



# PATHFINDER

September 19, 2006

Mr. Gary Janosko, Chief  
Fuel Cycle Facilities Branch  
Division of Fuel Cycle Safety and Safeguards  
Office of Nuclear Material Safety and Safeguards  
U. S. Nuclear Regulatory Commission  
11545 Rockville Pike  
Rockville, Maryland 20852

Ref: Revised surety estimate for the Shirley Basin mill tailings site  
Docket No. 40-6622, Source Material License No. SUA-442

Dear Mr. Janosko:

The enclosed revision of the Shirley Basin mill tailings site surety estimate is submitted in fulfillment of the requirement of Condition 27 of the referenced license.

The volumes of materials and corresponding unit costs have been broken down in this revision by different work areas, reflecting the structure of the existing contract under which most of the tailings reclamation work is being done. Pathfinder entered into a new contract with a different earth moving contractor in May, 2006. The quantities have been updated through the end of Pathfinder's fiscal September, 2006, reflecting work accomplished since the previous estimate (October, 2005).

Pathfinder requests an amendment to the referenced license to incorporate the revised surety amount as required by condition 27. A summary of the adjusted surety amount is shown below.

### SHIRLEY BASIN SITE

<u>ACTIVITY</u>	<u>CURRENT SURETY</u>	<u>PROPOSED SURETY</u>
1. Mill Decommissioning	\$0	\$0
2. Tailings Reclamation	2,870,876	2,533,138
3. Long Term Surveillance	734,121	752,954
<b>SUBTOTAL</b>	<b>\$3,604,997</b>	<b>\$3,286,092</b>
4. Contingency (15% of 1 & 2)	430,631	379,971
<b>TOTAL</b>	<b>\$4,035,628</b>	<b>\$3,666,063</b>
Increase/(Decrease)		(\$369,565)

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The decrease to \$3,666,063 in the proposed surety amount reflects a recalculation of the cost estimate based upon the approved revised reclamation plan, revised estimates of the various volumes, credit for work done through September of 2006, and unit costs based upon the actual contract in place to do the work.

The long term surveillance fee has been increased, consistent with the latest available CPI adjustment (August, 2006). Supporting information for the recalculated surety estimate is enclosed (two copies). Upon your written approval, we will proceed to obtain a rider for the existing Letter-of-Credit to reflect the revised surety amount.

Sincerely,



T. W. Hardgrove  
Manager, Reclamation Operations

Enclosures

Cc: D. B. Spitzberg, USNRC Region IV  
Donna Wichers

Pathfinder Mines Corporation  
Shirley Basin Mine  
Tailings and Mill Site Reclamation Cost Estimate  
September 19, 2006

ACTIVITY	QUANTITY	UNIT COST (\$)	COST (\$)
<b>Regrading and Channels Excavation:</b>			
Localized Cut/Fill-			
Pond #4	0 CY	1.90	0
Pond #5	0 CY	1.90	0
Pond #5 Dam	3,000 CY	2.62	7,860
West Pond #4	0 CY	1.40	0
Evap. Ponds	0 CY	1.40	0
Mill Site & Ore Pad	4,960 CY	1.40	6,944
West Channel & Related	129,060 CY	1.75	225,855
Pond #3 & Adjacent Area	19,605 CY	1.40	27,447
Imported Fill-			
Pond #4	0	2.80	0
Pond #5	0 CY	2.80	0
Pond #5 Dam	0 CY	2.80	0
West Pond #4	0 CY	2.80	0
Evap. Ponds	0 CY	2.80	0
Mill Site & Ore Pad	0 CY	2.80	0
Pond #3 & Adjacent Area	28,750 CY	2.80	80,500
<b>Clay Radon Barrier Placement:</b>			
Pond #4	0 CY	3.12	0
Pond #5	0 CY	3.56	0
West Pond #4	0 CY	3.12	0
Evap. Ponds	0 CY	3.84	0
Mill Site & Ore Pad	25,609 CY	1.92	49,169
Pond #3 & Adjacent Area	36,952 CY	3.12	115,290
<b>Sand Layer:</b>			
Pond #4	0 CY	3.34	0
Pond #5	0 CY	3.34	0
West Pond #4	0 CY	3.56	0
Evap. Ponds	0 CY	3.70	0
Mill Site & Ore Pad	25,609 CY	2.00	51,218
Pond #3 & Adjacent Area	18,476 CY	3.56	65,775
<b>Rip Rap, Rock Mulch, and Filter Bed:</b>			
Rip Rap (1.2') Purchase	0 tons	16.02	0
Rip Rap (0.8') Purchase	0 tons	15.52	0
Rip Rap (0.4') Purchase	0 tons	14.52	0
Rock Mulch (1.5" & 2.5") Purchase	0 tons	13.52	0
Filter Bed (<1.0") Purchase	0 tons	11.02	0
Large Rip Rap (1.2') Placement	18,037 tons	8.00	144,296
Small Rip Rap (0.8') Placement	3,146 tons	7.00	22,022
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Rock Mulch Placement	42,159 tons	5.90	248,738
Filter Bed Placement	60,228 tons	5.00	301,140
<b>Topsoil Placement:</b>			
Pond #4	10,000 CY	2.20	22,000
Pond #5	10,000 CY	2.91	29,100
West Pond #4	0 CY	3.24	0
Evap. Ponds	0 CY	3.28	0
Mill Site & Ore Pad	22,706 CY	2.91	66,074
West Channel & Related	77,287 CY	3.28	253,501
Pond #3 & Adjacent Area	24,551 CY	3.24	79,545
<b>Fuel Cost Adjustment:</b>			
			60,000
<b>Revegetation:</b>	<b>381 AC</b>	<b>162.50</b>	<b>61,913</b>
<b>SUBTOTAL</b>			<b>1,958,612</b>
Construction Management	—	Lump Sum	205,850
Engineering Design/Plan Changes	—	Lump Sum	8,200
Mobilization/Demobilization	—	Lump Sum	50,000
Legal Expenses	—	Lump Sum	10,000
Power	—	Lump Sum	1,600
Completion Report Preparation	—	Lump Sum	11,900
License Termination Activities	—	Lump Sum	28,700
Materials Testing	—	Lump Sum	48,520
Groundwater Restoration	—	Lump Sum	22,649
Solution Evaporation	—	Lump Sum	0
Fencing	—	Lump Sum	55,000
Radiological Surveys	—	Lump Sum	25,000
Environmental Monitoring	—	Lump Sum	107,107
<b>TOTAL</b>			<b>2,533,138</b>
Contingency (15%)			379,971
Site Surveillance			752,954
<b>GRAND TOTAL</b>			<b><u>\$3,666,063</u></b>

Shirley Basin Mill Tailings Site  
Reclamation Cost Estimate  
September 19, 2006

Materials Unit Rates and  
Equipment Hourly Costs

Most materials unit rates and equipment hourly rates utilized in this bond calculation are from the signed contract between Pathfinder and Carr Construction Company, Inc. (Carr) to accomplish the Shirley Basin tailings reclamation. During April, 2006, Pathfinder elected to re-bid the contract to complete the tailings reclamation. See the attached Exhibit "B" for the various materials unit rates, and Exhibit D for the equipment hourly rates as specified in the signed contract. **Pathfinder considers Exhibit "B" and Exhibit D to be confidential information.** Hourly equipment rates in Exhibit D are with an operator. Work designated as "Pond #3 & Adjacent Area" on page 1 of this surety estimate represents the second phase of the reclamation project, encompassing the ISL waste disposal site and adjacent ground that cannot be reclaimed until the ISL disposal is finished. The unit costs for this area are based upon the highest comparable costs from the existing contract.

Labor Costs

The labor rates for earth moving contractor help utilized in this calculation are also based upon the quoted rates as presented in Exhibit "D". The other labor rate utilized in this bonding calculation is \$26.33 per hour, based on Pathfinder's own projected labor rate for 2007 with an additional thirty-five percent for burden (benefits, unemployment insurance, social security, etc.). Based on Pathfinder's 2006 experience, it appears that \$26.33 per hour is appropriate for the non-earth moving activities.

Quantities of Materials

The quantities of materials presented in Table 1 are the latest revised figures for the remaining tailings reclamation work at Shirley Basin. They have been updated by adjusting for work projected to be accomplished through the end of September, 2006. They represent the actual quantities of material yet to be placed in order to complete the project. As of the end of September, 2006, virtually all of the grading work had been completed on Ponds 4 and 5, and the evaporation ponds. Most of the No. 5 dam outslope grading is also complete. Remaining significant grading work consists of the main west channel that will drain West Pond 4, and the Pond 3 and adjacent area work noted above. Radon barrier clay placement is complete on Pond 4, West Pond 4, the evaporation ponds, and Pond 5. Sand capillary layer placement is similarly

advanced. Topsoil placement is complete on West Pond 4 and the evaporation ponds, and nearly complete on Pond 4 and Pond 5.

### **Fuel Costs**

The contract for the tailings site reclamation specifies that any diesel fuel prices to the contractor above \$2.28/gallon requires Pathfinder to reimburse the contractor for the incremental fuel cost. Due to the substantial increases in fuel prices over the past year, this incremental payment has become significant. Using the 2006 construction season as a guide, incremental fuel costs have been about \$4,000 per week. Utilizing an estimated fifteen additional weeks of construction activity (into November, 2006, and eight weeks in 2007), some **\$60,000** has been inserted in Table 1 as a line item for added fuel charges.

### **Localized Cut/Fill and Imported Fill**

Sculpting the tailings area to create acceptable slopes and appropriate drainage basins and drainage ways (consistent with the reclamation plan) will be accomplished by grading the area and filling in low areas with above grade material or fill imported from an adjacent mine dump. The Carr contract unit rate for the remaining cut/fill grading varies from \$1.40/CY to \$2.62/CY. Imported fill generally is truck-hauled material from the Area 3 South Mine Waste Dump, and the remaining work contractual unit cost is \$2.80/CY.

### **Radon Barrier Placement**

Application of the radon barrier involves placement of one foot of material over the tailings. This cover system consists of a 0.5 foot thick clay cover and a 0.5 foot thick sandy capillary barrier.

The clay material is located in the Area 3 South Dump. The clay is compacted to 95% Proctor. Based on the Carr contract, the unit cost for the remaining clay placement is \$1.92/CY.

Based on the Carr contract, the unit cost for the remaining sandy layer placement is \$2.00/CY.

### **Rip Rap, Rock Mulch, and Filter Bed Purchase**

The granite was mined from a quarry area located approximately 15 miles northeast of the project. This quarry is owned by a local rancher. A contractor has completed the processing and hauling to

the Shirley Basin site of all of the required rock products. The royalty on rock production has also been paid.

Contract prices as reflected by Exhibit "B" for rock placement are as follows: **filter bed at \$5.00/ton, rock mulch at \$5.90/ton, 0.4' rip rap at \$6.00/ton, 0.8' rip rap at \$7.00/ton, and 1.2' rip rap at \$8.00/ton.** All rock quantities in tons were derived by converting estimated volume needs to weight, utilizing an average density of 1.37 tons/CY. Rock products placement in the second construction phase are projected at the same rates as in the current contract.

**Topsoil Placement**

Based on the Carr contract, the unit cost for the remaining **topsoil placement varies from \$2.20/CY to \$3.28/CY.**

**Re-vegetation**

Unit costs for the purchase of seed and the planting of the seed are based on vendor/contractor quotes provided to Pathfinder in August, 2006 for work to be accomplished in late October, 2006.

Discing and Seeding:	
Labor and equipment -	\$100.00/AC
Seed -	<u>62.50/AC</u>
Total	<b>\$162.50/AC</b>

**Construction Management and Miscellaneous Expenses**

There are fifteen weeks (fall, 2006 and spring, 2007) of construction activity left for the project, including the ISL disposal area (Pond 3). Construction management would entail an onsite engineer and a survey support team. An onsite engineer on a consulting basis would cost \$60/hr at prevailing rates in the area. The remaining construction covers 75 work days. The engineer would have a dedicated vehicle.

$$\$60/\text{hr} \times 10 \text{ hrs./day} \times 75 \text{ days} = \$45,000.$$

$$\text{Vehicle @ } \$60/\text{day} \times 75 \text{ days} = \$4,500.$$

A survey crew will consists of three technicians, two GPS units, and two vehicles (one of which also will be used to commute to work). Recently adjusted (July, 2006) contractual rates that Pathfinder is paying for survey services are used:

Shirley Basin Mill Tailings Site Reclamation Cost Estimate, September 19, 2006

3 technicians x \$55/hr/tech. x 10hr/day x 75 days = \$123,750.

2 GPS units @ \$150/day x 75 days = \$22,500.

2 Vehicles @ \$60/day x 75 days = \$9,000.

Survey supplies, consisting of stakes, paint, markers, etc. will cost \$1,100 for the duration of the project.

Total construction management cost is summarized as follows:

\$45,000 + \$4,500 + \$123,750 + \$22,500 + \$9,000 + \$1,100 =  
**\$205,850.**

Other miscellaneous expenses consist of the following:

- 1) Engineering design/plan changes - An estimated 20 hours of consulting engineering time would be devoted each month to plan modifications and general engineering support. Using prevailing rates for this area:

Engineer @ \$80/hr x 20 hrs./mo. x 4 mos. = \$6,400.

Clerical/drafting aide @ \$45/hr. x 10 hrs./mo. x 4 mos. =  
\$1,800.

Total Design Cost = \$6,400 + \$1,800 = **\$8,200.**

- 2) Mobilization - Carr, the current project contractor, will receive a demobilization fee of **\$50,000**. The mobilization charge for Carr has already been paid.
- 3) Legal expenses - An estimated **\$10,000** is applied to this activity, exclusive of license termination activities discussed below.
- 4) Power - Power needs will consist of electricity to service the office. Historically, that has been about \$400/month. Total power cost would be:  
  
\$400/mo. x 4 mos. = **\$1,600.**
- 5) Completion report preparation - It is estimated that approximately 160 hours of consultant time would be required to assemble the completion report. At typical engineering consultant rates, the following cost is derived:

Shirley Basin Mill Tailings Site Reclamation Cost Estimate, September 19, 2006

120 hrs. engineering work @ \$80/hr. =	\$9,600
40 hrs. clerical/drafting work @ \$45/hr. =	1,800
Materials -	<u>500</u>
Total	<b>\$11,900</b>

- 6) License termination activities - The cost to terminate the NRC license and transfer the site to DOE is estimated as follows:

Site final survey, survey caps, sign & monument -	\$6,500
Legal expenses -	5,000
Labor - 200 hrs. @ \$76/hr. -	15,200
Miscellaneous -	<u>2,000</u>
Total	<b>\$28,700</b>

**Materials Testing Costs:**

Based on Pathfinder's materials testing contract (revised July, 2006) with a local geotechnical testing firm to conduct all required field and laboratory testing, including labor, the average materials testing cost for the project for the remaining four months will be \$12,130/month. Using the monthly costs, the remaining project materials testing cost is derived:

$$\$12,130/\text{mo.} \times 4 \text{ mos.} = \$ 48,520.$$

**Groundwater restoration**

The NRC approved ACLs for the Shirley Basin site in October, 2005. The restoration program was terminated on November 1, 2005. No further costs are assigned to the corrective action program.

**Well Plugging:**

To date 112 wells have been abandoned because of the ongoing tailings reclamation work (all of these wells were either completed on tailings or immediately adjacent to tailings). There are 99 remaining wells associated with the tailings/mill site or the groundwater restoration effort. Average well depth varies for the different casing diameters. Two inch diameter wells average 24 feet below the land surface. Similarly, four inch wells average 76 feet, five inch wells average 61 feet, and six inch wells average 64 feet. Plugging will involve the filling of each well to five feet below the land surface with bentonite pellets. A two feet deep poured



concrete plug will be installed on top of the bentonite; after excavating around the casing, the casing will be cut off three feet below the land surface. The hole will then be backfilled with soil to the land surface. A cost summary for this activity follows:

Equipment:

A Cat 416CIT tractor/backhoe/loader will be utilized to dig out the top three feet of casing below the land surface and to backfill the hole after well plugging. A pickup truck will also be required to haul materials. The cost for this equipment is \$40.00/hr.

Materials:

Using average well depths and filling with bentonite to a point five feet below the land surface, the quantities of bentonite required for each well diameter size are as follows:

<u>Well Size</u>	<u>Avg. Depth-5'</u>	<u>CF of bentonite</u>
2"	19'	0.5
4"	71'	6.2
5"	56'	7.6
6"	59'	11.6

A 50 lb. bag of pellets cost \$2.73 FOB the tailings site (Pathfinder estimate). One CF of pellets equals 70 lbs.

$70 \text{ lbs/CF} / 50 \text{ lbs/bag} \times \$2.73/\text{bag} = \$3.82/\text{CF bentonite}.$

$\$3.82/\text{CF} \times .5 \text{ CF} = \$1.91 \text{ bentonite for } 2" \text{ well}.$

$\$3.82/\text{CF} \times 6.2 \text{ CF} = \$23.68 \text{ bentonite for } 4" \text{ well}.$

$\$3.82/\text{CF} \times 7.6 \text{ CF} = \$29.03 \text{ bentonite for } 5" \text{ well}.$

$\$3.82/\text{CF} \times 11.6 \text{ CF} = \$44.31 \text{ bentonite for } 6" \text{ well}.$

1 bag of sacked concrete will be required for each well at \$8.00/bag FOB the tailings site (Pathfinder estimate).

	<u>2" Well</u>	<u>4" Well</u>	<u>5" Well</u>	<u>6" Well</u>
Bentonite Pellets	\$ 1.91	\$23.68	\$29.03	\$44.31
Sacked Concrete	8.00	8.00	8.00	8.00
Total Materials	\$ 9.91	\$31.68	\$ 37.03	\$ 52.31

**Labor:**

An operator at \$32 per hour and an additional driver/laborer at \$28 per hour will be required.

It is assumed that each well requires two hours to plug. Therefore, labor = 2 hr./well x \$60/hr = \$120/well.

**Total Costs for Each Size Well:**

	<u>2" Well</u>	<u>4" Well</u>	<u>5" Well</u>	<u>6" Well</u>
Equipment	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00
Materials	9.91	31.68	37.03	52.31
Labor	<u>120.00</u>	<u>120.00</u>	<u>120.00</u>	<u>120.00</u>
Total	\$209.91	\$231.68	\$237.03	\$252.31

The cost to abandon the remaining wells is:

33 - 2" wells x \$209.91/well =	\$ 6,927
14 - 4" wells x \$231.68/well =	\$ 3,244
42 - 5" wells x \$237.03/well =	\$ 9,955
10 - 6" wells x \$252.31/well =	\$ 2,523
<b>Total</b>	<b>\$ 22,649</b>

Total Expense for Groundwater Restoration = **\$22,649.**

**Solution Evaporation**

The operation of the enhanced evaporation system was terminated a couple of years ago. No contaminated solution remains on site.

**Fencing**

New fencing will be necessary to establish the control boundary for the property prior to transfer to the DOE. Consistent with the proposed boundary in the ACL application, some 27,500 feet of fence will be constructed. Based on recent contract fencing work done for Pathfinder, a unit cost of \$2.00/linear foot of fence is appropriate, including materials and labor.

27,500 ft x \$2.00/ft = **\$55,000.**

**Radiological Surveys**

The majority of the required radiological surveys included in the

final reclamation plan have been completed. Additional survey work was done during May, 2005. Remaining post reclamation gamma/Ra226 survey work will focus on the area to the immediate south of the restricted area. Based upon recent experience using a contractor indicates that such an effort, including soil sample analyses, will cost about **\$25,000**.

### **Environmental Monitoring**

It is assumed that an environmental monitoring program will be maintained through next year (scheduled end of tailings site reclamation) and an additional six months thereafter. Seventy-seven of the required 100 radon flux tests have been completed to date on the tailings reclamation radon barrier.

#### Labor

1 technician for 40 hours per month for 21 months.  
40 hrs/mo. x 21 mos. x \$26.33/hr = \$22,117.

Administration, general overhead, and general engineering/  
consultant oversight -

Administration/overhead = \$500/mo x 21 mos. = \$10,500.

Engineering/consultants = \$500/mo x 21 mos. = \$10,500.

Materials and supplies @ \$100/mo x 21 mos. = \$2,100.

#### Analytical work

Water samples - \$6,800/sample period x 9 periods \$61,200  
Radon flux tests - 23 tests at \$30/test 690

Total analytical work \$61,890

Total Environmental Monitoring -

\$22,117 + \$10,500 + \$10,500 + \$2,100 + \$61,890 = **\$107,107.**

Shirley Basin Mill Tailings Site Reclamation Cost Estimate, September 19, 2006

**Long Term Surveillance Fee**

Inflation adjustment:

Consumer Price Index, all urban consumers -  
August, 2006 = 203.9  
December, 1978 = 67.7

$$203.9/67.7 \times \$250,000 = \mathbf{\$752,954.}$$

Pathfinder Mines Corporation  
Shirley Basin Mine  
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Quantities of Materials

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advanced. Topsoil placement is complete on West Pond 4 and the evaporation ponds, and nearly complete on Pond 4 and Pond 5.

### **Fuel Costs**

The contract for the tailings site reclamation specifies that any diesel fuel prices to the contractor above \$2.28/gallon requires Pathfinder to reimburse the contractor for the incremental fuel cost. Due to the substantial increases in fuel prices over the past year, this incremental payment has become significant. Using the 2006 construction season as a guide, incremental fuel costs have been about \$4,000 per week. Utilizing an estimated fifteen additional weeks of construction activity (into November, 2006, and eight weeks in 2007), some **\$60,000** has been inserted in Table 1 as a line item for added fuel charges.

### **Localized Cut/Fill and Imported Fill**

Sculpting the tailings area to create acceptable slopes and appropriate drainage basins and drainage ways (consistent with the reclamation plan) will be accomplished by grading the area and filling in low areas with above grade material or fill imported from an adjacent mine dump. The Carr contract unit rate for the remaining cut/fill grading varies from \$1.40/CY to \$2.62/CY. Imported fill generally is truck-hauled material from the Area 3 South Mine Waste Dump, and the remaining work contractual unit cost is \$2.80/CY.

### **Radon Barrier Placement**

Application of the radon barrier involves placement of one foot of material over the tailings. This cover system consists of a 0.5 foot thick clay cover and a 0.5 foot thick sandy capillary barrier.

The clay material is located in the Area 3 South Dump. The clay is compacted to 95% Proctor. Based on the Carr contract, the unit cost for the remaining clay placement is \$1.92/CY.

Based on the Carr contract, the unit cost for the remaining sandy layer placement is \$2.00/CY.

### **Rip Rap, Rock Mulch, and Filter Bed Purchase**

The granite was mined from a quarry area located approximately 15 miles northeast of the project. This quarry is owned by a local rancher. A contractor has completed the processing and hauling to

the Shirley Basin site of all of the required rock products. The royalty on rock production has also been paid.

Contract prices as reflected by Exhibit "B" for rock placement are as follows: **filter bed at \$5.00/ton, rock mulch at \$5.90/ton, 0.4' rip rap at \$6.00/ton, 0.8' rip rap at \$7.00/ton, and 1.2' rip rap at \$8.00/ton.** All rock quantities in tons were derived by converting estimated volume needs to weight, utilizing an average density of 1.37 tons/CY. Rock products placement in the second construction phase are projected at the same rates as in the current contract.

### **Topsoil Placement**

Based on the Carr contract, the unit cost for the remaining **topsoil placement varies from \$2.20/CY to \$3.28/CY.**

### **Re-vegetation**

Unit costs for the purchase of seed and the planting of the seed are based on vendor/contractor quotes provided to Pathfinder in August, 2006 for work to be accomplished in late October, 2006.

Discing and Seeding:	
Labor and equipment -	\$100.00/AC
Seed -	62.50/AC
Total	<u>\$162.50/AC</u>

### **Construction Management and Miscellaneous Expenses**

There are fifteen weeks (fall, 2006 and spring, 2007) of construction activity left for the project, including the ISL disposal area (Pond 3). Construction management would entail an onsite engineer and a survey support team. An onsite engineer on a consulting basis would cost \$60/hr at prevailing rates in the area. The remaining construction covers 75 work days. The engineer would have a dedicated vehicle.

$$\$60/\text{hr} \times 10 \text{ hrs./day} \times 75 \text{ days} = \$45,000.$$

$$\text{Vehicle @ } \$60/\text{day} \times 75 \text{ days} = \$4,500.$$

A survey crew will consists of three technicians, two GPS units, and two vehicles (one of which also will be used to commute to work). Recently adjusted (July, 2006) contractual rates that Pathfinder is paying for survey services are used:



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3 technicians x \$55/hr/tech. x 10hr/day x 75 days = \$123,750.

2 GPS units @ \$150/day x 75 days = \$22,500.

2 Vehicles @ \$60/day x 75 days = \$9,000.

Survey supplies, consisting of stakes, paint, markers, etc. will cost \$1,100 for the duration of the project.

Total construction management cost is summarized as follows:

\$45,000 + \$4,500 + \$123,750 + \$22,500 + \$9,000 + \$1,100 =  
**\$205,850.**

Other miscellaneous expenses consist of the following:

- 1) Engineering design/plan changes - An estimated 20 hours of consulting engineering time would be devoted each month to plan modifications and general engineering support. Using prevailing rates for this area:

Engineer @ \$80/hr x 20 hrs./mo. x 4 mos. = \$6,400.

Clerical/drafting aide @ \$45/hr. x 10 hrs./mo. x 4 mos. =  
\$1,800.

Total Design Cost = \$6,400 + \$1,800 = **\$8,200.**

- 2) Mobilization - Carr, the current project contractor, will receive a demobilization fee of **\$50,000**. The mobilization charge for Carr has already been paid.
- 3) Legal expenses - An estimated **\$10,000** is applied to this activity, exclusive of license termination activities discussed below.
- 4) Power - Power needs will consist of electricity to service the office. Historically, that has been about \$400/month. Total power cost would be:  
  
\$400/mo. x 4 mos. = **\$1,600.**
- 5) Completion report preparation - It is estimated that approximately 160 hours of consultant time would be required to assemble the completion report. At typical engineering consultant rates, the following cost is derived:

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120 hrs. engineering work @ \$80/hr. =	\$9,600
40 hrs. clerical/drafting work @ \$45/hr. =	1,800
Materials -	500
Total	<u>\$11,900</u>

- 6) License termination activities - The cost to terminate the NRC license and transfer the site to DOE is estimated as follows:

Site final survey, survey caps, sign & monument -	\$6,500
Legal expenses -	5,000
Labor - 200 hrs. @ \$76/hr. -	15,200
Miscellaneous -	2,000
Total	<u>\$28,700</u>

**Materials Testing Costs:**

Based on Pathfinder's materials testing contract (revised July, 2006) with a local geotechnical testing firm to conduct all required field and laboratory testing, including labor, the average materials testing cost for the project for the remaining four months will be \$12,130/month. Using the monthly costs, the remaining project materials testing cost is derived:

$$\text{\$12,130/mo.} \times 4 \text{ mos.} = \text{\$ 48,520.}$$

**Groundwater restoration**

The NRC approved ACLs for the Shirley Basin site in October, 2005. The restoration program was terminated on November 1, 2005. No further costs are assigned to the corrective action program.

**Well Plugging:**

To date 112 wells have been abandoned because of the ongoing tailings reclamation work (all of these wells were either completed on tailings or immediately adjacent to tailings). There are 99 remaining wells associated with the tailings/mill site or the groundwater restoration effort. Average well depth varies for the different casing diameters. Two inch diameter wells average 24 feet below the land surface. Similarly, four inch wells average 76 feet, five inch wells average 61 feet, and six inch wells average 64 feet. Plugging will involve the filling of each well to five feet below the land surface with bentonite pellets. A two feet deep poured

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concrete plug will be installed on top of the bentonite; after excavating around the casing, the casing will be cut off three feet below the land surface. The hole will then be backfilled with soil to the land surface. A cost summary for this activity follows:

Equipment:

A Cat 416CIT tractor/backhoe/loader will be utilized to dig out the top three feet of casing below the land surface and to backfill the hole after well plugging. A pickup truck will also be required to haul materials. The cost for this equipment is \$40.00/hr.

Materials:

Using average well depths and filling with bentonite to a point five feet below the land surface, the quantities of bentonite required for each well diameter size are as follows:

<u>Well Size</u>	<u>Avg. Depth-5'</u>	<u>CF of bentonite</u>
2"	19'	0.5
4"	71'	6.2
5"	56'	7.6
6"	59'	11.6

A 50 lb. bag of pellets cost \$2.73 FOB the tailings site (Pathfinder estimate). One CF of pellets equals 70 lbs.

70 lbs/CF/50 lbs/bag x \$2.73/bag = \$3.82/CF bentonite.

- \$3.82/CF x .5 CF = \$1.91 bentonite for 2" well.
- \$3.82/CF x 6.2 CF = \$23.68 bentonite for 4" well.
- \$3.82/CF x 7.6 CF = \$29.03 bentonite for 5" well.
- \$3.82/CF x 11.6 CF = \$44.31 bentonite for 6"well.

1 bag of sacked concrete will be required for each well at \$8.00/bag FOB the tailings site (Pathfinder estimate).

	<u>2" Well</u>	<u>4" Well</u>	<u>5" Well</u>	<u>6" Well</u>
Bentonite Pellets	\$ 1.91	\$23.68	\$29.03	\$44.31
Sacked Concrete	<u>8.00</u>	<u>8.00</u>	<u>8.00</u>	<u>8.00</u>
Total Materials	\$ 9.91	\$31.68	\$ 37.03	\$ 52.31

**Labor:**

An operator at \$32 per hour and an additional driver/laborer at \$28 per hour will be required.

It is assumed that each well requires two hours to plug. Therefore, labor = 2 hr./well x \$60/hr = \$120/well.

**Total Costs for Each Size Well:**

	<u>2" Well</u>	<u>4" Well</u>	<u>5" Well</u>	<u>6" Well</u>
Equipment	\$ 80.00	\$ 80.00	\$ 80.00	\$ 80.00
Materials	9.91	31.68	37.03	52.31
Labor	120.00	120.00	120.00	120.00
Total	\$209.91	\$231.68	\$237.03	\$252.31

The cost to abandon the remaining wells is:

33 - 2" wells x \$209.91/well =	\$ 6,927
14 - 4" wells x \$231.68/well =	\$ 3,244
42 - 5" wells x \$237.03/well =	\$ 9,955
10 - 6" wells x \$252.31/well =	\$ 2,523
Total	\$ 22,649

Total Expense for Groundwater Restoration = **\$22,649.**

**Solution Evaporation**

The operation of the enhanced evaporation system was terminated a couple of years ago. No contaminated solution remains on site.

**Fencing**

New fencing will be necessary to establish the control boundary for the property prior to transfer to the DOE. Consistent with the proposed boundary in the ACL application, some 27,500 feet of fence will be constructed. Based on recent contract fencing work done for Pathfinder, a unit cost of \$2.00/linear foot of fence is appropriate, including materials and labor.

$$27,500 \text{ ft} \times \$2.00/\text{ft} = \mathbf{\$55,000.}$$

**Radiological Surveys**

The majority of the required radiological surveys included in the

final reclamation plan have been completed. Additional survey work was done during May, 2005. Remaining post reclamation gamma/Ra226 survey work will focus on the area to the immediate south of the restricted area. Based upon recent experience using a contractor indicates that such an effort, including soil sample analyses, will cost about **\$25,000.**

**Environmental Monitoring**

It is assumed that an environmental monitoring program will be maintained through next year (scheduled end of tailings site reclamation) and an additional six months thereafter. Seventy-seven of the required 100 radon flux tests have been completed to date on the tailings reclamation radon barrier.

Labor

1 technician for 40 hours per month for 21 months.  
40 hrs/mo. x 21 mos. x \$26.33/hr = \$22,117.

Administration, general overhead, and general engineering/  
consultant oversight -

Administration/overhead = \$500/mo x 21 mos. = \$10,500.

Engineering/consultants = \$500/mo x 21 mos. = \$10,500.

Materials and supplies @ \$100/mo x 21 mos. = \$2,100.

Analytical work

Water samples - \$6,800/sample period x 9 periods \$61,200  
Radon flux tests - 23 tests at \$30/test 690

Total analytical work \$61,890

Total Environmental Monitoring -

\$22,117 + \$10,500 + \$10,500 + \$2,100 + \$61,890 = **\$107,107.**

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**Long Term Surveillance Fee**

Inflation adjustment:

Consumer Price Index, all urban consumers -  
August, 2006 = 203.9  
December, 1978 = 67.7

$$203.9/67.7 \times \$250,000 = \mathbf{\$752,954.}$$