HRI Churchrock Project
Section 8 Wellfield Equipment Tabulation

# H. Houses	# Injectors	# Extractors	# Feet 2"	# Feet 10"	# Feet 14"	Gravel Road
1	21	18	6690	540		
2	21	18	6950	440		
3	19	21	7010	460		
4	23	26	6370	360		
5	16	30	6770	500		
6	13	18	4070	260		
7	9	11	4500	1400		
8	30	28	9030	460		
9	27	28	8460	400		
10	15	13	4690	380		
11	21	15	6580	500		
Totals	215	226	71120	5700	7200	3600

Pipe Wall Volume Data

Outside Diameter (in)	Area Inside OD (ft2)	Wall Volume SDR17 (ft3/ft)
2	0.022	0.012
2.5	0.034	
3	0.049	0.018
3.5	0.067	
4	0.087	
4.5	0.110	
5	0.136	
5.5	0.165	
6	0.196	
6.5	0.230	
7	0.267	
7.5	0.307	
8	0.349	
8.5	0.394	
9	0.442	
9.486	0.491	
9.5	0.492	
10	0.545	0.140
10.5	0.601	
10.75	0.630	
11	0.660	
11.5	0.721	
12	0.785	
12.353	0.832	
12.5	0.852	
13	0.922	
13.5	0.994	
14	1.069	0.237
14.5	1.147	
15	1.227	
15.5	1.310	

	Wall Tk
14 " SDR 17	0.824
10 " SDR 17	0.632

PROGRAM TO CALCULATE THE VOLUME CONTAINED WITHIN A RECTANGULAR POND WITH KNOWN SLOPE AND DEPTH

ALL DIMENSIONS ARE IN FEET

THE TOP OF THE POND MEASUREMENTS ARE:

LENGTH	350
WIDTH	350
DEPTH	20
SLOPE	3

W=	BOTTOM WIDTH	230
L=	BOTTOM LENGTH	230

DEPTH	GALLONS	CUBIC FEET	CUBIC YARDS
0.50	200,438	26,797	992
1.00	406,104	54,292	2,011
1.50	617,066	82,496	3,055
2.00	833,392	111,416	4,127
2.50	1,055,148	141,063	5,225
3.00	1,282,401	171,444	6,350
3.50	1,515,220	202,570	7,503
4.00	1,753,671	234,448	8,683
4.50	1,997,822	267,089	9,892
5.00	2,247,740	300,500	11,130
5.50	2,503,492	334,692	12,396
6.00	2,765,147	369,672	13,692
6.50	3,032,770	405,451	15,017
7.00	3,306,429	442,036	16,372
7.50	3,586,193	479,438	17,757
8.00	3,872,127	517,664	19,173
8.50	4,164,299	556,725	20,619
9.00	4,462,777	596,628	22,097
9.50	4,767,629	637,384	23,607
10.00	5,078,920	679,000	25,148

Liner Size 375X375

PROGRAM TO CALCULATE THE VOLUME CONTAINED WITHIN A RECTANGULAR POND WITH KNOWN SLOPE AND DEPTH

ALL DIMENSIONS ARE IN FEET

THE TOP OF THE POND MEASUREMENTS ARE:

LENGTH	120
WIDTH	120
DEPTH	10
SLOPE	3

W=	BOTTOM WIDTH	60
L=	BOTTOM LENGTH	60

DEPTH	GALLONS	CUBIC FEET	CUBIC YARDS
0.50	14,148	1,892	70
1.00	29,711	3,972	147
1.50	46,754	6,251	232
2.00	65,345	8,736	324
2.50	85,553	11,438	424
3.00	107,443	14,364	532
3.50	131,083	17,525	649
4.00	156,541	20,928	775
4.50	183,885	24,584	911
5.00	213,180	28,500	1,056
5.50	244,495	32,687	1,211
6.00	277,897	37,152	1,376
6.50	313,453	41,906	1,552
7.00	351,231	46,956	1,739
7.50	391,298	52,313	1,938
8.00	433,720	57,984	2,148
8.50	478,567	63,980	2,370
9.00	525,904	70,308	2,604
9.50	575,799	76,979	2,851
10.00	628,320	84,000	3,111

Liner Size	150X150

CHEMICAL REDUCTANT

Assumptions:

1. H2S introduced to RO permeate at concentration of 400 mg/L for final pore volume.
2. Chemical costs = $0.5/lb, includes tank rental and safety equipment.

Costs for one Pore Volume

	P.V. Gal.	P.V. L	MG H2S P.V	Lbs H2S P.V.	Cost Dollars
Churchrock Section 8	147,814,123	559,476,455	223,790,582,048	493,458	$246,729.12

Ground Water Restoration

PV Assumptions - 9 pore volumes required pursuant to license condition 9.5

ZONE	Area (ft2)	Tk (ft)	Vol (ft3)	Por	gal/ft3	PV (gal)	H-PIF	V-PIF	CPV (gal)	9 X CPV
UA	318,700	8.6	2,740,820	0.25	7.48	5,125,333	1.5	1.3	9,994,400	89,949,601
LA	404,500	12.2	4,934,900	0.25	7.48	9,228,263	1.5	1.3	17,995,113	161,956,016
UB	329,500	10.5	3,459,750	0.25	7.48	6,469,733	1.5	1.3	12,615,978	113,543,805
LB	555,300	11.6	6,441,480	0.25	7.48	12,045,568	1.5	1.3	23,488,857	211,399,711
UC	658,700	14.9	9,814,630	0.25	7.48	18,353,358	1.5	1.3	35,789,048	322,101,435
ULC	378,200	10.5	3,971,100	0.25	7.48	7,425,957	1.5	1.3	14,480,616	130,325,545
LLC	321,900	12.3	3,959,370	0.25	7.48	7,404,022	1.5	1.3	14,437,843	129,940,584
UD	124,600	10.4	1,295,840	0.25	7.48	2,423,221	1.5	1.3	4,725,281	42,527,525
MD+LD	326,500	12	3,918,000	0.25	7.48	7,326,660	1.5	1.3	14,286,987	128,582,883
TOTALS	3,417,900		40,535,890			75,802,114			147,814,123	1,330,327,106

Area - Area of cut off grade mineralization
Tk - Thickness of cut off grade mineralization
Por - Estimated porosity of the rock
PV - Straight pore volume without any correction
H-PIF - Horizontal pore volume increase factor
V-PIF - Vertical pore volume increase factor
CPV - Corrected pore volume

Number of Wells

Extraction Wells

Header House 1	18
Header House 2	18
Header House 3	21
Header House 4	26
Header House 5	30
Header House 6	18
Header House 7	11
Header House 8	28
Header House 9	28
Header House 10	13
Header House 11	15
Total	226

Injection Wells

Header House 1	21
Header House 2	21
Header House 3	19
Header House 4	23
Header House 5	16
Header House 6	13
Header House 7	9
Header House 8	30
Header House 9	27
Header House 10	15
Header House 11	21
Total	215

MAIN PIPELINE REMOVAL

Assumptions:

1. Trenching with trackhoe at 1,500 ft/day
2. Pipeline extraction and backfilling with trackhoe at 1500 ft/day
3. Trackhoe rental: $1600/week
4. Fuel cost: $9/operating hour
5. Trackhoe operation requires one worker at $15/hour
6. Pipeline extraction requires 2 workers at $15/hour (in addition to trackhoe ope
7. Pipelines removed simultaneously
8. Includes removal of manholes
9. Operating schedule: 8 hours/day, 5 days/week

Main Pipeline Removal Costs per ft of Pipe

Equipment & Fuel

	Weekly	Daily	Hourly	Per Foot
Trackhoe	$1,200.00	$240.00	$30.00	$0.16
Fuel		$72.00	$9.00	$0.05
Labor				
Trackhoe operator		$120.00	$15.00	$0.08
Pipeline extractors (2)		$240.00	$30.00	$0.16
Total Per Foot Cost				$0.45
26800 feet of pipe removed.				$12,006

rator)

WELLFIELD PIPING REMOVAL

Assumptions:

1. Trenching with backhoe at 1500 ft/day
2. Pipeline extraction and backfilling with backhoe at 1500 ft/day
3. Backhoe rental: $750/week
4. Fuel cost: $9/operating hour
5. Backhoe operation requires 1 worker at $15/hour
6. Pipeline extraction requires 2 worders at $15/hour (in addition to trackhoe operator
7. Operating schedule: 8 hrs/day, 5 days/week

Wellfield Pipeline Removal Costs per ft of Pipe

Equipment & Fuel

	Weekly	Daily	Hourly	Per Foot
Backhoe	$550.00	$110.00	$13.75	$0.07
Fuel		$72.00	$9.00	$0.05
Labor				
Backhoe operator		$120.00	$15.00	$0.08
Pipeline extractors (2)		$240.00	$30.00	$0.16
Totals			$67.75	
Total Per Foot Cost				$0.36
71120 feet of pipe removed.				$25,698.03

WELLFIELD ROAD RECLAMATION

Assumptions:

1. Gravel road base removed at cost of $0.60/cy/1000 ft (WDEQ Guideline No. 12, Appendix C)
2. Gravel road base: average depth = 0.5 ft, average width = 15 ft
3. Roads scarified prior to topsoil application at cost of $30.51/acre (WDEQ Guideline No. 12, Appendix P)
4. Grading of scarified roads prior to topsoil application at cost of $33.27/acre (WDEQ Guideline No. 12, Appendix G)
5. Topsoil applied at cost or $0.60/cy/1000 ft (WDEQ Guideline No. 12, Appendix C, surface grade: level ground)
6. Stripped topsoil: average depth = 0.67 ft, average width = 25 ft
7. Discing/seeding cost of $200/acre

Costs per 1000 ft of road

	Width (ft)	Thick (ft.)	Yd3	$/Yd3	Total
Road base removal	15	0.5	278	$0.60	$166.67
Topsoil application	25	0.67	620	$0.60	$372.22

	Width (ft)	Acres	$/Acres	Total
Scarification	25	0.6	$30.51	$17.51
Grading	25	0.6	$33.27	$19.09
Disking/seeding	25	0.6	$200.00	$114.78

TOTAL WELLFIELD ROAD RECLAMATION	$690.28
Section 8 wellfield road 3600 feet long.	2485.00

DISKING/SEEDING

Assumption:

1. Based on actual contractor costs

TOTAL DISCING/SEEDING COSTS PER ACRE = $200.00

Revised October 15, 2010

TRANSPORTATION AND DISPOSAL

11.e.2 By-Product Material Transportation Disposal Costs per Ft3

Assumptions:
1. Based on contract costs for transportation to and disposal at the IUC White Mesa Mill near Blanding Utah
2.Transportation assumed a 200 mile trip at $4.76 per mile, $952 per trip. Bulk truck capacity 30 yds3. Drum truck capa
3. All 11.e.2 disposal fees are based upon actual current contract rates at Texas ISR facilities as itemized in 4 & 5 below
4. Drummed waste. $2,866 per shipment of 64 drums, 7.35 cu. ft. per drum, $6.09 per cubic foot.
5. Bulk waste. $1975.45 per shipment of 30 cu. yds. , $2.44 per cu. ft.
6. Per truck site unloading ($135.00) and decontamination ($150.00) amounts are specified in URI's current disposal site

Type of Waste: Sludge, resin, and other by-product type wastes shipped in drums.

	Unit Shipment Cost	Units/Drum	Drums/Truck	Total $/ft3
Disposal fee	$2,866.00	7.35	64	$6.09
Shipping	$952.00			$2.02
Site unloading	$135.00			$0.28
Site scanning	$150.00			$0.31
Total shipping and disposal				$8.71

Type of waste: Soil, sand, demolished concreteand other bulk wastes

	Unit Shipment Cost	Ft3/Truck	Total $/ft3
Disposal fee	$1,975.45	810	$2.44
Shipping	$952.00	810	$1.18
Site unloading	$45.00	810	$0.06
Site scanning	$150.00	810	$0.19
Total shipping and disposal			$3.85

Unrestricted Material Transportation Disposal Costs per ton

Assumptions:
1. Based on public costs disposal at theWaste Management Red Rocks Landfill. 24 $/ton
2. 1 ton is equal to 1 yd3
2. Transportation assumed a 30 mile trip at $2.00 per mile. Bulk truck capacity 20 yds3.

	Unit Cost	Total $/yds3
Disposal fee (ton)	$24.00	$24.00
Shipping (truck trip)	$60.00	$3.00
Total shipping and disposal (yd3)		$27.00

LABOR SUMMARIES

Rev. March 16, 2001

			Number	Hourly Rate	Yearly Salary	Annual	Monthly
Management and Accounting							
Salaried	Operations Manager		1	-	$120,000	$120,000	$10,000
Salaried	Environmental Manager		1	-	$105,000	$105,000	$8,750
Salaried	Accounting Manager				$105,000	$105,000	$8,750
Salaried	Accountant			-	$65,000	$65,000	$5,417
Plant Personnel							
Salaried	Plant Superintendent			-	$85,000	$85,000	$7,083
Salaried	Plant Engineer			-	$45,000	$45,000	$3,750
Salaried	Radiation Officer		1	-	$30,000	$30,000	$2,500
Salaried	Chemist		1	-	$46,000	$46,000	$3,833
Salaried	Plant Foreman			-	$28,000	$28,000	$2,333
Salaried	Maintenance Foreman			-	$28,000	$28,000	$2,333
Wage	Lab Technicans			$9.62	-	$20,010	$1,667
Wage	Secretary			$9.62	-	$20,010	$1,667
Wage	Electrician		1	$14.43	-	$30,014	$2,501
Wage	Apprentice Electrican			$12.01	-	$24,981	$2,082
Wage	Plant Operator		1	$11.54	-	$24,003	$2,000
Wage	Assistance Plant Operator			$11.54	-	$24,003	$2,000
Wage	Dryer Operator			$11.54	-	$24,003	$2,000
Wage	Maintenance			$11.54	-	$24,003	$2,000
Wellfield Personnel							
Salaried	Wellfield Superintendent			-	$41,200	$41,200	$3,433
Salaried	Drilling Engineer			-	$40,500	$40,500	$3,375
Salaried	Foreman		1	-	$28,000	$28,000	$2,333
Wage	Truck Driver		1	$11.54	-	$24,003	$2,000
Wage	Electrician			$14.43	-	$30,014	$2,501
Salaried	Data Entry Clerk			-	$20,000	$20,000	$1,667
Wage	Secretary				$20,000	$20,000	$1,667
Wage	Logger			$12.01	-	$24,981	$2,082
Wage	Wellfield Operators		1	$11.50	-	$23,920	$1,993
Wage	Assistant Wellfield Operator			$11.50	-	$23,920	$1,993
Wage	Balancer			$11.50	-	$23,920	$1,993
Wage	Environmental Sampler			$11.50	-	$23,920	$1,993
Wage	Pump Hoist Operators		1	$11.50	-	$23,920	$1,993
Wage	Backhoe Operator			$10.49	-	$21,819	$1,818
Wage	Maintenance			$11.50	-	$23,920	$1,993
Wage	Casing Crew			$11.50	-	$23,920	$1,993
Engineering & Geologic Personnel							
Salaried	Chief Engineer			-	$66,000	$66,000	$5,500
Salaried	RESERVOIR ENGINEER			-	$60,000	$60,000	$5,000
Salaried	Senior Geologist		1	-	$58,000	$58,000	$4,833
Salaried	Geologist			-	$48,800	$48,800	$4,067
Salaried	Logging Supervisor			-	$35,000	$35,000	$2,917
Wage	Secretary				$20,000	$20,000	$1,667
Wage	Surveyor			$12.02	-	$25,002	$2,083
Wage	Assistant Surveyor			$12.02	-	$25,002	$2,083
Wage	Logger			$10.49	-	$21,819	$1,818
		Total #	11				

Calculation of BC Solids Produced

Flow (g/min)	580
Flow (l/min)	2,195
Flow (l/d)	3,161,232
Solids (g/l)	4
Solids (g/d)	12,644,928
Solids (g/mo)	384,616,560
Solids (kg/mo)	384,617
Solids (lb/mo)	174,429
Solids (yd3/mo)*	87
Solids (ft3/mo)	2,355
Unit disposal cost ($/ft3)	$4.21
Monthly disposal cost ($)	**$9,905**

*1 yd3 ~ 1 ton

CHURCHROCK SECTION 8 GROUNDWATER RESTORATION AND DECOMMISSIONING COSTS **Rev. March 16, 2001**

COSTS ASSOCIATED WITH RO AND BRINE CONCENTRATION OPERATION AND MAINTENANCE

	Period	1/5	2/5	3/5	4/5	5/5	6/5	7/5	8/5	9/5	10/5	11/5	12/5
1	***Management and Accounting***												
2	Operations Manager	1	1	1	1	1	1	1	1	1	1	1	1
3	Environmental Manager	1	1	1	1	1	1	1	1	1	1	1	1
4	***Plant Personnel***												
5	Radiation Officer	1	1	1	1	1	1	1	1	1	1	1	1
6	Chemist	1	1	1	1	1	1	1	1	1	1	1	1
7	Electrician	1	1	1	1								
8	Plant Operator	1	1	1	1								
9	***Wellfield Personnel***												
10	Foreman	1	1	1	1	1	1	1	1	1	1	1	1
11	Truck Driver	1	1	1	1								
12	Wellfield Operators	1	1	1	1								
13	Pump Hoist Operators	1	1	1	1								
14	***Engineering & Geologic Personnel***												
15	Senior Geologist	1	1	1	1								
16													
17	***Total Employees***	11	11	11	11	5	5	5	5	5	5	5	5
18													
19	***Operations Statistics***												
20	Reverse Osmosis Treatment												
21	GPM RO Capacity	580	580	580	580								
22	GPM RO Product	464	464	464	464								
23	GPM RO Reject	116	116	116	116								
24	MM Gals, RO Processed - Month	25,891,200	24,220,800	25,891,200	25,056,000								
25	MM Gals, RO Permiate - Month	20,712,960	19,376,640	20,712,960	20,044,800								
26	MM Gals, RO Reject - Month	5,178,240	4,844,160	5,178,240	5,011,200								
27	Brine Concentration												
28	GPM BC Capacity	125	125	125	125								
29	GPM Distillate	113.5	113.5	113.5	113.5								
30	GPM Brine	2.5	2.5	2.5	2.5								
31	MM Gals, BC Capacity - Month	5,580,000	5,220,000	5,580,000	5,400,000								
32	MM Gals, Distillate - Month	5,066,640	4,739,760	5,066,640	4,903,200								
33	MM Gals, Brine - Month	111,600	104,400	111,600	108,000								
34	Process Results												
35	Beginning Gallons (9 PV Eq.)	112,864,706	87,085,106	62,968,706	37,189,106								
36	Beginning PV	0.76	0.59	0.43	0.25								
37	Gallons Processes Month	25,779,600	24,116,400	25,779,600	24,948,000								
38	PV Processed Month	0.17	0.16	0.17	0.17								
39	Cumulative Gallons Processed	1,243,242,000	1,267,358,400	1,293,138,000	1,318,086,000								
40	Cumulative PV Processed	8.41	8.57	8.75	8.92								
41	Remaining Gallons to Process	87,085,106	62,968,706	37,189,106	12,241,106								
42	Remaining PV to Process	0.59	0.43	0.25	0.08								
43	***ESTIMATED COST DETAIL***												
44													
45	Description					----------	----------	Final Decontamination, Decomissioning and Reclamation	----------	----------	----------	----------	----------
46	------- ----------												
47	Salaries-Direct	$32,250	$32,250	$32,250	$32,250	$27,417	$27,417	$27,417	$27,417	$27,417	$27,417	$27,417	$27,417
48	Wages-Direct	$10,487	$10,487	$10,487	$10,487	$0	$0	$0	$0	$0	$0	$0	$0
49	Insurance-Workmans Compensation	$1,368	$1,368	$1,368	$1,368	900	900	900	900	900	900	900	900
50	Payroll Taxes	$2,992	$2,992	$2,992	$2,992	4200	4200	4200	4200	4200	4200	4200	4200
51	Medical Insurance	$4,274	$4,274	$4,274	$4,274	4000	4000	4000	4000	4000	4000	4000	4000
52	401K Contributions	$1,068	$1,068	$1,068	$1,068	4000	4000	4000	4000	4000	4000	4000	4000
53	Telephone/Telegraph	$1,250	$1,250	$1,250	$1,250	$950	$950	$950	$950	$950	$950	$950	$950
54	Postage/Freight	$150	$150	$150	$150	$175	$175	$175	$175	$175	$175	$175	$175
55	Copy Equipment	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
56	Other Equipment & Rental	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200	$200
57	Office Supplies	$250	$250	$250	$250	$150	$150	$150	$150	$150	$150	$150	$150
58	Office Equipment Maintenance	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50	$50
59	Data Processing	$150	$150	$150	$150								
60	Maps	$50	$50	$50	$50					$1,000	$1,000	$1,000	$1,000
61	Drafting & Printing	$50	$50	$50	$50					$2,500	$2,500	$2,500	$2,500
62	Transportation - Air & Car	$850	$850	$850	$850	$300	$300	$300	$300	$300	$300	$300	$300
63	Meals & Entertainment	$200	$200	$200	$200	$300	$300	$300	$300	$300	$300	$300	$300
64	Misc. Travel Expense	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300
65	Env-Depreciable Equipment	$100	$100	$100	$100								
66	Env-Operational Analyses	$2,000	$2,000	$2,000	$2,000								
67	Environmental - Miscellaneous	$200	$200	$200	$200								
68	Safety	$250	$250	$250	$250			**D & D COSTS ARE ITEMIZED ON A TASK BASIS**					
69	Backhoe Maintenance	$700	$700	$700	$700								
70	Misc. Chemicals	$2,450	$2,450	$2,450	$2,450								
71	Utilities - Electric, Wellfield	$12,053	$12,053	$12,053	$12,053								
72	Utilities - Electric, Brine Concentrator	$32,850	$32,850	$32,850	$32,850								
73	Utilities - Electric, Plant and RO	$5,896	$5,896	$5,896	$5,896								
74	Submersible Pumps	$500	$500	$500	$500								
75	Submersible Motors	$500	$500	$500	$500								
76	Field Piping & Valves	$400	$400	$400	$400								
77	Meters	$50	$50	$50	$50								
78	Misc. Field	$100	$100	$100	$100								
79	Handtools	$100	$100	$100	$100								
80	Plant Piping & Valves	$200	$200	$200	$200								
81	Plant Brine Conc Inst.	$50	$50	$50	$50								
82	Pumps	$500	$500	$500	$500								
83	Plant Electrical	$100	$100	$100	$100								
84	Filters	$1,100	$1,100	$1,100	$1,100								
85	Evaporation Ponds	$50	$50	$50	$50								
86	Roads	$100	$100	$100	$100								
87	Gas, Oil, Grease	$1,150	$1,150	$1,150	$1,150								
88	Disposal - B.C. Soilds	$6,541	$6,541	$6,541	$6,541								
89	RO Unit	$250	$250	$250	$250								
90	Lab Supplies	$100	$100	$100	$100								
91	RO Membrane	$3,000	$3,000	$3,000	$3,000								
92	Field Equip. Repairs & Maint.	$150	$150	$150	$150								
93	Vehicle Repairs & Maint.	$550	$550	$550	$550								
94	Vehicles - Pickups	$500	$500	$500	$500								
95	Vehicles - Tractors & Trucks	$1,000	$1,000	$1,000	$1,000								
96	Vehicles - Automobiles	$500	$500	$500	$500								
97													
98	Monthly Total	$130,228	$130,228	$130,228	$130,228	$43,242	$43,242	$43,242	$43,242	$46,742	$46,742	$46,742	$46,742
99	Cumulative Total	$6,381,191	$6,511,420	$6,641,648	$6,771,877	$6,815,119	$6,858,361	$6,901,603	$6,944,845	$6,991,587	$7,038,329	$7,085,071	$7,131,813
100	Period Days	31	29	31	30	31	30	31	31	30	31	30	31

GROUND WATER RESTORATION Sampling

			Units	Sub Total	Total
Assumptions:					
	Labor from staff				
	Routine monitoring is covered in the restoration budget				
	One baseline well sampled per acre of wellfield (40)				
	One sample taken before restoration starts				
	Baseline wells sampled once per year during restoration				
	Stability samples taken every 2 months for six months				
I	**Monitoring and sampling costs**				
A.	Restoration well sampling				
	Estimated restoration period (years)		4.4		
	1	Well Sampling prior to restoration start			
		# of wells	40		
		$/sample	$380	$15,200	
	2	Restoration progress sampling			
		# of wells	40		
		$/sample	$120		
		Samples/year	1	$19,200	
B.	Stability				
		Estimated stabilization period (months)	6		
		# of wells	40		
		Sample freq. mos.	2		
		$/sample	$380		
		Total		$45,600	
Total monitoring and sampling costs					**$80,000**

CHURCHROCK SECTION 8 WELL PLUGGING AND ABANDONMENT

Assumptions

1. Cement shrinkage	120%
2. Cement cost per 94 pound sack	**$6.82**
3. Cost for Gel per 50 pound sack	**$12.65**
4. Holes Plugged per day	6
5. Engineer/gelolgist - per year (assume 20% time for this project)	$50,000.00
6. Backhoe & operator - per hour	$37.75
8. Cementer Contractor per well for cementing 800 ft hole	$450.00
9. Pump Hoist Contractor per well for cementing 800 ft hole	$375.00
10. Wellfield acreage fully developed	40 ac.
11. Assume Cement Mixture will be 12.5 ppg with 2% gel	
12. SX required for 800 ft (6" csg) of 12.5 ppg cement with 2% Gel (without shrinkage factor)	75.3
13. SX gel required for 75.3 SX Cmt (without shrinkage factor)	2.8
14. SX required for 800 ft (5" csg) of 12.5 ppg cement with 2% Gel (without shrinkage factor)	52.3
15. SX gel required for 52.3 SX Cmt (without shrinkage factor)	1.9
16. One Cubuc Yard equals 4.808905 bbls	
17. 1" Sch 40 Tremie pipe cost for circulating in cement to Total Depth (per ft	**$0.31**

Unit of Measure	IN	# of Wells	FT	FT	Cost	CU YD	CUFT	BBLS	SXS	SXS	w/o shrinkage	with shrinkage	BACKHOE			
ITEM	WELL DIAMETER	QTY	AVERAGE DEPTH	Tremie Pipe Required for Cementing	Tremie Pipe Required for Cementing	HOLE VOLUME	HOLE VOLUME	CEMENT REQ'D (w/shrinkage)	CEMENT REQ'D (wo/shringage)	GEL $ / well (wo/shrinkage)	CEMENT & GEL $ / well	CEMENT & GEL $ / well	$ / well ssume 10 hr da	ENG/GEOL $ / well	Contract Cementer for Mixing/Pumping Cement	Contract Pump Hoist to Cmt well ($ / well)
Injectors	6	215	800	**800**	**$248.00**	5.815	157.0	33.6	75.3	2.8	**$548.97**	**$658.76**	$62.92	$32.05	$450	$375.00
Extractors	6	226	800	**800**	**$248.00**	5.815	157.0	33.6	75.3	2.8	**$548.97**	**$658.76**	$62.92	$32.05	$450	$375.00
Deep Monitor	5	22	900	**900**	**$279.00**	4.543	122.7	26.2	84.7	3.2	**$617.59**	**$741.10**	$62.92	$32.05	$506	$421.88
Brushy Monitor	5	10	700	**700**	**$217.00**	3.533	95.4	20.4	65.9	2.5	**$480.35**	**$576.41**	$62.92	$32.05	$394	$328.13
Dakota Monitor	5	5	600	**600**	**$186.00**	3.029	81.8	17.5	56.5	2.1	**$411.72**	**$494.07**	$62.92	$32.05	$338	$281.25
Recapture Monitor	5	5	1000	**1000**	**$310.00**	5.048	136.3	29.1	94.1	3.5	**$686.21**	**$823.45**	$62.92	$32.05	$563	$468.75

Section 8 Total

	1	Labor				
		Number of persons	3			
		Ft^3/day	200			
		Number of days	5			
		$/day/person	$120			
	Total RO dismantling and loading cost		$1,800		$1,800	
	F	Brine concentration equipment				
	BC (ft^3)		4000			
	1	Labor				
		Number of persons	3			
		Ft^3/day	200			
		Number of days	20			
		$/day/person	$120			
	Total BC dismantling and loading cost		$7,200		$7,200	$52,386
	Total process equipment removal and loading costs					
II.	**Transportation and Disposal Costs (NRC-Licensed Facility)**					
	A.	Tankage (plastic and fiberglass)				
		Volume of tank construction material (ft^3)	1300	405		
		Volume of disposal assuming 50% void space (ft^3)	1950	607.5		
		Transportation and disposal unit cost ($/$ft^3$)	**$3.85**	**$3.85**		
	Subtotal tankage transportation and disposal costs		**$7,508**	**$2,339**	**$9,846**	
	B.	PVC pipe				
		Volume of crushed PVC pipe (ft^3)	108	108		
		Volume of disposal assuming 50% void space (ft^3)	162	162		
		Transportation and disposal unit cost ($/$ft^3$)	**$3.85**	**$3.85**		
	Subtotal PVC pipe transportation and disposal costs		**$624**	**$624**	**$1,247**	
	C.	Pumps				
		Volume of pumps (ft^3)	145	45		
		Volume of disposal assuming 50% void space (ft^3)	217.5	93		
		Transportation and disposal unit cost ($/$ft^3$)	**$3.85**	**$3.85**		
	Total dryer transportation and disposal costs per facility		**$837**	**$358**	**$1,195**	
	D.	Dryer				
		Dryer volume (ft^3)		2000		
		Volume for disposal assuming dryer remains intact (ft^3)		2000		
		Transportation and disposal unit cost ($/$ft^3$)		**$3.85**		
	Total tryer transportation and disposal costs per facility			**$7,700**	**$7,700**	
	E	Reverse osmosis unit				
		RO volume (ft^3)	1000			
		Volume for disposal assuming RO remains intact (ft^3)	1000			
		Transportation and disposal unit cost ($/$ft^3$)	**$3.85**			
	Total dryer transportation and disposal costs		**$3,850**		**$3,850**	
	F	Brine concentrator				
		BC volume (ft^3)	4000			
		Volume for disposal assuming BC remains intact (ft^3)	4000			
		Transportation and disposal unit cost ($/$ft^3$)	**$3.85**			
			$15,400		**$15,400**	
	Total equipment transportation and disposal costs					**$39,239**
III.	**Health and Safety Costs**					
	Radiation safety equipment		1000	1000	$2,000	
	Total health and safety costs					$2,000
TOTAL EQUIPMENT REMOVAL AND DISPOSAL COSTS						**$93,625**

VI.	**Header Houses**			
	Total quantity		11	
	Average header house volume (ft^3)		1600	
A.	Removal			
	Total volume (ft^3)		17600	
	Demolition unit cost per WDEQ Guideline No. 12 ($/ft^3$)		$0.15	
	Subtotal building demolition costs		$2,675	
B.	Survey and decontamination			
	Assumptions:			
	Cost per header house		$200	
	Subtotal survey and decontamination costs		$2,200	
C.	Disposal			
	Total volume (cy) assume 10% building volume		65	
	Volume for disposal assuming 10% void space (cy)		72	
	Unrestricted disposal cost of 26.7 $/yd3		$27.00	
	Subtotal on-site disposal costs		$1,936	
	Header house removal and disposal costs per wellfield			$6,811
V.	**Soil**			
	Assumptions:			
	Acres of wellfield.		40	
	Surveys by staff.			
	Depth of contaminated soil (in)		2	
	Percent of wellfield contaminated		1	
	Soil analysis each		$100	
A.	Survey costs			
	100 soil sample analysis		$10,000	
	Flags, and supplies		$1,000	
	Subtotal survey costs		$11,000	
B.	Disposal costs			
	Backhoe one week		$1,510	
	Volume to disposal		2904	
	NRC disposal unit cost (ft3)		**$3.85**	
	Subtotal NRC-licensed facility disposal costs		**$12,690**	
	Wellfield soil D & D costs			**$23,690**
	TOTAL WELLFIELD BUILDINGS AND EQUIPMENT REMOVAL AND DISPOSAL COSTS			**$121,912**

Rev. October 15, 2010

Building and Demolition and Disposal

Assumptions:

Churchrock offices will be of modular design and sold

Crownpoint offices will be left intact after the project ends

	Description	CR Satellite	Central Plant	Dryer	Combined
I.	**Decontamination Costs**				
A.	Wall decontamination				
	Area to be decontaminated (ft^2)	12167	9600	3400	
	Application rate (gallons/ft)	1	1	1	
	HCl acid wash, including labor ($/gallon)	$0.50	$0.50	$0.50	
	Subtotal wall decontamination costs	$6,083	$4,800	$1,700	$12,583
B.	Concrete floor decontamination				
	Area to be decontaminated (ft^2)	10491	6400	2500	
	Application rate (gallons/ft)	4	4	4	
	HCl acid wash, including labor ($/gallon)	$0.50	$0.50	$0.50	
	Subtotal concrete floor decontamination costs	$20,982	$12,800	$5,000	$38,782
II.	**Demolition Costs**				
A.	Building				
	Dryer bldg. demolition unit cost of $0.75/$ft^3$ for additional radiation safety precautions.				
	Volume of building (ft^3)	209820	192000	42500	
	Demolition unit cost per WDEQ Guideline No. 12 ($/$ft^3$)	$0.15	$0.15		
	Dryer building demolition unit cost ($/$ft^3$)			$0.75	
	Subtotal building demolition costs	$31,893	$29,184	$31,875	$92,952
B.	Concrete floor				
	Area of concrete floor (ft^2)	10491	6400	2500	
	Demolition unit cost (ft3) per local estimate	$1.20	$1.20	$1.20	
	Subtotal concrete floor demolition costs	$12,589	$7,680	$3,000	$23,269
III.	**Disposal Costs**				
A.	Building				
	Volume of building (cy)	7771	7111	1574	
	1 Unrestricted				
	Unrestricted disposal cost of 26.7 $/yd3	$27.00	$27.00	$27.00	
	Building will collaps to 10% of standing volume	777	711	157	
	Percentage (%) on site	100	100	90	
	Subtotal unrestricted disposal costs	$20,982	$19,200	$3,825	$44,007
	2 Restricted				
	Percentage (%)			10	
	Volume for disposal (ft^3)			425	
	Volume for disposal assuming 10% void space (ft^3)			467.5	
	Transportation and disposal unit cost ($/$ft^3$)			**$3.85**	
	Subtotal NRC-licensed facility disposal costs			**$1,800**	**$1,800**
	Subtotal building disposal costs				
B.	Concrete floor				

IV.	**Pond Decomissioning (350')**				
	Assumptions:				
		Sediment disposal of 6 inches (ft3)		26797	
		Pond dimension are 350 ft x 350 ft. x 20 ft. or 3 acres		3	
		Disposal of inner and outer liners			
		Soil below the liners is not contaminated			
		Folded liner volume each (ft3).		2700	
		Backhoe hourly rate (w/operator)		$37.75	
		Buldozer hourly rate (w/operator)		$37.75	
	A. Removal and loading				
	1 Equipment				
		Number of backhoes		1	
		Number of hours		40	
		Number of bulldozers		1	
		Number of hours		40	
	2 Labor				
		Number of persons		3	
		Number of hours		40	
		$/hr/person		$15.00	
	Total removal and loading costs			$4,820.00	
	B. Transportation and disposal				
		Transportation and disposal unit costs ($/ft3)		**$3.85**	
	Total transportation and disposal costs (sediment and 1 liner)			**$113,563**	
	Subtotal pond reclamation costs (1 ponds)				**$236,767**
V.	**Soil**				
	Assumptions:				
		Acres of plant area	6		
		Surveys by staff			
		Depth of contaminated soil (in)	2		
		Percent of wellfield contaminated	1		
		Soil analysis each	$100		
	A. Survey costs				
		50 soil sample analysis	$5,000		
		Flags, and supplies	$250		
	Subtotal survey costs		$5,250		
	B. Disposal costs				
		Backhoe one week	$1,510		
		Volume to disposal	436		
		NRC disposal unit cost (ft3)	**$3.85**		
	Subtotal NRC-licensed facility disposal costs		**$3,187**		
	Plant area soil D & D costs				**$8,437**
VI	**Final Sattellite Area Reclamation**				
	Assumptions:				
		Area of disturbance (acres)		10	
	A. Ripping overburden with dozer				
		Ripping unit cost per WDEQ Guideline No. 12, App.11 ($/acre)		$581.67	
	Subtotal ripping costs			$5,817	
	B. Disking and seeding				
		Disking/seeding unit cost ($/acre)		$200.00	
	Subtotal disking/seeding costs			$2,000	
	Subtotal surface reclamation costs				$7,817
TOTAL WELLFIELD AND SATELLITE SURFACE RECLAMATION COSTS					**$305,739**

HRI CROWNPOINT URANIUM PROJECT
Financial Assurance Plan for Churchrock Section 8 and the Crownpoint Central Plant
Summary

Category	Project Total	Contingency/ Profit 15%	Contingency/ Profit 25%	Initial Surety	Contingency/ Profit 15%	Contingency/ Profit 25%
Groundwater Restoration	$7,131,813	$1,069,772		$2,377,271	$356,591	
Groundwater Stability Analysis	$80,000	$12,000		$80,000	$12,000	
Well Plugging	$884,907	$132,736		$294,969	$44,245	
Equipment Removal	$93,625	$14,044		$93,625	$14,044	
Wellfield D & D	$121,912		$30,478	$120,402		$30,100
Building D & D	$255,847		$63,962	$255,847		$63,962
Surface Reclamation	$305,739		$76,435	$305,739		$76,435
Totals	$8,873,843	$1,228,552	$170,874	$3,527,853	$426,880	$170,497
Contingency/Profit			$1,399,426			$597,377
Total Surety			$10,273,269			$4,125,229

ABBREVIATIONS/ACRONYMS

$	Dollars
$/Kgal	Dollars per 1000 gallons
avg	average
BBLS	42 Gallon Barrel
ft	feet
ft2	square feet
ft3/CU FT	cubic feet
gal	gallons
gpm	gallons per minute
H&S	Health and Safety
H2S	Hydrogen Sulfide
H2SO4	Sulfuric Acid
HCl	Hydrochloric Acid
Hp	Horsepower
Kgal	1000 gallons
Kwh	Kilowatt-hours
HaOH	Caustic Soda
OD	Outside Diameter
PPE	personal protective equipment
PV	Pore Volume
reqm't	requirement
RO	Reverse Osmosis
SXS	sacks (94 lbs. cement, 50 lbs. gel)
WDEQ	Wyoming Department of Environmental Quality
WDW	Waste Disposal Well

yd3/CU YD	cubic yards
yr	year