40-8943

CROW BUTTE RESOURCES, INC.

86 Crow Butte Road
P.O. Box 169
Crawford, Nebraska 69339-0169

(308) 665-2215
(308) 665-2341 – FAX

September 8, 2003

Mr. Michael Linder
Director
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

Subject: Class III Underground Injection Control Permit Number NE 0122611
Class I Underground Injection Control Permit Number NE 0206369
2004 Surety Estimate

Dear Mr. Linder:

Attached is the annual update to the surety estimate for the Crow Butte Uranium Mine. The estimate for 2004 is $14,907,810, a 16.3 percent increase over the 2003 surety estimate. Significant changes to the surety estimate for 2004 include the following items:

1. Mine Unit 1 was removed from the groundwater restoration cost estimate based on approval of Mine Unit 1 by the U.S. Nuclear Regulatory Commission (NRC) in February 2003. NDEQ had previously approved Mine Unit 1 in 1999;
2. All Mine Unit 1 wells with the exception of 3 producers and 11 perimeter monitor wells were removed from disposal costs for downhole pipe, stingers, and pumps and well abandonment costs. The unit cost for well abandonment was also changed to reflect the experience gained this summer abandoning Mine Unit 1 wells;
3. The estimate includes the operation of seven wellhouses in Mine Unit 8 and four wellhouses in Mine Unit 9 by the end of 2004. Sixty wells are also projected for Mine Unit 10. These additional mining areas resulted in significant increases in the groundwater restoration and wellfield reclamation costs;
4. The floor and wall areas for the Main Plant were increased to allow for the new drum storage area and two yellowcake dryers were left on the surety estimate;
5. The waste disposal costs were revised to reflect the new disposal contract with IUSA.
6. The annual escalation of 2.1% based on the Consumer Price Index was applied to labor and some materials. Many items were rebaselined.

Upon approval, Crow Butte Resources, Inc. will provide a secured letter of credit on the renewal date to the State of Nebraska in an amount equal to the updated surety estimate.

NM5501

If you have any questions or require any further information, please do not hesitate to call me at (308) 665-2215.

Sincerely,
CROW BUTTE RESOURCES, INC.

Michael Griffin
Manager of Health, Safety, and Environmental Affairs

Enclosure

cc: Ms. Susan Frant, Branch Chief
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety and Safeguards
c/o Document Control Desk
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

U.S. Nuclear Regulatory Commission
Mr. John Lusher - ADDRESSEE ONLY
Fuel Cycle Licensing Branch
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Washington, DC 20555

Steve Collings – CBR, Denver

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2003-2004 Surety Estimate
(Revised September 2003)

Total Restoration and Reclamation Cost Estimate			
I.	Groundwater Restoration (Sheets 8 to 10)		$7,293,990
II.	Wellfield Reclamation (Sheets 11 to 14)		$3,493,370
III.	Commercial Plant Reclamation/Decommissioning (Sheets 15 to 18)		$350,304
IV.	R.O. Building Reclamation/Decommissioning (Sheets 15 to 18)		$51,515
V.	Evaporation Pond Reclamation (Sheets 19 to 22)		$530,174
VI.	Miscellaneous Site Reclamation (Sheets 23 to 25)		$111,029
VII.	Deep Disposal Well Reclamation (Sheet 26)		$70,458
VIII.	I-196 Brule Aquifer Restoration (Sheets 27 to 28)		$25,408
	Subtotal Reclamation and Restoration Cost Estimate		$11,926,248
	Contract Administration	10%	$1,192,625
	Contingency	15%	$1,788,937
	TOTAL		$14,907,810

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2003-2004 Surety estimate
(Revised September 2003)

Cost Element Summary

	2004	2003	Change
Groundwater Restoration			
Groundwater Sweep			
Total Gallons Processed (Kgal)	315,518	292,515	23,003
Total Cost	$171,790	$156,555	$15,235
RO Treatment			
Total Gallons Processed (Kgal)	1,893,108	1,755,089	138,019
Total Cost	$3,843,960	$3,469,935	$374,025
Recirculation			
Total Gallons Processed (Kgal)	315,518	292,515	23,003
Total Cost	$224,613	$207,655	$16,958
Sampling and Monitoring			
Total On Site Samples	19,225	17,739	1,486
Total On Site Analysis Costs	$903,030	$815,994	$87,036
Total Contract Samples	1,870	1,927	(57)
Total Contract Analysis Costs	$280,500	$289,050	($8,550)
Wellfield Reclamation			
Pipeline Removal and Loading	$611,619	$479,729	$131,890
Well Abandonment			
Total Number of Wells	3,005	2,762	243
Total Abandonment Cost	$1,017,580	$508,992	$508,587
Site Reclamation			
Site Earthwork	$131,462	$126,790	$4,672
Plant and Equipment Decontamination			
Decontamination Costs	$62,657	$58,121	$4,537
Demolition Costs	$200,293	$198,453	$1,840
Piping Shredding Costs	$203,829	$181,297	$22,533
Transportation and Disposal			
Byproduct Material			
Soil-Type Materials, Total Volume (Yd3)	3,293	2,982	311
Soil-Type Materials, Total Cost	$441,296	$359,378	$81,918
Unpackaged Bulk Materials, Total Volume (Yd3)	1,712	1,594	118
Unpackaged Bulk Materials, Total Cost	$227,305	$184,797	$42,508

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2003-2004 Surety Estimate
(Revised September 2003)

Master Cost Basis

Mine Unit Data

		Mine Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10
Total number of production wells		3	52	57	96	189	194	179	210	120	0
Total number of injection wells		0	79	96	169	219	293	300	350	200	0
Total number of shallow monitor wells		0	3	3	11	25	28	25	30	20	30
Total number of perimeter monitor wells		11	10	10	18	27	32	16	25	20	30
Total number of restoration wells		10	12	18	43	33	33	46	23	13	0
Wellfield Area (ft2)		403,712	509,600	586,188	1,033,440	1,385,181	1,567,768	1,904,560	2,188,410	1,226,280	0
Wellfield Area (acres)		9.27	11.70	13.46	23.72	31.80	35.99	43.72	50.24	28.15	0.00
Affected Ore Zone Area (ft2)		403,712	509,600	586,188	1,033,440	1,385,181	1,567,768	1,904,560	2,188,410	1,226,280	0
Avg. Completed Thickness		19.6	16.3	12.5	12.9	14.5	15.4	12.6	13.2	15.8	0
Porosity		0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0
Affected Volume (ft3)		7,912,755	8,306,480	7,327,350	13,331,376	20,085,125	24,143,627	23,997,456	28,887,012	19,375,224	0
Kgallons per Pore Volume		17,164	18,018	15,894	28,918	43,569	52,372	52,055	62,662	42,029	0
Number of Patterns in Unit(s)											
	Current	38	52	57	96	187	187	200	100	60	0
	Estimated next report	0	0	0	0	2	7	-21	110	60	0
	Total Estimated	38	52	57	96	189	194	179	210	120	0
Number of Wells in Unit(s)											
Production Wells											
	Current	38	52	57	96	187	187	200	120	60	0
	Estimated next report	-35	0	0	0	2	7	-21	90	60	0
	Total Estimated	3	52	57	96	189	194	179	210	120	0
Injection Wells											
	Current	72	79	96	169	221	309	325	200	100	0
	Estimated next report	-72	0	0	0	-2	-16	-25	150	100	0
	Total Estimated	0	79	96	169	219	293	300	350	200	0
Shallow Monitor Wells											
	Current	3	3	3	11	25	28	25	29	20	0
	Estimated next report	-3	0	0	0	0	0	0	1	0	30
	Total Estimated	0	3	3	11	25	28	25	30	20	30
Perimeter Monitor Wells											
	Current	11	10	10	18	27	32	16	25	20	0
	Estimated next report	0	0	0	0	0	0	0	0	0	30
	Total Estimated	11	10	10	18	27	32	16	25	20	30
Number of Wells per Wellfield		14	144	166	294	460	547	520	615	360	60
Total Number of Wells		3180									
Average Well Depth (ft) - Deep Wells		665	631	774	698	675	515	762	500	770	500
Average Well Depth (ft) - Shallow Wells		200	200	200	200	200	200	200	200	200	200

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2003-2004 Surety Estimate
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Master Cost Basis

Electrical Costs			
	2003 Rate	2004 Est Rate	
Power cost	$0.05	$0.05	kwHr
Kilowatt to Horsepower	0.746	0.746	Kw/HP
Horsepower per gallon per minute	0.167	0.167	HP/gpm

Labor Rates			
	2003 Rate	2004 Est Rate (CPI)	
Operator Labor Cost	$120.91	$123.46	day
Engineer Cost	$6,747.82	$6,890.35	month
Radiation Technician Costs	$5,562.76	$5,680.26	month

Chemical Costs			
	2003 Rate	2004 Est Rate	
Antiscalant for RO (adj for current actual cost)	$15.91	$20.00	gal
Reductant	$0.280	$0.27	lb
Cement	*	$0.10	pound
Bentonite Tubes	*	$6.00	tube
Salt	$61.00	$61.00	ton
Plug Gel	$6.98	$6.30	sack
Well Cap	$10.42	$6.25	each
Hydrochloric Acid (adj for current actual cost)	$0.57	$0.62	gallon

* Basis changed from 2002 to use of bag cement, bentonite tubes.

Analytical Costs			
Guideline 8 (contract lab)	$150.00	$150.00	analysis
6 parameter (in-house)	$46.00	$46.97	analysis
Other (radon, bio, etc.)	$806.00	$823.03	month

Spare Parts			
	2003 Rate	2004 Est Rate (CPI)	
Restoration spare parts estimate	$17,507.41	$17,877.22	year

CPI Escalators (CPI-U, U.S. City Average)	
1988 CPI (average)	118.3
June 1991 CPI (deep well estimate)	136.7
2002 CPI (June 2002)	179.9
Current CPI (July 2003)	183.7
2004 Escalation Factor	1.021

Crow Butte Resources, Inc.
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Master Cost Basis

Equipment Costs

Equipment	Base Rental Rate ($/hr)	Labor Costs ($/hr)	Repair Reserve Costs ($/hr)	Fuel Costs ($/hr)	Mob & Demob ($/hr)	Total ($/hr)
Cat 924G Loader	$22.16	$15.43	$6.00	$3.00	$2.00	$48.59
Cat 416 Backhoe	$12.22	$15.43	$3.50	$3.00	$2.00	$36.15
Shredder	$12.00			inc	inc	$12.00
Cat D8N Bulldozer	$79.55	$15.43	$11.25	$10.99	$2.00	$119.22
Smeal	$42.00	inc	inc	inc	inc	$42.00
Mixing Unit	$12.00			inc	inc	$12.00
Drill Rig	$110.00	inc	inc	inc	inc	$110.00

Basis:
Cat 924G, 416 and D8N rental rates from Nebraska Machinery; others estimated.
Repair Reserve costs based on Caterpillar Performance Handbook, Edition 31.
Current diesel usage from Caterpillar Handbook, Edition 32, with current costs for off-road fuel: $0.999 gallon
Mob/Demob based on $2.08/mi at 90 miles one way x 2 trips/176 hours
Labor rate based on current operator labor rate

Pipe Volumes

Nominal Pipe Size	Wall Thickness (in.)	Pipe OD (in.)	Volume per foot (ft3/ft)
3/8-inch O2 hose		0.37500	0.03130
2-inch Sch. 40 downhole	0.15400	2.37500	0.00740
1-1/4-inch Sch. 40 stinger	0.14000	1.66000	0.00440
2-inch SDR 13.5 inj & prod.	0.14815	2.29630	0.00690
4-inch SDR 35	0.11430	4.22860	0.01030
6-inch Sch. 40 process pipe	0.28000	6.56000	0.03840
6-inch Trunkline	0.49100	6.56600	0.06510
8-inch Trunkline	0.63900	8.54800	0.11030
10-inch Trunkline	0.79600	10.65400	0.17120
12-inch Trunkline	0.94400	12.63700	0.24080

Master Cost Basis

Pipe Removal and Shredding Costs

Activity	Removal Rate (ft/man-day)	Shredding Rate (ft/man-day)	Labor Rate (day)	Activity Cost per foot
2-inch SDR 13.5 inj & prod. Removal	225		$123	$0.549
2-inch SDR 13.5 inj & prod. Shredding		1920	$123	$0.064
Trunkline Removal	100		$123	$1.235
Trunkline Shredding		100	$123	$1.235
Downhole Pipe Removal	2000		$123	$0.062
Downhole Pipe Shredding		2250	$123	$0.055
Downhole Hose Removal	1000		$123	$0.123
Waste and RO Building Pipeline Removal	67		$123	$1.851
Waste and RO Building Pipeline Shredding		1500	$123	$0.082

Waste Disposal Costs

Waste Form	Fee		Density Correction Factor (Tons/Yd3)	Fee per Cubic Yard	Transport Cost		Total Transportation and Disposal	
Soil, Bulk Byproduct Material	$100.00	per Ton	0.54	$54.00	$80.00	per Yd3	$134.00	per Yd3
Unpackaged Bulk Byproduct Material (e.g., pipe, equipment)	$125.00	per Ton	0.42	$52.50	$80.00	per Yd3	$132.50	per Yd3
Solid Waste (landfill)	$0.00925	per Lb			Incl.	per Lb	$0.00925	per Lb
Solid Waste (landfill)	$370.00	per Load			Incl.	per Load	$370.00	per Load
Void Factor (for disposal)	1.25							

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Master Cost Basis

Plant Dismantling

Plant Components:	Number	Units	Estimated Disposal Volume	Units
Contaminated Tanks	27	each	19.3	Ft3 each
Uncontaminated Tanks	7	each	19.3	Ft3 each
Pumps	30	each	5	Ft3 each
Downhole Pumps	550	each	0.5	Ft3 each
Contaminated Piping	4125	feet	See estimate by piping size and material	
Uncontaminated Piping	4125	feet		
Filters	4	each	100	Ft3 each
Dryer	2	each	400	Ft3 each
Average PVC Pipe Diameter (inches)	6			

Activity	Units	1988 Cost	
Dismantle interior steel, tanks, piping and electrical:		$	$66,600
Dismantle Plant Building		$	$43,800
Concrete floor removal rate	$/ft2		$2.72

Plant Decontamination

Direct Dispose Plant Floor Area	5450	ft2	Decon Solution (HCl) Floor Application Rate	2	gal/ft2
Uncontaminated Plant Floor Area	7000	ft2			
Decontaminated Plant Floor Area*	18146	ft2			
Average concrete thickness	0.5	ft			
Plant Wall Area*	25332	ft2	Decon Solution (HCl) Wall Application Rate	1	gal/ft2

* Increases to account for planned drum storage area for new dryer

Crow Butte Resources Inc.
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Ground Water Restoration

				Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10
I.	**Ground Water Sweep Costs**											
	PV's Required			1	1	1	1	1	1	1	1	0
	Total Kgals for Treatment			18018	15894	28918	43569	52372	52055	62662	42029	0
	Ground Water Sweep Unit Cost ($/Kgal)	(Sheet 23)		$0.544	$0.544	$0.544	$0.544	$0.544	$0.544	$0.544	$0.544	$0.544
	Subtotal Ground Water Sweep Costs per Wellfield			**$9,810**	**$8,654**	**$15,745**	**$23,722**	**$28,515**	**$28,342**	**$34,117**	**$22,883**	**$0**
Total Ground Water Sweep Costs				**$171,790**								
II.	**Reverse Osmosis Costs**											
	PV's Required			6	6	6	6	6	6	6	6	0
	Total Kgals for Treatment			108110	95367	173511	261412	314234	312332	375970	252172	0
	Reverse Osmosis Unit Cost ($/Kgal)	(Sheet 24)		$2.03	$2.03	$2.03	$2.03	$2.03	$2.03	$2.03	$2.03	$2.03
	Subtotal Reverse Osmosis Costs per Wellfield			**$219,519**	**$193,643**	**$352,313**	**$530,797**	**$638,853**	**$634,190**	**$763,498**	**$512,037**	**$0**
Total Reverse Osmosis Costs				**$3,843,960**								
III.	**Recirculation Costs**											
	PV's Required			1	1	1	1	1	1	1	1	0
	Total Kgals for Treatment			18018	15894	28918	43569	52372	52055	62662	42029	0
	Recirculation Unit Cost ($/Kgal)	(Sheet 25)		$0.71	$0.71	$0.71	$0.71	$0.71	$0.71	$0.71	$0.71	$0.71
	Subtotal Recirculation Costs per Wellfield			**$12,817**	**$11,315**	**$20,587**	**$31,016**	**$37,283**	**$37,057**	**$44,698**	**$29,920**	**$0**
Total Recirculation Costs				**$224,613**								
IV.	**Consumables**											
	Spare parts, filters and consumables =	$ 17,877	year									
	Active restoration period (months)			6.9	6.1	11.1	16.7	20.0	19.9	23.9	16.1	0.0
	Consumable usage (months restoration x annual rate estimate)			$10,259	$9,049	$16,465	$24,806	$29,818	$29,638	$35,676	$23,929	$0
	Subtotal Consumables per Mine Unit			**$10,259**	**$9,049**	**$16,465**	**$24,806**	**$29,818**	**$29,638**	**$35,676**	**$23,929**	**$0**
Total Consumables Costs				**$179,639**								

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Ground Water Restoration													
					Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10	
V.	Monitoring and Sampling Costs													
		Guideline 1 analysis =	$150	analysis										
		6 parameter in-house analysis =	$47	analysis										
		Total restoration wells			12	18	43	33	33	46	23	13	0	
		Total monitor wells			13	13	29	52	60	41	55	40	60	
		Groundwater sweep duration (months)			0.36	0.32	0.57	0.86	1.04	1.03	1.24	0.83	0.00	
		Reverse Osmosis duration (months)			6.17	5.44	9.90	14.92	17.94	17.83	21.46	14.39	0.00	
		Recirculation duration (months)			0.36	0.32	0.57	0.86	1.04	1.03	1.24	0.83	0.00	
		Stabilization duration (months)			6	6	6	6	6	6	6	6	0	
	A.	Restoration Well Sampling												
		1. Well Sampling prior to restoration start												
		# of Wells			12	18	43	33	33	46	23	13	0	
		$/sample			$150	$150	$150	$150	$150	$150	$150	$150	$150	
		2. Groundwater Sweep Sampling												
		# of Wells			12	18	43	33	33	46	23	13	0	
		Total # samples			12	18	43	33	66	92	46	13	0	
		$/sample			$47	$47	$47	$47	$47	$47	$47	$47	$47	
		3. RO Sampling												
		# of Wells			12	18	43	33	33	46	23	13	0	
		Total # samples			72	90	430	495	594	828	483	182	0	
		$/sample			$47	$47	$47	$47	$47	$47	$47	$47	$47	
		4. Recirculation Sampling												
		# of Wells			12	18	43	33	33	46	23	13	0	
		Total # samples			12	18	43	33	66	92	46	13	0	
		$/sample			$150	$150	$150	$150	$150	$150	$150	$150	$150	
		5. Stabilization Sampling												
		# of Wells			12	18	43	33	33	46	23	13	0	
		Total # samples			72	108	258	198	198	276	138	78	0	
		$/sample			$150	$150	$150	$150	$150	$150	$150	$150	$150	
		6. Monitor Well Sampling												
		# of Wells			13	13	29	52	60	41	55	40	60	
		$/sample			$47	$47	$47	$47	$47	$47	$47	$47	$47	
		Total # samples (2.2/mo for entire period)			369	345	1088	2591	3434	2336	3624	1941	0	
		7. Other Laboratory Costs												
		Radon, urinalysis, etc. =	$823	month										
		Total for Other Laboratory Costs:			$5,667	$4,999	$9,096	$13,704	$16,473	$16,373	$19,709	$13,220	$0	
	Subtotal Monitoring and Sampling Costs per Mine Unit				$41,346	$47,878	$134,019	$199,809	$253,325	$231,413	$245,833	$129,151	$0	
Total Monitoring and Sampling Costs					$1,282,772									

Crow Butte Resources Inc.
Crow Butte Uranium Project 2003-2004 Surety Estimate
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Ground Water Restoration										
		Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10
VI.	**Supervisory Labor Cost**									
	Engineer Support = $6,890 month									
	HP Technician support = $5,680 month									
	Active restoration period (months)	6.9	6.1	11.1	16.7	20.0	19.9	23.9	16.1	0.0
	Stabilization period (months)	6	6	6	6	6	6	6	6	0
	1 Engineer support during active restoration	$47,448	$41,855	$76,151	$114,729	$137,912	$137,077	$165,007	$110,674	$0
	2 HP Technician support during active restoration	$39,115	$34,504	$62,777	$94,580	$113,692	$113,004	$136,028	$91,238	$0
	3 Engineer support during final stabilization								$41,342	$0
	4 HP Technician support during final stabilization								$34,082	$0
	Subtotal Supervisory Labor per Mine Unit	**$86,563**	**$76,359**	**$138,928**	**$209,310**	**$251,604**	**$250,081**	**$301,035**	**$277,335**	**$0**
Total Supervisory Labor Costs										
TOTAL RESTORATION COST PER WELLFIELD		**$380,324**	**$346,898**	**$678,056**	**$1,019,459**	**$1,238,598**	**$1,210,721**	**$1,424,678**	**$995,256**	**$0**
TOTAL GROUND WATER RESTORATION COSTS		**$7,293,990**								

Crow Butte Resources Inc.
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Wellfield Reclamation										
	Mine Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10
Wellfield Piping										
Assumptions:										
Number of Wellhouses	2	3	3	5	7	7	6	7	4	0
Total Mine Unit surface area (acres)	9.27	11.70	13.46	23.72	31.80	35.99	43.72	50.24	28.15	0.00
Total length of 2-inch production and injection lines (ft)	30000	34000	39520	68900	106080	128700	136500	216500	107200	0
Total length of 3/8-inch hose (ft)					66300					
Total length 1-1/4-inch stinger pipe (ft)	0	47400	57400	101400	0	91200	97500	102000	30000	0
Total length of 2-inch downhole production pipe (ft)	900	20800	22800	38400	74800	74800	80000	74000	26400	0
Total Length of Trunkline (6-inch) (ft)	1000	1600								
Total Length of Trunkline (8-inch) (ft)	4400	1300	1450	5400	3700	2000	1000	3030	2700	0
Total Length of Trunkline (10-inch) (ft)										
Total Length of Trunkline (12-inch) (ft)			1500	2000	14100	10000	5000	13850	3500	0
Total Length of All Trunkline (ft)	5400	2900	2950	7400	17800	12000	6000	16880	6200	0
Total number of production wells	3	52	57	96	189	194	179	210	120	0
Total number of injection wells	0	79	96	169	219	293	300	350	200	0
Total number of shallow monitor wells	0	3	3	11	25	28	25	30	20	30
Total number of perimeter monitor wells	11	10	10	18	27	32	16	25	20	30
I. Production and Injection Piping										
A. Removal and Loading										
Production and Injection Piping Removal Unit Cost ($/ft of pipe)	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55
Subtotal Production and Injection Piping Removal and Loading Costs	*$16,462*	*$18,657*	*$21,686*	*$37,807*	*$58,209*	*$70,621*	*$74,901*	*$118,800*	*$58,824*	*$0*
B. Pipe Shredding										
Production and Injection Piping Shredding Unit Cost ($/ft of pipe)	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06	$0.06
Subtotal Production and Injection Piping Removal and Loading Costs	*$1,929*	*$2,186*	*$2,541*	*$4,431*	*$6,821*	*$8,276*	*$8,778*	*$13,922*	*$6,893*	*$0*
C. Equipment Costs										
Cat 924G Loader Unit Costs for removal	$25,915	$29,370	$34,138	$59,517	$91,634	$111,174	$117,912	$187,017	$92,602	$0
Shredder Unit Costs for shredding	$6,400	$7,253	$8,431	$14,699	$22,630	$27,456	$29,120	$46,187	$22,869	$0
Subtotal Equipment Costs	*$32,315*	*$36,623*	*$42,569*	*$74,216*	*$114,263*	*$138,630*	*$147,032*	*$233,204*	*$115,471*	*$0*
D. Transport and Disposal Costs (NRC-Licensed Facility)										
Chipped Volume Reduction (ft^3/ft)	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069
Chipped Volume per Wellfield (yd^3)	7.7	8.7	10.1	17.6	27.1	32.9	34.9	55.3	27.4	0.0
Volume for Disposal Assuming 25% Void Space (yd^3)	10	11	13	22	34	41	44	69	34	0
Transportation and Disposal Unit Cost ($/yd^3$) Unpackaged Bulk	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50
Subtotal Production and Injection Piping Transport and Disposal Costs	*$1,325*	*$1,458*	*$1,723*	*$2,915*	*$4,505*	*$5,433*	*$5,830*	*$9,143*	*$4,505*	*$0*
Total Production and Injection Piping Costs	**$52,031**	**$58,924**	**$68,519**	**$119,369**	**$183,800**	**$222,960**	**$236,541**	**$376,069**	**$185,693**	**$0**

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Wellfield Reclamation

		Mine Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10
II.	**Trunklines**										
	A. Removal and Loading										
	Trunkline Removal Unit Cost ($/ft of pipe)	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23
	Subtotal Trunkline Removal and Loading Costs	*$6,667*	*$3,580*	*$3,642*	*$9,136*	*$21,977*	*$14,816*	*$7,408*	*$20,841*	*$7,655*	*$0*
	B. Pipe Shredding										
	Trunkline Shredding Unit Cost ($/ft of pipe)	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23	$1.23
	Subtotal Trunkline Shredding Costs	*$6,667*	*$3,580*	*$3,642*	*$9,136*	*$21,977*	*$14,816*	*$7,408*	*$20,841*	*$7,655*	*$0*
	C. Equipment Costs										
	Cat 924G Loader Unit Costs for removal	$10,495	$5,636	$5,734	$14,383	$34,596	$23,323	$11,662	$32,808	$12,050	$0
	Shredder Unit Costs for shredding	$2,592	$1,392	$1,416	$3,552	$8,544	$5,760	$2,880	$8,102	$2,976	$0
	Subtotal Equipment Costs	*$13,087*	*$7,028*	*$7,150*	*$17,935*	*$43,140*	*$29,083*	*$14,542*	*$40,910*	*$15,026*	*$0*
	D. Transport and Disposal Costs (NRC-Licensed Facility)										
	Chipped Volume Reduction (6-inch) (ft^3/ft)	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651	0.0651
	Chipped Volume Reduction (8-inch) (ft^3/ft)	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103	0.1103
	Chipped Volume Reduction (10-inch) (ft^3/ft)	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712	0.1712
	Chipped Volume Reduction (12-inch) (ft^3/ft)	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408	0.2408
	Chipped Volume per Wellfield (yd^3)	20.4	9.2	19.3	39.9	140.9	97.4	48.7	135.9	42.2	0.0
	Volume for Disposal Assuming 25% Void Space (ft^3)	25.0	11.0	24.0	50.0	176.0	122.0	61.0	170.0	53.0	0.0
	Transportation and Disposal Unit Cost ($/$ft^3$)	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50
	Subtotal Transport and Disposal Costs	*$3,313*	*$1,458*	*$3,180*	*$6,625*	*$23,320*	*$16,165*	*$8,083*	*$22,525*	*$7,023*	*$0*
Total Trunkline Costs		**$29,734**	**$15,647**	**$17,614**	**$42,832**	**$110,413**	**$74,880**	**$37,440**	**$105,117**	**$37,358**	**$0**
III.	**Downhole Pipe**										
	A. Removal and Loading										
	Downhole Piping Removal Unit Cost ($/ft of pipe)	$0.062	$0.062	$0.062	$0.062	$0.062	$0.062	$0.062	$0.062	$0.062	$0.062
	Downhole Hosing Removal Unit Cost ($/ft of pipe)	$0.123	$0.123	$0.123	$0.123	$0.123	$0.123	$0.123	$0.123	$0.123	$0.123
	Removal of 1-1/4-inch stinger pipe	$0	$2,926	$3,543	$6,260	$0	$5,630	$6,019	$6,297	$1,852	$0
	Removal of downhole production pipe	$56	$1,284	$1,407	$2,371	$4,618	$4,618	$4,939	$4,568	$1,630	$0
	Removal of downhole hose	$0	$0	$0	$0	$8,186	$0	$0	$0	$0	$0
	Subtotal Downhole Piping Removal and Loading Costs	*$56*	*$4,210*	*$4,951*	*$8,630*	*$12,803*	*$10,248*	*$10,958*	*$10,865*	*$3,482*	*$0*
	B. Pipe Shredding										
	Downhole Piping Shredding Unit Cost ($/ft of pipe)	$0.055	$0.055	$0.055	$0.055	$0.055	$0.055	$0.055	$0.055	$0.055	$0.055
	Subtotal Downhole Piping Shredding Costs	*$49*	*$3,742*	*$4,401*	*$7,671*	*$4,104*	*$9,109*	*$9,740*	*$9,658*	*$3,095*	*$0*
	C. Equipment Costs										
	Smeal Unit Costs for removal	$50	$3,819	$4,491	$7,829	$4,189	$9,296	$9,940	$9,856	$3,158	$0
	Shredder Unit Costs for shredding	$19	$1,455	$1,711	$2,982	$1,596	$3,541	$3,787	$3,755	$1,203	$0
	Subtotal Equipment Costs	*$70*	*$5,274*	*$6,202*	*$10,811*	*$5,785*	*$12,837*	*$13,727*	*$13,611*	*$4,362*	*$0*
	D. Transport and Disposal Costs (NRC-Licensed Facility)										
	Chipped Volume Reduction - 1-1/4-inch stinger (ft^3/ft)	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044
	Chipped Volume Reduction - 2-inch downhole production (ft^3/ft)	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074	0.0074
	Volume Reduction - 3/8-inch hose (ft3/ft)	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313
	Chipped Volume - 1-1/4-inch stinger (ft^3)	0	209	253	446	0	401	429	449	132	0
	Chipped Volume - 2-inch downhole production (ft^3)	7	154	169	284	554	554	592	548	195	0
	Volume 3/8-inch hose (ft3)	0	0	0	0	2075	0	0	0	0	0
	Volume for Disposal Assuming 25% Void Space (yd^3)	0.3	16.8	19.5	33.8	121.7	44.2	47.3	46.1	15.2	0.0
	Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50	$132.50
	Subtotal Downhole Piping Transport and Disposal Costs	*$41*	*$2,224*	*$2,584*	*$4,480*	*$16,125*	*$5,857*	*$6,263*	*$6,112*	*$2,008*	*$0*
Total Downhole Piping Costs		**$216**	**$15,451**	**$18,138**	**$31,593**	**$38,817**	**$38,051**	**$40,687**	**$40,245**	**$12,946**	**$0**

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Wellfield Reclamation										
	Mine Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10
IV. **Surface Reclamation**										
A. Removal and disposal of contaminated soil around wells										
Volume of contaminated soil (0.37 yd3 per injection and production well)	1.11	48.47	56.61	98.05	150.96	180.19	177.23	207.2	118.4	0
Disposal of contaminated soil $134.00 per yd3	$149	$6,495	$7,586	$13,139	$20,229	$24,145	$23,749	$27,765	$15,866	$0
Equipment (Cat 924G loader at 2 yd3/hr)	$27	$1,178	$1,375	$2,382	$3,668	$4,378	$4,306	$5,034	$2,877	$0
Labor (1 man-hour per 2 Yd3)	$9	$374	$437	$757	$1,165	$1,390	$1,368	$1,599	$914	$0
Subtotal removal and disposal of contaminated soil	*$184*	*$8,047*	*$9,398*	*$16,277*	*$25,061*	*$29,914*	*$29,422*	*$34,398*	*$19,656*	*$0*
B. Recontour and seeding										
Recontour and seeding (est. $300/acre)	$2,780	$3,510	$4,037	$7,117	$9,540	$10,797	$13,117	$15,072	$8,445	$0
Subtotal Recontour and Seeding	*$2,780*	*$3,510*	*$4,037*	*$7,117*	*$9,540*	*$10,797*	*$13,117*	*$15,072*	*$8,445*	*$0*
Total Surface Reclamation	**$2,965**	**$11,556**	**$13,435**	**$23,395**	**$34,601**	**$40,711**	**$42,539**	**$49,469**	**$28,101**	**$0**
IV. **Well Houses**										
Total Quantity	2	3	3	5	7	7	6	7	4	0
Average Well House Weight (Lbs.)	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
A. Removal										
Dismantlement at 2-man-days per wellhouse (man-days)	4	6	6	10	14	14	12	14	8	0
Dismantlement Labor Costs	$494	$741	$741	$1,235	$1,728	$1,728	$1,482	$1,728	$988	$0
Equipment (Cat 924G at 2 hours per wellhouse) (hrs)	4	6	6	10	14	14	12	14	8	0
Equipment Costs	$194	$292	$292	$486	$680	$680	$583	$680	$389	$0
Subtotal Well House Dismantlement Costs	*$688*	*$1,032*	*$1,032*	*$1,721*	*$2,409*	*$2,409*	*$2,065*	*$2,409*	*$1,376*	*$0*
B. Disposal										
Total Disposal Weight (6000 lbs per wellhouse) (Lbs)	12000	18000	18000	30000	42000	42000	36000	42000	24000	0
Subtotal Disposal Costs	*$111*	*$167*	*$167*	*$278*	*$389*	*$389*	*$333*	*$389*	*$222*	*$0*
Total Well House Removal and Disposal Costs	$799	$1,199	$1,199	$1,998	$2,797	$2,797	$2,398	$2,797	$1,598	$0
TOTAL REMOVAL AND DISPOSAL COSTS PER WELLFIELD	**$85,744**	**$101,777**	**$118,905**	**$219,187**	**$370,429**	**$379,399**	**$359,604**	**$572,697**	**$265,697**	**$0**
TOTAL WELLFIELD BUILDINGS AND EQUIPMENT REMOVAL AND DISPOSAL COSTS	**$2,474,440**									

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Well Abandonment										
		Mine Unit 1	Mine Unit 2	Mine Unit 3	Mine Unit 4	Mine Unit 5	Mine Unit 6	Mine Unit 7	Mine Unit 8	Mine Unit 9	Mine Unit 10
I.	**Well Abandonment (Wellfields)**										
	# of Production Wells	3	52	57	96	189	194	179	210	120	0
	# of Injection Wells	0	79	96	169	219	293	300	350	200	0
	# of Perimeter Monitoring Wells	11	10	10	18	27	32	16	25	20	30
	# of Shallow Monitoring Wells	0	3	3	11	25	28	25	30	20	30
	Total Number of Deep Wells	14	141	163	283	435	519	495	585	340	30
	Total Number of Shallow Wells	0	3	3	11	25	28	25	30	20	30
	Average Diameter of Casing (inches)	5	5	5	5	5	5	5	5	5	0
	Production, Injection and Perimeter Well Average Depth (ft)	665	631	774	698	675	515	762	500	770	500
	Shallow Well Average Depth (ft)	200	200	200	200	200	200	200	200	200	200
	Total Mine Unit Well Depth (ft)	9310	89571	126762	199734	298625	272885	382190	298500	265800	21000
	Well Abandonment Unit Cost ($/ft. of well)	$0.5180	$0.5180	$0.5180	$0.5180	$0.5180	$0.5180	$0.5180	$0.5180	$0.5180	$0.5180
	Subtotal Abandonment Cost per Wellfield	**$4,823**	**$46,399**	**$65,665**	**$103,465**	**$154,693**	**$141,359**	**$197,981**	**$154,628**	**$137,689**	**$10,878**
II.	**Downhole Pump Disposal**										
	Number of Downhole Pumps	550									
	Pump Disposal Volume(ft3)	0.5									
	Total Pump Disposal Volume(yd3)	10.2									
	Downhole Pump Disposal Rate ($/yd3)	$132.50									
	Subtotal Downhole Pump Disposal	**$1,350**									
Total Wellfield Abandonment Costs		**$1,018,929**									

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Plant Equipment Decommissioning			Commercial Plant	R.O. Building
I.	**Removal and Loading Costs**			
	Tankage			
		Number of Contaminated Tanks	27	
		Volume of Contaminated Tank Construction Material (ft^3)	521	
		Number of Chemical Tanks	7	
		Disposal Void Factor	1.25	
	A.	Labor to Remove and Load Tankage		
		Number of Persons	2	
		Tanks/Day	1	
		Number of Days	34	
		$/Day/Person	$123	
		Subtotal Removal Labor Costs	*$8,396*	
	B.	Labor to Clean Chemical Tankage		
		Number of Persons	1	
		Tanks/Day	1	
		Number of Days	7	
		$/Day/Person	$123	
		Subtotal Cleaning Labor Costs	*$864*	
	C.	Equipment		
		Saws, scaffolding, etc.	$5,708	
		Subtotal Equipment Costs	*$5,708*	
Total Equipment Removal and Loading Costs			$14,968	
II.	**Transportation and Disposal Costs (NRC-Licensed Facility)**			
	A.	Tankage		
		Volume of Tank Construction Material (ft^3)	521	
		Volume for Disposal Assuming Void Space (yd^3)	24.1	
		Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$132.50	
		Subtotal Tankage Transportation and Disposal Costs	*$3,197*	
	B.	Contaminated PVC Pipe		
		Volume of Shredded PVC Pipe (ft^3)	158.4	
		Volume for Disposal Assuming Void Space (yd^3)	7.3	
		Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$132.50	
		Subtotal Contaminated PVC Pipe Transportation and Disposal Costs	*$972*	

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Plant Equipment Decommissioning				
			Commercial Plant	**R.O. Building**
	C.	Pumps		
		Volume of Process Pumps (yd^3) (no void factor used)	5.6	
		Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$132.50	
		Subtotal Pump Transportation and Disposal Costs	*$736*	
	D.	Filters (injection, backwash and yellowcake filters)		
		Volume of Filters (yd^3) (no void factor used)	14.8	
		Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$132.50	
		Subtotal Filter Transportation and Disposal Costs	*$1,963*	
	E.	Dryer		
		Dryer Volume (yd^3) (no void factor used)	29.6	
		Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$132.50	
		Total Dryer Transportation and Disposal Costs	*$3,926*	
	Total Contaminated Equipment Transportation and Disposal Costs		**$10,793**	
III.	**Transportation and Disposal (Solid Waste for Landfill Disposal)**			
	A.	Cleaned Tankage		
		Volume of Tank Construction Material (ft^3)	135	
		Number of Landfill Trips	1	
		Transportation and Disposal Unit Cost ($/Load)	$370	
		Subtotal Tankage Transportation and Disposal Costs	*$370*	
	B.	Uncontaminated PVC Pipe		
		Volume of Shredded PVC Pipe (ft^3)	158.4	
		Number of Landfill Trips	1	
		Transportation and Disposal Unit Cost ($/Load)	$370	
		Subtotal PVC Pipe Transportation and Disposal Costs	*$370*	
	Total Uncontaminated Equipment Transportation and Disposal Costs		**$740**	
IV.	**Supervisory Labor Costs During Plant Decommissioning**			
		Estimated Duration (months)	6	
		Engineer	$41,342	
		Radiation Technician	$34,082	
	Total Supervisory Labor Costs		**$75,424**	
SUBTOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS PER FACILITY			$101,925	
		Building Area (Ft2)	34,000	5,000
		Building Equipment Removal and Disposal Cost per Square Foot	$3.00	$3.00
TOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS			**$101,925**	**$14,989**

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Building Demolition				
			Commercial Plant	R.O. Building
I.	Decontamination Costs			
	A.	Wall Decontamination		
		Area to be Decontaminated (ft^2)	25,332	
		HCl Application Rate (Gallons/ft^2)	1	
		HCl Acid Cost	$0.62	
		Subtotal Wall Decontamination Materials Costs	$15,579	
	B.	Concrete Floor Decontamination		
		Area to be Decontaminated (ft^2)	18146	
		HCl Application Rate (Gallons/ft^2)	2	
		HCl Acid Cost	$0.62	
		Subtotal Floor Decontamination Materials Costs	$22,320	
	C.	Decontamination Labor		
		Labor (man-days)	60	
		Subtotal Decontamination Labor Cost	$7,408	
	D.	Decontamination Equipment Costs		
		Sprayer pump	$500	
		Recycle pump	$500	
		Sprayer with hose	$1,000	
		Subtotal Decontamination Equipment Costs	$2,000	
	E.	Decontamination Waste Disposal (to Ponds)		
		Total gallons HCl waste	61,624	
		Pumping costs (5 HP/30 gpm)	$383	
	Subtotal Decontamination Costs		$47,690	
	Total Decontamination Costs		**$47,690**	
II.	Demolition Costs			
		Assumptions (based on costs to move plant from Texas in 1988):		
		Dismantling interior steel, tanks, pumps, etc.	$66,600	
		Dismantling plant building	$43,800	
	A.	Building Dismantling		
		Dismantle interior components (1988 $'s escalated by CPI)	$101,279	
		Plant building dismantling (1988 $'s escalated by CPI)	$66,607	
		Subtotal Building Dismantling	*$167,886*	
	B.	Concrete Floor Removal		
		Area of direct-dispose concrete floors (ft2)	5,450	
		Removal Rate ($/ft2)	$2.72	
		Subtotal Concrete Floor Removal	*$14,824*	
	Total Demolition Costs		**$182,710**	

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Building Demolition				
			Commercial Plant	R.O. Building
III.	**Disposal Costs**			
	A.	Concrete Floor		
		Area of Direct-Dispose Concrete Floor (ft^2)	5,450	
		Average Thickness of Concrete Floor (ft)	0.5	
		Volume of Concrete Floor (ft^3)	2,725	
		Volume of Concrete Floor (Yd3)	101	
		Transportation and Disposal Unit Cost ($/$Yd^3$) (Unpackaged Bulk)	$132.50	
		Subtotal Concrete Floor Disposal Costs	*$13,373*	
	Total Disposal Costs		**$13,373**	
IV	**Plant Site Reclamation**			
	A.	Plant Site Earthwork		
		Material to be Moved (Yd3)	20,000	
		D8N Bulldozer Earthwork Rate (Yd3/hr)	700	
		D8N Hourly Rate	$119	
		Subtotal Plant Site Earthwork	*$3,406*	
	B.	Revegetation		
		Area requiring Revegetation (Ac)	4	
		Revegetation Unit Cost ($/Ac)	$300	
		Subtotal Plant Site Revegetation	*$1,200*	
	Total Plant Site Reclamation Costs		**$4,606**	
SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS			$248,379	
		Building Area (Ft2)	34,000	5,000
		Building Demolition Cost per Square Foot	$7.31	$7.31
TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS			**$248,379**	**$36,526**

Crow Butte Resources, Inc.
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Evaporation Pond Reclamation			
		Commercial Ponds	**R&D Ponds**
Assumptions/Data:			
Number of Ponds		3	2
Area of Ponds (ft2)		250,000	50,000
Thickness of Liner Material (ft)		0.00833	0.0030
Leak detection piping size (in)		4	3
Leak detection piping length (ft/pond)		2,100	600
Earthwork Requirements (Yd3/pond)		60,000	30,000
Surface Restoration/Revegetation (Acres)		20	10
Sludge Production Rate (Yd3 sludge/gal)			0.000000102
(1 Yd3 sludge/9,772,000 gal R&D Phase)			
Estimated 1991 to 2004 Total Production (gallons)		22,036,193,000	
Liner Removal Rate (ft2/man-day)		10,000	10,000
Sludge Removal Rate (Yd3/man-day)		8.33	8.33
I. Pond Liner and Piping Removal			
A. Pond Liner and Piping Removal Labor			
Area of Ponds		750,000	100,000
Liner Removal Rate (ft2/Man-Day)		10,000	10,000
Total Man-Days		75	10
Labor Rate ($/man-day)		$123.46	$123.46
Subtotal Liner and Piping Removal Labor Costs		*$9,260*	*$1,235*
B. Pond Liner and Piping Removal Equipment			
Total Man-Days Removal Effort		75	10
Size of Crew		4	4
Total Days Removal Effort		18.75	2.5
Cat 924G Loader Hourly Rate ($/hr)		$48.59	$48.59
Subtotal Liner and Piping Removal Equipment Costs		*$7,288*	*$972*
Total Pond Liner and Piping Removal Costs		**$16,548**	**$2,206**

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Evaporation Pond Reclamation			
		Commercial Ponds	**R&D Ponds**
II.	**Pond Sludge Removal**		
	Pond Sludge Estimate		
	Estimated Production Flow since 1991 (gal)	22,036,193,000	
	Historical Sludge Production Rate	0.000000102	
	Estimated Pond Sludge Volume (Yd3)	2,255	Cleaned following R&D
A.	Pond Sludge Removal Labor		
	Pond Sludge Volume (Yd3)	2,255	
	Sludge Removal Rate (Yd3/man-day)	8.33	
	Total Man-Days	271	
	Labor Rate ($/man-day)	$123	
	Subtotal Pond Sludge Removal Labor Costs	*$33,410*	*$0*
B.	Pond Sludge Removal Equipment		
	Total Man-Days Removal Effort	271	
	Size of Crew	3	
	Total Days Removal Effort	90	
	Cat 924G Loader Hourly Rate ($/hr)	$48.59	
	Subtotal Pond Sludge Removal Equipment Costs	*$35,063*	*$0*
	Total Pond Sludge Removal Costs	**$68,473**	**$0**
III.	**Pond Byproduct Material Disposal**		
A.	Pond Liner Disposal		
	Area of Pond Liner (ft2)	750,000	100,000
	Thickness of Pond Liner (ft)	0.00833	0.00300
	Volume of Pond Liner (ft3)	6,248	300
	Void Space Factor	1.25	1.25
	Total Disposed Volume (yd3)	289	14
	Disposal Unit Costs ($/yd3) (Unpackaged Bulk)	$132.50	$132.50
	Subtotal Pond Liner Disposal Costs	*$38,324*	*$1,840*

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Evaporation Pond Reclamation					
				Commercial Ponds	**R&D Ponds**
	B.	Pond Piping Disposal			
		Total Length of Piping		6,300	1,200
		Piping Volume Factor (ft3/ft)		0.0103	0.0069
		Total Volume Pond Piping (ft3)		65	8
		Void Space Factor		1.25	1.25
		Total Disposed Volume (yd3)		3.0	0.4
		Disposal Unit Costs ($/yd3) (Unpackaged Bulk)		$132.50	$132.50
		Subtotal Pond Piping Disposal Costs		*$398*	*$51*
	B.	Pond Sludge Disposal			
		Total Volume Pond Sludge (Yd3)		2,255	
		Disposal Unit Costs ($/yd3) (Soil rate)		$134.00	
		Subtotal Pond Sludge Disposal Costs		*$302,175*	*$0*
	Total Byproduct Material Disposal Costs			**$340,896**	**$1,891**
IV	**Pond Site Reclamation**				
	A.	Pond Earthwork Requirements			
		Earthwork Requirements Yd3)		180,000	60,000
		D8N Bulldozer Earthwork Rate (Yd3/hr)		700	700
		Total D8N Hours		257	86
		D8N Hourly Rate		$119.22	$119.22
		Subtotal Pond Earthwork		*$30,657*	*$10,219*
	B.	Revegetation			
		Area requiring Revegetation (Ac)		20	10
		Revegetation Unit Cost ($/Ac)		$300	$300
		Subtotal Plant Site Revegetation		*$6,000*	*$3,000*
	Total Pond Site Reclamation Costs			**$36,657**	**$13,219**

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Evaporation Pond Reclamation			
		Commercial Ponds	R&D Ponds
V. Supervisory Labor Costs During Pond Reclamation			
Estimated Duration (months)		4	
Engineer Rate ($/month)		$6,890	
Total Engineer Labor		$27,561	
Radiation Technician Rate ($/month)		$5,680	
Total Radiation Tecnician Labor		$22,721	
Total Supervisory Labor Costs		**$50,282**	**$0**
TOTAL EVAPORATION POND RECLAMATION PER POND		**$512,857**	**$17,317**
TOTAL EVAPORATION POND RECLAMATION COSTS		**$530,174**	

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Miscellaneous Site Reclamation				
I.	**Access Road Reclamation**			
	Assumptions			
		Road Reclamation production rate (Yd3/hr)		200
		Length of Main Access Roads (ft)		10,900
		Average Main Access Road width (ft)		25
		Depth of Main Access Road Gravel Surface (ft)		1
		Surface Area of Main Access Road (Ac)		6.3
		Length of Wellfield Access Roads (ft)		47,100
		Average Wellfield Access Road width (ft)		12
		Depth of Wellfield Access Road Gravel Surface (ft)		0.5
		Surface Area of Wellfield Road (Ac)		13.0
	A. Main Access Road Dirtwork			
		Main Access Road Gravel Volume (Yd3)		10,093
		Total reclamation time (hrs)		50
		D8N Unit Operating Cost ($/hr)		$119
	Subtotal Main Access Road Gravel Roadbase Removal Costs			*$6,016*
	B. Wellfield Road Dirtwork			
		Wellfield Road Gravel Volume (Yd3)		10,467
		Total reclamation time (hrs)		52
		D8N Unit Operating Cost ($/hr)		$119
	Subtotal Wellfield Road Gravel Roadbase Removal Costs			*$6,239*
	E. Discing/Seeding			
		Assumptions		
		Surface Area (acres)		19.2
		Discing/Seeding Unit Cost ($/acre)		$300
	Subtotal Discing/Seeding Costs			*$5,769*
	Total Access Road Reclamation Costs			**$18,025**

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Miscellaneous Site Reclamation						
II.	**Wastewater Pipeline Reclamation**					
		Assumptions				
			Pipeline Removal Rate (ft./man-day)			67
			Pipeline Shredding Rate (ft./man-day)			1,500
			Number of Pond Pipelines			2
			Length of Pond Pipelines (ft)			2,000
			Number of RO Building Pipelines			4
			Length of RO Building Pipelines (ft)			300
			Average Pipe Size (Sch 40)			4
	A.	Pipeline Removal Costs				
			Length of Pipelines (ft)			5,200
			Removal Rate (ft/man-day)			67
			Removal Labor Rate ($/man-day)			$123
			Cat 924G Loader Use (days)			78
			Cat 924G Loader Cost			$30,305
		Subtotal Pipeline Removal Costs				*$39,930*
	B.	Pipeline Shredding Costs				
			Length of Pipelines (ft)			5,200
			Shredding Rate (ft/man-day)			1,500
			Shredding Labor Rate ($/man-day)			$123
			Shredder Use (days)			3
			Shredder Cost			$333
		Subtotal Pipeline Shredding Costs				*$761*

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Miscellaneous Site Reclamation			
	C.	Pipeline Transportation and Disposal (NRC-Licensed Facility)	
		Pipe Diameter (inches)	4
		Chipped Volume Reduction (ft^3/ft)	0.0103
		Subtotal Volume of Shredded PVC Pipe (yd^3)	2.0
		Disposal Void Factor	1.25
		Final Disposal Volume (yd3)	2.5
		Transportation and Disposal Unit Cost ($/$yd^3$) (Unpackaged Bulk)	$132.50
		Subtotal Pipeline Disposal Costs	*$329*
	Total Wastewater Pipeline Reclamation Costs		**$41,020**
III.	**Electrical Distribution System Removal**		
	Assumptions		
		Length of High Voltage Lines	22,200
		High Voltage Line Removal Rate ($/ft.)	$0.59
		High Voltage Line Removal Cost ($/ft.)	$13,098
		Substation Removal	$1,175
	Subtotal Electrical Distribution System Removal Costs		**$14,273**
IV.	**Supervisory Labor Costs During Miscellaneous Reclamation**		
	Estimated Duration (months)		3
	Engineer Rate ($/month)		$6,890
	Total Engineer Labor		$20,671
	Radiation Technician Rate ($/month)		$5,680
	Total Radiation Tecnician Labor		$17,041
	Total Supervisory Labor Costs		**$37,712**
TOTAL MISCELLANEOUS RECLAMATION COSTS			**$111,029**

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Deep Disposal Well Reclamation			
I.	**Cost Basis**		
	A.	Plugging and Abandonment	
		Cost Estimate from June 1996 for plugging and abandonment	$59,026
		June 1996 CPI	156.7
		June 2003 CPI	179.9
		Subtotal Escalated 2003 Plugging and Abandonment Costs	*$67,765*
	B.	Site Reclamation	
		Cost Estimate from June 1996 for reclamation	$2,346
		June 1996 CPI	156.7
		June 2003 CPI	179.9
		Subtotal Escalated 2003 Reclamation Costs	*$2,693*
TOTAL MISCELLANEOUS RECLAMATION COSTS			**$70,458**

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I-196 Brule Aquifer Restoration					
I.	**Ground Water Sweep Costs**				
	Assumptions				
		PV's Required from I-196a, I-196j and I-196n			3
		Total Gallons per Pore Volume			337,758
		Total Gallons to Treat			1,013,274
		Flow Rate (gpm)			3
		Pump Power Requirements (kw)			3
		Power Cost ($/kw)			$0.05
		Pumping Labor (man-day per day)			0.13
		Sampling Labor (man-day per day)			0.07
		Labor Rate ($/man-day)			$123
		Days to complete			235
	A.	Electrical Costs			
		Cost to pump 3 Pore Volumes			*$844*
	B.	Labor Costs			
		Labor for pumping 3 Pore Volumes			*$3,765*
Total Ground Water Sweep Costs					**$4,609**
II.	**Monitoring and Sampling Costs**				
	A.	Labor Costs for Monitoring			$2,068
	B.	Monitoring for I-196i, I-196m, and I-196l			$2,068
Total Monitoring and Sampling Costs					**$4,137**

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I-196 Brule Aquifer Restoration				
III	**Additional Ground Water Sweep**			
	Pump from additional wells and monitor as above			$8,746
	Drill 4 additional wells, 50 ft deep at $26/ft.			$5,200
Total Additional Ground Water Sweep				**$13,946**
IV	**Well Abandonment**			
	Abandon 14 wells at $194/well			$2,716
Total Well Abandonment				**$2,716**
TOTAL I-196 BRULE AQUIFER RESTORATION COSTS				**$25,408**

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GROUNDWATER RESTORATION
GROUNDWATER SWEEP (GWS) Unit Costs

Assumptions:

1.	All pumps are 5 hp pumping at 32 gpm		
2.	Cost of electricity =	$0.05	Kw hr
3.	Horsepower to kilowatt conversion =	0.746	Kw/HP
4.	Operator labor costs =	$123.46	man-day
5	Labor costs are based on 36 pumps at 1,150 gpm		

Wellfield Pumping Electrical Costs per 1000 Gallons

1000 gal × (5 hp / 32 gpm) × (1 hr / 60 min) × (0.746 kwh / hp) × ($ 0.05 / kwh) = $ 0.097

Wellfield Pumping Labor Costs per 1000 Gallons

1000 gal × (1 min / 1150 gal) × (8 hr / 480 min) × ($123 / man-day) × (2 / operators) = $ $0.447

Groundwater Sweep Production Rate

1150 gal/min × (60 min / hr gal) × (24 hr / day) × (365 day / year) × (1 year / 12 month) = *50,370,000 gallons/month*

TOTAL GWS COSTS PER 1000 GALLONS = $ 0.544

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Groundwater Reverse Osmosis (RO) Treatment Unit Costs

Assumptions:

1.	All pumps are 5 hp pumping at 32 gpm		
2.	Cost of electricity =	$0.05	Kw hr
3.	Horsepower to kilowatt conversion =	0.746	Kw/HP
4.	Operator labor costs =	$123.46	man-day
5.	RO System horsepower requirements for 400 gpm rated flow based upon:		
	RO Unit Pump	164 hp	
	Permeate/Injection pump	40 hp	
	Waste pump	8 hp	
	TOTAL:	212 hp	
6.	Chemical costs:		
	Reductant =	$0.270	lb
	Antiscalant =	$20.00	gal

Wellfield Pumping Electrical Costs per 1000 Gallons

1000	gal	X	5	hp	X	1	hr	X	0.746	kwh	X	$ 0.05		= $	0.097135417	per Kgal
			32	gpm		60	min		hp			kwh				

Reverse Osmosis Electrical Costs per 1000 Gallons

1000	gal	X	212	hp	X	1	hr	X	0.746	kwh	X	$ 0.05		= $	0.329483333	per Kgal
			400	gpm		60	min		hp			kwh				

Reverse Osmosis Labor Costs per 1000 Gallons

1000	gal	X	1	min	X	1	man-day	X	$123		X	2	operators	= $	$1.2861	per Kgal
			400	gal		480	min		man-day							

Treatment chemical costs per 1000 Gallons

Antiscalant:																		
1000	gal	X	8.33E-06	gal antiscalant	X	$20.00								= $	$0.17	per Kgal
			1	gal		gal antiscalant										
Reductant:																		
1000	gal	X	5.60E-04	lbs reductant	X	$0.270								= $	$0.15	per Kgal
			1	gal		lb reductant										

Reverse Osmosis Production Rate

400	gal	X	60	min	X	24	hr	X	365	day	X	1	year	=	*17,520,000*	*gallons*
	min		hr	gal			day			year		12	month			*month*

TOTAL RO COSTS PER 1000 GALLONS = $ **2.031**

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Groundwater Recirculation Unit Costs

Assumptions:

1. All pumps are 5 hp pumping at 32 gpm
2. Cost of electricity = $0.05 Kw hr
3. Horsepower to kilowatt conversion = 0.746 Kw/HP
4. Operator labor costs = $123.46 man-day
5. System horsepower requirements for 1,150 gpm rated flow based upon:
   injection pump = 30 hp
6. Chemical costs:
   Reductant = $0.270 lb

Wellfield Pumping Electrical Costs per 1000 Gallons

1000	gal	X	5	hp	X	1	hr	X	0.746	kwh	X	$ 0.05		= $	0.097	per Kgal
			32	gpm		60	min		hp			kwh				

Wellfield Injection Electrical Costs per 1000 Gallons

1000	gal	X	30	hp	X	1	hr	X	0.746	kwh	X	$ 0.05		= $	0.016	per Kgal
			1150	gpm		60	min		hp			kwh				

Recirculation Labor Costs per 1000 Gallons

1000	gal	X	1	min	X	1	man-day	X	$123		X	2	operators	= $	0.447	per Kgal
			1150	gal		480	min		man-day							

Treatment chemical costs per 1000 Gallons

Reductant:																
1000	gal	X	5.60E-04	lbs reductant	X	$0.270								= $	$0.151	per Kgal
			1	gal		lb reductant										

Recirculation Production Rate

1150	gal	X	60	min	X	24	hr	X	365	day	X	1	year	=	*50,370,000*	*gallons*
	min		hr	gal			day			year		12	month			*month*

TOTAL RECIRCULATION COSTS PER 1000 GALLONS = $ **0.712**

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WELL ABANDONMENT Unit Costs															
Assumptions:															
1	Use backhoe for 0.25 hr/well to dig, cut off, and cap well.														
2	Drill rig used 2.5 hrs to plug well.														
3	Labor for installing chips, etc. will require 2 workers at 0.5 hrs per well														
Well Abandonment Costs												**Cost per ft (based on 700 ft wells)**			
	Cat 416 Backhoe														
		0.25	hours	X	$	36.15	per hour		=$	9.04		$0.0129			
	Drill rig														
		2.5	hours	X	$	110.00	per hour		=$	275.00		$0.3929			
	Well Cap	1	each	X	$	6.25	each		=$	6.25		$0.0089			
Materials per foot of well (Variable Cost)															
	Cement	0.0714	lbs/ft	X	$	0.1	per pound		=$			$0.00714			
	Bentonite Chips	0.007	tubes/ft	X	$	6	per tube		=$			$0.042			
	Plug Gel	0.0086	sacks/ft	X	$	6.30	per sack		=$			$0.0542			
Total Estimated Cost per Foot:												**$0.5180**			