Cameco

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Smith Ranch-Highland Operation
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March 31, 2008

ATTN: Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
Mail stop T7 E-18
U.S Nuclear Regulatory Commission
11545 Rockville Pike, Two White Flint North
Rockville, MD 20852-2738

RE: Smith Ranch-Highland Operations
NRC License SUA-1548 (TAC J00514)
Request for Additional Information, Reynolds Surety Estimate

Dear Mr. Mandeville:

In your letter dated February 15, 2008 the NRC requested additional information and clarification regarding the items identified in your correspondence for the Reynolds Ranch surety estimate. Power Resources dba Cameco Resources has reviewed the seven items (comments) and provided responses for each below. These responses pertain only to the Reynolds Ranch amendment area, the Smith Ranch - Highland Uranium Project comment response will follow shortly in a separate correspondence.

Because some of the responses directly affected the previously submitted Reynolds Ranch surety estimate, Cameco Resource has enclosed an updated electronic file of the updated surety estimate for your review.

Comment 1:

The Reynolds Ranch surety estimate is not affected by the potential for impacted soils associated with liquid releases from the headerhouses due to design standards for headerhouses in the proposed Reynolds Ranch. Headerhouse design standards for all mine units now require concrete basements (walls and floor) in each headerhouse. Underground mine unit pipes serving the headerhouse utilize special "Link-Seals" to ensure a impermeable barrier between the concrete wall and piping.

A wet sump with alarm is incorporated into the design standard. The purpose of the sump and alarm is to shut down the headerhouse should aqueous liquid be detected in the sump

After restoration is complete, the concrete floor and walls will be surveyed, decontaminated if necessary, and the concrete properly disposed during decommissioning. .

The volume estimate per headerhouse under WF BLDGS K129 was increased to account for the additional concrete removal. No soils are expected to be impacted from potential leaks inside the headerhouses.

Comment 2:

The attached north-south Reynolds Ranch Cross-Section demonstrates a continuous confining strata of low permeable shale averaging 60' from surface. The average potentiometric surface at Reynolds Ranch is 300'.

Comment 3:

The surety estimate of $20,000 for spare well replacement parts cost is derived from actual annual well replacement parts based previous operating years. Based on historical usage of replacement parts the majority of replacement parts are well pumps. The annual estimated of $20,000 cost is based upon well replacement parts purchased over the years. The replacement cost has been incorporated into GW REST J100 of the surety estimate calculation spreadsheet. In addition to the annual replacement cost, Cameco Resources has committed to replacing all production and injections well head "wet" fittings (all plastic and metal fittings, hoses, caps, etc.) with new equipment every five years. A cost of $185 per well been added to the UC-MIT section in the spreadsheet. This additional cost has been incorporated into the MIT section due to the 5-year replacement interval coinciding with the 5-year MIT test.

Comment 4:

Cameco Resources has recently determined 5 Pore Volumes (PV) utilizing bioremediation and a new restoration technology is sufficient to restore mine units for the Reynolds Ranch area. The Christensen Ranch In-situ uranium mine north of the Reynolds Ranch area only required 5.2 PV's to successfully restore MU-6. This restoration was completed using hydrogen sulfide as a reductant. Cameco Resources believes bioremediation is more effective restoration technology than standard reductants utilized previously.

Fewer PV's are anticipated for future restoration than what has historically been documented. PV totals in the past at the Smith Ranch-Highland Operation are misleading due to the fact the previous restoration was always commingled with low-level production of the mine units, thus accounting for higher PV's during "restoration periods".

Low level production while commingled with restoration means only a portion (<40%) of the production fluid (after leaving the ion exchange column) enters the Reverse Osmosis (RO) unit. The remaining fluid never enters the RO unit and is recycled back into the mine unit as injection fluid. With closure of the facility very limited production will occur thus allowing for increased throughput though the RO units.

Cameco Resources believes 5 pore volumes (1 sweep, 4 RO with 2 bioremediation) is sufficient to restore a mine unit if 100% of the restoration water is sent through the RO unit resulting in cleaner injection fluids being incorporated back into the mine unit. For bonding purposes the calculations assume no production will take place other than what is recovered from the IX columns.

Comment 5:

Cameco Resources has revised the Groundwater Restoration Worksheet to reflect a total of 5 pore volumes (1 sweep, 4 reverse osmosis with bioremediation) for Mine Unit 27 in the Reynolds Ranch amendment area. The calculated restoration and stability period for this area totals 3.5 years, however 4 years was used for the surety estimate. The Reynolds Ranch will utilize a dedicated deep disposal well with the permitted limit of 150 gallons per minute (gpm). The disposal capacity exceeds the RO bleed rate of approximately 50 gpm.

The Reynolds Ranch surety estimate has been revised to reflect the change from a 2.0 to 5-year restoration schedule.

Comment 6:

1. The conversion factor for kilowatt to horsepower has been addressed and reference on the Recurring Costs Basis Worksheet.

2. The REY Satellite, Central Plant, and Main Facility utility costs are derived from actual operating costs during the 2007 operating year. The REY Satellite (not constructed) assumes operating costs are similar to currently operating Satellites which are similar in design and throughput.

3. The cost for the Environmental Manager, Environmental Technician, and Maintenance Technician are based on Cameco Resources current labor rates for the referenced positions.

4. The Elution Unit Chemical Cost was adjusted slightly, from $900 to $1,198. This change was based on actual operating cost for the months of January and February 2008. Section UC-ELUT was updated to reflect this change.

5. The Restoration Spare Parts cost was incorporated into section GW REST cell J100.

Comment 7:

Cameco Resources concurs with the NRC comments pertaining to the Radiation Survey following reclamation. The surety estimate has been revised to incorporate a radiation survey for Mine Unit 27 and associated structures (satellite, disposal well, etc.) within the Reynolds Ranch area. Based on recently completed radiation surveys for other Mine Units, the costs for a radiation survey is $432 per acre. The Reynolds Ranch disturbance area will be approximately 44.1 acres, The calculated costs for Reynolds Ranch radiation survey is $19,051. This amount has been added to section GW REST J92 of the revised surety estimate calculation for the Reynolds Ranch area.

If you have any questions, please contact me at (307) 358-6541, ext. 46.

Sincerely,

John McCarthy
Manager-Environmental Health & Safety

Enclosure

Cc: S. Magnuson
L. Spackman WDEQ/LQD
C. Foldenauer
File SR 4.3.3.1
S. Bakken

CAMECO RESOURCES INC SMITH RANCH URANIUM PROJECT REYNOLDS RANCH
SURETY ESTIMATE REVISION

Total Restoration and Reclamation Cost Estimate		
I.	**GROUNDWATER RESTORATION COST**	$3,649,690
II.	**EQUIPMENT REMOVAL & DISPOSAL COST**	$31,347
III.	**BUILDING DEMOLITION AND DISPOSAL COST**	$179,464
IV.	**WELLFIELD BUILDINGS & EQUIPMENT REMOVAL & DISPOSAL COST**	$87,329
V.	**WELL ABANDONMENT COST**	$406,526
VI.	**WELLFIELD AND SATELLITE SURFACE RECLAMATION COST**	$46,518
VII.	**TOTAL MISCELLANEOUS RECLAMATION COST**	$225,203
	SUBTOTAL RECLAMATION AND RESTORATION COST ESTIMATE	$4,626,077
CPI ESCALATOR JULY 1, 2007 TO NOV 2007 = 0.90%		$41,635
	SUBTOTAL	$4,667,712
	ADMINISTRATIVE, OVERHEAD, AND CONTINGENCY ITEMS (25%)	$1,166,928
	TOTAL	$5,834,640
	TOTAL CALCULATED SURETY (IN 2008 DOLLARS)	**$5,834,600**

RECURRING COST

	Item	Amount ($)	Units	Cost Basis
ELECTRICAL				
	Power Cost (current actual costs)	$0.051	kw/hr	*Cost of electricity from current contract - Pacific Power and Light*
	Kilowatt to Horsepower	$0.746	kw/hp	Conversion obtained from Unicon Engineering Software
	Horsepower per gpm	$0.167	hp/gpm	
	Per 1000 gallons pumped	$0.600	per 1000 gal	
	Cost per Month REY Sat 1 (Nat. gas, elec.)	$6,316	unit	Cost based on 2007 monthly average
	Cost per Month Central Plant (Nat. gas, elec.)	$5,657	unit	Cost based on 2007 monthly average and facility operating 25% of the time
	Cost per Month (Main Office)	$1,846	unit	Cost based on 2007 monthly average
LABOR RATES				
	Operator	$136.34	day	*Labor costs from current in-field charges paid by PRI*
	Environmental Manager	$100,000	year	*Labor Management costs from current in-field charges paid by PRI*
	Environmental Technician	$80,000	year	*Labor Technician costs from current in-field charges paid by PRI*
	Maintenance Technician	$34,000	year	*Labor costs from current in-field charges paid by PRI*
CHEMICAL				
	Reductant	$0.30	per 1000 lb	*Chemical costs from current PRI vendor purchase agreements*
	Cement	$7.62	sack	
	Plug Gel	$6.45	sack	
	Hydrochloric Acid	$0.1375	lb	
	Elution Unit Chemical Cost	$1,198	unit	*Based on Jan and Feb 2008 actual elution costs*
ANALYTICAL				
	Guideline 8	$200	batch	*Analytical costs from current contract with Energy Labs, Casper, Wyoming*
	6 Parameters	$70	batch	
	Other In-House (Radon, Biological, Soils, etc.)	$50	batch	*In-house estimate for material and labor*
SPARE PARTS				
	Restoration Spare Parts	$20,000	year	*Costs for spare parts from operator experience, mainly pump motor repair/replacement*
TRANSPORTATION AND DISPOSAL				
	11 (e)(2) Material Transport	$1.33	cubic yard	*Costs for Transportation and disposal from current contracts with NRC Licensed Facility*
	11 (e)(2) Material Disposal	$11.00	cubic yard	*& contract trucker*
	Soil/Solid Waste Transport (11(e) (2)	$1.33	cubic yard	*Costs for Transportation and disposal from current contracts with NRC Licensed Facility*
	Soil/Solid Waste Disposal (11(e) (2)	$3.70	cubic yard	*& contract trucker*
	Soil/Solid Waste (non-contam., on-site)	$1.25	cubic yard	*In-house estimate based on material cost and labor*
VEHICLE OPERATION				
	Unit Cost	$20.21	unit	*Cost per WDEQ Guideline 12*
PLANT DISMANTLING				
	Concrete Footer Demolition	$12.22	cubic foot	*Costs per WDEQ Guideline 12, App. K*
	Concrete Floor Demolition	$3.40	cubic foot	
PLANT DECONTAMINATION AND DISPOSAL				
	Direct Disposal Plant Floor	$1.25	cubic yard	*Costs for Transportation and disposal from current contracts with NRC Licensed Facility*
	Solution (HCL) Application Rate	$0.57	square foot	*In-house estimate based on actual material cost*
PIPE REMOVAL				
	2-inch SDR 13.5 inj. & prod. Removal	$0.91	foot	*Costs for pipe removal from operator experience*
	Trunkline Removal	$0.43	foot	*Includes labor and equimpment*

RECURRING COST

	Item	Amount ($)	Units	Cost Basis
EQUIPMENT				
	Cat Trackhoe	$1,125	week	*Costs for equipment rental from Wyoming Machinery, Casper, Wyoming. All inclusive (labor, repairs, fuel, and Mob)*
	Shredder	$50,000		*Equipment owned by PRI*
	Cat Motor Grader	$814.22	acre	*Costs per WDEQ Guideline 12, App. 11*
	Drill Rig	$110.00	hour	*Costs for equipment from operator experience*
	Hose Reel	$45.00	hour	*Costs for equipment from operator experience*
	Cementer	$45.00	hour	*Costs for equipment from operator experience*
	Dozer	$814.22	acre	*Costs per WDEQ Guideline 12, App. 11*
	Scraper	$814.22	acre	*Costs per WDEQ Guideline 12, App. 11*
	Pulling Reel	$45.00	hour	*Costs for equipment from operator experience*
	Manlift	$8,900.00	month	*Costs for equipment from operator experience*
	Belly Dump	$100.00	hour	*Costs for equipment from operator experience*
RECLAMATION				
	Discing and Seeding	$280	acre	*Operator Experience based on Current Contractor Pricing*
	Top Soil Application	$0.71	acre	*Costs per WDEQ Guideline 12, App. 11*
MIT				
	Mechanical Integrity Testing	$373.13	well	*Operator Experience based on Current Contractor Pricing*

Ground Water Restoration	Mine Unit-27
PV Assumptions	
Wellfield Area (ft2) (HH x 20 patterns x 10,000)	1,923,061
Wellfield Area (acres)	44.1
Affected Ore Zone Area (ft2)	1,923,061
Avg. Completed Thickness	20
Porosity	0.27
Flare Factor	1.7
Affected Volume (ft3)	65,384,074
Kgallons per Pore Volume	132,050
Number of Patterns in Unit(s)	
Current	205
Estimated next report period	0
Total Estimated	205
Number of Wells in Unit(s)	
Production Wells	
Current	205
Estimated next report period	0
Total Estimated	205
Injection Wells	
Current	572
Estimated next report period	0
Total Estimated	572
Monitoring Wells	
Current	85
Estimated next report period	0
Total Estimated	85
Number of Wells per Wellfield	862
Total Number of Wells	862
Average Well Depth (ft)	860
I. Ground Water Sweep Costs	
PV's Required	1
Total Kgals for Treatment	132,050
Ground Water Sweep Unit Cost ($/Kgal)	$1.40
Subtotal Ground Water Sweep Costs per Wellfield	$185,119
Total Ground Water Sweep Costs	**$185,119**
II. Reverse Osmosis Costs	
PV's Required	4
Total Kgals for Treatment	528,199
Reverse Osmosis Unit Cost ($/Kgal)	$0.96
Subtotal Reverse Osmosis Costs per Wellfield	$504,882
Total Reverse Osmosis Costs	**$504,882**
III. Chemical Reductant Costs	
Total Kgals for Treatment (2 Pore Volumes)	264099
Chemical Reductant Unit Cost ($/Kgal)	$0.30
Subtotal Chemical Reductant Costs per Wellfield	$79,230
Total Chemical Reductant Costs	**$79,230**

Ground Water Restoration	Mine Unit-27
IV. Elution Costs	
A. Elution Processing Costs	
Kgals/Elution Required	35,000
Number of Elutions	19
Processing Unit Cost ($/Elution)	$1,198
Subtotal Processing Costs per Wellfield	$22,762
Total Elution Costs	**$22,762**
B. Deep Well Injection Costs	
Deep Well Injection Volume (Kgals/Elution)	12
Total Kgals for Injection	228
Deep Well Injection Unit Cost ($/Kgals)	$1.45
Subtotal Deep Well Injection Costs	$331
Subtotal Well Injection Costs per Wellfield	$23,093
Total Well Injection	$23,093
Total : Elution & Deep Well	**$45,855**
V. Monitoring and Sampling Costs	
A. Active Restoration Period	
Estimated Restoration Period (Years)	4
1. UCL Sampling	
# of Wells	85
$/sample	FALSE
Samples/Year	6
Sub-total Restoration Analyses	$0
B. Stability Period	
Estimated Stabilization Period (Years)	0.5
1. Full Suite Analyses (Guideline 8)	
# of Wells	40
Samples/Year	3
$/sample	$200
2. Short List Analyses	
# of Wells	40
Samples/Year	9
$/sample	$70
Sub-total Stability Analyses	$24,600
Subtotal Monitoring and Sampling Costs per Wellfield	$43,651
Radiation Survey	$19,051
Total Monitoring and Sampling Costs	**$43,651**
VI. Mechanical Integrity Test (MIT) Costs	
Five Year MIT Unit Cost ($/well)	$373
Number of Wells (30% of Inj. and Rest. Wells)	172
Subtotal Mechanical Integrity Testing Costs per Wellfield	$64,035
Total Mechanical Integrity Testing Cost	**$64,035**
Wellfield Replacement Parts (pumps, motors, etc)	**$20,000**
TOTAL RESTORATION COSTS PER WELLFIELD	$920,010
TOTAL WELLFIELD RESTORATION COST	**$920,010**
VII. Building Utility Costs	RR-1
Electricity ($/Month)	$6,316
Number of Months	30

Ground Water Restoration	Mine Unit-27
Subtotal Utility Costs per Building	$189,480
Total Building Utility Costs	**$189,480**
VIII. Vehicle Operation Costs	
Number of Pickup Trucks/Pulling Units (Gas)	5
Unit Cost in $/hr (WDEQ Guideline No.12, Table D-1)	$20.21
Average Operating Time (Hrs/Year)	1000
Total Number of Years (Average)	4
Total Vehicle Operation Costs	**$404,200**
IX. Labor Costs	
Number of Environmental Managers/RSOs	1
$/Year MV	$100,000
Number of Restoration Managers	1
$/Year MV	$80,000
Number of Environmental Technicians	1
$/Year MV	$34,000
Number of Operators/Laborers	4
$/Year MV	$34,000
Number of Maintenance Technicians	1
$/Year MV	$34,000
Number of Years	4
Total Labor Costs	**$1,536,000**
IX. Capital Costs	
Purchase RO Units (1X800 gpm Units)	$600,000
Total Capital Costs	**$600,000**
TOTAL GROUND WATER RESTORATION COSTS	**$3,649,690**

Equipment Removal and Loading	Satellite RR-1
I. Removal and Loading Costs	
A. Tankage	
Number of Tanks	10
Volume of Tank Construction Material (ft^3)	397
1. Labor	
Number of Persons	3
Ft^3/Day	25
Number of Days	16
$/Day/Person	$136
Subtotal Labor Costs	$6,544
2. Equipment	
Number of Days	16
$/Day	$338
Subtotal Equipment Costs	$5,408
Subtotal Tankage Removal and Loading Costs	$11,952
B. PVC/Steel Pipe	
PVC Pipe Footage	4000
Average PVC Pipe Diameter (inches)	3
Shredded PVC Pipe Volume Reduction (ft^3/ft)	0.016
Volume of Shredded PVC Pipe (ft^3)	64
Steel Pipe Footage	0
Average Steel Pipe Diameter (inches)	0
Volume (ft^3)	0
1. Labor	
Number of Persons	2
Ft/Day	300
Number of Days	13
$/Day/Person	$136
Subtotal PVC/Steel Pipe Labor Costs	$3,545
Subtotal PVC/Steel Pipe Removal and Loading Costs	$3,545
C. Pumps	
Number of Pumps	13
Average Volume (ft^3/pump)	4.93
Volume of Pumps (ft^3)	64.09
1. Labor	
Number of Persons	1
Pumps/Day	2
Number of Days	7
$/Day/Person	$136
Subtotal Labor Costs	$954
Subtotal Pump Removal and Loading Costs	$954
D. Dryer	
Dryer Volume (ft^3)	
1. Labor	
Number of Persons	0
Ft^3/Day	0
Number of Days	0
$/Day/Person	$136
Total Labor Cost	$0
Total Dryer Dismantling and Loading Cost	$0
Subtotal Equipment Removal and Loading Costs per Facility	$22,995
Total Equipment Removal and Loading Costs	
II. Transportation and Disposal Costs (NRC-Licensed Facility)	
A. Tankage	
Volume of Tank Construction Material (ft^3)	397
Volume for Disposal Assuming 10% Void Space (ft^3)	436
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Subtotal Tankage Transportation and Disposal Costs	$5,376
B. PVC / Steel Pipe	
Volume of Shredded PVC Pipe (ft^3)	64
Volume for Disposal Assuming 10% Void Space (ft^3)	70
Volume of Steel Pipe (ft^3)	
Volume for Disposal Assuming 10% Void Space (ft^3)	0
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Subtotal PVC Pipe Transportation and Disposal Costs	$863
C. Pumps	
Volume of Pumps (ft^3)	64
Volume for Disposal Assuming 10% Void Space (ft^3)	70
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Subtotal Pump Transportation and Disposal Costs	$863
D. Dryer	
Dryer Volume (ft^3)	0
Volume for Disposal Assuming Dryer Remains Intact (ft^3)	0
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Total Dryer Transportation and Disposal Costs	$0
Subtotal Equipment Transportation and Disposal Costs per Facility	$7,102
Total Equipment Transportation and Disposal Costs	
III. Health and Safety Costs	
Radiation Safety Equipment	$1,250
Total Health and Safety Costs	1250
SUBTOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS PER FACILITY	$31,347
TOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS	$31,347

Building Demolition and Disposal	REY DW #1 Buildings	Satellite REY-1
I. Decontamination Costs		
A. Wall Decontamination		
Area to be Decontaminated (ft^2)	0	0
HCl Acid Wash, including labor ($/$ft^2$)	$0.59	$0.59
Subtotal Wall Decontamination Costs	$0	$0
B. Concrete Floor Decontamination		
Area to be Decontaminated (ft^2)	0	9000
HCl Acid Wash, including labor ($/$ft^2$)	$0.21	$0.21
Subtotal Concrete Floor Decontamination Costs	$0	$1,873
C. Deep Well Injection Costs		
Total Kgals for Injection	0	9
Deep Well Injection Unit Cost ($/Kgals)	$1.45	$1.45
Subtotal Deep Well Injection Costs	$0	$13
Subtotal Decontamination Costs per Building	$0	$1,886
Total Decontamination Costs		
II. Demolition Costs		
A. Building		
Assumptions:		
Dryer bldg. demolition unit cost of $0.73/$ft^3$ for additional		
radiation safety equipment		
Volume of Building (ft^3)	660.3	402,000
Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/$ft^3$)	$0.178	$0.178
Subtotal Building Demolition Costs	$118	$71,556
B. Concrete Floor		
Area of Concrete Floor (ft^2)	0	13400
Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/$ft^3$)	$3.17	$3.05
Subtotal Concrete Floor Demolition Costs	$0	$40,870
C. Concrete Footing		
Length of Concrete Footing (ft)	0	463
Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/$ft^3$)	$12.22	$12.22
Subtotal Concrete Footing Demolition Costs	$0	$5,658
Subtotal Demolition Costs per Building	$118	$118,084
Total Demolition Costs		
III. Disposal Costs		
A. Building		
Volume of Building (cy)	24	14889
1. On-Site		
Assumptions:		
On-site disposal cost of $1.25/cy		
Percentage (%)	100	100
Volume for Disposal (cubic yards)	24	14889
Disposal Unit Cost ($/cy)	$1.25	$1.25
Subtotal On-Site Disposal Costs	$31	$18,611

Building Demolition and Disposal	REY DW #1 Buildings	Satellite REY-1
2. NRC-Licensed Facility		
Percentage (%)	0	0
Volume for Disposal (ft^3)	0	0
Volume for Disposal Assuming 10% Void Space (ft^3)	0	0
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33	$12.33
Subtotal NRC-Licensed Facility Disposal Costs	$0	$0
Subtotal Building Disposal Costs	$31	$18,611
B. Concrete Floor		
Area of Concrete Floor (ft^2)	0	13400
Average Thickness of Concrete Floor (ft)	0.75	0.75
Volume of Concrete Floor (ft^3)	0	10050
Volume of Concrete Floor (cy)	0	372
1. On-Site		
Percentage (%)	0	75
Volume for Disposal (cy)	0	279
Disposal Unit Cost per WDEQ Guideline No.12,App.K ($/cy)	$6.39	$6.39
Subtotal On-Site Disposal Costs	$0	$1,784
2. NRC-Licensed Facility		
Assumptions:		
Additional $2.60/cy for segregation of concrete		
Percentage (%)	0	25
Volume for Disposal (ft^3)	0	2513
Segregation and Loading Unit Cost ($/$ft^3$)	$2.60	$2.60
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33	$12.33
Subtotal NRC-Licensed Facility Disposal Costs	$0	$37,512
Subtotal Concrete Floor Disposal Costs	$0	$39,296
C. Concrete Footing		
Length of Concrete Footing (ft)	0	463
Average Depth of Concrete Footing (ft)	4	4
Average Width of Concrete Footing (ft)	1	1
Volume of Concrete Footing (ft^3)	0	1852
Volume of Concrete Footing (cy)	0	69
Disposal Unit Cost per WDEQ Guideline No.12,App.K ($/cy)	$6.39	$6.39
Subtotal Concrete Footing Disposal Costs	$0	$438
Subtotal Disposal Costs per Building	$31	$58,345
Total Disposal Costs		
IV. Health and Safety Costs		
Radiation Safety Equipment RSO removed per item cost and generated	$0	$1,000
one lump sum cost!		
Total Health and Safety Costs		
SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS	$149	$179,315
TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS	**$179,464**	

Wellfield Buildings and Equipment Removal and Disposal	Mine Unit-27
I. Wellfield Piping	
Assumptions:	
Number of Header Houses per Wellfield	11
Length of Piping per Header House (ft)	2000
Total Length of Piping (ft)	24000
A. Removal and Loading	
Wellfield Piping Removal Unit Cost ($/ft of pipe)	$0.42
Subtotal Wellfield Piping Removal and Loading Costs	$10,080
B. Transport and Disposal Costs (NRC-Licensed Facility)	
Average Diameter of Piping (inches)	2
Chipped Volume Reduction (ft^3/ft)	0.005
Chipped Volume per Wellfield (ft^3)	120
Volume for Disposal Assuming 10% Void Space (ft^3)	132
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Subtotal Wellfield Piping Transport and Disposal Costs	$1,628
Wellfield Piping Costs per Wellfield	$11,708
C. Capitol Costs	
Fiberglass/ poly / PVC Pipe Shredder (Operator Owned)	$50,000
BFI Containers (2@$7,800.00 each) (Operator Owned)	$15,600
Total Wellfield Piping Costs	**$77,308**
II. Well Pumps and Tubing	
Assumptions:	
Pump and tubing removal costs included under ground water restoration labor costs	
60% of production/injection wells contain pumps and/or tubing	
A. Pump and Tubing Transportation and Disposal	
Number of Production Wells	205
Number of Injection Wells	572
1. Pump Volume	
Number of Production Wells with Pumps	123
Average Pump Volume (ft^3)	1
Pump Volume per Wellfield (ft^3)	123
2. Tubing Volume	
Assumptions:	
Average tubing length/wellfield based on average well depth minus 25 ft	
Number of Production Wells with Tubing	123
Number of Injection Wells with Tubing	343
Average Tubing Length per Well (ft)	835
Tubing Length per Wellfield (ft)	389110
Diameter of Production Well Fiberglass Tubing (inches)	2
Diameter of Injection Well HDPE Tubing (inches)	1.25
Chipped Volume Reduction (ft^3/ft)	0.005
Chipped Volume per Wellfield (ft^3)	1946

Wellfield Buildings and Equipment Removal and Disposal	Mine Unit-27
Volume of Pump and Tubing (ft^3)	2069
Volume for Disposal Assuming 10% Void Space (ft^3)	2276
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Subtotal Pump and Tubing Transport and Disposal Costs	$28,063
Pump and Tubing Costs per Wellfield	$28,063
Total Pump and Tubing Costs	**$28,063**
III. Buried Trunkline	
Assumptions:	
Length of Trunkline Trench (ft)	7105
A. Removal and Loading	
Main Pipeline Removal Unit Cost ($/ft of trench)	$0.84
Subtotal Trunkline Removal and Loading Costs	$5,968
B. Transport and Disposal Costs (NRC-Licensed Facility)	
1. 1" Carbon Steel Trunkline	
Piping Length (ft)	
Volume (ft^3)	
2. 1" HDPE Trunkline	
Piping Length (ft)	
Chipped Volume Reduction (ft^3/ft)	
Chipped Volume (ft^3)	
3. 3" HDPE Trunkline	
Piping Length (ft)	7105
Chipped Volume Reduction (ft^3/ft)	0.022
Chipped Volume (ft^3)	156
4. 6" HDPE Trunkline	
Piping Length (ft)	2410
Chipped Volume Reduction (ft^3/ft)	0.078
Chipped Volume (ft^3)	188
5. 8" HDPE Trunkline	
Piping Length (ft)	4100
Chipped Volume Reduction (ft^3/ft)	0.15
Chipped Volume (ft^3)	615
6. 10" HDPE Trunkline	
Piping Length (ft)	0
Chipped Volume Reduction (ft^3/ft)	0.277
Chipped Volume (ft^3)	0
7. 12" HDPE Trunkline	
Piping Length (ft)	1460
Chipped Volume Reduction (ft^3/ft)	0.293
Chipped Volume (ft^3)	427.78
8. 14" HDPE Trunkline	
Piping Length (ft)	740

Wellfield Buildings and Equipment Removal and Disposal	Mine Unit-27
Chipped Volume Reduction (ft^3/ft)	0.359
Chipped Volume (ft^3)	266
9. 16" HDPE Trunkline	
Piping Length (ft)	1440
Chipped Volume Reduction (ft^3/ft)	0.4
Chipped Volume (ft^3)	576
10. 18" HDPE Trunkline	
Piping Length (ft)	
Chipped Volume Reduction (ft^3/ft)	0.62
Chipped Volume (ft^3)	0
Total Trunkline Chipped Volume (ft^3)	2228.73
Volume for Disposal Assuming 10% Void Space (ft^3)	2452
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Subtotal Trunkline Transport and Disposal Costs	$30,233
Trunkline Decommissioning Costs per Wellfield	$36,201
Total Trunkline Decommissioning Costs	**$36,201**
IV. **Well Houses**	
Total Quantity	777
Average Well House Volume (ft^3)	1.86
A. Removal	
Total Volume (ft^3)	1445.22
Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/$ft^3$)	$0.178
Subtotal Well House Demolition Costs	$257
B. Survey and Decontamination	
Assumptions:	
Cost per Well House	3.97
Subtotal Survey and Decontamination Costs	$3,085
C. Disposal at NRC licensed Facility	
Total Volume (cy)	54
Volume for Disposal Assuming 10% Void Space (cy)	59
Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
Subtotal NRC Licensed Facility Disposal Costs	$727
Well House Removal and Disposal Costs per Wellfield	$4,069
Total Well House Removal and Disposal Costs	**$4,069**
V. **Header Houses** (Includes Booster Stations)	
Total Quantity	11
Average Header House Volume (ft^3)	800
A. Removal	
Total Volume (ft^3)	8800
Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/$ft^3$)	$0.178
Subtotal Building Demolition Costs	$1,566

Wellfield Buildings and Equipment Removal and Disposal	**Mine Unit-27**
B. Survey and Decontamination	
Assumptions:	
Cost per Header House	$312
Subtotal Survey and Decontamination Costs	$3,428
C. Disposal	
Total Volume (cy)	326
Volume for Disposal Assuming 10% Void Space (cy)	359
Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/ft^3)	$6.39
Subtotal On-Site Disposal Costs	$2,294
Header House Removal and Disposal Costs per Wellfield	$7,288
Total Header House Removal and Disposal Costs	**$7,288**
TOTAL REMOVAL AND DISPOSAL COSTS PER WELLFIELD	$87,329
TOTAL WELLFIELD BUILDINGS AND EQUIPMENT REMOVAL AND DISPOSAL COSTS	**$87,329**

Well Abandonment		Mine Unit-27
I.	**Well Abandonment (Wellfields)**	
	# of Production Wells	205
	# of Injection Wells	572
	# of Monitoring Wells	85
	Total Number of Wells	862
	Average Diameter of Casing (inches)	5
	Average Depth (ft)	860
	Well Abandonment Unit Cost ($/well)	$381
	Subtotal Abandonment Cost per Wellfield	$328,482
	Total Wellfield Abandonment Costs	**$328,482**
II.	**Waste Disposal Well Abandonment**	DDW RR1
	A. Well Plugging	
	All lump sum costs	
	Subtotal Well Plugging Costs per Well - based on current DDW Permit	$71,342
	B. Pump Dismantling and Decontamination	
	Number of Persons	2
	Number of Pumps	2
	Pumps/Day	0.5
	Number of Days	4
	$/Day/Person	$136
	Subtotal Dismantling and Decon Costs per Well	$1,091
	C. Tubing String Disposal (NRC-Licensed Facility)	
	Length of Tubing String (ft)	10100
	Diameter of Tubing String (inches)	2.875
	Volume of Tubing String (ft^3)	455
	Transportation and Disposal Unit Cost ($/$ft^3$)	$12.33
	Subtotal Tubing String Disposal Costs per Well	$5,611
	Subtotal Waste Disposal Well Abandonment Costs per Well	$78,044
	Total Waste Disposal Well Abandonment Costs	**$78,044**
TOTAL WELL ABANDONMENT COSTS		**$406,526**

Wellfield and Satellite Surface Reclamation		Mine Unit-27
I. Wellfield Pattern Area, Laydown Area, and Road Reclamation		
Area (acres)		50.0
Disking/Seeding Unit Cost ($/acre)		$280
Subtotal Pattern Area, Laydown Area, and Road Reclamation Costs		$14,000
Total Wellfield Area Reclamation Costs		**$14,000**
II. **Satellite Area Reclamation**		RR-1
Assumptions:		
Area of Disturbance (acres)		3
Average Depth of Stripped Topsoil (ft)		1
Surface Grade: Level Ground		
Average Length of Topsoil Haul (ft)		1000
A. Ripping Overburden with Dozer		
Ripping Unit Cost per WDEQ Guideline No.12, App.II ($/acre)		$814.22
Subtotal Ripping Costs		$2,443
B. Topsoil Application with Scraper		
Volume of Topsoil Removed (cy)		4840
Ripping Unit Cost per WDEQ Guideline No.12, App.II ($/acre)		$0.71
Subtotal Topsoil Application Costs		$3,436
C. Discing and Seeding		
Discing/Seeding Unit Cost ($/acre)		$280
Subtotal Discing/Seeding Costs		$840
Subtotal Surface Reclamation Costs per Satellite		$6,719
Total Satellite Building Area Reclamation Costs		**$6,719**
III **Surface Reclamation**		**Mine Unit-27**
A. Removal and disposal of contaminated soil around wells		
Volume of contaminated soil (0.37 yd3 per injection and production well - estimate)		287.49
Disposal of contaminated soil ($/yd3) (As per Byproduct Materal contract)		$12.33
Equipment (Backhoe $65/hr)		$9,343.43
Labor (1 man-hour ($17.hr) per 2 Yd3 - estimate)		$2,443.67
Subtotal removal and disposal of contaminated soil		$11,799.42
	Total	$11,799.42
B. Disc and seeding		
Disc and seeding (est. $280/acre)		$280.00
Subtotal Recontour and Seeding		$14,000.00
	Total	$14,000.00
	Total Surface Reclamation	$25,799
	Total	**$46,518**

Miscellaneous Reclamation											
I.	**CPP/Office Area/Pilot Plant/Maint. Shop/Chem. Storage/Yard Reclamation**										
		Assumptions									
			Concrete Pad= 0.3 acres								
			Total Area = 10.57 acres								
	A.	Concrete Pad									
			Area of Concrete Pad (ft^2)					0			
			Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/$ft^2$)					$3.40			
			Average Thickness of Concrete Floor (ft)					0.50			
			Volume of Concrete Floor (ft^3)					0			
			Volume of Concrete Floor (cy)					0			
			On-Site Disposal Unit Cost per WDEQ Guideline No.12,App.K ($/cy)					$5.00			
		Subtotal Concrete Pad Demolition and Disposal Costs						$0			
	B.	Gravel Road Base Removal									
			Assumptions								
				Average haul distance (ft)				0			
			Gravel Road Base Width (ft)								
			Gravel Road Base Area (acres)					0.0			
			Average Road Base Depth (ft)					0.5			
			Volume of Road Base (cy)					0			
			Removal Unit Cost per WDEQ Guideline No.12, App.C ($/cy)					$0.87			
		Subtotal Gravel Road Base Removal Costs						$0			
	B.	Ripping Overburden with Dozer									
			Overburden Surface Area (acres)					0.0			
			Ripping Unit Cost per WDEQ Guideline No.12, App.I1 ($/acre)					$814.22			
		Subtotal Ripping Overburden Costs						$0			
	C.	Topsoil Application									
			Assumptions:								
				Area of surface disturbance (ft^2)				0			
				Average thickness of topsoil (ft)				1			
				Average haul distance (ft)				0			
				Surface grade (%)				0%			
			Volume of Topsoil (cy)					0			
			Topsoil Unit Cost per WDEQ Guideline No.12, App.C ($/cy)					$1.12			
		Subtotal Topsoil Application Costs						$0			
	D.	Discing/Seeding									
			Assumptions								
			Surface Area (acres)					0			
			Discing/Seeding Unit Cost ($/acre)					$280			
		Total Discing/Seeding Costs						$0			
	Total CPP/Office/Yard Area Reclamation							**$0**			
II.	**Access Road Reclamation**							**RR-1 Access**	**Access to WF**		
	A.	Assumptions									
			Surface grade					1%	1%		
			Length of Road (ft)					1000	12000		
			Width of Road (ft)					40	14		
			Area of road (acres)					0.9	3.9		
	B.	Gravel Road Base Removal									
			Assumptions								
				Average haul distance (ft)				1000	1000		
			Gravel Road Base Width (ft)					30	10		
			Gravel Road Base Area (acres)					0.69	2.75		
			Average Road Base Depth (ft)					0.5	0.5		
			Volume of Road Base (cy)					556	2222		
			Removal Unit Cost per WDEQ Guideline No.12, App.C ($/cy)					$0.87	$0.87		
		Subtotal Gravel Road Base Removal Costs						$481	$1,924		
	C.	Ripping Overburden with Dozer									
			Overburden Surface Area (acres)					0.9	3.9		
			Ripping Unit Cost per WDEQ Guideline No.12, App.I1 ($/acre)					$814.22	$814.22		
		Subtotal Ripping Overburden Costs						$741	$3,135		
	D.	Topsoil Application									
			Assumptions								
				Average haul distance (ft)				1500	1500		
			Topsoil Surface Area (ft^2)					39639.6	167706		
			Depth of Topsoil (ft)					0.5	0.5		
			Volume of Topsoil (cy)					734	3106		
			Topsoil Unit Cost per WDEQ Guideline No.12, App.C ($/cy)					$1.50	$0.82		
		Subtotal Topsoil Application Costs						$1,101	$2,547		
	E.	Discing/Seeding									
			Assumptions								
			Surface Area (acres)					0.9	3.9		
			Discing/Seeding Unit Cost ($/acre)					$280	$280		
		Subtotal Discing/Seeding Costs						$255	$1,078		

Miscellaneous Reclamation									
Subtotal Reclamation Costs per Access Road					$2,578	$8,684			
Total Access Road Reclamation Costs					**$11,262**				
III.	**Trunk Lines**				**Trunk Line #1 (RR-1 to MU27)**	**Trunk Line #2 (MU27 to HH)**			
		Length of Trench (ft)			22000	11000			
	A.	Removal and Loading							
		Main Pipeline Removal Unit Cost ($/ft of trench)			$0.91	$0.91			
		Subtotal Trunkline Removal and Loading Costs			$20,020	$10,010			
	B.	Transport and Disposal Costs (NRC-Licensed Facility)							
		1	2" HDPE Trunkline						
			Piping Length (ft)		0	0			
			Chipped Volume Reduction (ft^3/ft)		0.005	0.005			
			Chipped Volume (ft^3)		0	0			
		1.	3" HDPE Trunkline						
			Piping Length (ft)		0	0			
			Chipped Volume Reduction (ft^3/ft)		0.022	0.022			
			Chipped Volume (ft^3)		0	0			
		2.	6" HDPE Trunkline						
			Piping Length (ft)		0	0			
			Chipped Volume Reduction (ft^3/ft)		0.078	0.078			
			Chipped Volume (ft^3)		0	0			
		3.	8" HDPE Trunkline						
			Piping Length (ft)		0	11000			
			Chipped Volume Reduction (ft^3/ft)		0.15	0.15			
			Chipped Volume (ft^3)		0	1650			
		3.	10" HDPE Trunkline						
			Piping Length (ft)		0	0			
			Chipped Volume Reduction (ft^3/ft)		0.277	0.277			
			Chipped Volume (ft^3)		0	0			
		4.	12" HDPE Trunkline						
			Piping Length (ft)		0	0			
			Chipped Volume Reduction (ft^3/ft)		0.293	0.293			
			Chipped Volume (ft^3)		0	0			
		5.	14" HDPE Trunkline						
			Piping Length (ft)		0	0			
			Chipped Volume Reduction (ft^3/ft)		0.359	0.359			
			Chipped Volume (ft^3)		0	0			
		5.	16" HDPE Trunkline						
			Piping Length (ft)		0	0			
			Chipped Volume Reduction (ft^3/ft)		0.4	0.4			
			Chipped Volume (ft^3)		0	0			
		6	18" HDPE Trunkline						
			Piping Length (ft)		22000	0			
			Chipped Volume Reduction (ft^3/ft)		0.47	0.47			
			Chipped Volume (ft^3)		10340	0			
		Total Pipeline Disposal Volume			10340	1650			
			Volume for Disposal Assuming 10% Void Space (ft^3)		11374	1815			
			Transportation and Disposal Unit Cost (NRC-Licensed Facility) ($/$ft^3$)		$12.33	$12.33			
					$140,241	$22,379			
	C.	Discing/Seeding							
			Assumptions:						
			Width of Pipeline Trench (ft)		4	4			
			Area of Pipeline Trench (acres)		2.0	1.0			
			Discing/Seeding Unit Cost ($/acre)		$280	$280			
		Subtotal Discing/Seeding Costs			$566	$283			
Subtotal Reclamation Costs per Pipeline					$160,827	$32,672			
Total Pipeline Reclamation Costs					**$193,499**				
IV.	**Settling Basin/Evap. Pond Reclamation**				**Evaporation Pond**	**SettlingPond**			
	A.	Soil Sampling and Monitoring							
			Number of Soil Samples		0	0			
			$/Sample		$50	$50			
		Subtotal Soil Sampling and Monitoring Costs			$0	$0			
	B.	Liner/Subsoil Removal and Disposal							
			Assumptions:						
			Clay liner and subsoil constitute by-product material						
			Thickness of clay liner (ft)		0	0			
			Thickness of contaminated subsoil (ft)		0	0			

Miscellaneous Reclamation		
Removal and Loading Unit Cost based on engineer's design		
report and Cat Performance Handbook		
Width of Pond (ft)	0	0
Length of Pond (ft)	0	0
Depth of Pond (ft)	0	0
Surface area of pond (ft^2)	0	0
1. Removal and Loading (Settling Pond is not By-Product, therefore can stay in place)		
Volume of Clay Liner (cy)	0	0
Clay Liner Removal and Loading Unit Cost ($/cy)	$3.63	$3.63
Subtotal Liner Removal and Loading Costs	$0	$0
2. Transportation and Disposal		
Volume of Clay Liner (ft^3)	0	0
Volume of Geotextile Liner (ft^3)	0	0
Volume of Geotextile Liner @ 40% void (ft^3)	0	0
Transportation and Disposal Unit Cost ($/ft^3)(As per byproduct material contract)	$12.33	$12.33
Subtotal Liner Transportation and Disposal Costs	$0	$0
Subtotal Liner Removal and Disposal Costs	$0	$0
C. Grade and Contour		
Volume of Embankment Material (CY)	0	0
Average Grade (%)	0	0
Distance (ft)	0	0
Material Moving Unit Cost per WDEQ Guideline No.12, App.E ($/cy)	$0.092	$0.161
Subtotal Grade and Contour Costs	$0	$0
C. Topsoil Application		
Assumptions:		
Area of surface disturbance (ft^2)	0	0
Average thickness of topsoil (ft)	0	0
Average haul distance (ft)	0	0
Surface grade (%)	0%	3%
Volume of Topsoil (cy)	0	0
Topsoil Unit Cost per WDEQ Guideline No.12, App.C ($/cy)	$1.12	$1.12
Subtotal Topsoil Application Costs	$0	$0
D. Discing/Seeding		
Assumptions:		
Area of surface disturbance (acres)	0.0	0.0
Discing/Seeding Unit Cost ($/acre)	$280	$280
Subtotal Discing/Seeding Costs	$0	$0
Subtotal Reclamation Costs per Pond	$0	$0
Total Settling Basin/Evap. Ponds Reclamation Costs	**$0**	
V. Miscellaneous Structures		
A. Potable Water Wells		
Total Depth (ft) (1- 5-inch Diameter Wells, @ 750 ft)	700	
Well Abandonment Unit Cost ($/100 ft) - per State Engineers Office	$63.10	
Subtotal Potable Water Wells Abandonment Costs	$441.70	
B. Fuel Area		
Concrete Floor		
Area of Concrete Floor (ft^2)		
Demolition Unit Cost per WDEQ Guideline No.12,App.K ($/ft^2)	$3.40	
Subtotal Concrete Floor Demolition Costs	$0	
Concrete Footing		
Length of Concrete Footing (ft)	0	
Demolition Unit Cost per WDEQ Guide. No.12,App.K ($/lin. ft)	$12.22	
Subtotal Concrete Footing Demolition Costs	$0	
Subtotal Fuel Area Costs	$0	
Total Miscellaneous Structures Reclamation Costs	**$441.70**	
Well Replacement Costs	**$20,000**	
TOTAL MISCELLANEOUS RECLAMATION COSTS	**$225,203**	

CLAY LINER REMOVAL AND LOADING						
Clay Liner Removal and Loading Cost						
	Labor =	17	per hour			Based on current labor rates
	Trackhoe =	$ 1,125.00	per week or	$ 28.13	per hour	All Inclusive, based on current rental rates
	Belly Dump with Operator =	$ 100.00	per hour			Based on current contractor pricing
	Belly Dump Size =	20	cubic yards			
	Disposal Rate =	40	yards/hour			Estimate based on experience
	TOTAL REMOVAL AND LOADING	**$ 3.63**	**per cubic yard**			

WELLFIELD BUILDING REMOVAL AND DEMO					
Cost per Well Head Cover					
	Env. Scanner :	17	per hour		Based on current labor rates
	Operator =	17	per hour		Based on current labor rates
	Total Wellhead	2300			
	HCl 35% Cost	$ 0.137	per pound		Based on current Univar costs for bulk HCl - April 2007
	Acid Usage Ra	4.1	pounds per wellhead cover		Estimate based on experience
	Acid Unit Cost	$ 0.56	per wellhead cover		
	Total Labor Ra	$ 39.70	per hour		
	Cleaning Rate	10	wellheads per hour		Estimate based on experience
	Survey / Deco	**$ 3.97**	**per wellhead cover**		
Cost per Header House					
	Env. Scanner :	17	per hour		Based on current labor rates
	Operator =	17	per hour		Based on current labor rates
	Number of Op	2			Based on experience
	HCl 35% Cost	$ 0.137	per pound		Based on current Univar costs for bulk HCl - April 2007
	Acid Usage Ra	20	pounds per header house		Estimate
	Acid Unit Cost	$ 2.74	per header house		
	Total Labor Ra	$ 311.64	per hour		
	Cleaning Rate	1	header house per day		Estimate based on experience
	Survey / Deco	**$ 311.64**	**per header house**		

ACID WASH							
Current acid cost is $275/ ton or .1375per lb.							
Commercial Concentrated acid is 37%							
Assume a 10% wash solution the price of the wash solution is $.012 per gallon							
Assume that .25 gallon of acid wash is used per sq ft. to clean walls.							
Assume that 1 gallon of acid wash is used per sq ft. to clean floors.							
Using the square footage supplied in the bond the following assumptions were used to							
generate the cost per square ft multiplier.							
Using the CPP IX and Plant square footages the assumption is as follows							
Acid Wash (Walls)							
Labor	2	Men		Bond CPP IX and CPP sq. footage			
Rate	$17	hr.					
Time	20	8hr. Days					
Man Lift Rental	$8,900.00	Month					
Labor Cost per sq. ft.	$0.54						
Acid	$0.003						
Consumables	$0.05						
Total	$0.59						
Acid Wash (Floors)							
Labor	2	Men		Bond CPP IX and CPP sq. footage			
Rate	$17	hr.					
Time	15	8hr. Days					
Labor Cost per sq. ft.	$0.15						
Acid	$0.01						
Consumables	$0.05						
Total	$0.21						

RADIUM TREATMENT					
	HUP SURETY ONLY				
Assumptions:					
1.	Based on actual operating costs				
Radium Treatment Costs per 1000 Gallons					
	Chemical	= $	0.177		
	Filtration	= $	0.021		
	Electricity	= $	0.048		
	By Product Disposal of Sludge	= $	0.097		
TOTAL RADIUM TREATMENT COSTS PER 1000 GALLONS		**= $**	**0.34**		

GROUNDWATER SWEEP (GWS)

Assumptions:

1. All pumps are 5 hp pumping at 5.0 gpm
2. Cost of electricity from Recurring Cost Sheet
3. All water pumped is disposed at WDW with a 20 hp pump
4. Repair and maintenance costs estimated at $0.50/1000 gallons, Operator Experience
5. Process sampling and analysis costs estimated at $0.03/1000 gallons, Operator Experience
6. Labor costs are not included

Wellfield Pumping Costs per 1000 Gallons

$$\frac{1000\ \text{gal}}{} \times \frac{5\ \text{hp}}{5\ \text{gpm}} \times \frac{1\ \text{hr}}{60\ \text{min}} \times \frac{0.746\ \text{kwh}}{\text{hp}} \times \frac{\$\ 0.051}{\text{kwh}} = \$\ 0.63$$

Pumping to WDW Costs per 1000 Gallons

$$\frac{1000\ \text{gal}}{} \times \frac{75\ \text{hp}}{200\ \text{gpm}} \times \frac{1\ \text{hr}}{60\ \text{min}} \times \frac{0.746\ \text{kwh}}{\text{hp}} \times \frac{\$\ 0.051}{\text{kwh}} = \$\ 0.24$$

Repair and Maintenance Costs per 1000 Gallons = $ 0.5

Process Sampling and Analysis Costs per 1000 Gallons = $ 0.03

TOTAL GWS COSTS PER 1000 GALLONS **= $ 1.40**

REVERSE OSMOSIS (RO)									
Assumptions:									
1.	Cost of electricity from Recurring Cost Sheet								
2.	75% permeate/25% reject split								
3.	Membrane life of 5 years with a cost of $700 per membrane element								
4.	Includes cost of pumping from wellfield to RO Unit								
5.	Process sampling and analysis costs estimated at $0.03/1000 gallons - Operator Experience								
6.	Labor costs are not included								
Reverse Osmosis Costs per 1000 Gallons								**Chemical Costs**	
	Electricity				= $	0.48			
	Chemicals				= $	$0.13		Scale Inhibitor	$2.00 $/lb
	Membrane Replacement				= $	$0.06		Dose Rate	6.75 ppm
	Repair and Maintenance				= $	0.26		RO Flow	400 gpm
	Process Sampling and Analysis				= $	0.03			
								lbs scale/1000gal	0.056330727
TOTAL RO COSTS PER 1000 GALLONS					**= $**	**0.96**			
								Cost per 1000 gal	$0.11
								Cleaning Chemicals	0.02
								Total Chemical Cost	$0.13
								Membrane Replacement	
								For 400gpm RO	400
								Number of membranes	96
								Cost per Membrane	$600.00
								Years of Life	5
								Labor to Change Membrane	$480.00
								Cost per 1000 gal	$0.06

REVERSE OSMOSIS (RO) pg2							
	Electrical Costs						
	for 400gpm RO						
	Mine Unit						
	Charge Pumps						
	Mine Unit Feed	Motor HP	Motor Quantity	KW			
	Deep Disposal Charge Pump	3	40	89.52			
		50	2	74.6			
		60	1	44.76			
		60	1	44.76			
			Total Installed KW	253.64			
			Cost per Hour	$11.41			
			Cost pre 1000gal	$0.48			

CHEMICAL REDUCTANT			
Assumptions:			
1.	Bioremediation is utilized		
2.	Based on actual operating costs during restoration activities		
3.	Added the cost of using cheese whey		
TOTAL CHEMICAL REDUCTANT COSTS PER Kgal		**= $**	**0.30**

ELUTION PROCESSING		
Assumptions:		
1. Based on actual operating costs		
TOTAL PROCESSING COSTS PER ELUTION	**= $**	**1198**

DEEP WELL INJECTION

Assumptions:

1. Pump 150 hp pumping at 100 gpm
2. Cost of electricity from Recurring Cost Sheet
3. Repair and maintenance costs based on average injection volume of 8,000,000 gallons per year
4. Repair and maintenance costs estimated at $.50/1000 gallons, Operator Experience
5. Chemical costs based on average injection volume of 8,000,000 gallons per year
6. Labor costs are not included

Waste Disposal Pumping Costs per 1000 Gallons

$$\frac{1000 \text{ gal}}{} \times \frac{150 \text{ hp}}{100 \text{ gpm}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{0.746 \text{ kwh}}{\text{hp}} \times \frac{\$ 0.051}{\text{kwh}} = \$ 0.95$$

Repair and Maintenance Costs per 1000 Gallons = $ 0.5

TOTAL DEEP WELL INJECTION COSTS PER 1000 GALLONS = $ **1.45**

WELL ABANDONMENT														
Assumptions:														
1	**Typical 8 hour working day**													
2	Trackhoe for 8.0 hr/day to dig and reclaim pit													
3	Use hose reel for 8 hr/day to pull equipment from well													
4	Use cementer for 8.0 hr/day to pump cement/plug gel													
5	Use tow vehicle for 8.0 hr/day to tow hose reel and cementer													
6	Labor for backhoe, hose reel, cementer will require 3 workers at 8.0 hr/day													
	Materials include 7.5 sacks of cement/100 ft and 1 sack of plug gel/100 ft of 5" well casing.													
	Cost of cement is $7.62 and plug gel cost is $6.45/sack.													
	Cement costs for 2007 = GCC Dakota Cement; Plug gel costs for 2007 = Casper Well Products													
	Fixed Costs													
	Trackhoe													
		8	hours	X	$	28.1	per hour				=$	225.00		
	Hose Reel/Tow Vehicle													
		8	hours	X	$	45	per hour				=$	360.00		
	Cementer													
		8	hours	X	$	45	per hour				=$	360.00		
	Tow Vehicle													
		8	hours	X	$	45	per hour				=$	360.00		
	Labor													
3	men=	24	man	X	$	17	per man				=$	409.02		
			hours				hour							
			Total Fixed Costs per 8.0 hr/day								=$	1714.02		
	Variable Costs				(per 100 ft of well depth)									
	Materials													
		7.5	sack cement		X		$	7.62	per		=$	57.15		
			per 100 feet						sack					
		1	sack plug gel		X		$	6.45	per ho		=$	6.45		
			per 100 feet						plug					

WELL ABANDONMENT Page 2														
	Total materials Cost (per 100 ft of well depth)									$	63.60			
	Total number of wells completed per/day													
			6											
	Cost per Well per Unit of Average Depth													
					Well Depth (ft)									
						450				**=$**	**333**			
						500				**=$**	**339**			
						550				**=$**	**344**			
						600				**=$**	**349**			
						650				**=$**	**355**			
						700				**=$**	**360**			
						750				**=$**	**365**			
						800				**=$**	**370**			
						850				**=$**	**376**			
						900				**=$**	**381**			
						950				**=$**	**386**			

FIVE YEAR MECHANICAL INTEGRITY TESTS (MIT)															
Assumptions:															
1	Pulling Unit for 8.0 hr/day per Recurring Cost Sheet														
2	MIT Unit for 8.0 hr/day per Recurring Cost Sheet														
3	Labor for operation of pulling unit will require 2 workers at $17/hr														
4	Labor for operation of MIT Unit will require 1 worker at $17/hr														
5	Average wells plugged per day is 6														
MIT Costs per Well															
Equipment:															
	Pulling Unit														
		8	hours	X	$	45	per hour						=$	360.00	
	MIT Unit														
		8	hours	X	$	45	per hour						=$	360.00	
Labor:															
	Pulling Unit														
		8	hours	X	$	17.04	per hour	X	2	workers			=$	$272.68	
	MIT Unit														
		8	hours	X	$	17.04	per hour						=$	136.34	
							TOTAL MIT COST PER DAY						**=$**	1129.00	
	Wells Completed					6	per day								
Well Replacement Fittings, Hose, etc ($150) & 1 hour labor ($35)														185	
							MIT COSTS PER WELL						**=$**	373.17	

MAIN PIPELINE REMOVAL													
Assumptions:													
1.	Trenching with trackhoe at 750 ft/day												
2.	Pipeline extraction and backfilling with trackhoe at 750 ft/day												
3.	Trackhoe rental: $1,125/week all inclusive fuel, maintenance, mob												
5.	Trackhoe operation requires 1 worker at $17/hour												
6.	Pipeline extraction requires 2 workers at $17/hour (in addition to trackhoe operator)												
7.	Pipelines removed simutaneously												
8.	Includes removal of manholes												
9.	Operating schedule: 8 hrs/day, 5 days/week												
Main Pipeline Removal Costs per ft of Trench													
Equipment													
	Trackhoe												
		$ 1125 / week	X	1 week / 5 days	X	1 days / 750 ft		=$	0.30				
Labor													
	Trackhoe Operation												
		$ 17 / man hr	X	8 man hrs / 1 day	X	1 days / 750 ft		=$	0.18				
	Pipeline Extraction												
		$ 17 / man hr	X	16 man hrs / 1 day	X	2 day / 750 ft		=$	0.36				
MAIN PIPELINE REMOVAL COST PER FT OF TRENCH									**=$**	**0.84**			

WELLFIELD PIPING REMOVAL													
Assumptions:													
1.	Trenching with backhoe at 1500 ft/day												
2.	Pipeline extraction and backfilling with backhoe at 1500/day												
3.	Backhoe rental: $1,125/week, all inclusive fuel, maintenance, mob												
4.	Backhoe operation requires 1 worker at $17/hour												
5.	Pipeline extraction requires 2 workers at $17/hour (in addition to trackhoe operator)												
6.	Operating schedule: 8 hrs/day, 5 days/week												
Main Pipeline Removal Costs per ft of Pipe													
Equipment													
	Backhoe												
		$ 1125 / week	X	1 week / 5 days		X	1 days / 1500 ft			=$	0.15		
Labor													
	Backhoe Operation												
		$ 17 / man hr	X	8 man hrs / 1 day		X	1 days / 1500 ft			=$	0.09		
	Pipeline Extraction												
		$ 17 / man hr	X	16 man hrs / 1 day		X	1 day / 1500 ft			=$	0.18		
	MAIN PIPELINE REMOVAL COST PER FT OF PIPE									**=$**	**0.420**		

WELLFIELD ROAD RECLAMATION

Assumptions (Roads constructed before January 1, 1997):

1. Gravel road base removed at cost of $0.86/cy/1000 ft (WDEQ Guideline No. 12, App. C, Level Ground, 500 ft haul)
2. Gravel road base: average depth = 0.25 ft, average width = 10 ft
3. Roads scarified prior to topsoil application at cost of $41.87/acre (WDEQ Guideline No. 12, Appendix P)
4. Grading of scarified roads prior to topsoil application at cost of $45.65/acre (WDEQ Guideline No. 12, Appendix G)
5. Topsoil applied at cost of $0.866/cy/1000 ft (WDEQ Guideline No. 12, App. C, Level Ground, 500 ft haul)
6. Stripped topsoil: average depth = 0.67 ft, average width = 25 ft
7. Discing/seeding cost of $280/acre is based on actual contractor costs

Gravel Road Base Removal Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{0.25\ ft}{} \times \frac{10\ ft}{} \times \frac{1\ cy}{27\ ft^3} \times \frac{\$0.87}{cy} = \$\ 80$$

Scarification Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{25\ ft}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$41.87}{acre} = \$\ 24$$

Grading Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{25\ ft}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$45.65}{acre} = \$\ 26$$

Topsoil Application Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{0.67\ ft}{} \times \frac{25\ ft}{} \times \frac{1\ cy}{27\ ft^3} \times \frac{\$0.87}{cy} = \$\ 537$$

Discing/Seeding Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{25\ ft}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$280}{acre} = \$\ 161$$

TOTAL WELLFIELD ROAD RECLAMATION COSTS PER 1000 FT OF ROAD (BEFORE JANUARY 1, 1997) = $ 828

Assumptions (Roads constructed after January 1, 1997):

1. Gravel road base will not be removed
2. Roads scarified prior to topsoil application at cost of $41.87/acre (WDEQ Guideline No. 12, Appendix P)
3. Grading of scarified roads prior to topsoil application at cost of $45.65/acre (WDEQ Guideline No. 12, Appendix G)
4. Topsoil applied at cost of $0.86/cy/1000 ft (WDEQ Guideline No. 12, App. C, Level Ground, 500 ft haul)
5. Stripped topsoil: average depth = 0.4 ft, average width = 20 ft
6. Discing/seeding cost of $280/acre is based on actual contractor costs

Scarification Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{20\ ft}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$41.87}{acre} = \$\ 19$$

Grading Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{20\ ft}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$45.65}{acre} = \$\ 21$$

Topsoil Application Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{0.40\ ft}{} \times \frac{20\ ft}{} \times \frac{1\ cy}{27\ ft^3} \times \frac{\$0.87}{cy} = \$\ 257$$

Discing/Seeding Costs per 1000 ft of Road

$$\frac{1000\ ft}{} \times \frac{20\ ft}{} \times \frac{1\ acre}{4.356E{+}04\ ft^2} \times \frac{\$280}{acre} = \$\ 129$$

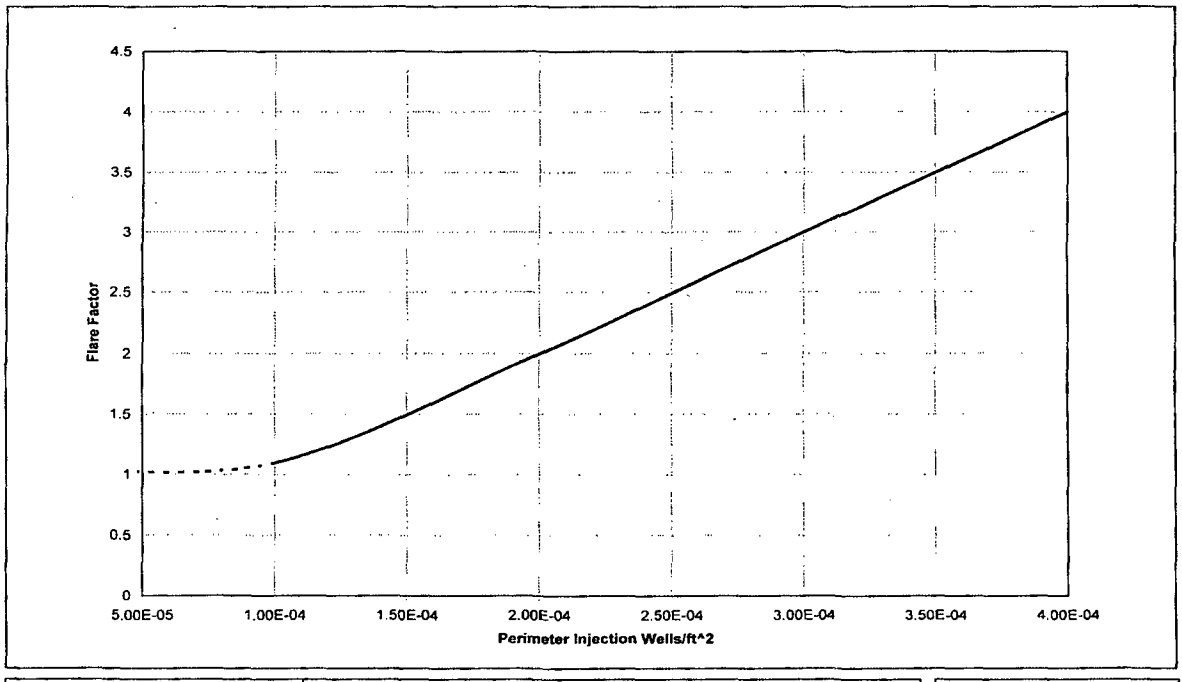
TOTAL WELLFIELD ROAD RECLAMATION COSTS PER 1000 FT OF ROAD (AFTER JANUARY 1, 1997) = $ 426

DISKING/SEEDING									
Assumptions:									
1.	Based on actual contractor costs in 2007								
2.	Drill Seeding $250/Acre - based on contractor estamate 6/2007								
3.	Seed cost $30/Acre - Based on 5/07 seed costs at SRHUP								
TOTAL DISKING/SEEDING COSTS PER ACRE					**= $**	**280.00**			

FLARE FACTOR CALCULATION

Assumptions:

1. Flare Factor Conservatively Estimated from Figure 3-16, Lewis Water Consultants, Inc., Oct. 1999 (below)
2. Number of Perimeter Injection Wells per sq.ft. estimated from wellfield spacing, total area, and perimeter area



Lewis Water Consultants
Environmental Science/Engineering/Modeling

RAMC Smith Ranch Facility

Figure 3-16. Predicted wellfield flare factor for RAMC commercial wellfields, as a function of wellfield scale

Date:	9/14/99
Project:	RAMC Wellfield Evaluation
File:	land.ppt

PORE VOLUME AND RESTORATION TIMING CALCULATION

Assumptions:

1. Pore Volumes required for wellfield resoration are conservatively estimated from Table 3-2, Lewis Water Consultants, Inc., Oct. 1999 (below)
2. Restoration Target is Return to Class of Use, Class I Groundwater (WDEQ)
3. Conservatively Assumes 1PV groundwater sweep, 3PVs RO with Reductant added to final 2 PVs of RO stream (4PV's total)
4. Restoration Timing is conservatively estimated at 2 years for all wellfields based on 400 gpm sweep rate and largest wellfield affected volume (Wellfield 15) at Smith Ranch.

Table 3-2. Predicted Wellfield 1 Restoration Timing

Constituent	Restoration Target (Background)	Number of Pore Volumes to Meet Target	Time Required to Meet Target (Baseline), days	Restoration Target (Class of use[a])	Number of Pore Volumes to Meet Target	Time Required to Meet Target (Class-of-Use)days
U	0.168	3.2	150	5	1.8	86
Se	0.001	3.2	150	0.01	2.3	109
Cl	4.176	4.4	210	250	0	0
SO_4	113.125	3.8	179	250	2.5	117
HCO_3	228.194	2.3	109	na	na	na
Ca	72.617	3.8	179	na	na	na
Na	22.525	3.2	150	na	na	na
As	0.001	3.0	141	0.05	0	0
B	0.100	3.2	150	0.75	0	0
Fe	0.065	0	0	0.3	0	0
Mn	0.022	4.4	210	0.05	3.4	160
Mg	17.364	3.2	150	na	na	na
K	7.269	3.2	150	na	na	na
F	0.322	3.2	150	2.4	na	na
SiO_2	16.975	3.2	150	na	na	na
Zn	0.010	3.2	150	5	0	0

[a] -- standards listed are for Wyoming Class I ground water, although baseline wellfield ground water does not meet this standard due to excessive radium.

Abbreviations/Acronyms						
$	Dollars					
$/Kgal	Dollars per 1000 gallons					
avg	average					
ft	feet					
ft2	square feet					
ft3	cubic feet					
gal	gallon					
gpm	gallons per minute					
H&S	Health and Safety					
H2S	Hydrogen Sulfide					
H2SO4	Sulfuric Acid					
HCl	Hydrochloric Acid					
Hp	Horsepower					
Kgal	1000 gallons					
Kwh	Kilowatt-hours					
NaOH	Caustic Soda					
OD	Outside Diameter					
PPE	personal protective equipment					
PV	Pore Volume Estimate					
reqm't	requirement					
RO	Reverse Osmosis					
WDW	Waste Disposal Well					
yd3	cubic yards					
yr	year					

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: "FIGURE 1, HORIZONTAL SCALE AS DESIGNATED VERTICAL SCALE 1"= 80'"

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