

CROW BUTTE RESOURCES, INC.

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



(308) 665-2215
(308) 665-2341 - FAX

September 25, 2002

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

40-8943

Subject: Class III Underground Injection Control Permit Number NE 0122611
2003 Surety Estimate

Dear Mr. Linder:

Attached is the annual update to the surety estimate for the Crow Butte Uranium Mine. The estimate for 2003 is \$12,816,973, a 3.7 percent increase over the 2002 surety estimate. Significant changes to the surety estimate for 2003 include the following items:

1. The estimate includes the operation of five wellhouses with 400 mining wells in Mine Unit 8 and two wellhouses with 160 mining wells in Mine Unit 9 by the end of 2003. These additional mining areas resulted in significant increases in the groundwater restoration and wellfield reclamation costs.
2. The sampling schedule for restoration was revised in several respects. Guideline 8 sampling costs were increased from \$130 per sample to \$150. Reverse osmosis and recirculation sampling were separated and reverse osmosis was estimated using the in-house analysis rate of \$46 per sample since this reflects CBR's actual laboratory methods for monitoring restoration treatment efficiency. Finally, the monitor well sampling schedule during restoration was increased from 2.0 samples per month to 2.2 samples. This rate more accurately reflects the biweekly monitor well sampling requirement.
3. The waste processing, transportation and disposal costs were revised to reflect the experience gained this year in processing and shipping bulk byproduct waste. The pipe shredding production rates were increased significantly. The byproduct transportation and disposal rates were recalculated by establishing separate soil and unpackaged bulk categories as allowed in our disposal contract. Density corrections were established for each type of waste and transportation costs were updated to reflect the actual experience from the 2002 waste campaign. Because of these adjustments, the 2002 rate of \$149.30 per cubic yard of byproduct waste was reduced to \$120.50 for soil-like material and \$115.70 for unpackaged bulk material (e.g., piping and equipment).
4. The equipment rates were updated for the backhoe, loader, and bulldozer using current Nebraska Machinery rental rates and Caterpillar performance data.
5. The annual escalator based of 1.1% on the Consumer Price Index was applied to labor and materials unless there was a significant difference in the actual costs this year.

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CROW BUTTE RESOURCES, INC.



Mr. Michael Linder
September 25, 2001
Page 2

6. Well abandonment costs were revised to more accurately reflect the actual depth of shallow monitor wells.

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.

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.

A handwritten signature in black ink, appearing to read 'M. Griffin', written over a circular stamp or seal.

Michael Griffin
Manager of Health, Safety, and Environmental Affairs

Enclosure

cc: Mr. Daniel M. Gillen, 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
Mail Stop T-8A33
Washington, DC 20555

Steve Collings – CBR, Denver

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

Total Restoration and Reclamation Cost Estimate			
I.	Groundwater Restoration (Sheets 2 to 4)		\$6,649,459
II.	Wellfield Reclamation (Sheets 5 to 8)		\$2,561,162
III.	Commercial Plant Reclamation/Decommissioning (Sheets 9 to 12)		\$341,475
IV.	R.O. Building Reclamation/Decommissioning (Sheets 9 to 12)		\$50,217
V.	Evaporation Pond Reclamation (Sheets 13 to 16)		\$457,257
VI.	Miscellaneous Site Reclamation (Sheets 17 to 19)		\$98,471
VII.	Deep Disposal Well Reclamation (Sheet 20)		\$70,458
VIII.	I-196 Brule Aquifer Restoration (Sheets 21 to 22)		\$25,081
	Subtotal Reclamation and Restoration Cost Estimate		\$10,253,578
		Contract Administration	10%
			\$1,025,358
		Contingency	15%
			\$1,538,037
		TOTAL	\$12,816,973

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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
Total number of production wells	38	52	57	96	189	194	179	150	60
Total number of injection wells	72	79	96	169	219	293	300	250	100
Total number of shallow monitor wells	3	3	3	11	25	28	25	29	20
Total number of perimeter monitor wells	11	10	10	18	27	32	16	25	20
Total number of restoration wells	10	12	18	43	33	33	46	23	13
Wellfield Area (ft ²)	403,712	509,600	586,188	1,033,440	1,385,181	1,567,768	1,904,560	1,425,000	660,000
Wellfield Area (acres)	9.27	11.70	13.46	23.72	31.80	35.99	43.72	32.71	15.15
Affected Ore Zone Area (ft ²)	403,712	509,600	586,188	1,033,440	1,385,181	1,567,768	1,904,560	1,425,000	660,000
Avg. Completed Thickness	19.6	16.3	12.5	12.9	14.5	15.4	12.6	13	17
Porosity	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Affected Volume (ft ³)	7,912,755	8,306,480	7,327,350	13,331,376	20,085,125	24,143,627	23,997,456	18,525,000	11,220,000
Kgallons per Pore Volume	17,164	18,018	15,894	28,918	43,569	52,372	52,055	40,184	24,338
Number of Patterns in Unit(s)									
Current	38	52	57	96	187	187	200	50	0
Estimated next report	0	0	0	0	2	7	-21	100	60
Total Estimated	38	52	57	96	189	194	179	150	60
Number of Wells in Unit(s)									
Production Wells									
Current	38	52	57	96	187	187	200	30	0
Estimated next report	0	0	0	0	2	7	-21	120	60
Total Estimated	38	52	57	96	189	194	179	150	60
Injection Wells									
Current	72	79	96	169	221	309	325	50	0
Estimated next report	0	0	0	0	-2	-16	-25	200	100
Total Estimated	72	79	96	169	219	293	300	250	100
Shallow Monitor Wells									
Current	3	3	3	11	25	28	25	25	0
Estimated next report	0	0	0	0	0	0	0	4	20
Total Estimated	3	3	3	11	25	28	25	29	20
Perimeter Monitor Wells									
Current	11	10	10	18	27	32	16	30	0
Estimated next report	0	0	0	0	0	0	0	-5	20
Total Estimated	11	10	10	18	27	32	16	25	20
Number of Wells per Wellfield	124	144	166	294	460	547	520	454	200
Total Number of Wells	2909								
Average Well Depth (ft) - Deep Wells	665	631	774	698	675	515	762	500	770
Average Well Depth (ft) - Shallow Wells	200	200	200	200	200	200	200	200	200

Crow Butte Resources, Inc.
 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2002)

Master Cost Basis

Electrical Costs			
Power cost		2003 Est Rate \$0.05	kwHr
Kilowatt to Horsepower		0.746	Kw/HP
Horsepower per gallon per minute		0.167	HP/gpm
Labor Rates			
Operator Labor Cost	2002 Rate \$119.63	2003 Est Rate \$120.91	day
Engineer Cost	\$6,676.53	\$6,747.82	month
Radiation Technician Costs	\$5,562.76	\$5,622.14	month
Chemical Costs			
Antiscalant for RO (adj for current actual cost)	2002 Rate \$16.50	2003 Est Rate \$15.91	gal
Reductant	\$0.280	\$0.28	lb
Cement	\$103.13	\$104.23	ton
Bentonite	\$195.94	\$198.03	ton
Salt	\$57.75	\$61.00	ton
Plug Gel	\$6.91	\$6.98	sack
Well Cap	\$10.31	\$10.42	each
Hydrochloric Acid (adj for current actual cost)	\$0.66	\$0.57	gallon
Analytical Costs			
Guideline 8 (contract lab)		\$150.00	analysis
6 parameter (in-house)		\$46.00	analysis
Other (radon, bio, etc.)		\$806.00	month
Spare Parts			
Restoration spare parts estimate	2002 Rate \$17,322.51	2003 Est Rate \$17,507.41	year

CPI Escalators (CPI-U, U.S. City Average)	
1988 CPI (average)	118.3
June 1991 CPI (deep well estimate)	156.7
2001 CPI (July 2001)	178
Current CPI (June 2002)	179.9
2003 Escalation Factor	1.011

Crow Butte Resources, Inc.
 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2002)

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Equipment Costs						
<u>Equipment</u>	<u>Base Rental Rate (\$/hr)</u>	<u>Labor Costs (\$/hr)</u>	<u>Repair Reserve Costs (\$/hr)</u>	<u>Fuel Costs (\$/hr)</u>	<u>Mob & Demob (\$/hr)</u>	<u>Total (\$/hr)</u>
Cat 924G Loader	22.16	15.11	6.00	2.85	2.00	48.12
Cat 416 Backhoe	12.22	15.11	3.50	2.85	2.00	35.68
Shredder	12.00		inc	inc	inc	12.00
Cat D8N Bulldozer	79.55	15.11	11.25	10.43	2.00	118.36
Smeal	42.00	inc	inc	inc	inc	42.00
Mixing Unit	12.00			inc	inc	12.00

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
 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			
<u>Nominal Pipe Size</u>	<u>Wall Thickness (in.)</u>	<u>Pipe OD (in.)</u>	<u>Volume per foot (ft³/ft)</u>
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

Crow Butte Resources, Inc.
 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2002)

Master Cost Basis

Pipe Removal and Shredding Costs				
<i>Activity</i>	<i>Removal Rate (ft/man-day)</i>	<i>Shredding Rate (ft/man-day)</i>	<i>Labor Rate (day)</i>	<i>Activity Cost per foot</i>
2-inch SDR 13.5 inj & prod. Removal	225		\$121	\$0 537
2-inch SDR 13.5 inj & prod. Shredding		1920	\$121	\$0 063
Trunkline Removal	100		\$121	\$1 209
Trunkline Shredding		100	\$121	\$1 209
Downhole Pipe Removal	2000		\$121	\$0 060
Downhole Pipe Shredding		2250	\$121	\$0 054
Downhole Hose Removal	1000		\$121	\$0 121
Waste and RO Building Pipeline Removal	67		\$121	\$1 813
Waste and RO Building Pipeline Shredding		1500	\$121	\$0 081

Waste Disposal Costs								
<i>Waste Form</i>	<i>Fee</i>		<i>Density Correction Factor (Tons/Yd3)</i>	<i>Fee per Cubic Yard</i>	<i>Transport Cost</i>		<i>Total Transportation and Disposal</i>	
Sol, Bulk Byproduct Material	\$75 00	per Ton	0.54	\$40 50	\$80 00	per Yd3	\$120 50	per Yd3
Unpackaged Bulk Byproduct Material (e.g., pipe, equipment)	\$85 00	per Ton	0.42	\$35 70	\$80 00	per Yd3	\$115 70	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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 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2002)

Master Cost Basis

Plant Dismantling						
<i>Plant Components:</i>	<i>Number</i>	<i>Units</i>	<i>Estimated Disposal Volume Units</i>		<i>Activity</i>	<i>1988 Cost</i>
Contaminated Tanks	27	each	19.3	F13 each	Dismantle interior steel, tanks, piping and electrical Dismantle Plant Building	\$ \$66,600
Uncontaminated Tanks	7	each	19.3	F13 each		\$ \$43,800
Pumps	30	each	5	F13 each	Concrete floor removal rate	\$/ft ² \$2.72
Downhole Pumps	550	each	0.5	F13 each		
Contaminated Piping	4125	feet	See estimate by piping size and material			
Uncontaminated Piping	4125	feet				
Filters	4	each	100	F13 each		
Dryer	2	each	400	F13 each		
Average PVC Pipe Diameter (inches)	6					

Plant Decontamination				
Direct Dispose Plant Floor Area	5450	ft ²	Decon Solution (HCl) Floor Application Rate	2 gal/ft ²
Uncontaminated Plant Floor Area	7000	ft ²		
Decontaminated Plant Floor Area	17530	ft ²		
Average concrete thickness	0.5	ft		
Plant Wall Area	24000	ft ²	Decon Solution (HCl) Wall Application Rate	1 gal/ft ²

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 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2003)

Ground Water Restoration										
	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	
I. Ground Water Sweep Costs										
PV's Required	1	1	1	1	1	1	1	1	1	1
Total Kgals for Treatment	17164	18018	15894	28918	43569	52372	52055	40184	24338	1
Ground Water Sweep Unit Cost (\$/Kgal) (Sheet 23)	\$0.535	\$0.535	\$0.535	\$0.535	\$0.535	\$0.535	\$0.535	\$0.535	\$0.535	\$0.535
Subtotal Ground Water Sweep Costs per Wellfield	\$9,186	\$9,644	\$8,507	\$15,477	\$23,318	\$28,630	\$27,860	\$21,507	\$13,026	
Total Ground Water Sweep Costs	\$156,555									
II. Reverse Osmosis Costs										
PV's Required	6	6	6	6	6	6	6	6	6	6
Total Kgals for Treatment	102986	108110	95367	173511	261412	314234	312332	241107	146031	6
Reverse Osmosis Unit Cost (\$/Kgal) (Sheet 24)	\$1.98	\$1.98	\$1.98	\$1.98	\$1.98	\$1.98	\$1.98	\$1.98	\$1.98	\$1.98
Subtotal Reverse Osmosis Costs per Wellfield	\$203,611	\$213,742	\$188,547	\$343,042	\$516,830	\$621,263	\$617,502	\$476,685	\$288,713	
Total Reverse Osmosis Costs	\$3,469,935									
III. Recirculation Costs										
PV's Required	1	1	1	1	1	1	1	1	1	1
Total Kgals for Treatment	17164	18018	15894	28918	43569	52372	52055	40184	24338	1
Recirculation Unit Cost (\$/Kgal) (Sheet 25)	\$0.71	\$0.71	\$0.71	\$0.71	\$0.71	\$0.71	\$0.71	\$0.71	\$0.71	\$0.71
Subtotal Recirculation Costs per Wellfield	\$12,185	\$12,791	\$11,283	\$20,529	\$30,929	\$37,179	\$36,954	\$28,527	\$17,278	
Total Recirculation Costs	\$207,655									
IV. Consumables										
Spare parts, filters and consumables =	\$ 17,507	year								
Active restoration period (months)	6.6	6.9	6.1	11.1	16.7	20.0	19.9	15.4	9.3	
Consumable usage (months restoration x annual rate estimate)	\$9,370	\$10,047	\$8,862	\$16,124	\$24,293	\$29,201	\$29,024	\$22,406	\$13,570	
Subtotal Consumables per Mine Unit	\$9,570	\$10,047	\$8,862	\$16,124	\$24,293	\$29,201	\$29,024	\$22,406	\$13,570	
Total Consumables Costs	\$163,898									

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 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2003)

Ground Water Restoration												
				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
V.	Monitoring and Sampling Costs											
	Guideline 8 analysis =	\$150	analysis									
	6 parameter in-house analysis =	\$46	analysis									
	Total restoration wells			10	12	18	43	33	33	46	23	13
	Total monitor wells			14	13	13	29	52	60	41	54	40
	Groundwater sweep duration (months)			0.34	0.36	0.32	0.57	0.86	1.04	1.03	0.80	0.48
	Reverse Osmosis duration (months)			5.88	6.17	5.44	9.90	14.92	17.94	17.83	13.76	8.34
	Recirculation duration (months)			0.34	0.36	0.32	0.57	0.86	1.04	1.03	0.80	0.48
	Stabilization duration (months)			6	6	6	6	6	6	6	6	6
	A. Restoration Well Sampling											
	1 Well Sampling prior to restoration start											
	# of Wells			10	12	18	43	33	33	46	23	13
	\$/sample			\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150
	2 Groundwater Sweep Sampling											
	# of Wells			10	12	18	43	33	33	46	23	13
	Total # samples			10	12	18	43	33	66	92	23	13
	\$/sample			\$46	\$46	\$46	\$46	\$46	\$46	\$46	\$46	\$46
	3 RO Sampling											
	# of Wells			10	12	18	43	33	33	46	23	13
	Total # samples			60	72	90	430	495	594	828	322	104
	\$/sample			\$46	\$46	\$46	\$46	\$46	\$46	\$46	\$46	\$46
	4 Recirculation Sampling											
	# of Wells			10	12	18	43	33	33	46	23	13
	Total # samples			10	12	18	43	33	66	92	23	13
	\$/sample			\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150
	5 Stabilization Sampling											
	# of Wells			10	12	18	43	33	33	46	23	13
	Total # samples			60	72	108	258	198	198	276	138	78
	\$/sample			\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150
	6 Monitor Well Sampling											
	# of Wells			14	13	13	29	52	60	41	54	40
	\$/sample			\$46	\$46	\$46	\$46	\$46	\$46	\$46	\$46	\$46
	Total # samples (2.2/mo for entire period)			387	369	345	1088	2591	3434	2336	2537	1347
	7 Other Laboratory Costs											
	Radon, unanalysis, etc =	\$806	month									
	Total for Other Laboratory Costs:			\$5,287	\$5,550	\$4,896	\$8,908	\$13,420	\$16,132	\$16,035	\$12,378	\$7,497
	Subtotal Monitoring and Sampling Costs per Mine Unit			\$38,309	\$40,788	\$47,334	\$132,314	\$196,494	\$249,006	\$227,911	\$172,550	\$90,441
	Total Monitoring and Sampling Costs			\$1,195,148								

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 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2003)

Ground Water Restoration														
						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
VI. Supervisory Labor Cost														
	Engineer Support =		\$6,748	month										
	HP Technician support =		\$5,622	month										
	Active restoration period (months)				6.6	6.9	6.1	11.1	16.7	20.0	19.9	15.4		9.3
	Stabilization period (months)				6	6	6	6	6	6	6	6	6	6
	1 Engineer support during active restoration				\$44,264	\$46,466	\$40,989	\$74,376	\$112,356	\$135,059	\$134,242	\$103,629		\$62,765
	2 HP Technician support during active restoration				\$36,880	\$38,715	\$34,151	\$62,135	\$93,613	\$112,528	\$111,847	\$86,341		\$52,294
	3 Engineer support during final stabilization													\$40,487
	4 HP Technician support during final stabilization													\$33,733
	Subtotal Supervisory Labor per Mine Unit				\$81,144	\$85,181	\$75,140	\$136,710	\$205,969	\$247,588	\$246,089	\$189,970		\$189,278
	Total Supervisory Labor Costs				\$1,457,069									
	TOTAL RESTORATION COST PER WELLFIELD				\$354,005	\$372,192	\$339,673	\$664,196	\$997,833	\$1,212,267	\$1,185,340	\$911,644		\$612,307
	TOTAL GROUND WATER RESTORATION COSTS				\$6,649,459									

		Wellfield Reclamation								
Wellfield Pipelng		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
	Aspenboxes	2	3	3	5	7	7	6	5	2
	Number of Wellhouses	2	3	3	5	7	7	6	5	2
	Total Mine Unit surface area	9,271	11,701	13,461	23,721	31,801	34,601	43,701	118,501	76,001
	Total Length of 2-inch production and injection lines (ft)	30000	34000	39520	68900	106080	128700	136500	68800	48000
	Total length of 3/8-inch hose (ft)					66300				
	Total length 1.14-inch stinger pipe (ft)	43200	43400	52400	101400	0	91200	97500	102000	30000
	Total length of 2-inch denohle production pipe (ft)	13200	20800	22800	38400	74800	74800	80000	78000	26800
	Total Length of Trunkline (6-inch) (ft)	1000	1600	1450	5400	3700	2000	1000	3400	550
	Total Length of Trunkline (12-inch) (ft)	4400	1300	1450	5400	3700	2000	1000	3400	550
	Total Length of All Trunkline (ft)	5400	2900	1300	2000	14100	10000	5000	10600	1600
	Total number of production wells	38	42	2950	7400	17800	12000	6000	14000	2150
	Total number of injection wells	72	79	96	169	189	194	179	150	60
	Total number of shallow monitor wells	3	3	3	11	25	28	25	29	100
	Total number of perimeter monitor wells	11	10	10	18	27	32	16	25	20
L. Production and Injection Piping										
A. Removal and Loading										
	Production and Injection Piping Removal Unit Cost (\$/ft of pipe)	\$0.34	\$0.34	\$0.34	\$0.34	\$0.34	\$0.34	\$0.34	\$0.34	\$0.34
	Subtotal Production and Injection Piping Removal and Loading Costs	\$16,121	\$18,270	\$21,217	\$37,024	\$57,004	\$69,159	\$73,350	\$346,971	\$23,793
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
	Subtotal Production and Injection Piping Removal and Loading Costs	\$1,889	\$2,141	\$2,489	\$4,319	\$4,680	\$8,105	\$8,595	\$4,312	\$3,023
C. Equipment Costs										
	CA 9260 Loader Unit Cost for removal	\$35,666	\$29,088	\$33,810	\$38,946	\$90,734	\$110,106	\$116,779	\$58,869	\$41,065
	Subtotal Equipment Costs	\$5,400	\$7,253	\$8,431	\$14,699	\$22,630	\$27,456	\$29,120	\$14,677	\$10,240
D. Transport and Disposal Costs (NRCA-Licensed Facility)										
	Chipped Volume per Wellfield (yd ³)	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069	0.0069
	Volume for Disposal Assuming 25% Void Space (yd ³)	7.7	8.7	10.1	12.6	27.1	32.9	34.9	17.6	12.3
	Transportation and Disposal Unit Cost (\$/yd ³) Unpackaged Bulk	\$11.70	\$15.70	\$15.70	\$15.70	\$15.70	\$15.70	\$15.70	\$15.70	\$15.70
	Subtotal Production and Injection Piping Transport and Disposal Costs	\$1,137	\$1,273	\$1,504	\$2,345	\$3,934	\$3,744	\$3,097	\$2,345	\$1,736
	Total Production and Injection Piping Costs	\$17,233	\$38,826	\$57,471	\$117,853	\$181,007	\$219,570	\$233,936	\$117,386	\$81,857

Crow Butte Resources Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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	
II. Trunklines										
A. Removal and Loading										
Trunkline Removal Unit Cost (\$/ft of pipe)	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21
Subtotal Trunkline Removal and Loading Costs	\$3,329	\$3,306	\$3,367	\$3,947	\$7,371	\$14,509	\$7,234	\$16,927	\$7,599	\$2,599
B. Pipe Shredding										
Trunkline Shredding Unit Cost (\$/ft of pipe)	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21	\$1.21
Subtotal Trunkline Shredding Costs	\$6,429	\$3,506	\$3,367	\$3,947	\$7,371	\$14,509	\$7,234	\$16,927	\$7,599	\$2,599
C. Equipment Costs										
Cut 924G Loader Unit Costs for removal	\$10,395	\$5,582	\$5,079	\$14,245	\$34,264	\$23,099	\$11,550	\$26,949	\$4,130	\$1,037
Shredder Unit Costs for shredding	\$2,592	\$1,392	\$1,416	\$3,352	\$6,544	\$5,760	\$2,880	\$6,720	\$1,037	\$1,037
Subtotal Equipment Costs	\$12,987	\$6,974	\$7,095	\$17,597	\$42,808	\$28,859	\$14,430	\$33,669	\$5,171	\$2,074
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	108.4	16.5	16.5
Volume for Disposal Assuming 25% Void Space (ft ³)	25.0	11.0	24.0	50.0	176.0	122.0	61.0	136.0	21.0	21.0
Transportation and Disposal Unit Cost (\$/ft ³)	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70
Subtotal Transport and Disposal Costs	\$2,893	\$1,273	\$2,777	\$5,785	\$20,363	\$14,115	\$7,058	\$15,735	\$2,470	\$2,470
Subtotal Trunkline Costs	\$28,907	\$15,260	\$17,805	\$41,476	\$186,214	\$71,992	\$35,996	\$83,258	\$12,799	\$4,673
III. Downhole Pipe										
A. Removal and Loading										
Downhole Piping Removal Unit Cost (\$/ft of pipe)	\$0.060	\$0.060	\$0.060	\$0.060	\$0.060	\$0.060	\$0.060	\$0.060	\$0.060	\$0.060
Downhole Hoop Removal Unit Cost (\$/ft of pipe)	\$0.121	\$0.121	\$0.121	\$0.121	\$0.121	\$0.121	\$0.121	\$0.121	\$0.121	\$0.121
Removal of 1-1/4-inch stagger pipe	\$2,462	\$2,462	\$3,470	\$6,130	\$0	\$5,513	\$5,894	\$6,166	\$1,814	\$1,814
Removal of downhole production pipe	\$919	\$1,257	\$1,378	\$2,331	\$4,522	\$4,522	\$4,836	\$4,474	\$1,596	\$1,596
Removal of downhole hose	\$0	\$0	\$0	\$0	\$8,016	\$0	\$0	\$0	\$0	\$0
Subtotal Downhole Piping Removal and Loading Costs	\$3,381	\$4,173	\$4,849	\$8,462	\$12,538	\$10,033	\$10,731	\$10,640	\$3,410	\$3,410
B. Pipe Shredding										
Downhole Piping Shredding Unit Cost (\$/ft of pipe)	\$0.054	\$0.054	\$0.054	\$0.054	\$0.054	\$0.054	\$0.054	\$0.054	\$0.054	\$0.054
Subtotal Downhole Piping Shredding Costs	\$1,138	\$3,663	\$4,810	\$7,312	\$4,019	\$8,920	\$9,338	\$9,458	\$3,021	\$3,021
C. Equipment Costs										
Small Unit Costs for removal	\$3,270	\$3,819	\$4,491	\$7,829	\$4,189	\$9,296	\$9,940	\$9,856	\$3,138	\$3,138
Shredder Unit Costs for shredding	\$1,246	\$1,455	\$1,711	\$2,982	\$1,596	\$3,541	\$3,787	\$3,755	\$1,203	\$1,203
Subtotal Equipment Costs	\$4,516	\$5,274	\$6,202	\$10,811	\$5,785	\$12,837	\$13,727	\$13,611	\$4,341	\$4,341
D. Transport and Disposal Costs (NRC-Licensed Facility)										
Chipped Volume Reduction - 1-1/4-inch stagger (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 (ft ³ /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 stagger (ft ³)	190	209	253	446	209	401	429	449	132	132
Chipped Volume - 2-inch downhole production (ft ³)	112	154	169	284	154	554	592	548	195	195
Volume 3/8-inch hose (ft ³)	0	0	0	0	0	0	0	0	0	0
Volume for Disposal Assuming 25% Void Space (yd ³)	14.0	16.8	19.5	33.8	121.7	44.2	47.3	46.1	15.2	15.2
Transportation and Disposal Unit Cost (\$/yd ³) (Unpackaged Bulk)	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70	\$115.70
Subtotal Downhole Piping Transport and Disposal Costs	\$1,621	\$1,942	\$2,257	\$3,912	\$14,081	\$5,114	\$5,469	\$5,337	\$1,733	\$1,733
Subtotal Downhole Piping Costs	\$12,806	\$15,804	\$17,817	\$30,687	\$36,433	\$36,907	\$39,465	\$39,045	\$12,555	\$12,555

Crow Butte Resources Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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
IV. Surface Reclamation									
A. Removal and disposal of contaminated soil around wells									
Volume of contaminated soil (0.37 yd3 per injection and production well)	407	4847	5661	9805	15096	18019	17723	148	592
Disposal of contaminated soil (\$120.50 per yd3)	\$4,904	\$5,841	\$6,822	\$11,815	\$18,191	\$21,713	\$21,356	\$17,834	\$7,134
Equipment (Cat 924G loader at 2 yd3/hr)	\$979	\$1,166	\$1,362	\$2,359	\$3,632	\$4,336	\$4,264	\$3,561	\$1,424
Labor (1 man-hour per 2 Yd3)	\$308	\$366	\$428	\$741	\$1,141	\$1,362	\$1,339	\$1,118	\$447
Subtotal removal and disposal of contaminated soil	\$6,191	\$7,373	\$8,611	\$14,915	\$22,964	\$27,410	\$26,960	\$22,514	\$9,005
B. Recontour and seeding									
Recontour and seeding (est. \$300/acre)	\$2,780	\$3,510	\$4,037	\$7,117	\$9,540	\$10,380	\$13,110	\$35,550	\$22,800
Subtotal Recontour and Seeding	\$2,780	\$3,510	\$4,037	\$7,117	\$9,540	\$10,380	\$13,110	\$35,550	\$22,800
Total Surface Reclamation	\$8,972	\$10,883	\$12,649	\$22,033	\$32,504	\$37,790	\$40,070	\$58,064	\$31,805
IV. Well Houses									
Total Quantity	2	3	3	5	7	7	6	5	2
Average Well House Weight (Lbs)	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	10	4
Dismantlement Labor Costs	\$484	\$725	\$725	\$1,209	\$1,693	\$1,693	\$1,451	\$1,209	\$484
Equipment (Cat 924G at 2 hours per wellhouse) (hrs)	4	6	6	10	14	14	12	10	4
Equipment Costs	\$192	\$289	\$289	\$481	\$674	\$674	\$577	\$481	\$192
Subtotal Well House Dismantlement Costs	\$676	\$1,014	\$1,014	\$1,690	\$2,366	\$2,366	\$2,028	\$1,690	\$676
B. Disposal									
Total Disposal Weight (6000 lbs per wellhouse) (Lbs)	12000	18000	18000	30000	42000	42000	36000	30000	12000
Subtotal Disposal Costs	\$111	\$167	\$167	\$278	\$389	\$389	\$333	\$278	\$111
Total Well House Removal and Disposal Costs	\$787	\$1,181	\$1,181	\$1,968	\$2,755	\$2,755	\$2,361	\$1,968	\$787
TOTAL REMOVAL AND DISPOSAL COSTS PER WELLFIELD	\$102,735	\$100,353	\$115,922	\$215,716	\$358,898	\$369,014	\$350,828	\$299,721	\$139,804
TOTAL WELLFIELD BUILDINGS AND EQUIPMENT REMOVAL AND DISPOSAL COSTS	\$2,050,991								

Crow Butte Resources Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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
I.	Well Abandonment (Wellfields)									
	# of Production Wells	38	52	57	96	189	194	179	150	60
	# of Injection Wells	72	79	96	169	219	293	300	250	100
	# of Perimeter Monitoring Wells	11	10	10	18	27	32	16	25	20
	# of Shallow Monitoring Wells	3	3	3	11	25	28	25	29	20
	Total Number of Deep Wells	121	141	163	283	435	519	495	425	180
	Total Number of Shallow Wells	3	3	3	11	25	28	25	29	20
	Average Diameter of Casing (inches)	5	5	5	5	5	5	5	5	5
	Production, Injection and Perimeter Well Average Depth (ft)	665	631	774	698	675	515	762	500	770
	Shallow Well Average Depth (ft)	200	200	200	200	200	200	200	200	200
	Total Mine Unit Well Depth (ft)	81065	89571	126762	199734	298625	272885	382190	218300	142600
	Well Abandonment Unit Cost (\$/ft. of well)	\$0.2809	\$0.2809	\$0.2809	\$0.2809	\$0.2809	\$0.2809	\$0.2809	\$0.2809	\$0.2809
	Subtotal Abandonment Cost per Wellfield	\$22,775	\$25,164	\$35,613	\$56,114	\$83,896	\$76,665	\$107,373	\$61,338	\$40,062
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)	\$115.70								
	Subtotal Downhole Pump Disposal	\$1,178								
	Total Wellfield Abandonment Costs	\$510,171								

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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			\$121	
	<i>Subtotal Removal Labor Costs</i>			<i>\$8,222</i>	
	B. Labor to Clean Chemical Tankage				
	Number of Persons			1	
	Tanks/Day			1	
	Number of Days			7	
	\$/Day/Person			\$121	
	<i>Subtotal Cleaning Labor Costs</i>			<i>\$846</i>	
	C. Equipment				
	Saws, scaffolding, etc			\$5,708	
	<i>Subtotal Equipment Costs</i>			<i>\$5,708</i>	
	Total Equipment Removal and Loading Costs			\$14,776	
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)			\$115.70	
	<i>Subtotal Tankage Transportation and Disposal Costs</i>			<i>\$2,791</i>	
	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)			\$115.70	
	<i>Subtotal Contaminated PVC Pipe Transportation and Disposal Costs</i>			<i>\$848</i>	

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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)			\$115 70	
	<i>Subtotal Pump Transportation and Disposal Costs</i>			<i>\$643</i>	
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)			\$115.70	
	<i>Subtotal Filter Transportation and Disposal Costs</i>			<i>\$1,714</i>	
E	Dryer				
	Dryer Volume (yd ³) (no void factor used)			29 6	
	Transportation and Disposal Unit Cost (\$/yd ³) (Unpackaged Bulk)			\$115 70	
	<i>Total Dryer Transportation and Disposal Costs</i>			<i>\$3,428</i>	
	Total Contaminated Equipment Transportation and Disposal Costs			\$9,425	
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	
	<i>Subtotal Tankage Transportation and Disposal Costs</i>			<i>\$370</i>	
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	
	<i>Subtotal PVC Pipe Transportation and Disposal Costs</i>			<i>\$370</i>	
	Total Uncontaminated Equipment Transportation and Disposal Costs			\$740	
IV. Supervisory Labor Costs During Plant Decommissioning					
	Estimated Duration (months)			6	
	Engineer			\$40,487	
	Radiation Technician			\$33,733	
	Total Supervisory Labor Costs			\$74,220	
SUBTOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS PER FACILITY				\$99,160	
	Building Area (ft ²)			34,000	5,000
	Building Equipment Removal and Disposal Cost per Square Foot			\$2.92	\$2.92
TOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS				\$99,160	\$14,582

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

Building Demolition				Commercial Plant	R.O. Building
I. Decontamination Costs					
A. Wall Decontamination					
	Area to be Decontaminated (ft ²)			24,000	
	HCl Application Rate (Gallons/ft ²)			1	
	HCl Acid Cost			\$0.57	
	Subtotal Wall Decontamination Materials Costs			\$13,704	
B Concrete Floor Decontamination					
	Area to be Decontaminated (ft ²)			17530	
	HCl Application Rate (Gallons/ft ²)			2	
	HCl Acid Cost			\$0.57	
	Subtotal Floor Decontamination Materials Costs			\$20,019	
C Decontamination Labor					
	Labor (man-days)			60	
	Subtotal Decontamination Labor Cost			\$7,254	
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			59,060	
	Pumping costs (5 HP/30 gpm)			\$367	
	Subtotal Decontamination Costs			\$43,345	
	Total Decontamination Costs			\$43,345	
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 (ft ²)			5,450	
	Removal Rate (\$/ft ²)			\$2.72	
	Subtotal Concrete Floor Removal			\$14,824	
	Total Demolition Costs			\$182,710	

Crow Butte Resources, Inc.
 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2002)

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 (Yd ³)			101	
	Transportation and Disposal Unit Cost (\$/Yd ³) (Unpackaged Bulk)			\$115.70	
	Subtotal Concrete Floor Disposal Costs			\$11,677	
	Total Disposal Costs			\$11,677	
IV. Plant Site Reclamation					
A.	Plant Site Earthwork				
	Material to be Moved (Yd ³)			20,000	
	D8N Bulldozer Earthwork Rate (Yd ³ /hr)			700	
	D8N Hourly Rate			\$118	
	Subtotal Plant Site Earthwork			\$3,382	
B	Revegetation				
	Area requiring Revegetation (Ac)			4	
	Revegetation Unit Cost (\$/Ac)			\$300	
	Subtotal Plant Site Revegetation			\$1,200	
	Total Plant Site Reclamation Costs			\$4,582	
SUBTOTAL BUILDING DEMOLITION AND DISPOSAL COSTS				\$242,314	
	Building Area (F ²)			34,000	5,000
	Building Demolition Cost per Square Foot			\$7.13	\$7.13
TOTAL BUILDING DEMOLITION AND DISPOSAL COSTS				\$242,314	\$35,634

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

Evaporation Pond Reclamation				Commercial Ponds	R&D Ponds
Assumptions/Data:					
	Number of Ponds			3	2
	Area of Ponds (ft ²)			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 (Yd ³ /pond)			60,000	30,000
	Surface Restoration/Revegetation (Acres)			20	10
	Sludge Production Rate (Yd ³ sludge/gal)				0.000000102
	(1 Yd ³ sludge/9,772,000 gal R&D Phase)				
	Estimated 1991 to 2002 Total Production (gallons)			19,768,586,000	
	Liner Removal Rate (ft ² /man-day)			10,000	10,000
	Sludge Removal Rate (Yd ³ /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 (ft ² /Man-Day)			10,000	10,000
	Total Man-Days			75	10
	Labor Rate (\$/man-day)			\$120.91	\$120.91
	<i>Subtotal Liner and Piping Removal Labor Costs</i>			<i>\$9,068</i>	<i>\$1,209</i>
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)			\$48.12	\$48.12
	<i>Subtotal Liner and Piping Removal Equipment Costs</i>			<i>\$7,219</i>	<i>\$962</i>
	Total Pond Liner and Piping Removal Costs			\$16,287	\$2,172

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

Evaporation Pond Reclamation				Commercial Ponds	R&D Ponds
II.	Pond Sludge Removal				
	Pond Sludge Estimate				
	Estimated Production Flow since 1991 (gal)			19,768,586,000	
	Historical Sludge Production Rate			0.000000102	
	Estimated Pond Sludge Volume (Yd3)			2,023	Cleaned following R&D
A.	Pond Sludge Removal Labor				
	Pond Sludge Volume (Yd3)			2,023	
	Sludge Removal Rate (Yd3/man-day)			8.33	
	Total Man-Days			243	
	Labor Rate (\$/man-day)			\$121	
	<i>Subtotal Pond Sludge Removal Labor Costs</i>			<i>\$29,351</i>	<i>\$0</i>
B.	Pond Sludge Removal Equipment				
	Total Man-Days Removal Effort			243	
	Size of Crew			3	
	Total Days Removal Effort			81	
	Cat 924G Loader Hourly Rate (\$/hr)			\$48.12	
	<i>Subtotal Pond Sludge Removal Equipment Costs</i>			<i>\$31,153</i>	<i>\$0</i>
	Total Pond Sludge Removal Costs			\$60,504	\$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)			\$115.70	\$115.70
	<i>Subtotal Pond Liner Disposal Costs</i>			<i>\$33,465</i>	<i>\$1,607</i>

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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)		\$115.70	\$115.70
		<i>Subtotal Pond Piping Disposal Costs</i>		<i>\$348</i>	<i>\$44</i>
B.	Pond Sludge Disposal				
		Total Volume Pond Sludge (Yd3)		2,023	
		Disposal Unit Costs (\$/yd3) (Soil rate)		\$120.50	
		<i>Subtotal Pond Sludge Disposal Costs</i>		<i>\$243,769</i>	<i>\$0</i>
		Total Byproduct Material Disposal Costs		\$277,582	\$1,651
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		\$118.36	\$118.36
		<i>Subtotal Pond Earthwork</i>		<i>\$30,436</i>	<i>\$10,145</i>
B.	Revegetation				
		Area requiring Revegetation (Ac)		20	10
		Revegetation Unit Cost (\$/Ac)		\$300	\$300
		<i>Subtotal Plant Site Revegetation</i>		<i>\$6,000</i>	<i>\$3,000</i>
		Total Pond Site Reclamation Costs		\$36,436	\$13,145

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

Evaporation Pond Reclamation					Commercial Ponds	R&D Ponds
V.	Supervisory Labor Costs During Pond Reclamation					
	Estimated Duration (months)				4	
	Engineer Rate (\$/month)				\$6,748	
	Total Engineer Labor				\$26,991	
	Radiation Technician Rate (\$/month)				\$5,622	
	Total Radiation Technician Labor				\$22,489	
	Total Supervisory Labor Costs				\$49,480	\$0
TOTAL EVAPORATION POND RECLAMATION PER POND					\$440,288	\$16,968
TOTAL EVAPORATION POND RECLAMATION COSTS					\$457,257	

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

Miscellaneous Site Reclamation			
I.	Access Road Reclamation		
	Assumptions		
	Road Reclamation production rate (Yd3/hr)		200
	Length of Main Access Roads (ft)		6,700
	Average Main Access Road width (ft)		25
	Depth of Main Access Road Gravel Surface (ft)		1
	Surface Area of Main Access Road (Ac)		3.8
	Length of Wellfield Access Roads (ft)		33,400
	Average Wellfield Access Road width (ft)		12
	Depth of Wellfield Access Road Gravel Surface (ft)		0.5
	Surface Area of Wellfield Road (Ac)		9.2
	A. Main Access Road Dirtwork		
	Main Access Road Gravel Volume (Yd3)		6,204
	Total reclamation time (hrs)		31
	D8N Unit Operating Cost (\$/hr)		\$118
	<i>Subtotal Main Access Road Gravel Roadbase Removal Costs</i>		<i>\$3,671</i>
	B. Wellfield Road Dirtwork		
	Wellfield Road Gravel Volume (Yd3)		7,422
	Total reclamation time (hrs)		37
	D8N Unit Operating Cost (\$/hr)		\$118
	<i>Subtotal Wellfield Road Gravel Roadbase Removal Costs</i>		<i>\$4,393</i>
	E. Discing/Seeding		
	Assumptions		
	Surface Area (acres)		13.0
	Discing/Seeding Unit Cost (\$/acre)		\$300
	<i>Subtotal Discing/Seeding Costs</i>		<i>\$3,914</i>
	Total Access Road Reclamation Costs		\$11,978

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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)			\$121
	Cat 924G Loader Use (days)			78
	Cat 924G Loader Cost			\$30,014
	<i>Subtotal Pipeline Removal Costs</i>			<i>\$39,440</i>
	B. Pipeline Shredding Costs			
	Length of Pipelines (ft)			5,200
	Shredding Rate (ft./man-day)			1,500
	Shredding Labor Rate (\$/man-day)			\$121
	Shredder Use (days)			3
	Shredder Cost			\$333
	<i>Subtotal Pipeline Shredding Costs</i>			<i>\$752</i>

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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 (yd ³)		2.5
	Transportation and Disposal Unit Cost (\$/yd ³) (Unpackaged Bulk)		\$115.70
	<i>Subtotal Pipeline Disposal Costs</i>		<i>\$287</i>
	Total Wastewater Pipeline Reclamation Costs		\$40,479
III.	Electrical Distribution System Removal		
	Assumptions		
	Length of High Voltage Lines		13,100
	High Voltage Line Removal Rate (\$/ft.)		\$0.59
	High Voltage Line Removal Cost (\$/ft.)		\$7,729
	Substation Removal		\$1,175
	Subtotal Pipeline Removal Costs		\$8,904
IV.	Supervisory Labor Costs During Miscellaneous Reclamation		
	Estimated Duration (months)		3
	Engineer Rate (\$/month)		\$6,748
	Total Engineer Labor		\$20,243
	Radiation Technician Rate (\$/month)		\$5,622
	Total Radiation Technician Labor		\$16,866
	Total Supervisory Labor Costs		\$37,110
TOTAL MISCELLANEOUS RECLAMATION COSTS			\$98,471

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2003)

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 2002 CPI				179.9
	<i>Subtotal Escalated 2002 Plugging and Abandonment Costs</i>				<i>\$67,765</i>
	B. Site Reclamation				
	Cost Estimate from June 1996 for reclamation				\$2,346
	June 1996 CPI				156.7
	June 2002 CPI				179.9
	<i>Subtotal Escalated 2002 Reclamation Costs</i>				<i>\$2,693</i>
TOTAL MISCELLANEOUS RECLAMATION COSTS					\$70,458

Crow Butte Resources Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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)		\$121
	Days to complete		235
A.	Electrical Costs		
	<i>Cost to pump 3 Pore Volumes</i>		<i>\$844</i>
B.	Labor Costs		
	<i>Labor for pumping 3 Pore Volumes</i>		<i>\$3,687</i>
	Total Ground Water Sweep Costs		\$4,531
II.	Monitoring and Sampling Costs		
A.	Labor Costs for Monitoring		
			\$2,026
B.	Monitoring for I-196i, I-196m, and I-196l		
			\$2,026
	Total Monitoring and Sampling Costs		\$4,051

Crow Butte Resources Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

I-196 Brule Aquifer Restoration			
III	Additional Ground Water Sweep		
	Pump from additional wells and monitor as above		\$8,582
	Drill 4 additional wells, 50 ft deep at \$26/ft.		\$5,200
	Total Additional Ground Water Sweep		\$13,782
IV	Well Abandonment		
	Abandon 14 wells at \$194/well		\$2,716
	Total Well Abandonment		\$2,716
TOTAL I-196 BRULE AQUIFER RESTORATION COSTS			\$25,081

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

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 =										\$120.91	man-day	
5. Labor costs are based on 36 pumps at 1,150 gpm												
Wellfield Pumping Electrical Costs per 1000 Gallons												
1000 gal	X	5 hp	X	1 hr	X	0.746 kwh	X	\$0.05		= \$	0.097	
		32 gpm		60 min		hp		. kwh				
Wellfield Pumping Labor Costs per 1000 Gallons												
1000 gal	X	1 min	X	8 hr	X	\$121	X	2	operators	= \$	\$0.438	
		1150 gal		480 min		man-day						
Groundwater Sweep Production Rate												
1150 gal	X	60 min	X	24 hr	X	365 day	X	1	year	=	50,370,000	gallons
		hr gal		day		year		12	month			month
TOTAL GWS COSTS PER 1000 GALLONS										= \$	0.535	

Crow Butte Resources, Inc.
 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2002)

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/HIP
4	Operator labor costs =									\$120.91	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 =								\$0.283	lb
		Antiscalant =								\$15.91	gal
Wellfield Pumping Electrical Costs per 1000 Gallons											
	1000 gal	X	5 hp	X	1 hr	X	0.746 kw	X	\$0.05		
			32 gpm		60 min		hp		kwh		
										- \$	0.097135417
											per Kgal
Reverse Osmosis Electrical Costs per 1000 Gallons											
	1000 gal	X	212 hp	X	1 hr	X	0.746 kw	X	\$0.05		
			400 gpm		60 min		hp		kwh		
										- \$	0.329483333
											per Kgal
Reverse Osmosis Labor Costs per 1000 Gallons											
	1000 gal	X	1 min	X	1 man-day	X	\$121	X	2	operators	
			400 gal		480 min		man-day		man-day		
										- \$	\$1.2594
											per Kgal
Treatment chemical costs per 1000 Gallons											
	Antiscalant:										
	1000 gal	X	8.33E-06 gal antiscalant	X			\$15.91				
			1 gal				gal antiscalant				
										- \$	\$0.13
											per Kgal
	Reductant:										
	1000 gal	X	5.60E-04 lbs reductant	X			\$0.283				
			1 gal				lb reductant				
										- \$	\$0.16
											per Kgal
Reverse Osmosis Production Rate											
	400 gal	X	60 min	X	24 hr	X	365 day	X	1	year	
			min		day		year		12	month	
										=	17,520,000
											gallons
											month
TOTAL RO COSTS PER 1000 GALLONS											= \$ 1.977

Crow Butte Resources, Inc.
 Crow Butte Uranium Project 2002-2003 Surety Estimate
 (Revised September 2002)

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 =										\$120.91 man-day
5.	System horsepower requirements for 1,150 gpm rated flow based upon:										
										injection pump	30 hp
6.	Chemical costs:										
										Reductant =	\$0.283 lb
Wellfield Pumping Electrical Costs per 1000 Gallons											
	1000 gal	X	5 hp	X	1 hr	X	0.746 kwh	X	\$0.05		
			32 gpm		60 min		hp		kwh	= \$	0.097 per Kgal
Wellfield Injection Electrical Costs per 1000 Gallons											
	1000 gal	X	30 hp	X	1 hr	X	0.746 kwh	X	\$0.05		
			1150 gpm		60 min		hp		kwh	= \$	0.016 per Kgal
Recirculation Labor Costs per 1000 Gallons											
	1000 gal	X	1 min	X	1 man-day	X	\$121	X	2 operators	= \$	0.438 per Kgal
			1150 gal		480 min		man-day		man-day		
Treatment chemical costs per 1000 Gallons											
	1000 gal	X	5.60E-04 lbs reductant	X	\$0.283					= \$	\$0.158 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
			hr gal		day		year		12 month		month
TOTAL RECIRCULATION COSTS PER 1000 GALLONS											= \$0.710

Crow Butte Resources, Inc.
Crow Butte Uranium Project 2002-2003 Surety Estimate
(Revised September 2002)

WELL ABANDONMENT Unit Costs									
Assumptions:									
1	Use backhoe for 0.5 hr/well to dig and reclaim pit.								
2	Mixing unit is used to pump plug gel into well at 2 hours per well.								
3	Labor for pulling hoses, running cementer, inserting plug gel, etc. will require 2 workers at 2 hrs per well								
Well Abandonment Costs					Cost per ft (based on 700 ft wells)				
Cat 416 Backhoe									
	0.5	hours	X	\$ 35.68	per hour	=	\$ 17.84		\$0.0255
Mixing unit									
	2	hours	X	\$ 12.00	per hour	=	\$ 24.00		\$0.0343
Labor									
	4	man	X	\$ 15.11	per man	=	\$ 60.45		\$0.0864
		hours			hour				
Well Cap									
	1	each	X	\$ 10.4201	each	=	\$ 10.42		\$0.0149
Materials per foot of well (Variable Cost)									
Cement									
	0.81	lbs/ft	X	\$ 104.231	per ton	=	\$		\$0.0422
Bentonite									
	0.065	lbs/ft	X	\$ 198.031	per ton	=	\$		\$0.0064
Salt									
	0.047	lbs/ft	X	\$ 61	per ton	=	\$		\$0.0014
Plug Gel									
	0.01	sacks/ft	X	\$ 6.98	per sack	=	\$		\$0.0698
Total Estimated Cost per Foot:									\$0.2809