipts Tax	\$ 12,200
Contingency	\$ 42,806
Bonding& Insurance	\$ -
Fee	\$ 20,701
Total Annual Operations and Maintenance Cost: Years 2-5	\$ 279,462
Annual Operations and Maintenance Cost: Years 6-23	
Routine System O&M	\$ 100,018
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 30,767
Subcontractor General Requirements	\$ 6,688
G&A	\$ 21,819
Overhead	\$ 7,792
New Mexico Gross Receipts Tax	\$ 11,104
Contingency	\$ 38,962
Bonding& Insurance	\$ -
Fee	\$ 18,842
Total Annual Operations and Maintenance Cost: Years 6-23	\$ 254,367
Post Closure Cost	
Closure Reporting	\$ 18,375
Professional Services ¹	\$ 4,226
Subcontractor General Requirements	\$ -
G&A	\$ 3,164
Overhead	\$ 1,130
New Mexico Gross Receipts Tax	\$ 1,610
Contingency	\$ 5,650
Bonding& Insurance	\$ -
Fee	\$ 2,732
Total Post Closure Cost	\$ 36,889
TOTAL PRESENT WORTH	\$ 6,339,322

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are in 2006 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

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SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

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Site Background Data

Elevation of Site = 4100 ft amsl or 12.68 psia
 Volume of Contaminated Ground water greater than 5 ug/L = 7,350 acre-ft based on JSAI model
 Volume of Contaminated Ground water greater than 1 ug/L = 25,700 acre-ft based on JSAI model

PCE Concentrations in wells sampled December 2005.

Sample Location	PCE (µg/L)
MW-SF1	11
MW-SF10	17
GWMW01 Port 2	21
GWMW01 Port 6	6
	14 µg/L, average concentrator

Pumping Rates for Plume Containment

	gpm
CLC-18	380
CLC-27	520

Total Annual Pumping: 473.0 MMgal

Mass Estimate

Mass of PCE above MCL in ground water = 150 kg of PCE based on JSAI model - JSAI estimate based on an effective porosity of 20% and does not address potential PCE mass in additional pore space

Conceptual Design

No new wells or treatment system added for this alternative

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Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new nested ground water extraction wells to be installed = 0 wells
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 0 working days no new wells or treatment system added
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<u>Construction</u>					
Underground Piping from CLC-18 to CLC-27 connection to Upper Griggs Reservoir	1000	ft	\$ 100.17	\$ 100,170	LF estimated by CLC; cost includes 10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Repair discharge line on CLC-27	1	LS	\$ 300.00	\$ 300	
Subtotal Capital Cost				\$ 100,470	
Site Work Allowance	0%	of	\$ 100,470.00	\$ -	
Mechanical Allowance	0%	of	\$ 100,470.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 100,470.00	\$ -	
Electrical Allowance	0%	of	\$ 100,470.00	\$ -	
Miscellaneous Equipment Allowance	0%	of	\$ 100,470.00	\$ -	
Subtotal Capital Cost				\$ 100,470	
Project Management	8%	of	\$ 100,470.00	\$ 8,038	
Design	15%	of	\$ 100,470.00	\$ 15,071	
Construction Management	15%	of	\$ 100,470.00	\$ 15,071	
Subcontractor General Requirements	5%	of	\$ 100,470.00	\$ 5,024	
Subtotal Capital Cost				\$ 143,672	
G&A	14%	of	\$ 143,672.10	\$ 20,114	
Overhead	5%	of	\$ 143,672.10	\$ 7,184	
New Mexico Gross Receipts Tax	7.125%	of	\$ 143,672.10	\$ 10,237	
Contingency	25%	of	\$ 143,672.10	\$ 35,918	
Subtotal Capital Cost				\$ 217,124	
Bonding& Insurance	2%	of	\$ 217,124.46	\$ 4,342	
Fee	8%	of	\$ 217,124.46	\$ 17,370	
TOTAL CAPITAL COST				\$ 238,837	

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 wells included under ground water monitoring
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 wells
5. Number of piezometers to be installed =

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6. Assume that the duration of construction is

0

 working days no new wells or treatment system added
7. The number of wells to be sampled for VOCs is

0

 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is

0

 wells includes only new well(s)
9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
YEAR 1 OPERATIONS AND MAINTENANCE					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>Routine System O&M</u>					
Labor - Technician	52	hr	\$ 75.00	\$ 3,900	1 hour/week
Labor - Engineer	26	hr	\$ 120.00	\$ 3,120	50% of the Tech time
Water Sample Analysis	94	sample	\$ 150.00	\$ 14,100	biweekly blending infl samples for each CLC well (2)/effl sampling (1), plus 20% extra for QA/QC
Air Sample Analysis	0	sample	\$ -	\$ -	none needed
O&M Supplies	1	LS	\$ 1,000.00	\$ 1,000	98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC)
Annual Operating Cost	473	MMGal	\$ 194.73	\$ 92,115	19, 21, 27)
Total Routine System O&M				\$ 114,235	
<u>Reporting (4 Qtrly Reports NOT incl. Construction Completion Report)</u>					
Labor - Engineer/Hydrogeologist	300	hr	\$ 120.00	\$ 36,000	no Construction Completion Report needed
Labor - Editor	200	hr	\$ 85.00	\$ 17,000	no Construction Completion Report needed
Labor - CAD Technician	100	hr	\$ 85.00	\$ 8,500	no Construction Completion Report needed
Total Reporting				\$ 61,500	
Subtotal Year 1 Operations and Maintenance				\$ 175,735	
Project Management	8%	of	\$ 175,735.09	\$ 14,059	
Technical Support	15%	of	\$ 175,735.09	\$ 26,360	
Construction Management	0%	of	\$ 175,735.09	\$ -	
Subcontractor General Requirements	5%	of	\$ 175,735.09	\$ 8,787	
Subtotal Year 1 Operations and Maintenance				\$ 224,941	

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 wells includes only new well(s)
9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
G&A	14%	of	\$ 224,940.92	\$ 31,492	
Overhead	5%	of	\$ 224,940.92	\$ 11,247	
New Mexico Gross Receipts Tax	7.125%	of	\$ 224,940.92	\$ 16,027	
Contingency	25%	of	\$ 224,940.92	\$ 56,235	
Subtotal Year 1 Operations and Maintenance				\$ 339,942	
Bonding& Insurance	0%	of	\$ 339,941.96	\$ -	- Bonding only applies to Capital Costs
Fee	8%	of	\$ 339,941.96	\$ 27,195	
TOTAL YEAR 1 OPERATIONS AND MAINTENANCE COST				\$ 367,137	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 2-5 (ANNUAL COST)

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	52	hr	\$ 75.00	\$ 3,900	1 hour/week
Labor - Engineer	26	hr	\$ 120.00	\$ 3,120	50% of the Tech time
Water Sample Analysis	94	sample	\$ 150.00	\$ 14,100	biweekly blending infl samples for each CLC well (2)/effl sampling (1), plus 20% extra for QA/QC
O&M Supplies	1	LS	\$ 1,000.00	\$ 1,000	
Annual Operating Cost	473	MMGal	\$ 158.33	\$ 74,898	avg costs provided by City, 3% inflation factor added per year (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 97,018	
<i>Reporting (2 Semiannual Reports)</i>					
Labor - Engineer/Hydrogeologist	200	hr	\$ 120.00	\$ 24,000	
Labor - Editor	100	hr	\$ 85.00	\$ 8,500	
Labor - CAD Technician	50	hr	\$ 85.00	\$ 4,250	
Total Reporting				\$ 36,750	
Subtotal Year 2-5 Operations and Maintenance				\$ 133,768	

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Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Project Management	8%	of	\$ 133,768.00	\$ 10,701	
Technical Support	15%	of	\$ 133,768.00	\$ 20,065	
Construction Management	0%	of	\$ 133,768.00	\$ -	
Subcontractor General Requirements	5%	of	\$ 133,768.00	\$ 6,688	
Subtotal Year 2-5 Operations and Maintenance				\$ 171,223	
G&A	14%	of	\$ 171,223.04	\$ 23,971	
Overhead	5%	of	\$ 171,223.04	\$ 8,561	
New Mexico Gross Receipts Tax	7.125%	of	\$ 171,223.04	\$ 12,200	
Contingency	25%	of	\$ 171,223.04	\$ 42,806	
Subtotal Year 2-5 Operations and Maintenance				\$ 258,761	
Bonding& Insurance	0%	of	\$ 258,760.82	\$ -	- Bonding only applies to Capital Costs
Fee	8%	of	\$ 258,760.82	\$ 20,701	
TOTAL ANNUAL COST: YEARS 2-5 OPERATIONS AND MAINTENANCE COST				\$ 279,462	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-23 (ANNUAL COST)

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	52	hr	\$ 75.00	\$ 3,900	1 hour/week
Labor - Engineer	26	hr	\$ 120.00	\$ 3,120	50% of the Tech time
Water Sample Analysis	94	sample	\$ 150.00	\$ 14,100	biweekly blending infl samples for each CLC well (2)/effl sampling (1), plus 20% extra for QA/QC
O&M Supplies	1	LS	\$ 4,000.00	\$ 4,000	costs expected to increase with aging equipment
Annual Operating Cost	473	MMGal	\$ 158.33	\$ 74,898	avg costs provided by City, 3% inflation factor added per year (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 100,018	

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Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<u>Reporting (Annual Reports)</u>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 6-23 Operations and Maintenance				\$ 118,393	
Project Management	8%	of	\$ 133,768.00	\$ 10,701	
Technical Support	15%	of	\$ 133,768.00	\$ 20,065	
Construction Management	0%	of	\$ 133,768.00	\$ -	
Subcontractor General Requirements	5%	of	\$ 133,768.00	\$ 6,688	
Subtotal Year 6-23 Operations and Maintenance				\$ 155,848	
G&A	14%	of	\$ 155,848.04	\$ 21,819	
Overhead	5%	of	\$ 155,848.04	\$ 7,792	
New Mexico Gross Receipts Tax	7.125%	of	\$ 155,848.04	\$ 11,104	
Contingency	25%	of	\$ 155,848.04	\$ 38,962	
Subtotal Year 6-23 Operations and Maintenance				\$ 235,525	
Bonding& Insurance	0%	of	\$ 235,525.35	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 235,525.35	\$ 18,842	
TOTAL ANNUAL COST: YEARS 6-23 OPERATIONS AND MAINTENANCE COST				\$ 254,367	

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Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>Closure Reporting</u>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Closure Reporting				\$ 18,375	
Subtotal Post-Closure Cost				\$ 18,375	
Project Management	8%	of	\$ 18,375.00	\$ 1,470	
Technical Support	15%	of	\$ 18,375.00	\$ 2,756	
Construction Management	0%	of	\$ 18,375.00	\$ -	
Subcontractor General Requirements	0%	of	\$ 18,375.00	\$ -	
Subtotal Post-Closure Cost				\$ 22,601	
G&A	14%	of	\$ 22,601.25	\$ 3,164	
Overhead	5%	of	\$ 22,601.25	\$ 1,130	
New Mexico Gross Receipts Tax	7.125%	of	\$ 22,601.25	\$ 1,610	
Contingency	25%	of	\$ 22,601.25	\$ 5,650	
Subtotal Post-Closure Cost				\$ 34,156	
Bonding& Insurance	0%	of	\$ 34,156.14	\$ -	- Bonding only applies to Capital Costs
Fee	8%	of	\$ 34,156.14	\$ 2,732	
TOTAL POST CLOSURE COST				\$ 36,889	

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PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
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Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

		E	A	B	C=A+B	A'E	B'E	C'E			
		Total PV									
Elapsed Time	Year	Discount Factor at 3%	Capital Cost	O&M Cost	Total Cost	Capital Costs	Total PV O&M	Total PV	Balance of Interest Bearing		
						at 3%	Costs at 3%	Costs at 3%	Account at 3%		
0	2007	1.000	\$ 238,837		\$ 238,837	\$ 238,837	\$ -	\$ 238,837	\$	6,283,500	
1	2008	0.971		\$ 378,151	\$ 378,151	\$ -	\$ 367,137	\$ 367,137	\$	6,082,509	
2	2009	0.943		\$ 296,481	\$ 296,481	\$ -	\$ 279,462	\$ 279,462	\$	5,959,609	
3	2010	0.915		\$ 305,375	\$ 305,375	\$ -	\$ 279,462	\$ 279,462	\$	5,823,861	
4	2011	0.888		\$ 314,537	\$ 314,537	\$ -	\$ 279,462	\$ 279,462	\$	5,674,604	
5	2012	0.863		\$ 323,973	\$ 323,973	\$ -	\$ 279,462	\$ 279,462	\$	5,511,150	
6	2013	0.837		\$ 303,728	\$ 303,728	\$ -	\$ 254,367	\$ 254,367	\$	5,363,645	
7	2014	0.813		\$ 312,840	\$ 312,840	\$ -	\$ 254,367	\$ 254,367	\$	5,202,329	
8	2015	0.789		\$ 322,225	\$ 322,225	\$ -	\$ 254,367	\$ 254,367	\$	5,026,507	
9	2016	0.766		\$ 331,892	\$ 331,892	\$ -	\$ 254,367	\$ 254,367	\$	4,835,454	
10	2017	0.744		\$ 341,848	\$ 341,848	\$ -	\$ 254,367	\$ 254,367	\$	4,628,414	
11	2018	0.722		\$ 352,104	\$ 352,104	\$ -	\$ 254,367	\$ 254,367	\$	4,404,599	
12	2019	0.701		\$ 362,667	\$ 362,667	\$ -	\$ 254,367	\$ 254,367	\$	4,163,190	
13	2020	0.681		\$ 373,547	\$ 373,547	\$ -	\$ 254,367	\$ 254,367	\$	3,903,332	
14	2021	0.661		\$ 384,753	\$ 384,753	\$ -	\$ 254,367	\$ 254,367	\$	3,624,136	
15	2022	0.642		\$ 396,296	\$ 396,296	\$ -	\$ 254,367	\$ 254,367	\$	3,324,675	
16	2023	0.623		\$ 408,185	\$ 408,185	\$ -	\$ 254,367	\$ 254,367	\$	3,003,985	
17	2024	0.605		\$ 420,431	\$ 420,431	\$ -	\$ 254,367	\$ 254,367	\$	2,661,061	
18	2025	0.587		\$ 433,043	\$ 433,043	\$ -	\$ 254,367	\$ 254,367	\$	2,294,858	
19	2026	0.570		\$ 446,035	\$ 446,035	\$ -	\$ 254,367	\$ 254,367	\$	1,904,288	
20	2027	0.554		\$ 459,416	\$ 459,416	\$ -	\$ 254,367	\$ 254,367	\$	1,488,218	
21	2028	0.538		\$ 473,198	\$ 473,198	\$ -	\$ 254,367	\$ 254,367	\$	1,045,471	
22	2029	0.522		\$ 487,394	\$ 487,394	\$ -	\$ 254,367	\$ 254,367	\$	574,819	
23	2030	0.507	\$ 72,803	\$ 502,016	\$ 574,819	\$ 36,889	\$ 254,367	\$ 291,256	\$	0	
Total Alternative 2 Ground Water Extraction wi			\$ 311,640	\$ 8,730,135	\$ 9,041,775	\$ 275,726	\$ 6,063,597	\$ 6,339,322			

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Alternative 2 - Ground Water Extraction with Blending

COST ESTIMATE SUMMARY ²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 408,342
Project Management	\$ 32,667
Design	\$ 20,417
Construction Management	\$ 40,834
Subcontractor General Requirements	\$ 20,417
G&A	\$ 73,175
Overhead	\$ 26,134
New Mexico Gross Receipts Tax	\$ 37,241
Contingency	\$ 130,669
Bonding& Insurance	\$ 15,798
Fee	\$ 63,192
Administrative/Legal Fees for IC	\$ 15,000
Total Capital Cost	\$ 883,886
Annual Operations and Maintenance Cost: Years 1-5	
Annual Ground Water Sampling (Monitor Wells)	\$ 77,850
Professional Services ¹	\$ 20,033
Subcontractor General Requirements	\$ 4,355
G&A	\$ 15,608
Overhead	\$ 5,574
New Mexico Gross Receipts Tax	\$ 7,944
Contingency	\$ 27,872
Bonding& Insurance	\$ 3,370
Fee	\$ 13,479
Total Annual Operations and Maintenance Cost: Years 1-5	\$ 185,335
Annual Operations and Maintenance Cost: Years 6-23	
Quarterly Water Level Measurements	\$ 3,250
Once Every Two Years Ground Water Sampling (Monitor Wells)	\$ 39,000
Professional Services ¹	\$ 9,718
Subcontractor General Requirements	\$ 2,113
G&A	\$ 7,571
Overhead	\$ 2,704
New Mexico Gross Receipts Tax	\$ 3,853
Contingency	\$ 13,520
Bonding& Insurance	\$ 1,635
Fee	\$ 6,538
Total Annual Operations and Maintenance Cost: Years 6-23	\$ 89,901
Five Year Review Cost - Per Report	
5-year Review Report	\$ 25,000
Professional Services ¹	\$ -
Subcontractor General Requirements	\$ -
G&A	\$ 3,500
Overhead	\$ 1,250
New Mexico Gross Receipts Tax	\$ 1,781
Contingency	\$ 6,250
Bonding& Insurance	\$ -
Fee	\$ 3,023
Total Five Year Review Cost - Per Report	\$ 40,804
Post Closure Cost	
Well Abandonment and Equipment Demobilization	\$ 93,060
Professional Services ¹	\$ 35,363
Subcontractor General Requirements	\$ 4,653
G&A	\$ 18,631
Overhead	\$ 6,654
New Mexico Gross Receipts Tax	\$ 9,482
Contingency	\$ 33,269
Bonding& Insurance	\$ 4,022
Fee	\$ 16,089
Total Post Closure Cost	\$ 221,222
TOTAL PRESENT WORTH	\$ 3,813,220

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.

2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 2 - Ground Water Extraction with Blending

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
ALTERNATIVE: 2 Ground Water Extraction with Blending
DESCRIPTION: Institutional Controls and Monitoring
PREPARED BY: L.Colella, T.Palaia
PROJECT NUMBER: 346535.FS.01

**NO DESIGN ACTIVITY FOR INSTITUTIONAL CONTROLS AND MONITORING PORTION OF THIS ALTERNATIVE.
REFER TO COST DETAILS SHEET COST BASIS.**

Alternative 2 - Ground Water Extraction with Blending

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed 3 with 3 screens for a total of 4125 ft
4. The number of new single-screen piezometers required to be installed 0 piezometers
5. The number of wells to be sampled for VOCs 84 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells to be sampled for NAIPs 0 wells
7. The number of wells on-site to be abandoned for post-closure is 84 wells
8. The number of wells to be sampled for PAH is 0
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Construction					
Nested Ground Water Monitor Well Installation	3	well	\$ 129,409.00	\$ 388,227	per recent MW installation invoice
Piezometer Installation	0	well	\$ 56,469.38	\$ -	- not needed since no active system
Fencing (Institutional Control)	0	ft	\$ 10.00	\$ -	- No treatment unit to protect
Well Permits	9	ea	\$ 30.00	\$ 270	For 3 screen nested wells
Equipment Rental	2	wk	\$ 200.00	\$ 400	MultiRAE
Subtotal Capital Cost				\$ 388,897	
Site Work Allowance	5%	of	\$ 388,897.00	\$ 19,445	
Mechanical Allowance	0%	of	\$ 388,897.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 388,897.00	\$ -	
Electrical Allowance	0%	of	\$ 388,897.00	\$ -	
Miscellaneous Equipment Allowance	0%	of	\$ 388,897.00	\$ -	
Subtotal Capital Cost				\$ 408,342	
Project Management	8%	of	\$ 408,341.85	\$ 32,667	
Design	5%	of	\$ 408,341.85	\$ 20,417	
Construction Management	10%	of	\$ 408,341.85	\$ 40,834	
Subcontractor General Requirements	5%	of	\$ 408,341.85	\$ 20,417	
Subtotal Capital Cost				\$ 522,678	
G&A	14%	of	\$ 522,677.57	\$ 73,175	
Overhead	5%	of	\$ 522,677.57	\$ 26,134	
New Mexico Gross Receipts Tax	7.125%	of	\$ 522,677.57	\$ 37,241	
Contingency	25%	of	\$ 522,677.57	\$ 130,669	
Subtotal Capital Cost				\$ 789,896	
Bonding& Insurance	2%	of	\$ 789,896.47	\$ 15,798	
Fee	8%	of	\$ 789,896.47	\$ 63,192	
Administrative/Legal Fees for IC	1	LS	\$ 15,000.00	\$ 15,000	
TOTAL CAPITAL COST				\$ 883,886	

Alternative 2 - Ground Water Extraction with Blending

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

0

 piezometers
5. The number of wells to be sampled for VOCs

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells to be sampled for NAIPs

0

 wells
7. The number of wells on-site to be abandoned for post-closure is

84

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 1-5 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>Monthly Water Level Measurements</u>					
Labor - Technician	120	hr	\$ 75.00	\$ 9,000	20 MWs per event, 2 people, 4 MWs per hour
Water Level Measurement Equipment Rental	1	LS	\$ 250.00	\$ 250	
Total Water Level Measurement				\$ 9,250	
<u>Annual Ground Water Sampling (Monitor Wells)</u>					
Subcontractor costs for multiport wells	1	LS	\$ 15,200.00	\$ 15,200	5 multiport wells: based on Dec 2005 invoice (4 days including move/demove, materials, equipment, labor, per diem)
Labor - Technician	632	hr	\$ 75.00	\$ 47,400	4 hrs/well, 2 people, not including 5 multiport wells
Ground Water Sample Analysis - VOC only	97	sample	\$ 150.00	\$ 14,550	Includes all wells plus 15% (on average #) QA/QC samples
Sampling Supplies	1	round	\$ 200.00	\$ 200	
GW Sampling Equipment Rental	1	round	\$ 500.00	\$ 500	
Total Annual Ground Water Sampling				\$ 77,850	
Subtotal Years 1-5 Operations and Maintenance				\$ 87,100	
Project Management		8%	of	\$ 87,100.00	\$ 6,968
Technical Support		15%	of	\$ 87,100.00	\$ 13,065
Construction Management		0%	of	\$ 87,100.00	\$ -
Subcontractor General Requirements		5%	of	\$ 87,100.00	\$ 4,355
Subtotal Years 1-5 Operations and Maintenance					\$ 111,488
G&A		14%	of	\$ 111,488.00	\$ 15,608
Overhead		5%	of	\$ 111,488.00	\$ 5,574
New Mexico Gross Receipts Tax		7.125%	of	\$ 111,488.00	\$ 7,944
Contingency		25%	of	\$ 111,488.00	\$ 27,872
Subtotal Years 1-5 Operations and Maintenance					\$ 168,486
Bonding & Insurance		2%	of	\$ 168,486.24	\$ 3,370
Fee		8%	of	\$ 168,486.24	\$ 13,479
TOTAL ANNUAL COST: YEARS 1-5 OPERATIONS AND MAINTENANCE COST					\$ 185,335

Alternative 2 - Ground Water Extraction with Blending

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

0

 piezometers
5. The number of wells to be sampled for VOCs

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells to be sampled for NAIPs

0

 wells
7. The number of wells on-site to be abandoned for post-closure is

84

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-23 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>Quarterly Water Level Measurements</u>					
Labor - Technician	40	hr	\$ 75.00	\$ 3,000	20 MWs per event, 2 people, 4 MWs per hour
Water Level Measurement Equipment Rental	1	ls	\$ 250.00	\$ 250	
Total Water Level Measurement				\$ 3,250	
<u>Once Every Two Years Ground Water Sampling (Monitor Wells)</u>					
Subcontractor costs for multiport wells	1	LS	\$ 7,600.00	\$ 7,600	5 multiport wells: based on Dec 2005 invoice (4 days [biennial] including move/demove, materials, equipment, labor, per diem)
Labor - Technician	316	hr	\$ 75.00	\$ 23,700	4 hrs/well, 2 people, not including 5 multiport wells
Ground Water Sample Analysis - VOC only	49	sample	\$ 150.00	\$ 7,350	Includes all wells plus 15% (on average #) QA/QC samples
Sampling Supplies	0.5	round	\$ 200.00	\$ 100	
GW Sampling Equipment Rental	0.5	round	\$ 500.00	\$ 250	
Total Semiannual Ground Water Sampling				\$ 39,000	
Subtotal Years 6-23 Operations and Maintenance				\$ 42,250	
Project Management		8%	of	\$ 42,250.00	\$ 3,380
Technical Support		15%	of	\$ 42,250.00	\$ 6,338
Construction Management		0%	of	\$ 42,250.00	\$ -
Subcontractor General Requirements		5%	of	\$ 42,250.00	\$ 2,113
Subtotal Years 6-23 Operations and Maintenance					\$ 54,080
G&A		14%	of	\$ 54,080.00	\$ 7,571
Overhead		5%	of	\$ 54,080.00	\$ 2,704
New Mexico Gross Receipts Tax		7.125%	of	\$ 54,080.00	\$ 3,853
Contingency		25%	of	\$ 54,080.00	\$ 13,520
Subtotal Years 6-23 Operations and Maintenance					\$ 81,728
Bonding & Insurance		2%	of	\$ 81,728.40	\$ 1,635
Fee		8%	of	\$ 81,728.40	\$ 6,538
TOTAL ANNUAL COST: YEARS 6-23 OPERATIONS AND MAINTENANCE COST					\$ 89,901

Alternative 2 - Ground Water Extraction with Blending

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

0

 piezometers
5. The number of wells to be sampled for VOCs

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells to be sampled for NAIPs

0

 wells
7. The number of wells on-site to be abandoned for post-closure is

84

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
FIVE YEAR REVIEW COST - PER REPORT					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>5-year Review Report</u>					
5-year Review Report	1	LS	\$ 25,000.00	\$ 25,000	
Subtotal Five Year Review Cost				\$ 25,000	
Project Management	0%	of	\$ 25,000.00	\$ -	
Technical Support	0%	of	\$ 25,000.00	\$ -	
Construction Management	0%	of	\$ 25,000.00	\$ -	
Subcontractor General Requirements	0%	of	\$ 25,000.00	\$ -	
Subtotal Five Year Review Cost				\$ 25,000	
G&A	14%	of	\$ 25,000.00	\$ 3,500	
Overhead	5%	of	\$ 25,000.00	\$ 1,250	
New Mexico Gross Receipts Tax	7.125%	of	\$ 25,000.00	\$ 1,781	
Contingency	25%	of	\$ 25,000.00	\$ 6,250	
Subtotal 5 Year Review Cost				\$ 37,781	
Bonding & Insurance	0%	of	\$ 37,781.25	\$ -	
Fee	8%	of	\$ 37,781.25	\$ 3,023	
TOTAL FIVE YEAR REVIEW COST - PER REPORT				\$ 40,804	

Alternative 2 - Ground Water Extraction with Blending

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

0

 piezometers
5. The number of wells to be sampled for VOCs

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells to be sampled for NAIPs

0

 wells
7. The number of wells on-site to be abandoned for post-closure is

84

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Well Abandonment and Equipment Demobilization</i>					
Well Abandonment	84	well	\$ 1,000.00	\$ 84,000	Assume abandon 5 wells/day
Equipment Demobilization	0	LS	\$ 10,000.00	\$ -	
Equipment Rental	3	wk	\$ 200.00	\$ 600	MultiRAE
<i>Subtotal Well Abandonment and Equipment Demobilization</i>				\$ 84,600	
Site Work Allowance	10%	of	\$ 84,600.00	\$ 8,460	
Mechanical Allowance	0%	of	\$ 84,600.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 84,600.00	\$ -	
Electrical Allowance	0%	of	\$ 84,600.00	\$ -	
Miscellaneous Equipment Allowance	0%	of	\$ 84,600.00	\$ -	
<i>Total Well Abandonment</i>				\$ 93,060	
<i>Subtotal Post-Closure Cost</i>				\$ 93,060	
Project Management	8%	of	\$ 93,060.00	\$ 7,445	
Technical Support	15%	of	\$ 93,060.00	\$ 13,959	
Construction Management	15%	of	\$ 93,060.00	\$ 13,959	
Subcontractor General Requirements	5%	of	\$ 93,060.00	\$ 4,653	
<i>Subtotal Post-Closure Cost</i>				\$ 133,076	
G&A	14%	of	\$133,075.80	\$ 18,631	
Overhead	5%	of	\$133,075.80	\$ 6,654	
New Mexico Gross Receipts Tax	7.125%	of	\$133,075.80	\$ 9,482	
Contingency	25%	of	\$133,075.80	\$ 33,269	
<i>Subtotal Post-Closure Cost</i>				\$ 201,111	
Bonding& Insurance	2%	of	\$201,110.80	\$ 4,022	
Fee	8%	of	\$201,110.80	\$ 16,089	
TOTAL POST CLOSURE COST				\$ 221,222	

Alternative 2 - Ground Water Extraction with Blending

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 2 Ground Water Extraction with Blending
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

Elapsed Time	Year	Discount Factor at 3%	A Capital Cost	B O&M Cost	C=A+B Total Cost	Total PV			Balance of Interest Bearing Account at 3%
						A*E Capital Costs at 3%	B*E Total PV O&M Costs at 3%	C*E Total PV Costs at 3%	
0	2007	1.000	\$ 883,886		\$ 883,886	\$ 883,886	\$ -	\$ 883,886	\$ 3,017,214
1	2008	0.971		\$ 190,895	\$ 190,895	\$ -	\$ 185,335	\$ 185,335	\$ 2,911,108
2	2009	0.943		\$ 196,622	\$ 196,622	\$ -	\$ 185,335	\$ 185,335	\$ 2,795,921
3	2010	0.915		\$ 202,520	\$ 202,520	\$ -	\$ 185,335	\$ 185,335	\$ 2,671,203
4	2011	0.888		\$ 208,596	\$ 208,596	\$ -	\$ 185,335	\$ 185,335	\$ 2,536,485
5	2012	0.863		\$ 262,157	\$ 262,157	\$ -	\$ 226,139	\$ 226,139	\$ 2,342,558
6	2013	0.837		\$ 107,347	\$ 107,347	\$ -	\$ 89,901	\$ 89,901	\$ 2,302,268
7	2014	0.813		\$ 110,567	\$ 110,567	\$ -	\$ 89,901	\$ 89,901	\$ 2,257,451
8	2015	0.789		\$ 113,884	\$ 113,884	\$ -	\$ 89,901	\$ 89,901	\$ 2,207,874
9	2016	0.766		\$ 117,301	\$ 117,301	\$ -	\$ 89,901	\$ 89,901	\$ 2,153,291
10	2017	0.744		\$ 175,657	\$ 175,657	\$ -	\$ 130,705	\$ 130,705	\$ 2,036,963
11	2018	0.722		\$ 124,444	\$ 124,444	\$ -	\$ 89,901	\$ 89,901	\$ 1,969,894
12	2019	0.701		\$ 128,178	\$ 128,178	\$ -	\$ 89,901	\$ 89,901	\$ 1,896,968
13	2020	0.681		\$ 132,023	\$ 132,023	\$ -	\$ 89,901	\$ 89,901	\$ 1,817,894
14	2021	0.661		\$ 135,984	\$ 135,984	\$ -	\$ 89,901	\$ 89,901	\$ 1,732,367
15	2022	0.642		\$ 203,634	\$ 203,634	\$ -	\$ 130,705	\$ 130,705	\$ 1,574,595
16	2023	0.623		\$ 144,265	\$ 144,265	\$ -	\$ 89,901	\$ 89,901	\$ 1,473,240
17	2024	0.605		\$ 148,593	\$ 148,593	\$ -	\$ 89,901	\$ 89,901	\$ 1,364,386
18	2025	0.587		\$ 153,051	\$ 153,051	\$ -	\$ 89,901	\$ 89,901	\$ 1,247,675
19	2026	0.570		\$ 157,642	\$ 157,642	\$ -	\$ 89,901	\$ 89,901	\$ 1,122,734
20	2027	0.554		\$ 236,068	\$ 236,068	\$ -	\$ 130,705	\$ 130,705	\$ 913,266
21	2028	0.538		\$ 167,243	\$ 167,243	\$ -	\$ 89,901	\$ 89,901	\$ 768,404
22	2029	0.522		\$ 172,260	\$ 172,260	\$ -	\$ 89,901	\$ 89,901	\$ 614,028
23	2030	0.507	\$ 436,601	\$ 177,428	\$ 614,028	\$ 221,222	\$ 89,901	\$ 311,123	\$ 0
Total Alternative 2 Ground Water Extraction w			\$ 1,320,487	\$ 3,766,358	\$ 5,086,845	\$ 1,105,108	\$ 2,708,112	\$ 3,813,220	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE SUMMARY ²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 1,257,485
Project Management	\$ 100,599
Design	\$ 188,623
Construction Management	\$ 188,623
Subcontractor General Requirements	\$ 62,874
G&A	\$ 251,748
Overhead	\$ 89,910
Tax	\$ 128,122
Contingency	\$ 449,551
Bonding& Insurance	\$ 54,351
Fee	\$ 217,403
Total Capital Cost	\$ 2,989,288
Year 1 Operations and Maintenance	
System Startup	\$ 27,050
Routine System O&M	\$ 357,127
Reporting (Annual Report and Construction Completion Report)	\$ 73,500
Professional Services ¹	\$ 105,266
Subcontractor General Requirements	\$ 22,884
G&A	\$ 82,016
Overhead	\$ 29,291
Tax	\$ 41,740
Contingency	\$ 146,457
Bonding& Insurance	\$ -
Fee	\$ 70,826
Total Year 1 Operations and Maintenance	\$ 956,157
Annual Operations and Maintenance Cost: Years 2-5	
Routine System O&M	\$ 304,087
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 74,166
Subcontractor General Requirements	\$ 16,123
G&A	\$ 57,785
Overhead	\$ 20,638
New Mexico Gross Receipts Tax	\$ 29,409
Contingency	\$ 103,188
Bonding& Insurance	\$ -
Fee	\$ 49,902
Total Annual Operations and Maintenance Cost: Years 2-5	\$ 673,672
Annual Operations and Maintenance Cost: Years 6-21	
Routine System O&M	\$ 304,087
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 74,166
Subcontractor General Requirements	\$ 16,123
G&A	\$ 57,785
Overhead	\$ 20,638
New Mexico Gross Receipts Tax	\$ 29,409
Contingency	\$ 103,188
Bonding& Insurance	\$ -
Fee	\$ 49,902
Total Annual Operations and Maintenance Cost: Years 6-21	\$ 673,672
Post Closure Cost	
Closure Reporting	\$ 18,375
Equipment Demobilization	\$ 172,500
Professional Services ¹	\$ 62,989
Subcontractor General Requirements	\$ 9,544
G&A	\$ 36,877
Overhead	\$ 13,170
New Mexico Gross Receipts Tax	\$ 18,768
Contingency	\$ 65,852
Bonding & Insurance	\$ 7,961
Fee	\$ 31,846
Total Post Closure Cost	\$ 437,882
TOTAL PRESENT WORTH	\$ 17,856,773

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are in 2006 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Site Background Data

Elevation of Site = 4100 ft amsl or 12.68 psia
 Volume of Contaminated Ground Water greater than 5 ug/L = 7,350 acre-ft based on JSAI model
 Volume of Contaminated Ground Water greater than 1 ug/L = 25,700 acre-ft based on JSAI model

PCE Concentrations in wells sampled December 2005.

Sample Location	PCE (ug/L)
MW-SF1	11
MW-SF10	17
GWMW01 Port 2	21
GWMW01 Port 6	6
	14 ug/L, average concentration

Pumping Rates for Plume Containment and Remediation in 21 Years (per JSAI modeling)

CLC-18	460 gpm
CLC-27	620 gpm

Total Annual Pumping: 568 MMgal

Mass Estimate

Assumptions

Mass of PCE above MCL in ground water = 150 kg of PCE based on JSAI model - JSAI estimate based on an effective porosity of 20% and does not address potential PCE mass in additional pore space

Conceptual Design

Pumping System Design Parameters

Estimated Number of Pumping Wells = 2 wells (CLC-18 and -27)
 Estimated pumping rate from CLC-18 = 460 gpm (based on JSAI modeling results)
 Estimated pumping rate from CLC-27 = 620 gpm (based on JSAI modeling results)
 Total Pumping Rate = 1080 gpm
 Depth of pumping wells = 600 ft bgs

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System Construction Time

Estimated drilling rate = 125 lf/day based on invoice
Total linear footage drilling = 0 lf (using existing pumping wells)
Estimated duration of drilling = 0.0 days or 0 days (rounded up)
Estimated linear footage of field piping per pumping well = 1500 ft per well average of piping required for all wells
Total linear footage of connection piping = 500 lf assumed 500 lf to stub up to treatment system and reconnect to existing CLC-27 line to UGR connection of CLC-18 to CLC -27 connection to Upper Griggs Reservoir; CLC estimated 1000 lf new piping needed in addition to the approximate length of 500 lf of existing piping.
Total linear footage of effluent field piping = 1,000 lf
Estimated field piping placing rate = 75 lf/day
Estimated duration of field piping = 20.0 days or 20 days (rounded up)
Total construction timeframe = 20 days

Air Stripper Design Parameters

Stripper design flowrate 1080 gpm
Unit flow rate 540 gpm (NEEP Model 41251 Tray Air stripper) 2 units in series needed for treatment
Governing contaminant PCE at 14 µg/L
Governing contaminant is based on consideration of a combination of low Henry's Constant and highest concentration versus MCL.
Influent temperature 50 °F

Unit Size: 12.5 ft x 7.3 ft NEEP Model 41251 Tray Air stripper

The Henry's Law Constant for PCE (25°C) = 176.5 atm
Converting the Henry's Constant for an actual temperature of 10 °C and using STRIPR Model data (CH2M HILL, 1991)
Actual Henry's Constant is 224 atm which is greater than the 10 atm threshold for effective air stripping.

Assume 100% of PCE is stripped and discharged untreated to the atmosphere. PCE is the controlling contaminant for air stripper design.

Vendor modeling indicates the Tray Air stripper uses a blower airflow rate of 2,400 scfm
PCE emissions 0.007 lbs/hr or 0.18 lbs/day or 65.2 lbs/yr
Average PCE emissions concentration is 0.8 mg/m³ or 0.2 ppmv

PCE is a hazardous air pollutant and therefore is a regulated air pollutant

The NIOSH PEL (10-hr TWA) for PCE is 25 ppmv or 136.5 mg/m³ or at 68°F and 1 atm
THEREFORE, NO OFFGAS EMISSIONS CONTROL WILL BE REQUIRED SINCE MASS EMISSIONS IS VERY LOW AND
THE CONCENTRATION IS TWO ORDERS OF MAGNITUDE LOWER THAN THE NIOSH STANDARD WITHOUT CONSIDERING ATMOSPHERIC DISPERSION.

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

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Pretreatment Design Parameters - Langlier Index and Ryznar Stability Index for CaCO₃ Scaling Potential

		1 (influent water)	2 (estimate of parameters within the stripper)
Flow	gpm	1080	1080
Temperature	Deg. F	60	77
Alkalinity, Total	mg/l CaCO ₃	211	211
pH	Std. Units	7.39	8.00
TDS	mg/l	919	919
Calcium	mg/l CaCO ₃	305	305
Magnesium	mg/l CaCO ₃	124	123.6
Sulfate	mg/l SO ₄ ²⁻	243	243
Chloride	mg/l Cl ⁻	165	165
LSI		0.170	0.936
RSI		7.05	6.13

LSI greater than 1 indicates potential for scaling

RSI less than 6 indicates potential for scaling

The LSI is close to the level indicating potential for scaling

The RSI, which is more commonly used, is close to the level that indicates that there is a potential for scaling once the stripping process begins.

Slight changes in parameters affect the results of these calculations.

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

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Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 110 working days (includes 90 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Construction					
Underground Piping from CLC-18 to CLC-27 connection to Upper Griggs Reservoir	1,000	ft	\$ 100.17	\$ 100,170	estimated LF from CLC: cost includes 10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Piping Connection to Treatment System	500	lf	\$ 100.17	\$ 50,085	10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Ground Water Extraction Pumps	2	ea	\$ 10,000.00	\$ 20,000	assume replace city pumps, vendor quote; 100gpm, 15 hp, 3-phase, 230V, 6 inch
Influent Equalization Tank	21,600	gal	\$ 1.00	\$ 21,600	provides 20-minutes of storage
Tank Effluent Pump	0	ea	\$ 4,000.00	\$ -	Provided with air stripper
Influent/Effluent Bag Filter	2	LS	\$ 7,500.00	\$ 15,000	1080 gpm size filter
Low-Profile Tray Air Stripper Package	2	LS	\$ 70,000.00	\$ 140,000	Assume 540 gpm NEEP Model 41251 Tray Air stripper (controls, piping, skid, blower, influent and effluent pumps)
Protective Enclosure	1	ea	\$ 150,000.00	\$ 150,000	Assume 30'x25' building at \$200/sf, includes overhead crane, pre-fab metal
Repair discharge line on CLC-27	1	LS	\$ 300.00	\$ 300	
Sulfuric Acid Bulk Storage Tank - Pretreatment Unit	1	LS	\$ 65,663.20	\$ 65,663	5,000 gal tank. 1 month supply, prorated costs for similar system, 1,000 gal unit at Fruit Ave, Albuquerque
Dessicant Dryer Unit - Pretreatment Unit	1	LS	\$ 39,397.92	\$ 39,398	5,000 gal unit. prorated costs for similar system, 1,000 gal unit at Fruit Ave, Albuquerque
Acid Feed Pump System - Pretreatment Unit	1	LS	\$ 83,384.29	\$ 83,384	Prorated costs for similar system, 100 gpm system at Fruit Ave, Albuquerque.
Acid Feed System Piping - Pretreatment Unit	1	LS	\$ 44,923.64	\$ 44,924	Prorated costs based on facility size for similar system, 100 gpm at Fruit Ave, Albuquerque
Health and Safety Provisions - Pretreatment Unit	1	LS	\$ 8,000.00	\$ 8,000	Prorated costs for similar system, 100 gpm at Fruit Ave, Albuquerque
Acid Storage Facility - Pretreatment Unit	1	LS	\$ 89,847.27	\$ 89,847	Assume 35'x35' for 5,000 gal tank incl. canopy, 2' concrete containment, and fencing. Prorated costs for similar system, 1,000 gal tank system at Fruit Ave, Albuquerque
Well Permits	0	ea	\$ 30.00	\$ -	not needed based on model
Equipment Rental	22	wk	\$ 200.00	\$ 4,400	MultiRAE
Subtotal Capital Cost				\$ 832,771	
Site Work Allowance	7%	of	\$ 832,771.31	\$ 58,294	
Mechanical Allowance	15%	of	\$ 832,771.31	\$ 124,916	
Instrumentation and Controls Allowance	12%	of	\$ 832,771.31	\$ 99,933	including SCADA system
Electrical Allowance	12%	of	\$ 832,771.31	\$ 99,933	
Miscellaneous Equipment Allowance	5%	of	\$ 832,771.31	\$ 41,639	
Subtotal Capital Cost				\$ 1,257,485	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

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2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
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7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Project Management	8%	of	\$ 1,257,484.68	\$ 100,599	
Design	15%	of	\$ 1,257,484.68	\$ 188,623	
Construction Management	15%	of	\$ 1,257,484.68	\$ 188,623	
Subcontractor General Requirements	5%	of	\$ 1,257,484.68	\$ 62,874	
Subtotal Capital Cost				\$ 1,798,203	
G&A	14%	of	\$ 1,798,203.09	\$ 251,748	
Overhead	5%	of	\$ 1,798,203.09	\$ 89,910	
New Mexico Gross Receipts Tax	7.125%	of	\$ 1,798,203.09	\$ 128,122	
Contingency	25%	of	\$ 1,798,203.09	\$ 449,551	
Subtotal Capital Cost				\$ 2,717,534	
Bonding& Insurance	2%	of	\$ 2,717,534.43	\$ 54,351	
Fee	8%	of	\$ 2,717,534.43	\$ 217,403	
TOTAL CAPITAL COST				\$ 2,989,288	

YEAR 1 OPERATIONS AND MAINTENANCE

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
System Startup					
Labor - Technician	150	hr	\$ 75.00	\$ 11,250	Assume 15 days for startup, 10 hrs/day
Labor - Engineer	100	hr	\$ 120.00	\$ 12,000	Assume 10 days for startup, 10 hrs/day
Air Sample Analysis	6	sample	\$ 150.00	\$ 900	quarterly sampling to prove de minimis VOC emissions, plus 2 QA/QC
Water Sample Analysis	6	sample	\$ 150.00	\$ 900	3 sets, VOC analysis for infl/effl, incl data valid.
Startup Equipment Rental	2	week	\$ 1,000.00	\$ 2,000	water quality monitoring for pretreatment effectiveness
Total System Startup				\$ 27,050	
Routine System O&M					
Labor - Technician	416	hr	\$ 75.00	\$ 31,200	8 hours/week
Labor - Engineer	416	hr	\$ 120.00	\$ 49,920	100% of the Tech time for first year
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Air Sample Analysis	0	sample	\$ -	\$ -	none needed after startup sampling
Acid Supply - Pretreatment Unit	1	LS	\$ 110,067.27	\$ 110,067	Prorated from 100 gpm system at Fruit Ave.
O&M Supplies and Cleaning Subcontractor	1	LS	\$ 4,000.00	\$ 4,000	Annual air stripper tray cleaning by subcontractor 98-99 avg costs provided by City, 3% inflation factor added per year
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	for 2006 values (used avg. for CLC 19, 21, 27)
Electricity	588,146	kw-hr	\$ 0.08	\$ 47,052	Air Stripper: 25 hp blowers + (2) 10 hp pumps per unit, full-time operations
Total Routine System O&M				\$ 357,127	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
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7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<i>Reporting (Annual Report and Construction Completion Report)</i>					
Labor - Engineer/Hydrogeologist	400	hr	\$ 120.00	\$ 48,000	
Labor - Editor	200	hr	\$ 85.00	\$ 17,000	
Labor - CAD Technician	100	hr	\$ 85.00	\$ 8,500	
Total Annual Reporting				\$ 73,500	
Subtotal Year 1 Operations and Maintenance				\$ 457,677	
Project Management	8%	of	\$ 457,677.09	\$ 36,614	
Technical Support	15%	of	\$ 457,677.09	\$ 68,652	
Construction Management	0%	of	\$ 457,677.09	\$ -	
Subcontractor General Requirements	5%	of	\$ 457,677.09	\$ 22,884	
Subtotal Year 1 Operations and Maintenance				\$ 585,827	
G&A	14%	of	\$ 585,826.67	\$ 82,016	
Overhead	5%	of	\$ 585,826.67	\$ 29,291	
New Mexico Gross Receipts Tax	7.125%	of	\$ 585,826.67	\$ 41,740	
Contingency	25%	of	\$ 585,826.67	\$ 146,457	
Subtotal Year 1 Operations and Maintenance				\$ 885,331	
Bonding& Insurance	0%	of	\$ 885,330.56	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 885,330.56	\$ 70,826	
TOTAL YEAR 1 OPERATIONS AND MAINTENANCE COST				\$ 956,157	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 2-5 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Acid Supply - Pretreatment Unit	1	LS	\$ 110,067.27	\$ 110,067	Prorated from 100 gpm system at Fruit Ave.
O&M Supplies and Cleaning Subcontractor	1	LS	\$ 4,000.00	\$ 4,000	Annual air stripper tray cleaning by subcontractor
Electricity	588,146	kw-hr	\$ 0.08	\$ 47,052	Air Stripper: 25 hp blowers + (2) 10 hp pumps per unit, full-time operations
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 304,087	98-99 avg costs provided by City, 3% inflation factor added per year

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

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9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 2-5 Operations and Maintenance				\$ 322,462	
Project Management	8%	of	\$ 322,462.09	\$ 25,797	
Technical Support	15%	of	\$ 322,462.09	\$ 48,369	
Construction Management	0%	of	\$ 322,462.09	\$ -	
Subcontractor General Requirements	5%	of	\$ 322,462.09	\$ 16,123	
Subtotal Year 2-5 Operations and Maintenance				\$ 412,751	
G&A	14%	of	\$ 412,751.47	\$ 57,785	
Overhead	5%	of	\$ 412,751.47	\$ 20,638	
New Mexico Gross Receipts Tax	7.125%	of	\$ 412,751.47	\$ 29,409	
Contingency	25%	of	\$ 412,751.47	\$ 103,188	
Subtotal Year 2-5 Operations and Maintenance				\$ 623,771	
Bonding & Insurance	0%	of	\$ 623,770.67	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 623,770.67	\$ 49,902	
TOTAL ANNUAL COST: YEARS 2-5 OPERATIONS AND MAINTENANCE COS				\$ 673,672	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-21 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Acid Supply - Pretreatment Unit	1	LS	\$ 110,067.27	\$ 110,067	Prorated from 100 gpm system at Fruit Ave.
O&M Supplies and Cleaning Subcontractor	1	LS	\$ 4,000.00	\$ 4,000	Annual air stripper tray cleaning by subcontractor
Electricity	588,146	kw-hr	\$ 0.08	\$ 47,052	Air Stripper: 25 hp blowers + (2) 10 hp pumps per unit, full-time operations 98-99 avg costs provided by City, 3% inflation factor added per year
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 304,087	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

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Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
<i>Total Reporting</i>				\$ 18,375	
Subtotal Year 6-21 Operations and Maintenance				\$ 322,462	
Project Management	8%	of	\$ 322,462.09	\$ 25,797	
Technical Support	15%	of	\$ 322,462.09	\$ 48,369	
Construction Management	0%	of	\$ 322,462.09	\$ -	
Subcontractor General Requirements	5%	of	\$ 322,462.09	\$ 16,123	
Subtotal Year 6-21 Operations and Maintenance				\$ 412,751	
G&A	14%	of	\$ 412,751.47	\$ 57,785	
Overhead	5%	of	\$ 412,751.47	\$ 20,638	
New Mexico Gross Receipts Tax	7.125%	of	\$ 412,751.47	\$ 29,409	
Contingency	25%	of	\$ 412,751.47	\$ 103,188	
Subtotal Year 6-21 Operations and Maintenance				\$ 623,771	
Bonding& Insurance	0%	of	\$ 623,770.67	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 623,770.67	\$ 49,902	
TOTAL ANNUAL COST: YEARS 6-21 OPERATIONS AND MAINTENANCE COS				\$ 673,672	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

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9. The G&A rate is 14%
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11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Closure Reporting</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$120.00	\$ 12,000	
Labor - Editor	50	hr	\$85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$85.00	\$ 2,125	
Total Closure Reporting				\$ 18,375	
<i>Equipment Demobilization</i>					
Equipment Demobilization	1	LS	\$ 150,000.00	\$ 150,000	
Subtotal Equipment Demobilization				\$ 150,000	
Site Work Allowance	10%	of	\$ 150,000.00	\$ 15,000	
Mechanical Allowance	0%	of	\$ 150,000.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 150,000.00	\$ -	
Electrical Allowance	5%	of	\$ 150,000.00	\$ 7,500	
Miscellaneous Equipment Allowance	0%	of	\$ 150,000.00	\$ -	
Total Equipment Demobilization				\$ 172,500	
Subtotal Post-Closure Cost				\$ 190,875	
Project Management	8%	of	\$ 190,875.00	\$ 15,270	
Technical Support	15%	of	\$ 190,875.00	\$ 28,631	
Construction Management	10%	of	\$ 190,875.00	\$ 19,088	
Subcontractor General Requirements	5%	of	\$ 190,875.00	\$ 9,544	
Subtotal Post-Closure Cost				\$ 263,408	
G&A	14%	of	\$ 263,407.50	\$ 36,877	
Overhead	5%	of	\$ 263,407.50	\$ 13,170	
New Mexico Gross Receipts Tax	7.125%	of	\$ 263,407.50	\$ 18,768	
Contingency	25%	of	\$ 263,407.50	\$ 65,852	
Subtotal Post-Closure Cost				\$ 398,075	
Bonding & Insurance	2%	of	\$ 398,074.58	\$ 7,961	
Fee	8%	of	\$ 398,074.58	\$ 31,846	
TOTAL POST CLOSURE COST				\$ 437,882	

Alternative 3 - Ground Water Extraction with Treatment

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

		E	A	B	C=A+B	A*E	B*E	C*E		
		Total PV								
Elapsed Time	Year	Discount Factor at 3%	Capital Cost	O&M Cost	Total Cost	Capital Costs at 3%	Total PV O&M Costs at 3%	Total PV Costs at 3%	Balance of Interest Bearing Account at 3%	
0	2007	1.000	\$ 2,989,288		\$ 2,989,288	\$ 2,989,288	\$ -	\$ 2,989,288	\$	15,313,510
1	2008	0.971		\$ 984,842	\$ 984,842	\$ -	\$ 956,157	\$ 956,157	\$	14,758,528
2	2009	0.943		\$ 714,699	\$ 714,699	\$ -	\$ 673,672	\$ 673,672	\$	14,465,144
3	2010	0.915		\$ 736,140	\$ 736,140	\$ -	\$ 673,672	\$ 673,672	\$	14,140,874
4	2011	0.888		\$ 758,224	\$ 758,224	\$ -	\$ 673,672	\$ 673,672	\$	13,784,130
5	2012	0.863		\$ 780,971	\$ 780,971	\$ -	\$ 673,672	\$ 673,672	\$	13,393,254
6	2013	0.837		\$ 804,400	\$ 804,400	\$ -	\$ 673,672	\$ 673,672	\$	12,966,519
7	2014	0.813		\$ 828,532	\$ 828,532	\$ -	\$ 673,672	\$ 673,672	\$	12,502,127
8	2015	0.789		\$ 853,388	\$ 853,388	\$ -	\$ 673,672	\$ 673,672	\$	11,998,201
9	2016	0.766		\$ 878,990	\$ 878,990	\$ -	\$ 673,672	\$ 673,672	\$	11,452,788
10	2017	0.744		\$ 905,359	\$ 905,359	\$ -	\$ 673,672	\$ 673,672	\$	10,863,852
11	2018	0.722		\$ 932,520	\$ 932,520	\$ -	\$ 673,672	\$ 673,672	\$	10,229,272
12	2019	0.701		\$ 960,496	\$ 960,496	\$ -	\$ 673,672	\$ 673,672	\$	9,546,839
13	2020	0.681		\$ 989,311	\$ 989,311	\$ -	\$ 673,672	\$ 673,672	\$	8,814,255
14	2021	0.661		\$ 1,018,990	\$ 1,018,990	\$ -	\$ 673,672	\$ 673,672	\$	8,029,123
15	2022	0.642		\$ 1,049,560	\$ 1,049,560	\$ -	\$ 673,672	\$ 673,672	\$	7,188,950
16	2023	0.623		\$ 1,081,046	\$ 1,081,046	\$ -	\$ 673,672	\$ 673,672	\$	6,291,141
17	2024	0.605		\$ 1,113,478	\$ 1,113,478	\$ -	\$ 673,672	\$ 673,672	\$	5,332,993
18	2025	0.587		\$ 1,146,882	\$ 1,146,882	\$ -	\$ 673,672	\$ 673,672	\$	4,311,694
19	2026	0.570		\$ 1,181,288	\$ 1,181,288	\$ -	\$ 673,672	\$ 673,672	\$	3,224,318
20	2027	0.554		\$ 1,216,727	\$ 1,216,727	\$ -	\$ 673,672	\$ 673,672	\$	2,067,819
21	2028	0.538	\$ 814,590	\$ 1,253,229	\$ 2,067,819	\$ 437,882	\$ 673,672	\$ 1,111,554	\$	0
Total Alternative 3 Ground Water Extraction w			\$ 3,803,877	\$ 20,189,071	\$ 23,992,948	\$ 3,427,170	\$ 14,429,603	\$ 17,856,773		

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Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE SUMMARY ²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper without Acid Pretreatment
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 756,744
Project Management	\$ 60,540
Design	\$ 113,512
Construction Management	\$ 113,512
Subcontractor General Requirements	\$ 37,837
G&A	\$ 151,500
Overhead	\$ 54,107
Tax	\$ 77,103
Contingency	\$ 270,536
Bonding& Insurance	\$ 32,708
Fee	\$ 130,831
Total Capital Cost	\$ 1,798,929
Year 1 Operations and Maintenance	
System Startup	\$ 19,700
Routine System O&M	\$ 206,500
Reporting (Annual Report and Construction Completion Report)	\$ 73,500
Professional Services ¹	\$ 68,931
Subcontractor General Requirements	\$ 14,985
G&A	\$ 53,706
Overhead	\$ 19,181
Tax	\$ 27,333
Contingency	\$ 95,904
Bonding& Insurance	\$ -
Fee	\$ 46,379
Total Year 1 Operations and Maintenance	\$ 626,118
Annual Operations and Maintenance Cost: Years 2-5	
Routine System O&M	\$ 194,020
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 48,851
Subcontractor General Requirements	\$ 10,620
G&A	\$ 38,061
Overhead	\$ 13,593
New Mexico Gross Receipts Tax	\$ 19,370
Contingency	\$ 67,966
Bonding& Insurance	\$ -
Fee	\$ 32,869
Total Annual Operations and Maintenance Cost: Years 2-5	\$ 443,725
Annual Operations and Maintenance Cost: Years 6-21	
Routine System O&M	\$ 194,020
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 48,851
Subcontractor General Requirements	\$ 10,620
G&A	\$ 38,061
Overhead	\$ 13,593
New Mexico Gross Receipts Tax	\$ 19,370
Contingency	\$ 67,966
Bonding& Insurance	\$ -
Fee	\$ 32,869
Total Annual Operations and Maintenance Cost: Years 6-21	\$ 443,725
Post Closure Cost	
Closure Reporting	\$ 18,375
Equipment Demobilization	\$ 115,000
Professional Services ¹	\$ 44,014
Subcontractor General Requirements	\$ 6,669
G&A	\$ 25,768
Overhead	\$ 9,203
New Mexico Gross Receipts Tax	\$ 13,114
Contingency	\$ 46,014
Bonding & Insurance	\$ 5,563
Fee	\$ 22,253
Total Post Closure Cost	\$ 305,973
TOTAL PRESENT WORTH	\$ 11,605,522

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are in 2006 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper without Acid Pretreatment
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Site Background Data

Elevation of Site = 4100 ft amsl or 12.68 psia
 Volume of Contaminated Ground Water greater than 5 ug/L = 7,350 acre-ft based on JSAI model
 Volume of Contaminated Ground Water greater than 1 ug/L = 25,700 acre-ft based on JSAI model

PCE Concentrations in wells sampled December 2005.

Sample Location	PCE (ug/L)
MW-SF1	11
MW-SF10	17
GWMW01 Port 2	21
GWMW01 Port 6	6
	14 μg/L, average concentration

Pumping Rates for Plume Containment and Remediation <20 Years (per JSAI modeling)

CLC-18	460 gpm
CLC-27	620 gpm
Total Annual Pumping:	568 MMgal

Mass Estimate

Assumptions

Mass of PCE above MCL in ground water = 150 kg of PCE based on JSAI model - JSAI estimate based on an effective porosity of 20% and does not address potential PCE mass in additional pore space

Conceptual Design

Pumping System Design Parameters

Estimated Number of Pumping Wells = 2 wells (CLC-18 and -27)
 Estimated pumping rate from CLC-18 = 460 gpm (based on JSAI modeling results)
 Estimated pumping rate from CLC-27 = 620 gpm (based on JSAI modeling results)
 Total Pumping Rate = 1080 gpm
 Depth of pumping wells = 600 ft bgs

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

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System Construction Time

Estimated drilling rate = 125 lf/day based on invoice
 Total linear footage drilling = 0 lf (using existing pumping wells)
 Estimated duration of drilling = 0.0 days or 0 days (rounded up)
 Estimated linear footage of field piping per pumping well = 1500 ft per well average of piping required for all wells
 Total linear footage of connection piping = 500 lf assumed 500 lf to stub up to treatment system and reconnect to existing CLC-27 line to UGR connection of CLC-18 to CLC -27 connection to Upper Griggs Reservoir; CLC estimated 1000 lf new piping needed in addition to the approximate length of 500 lf of existing piping.
 Total linear footage of effluent field piping = 1,000 lf Total linear footage of effluent field piping = 1,000 lf
 Estimated field piping placing rate = 75 lf/day
 Estimated duration of field piping = 20.0 days or 20 days (rounded up)
 Total construction timeframe = 20 days

Air Stripper Design Parameters

Stripper design flowrate 1080 gpm
 Unit flow rate 540 gpm (NEEP Model 41251 Tray Air stripper) 2 units in series needed for treatment
 Governing contaminant PCE at 14 µg/L
 Governing contaminant is based on consideration of a combination of low Henry's Constant and highest concentration versus MCL.
 Influent temperature 50 °F

Unit Size: 12.5 ft x 7.3 ft NEEP Model 41251 Tray Air stripper

The Henry's Law Constant for PCE (25°C) = 176.5 atm
 Converting the Henry's Constant for an actual temperature of 10 °C and using STRIPR Model data (CH2M HILL, 1991)
 Actual Henry's Constant is 224 atm which is greater than the 10 atm threshold for effective air stripping.

Assume 100% of PCE is stripped and discharged untreated to the atmosphere. PCE is the controlling contaminant for air stripper design.

Vendor modeling indicates the Tray Air stripper uses a blower airflow rate of 2,400 scfm
 PCE emissions 0.007 lbs/hr or 0.18 lbs/day or 65.2 lbs/yr
 Average PCE emissions concentration is 0.8 mg/m³ or 0.2 ppmv

PCE is a hazardous air pollutant and therefore is a regulated air pollutant

The NIOSH PEL (10-hr TWA) for PCE is 25 ppmv or 136.5 mg/m³ or at 68°F and 1 atm
 THEREFORE, NO OFFGAS EMISSIONS CONTROL WILL BE REQUIRED SINCE MASS EMISSIONS IS VERY LOW AND THE CONCENTRATION IS TWO ORDERS OF MAGNITUDE LOWER THAN THE NIOSH STANDARD WITHOUT CONSIDERING ATMOSPHERIC DISPERSION.

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

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Pretreatment Design Parameters - Langelier Index and Ryznar Stability Index for CaCO₃ Scaling Potential

		1 (influent water)	2 (estimate of parameters within the stripper)
Flow	gpm	1080	1080
Temperature	Deg . F	60	77
Alkalinity, Total	mg/l CaCO ₃	211	211
pH	Std. Units	7.39	8.00
TDS	mg/l	919	919
Calcium	mg/l CaCO ₃	305	305
Magnesium	mg/l CaCO ₃	124	123.6
Sulfate	mg/l SO ₄ ²⁻	243	243
Chloride	mg/l Cl ⁻	165	165
LSI		0.170	0.936
RSI		7.05	6.13

LSI greater than 1 indicates potential for scaling

RSI less than 6 indicates potential for scaling

The LSI is close to the level indicating potential for scaling

The RSI, which is more commonly used, is close to the level that indicates that there is a potential for scaling once the stripping process begins.

Slight changes in parameters affect the results of these calculations.

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper without Acid Pretreatment
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

- The accuracy of the cost estimate is +50%/-30%
- See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
- The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
- Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
- Number of piezometers to be installed = 0 piezometers included under ground water monitoring
- Assume that the duration of construction is 100 working days (includes 80 working days for treatment system construction and installation)
- The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
- The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
- The G&A rate is 14%
- The overhead rate is 5%
- The Bonding & Insurance rate is 2%
- The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty Unit	Unit Cost	Cost	Comments and References	
Construction					
Underground Piping from CLC-18 to CLC-27 connection to Upper Griggs Reservoir	1,000 ft	\$ 100.17	\$ 100,170	estimated LF from CLC: cost includes 10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)	
Piping Connection to Treatment System	500 lf	\$ 100.17	\$ 50,085	10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)	
Ground Water Extraction Pumps	2 ea	\$ 10,000.00	\$ 20,000	assume replace city pumps, vendor quote; 100gpm, 15 hp, 3-phase, 230V, 6 inch	
Influent Equalization Tank	21,600 gal	\$ 1.00	\$ 21,600	provides 20-minutes of storage	
Tank Effluent Pump	0 ea	\$ 4,000.00	\$ -	Provided with air stripper	
Influent/Effluent Bag Filter	2 LS	\$ 7,500.00	\$ 15,000	1080 gpm size filter	
Low-Profile Tray Air Stripper Package	2 LS	\$ 70,000.00	\$ 140,000	Assume 540 gpm NEEP Model 41251 Tray Air stripper (controls, piping, skid, blower, influent and effluent pumps)	
Protective Enclosure	1 ea	\$ 150,000.00	\$ 150,000	Assume 30'x25' building at \$200/sf, includes overhead crane, pre-fab metal	
Repair discharge line on CLC-27	1 LS	\$ 300.00	\$ 300		
Sulfuric Acid Bulk Storage Tank - Pretreatment Unit	0 LS	\$ 65,663.20	\$ -	- 5,000 gal tank. 1 month supply, prorated costs for similar system, 1,000 gal unit at Fruit Ave, Albuquerque	
Dessicant Dryer Unit - Pretreatment Unit	0 LS	\$ 39,397.92	\$ -	- 5,000 gal unit. prorated costs for similar system, 1,000 gal unit at Fruit Ave, Albuquerque	
Acid Feed Pump System - Pretreatment Unit	0 LS	\$ 83,384.29	\$ -	- Prorated costs for similar system, 100 gpm system at Fruit Ave, Albuquerque.	
Acid Feed System Piping - Pretreatment Unit	0 LS	\$ 44,923.64	\$ -	- Prorated costs based on facility size for similar system, 100 gpm at Fruit Ave, Albuquerque	
Health and Safety Provisions - Pretreatment Unit	0 LS	\$ 8,000.00	\$ -	- Prorated costs for similar system, 100 gpm at Fruit Ave, Albuquerque	
Acid Storage Facility - Pretreatment Unit	0 LS	\$ 89,847.27	\$ -	- Assume 35'x35' for 5,000 gal tank incl. canopy, 2 nd concrete containment, and fencing. Prorated costs for similar system, 1,000 gal tank system at Fruit Ave, Albuquerque	
Well Permits	0 ea	\$ 30.00	\$ -	- not needed based on model	
Equipment Rental	20 wk	\$ 200.00	\$ 4,000	MultiRAE	
Subtotal Capital Cost			\$ 501,155		
Site Work Allowance	7%	of	\$ 501,155.00	\$ 35,081	
Mechanical Allowance	15%	of	\$ 501,155.00	\$ 75,173	
Instrumentation and Controls Allowance	12%	of	\$ 501,155.00	\$ 60,139	including SCADA system
Electrical Allowance	12%	of	\$ 501,155.00	\$ 60,139	
Miscellaneous Equipment Allowance	5%	of	\$ 501,155.00	\$ 25,058	
Subtotal Capital Cost				\$ 756,744	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper without Acid Pretreatment
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

- The accuracy of the cost estimate is +50%/-30%
- See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
- The number of new nested monitor wells required to be installed =

0

 wells included under ground water monitoring
- Number of new ground water extraction wells to be installed =

0

 wells included under ground water monitoring
- Number of piezometers to be installed =

0

 piezometers included under ground water monitoring
- Assume that the duration of construction is

100

 working days (includes 80 working days for treatment system construction and installation)
- The number of wells to be sampled for VOCs is

0

 wells per round included under ground water monitoring
- The number of wells on-site to be abandoned for post-closure is

0

 wells includes only new extraction well(s)
- The G&A rate is

14%

- The overhead rate is

5%

- The Bonding & Insurance rate is

2%

- The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Project Management	8%	of	\$ 756,744.05	\$ 60,540	
Design	15%	of	\$ 756,744.05	\$ 113,512	
Construction Management	15%	of	\$ 756,744.05	\$ 113,512	
Subcontractor General Requirements	5%	of	\$ 756,744.05	\$ 37,837	
Subtotal Capital Cost				\$ 1,082,144	
G&A	14%	of	\$ 1,082,143.99	\$ 151,500	
Overhead	5%	of	\$ 1,082,143.99	\$ 54,107	
New Mexico Gross Receipts Tax	7.125%	of	\$ 1,082,143.99	\$ 77,103	
Contingency	25%	of	\$ 1,082,143.99	\$ 270,536	
Subtotal Capital Cost				\$ 1,635,390	
Bonding& Insurance	2%	of	\$ 1,635,390.11	\$ 32,708	
Fee	8%	of	\$ 1,635,390.11	\$ 130,831	
TOTAL CAPITAL COST				\$ 1,798,929	

YEAR 1 OPERATIONS AND MAINTENANCE

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
System Startup					
Labor - Technician	100	hr	\$ 75.00	\$ 7,500	Assume 10 days for startup, 10 hrs/day
Labor - Engineer	70	hr	\$ 120.00	\$ 8,400	Assume 7 days for startup, 10 hrs/day
Air Sample Analysis	6	sample	\$ 150.00	\$ 900	quarterly sampling to prove de minimis VOC emissions, plus 2 QA/QC
Water Sample Analysis	6	sample	\$ 150.00	\$ 900	3 sets, VOC analysis for infl/effl, incl data valid.
Startup Equipment Rental	2	week	\$ 1,000.00	\$ 2,000	water quality monitoring for pretreatment effectiveness
Total System Startup				\$ 19,700	
Routine System O&M					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	208	hr	\$ 120.00	\$ 24,960	100% of the Tech time for first year
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Air Sample Analysis	0	sample	\$ -	\$ -	none needed after startup sampling
Acid Supply - Pretreatment Unit	0	LS	\$ 110,067.27	\$ -	- Prorated from 100 gpm system at Fruit Ave.
O&M Supplies and Cleaning Subcontractor	1	LS	\$ 4,000.00	\$ 4,000	Annual air stripper tray cleaning by subcontractor 98-99 avg costs provided by City, 3% inflation factor added per year for 2006
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	values (used avg. for CLC 19, 21, 27)
Electricity	588,146	kw-hr	\$ 0.08	\$ 47,052	Air Stripper: 25 hp blowers + (2) 10 hp pumps per unit, full-time operations
Total Routine System O&M				\$ 206,500	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper without Acid Pretreatment
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

- The accuracy of the cost estimate is +50%/-30%
- See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
- The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
- Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
- Number of piezometers to be installed = 0 piezometers included under ground water monitoring
- Assume that the duration of construction is 100 working days (includes 80 working days for treatment system construction and installation)
- The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
- The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
- The G&A rate is 14%
- The overhead rate is 5%
- The Bonding & Insurance rate is 2%
- The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<i>Reporting (Annual Report and Construction Completion Report)</i>					
Labor - Engineer/Hydrogeologist	400	hr	\$ 120.00	\$ 48,000	
Labor - Editor	200	hr	\$ 85.00	\$ 17,000	
Labor - CAD Technician	100	hr	\$ 85.00	\$ 8,500	
Total Annual Reporting				\$ 73,500	
Subtotal Year 1 Operations and Maintenance				\$ 299,700	
Project Management	8%	of	\$ 299,699.82	\$ 23,976	
Technical Support	15%	of	\$ 299,699.82	\$ 44,955	
Construction Management	0%	of	\$ 299,699.82	\$ -	
Subcontractor General Requirements	5%	of	\$ 299,699.82	\$ 14,985	
Subtotal Year 1 Operations and Maintenance				\$ 383,616	
G&A	14%	of	\$ 383,615.77	\$ 53,706	
Overhead	5%	of	\$ 383,615.77	\$ 19,181	
New Mexico Gross Receipts Tax	7.125%	of	\$ 383,615.77	\$ 27,333	
Contingency	25%	of	\$ 383,615.77	\$ 95,904	
Subtotal Year 1 Operations and Maintenance				\$ 579,739	
Bonding & Insurance	0%	of	\$ 579,739.34	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 579,739.34	\$ 46,379	
TOTAL YEAR 1 OPERATIONS AND MAINTENANCE COST				\$ 626,118	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 2-5 (ANNUAL COST)

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Acid Supply - Pretreatment Unit	0	LS	\$ 110,067.27	\$ -	Prorated from 100 gpm system at Fruit Ave.
O&M Supplies and Cleaning Subcontractor	1	LS	\$ 4,000.00	\$ 4,000	Annual air stripper tray cleaning by subcontractor
Electricity	588,146	kw-hr	\$ 0.08	\$ 47,052	Air Stripper: 25 hp blowers + (2) 10 hp pumps per unit, full-time operations 98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	
Total Routine System O&M				\$ 194,020	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper without Acid Pretreatment
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

- The accuracy of the cost estimate is +50%/-30%
- See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
- The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
- Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
- Number of piezometers to be installed = 0 piezometers included under ground water monitoring
- Assume that the duration of construction is 100 working days (includes 80 working days for treatment system construction and installation)
- The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
- The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
- The G&A rate is 14%
- The overhead rate is 5%
- The Bonding & Insurance rate is 2%
- The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 2-5 Operations and Maintenance				\$ 212,395	
Project Management	8%	of	\$ 212,394.82	\$ 16,992	
Technical Support	15%	of	\$ 212,394.82	\$ 31,859	
Construction Management	0%	of	\$ 212,394.82	\$ -	
Subcontractor General Requirements	5%	of	\$ 212,394.82	\$ 10,620	
Subtotal Year 2-5 Operations and Maintenance				\$ 271,865	
G&A	14%	of	\$ 271,865.37	\$ 38,061	
Overhead	5%	of	\$ 271,865.37	\$ 13,593	
New Mexico Gross Receipts Tax	7.125%	of	\$ 271,865.37	\$ 19,370	
Contingency	25%	of	\$ 271,865.37	\$ 67,966	
Subtotal Year 2-5 Operations and Maintenance				\$ 410,857	
Bonding & Insurance	0%	of	\$ 410,856.55	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 410,856.55	\$ 32,869	
TOTAL ANNUAL COST: YEARS 2-5 OPERATIONS AND MAINTENANCE COST				\$ 443,725	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-21 (ANNUAL COST)

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Acid Supply - Pretreatment Unit	0	LS	\$ 110,067.27	\$ -	Prorated from 100 gpm system at Fruit Ave.
O&M Supplies and Cleaning Subcontractor	1	LS	\$ 4,000.00	\$ 4,000	Annual air stripper tray cleaning by subcontractor
Electricity	588,146	kw-hr	\$ 0.08	\$ 47,052	Air Stripper: 25 hp blowers + (2) 10 hp pumps per unit, full-time operations 98-99 avg costs provided by City, 3% inflation factor added per year for 2006
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 194,020	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
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 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 100 working days (includes 80 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 6-21 Operations and Maintenance				\$ 212,395	
Project Management	8%	of	\$ 212,394.82	\$ 16,992	
Technical Support	15%	of	\$ 212,394.82	\$ 31,859	
Construction Management	0%	of	\$ 212,394.82	\$ -	
Subcontractor General Requirements	5%	of	\$ 212,394.82	\$ 10,620	
Subtotal Year 6-21 Operations and Maintenance				\$ 271,865	
G&A	14%	of	\$ 271,865.37	\$ 38,061	
Overhead	5%	of	\$ 271,865.37	\$ 13,593	
New Mexico Gross Receipts Tax	7.125%	of	\$ 271,865.37	\$ 19,370	
Contingency	25%	of	\$ 271,865.37	\$ 67,966	
Subtotal Year 6-21 Operations and Maintenance				\$ 410,857	
Bonding& Insurance	0%	of	\$ 410,856.55	\$ -	- Bonding only applies to Capital Costs
Fee	8%	of	\$ 410,856.55	\$ 32,869	
TOTAL ANNUAL COST: YEARS 6-21 OPERATIONS AND MAINTENANCE COST				\$ 443,725	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
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Assumptions

- The accuracy of the cost estimate is +50%/-30%
- See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
- The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
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- Assume that the duration of construction is 100 working days (includes 80 working days for treatment system construction and installation)
- The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
- The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
- The G&A rate is 14%
- The overhead rate is 5%
- The Bonding & Insurance rate is 2%
- The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Closure Reporting</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$120.00	\$ 12,000	
Labor - Editor	50	hr	\$85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$85.00	\$ 2,125	
Total Closure Reporting				\$ 18,375	
<i>Equipment Demobilization</i>					
Equipment Demobilization	1	LS	\$ 100,000.00	\$ 100,000	
Subtotal Equipment Demobilization				\$ 100,000	
Site Work Allowance	10%	of	\$ 100,000.00	\$ 10,000	
Mechanical Allowance	0%	of	\$ 100,000.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 100,000.00	\$ -	
Electrical Allowance	5%	of	\$ 100,000.00	\$ 5,000	
Miscellaneous Equipment Allowance	0%	of	\$ 100,000.00	\$ -	
Total Equipment Demobilization				\$ 115,000	
Subtotal Post-Closure Cost				\$ 133,375	
Project Management	8%	of	\$ 133,375.00	\$ 10,670	
Technical Support	15%	of	\$ 133,375.00	\$ 20,006	
Construction Management	10%	of	\$ 133,375.00	\$ 13,338	
Subcontractor General Requirements	5%	of	\$ 133,375.00	\$ 6,669	
Subtotal Post-Closure Cost				\$ 184,058	
G&A	14%	of	\$ 184,057.50	\$ 25,768	
Overhead	5%	of	\$ 184,057.50	\$ 9,203	
New Mexico Gross Receipts Tax	7.125%	of	\$ 184,057.50	\$ 13,114	
Contingency	25%	of	\$ 184,057.50	\$ 46,014	
Subtotal Post-Closure Cost				\$ 278,157	
Bonding & Insurance	2%	of	\$ 278,156.90	\$ 5,563	
Fee	8%	of	\$ 278,156.90	\$ 22,253	
TOTAL POST CLOSURE COST				\$ 305,973	

Alternative 3 - Ground Water Extraction with Treatment

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper without Acid Pretreatment
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

		E	A	B	C=A+B	A'E	B'E	C'E		
						Total PV				
Elapsed Time	Year	Discount Factor at 3%	Capital Cost	O&M Cost	Total Cost	Capital Costs at 3%	Total PV O&M Costs at 3%	Total PV Costs at 3%	Total PV	Balance of Interest Bearing Account at 3%
0	2007	1.000	\$ 1,798,929		\$ 1,798,929	\$ 1,798,929	\$ -	\$ 1,798,929	\$ 1,798,929	\$ 10,100,790
1	2008	0.971		\$ 644,902	\$ 644,902	\$ -	\$ 626,118	\$ 626,118	\$ 9,739,565	\$ 9,739,565
2	2009	0.943		\$ 470,748	\$ 470,748	\$ -	\$ 443,725	\$ 443,725	\$ 9,546,881	\$ 9,546,881
3	2010	0.915		\$ 484,870	\$ 484,870	\$ -	\$ 443,725	\$ 443,725	\$ 9,333,871	\$ 9,333,871
4	2011	0.888		\$ 499,416	\$ 499,416	\$ -	\$ 443,725	\$ 443,725	\$ 9,099,489	\$ 9,099,489
5	2012	0.863		\$ 514,399	\$ 514,399	\$ -	\$ 443,725	\$ 443,725	\$ 8,842,642	\$ 8,842,642
6	2013	0.837		\$ 529,831	\$ 529,831	\$ -	\$ 443,725	\$ 443,725	\$ 8,562,196	\$ 8,562,196
7	2014	0.813		\$ 545,726	\$ 545,726	\$ -	\$ 443,725	\$ 443,725	\$ 8,256,964	\$ 8,256,964
8	2015	0.789		\$ 562,098	\$ 562,098	\$ -	\$ 443,725	\$ 443,725	\$ 7,925,712	\$ 7,925,712
9	2016	0.766		\$ 578,961	\$ 578,961	\$ -	\$ 443,725	\$ 443,725	\$ 7,567,154	\$ 7,567,154
10	2017	0.744		\$ 596,329	\$ 596,329	\$ -	\$ 443,725	\$ 443,725	\$ 7,179,950	\$ 7,179,950
11	2018	0.722		\$ 614,219	\$ 614,219	\$ -	\$ 443,725	\$ 443,725	\$ 6,762,702	\$ 6,762,702
12	2019	0.701		\$ 632,646	\$ 632,646	\$ -	\$ 443,725	\$ 443,725	\$ 6,313,958	\$ 6,313,958
13	2020	0.681		\$ 651,625	\$ 651,625	\$ -	\$ 443,725	\$ 443,725	\$ 5,832,203	\$ 5,832,203
14	2021	0.661		\$ 671,174	\$ 671,174	\$ -	\$ 443,725	\$ 443,725	\$ 5,315,860	\$ 5,315,860
15	2022	0.642		\$ 691,309	\$ 691,309	\$ -	\$ 443,725	\$ 443,725	\$ 4,763,287	\$ 4,763,287
16	2023	0.623		\$ 712,048	\$ 712,048	\$ -	\$ 443,725	\$ 443,725	\$ 4,172,776	\$ 4,172,776
17	2024	0.605		\$ 733,410	\$ 733,410	\$ -	\$ 443,725	\$ 443,725	\$ 3,542,547	\$ 3,542,547
18	2025	0.587		\$ 755,412	\$ 755,412	\$ -	\$ 443,725	\$ 443,725	\$ 2,870,749	\$ 2,870,749
19	2026	0.570		\$ 778,075	\$ 778,075	\$ -	\$ 443,725	\$ 443,725	\$ 2,155,454	\$ 2,155,454
20	2027	0.554		\$ 801,417	\$ 801,417	\$ -	\$ 443,725	\$ 443,725	\$ 1,394,658	\$ 1,394,658
21	2028	0.538	\$ 569,199	\$ 825,459	\$ 1,394,658	\$ 305,973	\$ 443,725	\$ 749,698	\$ (0)	\$ (0)
Total Alternative 3 Ground Water Extraction with			\$ 2,368,128	\$ 13,294,075	\$ 15,662,203	\$ 2,104,902	\$ 9,500,620	\$ 11,605,522		

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Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE SUMMARY ²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 991,700
Project Management	\$ 79,336
Design	\$ 148,755
Construction Management	\$ 148,755
Subcontractor General Requirements	\$ 49,585
G&A	\$ 198,538
Overhead	\$ 70,907
Tax	\$ 101,042
Contingency	\$ 354,533
Bonding& Insurance	\$ 42,863
Fee	\$ 171,452
Total Capital Cost	\$ 2,357,466
Year 1 Operations and Maintenance	
System Startup	\$ 17,200
Routine System O&M	\$ 182,024
Reporting (Annual Report and Construction Completion Report)	\$ 73,500
Professional Services ¹	\$ 62,727
Subcontractor General Requirements	\$ 13,636
G&A	\$ 48,872
Overhead	\$ 17,454
Tax	\$ 24,872
Contingency	\$ 87,272
Bonding& Insurance	\$ -
Fee	\$ 42,205
Total Year 1 Operations and Maintenance	\$ 569,762
Annual Operations and Maintenance Cost: Years 2-5	
Routine System O&M	\$ 161,984
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 41,483
Subcontractor General Requirements	\$ 9,018
G&A	\$ 32,320
Overhead	\$ 11,543
New Mexico Gross Receipts Tax	\$ 16,449
Contingency	\$ 57,715
Bonding& Insurance	\$ -
Fee	\$ 27,911
Total Annual Operations and Maintenance Cost: Years 2-5	\$ 376,797
Annual Operations and Maintenance Cost: Years 6-21	
Routine System O&M	\$ 155,936
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 41,483
Subcontractor General Requirements	\$ 9,018
G&A	\$ 31,474
Overhead	\$ 11,241
New Mexico Gross Receipts Tax	\$ 16,018
Contingency	\$ 56,203
Bonding& Insurance	\$ -
Fee	\$ 27,180
Total Annual Operations and Maintenance Cost: Years 6-21	\$ 366,926
Post Closure Cost	
Closure Reporting	\$ 18,375
Equipment Demobilization	\$ 115,000
Professional Services ¹	\$ 44,014
Subcontractor General Requirements	\$ 6,669
G&A	\$ 25,768
Overhead	\$ 9,203
New Mexico Gross Receipts Tax	\$ 13,114
Contingency	\$ 46,014
Bonding& Insurance	\$ 5,563
Fee	\$ 22,253
Total Post Closure Cost	\$ 305,973
TOTAL PRESENT WORTH	\$ 10,611,210

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are in 2006 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Site Background Data

Elevation of Site = 4100 ft amsl or 12.68 psia
 Volume of Contaminated Ground Water greater than 5 ug/L = 7,350 acre-ft based on JSAI model
 Volume of Contaminated Ground Water greater than 1 ug/L = 25,700 acre-ft based on JSAI model

PCE Concentrations in wells sampled December 2005.

Sample Location	PCE (ug/L)
MW-SF1	11
MW-SF10	17
GWMW01 Port 2	21
GWMW01 Port 6	6
	14 ug/L, average concentration

Pumping Rates for Plume Containment and Remediation <20 Years (per JSAI modeling)

CLC-18	460 gpm
CLC-27	620 gpm

Total Annual Pumping: 568 MMgal

Mass Estimate

Mass of PCE above MCL in ground water = 150 kg of PCE based on JSAI model - JSAI estimate based on an effective porosity of 20% and does not address potential PCE mass in additional pore space

Conceptual Design

Pumping System Design Parameters

Estimated Number of Pumping Wells = 2 wells (CLC-18 and -27)
 Estimated pumping rate from CLC-18 = 460 gpm (based on JSAI modeling results)
 Estimated pumping rate from CLC-27 = 620 gpm (based on JSAI modeling results)
 Total Pumping Rate = 1080 gpm
 Depth of pumping wells = 600 ft bgs

System Construction Time

Estimated drilling rate = 125 lf/day based on invoice
 Total linear footage drilling = 0 lf
 Estimated duration of drilling = 0.0 days or 0 days (rounded up)
 Estimated linear footage of field piping per pumping well = 1500 ft per well average of piping required for all wells
 Total linear footage of connection piping = 500 lf assumed 500 lf to stub up to treatment system and reconnect to existing CLC-27 line to UGR connection of CLC-18 to CLC -27 connection to Upper Griggs Reservoir; CLC estimated 1000 lf new piping needed in addition to the approximate length of 500 lf of existing piping.
 Total linear footage of effluent field piping = 1,000 lf
 Estimated field piping placing rate = 75 lf/day
 Estimated duration of field piping = 20.0 days or 20 days (rounded up)
 Total construction timeframe = 20 days

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
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 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Granular Activated Carbon (GAC) Conceptual Design Parameters

All organic contaminants found are adsorbable with GAC.

GAC treatment system design flowrate is 1080 gpm

Governing contaminant PCE at 14 µg/L

GAC usage rate for PCE only 0.99 lbs GAC/hr or 23.7 lbs GAC/day or 8,640 lbs GAC/yr based on GAC vendor modeling

Assuming a multiplier of 1.00 for additional organic contaminants that will also adsorb and use carbon (vendor modeling includes other contaminants)

The total GAC usage rate = 1.0 lbs GAC/hr or 23.7 lbs GAC/day or 8,640 lbs GAC/yr

Assuming a carbon cost of \$1.75 per lb GAC for supply and changeout --> \$15,120 for GAC changeout per year per vendor quote

Required changeout period of 0.2 times per year based on GAC vendor modeling

Assume a carbon vessel size of 10,000 lb and we need 4 vessels in parallel

350 gpm

GAC Unit: QED Model CWS10000, rated for up to 350 gpm

Assuming a 10,000 lb vessel costs \$18,000 with GAC, total cost = \$72,000 for vessels and GAC only per vendor quote

In addition, there would be an annual recurring cost of \$15,120 for GAC changeout per year

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

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 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 90 working days (includes 70 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<u>Construction</u>					
Underground Piping from CLC-18 to CLC-27 connection to Upper Griggs Reservoir	1,000	ft	\$ 100.17	\$ 100,170	estimated LF from CLC: cost includes 10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Piping Connection to Treatment System	500	lf	\$ 100.17	\$ 50,085	10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Ground Water Extraction Pumps	2	ea	\$ 10,000.00	\$ 20,000	assume replace city pumps, vendor quote; 100gpm, 15 hp, 3-phase, 230V, 6 inch
Influent Equalization Tank	21,600	gal	\$ 1.00	\$ 21,600	provides 20 minutes of storage
Tank Effluent Pump	2	ea	\$ 4,000.00	\$ 8,000	Assumes 10 hp units - one pump will supply 2 GAC units (Pump with motor controls for 540 GPM @ 50'TDH)
Influent/Effluent Bag Filter	2	LS	\$ 7,500.00	\$ 15,000	1080 gpm size filter
GAC Treatment system	4	vessel	\$ 72,000.00	\$ 288,000	QED Model CWS10000, rated for up to 350 gpm
Protective Enclosure	1	ea	\$ 150,000.00	\$ 150,000	Assume 30'x25' building at \$200/sf, includes overhead crane, pre-fab metal
Repair discharge line on CLC-27	1	LS	\$ 300.00	\$ 300	
Equipment Rental	18	wk	\$ 200.00	\$ 3,600	MultiRAE
Subtotal Capital Cost				\$ 656,755	
Site Work Allowance	7%	of	\$ 656,755.00	\$ 45,973	
Mechanical Allowance	15%	of	\$ 656,755.00	\$ 98,513	
Instrumentation and Controls Allowance	12%	of	\$ 656,755.00	\$ 78,811	including SCADA system
Electrical Allowance	12%	of	\$ 656,755.00	\$ 78,811	
Miscellaneous Equipment Allowance	5%	of	\$ 656,755.00	\$ 32,838	
Subtotal Capital Cost				\$ 991,700	
Project Management	8%	of	\$ 991,700.05	\$ 79,336	
Design	15%	of	\$ 991,700.05	\$ 148,755	
Construction Management	15%	of	\$ 991,700.05	\$ 148,755	
Subcontractor General Requirements	5%	of	\$ 991,700.05	\$ 49,585	
Subtotal Capital Cost				\$ 1,418,131	
G&A	14%	of	\$ 1,418,131.07	\$ 198,538	
Overhead	5%	of	\$ 1,418,131.07	\$ 70,907	
New Mexico Gross Receipts Tax	7.125%	of	\$ 1,418,131.07	\$ 101,042	
Contingency	25%	of	\$ 1,418,131.07	\$ 354,533	
Subtotal Capital Cost				\$ 2,143,151	
Bonding& Insurance	2%	of	\$ 2,143,150.58	\$ 42,863	
Fee	8%	of	\$ 2,143,150.58	\$ 171,452	
TOTAL CAPITAL COST				\$ 2,357,466	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 90 working days (includes 70 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST				
Item/Activity	Qty Unit	Unit Cost	Cost	Comments and References
YEAR 1 OPERATIONS AND MAINTENANCE				
Item/Activity	Qty Unit	Unit Cost	Cost	Comments
<u>System Startup</u>				
Labor - Technician	100 hr	\$ 75.00	\$ 7,500	Assume 10 days for startup, 10 hrs/day
Labor - Engineer	70 hr	\$ 120.00	\$ 8,400	Assume 7 days for startup, 10 hrs/day
Water Sample Analysis	6 sample	\$ 150.00	\$ 900	3 sets, VOC analysis for infl/effl, incl data valid.
Air Sample Analysis	0 sample	\$ 150.00	\$ -	no air emissions with GAC
Startup Equipment Rental	2 week	\$ 200.00	\$ 400	
Total System Startup			\$ 17,200	
<u>Routine System O&M</u>				
Labor - Technician	208 hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	208 hr	\$ 120.00	\$ 24,960	100% of the Tech time for first year
Water Sample Analysis	29 sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Air Sample Analysis	0 sample	\$ -	\$ -	no air emissions with GAC
O&M Supplies	1 LS	\$ 1,000.00	\$ 1,000	
Electricity	130,699 kw-hr	\$ 0.08	\$ 10,456	Assumes continuous operation of the tank effluent pumps
GAC Replacement	1 LS	\$ 15,120.00	\$ 15,120	
Annual Extraction Well and Distribution Operating Cost	568 MMGal	\$ 194.73	\$ 110,538	98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M			\$ 182,024	
<u>Reporting (Annual Report and Construction Completion Report)</u>				
Labor - Engineer/Hydrogeologist	400 hr	\$ 120.00	\$ 48,000	
Labor - Editor	200 hr	\$ 85.00	\$ 17,000	
Labor - CAD Technician	100 hr	\$ 85.00	\$ 8,500	
Total Annual Reporting			\$ 73,500	
Subtotal Year 1 Operations and Maintenance			\$ 272,724	
Project Management	8% of	\$ 272,724.05	\$ 21,818	
Technical Support	15% of	\$ 272,724.05	\$ 40,909	
Construction Management	0% of	\$ 272,724.05	\$ -	
Subcontractor General Requirements	5% of	\$ 272,724.05	\$ 13,636	
Subtotal Year 1 Operations and Maintenance			\$ 349,087	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 90 working days (includes 70 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
G&A	14%	of	\$ 349,086.78	\$ 48,872	
Overhead	5%	of	\$ 349,086.78	\$ 17,454	
New Mexico Gross Receipts Tax	7.125%	of	\$ 349,086.78	\$ 24,872	
Contingency	25%	of	\$ 349,086.78	\$ 87,272	
Subtotal Year 1 Operations and Maintenance				\$ 527,557	
Bonding& Insurance	0%	of	\$ 527,557.40	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 527,557.40	\$ 42,205	
TOTAL YEAR 1 OPERATIONS AND MAINTENANCE COST				\$ 569,762	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 2-5 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
O&M Supplies	1	LS	\$ 1,000.00	\$ 1,000	
Electricity	130,699	kw-hr	\$ 0.08	\$ 10,456	Assumes continuous operation of the tank effluent pumps
GAC Replacement	1	LS	\$ 7,560.00	\$ 7,560	assumes GAC usage rate drops 50% from initial rate 98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	
Total Routine System O&M				\$ 161,984	
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 2-5 Operations and Maintenance				\$ 180,359	
Project Management	8%	of	\$ 180,359.05	\$ 14,429	
Technical Support	15%	of	\$ 180,359.05	\$ 27,054	
Construction Management	0%	of	\$ 180,359.05	\$ -	
Subcontractor General Requirements	5%	of	\$ 180,359.05	\$ 9,018	
Subtotal Year 2-5 Operations and Maintenance				\$ 230,860	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 90 working days (includes 70 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
G&A	14%	of	\$ 230,859.58	\$ 32,320	
Overhead	5%	of	\$ 230,859.58	\$ 11,543	
New Mexico Gross Receipts Tax	7.125%	of	\$ 230,859.58	\$ 16,449	
Contingency	25%	of	\$ 230,859.58	\$ 57,715	
Subtotal Year 2-5 Operations and Maintenance				\$ 348,887	
Bonding& Insurance	0%	of	\$ 348,886.54	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 348,886.54	\$ 27,911	
TOTAL ANNUAL COST: YEARS 2-5 OPERATIONS AND MAINTENANCE COS				\$ 376,797	

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-18 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
O&M Supplies	1	LS	\$ 1,000.00	\$ 1,000	
Electricity	130,699	kw-hr	\$ 0.08	\$ 10,456	Assumes continuous operation of the tank effluent pumps
GAC Replacement	1	LS	\$ 1,512.00	\$ 1,512	assumes GAC usage rate drops 90% from initial rate
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 155,936	
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 6-21 Operations and Maintenance				\$ 174,311	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 90 working days (includes 70 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Project Management	8%	of	\$ 180,359.05	\$ 14,429	
Technical Support	15%	of	\$ 180,359.05	\$ 27,054	
Construction Management	0%	of	\$ 180,359.05	\$ -	
Subcontractor General Requirements	5%	of	\$ 180,359.05	\$ 9,018	
Subtotal Year 6-21 Operations and Maintenance				\$ 224,812	
G&A	14%	of	\$ 224,811.58	\$ 31,474	
Overhead	5%	of	\$ 224,811.58	\$ 11,241	
New Mexico Gross Receipts Tax	7.125%	of	\$ 224,811.58	\$ 16,018	
Contingency	25%	of	\$ 224,811.58	\$ 56,203	
Subtotal Year 6-21 Operations and Maintenance				\$ 339,747	
Bonding& Insurance	0%	of	\$ 339,746.50	\$ -	- Bonding only applies to Capital Costs
Fee	8%	of	\$ 339,746.50	\$ 27,180	
TOTAL ANNUAL COST: YEARS 6-18 OPERATIONS AND MAINTENANCE COS				\$ 366,926	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
4. Number of new ground water extraction wells to be installed = 0 wells
5. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
6. Assume that the duration of construction is 90 working days (includes 70 working days for treatment system construction and installation)
7. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
8. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
9. The G&A rate is 14%
10. The overhead rate is 5%
11. The Bonding & Insurance rate is 2%
12. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Closure Reporting</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$120.00	\$ 12,000	
Labor - Editor	50	hr	\$85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$85.00	\$ 2,125	
Total Closure Reporting				\$ 18,375	
<i>Equipment Demobilization</i>					
Equipment Demobilization	1	LS	\$ 100,000.00	\$ 100,000	
Subtotal Equipment Demobilization				\$ 100,000	
Site Work Allowance	10%	of	\$ 100,000.00	\$ 10,000	
Mechanical Allowance	0%	of	\$ 100,000.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 100,000.00	\$ -	
Electrical Allowance	5%	of	\$ 100,000.00	\$ 5,000	
Miscellaneous Equipment Allowance	0%	of	\$ 100,000.00	\$ -	
Total Well Abandonment and Equipment Demobilization				\$ 115,000	
Subtotal Post-Closure Cost				\$ 133,375	
Project Management	8%	of	\$ 133,375.00	\$ 10,670	
Technical Support	15%	of	\$ 133,375.00	\$ 20,006	
Construction Management	10%	of	\$ 133,375.00	\$ 13,338	
Subcontractor General Requirements	5%	of	\$ 133,375.00	\$ 6,669	
Subtotal Post-Closure Cost				\$ 184,058	
G&A	14%	of	\$ 184,057.50	\$ 25,768	
Overhead	5%	of	\$ 184,057.50	\$ 9,203	
New Mexico Gross Receipts Tax	7.125%	of	\$ 184,057.50	\$ 13,114	
Contingency	25%	of	\$ 184,057.50	\$ 46,014	
Subtotal Post-Closure Cost				\$ 278,157	
Bonding & Insurance	2%	of	\$ 278,156.90	\$ 5,563	
Fee	8%	of	\$ 278,156.90	\$ 22,253	
TOTAL POST CLOSURE COST				\$ 305,973	

Alternative 3 - Ground Water Extraction with Treatment

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with GAC
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

		E	A	B	C=A+B	A*E	B*E	C*E		
		Total PV								
Elapsed Time	Year	Discount Factor at 3%	Capital Cost	O&M Cost	Total Cost	Capital Costs at 3%	Total PV O&M Costs at 3%	Total PV Costs at 3%	Balance of Interest Bearing Account at 3%	
0	2007	1.000	\$ 2,357,466		\$ 2,357,466	\$ 2,357,466	\$ -	\$ 2,357,466	\$	8,501,356
1	2008	0.971		\$ 586,855	\$ 586,855	\$ -	\$ 569,762	\$ 569,762	\$	8,151,936
2	2009	0.943		\$ 399,744	\$ 399,744	\$ -	\$ 376,797	\$ 376,797	\$	7,984,758
3	2010	0.915		\$ 411,737	\$ 411,737	\$ -	\$ 376,797	\$ 376,797	\$	7,800,212
4	2011	0.888		\$ 424,089	\$ 424,089	\$ -	\$ 376,797	\$ 376,797	\$	7,597,407
5	2012	0.863		\$ 436,812	\$ 436,812	\$ -	\$ 376,797	\$ 376,797	\$	7,375,413
6	2013	0.837		\$ 438,129	\$ 438,129	\$ -	\$ 366,926	\$ 366,926	\$	7,145,402
7	2014	0.813		\$ 451,273	\$ 451,273	\$ -	\$ 366,926	\$ 366,926	\$	6,894,953
8	2015	0.789		\$ 464,811	\$ 464,811	\$ -	\$ 366,926	\$ 366,926	\$	6,623,046
9	2016	0.766		\$ 478,755	\$ 478,755	\$ -	\$ 366,926	\$ 366,926	\$	6,328,619
10	2017	0.744		\$ 493,118	\$ 493,118	\$ -	\$ 366,926	\$ 366,926	\$	6,010,566
11	2018	0.722		\$ 507,912	\$ 507,912	\$ -	\$ 366,926	\$ 366,926	\$	5,667,734
12	2019	0.701		\$ 523,149	\$ 523,149	\$ -	\$ 366,926	\$ 366,926	\$	5,298,923
13	2020	0.681		\$ 538,844	\$ 538,844	\$ -	\$ 366,926	\$ 366,926	\$	4,902,882
14	2021	0.661		\$ 555,009	\$ 555,009	\$ -	\$ 366,926	\$ 366,926	\$	4,478,309
15	2022	0.642		\$ 571,659	\$ 571,659	\$ -	\$ 366,926	\$ 366,926	\$	4,023,849
16	2023	0.623		\$ 588,809	\$ 588,809	\$ -	\$ 366,926	\$ 366,926	\$	3,538,092
17	2024	0.605		\$ 606,473	\$ 606,473	\$ -	\$ 366,926	\$ 366,926	\$	3,019,567
18	2025	0.587		\$ 624,667	\$ 624,667	\$ -	\$ 366,926	\$ 366,926	\$	2,466,747
19	2026	0.570		\$ 643,407	\$ 643,407	\$ -	\$ 366,926	\$ 366,926	\$	1,878,040
20	2027	0.554		\$ 662,710	\$ 662,710	\$ -	\$ 366,926	\$ 366,926	\$	1,251,790
21	2028	0.538	\$ 569,199	\$ 682,591	\$ 1,251,790	\$ 305,973	\$ 366,926	\$ 672,899	\$	0
Total Alternative 3 Ground Water Extraction w			\$ 2,926,665	\$ 11,090,553	\$ 14,017,217	\$ 2,663,438	\$ 7,947,771	\$ 10,611,210		

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE SUMMARY²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 1,289,246
Project Management	\$ 103,140
Design	\$ 193,387
Construction Management	\$ 193,387
Subcontractor General Requirements	\$ 64,462
G&A	\$ 258,107
Overhead	\$ 92,181
Tax	\$ 131,358
Contingency	\$ 460,905
Bonding& Insurance	\$ 55,723
Fee	\$ 222,894
Total Capital Cost	\$ 3,064,790
Year 1 Operations and Maintenance	
System Startup	\$ 53,400
Routine System O&M	\$ 252,240
Reporting (Annual Report and Construction Completion Report)	\$ 73,500
Professional Services ¹	\$ 87,202
Subcontractor General Requirements	\$ 18,957
G&A	\$ 67,942
Overhead	\$ 24,265
Tax	\$ 34,578
Contingency	\$ 121,325
Bonding& Insurance	\$ -
Fee	\$ 58,673
Total Year 1 Operations and Maintenance	\$ 792,081
Annual Operations and Maintenance Cost: Years 2-5	
Routine System O&M	\$ 199,200
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 50,042
Subcontractor General Requirements	\$ 10,879
G&A	\$ 38,989
Overhead	\$ 13,925
New Mexico Gross Receipts Tax	\$ 19,843
Contingency	\$ 69,624
Bonding& Insurance	\$ -
Fee	\$ 33,670
Total Annual Operations and Maintenance Cost: Years 2-5	\$ 454,547
Annual Operations and Maintenance Cost: Years 6-21	
Routine System O&M	\$ 199,200
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 50,042
Subcontractor General Requirements	\$ 10,879
G&A	\$ 38,989
Overhead	\$ 13,925
New Mexico Gross Receipts Tax	\$ 19,843
Contingency	\$ 69,624
Bonding& Insurance	\$ -
Fee	\$ 33,670
Total Annual Operations and Maintenance Cost: Years 6-21	\$ 454,547
Post Closure Cost	
Closure Reporting	\$ 18,375
Equipment Demobilization	\$ 172,500
Professional Services ¹	\$ 62,989
Subcontractor General Requirements	\$ 9,544
G&A	\$ 36,877
Overhead	\$ 13,170
New Mexico Gross Receipts Tax	\$ 18,768
Contingency	\$ 65,852
Bonding& Insurance	\$ 7,961
Fee	\$ 31,846
Total Post Closure Cost	\$ 437,882
TOTAL PRESENT WORTH	\$ 13,385,700

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are in 2006 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Site Background Data

Elevation of Site = 4100 ft amsl or 12.68 psia
 Volume of Contaminated Ground Water greater than 5 ug/L = 7,350 acre-ft based on JSAI model
 Volume of Contaminated Ground Water greater than 1 ug/L = 25,700 acre-ft based on JSAI model

PCE Concentrations in wells sampled December 2005.

Sample Location	PCE (ug/L)
MW-SF1	11
MW-SF10	17
GWMW01 Port 2	21
GWMW01 Port 6	6
	14 ug/L, average concentration

Pumping Rates for Plume Containment and Remediation <20 Years (per JSAI modeling)

CLC-18	460	gpm
CLC-27	620	gpm
Total Annual Pumping:	568	MMgal

Mass Estimate

Mass of PCE above MCL in ground water =

150 kg of PCE

based on JSAI model - JSAI estimate based on an effective porosity of 20% and does not address potential PCE mass in additional pore space

Alternative 3 - Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Conceptual Design

Pumping System Design Parameters

Estimated Number of Pumping Wells =	2	wells (CLC-18 and -27)
Estimated pumping rate from CLC-18 =	460	gpm (based on JSAI modeling results)
Estimated pumping rate from CLC-27 =	620	gpm (based on JSAI modeling results)
Total Pumping Rate =	1080	gpm
Depth of pumping wells =	600	ft bgs

System Construction Time

Estimated drilling rate =	125	lf/day	based on invoice
Total linear footage drilling =	0	lf	
Estimated duration of drilling =	0.0	days or	0 days (rounded up)
Estimated linear footage of field piping per pumping well =	500	lf	1500 ft per well average of piping required for all wells
Total linear footage of connection piping =	1,000	lf	assumed 500 lf to stub up to treatment system and reconnect to existing CLC-27 line to UGR connection of CLC-18 to CLC -27 connection to Upper Griggs Reservoir; CLC estimated 1000 lf new piping needed in addition to the approximate length of 500 lf of existing piping.
Total linear footage of effluent field piping =	1,000	lf	
Estimated field piping placing rate =	75	lf/day	
Estimated duration of field piping =	20.0	days or	20 days (rounded up)
Total construction timeframe =	20	days	

HiPOx Treatment System Components (1080 gpm system)

System Costs:	\$	531,250	(Vendor quote [Applied Process Technology] of \$425,000 plus 25% uncertainty factor, plus FOB and taxes)
Operating Costs (per year) - Vendor Quote			
Oxygen Generator	\$	8,760	
Hydrogen Peroxide	\$	6,389	Assumes NSF grade
O3 Generator Electricity	\$	4,739	
Consumable Costs	\$	19,888	
TOTAL ANNUAL COST	\$	39,776	

Note: HiPOx is a specific patented ex-situ chemical oxidation process that combines ozone and hydrogen peroxide to destroy contaminants in the influent ground water

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
5. Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
6. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
7. Assume that the duration of construction is 110 working days (includes 90 working days for treatment system construction and installation)
8. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
10. The G&A rate is 14%
11. The overhead rate is 5%
12. The Bonding & Insurance rate is 2%
13. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<u>Construction</u>					
Underground Piping from CLC-18 to CLC-27 connection to Upper Griggs Reservoir	1,000	ft	\$ 100.17	\$ 100,170	estimated LF from CLC: cost includes 10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Piping Connection to Treatment System	500	lf	\$ 100.17	\$ 50,085	10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Ground Water Extraction Pumps	2	ea	\$ 10,000.00	\$ 20,000	assume replace city pumps, vendor quote; 100gpm, 15 hp, 3-phase, 230V, 6 inch
Influent Equalization Tank	21,600	gal	\$ 1.00	\$ 21,600	provides 20-minutes of storage
Tank Effluent Pump	2	ea	\$ 4,000.00	\$ 8,000	Assumes 10 hp units - (Pump with motor controls for 540 GPM @ 50'TDH)
Influent and Effluent Bag Filters	2	LS	\$ 7,500.00	\$ 15,000	1080 gpm size filter Equipment is skid mounted, pre-assembled, pre-tested, and fully automated.
HiPOx Treatment System	1	LS	\$ 531,250.00	\$ 531,250	Equipment includes reactor, instruments, controls, H2O2 storage, O3 generator/chiller, and on-site O2 generation system 1-time bench test to accurately determine dosing requirements and equipment
HiPOx Bench Test	1	LS	\$ 3,000.00	\$ 3,000	sizing
Protective Enclosure	1	ea	\$ 100,000.00	\$ 100,000	Vendor quote: 8' x 40' climate-controlled enclosure
Repair discharge line on CLC-27	1	LS	\$ 300.00	\$ 300	
Equipment Rental	22	wk	\$ 200.00	\$ 4,400	MultiRAE
Subtotal Capital Cost				\$ 853,805	
Site Work Allowance	7%	of	\$ 853,805.00	\$ 59,766	
Mechanical Allowance	15%	of	\$ 853,805.00	\$ 128,071	
Instrumentation and Controls Allowance	12%	of	\$ 853,805.00	\$ 102,457	including SCADA system
Electrical Allowance	12%	of	\$ 853,805.00	\$ 102,457	
Miscellaneous Equipment Allowance	5%	of	\$ 853,805.00	\$ 42,690	
Subtotal Capital Cost				\$ 1,289,246	
Project Management	8%	of	\$ 1,289,245.55	\$ 103,140	
Design	15%	of	\$ 1,289,245.55	\$ 193,387	
Construction Management	15%	of	\$ 1,289,245.55	\$ 193,387	
Subcontractor General Requirements	5%	of	\$ 1,289,245.55	\$ 64,462	
Subtotal Capital Cost				\$ 1,843,621	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
5. Number of new ground water extraction wells to be installed = 0 wells
6. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
7. Assume that the duration of construction is 110 working days (includes 90 working days for treatment system construction and installation)
8. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
10. The G&A rate is 14%
11. The overhead rate is 5%
12. The Bonding & Insurance rate is 2%
13. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
G&A	14%	of	\$ 1,843,621.14	\$ 258,107	
Overhead	5%	of	\$ 1,843,621.14	\$ 92,181	
New Mexico Gross Receipts Tax	7.125%	of	\$ 1,843,621.14	\$ 131,358	
Contingency	25%	of	\$ 1,843,621.14	\$ 460,905	
Subtotal Capital Cost				\$ 2,786,172	
Bonding& Insurance	2%	of	\$ 2,786,172.44	\$ 55,723	
Fee	8%	of	\$ 2,786,172.44	\$ 222,894	
TOTAL CAPITAL COST				\$ 3,064,790	

YEAR 1 OPERATIONS AND MAINTENANCE					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
System Startup					
Labor - Technician	300	hr	\$ 75.00	\$ 22,500	Assume 30 days for startup, 10 hrs/day
Labor - Engineer	200	hr	\$ 120.00	\$ 24,000	Assume 20 days for startup, 10 hrs/day
Water Sample Analysis	6	sample	\$ 150.00	\$ 900	3 sets, VOC analysis for infl/effl, incl data valid.
Air Sample Analysis	0	sample	\$ 150.00	\$ -	no air emissions from HiPOx
Startup Equipment Rental	6	week	\$ 1,000.00	\$ 6,000	intensive water quality monitoring
Total System Startup				\$ 53,400	
Routine System O&M					
Labor - Technician	416	hr	\$ 75.00	\$ 31,200	8 hours/week
Labor - Engineer	416	hr	\$ 120.00	\$ 49,920	100% of the Tech time for first year
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Air Sample Analysis	0	sample	\$ -	\$ -	none needed after startup sampling
O&M Supplies	1	LS	\$ 6,000.00	\$ 6,000	
HiPOx System O&M	1	LS	\$ 39,776.00	\$ 39,776	chemical and O3 generator electrical costs per vendor
Electricity	130,699	kw-hr	\$ 0.08	\$ 10,456	assumes continuous operation of the tank effluent pumps
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 252,240	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
5. Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
6. Number of piezometers to be installed = 0 piezometers included under ground water monitoring
7. Assume that the duration of construction is 110 working days (includes 90 working days for treatment system construction and installation)
8. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
10. The G&A rate is 14%
11. The overhead rate is 5%
12. The Bonding & Insurance rate is 2%
13. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
<i>Reporting (Annual Report and Construction Completion Report)</i>					
Labor - Engineer/Hydrogeologist	400	hr	\$ 120.00	\$ 48,000	
Labor - Editor	200	hr	\$ 85.00	\$ 17,000	
Labor - CAD Technician	100	hr	\$ 85.00	\$ 8,500	
Total Annual Reporting				\$ 73,500	
Subtotal Year 1 Operations and Maintenance				\$ 379,140	
Project Management	8%	of	\$ 379,140.05	\$ 30,331	
Technical Support	15%	of	\$ 379,140.05	\$ 56,871	
Construction Management	0%	of	\$ 379,140.05	\$ -	
Subcontractor General Requirements	5%	of	\$ 379,140.05	\$ 18,957	
Subtotal Year 1 Operations and Maintenance				\$ 485,299	
G&A	14%	of	\$ 485,299.26	\$ 67,942	
Overhead	5%	of	\$ 485,299.26	\$ 24,265	
New Mexico Gross Receipts Tax	7.125%	of	\$ 485,299.26	\$ 34,578	
Contingency	25%	of	\$ 485,299.26	\$ 121,325	
Subtotal Year 1 Operations and Maintenance				\$ 733,409	
Bonding& Insurance	0%	of	\$ 733,408.51	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 733,408.51	\$ 58,673	
TOTAL YEAR 1 OPERATIONS AND MAINTENANCE COST				\$ 792,081	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
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8. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
10. The G&A rate is 14%
11. The overhead rate is 5%
12. The Bonding & Insurance rate is 2%
13. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 2-5 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
O&M Supplies	1	LS	\$ 6,000.00	\$ 6,000	
Electricity	130,699	kw-hr	\$ 0.08	\$ 10,456	assumes continuous operation of the tank effluent pumps
HIPOx System O&M	1	LS	\$ 39,776.00	\$ 39,776	chemical and O3 generator electrical costs per vendor
					98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	(used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 199,200	
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 2-5 Operations and Maintenance				\$ 217,575	
Project Management	8%	of	\$ 217,575.05	\$ 17,406	
Technical Support	15%	of	\$ 217,575.05	\$ 32,636	
Construction Management	0%	of	\$ 217,575.05	\$ -	
Subcontractor General Requirements	5%	of	\$ 217,575.05	\$ 10,879	
Subtotal Year 2-5 Operations and Maintenance				\$ 278,496	
G&A	14%	of	\$ 278,496.06	\$ 38,989	
Overhead	5%	of	\$ 278,496.06	\$ 13,925	
New Mexico Gross Receipts Tax	7.125%	of	\$ 278,496.06	\$ 19,843	
Contingency	25%	of	\$ 278,496.06	\$ 69,624	
Subtotal Year 2-5 Operations and Maintenance				\$ 420,877	
Bonding& Insurance	0%	of	\$ 420,877.17	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 420,877.17	\$ 33,670	
TOTAL ANNUAL COST: YEARS 2-5 OPERATIONS AND MAINTENANCE COS'				\$ 454,547	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
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8. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
10. The G&A rate is 14%
11. The overhead rate is 5%
12. The Bonding & Insurance rate is 2%
13. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-21 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Routine System O&M</i>					
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
O&M Supplies	1	LS	\$ 6,000.00	\$ 6,000	
Electricity	130,699	kw-hr	\$ 0.08	\$ 10,456	assumes continuous operation of the tank effluent pumps
HIPOx System O&M	1	LS	\$ 39,776.00	\$ 39,776	chemical and O3 generator electrical costs per vendor
Annual Extraction Well and Distribution Operating Cost	568	MMGal	\$ 194.73	\$ 110,538	98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 199,200	
<i>Reporting (Annual Reports)</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 6-21 Operations and Maintenance				\$ 217,575	
Project Management	8%	of	\$ 217,575.05	\$ 17,406	
Technical Support	15%	of	\$ 217,575.05	\$ 32,636	
Construction Management	0%	of	\$ 217,575.05	\$ -	
Subcontractor General Requirements	5%	of	\$ 217,575.05	\$ 10,879	
Subtotal Year 6-21 Operations and Maintenance				\$ 278,496	
G&A	14%	of	\$ 278,496.06	\$ 38,989	
Overhead	5%	of	\$ 278,496.06	\$ 13,925	
New Mexico Gross Receipts Tax	7.125%	of	\$ 278,496.06	\$ 19,843	
Contingency	25%	of	\$ 278,496.06	\$ 69,624	
Subtotal Year 6-21 Operations and Maintenance				\$ 420,877	
Bonding& Insurance	0%	of	\$ 420,877.17	\$ -	Bonding only applies to Capital Costs
Fee	8%	of	\$ 420,877.17	\$ 33,670	
TOTAL ANNUAL COST: YEARS 6-21 OPERATIONS AND MAINTENANCE COS*				\$ 454,547	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed = 0 wells included under ground water monitoring
5. Number of new ground water extraction wells to be installed = 0 wells included under ground water monitoring
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8. The number of wells to be sampled for VOCs is 0 wells per round included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is 0 wells includes only new extraction well(s)
10. The G&A rate is 14%
11. The overhead rate is 5%
12. The Bonding & Insurance rate is 2%
13. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Closure Reporting</i>					
Labor - Engineer/Hydrogeologist	100	hr	\$120.00	\$ 12,000	
Labor - Editor	50	hr	\$85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$85.00	\$ 2,125	
Total Closure Reporting				\$ 18,375	
<i>Equipment Demobilization</i>					
Equipment Demobilization	1	LS	\$ 150,000.00	\$ 150,000	
Subtotal Equipment Demobilization				\$ 150,000	
Site Work Allowance	10%	of	\$ 150,000.00	\$ 15,000	
Mechanical Allowance	0%	of	\$ 150,000.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 150,000.00	\$ -	
Electrical Allowance	5%	of	\$ 150,000.00	\$ 7,500	
Miscellaneous Equipment Allowance	0%	of	\$ 150,000.00	\$ -	
Total Equipment Demobilization				\$ 172,500	
Subtotal Post-Closure Cost				\$ 190,875	
Project Management	8%	of	\$ 190,875.00	\$ 15,270	
Technical Support	15%	of	\$ 190,875.00	\$ 28,631	
Construction Management	10%	of	\$ 190,875.00	\$ 19,088	
Subcontractor General Requirements	5%	of	\$ 190,875.00	\$ 9,544	
Subtotal Post-Closure Cost				\$ 263,408	
G&A	14%	of	\$ 263,407.50	\$ 36,877	
Overhead	5%	of	\$ 263,407.50	\$ 13,170	
New Mexico Gross Receipts Tax	7.125%	of	\$ 263,407.50	\$ 18,768	
Contingency	25%	of	\$ 263,407.50	\$ 65,852	
Subtotal Post-Closure Cost				\$ 398,075	
Bonding& Insurance	2%	of	\$ 398,074.58	\$ 7,961	
Fee	8%	of	\$ 398,074.58	\$ 31,846	
TOTAL POST CLOSURE COST				\$ 437,882	

Alternative 3 - Ground Water Extraction with Treatment

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Chemical/UV Oxidation
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

		E	A	B	C=A+B	A'E	B'E	C'E		
		Total PV								
Elapsed Time	Year	Discount Factor at 3%	Capital Cost	O&M Cost	Total Cost	Capital Costs at 3%	Total PV O&M Costs at 3%	Total PV Costs at 3%	Balance of Interest Bearing Account at 3%	
0	2007	1.000	\$ 3,064,790		\$ 3,064,790	\$ 3,064,790	\$ -	\$ 3,064,790	\$ 10,630,537	
1	2008	0.971		\$ 815,844	\$ 815,844	\$ -	\$ 792,081	\$ 792,081	\$ 10,109,135	
2	2009	0.943		\$ 482,229	\$ 482,229	\$ -	\$ 454,547	\$ 454,547	\$ 9,915,713	
3	2010	0.915		\$ 496,696	\$ 496,696	\$ -	\$ 454,547	\$ 454,547	\$ 9,701,587	
4	2011	0.888		\$ 511,597	\$ 511,597	\$ -	\$ 454,547	\$ 454,547	\$ 9,465,689	
5	2012	0.863		\$ 526,945	\$ 526,945	\$ -	\$ 454,547	\$ 454,547	\$ 9,206,907	
6	2013	0.837		\$ 542,753	\$ 542,753	\$ -	\$ 454,547	\$ 454,547	\$ 8,924,078	
7	2014	0.813		\$ 559,036	\$ 559,036	\$ -	\$ 454,547	\$ 454,547	\$ 8,615,994	
8	2015	0.789		\$ 575,807	\$ 575,807	\$ -	\$ 454,547	\$ 454,547	\$ 8,281,392	
9	2016	0.766		\$ 593,081	\$ 593,081	\$ -	\$ 454,547	\$ 454,547	\$ 7,918,960	
10	2017	0.744		\$ 610,874	\$ 610,874	\$ -	\$ 454,547	\$ 454,547	\$ 7,527,329	
11	2018	0.722		\$ 629,200	\$ 629,200	\$ -	\$ 454,547	\$ 454,547	\$ 7,105,073	
12	2019	0.701		\$ 648,076	\$ 648,076	\$ -	\$ 454,547	\$ 454,547	\$ 6,650,707	
13	2020	0.681		\$ 667,518	\$ 667,518	\$ -	\$ 454,547	\$ 454,547	\$ 6,162,685	
14	2021	0.661		\$ 687,544	\$ 687,544	\$ -	\$ 454,547	\$ 454,547	\$ 5,639,396	
15	2022	0.642		\$ 708,170	\$ 708,170	\$ -	\$ 454,547	\$ 454,547	\$ 5,079,162	
16	2023	0.623		\$ 729,415	\$ 729,415	\$ -	\$ 454,547	\$ 454,547	\$ 4,480,240	
17	2024	0.605		\$ 751,298	\$ 751,298	\$ -	\$ 454,547	\$ 454,547	\$ 3,840,811	
18	2025	0.587		\$ 773,836	\$ 773,836	\$ -	\$ 454,547	\$ 454,547	\$ 3,158,983	
19	2026	0.570		\$ 797,052	\$ 797,052	\$ -	\$ 454,547	\$ 454,547	\$ 2,432,790	
20	2027	0.554		\$ 820,963	\$ 820,963	\$ -	\$ 454,547	\$ 454,547	\$ 1,660,182	
21	2028	0.538	\$ 814,590	\$ 845,592	\$ 1,660,182	\$ 437,882	\$ 454,547	\$ 892,429	\$ (0)	
Total Alternative 3 Ground Water Extraction wit			\$ 3,879,379	\$ 13,773,525	\$ 17,652,904	\$ 3,502,672	\$ 9,883,028	\$ 13,385,700		

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE SUMMARY²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 1,002,005
Project Management	\$ 80,160
Design	\$ 50,100
Construction Management	\$ 100,201
Subcontractor General Requirements	\$ 50,100
G&A	\$ 179,559
Overhead	\$ 64,128
New Mexico Gross Receipts Tax	\$ 91,383
Contingency	\$ 320,642
Bonding& Insurance	\$ 38,766
Fee	\$ 155,062
Administrative/Legal Fees for IC	\$ 15,000
Total Capital Cost	\$ 2,147,107
Annual Operations and Maintenance Cost: Years 1-5	
Monthly Water Level Measurements (Piezometers)	\$ 13,750
Annual Ground Water Sampling (Monitor Wells)	\$ 77,850
Professional Services ¹	\$ 21,068
Subcontractor General Requirements	\$ 4,580
G&A	\$ 16,415
Overhead	\$ 5,862
New Mexico Gross Receipts Tax	\$ 8,354
Contingency	\$ 29,312
Bonding& Insurance	\$ 3,544
Fee	\$ 14,175
Total Annual Operations and Maintenance Cost: Years 1-5	\$ 194,910
Annual Operations and Maintenance Cost: Years 6-21	
Once Every Two Years Ground Water Sampling	\$ 43,750
Professional Services ¹	\$ 10,063
Subcontractor General Requirements	\$ 2,188
G&A	\$ 7,840
Overhead	\$ 2,800
New Mexico Gross Receipts Tax	\$ 3,990
Contingency	\$ 14,000
Bonding& Insurance	\$ 1,693
Fee	\$ 6,770
Total Annual Operations and Maintenance Cost: Years 6-21	\$ 93,093
Five Year Review Cost - Per Report	
5-year Review Report	\$ 25,000
Professional Services ¹	\$ -
Subcontractor General Requirements	\$ -
G&A	\$ 3,500
Overhead	\$ 1,250
New Mexico Gross Receipts Tax	\$ 1,781
Contingency	\$ 6,250
Bonding& Insurance	\$ -
Fee	\$ 3,023
Total Five Year Review - Per Report	\$ 40,804
Post Closure Cost	
Well Abandonment	\$ 104,280
Professional Services ¹	\$ 39,626
Subcontractor General Requirements	\$ 5,214
G&A	\$ 20,877
Overhead	\$ 7,456
New Mexico Gross Receipts Tax	\$ 10,625
Contingency	\$ 37,280
Bonding& Insurance	\$ 4,507
Fee	\$ 18,029
Total Post Closure Cost	\$ 247,894
TOTAL PRESENT WORTH	\$ 5,022,255

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 3 - Ground Water Extraction with Treatment
SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
ALTERNATIVE: 3 Ground Water Extraction with Treatment
DESCRIPTION: Institutional Controls and Monitoring
PREPARED BY: L.Colella, T.Palaia
PROJECT NUMBER: 346535.FS.01

**NO DESIGN ACTIVITY FOR INSTITUTIONAL CONTROLS AND MONITORING PORTION OF THIS ALTERNATIVE.
REFER TO COST DETAILS SHEET COST BASIS.**

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed 3 with 3 screens for a total of 4125 ft
4. The number of new single-screen piezometers required to be installed 10 piezometers
5. The number of wells to be sampled for VOCs 84 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells on-site to be abandoned for post-closure is 94 wells
7. The number of wells to be sampled for PAH is 0
8. The G&A rate is 14%
9. The overhead rate is 5%
10. The Bonding & Insurance rate is 2%
11. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Construction					
Nested Ground Water Monitor Well Installation	3	well	\$ 129,409.00	\$ 388,227	per recent MW installation invoice
Piezometer Installation	10	piezometer	\$ 56,469.38	\$ 564,694	Assume 600' deep, with same per-foot cost as nest MWs.
Fencing (Institutional Control)	0	ft	\$ 10.00	\$ -	No treatment unit to protect
Well Permits	19	ea	\$ 30.00	\$ 570	For 3 screen nested wells and 10 piezometers
Equipment Rental	4	wk	\$ 200.00	\$ 800	MultiRAE
Subtotal Capital Cost				\$ 954,291	
Site Work Allowance	5%	of	\$ 954,290.82	\$ 47,715	
Mechanical Allowance	0%	of	\$ 954,290.82	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 954,290.82	\$ -	
Electrical Allowance	0%	of	\$ 954,290.82	\$ -	
Miscellaneous Equipment Allowance	0%	of	\$ 954,290.82	\$ -	
Subtotal Capital Cost				\$ 1,002,005	
Project Management	8%	of	\$ 1,002,005.36	\$ 80,160	
Design	5%	of	\$ 1,002,005.36	\$ 50,100	
Construction Management	10%	of	\$ 1,002,005.36	\$ 100,201	
Subcontractor General Requirements	5%	of	\$ 1,002,005.36	\$ 50,100	
Subtotal Capital Cost				\$ 1,282,567	
G&A	14%	of	\$ 1,282,566.86	\$ 179,559	
Overhead	5%	of	\$ 1,282,566.86	\$ 64,128	
New Mexico Gross Receipts Tax	7.125%	of	\$ 1,282,566.86	\$ 91,383	
Contingency	25%	of	\$ 1,282,566.86	\$ 320,642	
Subtotal Capital Cost				\$ 1,938,279	
Bonding& Insurance	2%	of	\$ 1,938,279.17	\$ 38,766	
Fee	8%	of	\$ 1,938,279.17	\$ 155,062	
Administrative/Legal Fees for IC	1	LS	\$ 15,000.00	\$ 15,000	
TOTAL CAPITAL COST				\$ 2,147,107	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed 3 with 3 screens for a total of 4125 ft
4. The number of new single-screen piezometers required to be installed 10 piezometers
5. The number of wells to be sampled for VOCs 84 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells on-site to be abandoned for post-closure is 94 wells
7. The number of wells to be sampled for PAH is 0
8. The G&A rate is 14%
9. The overhead rate is 5%
10. The Bonding & Insurance rate is 2%
11. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 1-5 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>Monthly Water Level Measurements (Piezometers)</u>					
Labor - Technician	180	hr	\$ 75.00	\$ 13,500	30 piezometers/MWs per event, 2 people, 4 piezometers/MWs per hour
Water Level Measurement Equipment Rental	1	LS	\$ 250.00	\$ 250	
Total Water Level Measurement				\$ 13,750	
<u>Annual Ground Water Sampling (Monitor Wells)</u>					
Subcontractor costs for multiport wells	1	LS	\$ 15,200.00	\$ 15,200	5 multiport wells: based on Dec 2005 invoice (4 days including move/demove, materials, equipment, labor, per diem)
Labor - Technician	632	hr	\$ 75.00	\$ 47,400	4 hrs/well, 2 people, not including 5 multiport wells
Ground Water Sample Analysis - VOC only	97	sample	\$ 150.00	\$ 14,550	Includes all wells plus 15% (on average #) QA/QC samples
Sampling Supplies	1	round	\$ 200.00	\$ 200	
GW Sampling Equipment Rental	1	round	\$ 500.00	\$ 500	
Total Annual Ground Water Sampling				\$ 77,850	
Subtotal Years 1-5 Operations and Maintenance				\$ 91,600	
Project Management	8%	of	\$ 91,600.00	\$ 7,328	
Technical Support	15%	of	\$ 91,600.00	\$ 13,740	
Construction Management	0%	of	\$ 91,600.00	\$ -	
Subcontractor General Requirements	5%	of	\$ 91,600.00	\$ 4,580	
Subtotal Years 1-5 Operations and Maintenance				\$ 117,248	
G&A	14%	of	\$ 117,248.00	\$ 16,415	
Overhead	5%	of	\$ 117,248.00	\$ 5,862	
New Mexico Gross Receipts Tax	7.125%	of	\$ 117,248.00	\$ 8,354	
Contingency	25%	of	\$ 117,248.00	\$ 29,312	
Subtotal Years 1-5 Operations and Maintenance				\$ 177,191	
Bonding & Insurance	2%	of	\$ 177,191.04	\$ 3,544	
Fee	8%	of	\$ 177,191.04	\$ 14,175	
TOTAL ANNUAL COST: YEARS 1-5 OPERATIONS AND MAINTENANCE COS*				\$ 194,910	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed 3 with 3 screens for a total of 4125 ft
4. The number of new single-screen piezometers required to be installed 10 piezometers
5. The number of wells to be sampled for VOCs 84 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells on-site to be abandoned for post-closure is 94 wells
7. The number of wells to be sampled for PAH is 0
8. The G&A rate is 14%
9. The overhead rate is 5%
10. The Bonding & Insurance rate is 2%
11. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-21 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>Quarterly Water Level Measurements</u>					
Labor - Technician	60	hr	\$ 75.00	\$ 4,500	30 piezometers/MWs per event, 2 people, 4 piezometers/MWs per hour
Water Level Measurement Equipment Rental	1	LS	\$ 250.00	\$ 250	
Total Water Level Measurement				\$ 4,750	
<u>Once Every Two Years Ground Water Sampling</u>					
Subcontractor costs for multiport wells	1	LS	\$ 7,600.00	\$ 7,600	5 multiport wells: based on Dec 2005 invoice (4 days [biennial] including move/demove, materials, equipment, labor, per diem)
Labor - Technician	316	hr	\$ 75.00	\$ 23,700	4 hrs/well, 2 people, not including 5 multiport wells
Ground Water Sample Analysis - VOC only	49	sample	\$ 150.00	\$ 7,350	Includes all wells plus 15% (on average #) QA/QC samples
Sampling Supplies	0.5	round	\$ 200.00	\$ 100	
GW Sampling Equipment Rental	0.5	round	\$ 500.00	\$ 250	
Total Semiannual Ground Water Sampling				\$ 39,000	
Subtotal Years 6-21 Operations and Maintenance				\$ 43,750	
Project Management	8%	of	\$ 43,750.00	\$ 3,500	
Technical Support	15%	of	\$ 43,750.00	\$ 6,563	
Construction Management	0%	of	\$ 43,750.00	\$ -	
Subcontractor General Requirements	5%	of	\$ 43,750.00	\$ 2,188	
Subtotal Years 6-21 Operations and Maintenance				\$ 56,000	
G&A	14%	of	\$ 56,000.00	\$ 7,840	
Overhead	5%	of	\$ 56,000.00	\$ 2,800	
New Mexico Gross Receipts Tax	7.125%	of	\$ 56,000.00	\$ 3,990	
Contingency	25%	of	\$ 56,000.00	\$ 14,000	
Subtotal Years 6-21 Operations and Maintenance				\$ 84,630	
Bonding & Insurance	2%	of	\$ 84,630.00	\$ 1,693	
Fee	8%	of	\$ 84,630.00	\$ 6,770	
TOTAL ANNUAL COST: YEARS 6-21 OPERATIONS AND MAINTENANCE COS				\$ 93,093	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed 3 with 3 screens for a total of 4125 ft
4. The number of new single-screen piezometers required to be installed 10 piezometers
5. The number of wells to be sampled for VOCs 84 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells on-site to be abandoned for post-closure is 94 wells
7. The number of wells to be sampled for PAH is 0
8. The G&A rate is 14%
9. The overhead rate is 5%
10. The Bonding & Insurance rate is 2%
11. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
FIVE YEAR REVIEW COST - PER REPORT					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<u>5-year Review Report</u>					
5-year Review Report	1	LS	\$ 25,000.00	\$ 25,000	
Subtotal Five Year Review Cost				\$ 25,000	
Project Management	0%	of	\$ 25,000.00	\$ -	
Technical Support	0%	of	\$ 25,000.00	\$ -	
Construction Management	0%	of	\$ 25,000.00	\$ -	
Subcontractor General Requirements	0%	of	\$ 25,000.00	\$ -	
Subtotal Five Year Review Cost				\$ 25,000	
G&A	14%	of	\$ 25,000.00	\$ 3,500	
Overhead	5%	of	\$ 25,000.00	\$ 1,250	
New Mexico Gross Receipts Tax	7.125%	of	\$ 25,000.00	\$ 1,781	
Contingency	25%	of	\$ 25,000.00	\$ 6,250	
Subtotal Five Year Review Cost				\$ 37,781	
Bonding& Insurance	0%	of	\$ 37,781.25	\$ -	
Fee	8%	of	\$ 37,781.25	\$ 3,023	
TOTAL FIVE YEAR REVIEW COST - PER REPORT				\$ 40,804	

Alternative 3 - Ground Water Extraction with Treatment

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed 3 with 3 screens for a total of 4125 ft
4. The number of new single-screen piezometers required to be installed 10 piezometers
5. The number of wells to be sampled for VOCs 84 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
6. The number of wells on-site to be abandoned for post-closure is 94 wells
7. The number of wells to be sampled for PAH is 0
8. The G&A rate is 14%
9. The overhead rate is 5%
10. The Bonding & Insurance rate is 2%
11. The fee rate is 8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Well Abandonment</i>					
Well Abandonment	94	well	\$ 1,000.00	\$ 94,000	Assume abandon 5 wells/day
Equipment Rental	4	wk	\$ 200.00	\$ 800	MultiRAE
<i>Subtotal Well Abandonment and Equipment Demobilization</i>				\$ 94,800	
Site Work Allowance	10%	of	\$ 94,800.00	\$ 9,480	
Mechanical Allowance	0%	of	\$ 94,800.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 94,800.00	\$ -	
Electrical Allowance	0%	of	\$ 94,800.00	\$ -	
Miscellaneous Equipment Allowance	0%	of	\$ 94,800.00	\$ -	
<i>Total Well Abandonment</i>				\$ 104,280	
Subtotal Post-Closure Cost				\$ 104,280	
Project Management	8%	of	\$ 104,280.00	\$ 8,342	
Technical Support	15%	of	\$ 104,280.00	\$ 15,642	
Construction Management	15%	of	\$ 104,280.00	\$ 15,642	
Subcontractor General Requirements	5%	of	\$ 104,280.00	\$ 5,214	
Subtotal Post-Closure Cost				\$ 149,120	
G&A	14%	of	\$149,120.40	\$ 20,877	
Overhead	5%	of	\$149,120.40	\$ 7,456	
New Mexico Gross Receipts Tax	7.125%	of	\$149,120.40	\$ 10,625	
Contingency	25%	of	\$149,120.40	\$ 37,280	
Subtotal Post-Closure Cost				\$ 225,358	
Bonding& Insurance	2%	of	\$225,358.20	\$ 4,507	
Fee	8%	of	\$225,358.20	\$ 18,029	
TOTAL POST CLOSURE COST				\$ 247,894	

Alternative 3 - Ground Water Extraction with Treatment

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 3 Ground Water Extraction with Treatment
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

		E	A	B	C=A+B	A*E	B*E	C*E		
		Total PV								
Elapsed Time	Year	Discount Factor at 3%	Capital Cost	O&M Cost	Total Cost	Capital Costs at 3%	Total PV O&M Costs at 3%	Total PV Costs at 3%	Balance of Interest Bearing Account at 3%	
0	2007	1.000	\$ 2,147,107		\$ 2,147,107	\$ 2,147,107	\$ -	\$ 2,147,107	\$	2,961,402
1	2008	0.971		\$ 200,757	\$ 200,757	\$ -	\$ 194,910	\$ 194,910	\$	2,843,464
2	2009	0.943		\$ 206,780	\$ 206,780	\$ -	\$ 194,910	\$ 194,910	\$	2,715,784
3	2010	0.915		\$ 212,984	\$ 212,984	\$ -	\$ 194,910	\$ 194,910	\$	2,577,885
4	2011	0.888		\$ 219,373	\$ 219,373	\$ -	\$ 194,910	\$ 194,910	\$	2,429,267
5	2012	0.863		\$ 273,257	\$ 273,257	\$ -	\$ 235,714	\$ 235,714	\$	2,220,690
6	2013	0.837		\$ 111,158	\$ 111,158	\$ -	\$ 93,093	\$ 93,093	\$	2,172,818
7	2014	0.813		\$ 114,493	\$ 114,493	\$ -	\$ 93,093	\$ 93,093	\$	2,120,076
8	2015	0.789		\$ 117,927	\$ 117,927	\$ -	\$ 93,093	\$ 93,093	\$	2,062,213
9	2016	0.766		\$ 121,465	\$ 121,465	\$ -	\$ 93,093	\$ 93,093	\$	1,998,970
10	2017	0.744		\$ 179,946	\$ 179,946	\$ -	\$ 133,897	\$ 133,897	\$	1,873,594
11	2018	0.722		\$ 128,862	\$ 128,862	\$ -	\$ 93,093	\$ 93,093	\$	1,797,074
12	2019	0.701		\$ 132,728	\$ 132,728	\$ -	\$ 93,093	\$ 93,093	\$	1,714,276
13	2020	0.681		\$ 136,710	\$ 136,710	\$ -	\$ 93,093	\$ 93,093	\$	1,624,893
14	2021	0.661		\$ 140,812	\$ 140,812	\$ -	\$ 93,093	\$ 93,093	\$	1,528,604
15	2022	0.642		\$ 208,607	\$ 208,607	\$ -	\$ 133,897	\$ 133,897	\$	1,359,597
16	2023	0.623		\$ 149,387	\$ 149,387	\$ -	\$ 93,093	\$ 93,093	\$	1,246,516
17	2024	0.605		\$ 153,869	\$ 153,869	\$ -	\$ 93,093	\$ 93,093	\$	1,125,427
18	2025	0.587		\$ 158,485	\$ 158,485	\$ -	\$ 93,093	\$ 93,093	\$	995,951
19	2026	0.570		\$ 163,239	\$ 163,239	\$ -	\$ 93,093	\$ 93,093	\$	857,693
20	2027	0.554		\$ 241,832	\$ 241,832	\$ -	\$ 133,897	\$ 133,897	\$	634,336
21	2028	0.538	\$ 461,156	\$ 173,180	\$ 634,336	\$ 247,894	\$ 93,093	\$ 340,987	\$	0
Total Alternative 3 Ground Water Extraction w			\$ 2,608,263	\$ 3,545,852	\$ 6,154,115	\$ 2,395,001	\$ 2,627,254	\$ 5,022,255		

Alternative 4 - Enhanced Ground Water Extraction with Treatment

COST ESTIMATE SUMMARY ²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 4 Enhanced Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 1,764,781
Project Management	\$ 141,182
Design	\$ 264,717
Construction Management	\$ 264,717
Subcontractor General Requirements	\$ 88,239
G&A	\$ 353,309
Overhead	\$ 126,182
Tax	\$ 179,809
Contingency	\$ 630,909
Bonding& Insurance	\$ 76,277
Fee	\$ 305,108
Total Capital Cost	\$ 4,195,230
Year 1 Operations and Maintenance	
System Startup	\$ 27,050
Routine System O&M	\$ 357,127
Reporting (Annual Report and Construction Completion Report)	\$ 73,500
Professional Services ¹	\$ 105,266
Subcontractor General Requirements	\$ 22,884
G&A	\$ 82,016
Overhead	\$ 29,291
Tax	\$ 41,740
Contingency	\$ 146,457
Bonding& Insurance	\$ -
Fee	\$ 70,826
Total Year 1 Operations and Maintenance	\$ 956,157
Annual Operations and Maintenance Cost: Years 2-5	
Routine System O&M	\$ 304,087
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 74,166
Subcontractor General Requirements	\$ 16,123
G&A	\$ 57,785
Overhead	\$ 20,638
New Mexico Gross Receipts Tax	\$ 29,409
Contingency	\$ 103,188
Bonding& Insurance	\$ -
Fee	\$ 49,902
Total Annual Operations and Maintenance Cost: Years 2-5	\$ 673,672
Annual Operations and Maintenance Cost: Years 6-14	
Routine System O&M	\$ 287,711
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 74,166
Subcontractor General Requirements	\$ 16,123
G&A	\$ 55,493
Overhead	\$ 19,819
New Mexico Gross Receipts Tax	\$ 28,242
Contingency	\$ 99,094
Bonding& Insurance	\$ -
Fee	\$ 47,922
Total Annual Operations and Maintenance Cost: Years 6-14	\$ 646,944
Post Closure Cost	
Closure Reporting	\$ 18,375
Equipment Demobilization and Well Abandonment	\$ 184,000
Professional Services ¹	\$ 66,784
Subcontractor General Requirements	\$ 10,119
G&A	\$ 39,099
Overhead	\$ 13,964
New Mexico Gross Receipts Tax	\$ 19,899
Contingency	\$ 69,819
Bonding& Insurance	\$ 8,441
Fee	\$ 33,765
Total Post Closure Cost	\$ 464,264
TOTAL PRESENT WORTH	\$ 14,132,838

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are in 2006 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 4 - Enhanced Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 4 Enhanced Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Site Background Data

Elevation of Site = 4100 ft amsl or 12.68 psia
 Volume of Contaminated Ground Water greater than 5 ug/L = 7,350 acre-ft based on JSAI model
 Volume of Contaminated Ground Water greater than 1 ug/L = 25,700 acre-ft based on JSAI model

PCE Concentrations in wells sampled December 2005.

Sample Location	PCE (ug/L)
MW-SF1	11
MW-SF10	17
GWMW01 Port 2	21
GWMW01 Port 6	6
	14 µg/L, average concentration

Pumping Rates for Plume Containment and Remediation: 14 Years (per JSAI modeling)

CLC-18	460 gpm
CLC-27	620 gpm

New Well #1 to replace operation of CLC-18 after 5 years per JSAI modeling 300 gpm

Total Annual: Years 1-5	568 MMgal
Total Annual: Years 6-14	484 MMgal

Mass Estimate

Mass of PCE above MCL in ground water = 150 kg of PCE based on JSAI model - JSAI estimate based on an effective porosity of 20% and does not address potential PCE mass in additional pore space

Conceptual Design

Pumping System Design Parameters

Estimated Number of Pumping Wells =	3 wells
Estimated pumping rate from CLC-18 =	460 gpm (based on JSAI modeling results)
Estimated pumping rate from CLC-27 =	620 gpm (based on JSAI modeling results)

Estimated pumping rate from New Well = 300 gpm (to replace operation of CLC-18 after 5 years)

Total Pumping Rate in Years 1-5 = 1,080 gpm (assumes CLC-18 and 27 only)
 Total Pumping Rate in Years 6-14 = 920 gpm (assumes CLC-27 and new well only)
 Depth of new pumping well = 450 ft bgs

System Construction Time

Estimated drilling rate = 125 lf/day based on invoice
 Total linear footage drilling = 900 lf
 Estimated duration of drilling = 7.2 days or 8 days (rounded up)
 Estimated linear footage of field piping per pumping well = 1500 ft per well average of piping required for all wells
 Total linear footage of connection piping = 500 lf assumed 500 lf to stub up to treatment system and reconnect to existing CLC-27 line to UGR connection of CLC-18 to CLC -27 connection to Upper Griggs Reservoir; CLC estimated 1000 lf new piping needed in addition to the approximate length of 500 lf of existing piping.
 Total linear footage of effluent field piping = 1,000 lf
 Total linear footage of effluent field piping = 750 lf estimated connection of new well to CLC -27 connection to Upper Griggs Reservoir
 Estimated field piping placing rate = 75 lf/day
 Estimated duration of field piping = 30.0 days or 30 days (rounded up)
 Total construction timeframe = 38 days

Alternative 4 - Enhanced Ground Water Extraction with Treatment

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 4 Enhanced Ground Water Extraction with Treatment
 DESCRIPTION: Ground Water Extraction and Treatment with Air Stripper
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Air Stripper Design Parameters

Stripper design flowrate 1080 gpm
 Unit flow rate 540 gpm (NEEP Model 41251 Tray Air stripper) 2 units in series needed for treatment
 Governing contaminant PCE at 14 µg/L
 Governing contaminant is based on consideration of a combination of low Henry's Constant and highest concentration versus MCL.
 Influent temperature 50 °F

Unit Size: 12.5 ft x 7.3 ft NEEP Model 41251 Tray Air stripper

The Henry's Law Constant for PCE (25°C) = 176.5 atm
 Converting the Henry's Constant for an actual temperature of 10 °C and using STRIPR Model data (CH2M HILL, 1991)
 Actual Henry's Constant is 224 atm which is greater than the 10 atm threshold for effective air stripping.

Assume 100% of PCE is stripped and discharged untreated to the atmosphere. PCE is the controlling contaminant for air stripper design.
 Vendor modeling indicates the Tray Air stripper uses a blower airflow rate of 2,400 scfm
 PCE emissions 0.007 lbs/hr or 0.18 lbs/day or 65.2 lbs/yr
 Average PCE emissions concentration is 0.8 mg/m³ or 0.2 ppmv

PCE is a hazardous air pollutant and therefore is a regulated air pollutant

The NIOSH PEL (10-hr TWA) for PCE is 25 ppmv or 136.5 mg/m³ or at 68°F and 1 atm
 THEREFORE, NO OFFGAS EMISSIONS CONTROL WILL BE REQUIRED SINCE MASS EMISSIONS IS VERY LOW AND
 THE CONCENTRATION IS TWO ORDERS OF MAGNITUDE LOWER THAN THE NIOSH STANDARD WITHOUT CONSIDERING ATMOSPHERIC DISPERSION.

Pretreatment Design Parameters - Langlier Index and Ryznar Stability Index for CaCO₃ Scaling Potential

		1 (influent water)	2 (estimate of parameters within the stripper)
Flow	gpm	1080	1080
Temperature	Deg . F	60	77
Alkalinity, Total	mg/l CaCO ₃	211	211
pH	Std. Units	7.39	8.00
TDS	mg/l	919	919
Calcium	mg/l CaCO ₃	305	305
Magnesium	mg/l CaCO ₃	124	123.6
Sulfate	mg/l SO ₄ ²⁻	243	243
Chloride	mg/l Cl ⁻	165	165
LSI		0.170	0.936
RSI		7.05	6.13

LSI greater than 1 indicates potential for scaling
 RSI less than 6 indicates potential for scaling

The LSI is close to the level indicating potential for scaling
 The RSI, which is more commonly used, is close to the level that indicates that there is a potential for scaling once the stripping process begins.
 Slight changes in parameters affect the results of these calculations.

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Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE SUMMARY²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 5 In-Well Stripping in Higher Concentration Areas of the Ground
 Water Plume
 ALTERNATIVE: Treatment using In-Well Stripping System
 DESCRIPTION: L.Colella, T.Palaia
 PREPARED BY: 346535.FS.01
 PROJECT NUMBER:

Capital Cost	
Construction	\$ 6,838,598
Project Management	\$ 547,088
Design	\$ 1,025,790
Construction Management	\$ 1,025,790
Subcontractor General Requirements	\$ 341,930
G&A	\$ 1,369,087
Overhead	\$ 488,960
Tax	\$ 696,768
Contingency	\$ 2,444,799
Bonding& Insurance	\$ 295,576
Fee	\$ 1,182,305
Total Capital Cost	\$ 16,256,690
Year 1 Operations and Maintenance	
System Startup	\$ 67,800
Routine System O&M	\$ 268,603
Reporting (Annual Report and Construction Completion Report)	\$ 73,500
Professional Services ¹	\$ 94,278
Subcontractor General Requirements	\$ 20,495
G&A	\$ 73,455
Overhead	\$ 26,234
Tax	\$ 37,383
Contingency	\$ 131,169
Bonding& Insurance	\$ -
Fee	\$ 63,433
Total Year 1 Operations and Maintenance	\$ 856,350
Annual Operations and Maintenance Cost: Years 2-20	
Routine System O&M	\$ 213,463
Reporting (Annual Reports)	\$ 18,375
Professional Services ¹	\$ 53,323
Subcontractor General Requirements	\$ 11,592
G&A	\$ 41,545
Overhead	\$ 14,838
New Mexico Gross Receipts Tax	\$ 21,144
Contingency	\$ 74,188
Bonding& Insurance	\$ -
Fee	\$ 35,877
Total Annual Operations and Maintenance Cost: Years 2-20	\$ 484,345
Post Closure Cost	
Well Abandonment and Equipment Demobilization	\$ 322,000
Closure Reporting	\$ 18,375
Well Abandonment and Equipment Demobilization	\$ -
Professional Services ¹	\$ 112,324
Subcontractor General Requirements	\$ 17,019
G&A	\$ 65,760
Overhead	\$ 23,486
New Mexico Gross Receipts Tax	\$ 33,467
Contingency	\$ 117,429
Bonding& Insurance	\$ 14,197
Fee	\$ 56,789
Total Post Closure Cost	\$ 780,847
TOTAL PRESENT WORTH	\$ 27,096,438

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.
 2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are in 2006 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Site Background Data

Elevation of Site = 4100 ft amsl or 12.68 psia
 Volume of Contaminated Ground Water greater than 5 ug/L = 7,350 acre-ft based on JSAI model
 Volume of Contaminated Ground Water greater than 1 ug/L = 25,700 acre-ft based on JSAI model

PCE Concentrations in wells sampled December 2005.

Sample Location	PCE (ug/L)
MW-SF1	11
MW-SF10	17
GWMW01 Port 2	21
GWMW01 Port 6	6
	14 ug/L, average concentration

Pumping Rates for Plume Containment and Remediation

New Extraction Well 300 gpm
 Total Annual Pumping: 158 MMgal
 Depth of new pumping well = 450 ft bgs

Mass Estimate

Mass of PCE above MCL in ground water = 150 kg of PCE based on JSAI model - JSAI estimate based on an effective porosity of 20% and does not address potential PCE mass in additional pore space

Conceptual Design

DDC System Design Parameters

Radius of Influence for Air Stripper:	150 ft
Area each well will cover:	70650 sf
Number of wells required for treatment of plume in upper zone:	4 wells
Number of wells required for treatment of plume in intermediate zone:	8 wells
Number of blower systems required:	8
Linear footage of field piping between wells:	0 lf
Average linear footage of field piping between extraction wells:	0 ft
Total linear footage of connection piping =	500 lf
Total linear footage of effluent field piping required:	750
Depth of upper zone DDC wells:	400 ft
Depth of intermediate zone DDC wells:	500 ft

assumes 1 blower for each int/deep pair (and int/deep wells are co-located)
 assumes 1 blower for each int/deep pair (and int/deep wells are co-located)

assumes 1 blower for each int/deep pair (and int/deep wells are co-located)
 assumed 500 lf to stub up to treatment system and reconnect to existing CLC-27 line to UGR
 estimated connection of new well to CLC -27 connection to Upper Griggs Reservoir

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

System Construction Time

Estimated drilling rate = 125 lf/day based on invoice
 Total linear footage drilling = 6,050 lf
 Estimated duration of drilling = 48.4 days or 49 days (rounded up)
 Estimated field piping placing rate = 75 lf/day
 Estimated duration of field piping = 16.7 days or 17 days (rounded up)
 Total construction timeframe = 66 days

Pretreatment Design Parameters - Langlier Index and Ryznar Stability Index for CaCO₃ Scaling Potential

		1 (influent water)	2 (estimate of parameters within the stripper)
Flow	gpm	300	300
Temperature	Deg. F	60	77
Alkalinity, Total	mg/l CaCO ₃	211	211
pH	Std. Units	7.39	8.00
TDS	mg/l	919	919
Calcium	mg/l CaCO ₃	305	305
Magnesium	mg/l CaCO ₃	124	123.6
Sulfate	mg/l SO ₄ ²⁻	243	243
Chloride	mg/l Cl ⁻	165	165
LSI		0.170	0.936
RSI		7.05	6.13

LSI greater than 1 indicates potential for scaling
 RSI less than 6 indicates potential for scaling

The LSI is close to the level indicating potential for scaling
 The RSI, which is more commonly used, is close to the level that indicates that there is a potential for scaling once the stripping process begins.
 Slight changes in parameters affect the results of these calculations.

Granular Activated Carbon (GAC) Conceptual Design Parameters

All organic contaminants found are adsorbable with GAC.

GAC treatment system design flowrate is 300 lf
 Governing contaminant PCE at 14 µg/L

GAC usage rate for PCE only 0.27 lbs GAC/hr or 6.6 lbs GAC/day or 2,400 lbs GAC/yr based on GAC vendor modeling
 Assuming a multiplier of 1.00 for additional organic contaminants that will also adsorb and use carbon (vendor modeling includes other contaminants)
 The total GAC usage rate = 0.3 lbs GAC/hr or 6.6 lbs GAC/day or 2,400 lbs GAC/yr
 Assuming a carbon cost of \$1.75 per lb GAC for supply and changeout --> \$4,200 for GAC changeout per year per vendor quote

Required changeout period of 0.2 times per year based on GAC vendor modeling
 Assume a carbon vessel size of 10,000 lb and we need 1 vessel
 350 gpm

GAC Unit: QED Model CWS10000, rated for up to 350 gpm

Assuming a 10,000 lb vessel costs \$18,000 with GAC, total cost = \$18,000 for vessels and GAC only per vendor quote
 In addition, there would be an annual recurring cost of \$4,200 for GAC changeout per year

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed =

0	wells
---	-------

 included under ground water monitoring
4. Number of new shallow DDC wells to be installed =

4	wells
---	-------
5. Number of new intermediate DDC wells to be installed=

8	wells
---	-------
6. Number of new extraction wells to be installed=

1	wells
---	-------
7. Assume that the duration of construction is

126	working days (includes 60 working days for treatment system construction and installation)
-----	--
8. The number of wells to be sampled for VOCs is

0	wells per round
---	-----------------

 included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is

13	wells
----	-------

 new DDC wells only
10. The G&A rate is

14%

11. The overhead rate is

5%

12. The Bonding & Insurance rate is

2%

13. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST				
Item/Activity	Qty Unit	Unit Cost	Cost	Comments and References
<u>Construction</u>				
Ground Water Extraction Well Installation	1 well	\$ 200,000.00	\$ 200,000	JSP Memo 7/8/06
Underground Piping from new extraction well to CLC-27 connection to Upper Griggs Reservoir	750 ft	\$ 100.17	\$ 75,128	10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Connection to Treatment System	500 lf	\$ 100.17	\$ 50,085	10-inch pipe, trenching, backfill, compacting, asphalt repaving (RS Means)
Well Installation (shallow stripping)	4 well	\$ 258,818.00	\$ 1,035,272	1 8-inch PVC installed to a depth of 400 feet based on recent invoice for MW installation
Well Installation (intermediate stripping)	8 well	\$ 284,699.80	\$ 2,277,598	1 8-inch PVC installed to a depth of 500 feet based on recent invoice for MW installation (plus 10% for add'l depth)
Trenching, Backfill, and Compaction	500 lf	\$ 5.00	\$ 2,500	RS Means
Catalytic Oxidizer	0 ea	\$ 100,000.00	\$ -	Assumed no offgas treatment is required
DDC Treatment System	8 LS	\$ 90,000.00	\$ 720,000	Based on vendor quote of \$270,000 for a three well system (\$270,000/3 = \$90,000)
Repair discharge line on CLC-27	1 LS	\$ 300.00	\$ 300	
Protective Enclosures for Blowers	8 LS	\$ 1,250.00	\$ 10,000	Assume 5'x5' dog house per blower at \$50/sf, assumes 1 blower per int/deep well pair
Ground Water Extraction Pumps	1 ea	\$ 10,000.00	\$ 10,000	vendor quote; 100gpm, 15 hp, 3-phase, 230V, 6 inch
Influent Equalization Tank	18,000 gal	\$ 1.00	\$ 18,000	provides 60-minutes of storage
Tank Effluent Pump	1 ea	\$ 2,900.00	\$ 2,900	Assumes 10 hp unit - (prorate from 540 GPM vendor quote)
Influent/Effluent Bag Filter	1 LS	\$ 3,500.00	\$ 3,500	300 gpm size filter
GAC Treatment system	1 vessel	\$ 18,000.00	\$ 18,000	QED Model CWS10000, rated for up to 350 gpm
Protective Enclosure	1 ea	\$ 100,000.00	\$ 100,000	Assume 20'x25' building at \$200/sf, includes overhead crane, pre-fab metal
Well permits	13 ea	\$ 30.00	\$ 390	Treatment wells and new extraction well
Equipment Rental	26 wk	\$ 200.00	\$ 5,200	MultiRAE
Subtotal Capital Cost			\$ 4,528,873	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed =

0	wells
---	-------

included under ground water monitoring
4. Number of new shallow DDC wells to be installed =

4	wells
---	-------
5. Number of new intermediate DDC wells to be installed=

8	wells
---	-------
6. Number of new extraction wells to be installed=

1	wells
---	-------
7. Assume that the duration of construction is

126	working days (includes 60 working days for treatment system construction and installation)
-----	--
8. The number of wells to be sampled for VOCs is

0	wells per round
---	-----------------

included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is

13	wells
----	-------

new DDC wells only
10. The G&A rate is

14%

11. The overhead rate is

5%

12. The Bonding & Insurance rate is

2%

13. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

Site Work Allowance	7%	of	\$ 4,528,872.90	\$ 317,021	
Mechanical Allowance	15%	of	\$ 4,528,872.90	\$ 679,331	
Instrumentation and Controls Allowance	12%	of	\$ 4,528,872.90	\$ 543,465	including SCADA system
Electrical Allowance	12%	of	\$ 4,528,872.90	\$ 543,465	
Miscellaneous Equipment Allowance	5%	of	\$ 4,528,872.90	\$ 226,444	
Subtotal Capital Cost				\$ 6,838,598	
Project Management	8%	of	\$ 6,838,598.08	\$ 547,088	
Design	15%	of	\$ 6,838,598.08	\$ 1,025,790	
Construction Management	15%	of	\$ 6,838,598.08	\$ 1,025,790	
Subcontractor General Requirements	5%	of	\$ 6,838,598.08	\$ 341,930	
Subtotal Capital Cost				\$ 9,779,195	
G&A	14%	of	\$ 9,779,195.25	\$ 1,369,087	
Overhead	5%	of	\$ 9,779,195.25	\$ 488,960	
New Mexico Gross Receipts Tax	7.125%	of	\$ 9,779,195.25	\$ 696,768	
Contingency	25%	of	\$ 9,779,195.25	\$ 2,444,799	
Subtotal Capital Cost				\$ 14,778,809	
Bonding& Insurance	2%	of	\$ 14,778,808.83	\$ 295,576	
Fee	8%	of	\$ 14,778,808.83	\$ 1,182,305	
TOTAL CAPITAL COST				\$ 16,256,690	

YEAR 1 OPERATIONS AND MAINTENANCE

Item/Activity	Qty Unit	Unit Cost	Cost	Comments
System Startup				
Labor - Technician	300 hr	\$ 75.00	\$ 22,500	Assume 30 days for startup, 10 hrs/day
Labor - Engineer	300 hr	\$ 120.00	\$ 36,000	Assume 30 days for startup, 10 hrs/day
Air Sample Analysis	32 sample	\$ 150.00	\$ 4,800	Collect 2 air samples (+ QA/QC) for verification of compliance with air standards daily 1 week, weekly 1 month, monthly thereafter, VOC analysis for infl/effl, incl data valid.
Water Sample Analysis	22 sample	\$ 150.00	\$ 3,300	
Startup Equipment Rental	6 week	\$ 200.00	\$ 1,200	
Total System Startup			\$ 67,800	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed =

0	wells
---	-------

included under ground water monitoring
4. Number of new shallow DDC wells to be installed =

4	wells
---	-------
5. Number of new intermediate DDC wells to be installed=

8	wells
---	-------
6. Number of new extraction wells to be installed=

1	wells
---	-------
7. Assume that the duration of construction is

126	working days (includes 60 working days for treatment system construction and installation)
-----	--
8. The number of wells to be sampled for VOCs is

0	wells per round
---	-----------------

included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is

13	wells
----	-------

new DDC wells only
10. The G&A rate is

14%

11. The overhead rate is

5%

12. The Bonding & Insurance rate is

2%

13. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

Routine System O&M

Electricity and general O&M costs for stripping wells	12 month	\$	10,666.67	\$	128,000	Based on estimate from vendor of \$4000/month to operate a 3 well system. (\$4000/3*8=\$10,667)
Labor - Technician	416 hr	\$	75.00	\$	31,200	8 hours/week
Labor - Engineer	416 hr	\$	120.00	\$	49,920	100% of the Tech time for first year
Water Sample Analysis	29 sample	\$	150.00	\$	4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Air Sample Analysis	0 sample	\$	-	\$	-	none needed after startup sampling
O&M Supplies	1 LS	\$	15,000.00	\$	15,000	
Electricity	65,350 kw-hr	\$	0.08	\$	5,228	Assumes continuous operation of the tank effluent pumps
GAC Replacement	1 LS	\$	4,200.00	\$	4,200	
Annual Extraction Well and Distribution Operating Cost	158 MMGal	\$	194.73	\$	30,705	Assumed the same as a City well: '98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$	268,603	

Reporting (Annual Report and Construction Completion Report)

Labor - Engineer/Hydrogeologist	400 hr	\$	120.00	\$	48,000
Labor - Editor	200 hr	\$	85.00	\$	17,000
Labor - CAD Technician	100 hr	\$	85.00	\$	8,500
Total Reporting				\$	73,500
Subtotal Year 1 Operations and Maintenance				\$	409,903

Project Management	8%	of	\$	409,903.00	\$	32,792
Technical Support	15%	of	\$	409,903.00	\$	61,485
Construction Management	0%	of	\$	409,903.00	\$	-
Subcontractor General Requirements	5%	of	\$	409,903.00	\$	20,495
Subtotal Year 1 Operations and Maintenance					\$	524,676

G&A	14%	of	\$	524,675.84	\$	73,455
Overhead	5%	of	\$	524,675.84	\$	26,234
New Mexico Gross Receipts Tax	7.125%	of	\$	524,675.84	\$	37,383
Contingency	25%	of	\$	524,675.84	\$	131,169
Subtotal Capital Cost					\$	792,916

Bonding& Insurance	0%	of	\$	792,916.36	\$	-	Bonding only applies to Capital Costs
Fee	8%	of	\$	792,916.36	\$	63,433	

TOTAL YEAR 1 OPERATIONS AND MAINTENANCE COST **\$ 856,350**

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palala
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed =

0	wells
---	-------

included under ground water monitoring
4. Number of new shallow DDC wells to be installed =

4	wells
---	-------
5. Number of new intermediate DDC wells to be installed=

8	wells
---	-------
6. Number of new extraction wells to be installed=

1	wells
---	-------
7. Assume that the duration of construction is

126	working days (includes 60 working days for treatment system construction and installation)
-----	--
8. The number of wells to be sampled for VOCs is

0	wells per round
---	-----------------

included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is

13	wells
----	-------

new DDC wells only
10. The G&A rate is

14%

11. The overhead rate is

5%

12. The Bonding & Insurance rate is

2%

13. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 2-20 (ANNUAL COST)

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
Routine System O&M					
Electricity and general O&M costs for stripping wells	12	month	\$ 10,666.67	\$ 128,000	Based on estimate from vendor of \$4000/month to operate a 3 well system. (\$4000*113/3=\$150,667)
Labor - Technician	208	hr	\$ 75.00	\$ 15,600	4 hours/week
Labor - Engineer	104	hr	\$ 120.00	\$ 12,480	50% of the Tech time
Water Sample Analysis	29	sample	\$ 150.00	\$ 4,350	monthly infl/effl sampling for permit, plus 20% extra for QA/QC
Air Sample Analysis	0	sample	\$ -	\$ -	assume de minimus proven in Year 1
O&M Supplies	1	LS	\$ 15,000.00	\$ 15,000	
GAC Replacement	1	LS	\$ 2,100.00	\$ 2,100	assumes GAC usage rate drops 50% from initial rate
Electricity	65,350	kw-hr	\$ 0.08	\$ 5,228	Assumes continuous operation of the tank effluent pumps
Annual Extraction Well and Distribution Operating Cost	158	MMGal	\$ 194.73	\$ 30,705	Assumed the same as a City well: '98-99 avg costs provided by City, 3% inflation factor added per year for 2006 values (used avg. for CLC 19, 21, 27)
Total Routine System O&M				\$ 213,463	
Reporting (Annual Reports)					
Labor - Engineer/Hydrogeologist	100	hr	\$ 120.00	\$ 12,000	
Labor - Editor	50	hr	\$ 85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$ 85.00	\$ 2,125	
Total Reporting				\$ 18,375	
Subtotal Year 2-20 Operations and Maintenance				\$ 231,838	
Project Management	8%	of	\$ 231,838.00	\$ 18,547	
Technical Support	15%	of	\$ 231,838.00	\$ 34,776	
Construction Management	0%	of	\$ 231,838.00	\$ -	
Subcontractor General Requirements	5%	of	\$ 231,838.00	\$ 11,592	
Subtotal Year 2-20 Operations and Maintenance				\$ 296,753	
G&A	14%	of	\$ 296,752.64	\$ 41,545	
Overhead	5%	of	\$ 296,752.64	\$ 14,838	
New Mexico Gross Receipts Tax	7.125%	of	\$ 296,752.64	\$ 21,144	
Contingency	25%	of	\$ 296,752.64	\$ 74,188	
Subtotal Year 2-20 Operations and Maintenance				\$ 448,467	
Bonding& Insurance	0%	of	\$ 448,467.43	\$ -	- Bonding only applies to Capital Costs
Fee	8%	of	\$ 448,467.43	\$ 35,877	
TOTAL ANNUAL COST: YEARS 2-20 OPERATIONS AND MAINTENANCE COS				\$ 484,345	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested monitor wells required to be installed =

0

 wells included under ground water monitoring
4. Number of new shallow DDC wells to be installed =

4

 wells
5. Number of new intermediate DDC wells to be installed=

8

 wells
6. Number of new extraction wells to be installed=

1

 wells
7. Assume that the duration of construction is

126

 working days (includes 60 working days for treatment system construction and installation)
8. The number of wells to be sampled for VOCs is

0

 wells per round included under ground water monitoring
9. The number of wells on-site to be abandoned for post-closure is

13

 wells new DDC wells only
10. The G&A rate is

14%

11. The overhead rate is

5%

12. The Bonding & Insurance rate is

2%

13. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

POST CLOSURE COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
Well Abandonment and Equipment Demobilization					
Well Abandonment	13	wells	\$ 10,000.00	\$ 130,000	Assume abandon 10 wells/day
Equipment Demobilization	1	LS	\$ 150,000.00	\$ 150,000	
Subtotal Well Abandonment and Equipment Demobilization				\$ 280,000	
Site Work Allowance	10%	of	\$280,000.00	\$ 28,000	
Mechanical Allowance	0%	of	\$280,000.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$280,000.00	\$ -	
Electrical Allowance	5%	of	\$280,000.00	\$ 14,000	
Miscellaneous Equipment Allowance	0%	of	\$280,000.00	\$ -	
Total Well Abandonment				\$ 322,000	
Closure Reporting					
Labor - Engineer/Hydrogeologist	100	hr	\$120.00	\$ 12,000	
Labor - Editor	50	hr	\$85.00	\$ 4,250	
Labor - CAD Technician	25	hr	\$85.00	\$ 2,125	
Total Closure Reporting				\$ 18,375	
Subtotal Post-Closure Cost				\$ 340,375	
Project Management	8%	of	\$ 340,375.00	\$ 27,230	
Technical Support	15%	of	\$ 340,375.00	\$ 51,056	
Construction Management	10%	of	\$ 340,375.00	\$ 34,038	
Subcontractor General Requirements	5%	of	\$ 340,375.00	\$ 17,019	
Subtotal Post-Closure Cost				\$ 469,718	
G&A	14%	of	\$ 469,717.50	\$ 65,760	
Overhead	5%	of	\$ 469,717.50	\$ 23,486	
New Mexico Gross Receipts Tax	7.125%	of	\$ 469,717.50	\$ 33,467	
Contingency	25%	of	\$ 469,717.50	\$ 117,429	
Subtotal Capital Cost				\$ 709,861	
Bonding& Insurance	2%	of	\$ 709,860.57	\$ 14,197	
Fee	8%	of	\$ 709,860.57	\$ 56,789	
TOTAL POST CLOSURE COST				\$ 780,847	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Treatment using In-Well Stripping System
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

		E	A	B	C=A+B	A*E	B*E	C*E		
		Total PV								
Elapsed Time	Year	Discount Factor at 3%	Capital Cost	O&M Cost	Total Cost	Capital Costs at 3%	Total PV O&M Costs at 3%	Total PV Costs at 3%	Balance of Interest Bearing Account at 3%	
0	2007	1.000	\$ 16,256,690		\$ 16,256,690	\$ 16,256,690	\$ -	\$ 16,256,690	\$	11,164,940
1	2008	0.971		\$ 882,040	\$ 882,040	\$ -	\$ 856,350	\$ 856,350	\$	10,591,387
2	2009	0.943		\$ 513,841	\$ 513,841	\$ -	\$ 484,345	\$ 484,345	\$	10,379,872
3	2010	0.915		\$ 529,257	\$ 529,257	\$ -	\$ 484,345	\$ 484,345	\$	10,146,134
4	2011	0.888		\$ 545,134	\$ 545,134	\$ -	\$ 484,345	\$ 484,345	\$	9,889,030
5	2012	0.863		\$ 561,488	\$ 561,488	\$ -	\$ 484,345	\$ 484,345	\$	9,607,367
6	2013	0.837		\$ 578,333	\$ 578,333	\$ -	\$ 484,345	\$ 484,345	\$	9,299,905
7	2014	0.813		\$ 595,683	\$ 595,683	\$ -	\$ 484,345	\$ 484,345	\$	8,965,349
8	2015	0.789		\$ 613,554	\$ 613,554	\$ -	\$ 484,345	\$ 484,345	\$	8,602,349
9	2016	0.766		\$ 631,960	\$ 631,960	\$ -	\$ 484,345	\$ 484,345	\$	8,209,501
10	2017	0.744		\$ 650,919	\$ 650,919	\$ -	\$ 484,345	\$ 484,345	\$	7,785,339
11	2018	0.722		\$ 670,447	\$ 670,447	\$ -	\$ 484,345	\$ 484,345	\$	7,328,340
12	2019	0.701		\$ 690,560	\$ 690,560	\$ -	\$ 484,345	\$ 484,345	\$	6,836,913
13	2020	0.681		\$ 711,277	\$ 711,277	\$ -	\$ 484,345	\$ 484,345	\$	6,309,406
14	2021	0.661		\$ 732,615	\$ 732,615	\$ -	\$ 484,345	\$ 484,345	\$	5,744,094
15	2022	0.642		\$ 754,593	\$ 754,593	\$ -	\$ 484,345	\$ 484,345	\$	5,139,186
16	2023	0.623		\$ 777,231	\$ 777,231	\$ -	\$ 484,345	\$ 484,345	\$	4,492,813
17	2024	0.605		\$ 800,548	\$ 800,548	\$ -	\$ 484,345	\$ 484,345	\$	3,803,033
18	2025	0.587		\$ 824,565	\$ 824,565	\$ -	\$ 484,345	\$ 484,345	\$	3,067,822
19	2026	0.570		\$ 849,302	\$ 849,302	\$ -	\$ 484,345	\$ 484,345	\$	2,285,076
20	2027	0.554	\$ 1,410,296	\$ 874,781	\$ 2,285,076	\$ 780,847	\$ 484,345	\$ 1,265,191	\$	(0)
Total Alternative 5 In-Well Stripping in Higher			\$ 17,666,986	\$ 13,788,127	\$ 31,455,113	\$ 17,037,536	\$ 10,058,901	\$ 27,096,438		

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Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE SUMMARY ²

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Capital Cost	
Construction	\$ 1,002,005
Project Management	\$ 80,160
Design	\$ 50,100
Construction Management	\$ 100,201
Subcontractor General Requirements	\$ 50,100
G&A	\$ 179,559
Overhead	\$ 64,128
New Mexico Gross Receipts Tax	\$ 91,383
Contingency	\$ 320,642
Bonding& Insurance	\$ 38,766
Fee	\$ 155,062
Administrative/Legal Fees for IC	\$ 15,000
Total Capital Cost	\$ 2,147,107
Annual Operations and Maintenance Cost: Years 1-5	
Monthly Water Level Measurements (Piezometers)	\$ 13,750
Annual Ground Water Sampling (Monitor Wells)	\$ 77,850
Professional Services ¹	\$ 21,068
Subcontractor General Requirements	\$ 4,580
G&A	\$ 16,415
Overhead	\$ 5,862
New Mexico Gross Receipts Tax	\$ 8,354
Contingency	\$ 29,312
Bonding& Insurance	\$ 3,544
Fee	\$ 14,175
Total Annual Operations and Maintenance Cost: Years 1-5	\$ 194,910
Annual Operations and Maintenance Cost: Years 6-20	
Once Every Two Years Ground Water Sampling	\$ 43,750
Professional Services ¹	\$ 10,063
Subcontractor General Requirements	\$ 2,188
G&A	\$ 7,840
Overhead	\$ 2,800
New Mexico Gross Receipts Tax	\$ 3,990
Contingency	\$ 14,000
Bonding& Insurance	\$ 1,693
Fee	\$ 6,770
Total Annual Operations and Maintenance Cost: Years 6-20	\$ 93,093
Five Year Review Cost Per Report	
5-year Review Report	\$ 25,000
Professional Services ¹	\$ -
Subcontractor General Requirements	\$ -
G&A	\$ 3,500
Overhead	\$ 1,250
New Mexico Gross Receipts Tax	\$ 1,781
Contingency	\$ 6,250
Bonding& Insurance	\$ -
Fee	\$ 3,023
Total Five Year Review Cost Per Report	\$ 40,804
Post Closure Cost	
Well Abandonment and Equipment Demobilization	\$ 104,280
Professional Services ¹	\$ 39,626
Subcontractor General Requirements	\$ 5,214
G&A	\$ 20,877
Overhead	\$ 7,456
New Mexico Gross Receipts Tax	\$ 10,625
Contingency	\$ 37,280
Bonding& Insurance	\$ 4,507
Fee	\$ 18,029
Total Post Closure Cost	\$ 247,894
TOTAL PRESENT WORTH	\$ 4,786,541

NOTES:

1 - Professional Services includes Project Management, Design/Technical Support, and Construction Management.

2 - The cost estimates provided are to an accuracy of +50 percent to -30 percent and are prepared for the sole purpose of alternative comparison. The alternative cost estimates are based on conceptual design from information available at the time of this study. The actual cost of the project would depend on the final scope and design of the selected remedial action, the schedule of implementation, competitive market conditions, and other variables.

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

SITE DATA AND ALTERNATIVE CONCEPTUAL DESIGN

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
DESCRIPTION: Institutional Controls and Monitoring
PREPARED BY: L.Colella, T.Palaia
PROJECT NUMBER: 346535.FS.01

**NO DESIGN ACTIVITY FOR INSTITUTIONAL CONTROLS AND MONITORING PORTION OF THIS ALTERNATIVE
REFER TO COST DETAILS SHEET COST BASIS.**

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

10

 piezometers
5. The number of wells to be sampled for NAIPs is

0

 wells
6. The number of wells to be sampled for VOCs only is

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
7. The number of wells on-site to be abandoned for post-closure is

94

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST

Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
Construction					
Nested Ground Water Monitor Well Installation	3	well	\$ 129,409.00	\$ 388,227	per recent MW installation invoice
Piezometer Installation	10	well	\$ 56,469.38	\$ 564,694	Assume 600' deep, with same per-foot cost as nest MWs.
Fencing (Institutional Control)	0	ft	\$ 10.00	\$ -	No treatment unit to protect
Well Permits	19	ea	\$ 30.00	\$ 570	For 3 screen nested wells
Equipment Rental	4	wk	\$ 200.00	\$ 800	MultiRAE
Subtotal Capital Cost				\$ 954,291	
Site Work Allowance	5%	of	\$ 954,290.82	\$ 47,715	
Mechanical Allowance	0%	of	\$ 954,290.82	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 954,290.82	\$ -	
Electrical Allowance	0%	of	\$ 954,290.82	\$ -	
Miscellaneous Equipment Allowance	0%	of	\$ 954,290.82	\$ -	
Subtotal Capital Cost				\$ 1,002,005	
Project Management	8%	of	\$ 1,002,005.36	\$ 80,160	
Design	5%	of	\$ 1,002,005.36	\$ 50,100	
Construction Management	10%	of	\$ 1,002,005.36	\$ 100,201	
Subcontractor General Requirements	5%	of	\$ 1,002,005.36	\$ 50,100	
Subtotal Capital Cost				\$ 1,282,567	
G&A	14%	of	\$ 1,282,566.86	\$ 179,559	
Overhead	5%	of	\$ 1,282,566.86	\$ 64,128	
New Mexico Gross Receipts Tax	7.125%	of	\$ 1,282,566.86	\$ 91,383	
Contingency	25%	of	\$ 1,282,566.86	\$ 320,642	
Subtotal Capital Cost				\$ 1,938,279	
Bonding & Insurance	2%	of	\$ 1,938,279.17	\$ 38,766	
Fee	8%	of	\$ 1,938,279.17	\$ 155,062	
Administrative/Legal Fees for IC	1	LS	\$ 15,000.00	\$ 15,000	
TOTAL CAPITAL COST				\$ 2,147,107	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

10

 piezometers
5. The number of wells to be sampled for NAIPs is

0

 wells
6. The number of wells to be sampled for VOCs only is

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
7. The number of wells on-site to be abandoned for post-closure is

94

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 1-5 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Monthly Water Level Measurements (Piezometers)</i>					
Labor - Technician	180	hr	\$ 75.00	\$ 13,500	30 piezometers/MWs per event, 2 people, 4 piezometers/MWs per hour
Water Level Measurement Equipment Rental	1	LS	\$ 250.00	\$ 250	
Total Water Level Measurement				\$ 13,750	
<i>Annual Ground Water Sampling (Monitor Wells)</i>					
Subcontractor costs for multiport wells	1	LS	\$ 15,200.00	\$ 15,200	5 multiport wells: based on Dec 2005 invoice (4 days including move/demove, materials, equipment, labor, per diem)
Labor - Technician	632	hr	\$ 75.00	\$ 47,400	4 hrs/well, 2 people, not including 5 multiport wells
Ground Water Sample Analysis - VOC only	97	sample	\$ 150.00	\$ 14,550	Includes all wells plus 15% (on average #) QA/QC samples
Ground Water Sample Analysis - NAIP	0	sample	\$ 600.00	\$ -	- Includes 15% (on average #) QA/QC samples
Sampling Supplies	1	round	\$ 200.00	\$ 200	
GW Sampling Equipment Rental	1	round	\$ 500.00	\$ 500	
Total Annual Ground Water Sampling				\$ 77,850	
Subtotal Years 1-5 Operations and Maintenance				\$ 91,600	
Project Management	8%	of	\$ 91,600.00	\$ 7,328	
Technical Support	15%	of	\$ 91,600.00	\$ 13,740	
Construction Management	0%	of	\$ 91,600.00	\$ -	
Subcontractor General Requirements	5%	of	\$ 91,600.00	\$ 4,580	
Subtotal Years 1-5 Operations and Maintenance				\$ 117,248	
G&A	14%	of	\$ 117,248.00	\$ 16,415	
Overhead	5%	of	\$ 117,248.00	\$ 5,862	
New Mexico Gross Receipts Tax	7.125%	of	\$ 117,248.00	\$ 8,354	
Contingency	25%	of	\$ 117,248.00	\$ 29,312	
Subtotal Years 1-5 Operations and Maintenance				\$ 177,191	
Bonding& Insurance	2%	of	\$ 177,191.04	\$ 3,544	
Fee	8%	of	\$ 177,191.04	\$ 14,175	
TOTAL ANNUAL COST: YEARS 1-5 OPERATIONS AND MAINTENANCE COS'				\$ 194,910	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

10

 piezometers
5. The number of wells to be sampled for NAIPs is

0

 wells
6. The number of wells to be sampled for VOCs only is

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
7. The number of wells on-site to be abandoned for post-closure is

94

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
ANNUAL OPERATIONS AND MAINTENANCE COST - YEARS 6-20 (ANNUAL COST)					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Quarterly Water Level Measurements</i>					
Labor - Technician	60	hr	\$ 75.00	\$ 4,500	30 piezometers/MWs per event, 2 people, 4 piezometers/MWs per hour
Water Level Measurement Equipment Rental	1	LS	\$ 250.00	\$ 250	
Total Water Level Measurement				\$ 4,750	
<i>Once Every Two Years Ground Water Sampling</i>					
Subcontractor costs for multport wells	1	LS	\$ 7,600.00	\$ 7,600	5 multiport wells: based on Dec 2005 invoice (4 days [biennial] including move/demove, materials, equipment, labor, per diem)
Labor - Technician	316	hr	\$ 75.00	\$ 23,700	4 hrs/well, 2 people, not including 5 multiport wells
Ground Water Sample Analysis - VOC only	49	sample	\$ 150.00	\$ 7,350	Includes all wells plus 15% (on average #) QA/QC samples
Sampling Supplies	0.5	round	\$ 200.00	\$ 100	
GW Sampling Equipment Rental	0.5	round	\$ 500.00	\$ 250	
Total Semiannual Ground Water Sampling				\$ 39,000	
Subtotal Years 6-10 Operations and Maintenance				\$ 43,750	
Project Management	8%	of	\$ 43,750.00	\$ 3,500	
Technical Support	15%	of	\$ 43,750.00	\$ 6,563	
Construction Management	0%	of	\$ 43,750.00	\$ -	
Subcontractor General Requirements	5%	of	\$ 43,750.00	\$ 2,188	
Subtotal Years 6-20 Operations and Maintenance				\$ 56,000	
G&A	14%	of	\$ 56,000.00	\$ 7,840	
Overhead	5%	of	\$ 56,000.00	\$ 2,800	
New Mexico Gross Receipts Tax	7.125%	of	\$ 56,000.00	\$ 3,990	
Contingency	25%	of	\$ 56,000.00	\$ 14,000	
Subtotal Years 6-20 Operations and Maintenance				\$ 84,630	
Bonding& Insurance	2%	of	\$ 84,630.00	\$ 1,693	
Fee	8%	of	\$ 84,630.00	\$ 6,770	
TOTAL ANNUAL COST: YEARS 6-20 OPERATIONS AND MAINTENANCE COS'				\$ 93,093	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

10

 piezometers
5. The number of wells to be sampled for NAIPs is

0

 wells
6. The number of wells to be sampled for VOCs only is

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
7. The number of wells on-site to be abandoned for post-closure is

94

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
FIVE YEAR REVIEW COST - PER REPORT					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>5-year Review Report</i>					
5-year Review Report	1	LS	\$ 25,000.00	\$ 25,000	
Subtotal Five Year Review Cost				\$ 25,000	
Project Management	0%	of	\$ 25,000.00	\$ -	
Technical Support	0%	of	\$ 25,000.00	\$ -	
Construction Management	0%	of	\$ 25,000.00	\$ -	
Subcontractor General Requirements	0%	of	\$ 25,000.00	\$ -	
Subtotal Five Year Review Cost				\$ 25,000	
G&A	14%	of	\$ 25,000.00	\$ 3,500	
Overhead	5%	of	\$ 25,000.00	\$ 1,250	
New Mexico Gross Receipts Tax	7.125%	of	\$ 25,000.00	\$ 1,781	
Contingency	25%	of	\$ 25,000.00	\$ 6,250	
Subtotal 5 Year Review Cost				\$ 37,781	
Bonding& Insurance	0%	of	\$ 37,781.25	\$ -	
Fee	8%	of	\$ 37,781.25	\$ 3,023	
TOTAL FIVE YEAR REVIEW COST - PER REPORT				\$ 40,804	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

COST ESTIMATE DETAILS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. The accuracy of the cost estimate is +50%/-30%
2. See "Conceptual Design" spreadsheet for basis of cost estimate assumptions.
3. The number of new nested MWs to be installed

3

 with 3 screens for a total of

4125

 ft
4. The number of new single-screen piezometers required to be installed

10

 piezometers
5. The number of wells to be sampled for NAIPs is

0

 wells
6. The number of wells to be sampled for VOCs only is

84

 wells (includes all existing MWs in ground water sampling program plus new monitor wells)
7. The number of wells on-site to be abandoned for post-closure is

94

 wells
8. The number of wells to be sampled for PAH is

0

9. The G&A rate is

14%

10. The overhead rate is

5%

11. The Bonding & Insurance rate is

2%

12. The fee rate is

8%

Detailed Capital and Operations and Maintenance Costs

CAPITAL COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments and References
POST CLOSURE COST					
Item/Activity	Qty	Unit	Unit Cost	Cost	Comments
<i>Well Abandonment and Equipment Demobilization</i>					
Well Abandonment	94	well	\$ 1,000.00	\$ 94,000	Assume abandon 5 wells/day
Equipment Rental	4	wk	\$ 200.00	\$ 800	MultiRAE
<i>Subtotal Well Abandonment and Equipment Demobilization</i>				\$ 94,800	
Site Work Allowance	10%	of	\$ 94,800.00	\$ 9,480	
Mechanical Allowance	0%	of	\$ 94,800.00	\$ -	
Instrumentation and Controls Allowance	0%	of	\$ 94,800.00	\$ -	
Electrical Allowance	0%	of	\$ 94,800.00	\$ -	
Miscellaneous Equipment Allowance	0%	of	\$ 94,800.00	\$ -	
<i>Total Well Abandonment</i>				\$ 104,280	
<i>Subtotal Post-Closure Cost</i>				\$ 104,280	
Project Management	8%	of	\$ 104,280.00	\$ 8,342	
Technical Support	15%	of	\$ 104,280.00	\$ 15,642	
Construction Management	15%	of	\$ 104,280.00	\$ 15,642	
Subcontractor General Requirements	5%	of	\$ 104,280.00	\$ 5,214	
<i>Subtotal Post-Closure Cost</i>				\$ 149,120	
G&A	14%	of	\$ 149,120.40	\$ 20,877	
Overhead	5%	of	\$ 149,120.40	\$ 7,456	
New Mexico Gross Receipts Tax	7.125%	of	\$ 149,120.40	\$ 10,625	
Contingency	25%	of	\$ 149,120.40	\$ 37,280	
<i>Subtotal Post-Closure Cost</i>				\$ 225,358	
Bonding& Insurance	2%	of	\$ 225,358.20	\$ 4,507	
Fee	8%	of	\$ 225,358.20	\$ 18,029	
TOTAL POST CLOSURE COST				\$ 247,894	

Alternative 5 - In-Well Stripping in Higher Concentration Areas of the Ground Water Plume

PRESENT WORTH ANALYSIS

PROJECT: Griggs and Walnut Superfund Site Feasibility Study
 SITE: Griggs and Walnut Superfund Site - Las Cruces, New Mexico
 ALTERNATIVE: 5 In-Well Stripping in Higher Concentration Areas of the Ground Water Plume
 DESCRIPTION: Institutional Controls and Monitoring
 PREPARED BY: L.Colella, T.Palaia
 PROJECT NUMBER: 346535.FS.01

Assumptions

1. Real Discount Rate **3.00%** Source: OMB Circular No. A-94, Jan. 2007 version of Appendix C obtained from http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
2. Assumes Total PV earns interest for an entire year (12 months), compound annually.
3. Escalation factor is **3.00%**

Present Worth Analysis

Elapsed Time	Year	Discount Factor at 3%	A Capital Cost	B O&M Cost	C=A+B Total Cost	Total PV		C*E Total PV	Balance of Interest Bearing Account at 3%
						A*E Capital Costs at 3%	B*E Total PV O&M Costs at 3%		
0	2007	1.000	\$ 2,147,107		\$ 2,147,107	\$ 2,147,107	\$ -	\$ 2,147,107	\$ 2,718,617
1	2008	0.971		\$ 200,757	\$ 200,757	\$ -	\$ 194,910	\$ 194,910	\$ 2,593,395
2	2009	0.943		\$ 206,780	\$ 206,780	\$ -	\$ 194,910	\$ 194,910	\$ 2,458,213
3	2010	0.915		\$ 212,984	\$ 212,984	\$ -	\$ 194,910	\$ 194,910	\$ 2,312,587
4	2011	0.888		\$ 219,373	\$ 219,373	\$ -	\$ 194,910	\$ 194,910	\$ 2,156,010
5	2012	0.863		\$ 155,223	\$ 155,223	\$ -	\$ 133,897	\$ 133,897	\$ 2,060,811
6	2013	0.837		\$ 111,158	\$ 111,158	\$ -	\$ 93,093	\$ 93,093	\$ 2,008,142
7	2014	0.813		\$ 114,493	\$ 114,493	\$ -	\$ 93,093	\$ 93,093	\$ 1,950,459
8	2015	0.789		\$ 117,927	\$ 117,927	\$ -	\$ 93,093	\$ 93,093	\$ 1,887,508
9	2016	0.766		\$ 121,465	\$ 121,465	\$ -	\$ 93,093	\$ 93,093	\$ 1,819,024
10	2017	0.744		\$ 179,946	\$ 179,946	\$ -	\$ 133,897	\$ 133,897	\$ 1,688,250
11	2018	0.722		\$ 128,862	\$ 128,862	\$ -	\$ 93,093	\$ 93,093	\$ 1,606,169
12	2019	0.701		\$ 132,728	\$ 132,728	\$ -	\$ 93,093	\$ 93,093	\$ 1,517,644
13	2020	0.681		\$ 136,710	\$ 136,710	\$ -	\$ 93,093	\$ 93,093	\$ 1,422,362
14	2021	0.661		\$ 140,812	\$ 140,812	\$ -	\$ 93,093	\$ 93,093	\$ 1,319,997
15	2022	0.642		\$ 208,607	\$ 208,607	\$ -	\$ 133,897	\$ 133,897	\$ 1,144,732
16	2023	0.623		\$ 149,387	\$ 149,387	\$ -	\$ 93,093	\$ 93,093	\$ 1,025,205
17	2024	0.605		\$ 153,869	\$ 153,869	\$ -	\$ 93,093	\$ 93,093	\$ 897,477
18	2025	0.587		\$ 158,485	\$ 158,485	\$ -	\$ 93,093	\$ 93,093	\$ 761,162
19	2026	0.570		\$ 163,239	\$ 163,239	\$ -	\$ 93,093	\$ 93,093	\$ 615,860
20	2027	0.554	\$ 447,724	\$ 168,136	\$ 615,860	\$ 247,894	\$ 93,093	\$ 340,987	\$ 0
Total Alternative 5 In-Well Stripping in Higher			\$ 2,594,831	\$ 3,180,941	\$ 5,775,773	\$ 2,395,001	\$ 2,391,540	\$ 4,786,541	