

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### F. Cased highway/railroad crossings

Description of Work:

Detailed cost estimate below reflects work required to retire a typical cased highway/railroad crossing (100 feet). Work includes ROW fence removal, excavation and shoring of trench, removal of pipe from casing, filling casing with grout, removal of vent pipes, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

1. Remove ROW fence and access work sites (1/2 day)

Equipment	No.	Hours	Rate	Total
dozer, cat D-6R	1	5	\$89.97	\$450
lowboy	1	5	\$53.34	\$267
flatbed truck	1	5	\$24.00	\$120
3/4 ton pick-up with trailer	1	5	\$22.79	\$114
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$57
			Subtotal:	\$1,106

Labor	No.	Hours	Rate	Total
operator	1	5	\$60.41	\$302
teamster	2	5	\$41.32	\$413
pipefitter/welder	1	5	\$57.06	\$285
helper	1	5	\$39.94	\$200
laborer	4	5	\$43.88	\$878
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	10	\$90.00
			Subtotal:	\$2,837

Material	Total
allow 2% of labor	\$57
	Subtotal:
	\$57

Total Direct Costs (1) = \$3,999

2. Excavate and remove pipe from casing (2 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	20	\$49.90	\$998
dozer, Cat D-6R w winch	1	20	\$98.11	\$1,962
hydrocrane, Grove, 30 ton	1	20	\$66.54	\$1,331
pipe truck	1	20	\$49.49	\$990
flatbed truck	1	20	\$24.00	\$480
3/4 ton pick-up with trailer	1	20	\$22.79	\$456
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$282
			Subtotal:	\$6,893

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**I. F. Cased highway/railroad crossings (continued)**

Line Item 2 (continued)

Labor		No.	Hours	Rate	Total	
operator (dozer, backhoe)		2	20	\$60.41	\$2,416	
operator (hydrocrane)		1	20	\$60.41	\$1,208	
teamster		2	20	\$41.32	\$1,653	
pipefitter/welder		1	20	\$57.06	\$1,141	
helper		1	20	\$39.94	\$799	
laborer		4	20	\$43.88	\$3,510	
foreman		1	20	\$61.83	\$1,237	
per diem	2 days	crew size:	12	\$90.00	\$2,160	
					Subtotal:	\$14,124
Material					Total	
allow 2% of labor					\$282	
					Subtotal:	\$282
Total Direct Costs (2) =					\$21,300	

3. Fill casing with grout, backfill trench, grade disturbed areas (2 days)

Equipment		No.	Hours	Rate	Total	
backhoe, Cat 320C		1	20	\$49.90	\$998	
dump truck 8 cy		1	20	\$23.72	\$474	
grout pump, trailer mounted		1	20	\$12.88	\$258	
1/2 ton pickup with 4wd		2	20	\$9.85	\$394	
small tools, 2% of labor					\$161	
					Subtotal:	\$2,285
Labor		No.	Hours	Rate	Total	
operator (backhoe)		1	20	\$60.41	\$1,208	
teamster		1	20	\$41.32	\$826	
laborer		4	20	\$43.88	\$3,510	
foreman		1	20	\$61.83	\$1,237	
per diem	2 days	crew size:	7	\$90.00	\$1,260	
					Subtotal:	\$8,041
Material					Total	
Grout (cy)	\$98	13 cy	(Note: assumes 24" pipe)		\$1,274	
Sales tax @ 5%					\$64	
Miscellaneous 2% of labor					\$161	
					Subtotal:	\$1,499
Total Direct Costs (3) =					\$11,825	

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. F. Cased highway/railroad crossings (continued)

#### 4. Restore sites (1/2 day)

Equipment	No.	Hours	Rate	Total
flatbed truck	1	5	\$24.00	\$120
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$33
			Subtotal:	\$252

Labor	No.	Hours	Rate	Total
teamster	1	5	\$41.32	\$207
laborer	4	5	\$43.88	\$878
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	\$90.00	\$270
			Subtotal:	\$1,663

Material	Total
allow \$2000 for topsoil, seed, fertilizer, straw bales, etc.	\$2,000
Sales tax @ 5%	\$100
	Subtotal:
	\$2,100

Total Direct Costs (4) = \$4,015

### Summary: Cased Highway/Railroad Crossings

#### A. Pipeline contractor costs

1. Remove ROW fence and access work sites	\$3,999
2. Excavate and remove pipe from casing	\$21,300
3. Fill casing with grout, backfill trench, grade disturbed areas	\$11,825
4. Restore sites	\$4,015
	Pipeline contractor direct costs:
	\$41,139
	5% Mobilization
	\$2,057
	Subtotal:
	\$43,196
	15% Contractor overhead:
	\$6,479
	Subtotal:
	\$49,675
	10% Contractor profit:
	\$4,968
	Total pipeline contractor costs:
	\$54,643

#### B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

\$2,732  
Total environmental contractor cost: \$2,732

#### C. Pipeline company inspection costs

1. Number of days per site	5
2. Company cost per day	\$500
	Total company inspection cost per site:
	\$2,500

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**I. F. Cased highway/railroad crossings (continued)**

D. Pipeline company management and overhead costs (15% of A + B + C)	\$8,981
Total management and overhead cost:	\$8,981
Total cost to retire an uncased crossing (A + B + C + D):	\$68,856

**Wholly-owned facilities (24" Mainline and associated laterals)**

No. of cased highway crossings:	25
Item F. 1. Total estimated cost to retire cased highway crossings:	\$1,721,400
No. of cased railroad crossings:	9
Item F. 2. Total estimated cost to retire cased railroad crossings:	\$619,704

**Jointly-owned facilities (30" Mainline and associated laterals)**

No. of cased highway crossings	27
Item F. 1. Total estimated cost to retire cased highway crossings:	\$1,859,112
No. of cased railroad crossings:	7
Item F. 2. Total estimated cost to retire cased railroad crossings:	\$481,992

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### J. Cathodic protection facilities

##### Description of Work:

Detailed cost estimate below reflects work required to remove cathodic protection test sites and rectifiers. Work includes removal of test sites and rectifiers and associated electrical equipment. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

##### 1. Remove test sites

Equipment	No.	Hours	Rate	Total
1/2 ton pickup with 4wd	1	1	\$9.85	\$10
small tools, 2% of labor				\$4
Subtotal:				\$13

Labor	No.	Hours	Rate	Total
laborer	2	1	\$43.88	\$88
foreman	1	1	\$61.83	\$62
per diem	1/10 day	crew size: 3	\$90.00	\$27
Subtotal:				\$177

Material	Total
allow 2% of labor	\$4
Subtotal:	\$4

Total Direct Costs (1) = \$193

#### Summary: Remove Test Sites

##### A. Pipeline contractor costs

Pipeline contractor direct costs:	\$193
5% Mobilization	\$10
Subtotal:	\$203
15% Contractor overhead:	\$30
Subtotal:	\$234
10% Contractor profit:	\$23
Total pipeline contractor costs:	\$257

##### B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

Total environmental contractor cost:	\$13
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## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. J. Cathodic protection facilities (continued)

C. Pipeline company inspection costs		
1. Number of days per site	0.1	
2. Company cost per day	\$500	
Total company inspection cost per site:	\$50	

D. Pipeline company management and overhead costs (15% of A + B + C)		
Total management and overhead cost:	\$48	

Total cost to remove a C.P. test site (A + B + C + D): \$368

#### Wholly-owned facilities (24" Mainline and associated laterals)

No. of cathodic protection test sites:		246
Item J.1	Total estimated cost to retire cathodic protection test sites:	\$90,528

#### Jointly-owned facilities (30" Mainline and associated laterals)

No. of cathodic protection test sites:		160
Item J.1	Total estimated cost to retire cathodic protection test sites:	\$58,880

### 2. Remove rectifiers

Equipment	No.	Hours	Rate	Total
3/4 ton pick-up with trailer	1	5	\$22.79	\$114
1/2 ton pickup with 4wd	1	5	\$9.85	\$49
small tools, 2% of labor				\$19
			Subtotal:	\$182

Labor	No.	Hours	Rate	Total
electrician	1	5	\$60.72	\$304
helper	1	5	\$42.50	\$213
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	\$90.00	\$135
			Subtotal:	\$960

Material	Total
allow 2% of labor	\$19
	Subtotal: <span style="float: right;">\$19</span>

Total Direct Costs (1) = \$1,162

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. J. Cathodic protection facilities (continued)

#### Summary: Remove Rectifiers

A. Pipeline contractor costs

Pipeline contractor direct costs:		\$1,162
5% Mobilization		\$58
	Subtotal:	\$1,220
15% Contractor overhead:		\$183
	Subtotal:	\$1,403
10% Contractor profit:		\$140
Total pipeline contractor costs:		\$1,543

B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

		\$77
Total environmental contractor cost:		\$77

C. Pipeline company inspection costs

1. Number of days per site		0.5
2. Company cost per day		\$500
	Total company inspection cost per site:	\$250

D. Pipeline company management and overhead costs (15% of A + B + C)

		\$281
Total management and overhead cost:		\$281

Total cost to remove a rectifier (A + B + C + D): \$2,151

#### **Wholly-owned facilities (24" Mainline and associated laterals)**

No. of rectifiers		7
Item J. 2. Total estimated cost to remove rectifiers:		\$15,057

#### **Jointly-owned facilities (30" Mainline and associated laterals)**

No. of rectifiers		12
Item J. 2. Total estimated cost to remove rectifiers:		\$25,812

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### A. Clean and purge pipelines

Description of Work:

Prior to its last delivery, PNGTS conducts a series of pigging operations to ensure that its pipelines are clean and free of liquids. After the last delivery to its customers, PNGTS operating staff isolates the pipeline system from gas supply inputs and delivery points. Abandonment pressure is estimated to be 200 psig. Line pack is evacuated by flaring or venting. At this point pipeline is filled with natural gas at atmospheric pressure. PNGTS staff evacuates sections of pipeline using pipeline evacuation equipment. At this point pipeline is filled with air at atmospheric pressure. Pipeline is ready for demolition work.

- 1 Estimated cost to clean and purge 100-mile transmission pipeline segment of hydrocarbons:

	Unit	No.	Days	Rate	Total
a. Pigging operation prior to final shutdown	each	2		\$10,000	\$20,000
b. Isolate pipeline from input and delivery points	person	3	5	\$1,000	\$15,000
c. Blowdown system at M/L valves (10 sites)	person	3	10	\$1,000	\$30,000
d. Pipeline evacuation (10 sites)	person	3	20	\$1,000	\$60,000
					\$125,000

Estimated cost per mile: \$1,250

- 2 Estimated cost to clean and purge transmission pipelines:

		Cost Per		Total
		Miles	Mile	
a. Wholly-owned facilities (24" mainline and associated facilities)				
24 "	Mainline	143.83	\$1,250	\$179,788
8 "	Groveton Lateral	0.66	\$1,250	\$825
12 "	Rumford lateral	26.51	\$1,250	\$33,138
12 "	Jay lateral	16.78	\$1,250	\$20,975
		187.78		\$234,725
b. Jointly-owned facilities (30" mainline and associated facilities)				
30 "	Mainline	100.56	\$1,250	\$125,700
12 "	Westbrook lateral	3.84	\$1,250	\$4,800
16 "	Newington lateral	1.20	\$1,250	\$1,500
20 "	Haverhill lateral	0.80	\$1,250	\$1,000
		106.40		\$133,000

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### B. Fill pipelines with nitrogen

Description of Work:

Detailed cost estimate below reflects work required to fill capped segments between road crossings, river crossings, stream crossings, etc. with nitrogen. Each segment is assumed to be 1/2 mile in length. Estimate includes cost of pigs, pipe fittings, and nitrogen. Work is done in conjunction with crossing crews. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead costs.

1. Fill segment with nitrogen (1/2 day)

Equipment	No.	Hours	Rate	Total
flatbed truck	1	5	\$24.00	\$120
3/4 ton pick-up with trailer	2	5	\$22.79	\$228
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$56
Subtotal:				\$503

Labor	No.	Hours	Rate	Total
teamster	1	5	\$41.32	\$207
pipefitter/welder	2	5	\$57.06	\$571
helper	2	5	\$39.94	\$399
laborer	4	5	\$43.88	\$878
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	\$90.00	\$450
Subtotal:				\$2,813

Material		Total
pig	1 each	\$400
fittings	2 each	\$500
nitrogen	15,000 cu ft	\$0.01
transportation and pumping charges	5 hours	\$150
Sales tax @ 5%		\$115
Subtotal:		\$2,415

Total Direct Costs (1) = \$5,731

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. B. Fill pipelines with nitrogen (continued)

#### Summary: Fill Pipelines with Nitrogen

A. Pipeline contractor costs

1. Fill segment with nitrogen

Pipeline contractor direct costs:		\$5,731
5% Mobilization		\$287
	Subtotal:	\$6,017
15% Contractor overhead:		\$903
	Subtotal:	\$6,920
10% Contractor profit:		\$692
Total pipeline contractor costs:		\$7,612

B. Environmental contractor costs (5% of pipeline contractor costs)

This section reflects work performed by environmental contractor to monitor work and check for presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

		\$381
Total environmental contractor costs:		\$381

C. Pipeline company inspection costs

1. Number of days per segment

1/2

2. Company cost per day

\$500

		\$250
Total co. inspection cost per segment:		\$250

D. Pipeline company management and overhead costs (15% of A + B + C)

		\$1,236
Total management and overhead cost:		\$1,236

		\$9,479
Total cost to fill one segment with nitrogen (A + B + C + D):		\$9,479

Wholly-owned facilities - Number of segments assuming no pipe removed:		425
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Jointly-owned facilities - Number of segments assuming no pipe removed:		285
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#### Total Estimated Cost to Fill Pipe with Nitrogen (Option I)

A. Wholly-owned facilities (24" mainline and associated laterals)

		419
Item B. Total estimated cost to fill pipelines with nitrogen		\$4,028,575

B. Jointly-owned facilities (30" mainline and associated laterals)

		285
Item B. Total estimated cost to fill pipelines with nitrogen		\$2,701,515

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. B. Fill pipelines with nitrogen (continued)**

**Total Estimated Cost to Fill Pipe with Nitrogen (Option III)**

A. Wholly-owned facilities (24" mainline and associated laterals)

	No. of segments:	385
Item B.	Total estimated cost to fill pipelines with nitrogen	\$3,649,415

B. Jointly-owned facilities (30" mainline and associated laterals)

	No. of segments:	249
Item B.	Total estimated cost to fill pipelines with nitrogen	\$2,360,271

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### H. River and large stream crossings

##### 1. HDD crossings

Description of Work:

Detailed cost estimate below reflects work required to retire a typical HDD crossing. Work includes ROW fence removal, excavation and shoring of trench, capping pipe ends, filling pipe with water, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

1. Remove ROW fence and access work sites (2 days)

Equipment	No.	Hours	Rate	Total
dozer, cat D-6R	1	20	\$89.97	\$1,799
lowboy	1	20	\$53.34	\$1,067
flatbed truck	1	20	\$24.00	\$480
3/4 ton pick-up with trailer	1	20	\$22.79	\$456
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$227
Subtotal:				\$4,423

Labor	No.	Hours	Rate	Total
operator	1	20	\$60.41	\$1,208
teamster	2	20	\$41.32	\$1,653
pipefitter/welder	1	20	\$57.06	\$1,141
helper	1	20	\$39.94	\$799
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem	2 days	crew size:	\$90.00	\$1,800
Subtotal:				\$11,348

Material	Total
allow 2% of labor	\$227
Subtotal:	\$227

Total Direct Costs (1) = \$15,998

2. Excavate and cap pipe ends (2 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	20	\$49.90	\$998
flatbed truck	1	20	\$24.00	\$480
lowboy	1	20	\$53.34	\$1,067
3/4 ton pick-up with trailer	1	20	\$22.79	\$456
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$227
Subtotal:				\$3,622

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. H. 1. HDD crossings (continued)**

Line Item 2 (continued)

Labor	No.	Hours	Rate	Total	
operator	1	20	\$60.41	\$1,208	
teamster	2	20	\$41.32	\$1,653	
pipefitter/welder	1	20	\$57.06	\$1,141	
helper	1	20	\$39.94	\$799	
laborer	4	20	\$43.88	\$3,510	
foreman	1	20	\$61.83	\$1,237	
per diem	2 days	crew size:	10	\$90.00	
				<u>Subtotal:</u>	\$11,348

Material	Total
allow 2% of labor	\$227
<u>Subtotal:</u>	\$227

Total Direct Costs (2) = \$15,196

3. Fill pipe with water (1 day)

Equipment	No.	Hours	Rate	Total	
water pump, 6" dia. with hose	1	10	\$17.38	\$174	
flatbed truck	1	10	\$24.00	\$240	
lights, trailer mounted	1	10	\$6.84	\$68	
1/2 ton pickup with 4wd	1	10	\$9.85	\$99	
small tools, 2% of labor				\$59	
				<u>Subtotal:</u>	\$640

Labor	No.	Hours	Rate	Total	
operator	1	10	\$58.16	\$582	
teamster	1	10	\$41.32	\$413	
laborer	2	10	\$43.88	\$878	
foreman	1	10	\$61.83	\$618	
per diem	1 day	crew size:	5	\$90.00	
				<u>Subtotal:</u>	\$2,941

Material	Total
Miscellaneous (2% of labor)	\$59
<u>Subtotal:</u>	\$59

Total Direct Costs (3) = \$3,639

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. H. 1. HDD crossings (continued)**

4. Backfill trench, grade disturbed areas (2 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	20	\$49.90	\$998
dump truck 8 cy	1	20	\$23.72	\$474
lowboy	1	20	\$53.34	\$1,067
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$181
Subtotal:				\$3,114

Labor	No.	Hours	Rate	Total
operator	1	20	\$60.41	\$1,208
teamster	2	20	\$41.32	\$1,653
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem	2 days	crew size:	8	\$90.00
Subtotal:				\$9,048

Material	Total
Miscellaneous (2% of labor)	\$181
Subtotal:	\$181

Total Direct Costs (4) = \$12,343

5. Restore sites (2 days)

Equipment	No.	Hours	Rate	Total
flatbed truck	1	20	\$24.00	\$480
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$133
Subtotal:				\$1,007

Labor	No.	Hours	Rate	Total
teamster	1	20	\$41.32	\$826
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem	2 days	crew size:	6	\$90.00
Subtotal:				\$6,653

Material	Total
allow \$ 2000 for topsoil, seed, fertilizer, straw bales, etc.	\$2,000
Sales tax @ 5%	\$100
Subtotal:	\$2,100

Total Direct Costs (5) = \$9,760

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. H. 1. HDD crossings (continued)

#### Summary: River and Large Stream HDD Crossings

A. Pipeline contractor costs		
1. Remove ROW fence and access work sites	\$15,998	
2. Excavate and cap pipe ends	\$15,196	
3. Fill pipe with water	\$3,639	
4. Backfill trench, grade disturbed areas	\$12,343	
5. Restore sites	\$9,760	
	\$56,936	Pipeline contractor direct costs:
	\$2,847	5% Mobilization
	\$59,783	Subtotal:
	\$8,967	15% Contractor overhead:
	\$68,750	Subtotal:
	\$6,875	10% Contractor profit:
	\$75,625	Total pipeline contractor costs:
B. Environmental contractor costs (5% of pipeline contractor costs)		
This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.		
	\$3,781	
	\$3,781	Total environmental contractor cost:
C. Pipeline company inspection costs		
1. Number of days per site	9	
2. Company cost per day	\$500	
	\$4,500	Total company inspection cost per site:
D. Pipeline company management and overhead costs (15% of A + B + C)		
	\$12,586	
	\$12,586	Total management and overhead cost:
	\$96,493	Total cost to retire an HDD crossing (A + B + C + D):

#### **Wholly-owned facilities (24" Mainline and associated laterals)**

No. of HDD crossings:	12
Item H. 1. Total estimated cost to retire HDD crossings:	\$1,157,916

#### **Jointly-owned facilities (30" Mainline and associated laterals)**

No. of HDD crossings:	7
Item H. 1. Total estimated cost to retire HDD crossings:	\$675,451

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### L. M&R stations

#### 2. Medium M&R stations

##### Description of Work:

Detailed cost estimate below reflects work required to retire a typical medium M&R station. Work includes ROW fence removal, excavation, removal of valves, blowdowns, meter piping and equipment, removal of meter and control building(s), capping pipelines, excavation of gravel, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

#### 1. Remove ROW fence and access work site (1 day)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	10	\$49.90	\$499
flatbed truck	1	10	\$24.00	\$240
lowboy	1	10	\$53.34	\$533
3/4 ton pick-up with trailer	1	10	\$22.79	\$228
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$113
Subtotal:				\$1,811

Labor	No.	Hours	Rate	Total
operator	1	10	\$60.41	\$604
teamster	2	10	\$41.32	\$826
pipefitter/welder	1	10	\$57.06	\$571
helper	1	10	\$39.94	\$399
laborer	4	10	\$43.88	\$1,755
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	\$90.00	\$900
Subtotal:				\$5,674

Material	Total
allow 2% of labor	\$113
Subtotal:	\$113

Total Direct Costs (1) = \$7,598

#### 2. Excavate, remove valves, blowdowns, cap pipe ends, demolish control bldgs and meter runs (10 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C w hammer	1	100	\$73.90	\$7,390
hydrocrane, Grove 30 ton	1	100	\$66.54	\$6,654
flatbed truck	1	100	\$24.00	\$2,400
3/4 ton pick-up with trailer	2	100	\$22.79	\$4,557
1/2 ton pickup with 4wd	2	100	\$9.85	\$1,971
small tools, 2% of labor				\$1,403
Subtotal:				\$24,375

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. L. 2. Medium M&R stations (continued)**

Line Item 2 (continued)

Labor	No.	Hours	Rate	Total
operator	1	100	\$60.41	\$6,041
operator (hydrocrane)	1	100	\$60.41	\$6,041
teamster	1	100	\$41.32	\$4,132
pipefitter/welder	2	100	\$57.06	\$11,411
helper	2	100	\$39.94	\$7,988
laborer	4	100	\$43.88	\$17,551
foreman	1	100	\$61.83	\$6,183
per diem	10 days	crew size:	12	\$90.00
			Subtotal:	\$70,146
<hr/>				
Material				Total
allow 2% of labor				\$1,403
			Subtotal:	\$1,403
				Total Direct Costs (2) =
				\$95,925

3. Remove gravel and miscellaneous debris (2 days)

Equipment	No.	Hours	Rate	Total
track loader, Cat 953C	1	20	\$57.52	\$1,150
dump truck 14 cy	3	20	\$35.10	\$2,106
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$201
			Subtotal:	\$3,851
<hr/>				
Labor	No.	Hours	Rate	Total
operator	1	20	\$60.41	\$1,208
teamster	3	20	\$41.32	\$2,479
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem	2 days	crew size:	9	\$90.00
			Subtotal:	\$10,054
<hr/>				
Material				Total
Miscellaneous (2% of labor)				\$201
			Subtotal:	\$201
				Total Direct Costs (3) =
				\$14,107

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. L. 2. Medium M&R stations (continued)**

4. Restore site (2 days)

Equipment	No.	Hours	Rate	Total
track loader, Cat 953C	1	20	\$57.52	\$1,150
flatbed truck	1	20	\$24.00	\$480
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$161
			Subtotal:	\$2,185

Labor	No.	Hours	Rate	Total
operator	1	20	\$60.41	\$1,208
teamster	1	20	\$41.32	\$826
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem            2 days            crew size:	7		\$90.00	\$1,260
			Subtotal:	\$8,041

Material	Total
allow \$ 10,000 for topsoil, seed, fertilizer, straw bales, etc.	\$10,000
Sales tax @ 5%	\$500
	Subtotal: \$10,500

Total Direct Costs (4) = \$20,727

**Summary: Medium M&R Stations**

A. Pipeline contractor costs

1. Remove ROW fence and access work site	\$7,598
2. Excavate, remove valves and blowdowns, cap pipe ends	\$95,925
3. Remove gravel and miscellaneous debris	\$14,107
4. Restore site	\$20,727
	<hr/>
Pipeline contractor direct costs:	\$138,356
5% Mobilization	\$6,918
	<hr/>
Subtotal:	\$145,274
15% Contractor overhead:	\$21,791
	<hr/>
Subtotal:	\$167,065
10% Contractor profit:	\$16,707
	<hr/>
Total pipeline contractor costs:	\$183,772

B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

	\$9,189
	<hr/>
Total environmental contractor cost:	\$9,189

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. L. 2. Medium M&R stations (continued)**

C. Pipeline company inspection costs		
1. Number of days per site		15
2. Company cost per day		\$500
Total company inspection cost per site:		\$7,500

D. Pipeline company management and overhead costs (15% of A + B + C)		
		\$30,069
Total management and overhead cost:		\$30,069

Total cost to retire a medium M&R station (A + B + C + D):	\$230,529
--	-----------

**Wholly-owned facilities (24" Mainline and associated laterals)**

No. of medium M&R stations:	1
Item L. 2. Total estimated cost to retire medium M&R stations	\$230,529

**Jointly-owned facilities (30" Mainline and associated laterals)**

No. of medium M&R stations:	3
Item L. 2. Total estimated cost to retire medium M&R stations:	\$691,587

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### D. Pipe handling and storage

Description of Work:

Detailed cost estimate below reflects work required to unload pipe from pipe trucks, store pipe in temporary storage yards, and load pipe onto contract carriers for transport to scap yard. Estimate is based on handling one mile of pipe per day. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead costs.

1. Unload pipe from pipe trucks and stack in storage yard.

Equipment	No.	Hours	Rate	Total
hydrocrane, Grove, 30 ton	1	10	\$66.54	\$665
1/2 ton pickup with 4wd	1	10	\$9.85	\$99
small tools, 2% of labor				\$49
Subtotal:				\$813

Labor	No.	Hours	Rate	Total
operator (hydrocrane)	1	10	\$60.41	\$604
laborer	2	10	\$43.88	\$878
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	\$90.00	\$360
Subtotal:				\$2,460

Material	Total
allow 2% of labor	\$49
Subtotal:	\$49

Total Direct Costs (1) = \$3,322

2. Load pipe in storage yard onto contract carriers.

Equipment	No.	Hours	Rate	Total
hydrocrane, Grove, 30 ton	1	10	\$66.54	\$665
1/2 ton pickup with 4wd	1	10	\$9.85	\$99
small tools, 2% of labor				\$49
Subtotal:				\$813

Labor	No.	Hours	Rate	Total
operator (hydrocrane)	1	10	\$60.41	\$604
laborer	2	10	\$43.88	\$878
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	\$90.00	\$360
Subtotal:				\$2,460

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. D. Pipe handling and storage (continued)**

Line Item 2 (continued)

Material	Total
allow 2% of labor	\$49
Subtotal:	\$49
Total Direct Costs (2) =	\$3,322

**Summary: Pipe handling and storage**

A. Pipeline contractor costs	
1. Unload pipe from pipe trucks and stack in storage yard	\$3,322
2. Load pipe in storage yard onto contract carriers	\$3,322
Pipeline contractor direct costs:	\$6,645
5% Mobilization	\$332
Subtotal:	\$6,977
15% Contractor overhead:	\$1,047
Subtotal:	\$8,023
10% Contractor profit:	\$802
Total pipeline contractor costs:	\$8,826
B. Environmental contractor costs (5% of pipeline contractor costs)	
This section reflects work performed by environmental contractor to monitor work and check for presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.	
Total environmental contractor costs:	\$441
C. Pipeline company inspection costs	
1. Number of inspectors	2
2. Company cost per day	\$500
Total company inspection cost per mile:	\$1,000
D. Pipeline company management and overhead costs (15% of A + B + C)	
Total management and overhead cost:	\$1,540
Total estimated cost to handle and store 1 mile of pipeline (A + B + C + D):	\$11,807
Estimated cost per foot to handle and store 1 mile of pipeline:	\$2.24

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. D. Pipe handling and storage (continued)**

**I. Total Estimated Pipe Handling and Storage Cost (Option I)**

I (a) Wholly-owned facilities (24" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Length (ft)	Estimated Cost/ft	Total Estimated Cost
8	53	\$2.24	\$119
12	3,010	\$2.24	\$6,742
16	0	\$2.24	\$0
20	0	\$2.24	\$0
24	10,138	\$2.24	\$22,709
30	0	\$2.24	\$0
<b>Total:</b>	<b>13,201</b>		<b>\$29,570</b>

**II. Total Estimated Pipe Handling and Storage Cost (Option II)**

II (a) Wholly-owned facilities (24" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Length (ft)	Estimated Cost/ft	Total Estimated Cost
8	3,221	\$2.24	\$7,215
12	211,570	\$2.24	\$473,917
16	0	\$2.24	\$0
20	0	\$2.24	\$0
24	702,926	\$2.24	\$1,574,554
30	0	\$2.24	\$0
<b>Total:</b>	<b>917,717</b>		<b>\$2,055,686</b>

II (b) Jointly-owned facilities (30" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Length (ft)	Estimated Cost/ft	Total Estimated Cost
8	0	\$2.24	\$0
12	18,322	\$2.24	\$41,041
16	5,755	\$2.24	\$12,891
20	3,802	\$2.24	\$8,516
24	0	\$2.24	\$0
30	480,322	\$2.24	\$1,075,921
<b>Total:</b>	<b>508,201</b>		<b>\$1,138,370</b>

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. D. Pipe handling and storage (continued)**

**III. Total Estimated Pipe Handling and Storage Cost (Option III)**

III (a) Wholly-owned facilities (24" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Length (ft)	Estimated Cost/ft	Total Estimated Cost
8	317	\$2.24	\$710
12	19,958	\$2.24	\$44,706
16	0	\$2.24	\$0
20	0	\$2.24	\$0
24	66,264	\$2.24	\$148,431
30	0	\$2.24	\$0
<b>Total:</b>	<b>86,539</b>		<b>\$193,847</b>

III (b) Jointly-owned facilities (30" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Length (ft)	Estimated Cost/ft	Total Estimated Cost
8	0	\$2.24	\$0
12	6,706	\$2.24	\$15,021
16	0	\$2.24	\$0
20	0	\$2.24	\$0
24	0	\$2.24	\$0
30	57,816	\$2.24	\$129,508
<b>Total:</b>	<b>64,522</b>		<b>\$144,529</b>

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### C. Pipe removal

Description of Work:

Detailed cost estimate below reflects work required to remove a 24" diameter pipeline. Work includes trench excavation, cutting pipe into 40-ft sections, loading pipe onto pipe trucks and hauling to temporary storage yard, backfilling trench, and restoration of area. Time to achieve each task is based on the removal of one mile of 24" dia. pipe. Removal costs are adjusted for pipe diameters greater than or less than 24". Estimate also includes environmental inspection, pipeline company inspection, ROW damage payments, and pipeline company management and overhead costs.

1. Excavate trench (1 day)

Equipment	No.	Hours	Rate	Total
dozer, Cat D-6R	1	10	\$89.97	\$900
backhoe, Cat 320C	4	10	\$49.90	\$1,996
flatbed truck	1	10	\$24.00	\$240
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$136
Subtotal:				\$3,469

Labor	No.	Hours	Rate	Total
operator	5	10	\$60.41	\$3,020
teamster	1	10	\$41.32	\$413
laborer	4	10	\$43.88	\$1,755
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	\$90.00	\$990
Subtotal:				\$6,797

Material	Total
allow 2% of labor	\$136
Subtotal:	\$136

Total Direct Costs (1) = \$10,402

2. Remove pipe from trench, cut pipe, load on trucks, and haul to storage yard (1 day)

Equipment	No.	Hours	Rate	Total
hydrocrane, Grove, 30 ton	1	10	\$66.54	\$665
pipelayer, Cat, 572-R, 20' boom	3	10	\$75.41	\$2,262
pipe truck	5	10	\$49.49	\$2,475
flatbed truck	1	10	\$24.00	\$240
lowboy	1	10	\$53.34	\$533
3/4 ton pick-up with trailer	4	10	\$22.79	\$911
1/2 ton pickup with 4wd	4	10	\$9.85	\$394
small tools, 2% of labor				\$317
Subtotal:				\$7,798

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. C. Pipe removal (continued)**

Line Item 2 (continued)

Labor	No.	Hours	Rate	Total
operator (hydrocrane)	1	10	\$60.41	\$604
operator	3	10	\$60.41	\$1,812
teamster	7	10	\$41.32	\$2,893
pipefitter/welder	4	10	\$57.06	\$2,282
helper	4	10	\$39.94	\$1,598
laborer	8	10	\$43.88	\$3,510
foreman	1	10	\$61.83	\$618
per diem            1 day            crew size:	28		\$90.00	\$2,520
			Subtotal:	\$15,837
<hr/>				
Material				Total
Miscellaneous 2% of labor				\$317
			Subtotal:	\$317
				Total Direct Costs (2) =
				\$23,952

3. Backfill trench (1 day)

Equipment	No.	Hours	Rate	Total
dozer, Cat D-6R	1	10	\$89.97	\$900
track loader, Cat 953C	2	10	\$57.52	\$1,150
dump truck 14 cy	6	10	\$35.10	\$2,106
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$158
			Subtotal:	\$4,512
<hr/>				
Labor	No.	Hours	Rate	Total
operator	3	10	\$60.41	\$1,812
teamster	6	10	\$41.32	\$2,479
laborer	4	10	\$43.88	\$1,755
foreman	1	10	\$61.83	\$618
per diem            1 day            crew size:	14		\$90.00	\$1,260
			Subtotal:	\$7,925
<hr/>				
Material				Total
Backfill (cy)            \$10            675 cy				\$6,750
Sales tax @ 5%				\$338
Miscellaneous (2% of labor)				\$158
			Subtotal:	\$7,246
				Total Direct Costs (3) =
				\$19,682

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. C. Pipe removal (continued)

#### 4. Restore site (1 day)

Equipment	No.	Hours	Rate	Total
dozer, Cat D-6R	2	10	\$89.97	\$1,799
track loader, Cat 953C	1	10	\$57.52	\$575
flatbed truck	2	10	\$24.00	\$480
dump truck 14 cy	5	10	\$35.10	\$1,755
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$169
Subtotal:				\$4,975

Labor	No.	Hours	Rate	Total
operator	3	10	\$60.41	\$1,812
teamster	7	10	\$41.32	\$2,893
laborer	4	10	\$43.88	\$1,755
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	15	\$90.00
Subtotal:				\$8,428

Material	Total
allow \$ 15,000 for topsoil, seed, fertilizer, straw bales, etc.	\$15,000
Sales tax @ 5%	\$750
Subtotal:	\$15,750

Total Direct Costs (4) = \$29,153

### Summary: Pipe Removal

#### A. Pipeline contractor costs

1. Excavate trench	\$10,402
2. Remove pipe from trench, cut pipe, load on trucks, and haul to storage yard	\$23,952
3. Backfill trench	\$19,682
4. Restore site	\$29,153
Pipeline contractor direct costs:	
	\$83,189
5% Mobilization	\$4,159
Subtotal:	\$87,349
15% Contractor overhead:	\$13,102
Subtotal:	\$100,451
10% Contractor profit:	\$10,045
Total pipeline contractor costs:	\$110,496

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. C. Pipe removal (continued)

B. Environmental contractor costs (5% of pipeline contractor costs)

This section reflects work performed by environmental contractor to monitor work and check for presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

	\$5,525
Total environmental contractor costs:	\$5,525

C. Pipeline company inspection costs

1. Number of days per mile

2

2. Company cost per day

\$500

	\$500
Total company inspection cost per mile:	\$1,000

D. ROW damages

	\$21,120
Total ROW damage costs per mile:	\$21,120

E. Pipeline company management and overhead costs (15% of A + B + C + D)

	\$20,721
Total management and overhead cost:	\$20,721

Total estimated cost to remove 1 mile of 24" dia. pipeline (A + B + C + D + E):	\$158,862
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Estimated cost per foot to remove 1 mile of 24" dia. pipeline:	\$30
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### I. Total Estimated Cost to Remove Pipe (Option I)

I (a) Wholly-Owned Facilities (24" Mainline and associated laterals)

(See Note)							
Pipeline Diameter (in.)	Pipeline Volume (cu. in.)	Six-Tenths Factor	Estimated Removal Cost/ft	Pipeline Removed (mile)	Adjusted P/L Length (mile)	Pipeline Removed (ft)	Estimated Removal Cost
8	50.3	0.2676	\$8	0.01	0.01	53	\$424
12	113.1	0.4353	\$13	0.62	0.57	3,010	\$39,130
16	201.1	0.6147	\$18				
20	314.2	0.8035	\$24				
24	452.4	1.0000	\$30	2.07	1.92	10,138	\$304,140
30	706.9	1.3070	\$39				
Total:				2.70	2.50	13,201	\$343,694

Note: Pipeline length reduced to take crossings into consideration.

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. C. Pipe removal (continued)**

**II. Total Estimated Cost to Remove Pipe (Option II)**

II (a) Wholly-Owned Facilities (24" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Volume (cu. in.)	Six-Tenths Factor	Estimated Removal Cost/ft	(See Note)		Pipeline Removed (ft)	Estimated Removal Cost
				Pipeline Removed (mile)	Adjusted P/L Length (mile)		
8	50.3	0.2676	\$8	0.66	0.61	3,221	\$25,768
12	113.1	0.4353	\$13	43.29	40.07	211,570	\$2,750,410
16	201.1	0.6147	\$18				
20	314.2	0.8035	\$24				
24	452.4	1.0000	\$30	143.83	133.13	702,926	\$21,087,780
30	706.9	1.3070	\$39				
Total:				187.78	173.81	917,717	\$23,863,958

Note: Pipeline length reduced to take crossings into consideration.

II (b) Jointly-owned facilities (30" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Volume (cu. in.)	Six-Tenths Factor	Estimated Removal Cost/ft	(See Note)		Pipeline Removed (ft)	Estimated Removal Cost
				Pipeline Removed (mile)	Adjusted P/L Length (mile)		
8	50.3	0.2676	\$8				
12	113.1	0.4353	\$13	3.84	3.47	18,322	\$238,186
16	201.1	0.6147	\$18	1.20	1.09	5,755	\$103,590
20	314.2	0.8035	\$24	0.80	0.72	3,802	\$91,248
24	452.4	1.0000	\$30				
30	706.9	1.3070	\$39	100.56	90.97	480,322	\$18,732,558
Total:				106.40	96.25	508,201	\$19,165,582

Note: Pipeline length reduced to take crossings into consideration.

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. C. Pipe removal (continued)**

**Total Estimated Cost to Remove Pipe (Option III)**

III (a) Wholly-Owned Facilities (24" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Volume (cu. in.)	Six-Tenths Factor	Estimated Removal Cost/ft	(See Note)		Pipeline Removed (ft)	Estimated Removal Cost
				Pipeline Removed (mile)	Adjusted P/L Length (mile)		
8	50.3	0.2676	\$8	0.06	0.06	317	\$2,536
12	113.1	0.4353	\$13	4.08	3.78	19,958	\$259,454
16	201.1	0.6147	\$18				
20	314.2	0.8035	\$24				
24	452.4	1.0000	\$30	13.56	12.55	66,264	\$1,987,920
30	706.9	1.3070	\$39				
Total:				17.70	16.39	86,539	\$2,249,910

Note: Pipeline length reduced to take crossings into consideration.

III (b) Jointly-owned facilities (30" Mainline and associated laterals)

Pipeline Diameter (in.)	Pipeline Volume (cu. in.)	Six-Tenths Factor	Estimated Removal Cost/ft	(See Note)		Pipeline Removed (ft)	Estimated Removal Cost
				Pipeline Removed (mile)	Adjusted P/L Length (mile)		
8	50.3	0.2676	\$8				
12	113.1	0.4353	\$13	1.40	1.27	6,706	\$87,178
16	201.1	0.6147	\$18				
20	314.2	0.8035	\$24				
24	452.4	1.0000	\$30				
30	706.9	1.3070	\$39	12.10	10.95	57,816	\$2,254,824
Total:				13.50	12.22	64,522	\$2,342,002

Note: Pipeline length reduced to take crossings into consideration.

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Pipeline Contractor Equipment Rates**

Equipment Description	(Note 1)	(Note 2)	Dec 2007
	July 2007 Equipment Rate (\$/hr)	Escalation Factor	Equipment Rate (\$/hr)
1 air compressor 160G, 160 cfm	\$13.32	1.02	\$13.59
2 air hose, 1-inch, 100 ft	\$1.19	1.02	\$1.21
3 paving breaker, 80-90 Lb	\$0.80	1.02	\$0.82
4 crane, 30 ton, Grove, hydrocrane 152 hp	\$65.24	1.02	\$66.54
5 crane, 50 ton, Grove, hydrocrane 400 hp	\$118.98	1.02	\$121.36
6 fork lift	\$20.79	1.02	\$21.21
7 motor grader, Cat 135-H, 135 hp	\$42.76	1.02	\$43.62
8 hydraulic excavator, Bobcat, 0.10 cy	\$13.18	1.02	\$13.44
9 hydraulic excavator, Cat 312C, 0.68 cy	\$38.95	1.02	\$39.73
10 hydraulic excavator, Cat 320C, 1.50 cy	\$48.92	1.02	\$49.90
11 hydraulic excavator, Cat 320CL, 0.80 cy	\$58.69	1.02	\$59.86
12 hydraulic hammer, 3000 ft-lb	\$23.53	1.02	\$24.00
13 hydraulic grapple, Labounty 120 TR	\$6.94	1.02	\$7.08
14 hydraulic shears, 27", Labounty MSD 40-III SV	\$27.11	1.02	\$27.65
15 lights, 6/1000W, 8 KW gen, trailer mtd.	\$6.71	1.02	\$6.84
16 pipelayer, Cat 561M, 18 ft boom, 40,000 lbs capacity	\$39.12	1.02	\$39.90
17 pipelayer, Cat 572R, 20 ft boom, 90,000 lbs capacity	\$73.93	1.02	\$75.41
18 pump, grout, trailer mounted, 810 cf/hr	\$12.63	1.02	\$12.88
19 pump, grout, trailer mounted, 2295 cf/hr	\$29.51	1.02	\$30.10
20 pump, water, skid-mounted, 6" dia, 1165 gpm	\$13.54	1.02	\$13.81
21 pump, hose, 6" dia, 100' length	\$3.50	1.02	\$3.57
22 tractor, Cat D-6R, 165 hp	\$88.21	1.02	\$89.97
23 winch for D-6R dozer	\$7.98	1.02	\$8.14
24 track loader, Cat 953C, 2.25 cy	\$56.39	1.02	\$57.52
25 dump truck, 8 cy	\$23.25	1.02	\$23.72
26 dump truck, 14 cy	\$34.41	1.02	\$35.10
27 flatbed truck	\$23.53	1.02	\$24.00
28 pipe truck	\$48.52	1.02	\$49.49
29 lowboy, 50 ton	\$52.29	1.02	\$53.34
30 1/2 ton pickup, crew, 4wd	\$9.66	1.02	\$9.85
31 3/4 ton pickup, crew, 4wd	\$11.74	1.02	\$11.97
32 welder, trailer mounted, 45 hp	\$10.60	1.02	\$10.81

Notes

- Hourly Equipment Rates from July 2007, US Army Corps of Engineers Construction Equipment Ownership and Operating Expense Schedule, Region I.
- Escalation factor based on ENR construction cost indices July 2007 of 7959 and December 2007 of 8089 per ENR 1/7/08.

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Pipeline Contractor Labor Rates and Company Inspection Costs**

A Pipeline contractor labor rates

Trade	(Note 1)		(Note 2)		(Note 3)		(Note 4)	
	Sep 2007 Labor Rate Including Fringe Benefits (\$/hr)	Escalation Factor	Dec 2007 Labor Rate Including Fringe Benefits (\$/hr)	Overtime Factor	Dec 2007 Labor Rate Adjusted for Overtime (\$/hr)	Labor Overhead 25% of Dec 2007 Base Rate (%)	Dec 2007 Labor Rate Pipeline Demolition Estimate (\$/hr)	
1 Operating engineers:								
2 Crane operator	\$42.54	1.00	\$42.54	1.17	\$49.77	\$10.64	\$60.41	
3 Heavy equipment	\$42.54	1.00	\$42.54	1.17	\$49.77	\$10.64	\$60.41	
4 Small equipment	\$40.96	1.00	\$40.96	1.17	\$47.92	\$10.24	\$58.16	
5 Pipefitter/welder	\$40.18	1.00	\$40.18	1.17	\$47.01	\$10.05	\$57.06	
6 Pipefitter/welder helper	\$28.13	1.00	\$28.13	1.17	\$32.91	\$7.03	\$39.94	
7 Electrician	\$42.76	1.00	\$42.76	1.17	\$50.03	\$10.69	\$60.72	
8 Electrician helper	\$29.93	1.00	\$29.93	1.17	\$35.02	\$7.48	\$42.50	
9 Teamster	\$29.10	1.00	\$29.10	1.17	\$34.05	\$7.28	\$41.32	
10 Laborer	\$30.90	1.00	\$30.90	1.17	\$36.15	\$7.73	\$43.88	
11 Foreman	\$43.54	1.00	\$43.54	1.17	\$50.94	\$10.89	\$61.83	

Labor overhead factor: 25%

Per diem: \$90 IRS Publication 1542, "Per Diem Rates"

B. Pipeline company inspection costs

	Estimated Cost/day
1 Pipeline and M&R stations	\$500

Note: Inspection costs include direct labor, per diem, and transportation costs.

Notes

- Hourly union pay scales, September 2007, Syracuse, New York (ENR September 17, 2007).
- Escalation factor based on ENR construction cost indices September 2007 of 8050 and December 2007 of 8089 per ENR 1/7/08.
- Work 6-day week, 10-hr day. See workpapers for calculation of overtime factor.
- FICA, unemployment compensation, and workers compensation insurance that employers must pay.

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. Pipeline Retirement**

**K. Pipeline markers**

Description of Work:

Detailed cost estimate below reflects work required to remove a pipeline marker.

1. Remove pipeline marker

Equipment	No.	Hours	Rate	Total
1/2 ton pickup with 4wd	1	0.25	\$9.85	\$2
small tools, 2% of labor				\$1
			Subtotal:	\$3
Labor	No.	Hours	Rate	Total
laborer	2	0.25	\$43.88	\$22
foreman	1	0.25	\$61.83	\$15
			Subtotal:	\$37
Material				Total
allow 2% of labor				\$1
			Subtotal:	\$1
			Total Direct Costs (1) =	\$41

**Summary: Pipeline Markers**

A. Pipeline contractor costs

Pipeline contractor direct costs:	\$41
Subtotal:	\$41
5% Mobilization	\$2
Subtotal:	\$43
15% Contractor overhead:	\$7
Subtotal:	\$50
10% Contractor profit:	\$5
Total pipeline contractor costs:	\$55

B. Pipeline company management and overhead costs (15% of A)

Total management and overhead cost:	\$8
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Total cost to remove a pipeline marker (A + B): \$63

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. K. Pipeline markers (continued)**

**Wholly-owned facilities (24" mainline and associated laterals)**

	No. of pipeline markers:	1,878
Item K.	Total estimated cost to retire small M&R stations	\$118,314

**Jointly-owned facilities (30" Mainline and associated laterals)**

	No. of pipeline markers:	1,064
Item K.	Total estimated cost to retire small M&R stations	\$67,032

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### I. Remote valve sites

Description of Work:

Detailed cost estimate below reflects work required to retire a typical remote valve site. Work includes ROW fence removal, excavation, removal of valves and blowdowns, capping pipelines, excavation of gravel, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

1. Remove ROW fence and access work site (1/2 day)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	5	\$49.90	\$249
flatbed truck	1	5	\$24.00	\$120
lowboy	1	5	\$53.34	\$267
3/4 ton pick-up with trailer	1	5	\$22.79	\$114
1/2 ton pickup with 4wd	1	5	\$9.85	\$49
small tools, 2% of labor				\$46
Subtotal:				\$846

Labor	No.	Hours	Rate	Total
operator	1	5	\$60.41	\$302
teamster	2	5	\$41.32	\$413
pipefitter/welder	1	5	\$57.06	\$285
helper	1	5	\$39.94	\$200
laborer	2	5	\$43.88	\$439
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	\$90.00	\$360
Subtotal:				\$2,308

Material	Total
allow 2% of labor	\$46
Subtotal:	\$46

Total Direct Costs (1) = \$3,200

2. Excavate, remove valves and blowdowns, cap pipe ends (1 day)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	10	\$49.90	\$499
crane, Grove 30 ton	1	10	\$66.54	\$665
flatbed truck	1	10	\$24.00	\$240
3/4 ton pick-up with trailer	1	10	\$22.79	\$228
1/2 ton pickup with 4wd	1	10	\$9.85	\$99
small tools, 2% of labor				\$96
Subtotal:				\$1,827

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. I. Remote valve sites (continued)**

Line Item 2 (continued)

Labor			No.	Hours	Rate	Total
operator			1	10	\$60.41	\$604
operator (crane)			1	10	\$60.41	\$604
teamster			1	10	\$41.32	\$413
pipefitter/welder			1	10	\$57.06	\$571
helper			1	10	\$39.94	\$399
laborer			2	10	\$43.88	\$878
foreman			1	10	\$61.83	\$618
per diem	1 day	crew size:	8		\$90.00	\$720
Subtotal:						\$4,807
Material						Total
allow 2% of labor						\$96
Subtotal:						\$96
Total Direct Costs (2) =						\$6,730

3. Remove gravel and miscellaneous debris, grade disturbed area (1/2 day)

Equipment			No.	Hours	Rate	Total
backhoe, Cat 320C			1	5	\$49.90	\$249
dump truck, 8 cy			1	5	\$23.72	\$119
1/2 ton pickup with 4wd			1	5	\$9.85	\$49
small tools, 2% of labor						\$30
Subtotal:						\$447
Labor			No.	Hours	Rate	Total
operator			1	5	\$60.41	\$302
teamster			1	5	\$41.32	\$207
laborer			2	5	\$43.88	\$439
foreman			1	5	\$61.83	\$309
per diem	1/2 day	crew size:	5		\$90.00	\$225
Subtotal:						\$1,482
Material						Total
Miscellaneous (2% of labor)						\$30
Subtotal:						\$30
Total Direct Costs (3) =						\$1,958

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. I. Remote valve sites (continued)

4. Restore site (1/2 day)

Equipment	No.	Hours	Rate	Total
flatbed truck	1	5	\$24.00	\$120
1/2 ton pickup with 4wd	1	5	\$9.85	\$49
small tools, 2% of labor				\$25
			Subtotal:	\$194

Labor	No.	Hours	Rate	Total
teamster	1	5	\$60.41	\$302
laborer	2	5	\$43.88	\$439
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	\$90.00	\$180
			Subtotal:	\$1,230

Material	Total
allow \$ 1000 for backfill, topsoil, seed, fertilizer, straw bales, etc.	\$1,000
Sales tax @ 5%	\$50
	Subtotal:
	\$1,050

Total Direct Costs (4) = \$2,474

### Summary: Remote Valve Sites

A. Pipeline contractor costs

1. Remove ROW fence and access work site	\$3,200
2. Excavate, remove valves and blowdowns, cap pipe ends	\$6,730
3. Remove gravel and miscellaneous debris	\$1,958
4. Restore site	\$2,474
	Subtotal:
	\$14,362
	5% Mobilization
	\$718
	Subtotal:
	\$15,080
	15% Contractor overhead:
	\$2,262
	Subtotal:
	\$17,342
	10% Contractor profit:
	\$1,734
	Total pipeline contractor costs:
	\$19,076

B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

	\$954
	Total environmental contractor cost:
	\$954

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. I. Remote valve sites (continued)**

C. Pipeline company inspection costs		
1. Number of days per site		2.5
2. Company cost per day		<u>\$500</u>
Total company inspection cost per site:		<u>\$1,250</u>

D. Pipeline company management and overhead costs (15% of A + B + C)		
		<u>\$3,192</u>
Total management and overhead cost:		<u>\$3,192</u>

Total cost to retire a remote valve site (A + B + C + D):	\$24,472
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**Wholly-owned facilities (24" Mainline and associated laterals)**

No. of remote valve sites:	15
Item I. Total estimated cost to retire remote valves:	\$367,080

**Jointly-owned facilities (30" Mainline and associated laterals)**

No. of remote valve sites:	16
Item I. Total estimated cost to retire remote valves:	\$391,552

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**II. Salvage**

**C. Line pack**

1 Wholly-owned facilities

a. Amount of recoverable line pack

1	Abandonment pressure assumed to be 200 psig.	
2	Wholly-owned PNGTS transmission line pack (Dth)	245,000
3	Unrecoverable line pack (Dth) (Ref: Workpapers - Line pack calculation)	<u>38,799</u>
4	Recoverable PNGTS transmission line pack (Dth)	Total: 206,201

b. Value of wholly-owned recoverable line pack

1	Spot price, ICE daily Indices, Dracut, MA, December 31, 2007	\$7.53
2	Value of wholly-owned recoverable line pack:	(\$1,552,694)

2 Jointly-owned facilities (33.24%)

a. Amount of recoverable line pack

1	Abandonment pressure assumed to be 200 psig.	
2	Jointly-owned PNGTS transmission line pack (Dth)	180,000
3	Unrecoverable line pack (Dth) (Ref: Workpapers - Line pack calculation)	<u>39,915</u>
4	Recoverable PNGTS transmission line pack (Dth)	Total: 140,085

b. Value of jointly-owned recoverable line pack

1	Spot price, ICE daily Indices, Dracut, MA, December 31, 2007	\$7.53
2	Value of partially-owned recoverable line pack:	(\$1,054,840)

## Portland Natural Gas Transmission System Final Abandonment Estimate

### II. Salvage

#### A. Scrap steel

Estimated carbon steel scap value: (\$160) per ton

#### 1 Wholly-owned facilities

<u>Wholly-owned facilities</u>					
	No.	Weight/ Valve (ton)	Total Weight (ton)	Scrap Value (ton)	Estimated Salvage (2007\$)
a. Remote valves					
1 Mainline 24"	11	4.0	44	(\$160)	(\$7,040)
2 Laterals (8", 3-12")	4	1.0	4	(\$160)	(\$640)
<b>Total:</b>	<b>15</b>		<b>48</b>		<b>(\$7,680)</b>

<u>Wholly-owned facilities</u>					
	No.	Weight/ Station (ton)	Total Weight (ton)	Scrap Value (ton)	Estimated Salvage (2007\$)
b. M&R stations (valves, pipe)					
1 Small M&R station	6	10	60	(\$160)	(\$9,600)
2 Medium M&R station	1	20	20	(\$160)	(\$3,200)
<b>Total:</b>	<b>7</b>		<b>80</b>		<b>(\$12,800)</b>

<u>Wholly-owned facilities</u>						
	No.	Length of Pipe Removed (ft)	Wt/ft 24-inch Pipe (lbs)	Total Weight (lbs)	Total Weight (ton)	Estimated Salvage (2007\$)
C. Pipe (misc. removal)						
1 Uncased hwy crossings	174	40	103.79	722,378	361	(\$57,760)
2 Uncased RR crossings	1	40	103.79	4,152	2	(\$320)
3 Cased hwy crossings	25	240	103.79	622,740	311	(\$49,760)
4 Cased RR crossings	9	240	103.79	224,186	112	(\$17,920)
5 Small stream crossings	188	40	103.79	780,501	390	(\$62,400)
6 HDD crossings	12	40	103.79	49,819	25	(\$4,000)
7 Trench crossings	16	40	103.79	66,426	33	(\$5,280)
<b>Total:</b>					<b>1,234</b>	<b>(\$197,440)</b>

<u>Wholly-owned facilities</u>						
		Length Removed (ft)	Wt/ft (lbs)	Total Weight (lbs)	Total Weight (ton)	Estimated Salvage (2007\$)
d. Pipe removal Option I (a)						
1 8"		53	22.36	1,185	1	(\$160)
2 12"		3,010	35.07	105,561	53	(\$8,480)
3 24"		10,138	103.79	1,052,223	526	(\$84,160)
<b>Total:</b>		<b>13,201</b>			<b>580</b>	<b>(\$92,800)</b>

<u>Wholly-owned facilities</u>						
		Length Removed (ft)	Wt/ft (lbs)	Total Weight (lbs)	Total Weight (ton)	Estimated Salvage (2007\$)
e. Pipe removal Option II (a)						
1 8"		3,221	22.36	72,022	36	(\$5,760)
2 12"		211,570	35.07	7,419,760	3,710	(\$593,600)
3 24"		702,926	103.79	72,956,690	36,478	(\$5,836,480)
<b>Total:</b>		<b>917,717</b>			<b>40,224</b>	<b>(\$6,435,840)</b>

## Portland Natural Gas Transmission System Final Abandonment Estimate

### II. A. Steel scrap (continued)

#### 1 Wholly-owned facilities (continued)

<u>Wholly-owned facilities</u>					
	Length Removed (ft)	Wt/ft (lbs)	Total Weight (lbs)	Total Weight (ton)	Estimated Salvage (2007\$)
f. Pipe removal Option III (a)					
1 8"	317	22.36	7,088	4	(\$640)
2 12"	19,958	35.07	699,927	350	(\$56,000)
3 24"	66,264	103.79	6,877,541	3,439	(\$550,240)
Total:	86,539			3,793	(\$606,880)

#### 2 Jointly-owned facilities (33.24%)

<u>Jointly-owned facilities</u>					
	No.	Weight/ Valve (ton)	Total Weight (ton)	Scrap Value (ton)	Estimated Salvage (2007\$)
a. Remote valves					
1 Mainline 30"	13	7	91	(\$160)	(\$14,560)
2 Laterals (12",16",20")	3	2	6	(\$160)	(\$960)
Total:	13		97		(\$15,520)

<u>Jointly-owned facilities</u>					
	No.	Weight/ Station (ton)	Total Weight (ton)	Scrap Value (ton)	Estimated Salvage (2007\$)
b. Remote M&R stations (valves, pipe)					
1 Small M&R station	9	10	90	(\$160)	(\$14,400)
2 Medium M&R station	3	20	60	(\$160)	(\$9,600)
Total:	12		150		(\$24,000)

<u>Jointly-owned facilities</u>						
	No.	Length of Pipe Removed (ft)	Wt/ft 30-inch Pipe (lbs)	Total Weight (lbs)	Total Weight (ton)	Estimated Salvage (2007\$)
c. Pipe (misc. removal)						
1 Uncased hwy crossings	125	40	193.93	969,650	485	(\$77,600)
2 Uncased RR crossings	4	40	193.93	31,029	16	(\$2,560)
3 Cased hwy crossings	27	240	193.93	1,256,666	628	(\$100,480)
4 Cased RR crossings	7	240	193.93	325,802	163	(\$26,080)
5 Small stream crossings	106	40	193.93	822,263	411	(\$65,760)
6 HDD crossings	7	40	193.93	54,300	27	(\$4,320)
7 Trench crossings	9	40	193.93	69,815	35	(\$5,600)
Total:					1,765	(\$282,400)

<u>Jointly-owned facilities</u>						
		Length Removed (ft)	Wt/ft (lbs)	Total Weight (lbs)	Total Weight (ton)	Estimated Salvage (2007\$)
d. Pipe removal Option II (b)						
1 12"		18,322	35.07	642,553	321	(\$51,360)
2 16"		5,755	62.58	360,148	180	(\$28,800)
3 20"		3,802	86.19	327,694	164	(\$26,240)
4 30"		480,322	193.93	93,148,845	46,574	(\$7,451,840)
Total:		508,201			47,239	(\$7,558,240)

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**II. A. Steel scrap (continued)**

	Length Removed	Wt/ft	Total Weight	Total Weight	Estimated Salvage
	(ft)	(lbs)	(lbs)	(ton)	(2007\$)
<u>Jointly-owned facilities</u>					
d. Pipe removal Option III (b)					
1 12"	6,706	35.07	235,179	118	(\$18,880)
2 16"	0	62.58	0	0	\$0
3 20"	0	86.19	0	0	\$0
4 30"	57,816	193.93	11,212,257	5,606	(\$896,960)
Total:	64,522			5,724	(\$915,840)

**Summary Scrap Steel Salvage**

I Wholly-owned facilities

A Option I (a)

1 Remote valves	(\$7,680)
2 Remote M&R stations (valves, pipe)	(\$12,800)
3 Pipe (misc. removal)	(\$197,440)
4 Pipe removal	(\$92,800)
Total:	(\$310,720)

B. Option II (a)

1 Remote valves	(\$7,680)
2 Remote M&R stations (valves, pipe)	(\$12,800)
3 Pipe (misc. removal)	(\$197,440)
4 Pipe removal	(\$6,435,840)
Total:	(\$6,653,760)

C. Option III (a)

1 Remote valves	(\$7,680)
2 Remote M&R stations (valves, pipe)	(\$12,800)
3 Pipe (misc. removal)	(\$197,440)
4 Pipe removal	(\$606,880)
Total:	(\$824,800)

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**II. B. Scrap steel (continued)**

**Summary Scrap Steel Salvage**

II. Jointly-owned facilities (33.24%)

A Option I (b)

1	Remote valves	(\$15,520)
2	Remote M&R stations (valves, pipe)	(\$24,000)
3	Pipe (misc. removal)	(\$282,400)
4	Pipe removal (No pipe removed)	
		Total: (\$321,920)

B. Option II (b)

1	Remote valves	(\$15,520)
2	Remote M&R stations (valves, pipe)	(\$24,000)
3	Pipe (misc. removal)	(\$282,400)
4	Pipe removal	(\$7,558,240)
		Total: (\$7,880,160)

C. Option III (b)

1	Remote valves	(\$15,520)
2	Remote M&R stations (valves, pipe)	(\$24,000)
3	Pipe (misc. removal)	(\$282,400)
4	Pipe removal	(\$915,840)
		Total: (\$1,237,760)

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### L. M&R stations

##### 1. Small M&R stations

Description of Work:

Detailed cost estimate below reflects work required to retire a typical small M&R station. Work includes ROW fence removal, excavation, removal of valves, blowdowns, meter piping and equipment, removal of meter and control building(s), capping pipelines, excavation of gravel, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

1. Remove ROW fence and access work site (1/2 day)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	5	\$49.90	\$249
flatbed truck	1	5	\$24.00	\$120
lowboy	1	5	\$53.34	\$267
3/4 ton pick-up with trailer	1	5	\$22.79	\$114
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$57
Subtotal:				\$905

Labor	No.	Hours	Rate	Total	
operator	1	5	\$60.41	\$302	
teamster	2	5	\$41.32	\$413	
pipefitter/welder	1	5	\$57.06	\$285	
helper	1	5	\$39.94	\$200	
laborer	4	5	\$43.88	\$878	
foreman	1	5	\$61.83	\$309	
per diem	1/2 day	crew size:	10	\$90.00	\$450
Subtotal:				\$2,837	

Material	Total
allow 2% of labor	\$57
Subtotal:	\$57

Total Direct Costs (1) = \$3,799

2. Excavate, remove valves and blowdowns, cap pipe ends, demolish meter and control building(s), remove meter run (5 days).

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C w hammer	1	50	\$73.90	\$3,695
hydrocrane, Grove 30 ton	1	50	\$66.54	\$3,327
flatbed truck	1	50	\$24.00	\$1,200
3/4 ton pick-up with trailer	2	50	\$22.79	\$2,279
1/2 ton pickup with 4wd	2	50	\$9.85	\$985
small tools, 2% of labor				\$701
Subtotal:				\$12,188

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. L. 1. Small M&R stations (continued)**

Line Item 2 (continued)

Labor	No.	Hours	Rate	Total
operator	1	50	\$60.41	\$3,020
operator (hydrocrane)	1	50	\$60.41	\$3,020
teamster	1	50	\$41.32	\$2,066
pipefitter/welder	2	50	\$57.06	\$5,706
helper	2	50	\$39.94	\$3,994
laborer	4	50	\$43.88	\$8,776
foreman	1	50	\$61.83	\$3,091
per diem	5 days	crew size:	12	\$90.00
				<u>\$5,400</u>
			Subtotal:	\$35,073
Material				Total
allow 2% of labor				<u>\$701</u>
			Subtotal:	\$701
Total Direct Costs (2) =				\$47,962

3. Remove gravel and miscellaneous debris (1 day)

Equipment	No.	Hours	Rate	Total
track loader, Cat 953C	1	10	\$57.52	\$575
dump truck 14 cy	2	10	\$35.10	\$702
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				<u>\$90</u>
			Subtotal:	\$1,565
Labor	No.	Hours	Rate	Total
operator	1	10	\$60.41	\$604
teamster	2	10	\$41.32	\$826
laborer	4	10	\$43.88	\$1,755
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	8	\$90.00
				<u>\$720</u>
			Subtotal:	\$4,524
Material				Total
Miscellaneous (2% of labor)				<u>\$90</u>
			Subtotal:	\$90
Total Direct Costs (3) =				\$6,179

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. L. 1. Small M&R stations (continued)

4. Restore site (1 day)

Equipment	No.	Hours	Rate	Total
track loader, Cat 953C	1	10	\$57.52	\$575
flatbed truck	1	10	\$24.00	\$240
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$80
Subtotal:				\$1,093

Labor	No.	Hours	Rate	Total	
operator	1	10	\$60.41	\$604	
teamster	1	10	\$41.32	\$413	
laborer	4	10	\$43.88	\$1,755	
foreman	1	10	\$61.83	\$618	
per diem	1 day	crew size:	7	\$90.00	\$630
Subtotal:				\$4,021	

Material	Total
allow \$ 5000 for topsoil, seed, fertilizer, straw bales, etc.	\$5,000
Sales tax @ 5%	\$250
Subtotal:	\$5,250

Total Direct Costs (4) = \$10,363

### Summary: Small M&R Stations

A. Pipeline contractor costs

1. Remove ROW fence and access work site	\$3,799
2. Excavate, remove valves and blowdowns, cap pipe ends	\$47,962
3. Remove gravel and miscellaneous debris	\$6,179
4. Restore site	\$10,363
Pipeline contractor direct costs:	\$68,304
5% Mobilization	\$3,415
Subtotal:	\$71,719
15% Contractor overhead:	\$10,758
Subtotal:	\$82,477
10% Contractor profit:	\$8,248
Total pipeline contractor costs:	\$90,724

B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

Total environmental contractor cost:	\$4,536
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**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. L. 1. Small M&R stations (continued)**

C. Pipeline company inspection costs		
1. Number of days per site		7.5
2. Company cost per day		\$500
Total company inspection cost per site:		\$3,750
D. Pipeline company management and overhead costs (15% of A + B + C)		
		\$14,852
Total management and overhead cost:		\$14,852
Total cost to retire a small M&R station (A + B + C + D):		\$113,862

**Wholly-owned facilities (24" Mainline and associated laterals)**

	No. of small M&R stations	6
Item L. 1.	Total estimated cost to retire small M&R stations	\$683,172

**Jointly-owned facilities (30" Mainline and associated laterals)**

	No. of small M&R stations	9
Item L. 1.	Total estimated cost to retire small M&R stations:	\$1,024,758

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### G. Small stream crossings

Description of Work:

Detailed cost estimate below reflects work required to retire a typical small stream crossing (100 feet). River and large stream crossings are not included in this line item. Work includes, excavation and shoring of trench, capping pipe ends, filling pipe with grout, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

1. Remove ROW fence and access work sites (1/2 day)

Equipment	No.	Hours	Rate	Total
dozer, cat D-6R	1	5	\$89.97	\$450
lowboy	1	5	\$53.34	\$267
flatbed truck	1	5	\$24.00	\$120
3/4 ton pick-up with trailer	1	5	\$22.79	\$114
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$57
Subtotal:				\$1,106

Labor	No.	Hours	Rate	Total
operator	1	5	\$60.41	\$302
teamster	2	5	\$41.32	\$413
pipefitter/welder	1	5	\$57.06	\$285
helper	1	5	\$39.94	\$200
laborer	4	5	\$43.88	\$878
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	10	\$90.00
Subtotal:				\$2,837

Material	Total
allow 2% of labor	\$57
Subtotal:	
	\$57

Total Direct Costs (1) = \$3,999

2. Excavate and cap pipe ends (2 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	20	\$49.90	\$998
flatbed truck	1	20	\$24.00	\$480
3/4 ton pick-up with trailer	1	20	\$22.79	\$456
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$207
Subtotal:				\$2,535

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. G. Small stream crossings (continued)**

Line Item 2 (continued)

Labor	No.	Hours	Rate	Total
operator	1	20	\$60.41	\$1,208
teamster	1	20	\$41.32	\$826
pipefitter/welder	1	20	\$57.06	\$1,141
helper	1	20	\$39.94	\$799
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem	2 days	crew size:	9	\$90.00
			Subtotal:	\$10,341
Material				Total
allow 2% of labor				\$207
			Subtotal:	\$207
Total Direct Costs (2) =				\$13,083

3. Fill pipe with grout, backfill trench, grade disturbed areas (1 day)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	10	\$49.90	\$499
dump truck 8 cy	1	10	\$23.72	\$237
grout pump, trailer mounted	1	10	\$12.88	\$129
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$80
			Subtotal:	\$1,142
Labor	No.	Hours	Rate	Total
operator	1	10	\$60.41	\$604
teamster (dump)	1	10	\$41.32	\$413
laborer	4	10	\$43.88	\$1,755
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	7	\$90.00
			Subtotal:	\$4,021
Material				Total
Grout (cy)	\$98	13 cy	(Note: assumes 24" pipe)	\$1,274
Sales tax @ 5%				\$64
Miscellaneous (2% of labor)				\$80
			Subtotal:	\$1,418
Total Direct Costs (3) =				\$6,581

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. G. Small stream crossings (continued)**

4. Restore sites (1/2 day)

Equipment	No.	Hours	Rate	Total
flatbed truck	1	5	\$24.00	\$120
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$33
			Subtotal:	\$252

Labor	No.	Hours	Rate	Total
teamster	1	5	\$41.32	\$207
laborer	4	5	\$43.88	\$878
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	6	\$90.00
			Subtotal:	\$1,663

Material	Total
allow \$ 1000 for topsoil, seed, fertilizer, straw bales, etc.	\$1,000
Sales tax @ 5%	\$50
	Subtotal:
	\$1,050

Total Direct Costs (4) = \$2,965

**Summary: Small Stream Crossings**

A. Pipeline contractor costs

1. Remove ROW fence and access work sites	\$3,999
2. Excavate and cap pipe ends	\$13,083
3. Fill pipe with grout, backfill trench, grade disturbed areas	\$6,581
4. Restore sites	\$2,965
	Subtotal:
	\$26,628
Pipeline contractor direct costs:	\$26,628
5% Mobilization	\$1,331
	Subtotal:
	\$27,960
15% Contractor overhead:	\$4,194
	Subtotal:
	\$32,154
10% Contractor profit:	\$3,215
Total pipeline contractor costs:	\$35,369

B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

	\$1,768
Total environmental contractor cost:	\$1,768

C. Pipeline company inspection costs

1. Number of days per site	4
2. Company cost per day	\$500
Total company inspection cost per site:	\$2,000

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. G. Small stream crossings (continued)**

D. Pipeline company management and overhead costs (15% of A + B + C)		\$5,871
	Total management and overhead cost:	\$5,871
Total cost to retire a small stream crossing (A + B + C + D):		\$45,008

**Wholly-owned facilities (24" Mainline and associated laterals)**

No. of small stream crossings:		188
Item G. Total estimated cost to retire small stream crossings:		\$8,461,504

**Jointly-owned facilities (30" Mainline and associated laterals)**

No. of small stream crossings:		106
Item G. Total estimated cost to retire small stream crossings:		\$4,770,848

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option I**  
(Minimum pipe removal footage)

	<u>Estimated Cost (December 2007\$)</u>		
	<u>Option I (a)</u>	<u>Option I (b)</u>	<u>Option I</u>
	(100% PNGTS)	(33.24% PNGTS)	
	<u>Subtotal</u>	<u>Subtotal</u>	<u>Total</u>
<b>I. Pipeline Retirement</b>			
A. Clean and purge pipelines	\$234,725	\$44,209	\$278,934
B. Fill pipelines with nitrogen	\$4,028,575	\$897,984	\$4,926,559
C. Pipe removal	\$343,694		\$343,694
D. Pipe handling and storage	\$29,570		\$29,570
E. Uncased highway/railroad crossings			
1 Uncased highway crossings	\$7,831,392	\$1,870,082	\$9,701,474
2 Uncased railroad crossings	\$45,008	\$59,843	\$104,851
F. Cased highway/railroad crossings			
1 Cased highway crossings	\$1,721,400	\$617,969	\$2,339,369
2 Cased railroad crossings	\$619,704	\$160,214	\$779,918
G. Small stream crossings	\$8,461,504	\$1,585,830	\$10,047,334
H. River and large stream crossings			
1 HDD crossings	\$1,157,916	\$224,520	\$1,382,436
2 Trench crossings	\$1,600,560	\$299,265	\$1,899,825
I. Remote valve sites	\$367,080	\$130,152	\$497,232
J. Cathodic protection facilities			
1 Remove test sites	\$90,528	\$19,572	\$110,100
2 Remove rectifiers	\$15,057	\$8,580	\$23,637
K. Pipeline markers	\$118,314	\$22,281	\$140,595
L. M&R stations			
1 Small M&R stations	\$683,172	\$340,630	\$1,023,802
2 Medium M&R stations	\$230,529	\$229,884	\$460,413
<b>Total I:</b>	<b>\$27,578,728</b>	<b>\$6,511,013</b>	<b>\$34,089,742</b>
<b>II. Salvage</b>			
A. Scrap steel	(\$310,720)	(\$107,006)	(\$417,726)
B. Line pack	(\$1,552,694)	(\$350,629)	(\$1,903,322)
<b>Total II:</b>	<b>(\$1,863,414)</b>	<b>(\$457,635)</b>	<b>(\$2,321,049)</b>
<b>III. Contingency (10% of I above)</b>			
	\$2,757,873	\$651,101	\$3,408,974
<b>Total III:</b>	<b>\$2,757,873</b>	<b>\$651,101</b>	<b>\$3,408,974</b>
<b>Grand Total III:</b>	<b>\$28,473,187</b>	<b>\$6,704,479</b>	<b>\$35,177,667</b>

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option I (a) - 24" Mainline**  
(100% PNGTS ownership)

	<u>Option I (a)</u> Estimated PNGTS Cost
<b>I. Pipeline Retirement</b>	
A. Clean and purge pipelines	\$234,725
B. Fill pipelines with nitrogen	\$4,028,575
C. Pipe removal	\$343,694
D. Pipe handling and storage	\$29,570
E. Uncased highway/railroad crossings	
1 Uncased highway crossings	\$7,831,392
2 Uncased railroad crossings	\$45,008
F. Cased highway/railroad crossings	
1 Cased highway crossings	\$1,721,400
2 Cased railroad crossings	\$619,704
G. Small stream crossings	\$8,461,504
H. River and large stream crossings	
1 HDD crossings	\$1,157,916
2 Trench crossings	\$1,600,560
I. Remote valve sites	\$367,080
J. Cathodic protection facilities	
1 Remove test sites	\$90,528
2 Remove rectifiers	\$15,057
K. Pipeline markers	\$118,314
L. M&R stations	
1 Small M&R stations	\$683,172
2 Medium M&R stations	\$230,529
<b>Total I:</b>	<u>\$27,578,728</u>
<b>II. Salvage</b>	
A. Scrap steel	(\$310,720)
B. Line pack	(\$1,552,694)
<b>Total II:</b>	<u>(\$1,863,414)</u>
<b>III. Contingency (10% of I above)</b>	
<b>Total III:</b>	<u>\$2,757,873</u>
<b>Grand Total III:</b>	\$28,473,187

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option I (b) - 30" Mainline  
(33.24% PNGTS Ownership)**

	<u>Option I (b)</u> Estimated Total cost	<u>1/</u> <u>Option I (b)</u> Estimated PNGTS Cost
<b>I. Pipeline Retirement</b>		
A. Clean and purge pipelines	\$133,000	\$44,209
B. Fill pipelines with nitrogen	\$2,701,515	\$897,984
C. Pipe removal		
D. Pipe handling and storage		
E. Uncased highway/railroad crossings		
1 Uncased highway crossings	\$5,626,000	\$1,870,082
2 Uncased railroad crossings	\$180,032	\$59,843
F. Cased highway/railroad crossings		
1 Cased highway crossings	\$1,859,112	\$617,969
2 Cased railroad crossings	\$481,992	\$160,214
G. Small stream crossings	\$4,770,848	\$1,585,830
H. River and large stream crossings		
1 HDD crossings	\$675,451	\$224,520
2 Trench crossings	\$900,315	\$299,265
I. Remote valve sites	\$391,552	\$130,152
J. Cathodic protection facilities		
1 Remove test sites	\$58,880	\$19,572
2 Remove rectifiers	\$25,812	\$8,580
K. Pipeline markers	\$67,032	\$22,281
L. M&R stations		
1 Small M&R stations	\$1,024,758	\$340,630
2 Medium M&R stations	\$691,587	\$229,884
<b>Total I:</b>	\$19,587,886	\$6,511,013
<b>II. Salvage</b>		
A. Scrap steel	(\$321,920)	(\$107,006)
B. Line pack	(\$1,054,840)	(\$350,629)
<b>Total II:</b>	(\$1,376,760)	(\$457,635)
<b>III. Contingency</b> (10% of I above)		
<b>Total III:</b>	\$1,958,789	\$651,101
<b>Grand Total III:</b>	\$20,169,915	\$6,704,479

Note 1: PNGTS percentage ownership: 33.24%

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option II**  
(Maximum pipe removal footage)

		<u>Estimated Cost (December 2007\$)</u>		
		<u>Option II (a)</u>	<u>Option II (b)</u>	<u>Option II</u>
		(100% PNGTS)	(33.24% PNGTS)	
		<u>Subtotal</u>	<u>Subtotal</u>	<u>Total</u>
<b>I. Pipeline Retirement</b>				
A.	Clean and purge pipelines	\$234,725	\$44,209	\$278,934
B.	Fill pipelines with nitrogen (Not applicable)			
C.	Pipe removal	\$23,863,958	\$6,370,639	\$30,234,597
D.	Pipe handling and storage	\$2,055,686	\$378,394	\$2,434,080
E.	Uncased highway/railroad crossings			
1	Uncased highway crossings	\$7,831,392	\$1,870,082	\$9,701,474
2	Uncased railroad crossings	\$45,008	\$59,843	\$104,851
F.	Cased highway/railroad crossings			
1	Cased highway crossings	\$1,721,400	\$617,969	\$2,339,369
2	Cased railroad crossings	\$619,704	\$160,214	\$779,918
G.	Small stream crossings	\$8,461,504	\$1,585,830	\$10,047,334
H.	River and large stream crossings			
1	HDD crossings	\$1,157,916	\$224,520	\$1,382,436
2	Trench crossings	\$1,600,560	\$299,265	\$1,899,825
I.	Remote valve sites	\$367,080	\$130,152	\$497,232
J.	Cathodic protection facilities			
1	Remove test sites	\$90,528	\$19,572	\$110,100
2	Remove rectifiers	\$15,057	\$8,580	\$23,637
K.	Pipeline markers	\$118,314	\$22,281	\$140,595
L.	M&R stations			
1	Small M&R stations	\$683,172	\$340,630	\$1,023,802
2	Medium M&R stations	\$230,529	\$229,884	\$460,413
	<b>Total I:</b>	<u>\$49,096,533</u>	<u>\$12,362,063</u>	<u>\$61,458,597</u>
<b>II. Salvage</b>				
A.	Scrap steel	(\$6,653,760)	(\$2,619,365)	(\$9,273,125)
B.	Line pack	(\$1,552,694)	(\$350,629)	(\$1,903,322)
	<b>Total II:</b>	<u>(\$8,206,454)</u>	<u>(\$2,969,994)</u>	<u>(\$11,176,448)</u>
<b>III. Contingency</b> (10% of I above)				
		\$4,909,653	\$1,236,206	\$6,145,860
	<b>Total III:</b>	<u>\$4,909,653</u>	<u>\$1,236,206</u>	<u>\$6,145,860</u>
	<b>Grand Total III:</b>	\$45,799,732	\$10,628,275	\$56,428,009

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option II (a) - 24" Mainline**  
(100% PNGTS ownership)

	<u>Option II (a)</u> Estimated PNGTS Cost
<b>I. Pipeline Retirement</b>	
A. Clean and purge pipelines	\$234,725
B. Fill pipelines with nitrogen (Not applicable)	
C. Pipe removal	\$23,863,958
D. Pipe handling and storage	\$2,055,686
E. Uncased highway/railroad crossings	
1 Uncased highway crossings	\$7,831,392
2 Uncased railroad crossings	\$45,008
F. Cased highway/railroad crossings	
1 Cased highway crossings	\$1,721,400
2 Cased railroad crossings	\$619,704
G. Small stream crossings	\$8,461,504
H. River and large stream crossings	
1 HDD crossings	\$1,157,916
2 Trench crossings	\$1,600,560
I. Remote valve sites	\$367,080
J. Cathodic protection facilities	
1 Remove test sites	\$90,528
2 Remove rectifiers	\$15,057
K. Pipeline markers	\$118,314
L. M&R stations	
1 Small M&R stations	\$683,172
2 Medium M&R stations	\$230,529
	<b>Total I:</b> <u>\$49,096,533</u>
<b>II. Salvage</b>	
A. Scrap steel	(\$6,653,760)
B. Line pack	(\$1,552,694)
	<b>Total II:</b> <u>(\$8,206,454)</u>
<b>III. Contingency (10% of I above)</b>	
	<u>\$4,909,653</u>
	<b>Total III:</b> <u>\$4,909,653</u>
	<b>Grand Total III:</b> <u>\$45,799,732</u>

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option II (b) - 30" Mainline  
(33.24% PNGTS Ownership)**

		<u>1/</u>	<u>Option II (b)</u>	<u>Option II (b)</u>
		Estimated	Estimated	PNGTS Cost
		Total cost		
<b>I. Pipeline Retirement</b>				
A.	Clean and purge pipelines	\$133,000	\$44,209	
B.	Fill pipelines with nitrogen (Not applicable)			
C.	Pipe removal	\$19,165,582	\$6,370,639	
D.	Pipe handling and storage	\$1,138,370	\$378,394	
E.	Uncased highway/railroad crossings			
	1 Uncased highway crossings	\$5,626,000	\$1,870,082	
	2 Uncased railroad crossings	\$180,032	\$59,843	
F.	Cased highway/railroad crossings			
	1 Cased highway crossings	\$1,859,112	\$617,969	
	2 Cased railroad crossings	\$481,992	\$160,214	
G.	Small stream crossings	\$4,770,848	\$1,585,830	
H.	River and large stream crossings			
	1 HDD crossings	\$675,451	\$224,520	
	2 Trench crossings	\$900,315	\$299,265	
I.	Remote valve sites	\$391,552	\$130,152	
J.	Cathodic protection facilities			
	1 Remove test sites	\$58,880	\$19,572	
	2 Remove rectifiers	\$25,812	\$8,580	
K.	Pipeline markers	\$67,032	\$22,281	
L.	M&R stations			
	1 Small M&R stations	\$1,024,758	\$340,630	
	2 Medium M&R stations	\$691,587	\$229,884	
	<b>Total I:</b>	\$37,190,323	\$12,362,063	
<b>II. Salvage</b>				
A.	Scrap steel	(\$7,880,160)	(\$2,619,365)	
B.	Line pack	(\$1,054,840)	(\$350,629)	
	<b>Total II:</b>	(\$8,935,000)	(\$2,969,994)	
<b>III. Contingency</b>	(10% of I above)			
		\$3,719,032	\$1,236,206	
	<b>Total III:</b>	\$3,719,032	\$1,236,206	
	<b>Grand Total III:</b>	\$31,974,355	\$10,628,275	

Note 1: PNGTS percentage ownership: 33.24%

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option III**  
(Intermediate pipe removal footage)

				<u>Estimated Cost (December 2007\$)</u>		
				<u>Option III (a)</u>	<u>Option III (b)</u>	<u>Option III</u>
				(100% PNGTS)	(33.24% PNGTS)	
				<u>Subtotal</u>	<u>Subtotal</u>	<u>Total</u>
<b>I. Pipeline Retirement</b>						
A.	Clean and purge pipelines			\$234,725	\$44,209	\$278,934
B.	Fill pipelines with nitrogen			\$3,649,415	\$784,554	\$4,433,969
C.	Pipe removal			\$2,249,910	\$778,481	\$3,028,391
D.	Pipe handling and storage			\$193,847	\$48,042	\$241,889
E.	Uncased highway/railroad crossings					
1	Uncased highway crossings			\$7,831,392	\$1,870,082	\$9,701,474
2	Uncased railroad crossings			\$45,008	\$59,843	\$104,851
F.	Cased highway/railroad crossings					
1	Cased highway crossings			\$1,721,400	\$617,969	\$2,339,369
2	Cased railroad crossings			\$619,704	\$160,214	\$779,918
G.	Small stream crossings			\$8,461,504	\$1,585,830	\$10,047,334
H.	River and large stream crossings					
1	HDD crossings			\$1,157,916	\$224,520	\$1,382,436
2	Trench crossings			\$1,600,560	\$299,265	\$1,899,825
I.	Remote valve sites			\$367,080	\$130,152	\$497,232
J.	Cathodic protection facilities					
1	Remove test sites			\$90,528	\$19,572	\$110,100
2	Remove rectifiers			\$15,057	\$8,580	\$23,637
K.	Pipeline markers			\$118,314	\$22,281	\$140,595
L.	M&R stations					
1	Small M&R stations			\$683,172	\$340,630	\$1,023,802
2	Medium M&R stations			\$230,529	\$229,884	\$460,413
	<b>Total I:</b>			<u>\$29,270,061</u>	<u>\$7,224,107</u>	<u>\$36,494,168</u>
<b>II. Salvage</b>						
A.	Scrap steel			(\$824,800)	(\$411,431)	(\$1,236,231)
B.	Line pack			(\$1,552,694)	(\$350,629)	(\$1,903,322)
	<b>Total II:</b>			<u>(\$2,377,494)</u>	<u>(\$762,060)</u>	<u>(\$3,139,554)</u>
<b>III. Contingency</b> (10% of I above)						
				\$2,927,006	\$722,411	\$3,649,417
	<b>Total III:</b>			<u>\$2,927,006</u>	<u>\$722,411</u>	<u>\$3,649,417</u>
	<b>Grand Total III:</b>			\$29,819,573	\$7,184,458	\$37,004,031

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option III (a) - 24" Mainline  
(100% PNGTS ownership)**

	<u>Option III (a) Estimated PNGTS Cost</u>
<b>I. Pipeline Retirement</b>	
A. Clean and purge pipelines	\$234,725
B. Fill pipelines with nitrogen	\$3,649,415
C. Pipe removal	\$2,249,910
D. Pipe handling and storage	\$193,847
E. Uncased highway/railroad crossings	
1 Uncased highway crossings	\$7,831,392
2 Uncased railroad crossings	\$45,008
F. Cased highway/railroad crossings	
1 Cased highway crossings	\$1,721,400
2 Cased railroad crossings	\$619,704
G. Small stream crossings	\$8,461,504
H. River and large stream crossings	
1 HDD crossings	\$1,157,916
2 Trench crossings	\$1,600,560
I. Remote valve sites	\$367,080
J. Cathodic protection facilities	
1 Remove test sites	\$90,528
2 Remove rectifiers	\$15,057
K. Pipeline markers	\$118,314
L. M&R stations	
1 Small M&R stations	\$683,172
2 Medium M&R stations	\$230,529
<b>Total I:</b>	\$29,270,061
<b>II. Salvage</b>	
A. Scrap steel	(\$824,800)
B. Line pack	(\$1,552,694)
<b>Total II:</b>	(\$2,377,494)
<b>III. Contingency (10% of I above)</b>	
<b>Total III:</b>	\$2,927,006
	\$2,927,006
<b>Grand Total III:</b>	\$29,819,573

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**Summary Option III (b) - 30" Mainline  
(33.24% PNGTS Ownership)**

	<u>1/</u>	
	<u>Option III (b)</u>	<u>Option III (b)</u>
	Estimated	Estimated
	<u>Total cost</u>	<u>PNGTS Cost</u>
<b>I. Pipeline Retirement</b>		
A. Clean and purge pipelines	\$133,000	\$44,209
B. Fill pipelines with nitrogen	\$2,360,271	\$784,554
C. Pipe removal	\$2,342,002	\$778,481
D. Pipe handling and storage	\$144,529	\$48,042
E. Uncased highway/railroad crossings		
1 Uncased highway crossings	\$5,626,000	\$1,870,082
2 Uncased railroad crossings	\$180,032	\$59,843
F. Cased highway/railroad crossings		
1 Cased highway crossings	\$1,859,112	\$617,969
2 Cased railroad crossings	\$481,992	\$160,214
G. Small stream crossings	\$4,770,848	\$1,585,830
H. River and large stream crossings		
1 HDD crossings	\$675,451	\$224,520
2 Trench crossings	\$900,315	\$299,265
I. Remote valve sites	\$391,552	\$130,152
J. Cathodic protection facilities		
1 Remove test sites	\$58,880	\$19,572
2 Remove rectifiers	\$25,812	\$8,580
K. Pipeline markers	\$67,032	\$22,281
L. M&R stations		
1 Small M&R stations	\$1,024,758	\$340,630
2 Medium M&R stations	\$691,587	\$229,884
<b>Total I:</b>	<u>\$21,733,173</u>	<u>\$7,224,107</u>
<b>II. Salvage</b>		
A. Scrap steel	(\$1,237,760)	(\$411,431)
B. Line pack	(\$1,054,840)	(\$350,629)
<b>Total II:</b>	<u>(\$2,292,600)</u>	<u>(\$762,060)</u>
<b>III. Contingency (10% of I above)</b>		
<b>Total III:</b>	<u>\$2,173,317</u>	<u>\$722,411</u>
<b>Grand Total III:</b>	\$21,613,890	\$7,184,458

Note 1: PNGTS Percentage ownership: 33.24%

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### H. River and large stream crossings

##### 2. Trench crossings

###### Description of Work:

Detailed cost estimate below reflects work required to retire a typical trench crossing (125 feet). Work includes ROW fence removal, excavation and shoring of trench, capping pipe ends, filling pipe with grout, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

###### 1. Remove ROW fence and access work sites (2 days)

Equipment	No.	Hours	Rate	Total
dozer, cat D-6R	1	20	\$89.97	\$1,799
lowboy	1	20	\$53.34	\$1,067
flatbed truck	1	20	\$24.00	\$480
3/4 ton pick-up with trailer	1	20	\$22.79	\$456
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$227
Subtotal:				\$4,423

Labor	No.	Hours	Rate	Total
operator	1	20	\$60.41	\$1,208
teamster	2	20	\$41.32	\$1,653
pipefitter/welder	1	20	\$57.06	\$1,141
helper	1	20	\$39.94	\$799
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem	2 days	crew size:	\$90.00	\$1,800
Subtotal:				\$11,348

Material	Total
allow 2% of labor	\$227
Subtotal:	\$227

Total Direct Costs (1) = \$15,998

###### 2. Excavate and cap pipe ends (2 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	20	\$49.90	\$998
flatbed truck	1	20	\$24.00	\$480
lowboy	1	20	\$53.34	\$1,067
3/4 ton pick-up with trailer	1	20	\$22.79	\$456
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$227
Subtotal:				\$3,622

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. H. 2. Trench crossings (continued)**

Line Item 2 (continued)

Labor		No.	Hours	Rate	Total
operator		1	20	\$60.41	\$1,208
teamster		2	20	\$41.32	\$1,653
pipefitter/welder		1	20	\$57.06	\$1,141
helper		1	20	\$39.94	\$799
laborer		4	20	\$43.88	\$3,510
foreman		1	20	\$61.83	\$1,237
per diem	2 days	crew size: 10		\$90.00	\$1,800
Subtotal:					\$11,348

Material	Total
allow 2% of labor	\$227
Subtotal:	\$227

Total Direct Costs (2) = \$15,196

3. Fill pipe with grout (1 day)

Equipment	No.	Hours	Rate	Total
grout pump, trailer mounted	1	10	\$30.10	\$301
lights, trailer mounted	1	10	\$6.84	\$68
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$70
Subtotal:				\$636

Labor		No.	Hours	Rate	Total
operator		1	10	\$58.16	\$582
laborer		4	10	\$43.88	\$1,755
foreman		1	10	\$61.83	\$618
per diem	1 day	crew size: 6		\$90.00	\$540
Subtotal:					\$3,495

Material	Total
Grout (cy) \$98 16 cy (Note: assumes 24" pipe)	\$1,568
Sales tax @ 5%	\$78
Miscellaneous (2% of labor)	\$70
Subtotal:	\$1,716

Total Direct Costs (3) = \$5,848

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. H. 2. Trench crossings (continued)**

4. Backfill trench, grade disturbed areas (2 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	20	\$49.90	\$998
dump truck 8 cy	1	20	\$23.72	\$474
lowboy	1	20	\$53.34	\$1,067
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$181
Subtotal:				\$3,114

Labor	No.	Hours	Rate	Total	
operator	1	20	\$60.41	\$1,208	
teamster	2	20	\$41.32	\$1,653	
laborer	4	20	\$43.88	\$3,510	
foreman	1	20	\$61.83	\$1,237	
per diem	2 days	crew size:	8	\$90.00	\$1,440
Subtotal:				\$9,048	

Material	Total
Miscellaneous (2% of labor)	\$181
Subtotal:	\$181

Total Direct Costs (4) = \$12,343

5. Restore sites (2 days)

Equipment	No.	Hours	Rate	Total
flatbed truck	1	20	\$24.00	\$480
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$133
Subtotal:				\$1,007

Labor	No.	Hours	Rate	Total	
teamster	1	20	\$41.32	\$826	
laborer	4	20	\$43.88	\$3,510	
foreman	1	20	\$61.83	\$1,237	
per diem	2 days	crew size:	6	\$90.00	\$1,080
Subtotal:				\$6,653	

Material	Total
allow \$ 2000 for topsoil, seed, fertilizer, straw bales, etc.	\$2,000
Sales tax @ 5%	\$100
Subtotal:	\$2,100

Total Direct Costs (5) = \$9,760

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. H. 2. Trench crossings (continued)

#### Summary: River and Large Stream Trench Crossings

A. Pipeline contractor costs		
1. Remove ROW fence and access work sites	\$15,998	
2. Excavate and cap pipe ends	\$15,196	
3. Fill pipe with grout	\$5,848	
4. Backfill trench, grade disturbed areas	\$12,343	
5. Restore sites	\$9,760	
	\$59,145	Pipeline contractor direct costs:
	\$2,957	5% Mobilization
	\$62,102	Subtotal:
	\$9,315	15% Contractor overhead:
	\$71,417	Subtotal:
	\$7,142	10% Contractor profit:
	\$78,559	Total pipeline contractor costs:
B. Environmental contractor costs (5% of pipeline contractor costs)		
This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.		
	\$3,928	
	\$3,928	Total environmental contractor cost:
C. Pipeline company inspection costs		
1. Number of days per site	9	
2. Company cost per day	\$500	
	\$4,500	Total company inspection cost per site:
D. Pipeline company management and overhead costs (15% of A + B + C)		
	\$13,048	
	\$13,048	Total management and overhead cost:
	\$100,035	Total cost to retire a trench crossing (A + B + C + D):

#### **Wholly-owned facilities (24" Mainline and associated laterals)**

No. of trench crossings:	16
Item H. 2. Total estimated cost to retire trench crossings:	\$1,600,560

#### **Jointly-owned facilities (30" Mainline and associated laterals)**

No. of trench crossings:	9
Item H. 2. Total estimated cost to retire trench crossings:	\$900,315

## Portland Natural Gas Transmission System Final Abandonment Estimate

### I. Pipeline Retirement

#### E. Uncased highway/railroad crossings

##### Description of Work:

Detailed cost estimate below reflects work required to retire a typical uncased highway/railroad crossing (100 ft). Work includes ROW fence removal, excavation and shoring of trench, capping pipe ends, filling pipe with grout, backfilling, and restoration of area. Estimate also includes environmental inspection, pipeline company inspection, and pipeline company management and overhead.

##### 1. Remove ROW fence and access work sites (1/2 day)

Equipment	No.	Hours	Rate	Total
dozer, cat D-6R	1	5	\$89.97	\$450
flatbed truck	1	5	\$24.00	\$120
lowboy	1	5	\$53.34	\$267
3/4 ton pick-up with trailer	1	5	\$22.79	\$114
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$57
Subtotal:				\$1,106

Labor	No.	Hours	Rate	Total
operator	1	5	\$60.41	\$302
teamster	2	5	\$41.32	\$413
pipefitter/welder	1	5	\$57.06	\$285
helper	1	5	\$39.94	\$200
laborer	4	5	\$43.88	\$878
foreman	1	5	\$61.83	\$309
per diem	1/2 day	crew size:	10	\$90.00
Subtotal:				\$2,837

Material	Total
allow 2% of labor	\$57
Subtotal:	\$57

Total Direct Costs (1) = \$3,999

##### 2. Excavate and cap pipe ends (2 days)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	20	\$49.90	\$998
flatbed truck	1	20	\$24.00	\$480
3/4 ton pick-up with trailer	1	20	\$22.79	\$456
1/2 ton pickup with 4wd	2	20	\$9.85	\$394
small tools, 2% of labor				\$207
Subtotal:				\$2,535

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. E. Uncased highway/railroad crossings (continued)**

Line Item 2 (continued)

Labor	No.	Hours	Rate	Total
operator	1	20	\$60.41	\$1,208
teamster	1	20	\$41.32	\$826
pipefitter/welder	1	20	\$57.06	\$1,141
helper	1	20	\$39.94	\$799
laborer	4	20	\$43.88	\$3,510
foreman	1	20	\$61.83	\$1,237
per diem	2 days	crew size:	9	\$90.00
			Subtotal:	\$10,341
Material				Total
allow 2% of labor				\$207
				Subtotal:
				\$207
Total Direct Costs (2) =				\$13,083

3. Fill pipe with grout, backfill trench, grade disturbed areas (1 day)

Equipment	No.	Hours	Rate	Total
backhoe, Cat 320C	1	10	\$49.90	\$499
dump truck 8 cy	1	10	\$23.72	\$237
grout pump, trailer mounted	1	10	\$12.88	\$129
1/2 ton pickup with 4wd	2	10	\$9.85	\$197
small tools, 2% of labor				\$80
				Subtotal:
				\$1,142
Labor	No.	Hours	Rate	Total
operator	1	10	\$60.41	\$604
teamster	1	10	\$41.32	\$413
laborer	4	10	\$43.88	\$1,755
foreman	1	10	\$61.83	\$618
per diem	1 day	crew size:	7	\$90.00
			Subtotal:	\$4,021
Material				Total
Grout (cy)	\$98	13 cy	(Note: assumes 24" pipe)	\$1,274
Sales tax @ 5%				\$64
Miscellaneous (2% of labor)				\$80
				Subtotal:
				\$1,418
Total Direct Costs (3) =				\$6,581

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. E. Uncased highway/railroad crossings (continued)**

4. Restore sites (1/2 day)

Equipment	No.	Hours	Rate	Total
flatbed truck	1	5	\$24.00	\$120
1/2 ton pickup with 4wd	2	5	\$9.85	\$99
small tools, 2% of labor				\$33
			Subtotal:	\$252

Labor	No.	Hours	Rate	Total
teamster	1	5	\$41.32	\$207
laborer	4	5	\$43.88	\$878
foreman	1	5	\$61.83	\$309
per diem            1/2 day            crew size:	6		\$90.00	\$270
			Subtotal:	\$1,663

Material	Total
allow \$ 1000 for topsoil, seed, fertilizer, straw bales, etc.	\$1,000
sales tax @ 5%	\$50
	Subtotal: \$1,050

Total Direct Costs (4) = \$2,965

**Summary: Uncased Highway/Railroad Crossings**

A. Pipeline contractor costs

1. Remove ROW fence and access work sites	\$3,999
2. Excavate and cap pipe ends	\$13,083
3. Fill pipe with grout, backfill trench, grade disturbed areas	\$6,581
4. Restore sites	\$2,965
	Pipeline contractor direct costs: \$26,628
	5% Mobilization \$1,331
	Subtotal: \$27,960
	15% Contractor overhead: \$4,194
	Subtotal: \$32,154
	10% Contractor profit: \$3,215
	Total pipeline contractor costs: \$35,369

B. Environmental contractor costs (5% of pipeline contractor costs)

This section of estimate reflects work performed by environmental contractor to check for the presence of hazardous materials. Work involves inspection, sampling, evaluation, and report writing.

	\$1,768
Total environmental contractor cost:	\$1,768

C. Pipeline company inspection costs

1. Number of days per site	4
2. Company cost per day	\$500
Total inspection costs per site:	\$2,000

**Portland Natural Gas Transmission System  
Final Abandonment Estimate**

**I. E. Uncased highway/railroad crossings (continued)**

D. Pipeline company management and overhead costs (15% of A + B + C)

	\$5,871
Total management and overhead cost:	\$5,871

Total cost to retire an uncased crossing (A + B + C + D):	\$45,008
---	----------

**Wholly-owned facilities (24" Mainline and associated laterals)**

No. of uncased highway crossings:	174
Item E. 1. Total estimated cost to retire uncased highway crossings:	\$7,831,392

No. of uncased railroad crossings:	1
Item E. 2. Total estimated cost to retire uncased railroad crossings:	\$45,008

**Jointly-owned facilities (30" Mainline and associated laterals)**

No. of uncased highway crossings:	125
Item E. 1. Total estimated cost to retire uncased highway crossings:	\$5,626,000

No. of uncased railroad crossings:	4
Item E. 2. Total estimated cost to retire uncased railroad crossings:	\$180,032

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General

#### A. Quantities

1	Total pipeline miles per PNGTS schematic		
	a. Wholly-owned facilities PNGTS ownership:	100.00%	<u>Miles</u>
	1 24" mainline		143.83
	2 8" Groveton lateral		0.66
	3 12" Rumford lateral		26.51
	4 12" Jay lateral		<u>16.78</u>
			Total: 187.78
	b. Jointly-owned facilities PNGTS ownership:	33.24%	
	1 30" mainline		100.56
	2 12" Westbrook lateral		3.84
	3 16" Newington lateral		1.20
	4 20" Haverhill lateral		<u>0.80</u>
			Total: 106.40
2	No. of uncased railroad/highway crossings		
	a. Wholly-owned facilities (24" and laterals)		
	1 Uncased highway crossings		<u>No.</u>
	a. 24" mainline		130
	b. 12" Rumford/Jay lateral		<u>44</u>
			Total: 174
	2 Uncased RR crossings		
	a. 24" mainline		1
	b. 12" Rumford/Jay lateral		<u>0</u>
			Total: 1
	b. Jointly-owned facilities (30" and laterals)		
	1 Uncased highway crossings		<u>No.</u>
	a. 30" mainline		119
	b. 12" Westbrook lateral		2
	c. 16" Newington lateral		<u>4</u>
			Total: 125
	2 Uncased RR crossings		
	a. 30" mainline		2
	b. 12" Westbrook lateral		<u>2</u>
			Total: 4
3	No. of cased railroad/highway crossings		
	a. Wholly-owned facilities (24" and laterals)		
	1 Cased highway crossings		<u>No.</u>
	a. 24" mainline		22
	b. 8" Groveton lateral		1
	c. 12" Rumford/Jay lateral		<u>2</u>
			Total: 25
	2 Cased RR crossings		
	a. 24" mainline		6
	b. 8" Groveton lateral		2
	c. 12" Rumford/Jay lateral		<u>1</u>
			Total: 9

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General - (continued)

b. Jointly-owned facilities (30" and laterals)		
1 Cased highway crossings	<u>No.</u>	
a. 30" mainline	25	
b. 12" Westbrook lateral	<u>2</u>	
	Total:	27
2 Cased RR crossings		
a. 30" mainline	<u>7</u>	
	Total:	7
4 No. of small stream crossings		
a. Wholly-owned facilities (24" and laterals)	<u>No.</u>	
1 Situations where grouting required	188	
b. Jointly-owned facilities (30" and laterals)		
1 Situations where grouting required	106	
5 No. of HDD crossings		
a. Wholly-owned facilities (24" and laterals)	<u>Dia.</u>	<u>Length</u>
1 Connecticut River	24"	984
2 Mohawk River	24"	908
3 Huckins Ponds	24"	1,352
4 Upper Ammonoosuc	24"	887
5 Upper Ammonoosuc	24"	981
6 Androscoggin	24"	845
7 Androscoggin	24"	1,095
8 Androscoggin	24"	862
9 Androscoggin	24"	952
10 Crooked	24"	1,196
11 Androscoggin	24"	1,656
12 Androscoggin	24"	<u>1,391</u>
	Average crossing length:	1,092
	Say:	1,100
b. Jointly-owned facilities (30" and laterals)	<u>Dia.</u>	<u>Length</u>
1 Squamscott River	30"	1,374
2 Piscataqua River	30"	2,838
3 Great Works River	30"	1,050
4 Great Works River	30"	1,529
5 Saco River	30"	1,872
6 Presumscott River	30"	1,753
7 Presumscott River (Westbrook Lateral)	12"	<u>700</u>
	Average crossing length:	1,588
	Say:	1,600

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General (continued)

6 No. of river and large stream trench crossings

a. Wholly-owned facilities (24" and laterals)	<u>Dia.</u>	<u>Length (ft)</u>
1 Sims Stream	24"	39
2 Philips Brook	24"	89
3 Peabody River	24"	169
4 Androscoggin River (lobe)	24"	130
5 Pleasant River	24"	47
6 Pleasant River	24"	28
7 Crooked River	24"	29
8 Crooked River	24"	48
9 Crooked River	24"	120
10 Crooked River	24"	45
11 Crooked River	24"	58
12 Crooked River	24"	93
13 Jordan River	24"	85
14 Pleasant River	24"	55
15 Concord River (Rum/Jay Lateral)	12"	59
16 Spear Stream (Rum/Jay Lateral)	12"	46
		Average crossing length: 71
		Say: 100

b. Jointly-owned facilities (30" and laterals)	<u>Dia.</u>	<u>Length (ft)</u>
1 Pow Wow River	30"	413
2 Exeter River	30"	95
3 Little River	30"	66
4 Winnicut River	30"	20
5 Merriland River	30"	50
6 Branch Brook	30"	24
7 Mausam River	30"	332
8 Kennebunk River	30"	56
9 Nonesuch River	30"	165
		Average crossing length: 136
		Say: 150

7 Pipe to be removed - Option I

a. Wholly-owned facilities (24" and laterals)	<u>Pipeline Dia.</u>	<u>Length</u>	<u>Length</u>
1 <u>Location of pipe segments removed</u>	<u>(in)</u>	<u>(ft)</u>	<u>(miles)</u>
a. St. Lawrence and Atlantic RR (14 properties)	24	7,257	1.37
b. White Mountain National Forest (4 parcels)	24	7,004	1.33
		Total:	2.70

Option I (a)	<u>Diameter</u>	<u>P/L Length</u>	<u>Allocation</u>	<u>Length</u>
<u>Allocation of pipe segments removed</u>	<u>(in)</u>	<u>(miles)</u>	<u>Factor</u>	<u>(miles)</u>
1 24" mainline	24	143.83	76.59%	2.07
2 8" Groveton lateral	8	0.66	0.35%	0.01
3 12" Rumford/Jay lateral	12	43.29	23.05%	0.62
		Total:	100.00%	2.70

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General (continued)

8 Pipe to be removed - Option III

a. Wholly-owned facilities (24" and laterals)	Pipeline Dia. (in)	Length (ft)	Length (miles)
1 Segments removed - Option III (a):			
a. St. Lawrence and Atlantic RR (14 properties)	24	7,257	1.37
b. White Mountain National Forest (4 parcels)	24	7,004	1.33
Total:		14,261	2.70

Option III (a) Allocation of pipe segments removed	Diameter (in)	P/L Length (miles)	Allocation Factor	Length (miles)
24" mainline	24	143.83	76.59%	2.07
8" Groveton lateral	8	0.66	0.35%	0.01
12" Rumford/Jay lateral	12	43.29	23.05%	0.62
Total:		187.78	100.00%	2.70

2 Class 3 pipe removed - Option III (a)	15.00 miles			
Allocation of Class III pipe removed	Diameter (in)	P/L Length (miles)	Allocation Factor	Length (miles)
a. 24" mainline	24	143.83	76.59%	11.49
b. 8" Groveton lateral	8	0.66	0.35%	0.05
c. 12" Rumford/Jay lateral	12	43.29	23.05%	3.46
Total:		187.78	100.00%	15.00

3 Total pipe removed - Option III (a)	Pipeline Dia. (in)	Length (miles)
a. 24" mainline	24	13.56
b. 8" Groveton lateral	8	0.06
c. 12" Rumford/Jay lateral	12	4.08
Total:		17.70

b. Jointly-owned facilities (30" and laterals)	Pipeline Dia. (in)	Length (miles)
1 Total pipe removed - Option III (b)		
a. 30" mainline	30	12.10
b. 12" Westbrook lateral	12	1.40
Total:		13.50

9 Pipe removal crossing adjustment factors (all Options)	Estimated No.	Average length (ft)	Length (ft)
a. Wholly-owned facilities (24" and laterals)			
1 Uncased hwy crossings (all diameters)	174	140	24,360
2 Uncased RR crossings (all diameters)	1	140	140
3 Cased hwy crossings (all diameters)	25	240	6,000
4 Cased RR crossings (all diameters)	9	240	2,160
5 Small stream crossings	188	140	26,320
6 River and large stream crossings			
7 a. HDD crossings	12	1,100	13,200
8 b. Trenched crossings	16	100	1,600
9 Total:	425		73,780

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General (continued)

9 a.	Wholly-owned facilities (24" and laterals) - (continued)	
10	Total crossing length (ft)	73,780
11	Crossing length (miles)	13.97
12	Total pipe length (miles)	187.78
13	Adjusted pipe removal length (miles)	173.81
14	Wholly-owned facilities crossing reduction factor	0.9256

9 Pipe removal crossing adjustment factors (all Options)

b.	Jointly-owned facilities (30" and laterals)	Estimated	Average length	Length
		No.	(ft)	(ft)
		<hr/>		
1	Uncased hwy crossings (all diameters)	125	140	17,500
2	Uncased RR crossings (all diameters)	4	140	560
3	Cased hwy crossings (all diameters)	27	240	6,480
4	Cased RR crossings (all diameters)	7	240	1,680
5	Small stream crossings	106	140	14,840
6	River and large stream crossings			
7	a. HDD crossings	7	1,600	11,200
8	b. Trenched crossings	9	150	1,350
9	Total:	<hr/> 285		53,610
10	Total crossing length (ft):			53,610
11	Crossing length (miles)			10.15
12	Total pipe length (miles)			106.40
13	Adjusted pipe removal length (miles)			96.25
14	Jointly-owned facilities crossing reduction factor			0.9046

10 Fill pipelines with nitrogen (assuming all pipelines are abandoned in-place)

a.	Wholly-owned facilities (24" and laterals)	
1	No. of crossings	<hr/> 425
	No. of segments for nitrogen fill:	425
b.	Jointly-owned facilities (30" and laterals)	
1	No. of crossings	<hr/> 285
	No. of segments for nitrogen fill:	285

11 Fill pipelines with nitrogen -- nitrogen fill reduction factor for Option I

a.	Wholly-owned facilities (24" and laterals)	
1	Total pipeline mileage	187.78
2	Pipeline to be removed	2.70
3	Pipelines to be abandoned in-place	185.08
4	Nitrogen fill reduction factor Option I (a)	0.9856
b.	Jointly-owned facilities (30" and laterals)	
1	Total pipeline mileage	106.40
2	Pipeline to be removed	0.00
3	Pipelines to be abandoned in-place	106.40
4	Nitrogen fill reduction factor Option I (b)	1.0000

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General (continued)

12 Fill pipelines with nitrogen -- nitrogen fill reduction factor for Option III

a. Wholly-owned facilities (24" and laterals)		
1	Total pipeline mileage	187.78
2	Pipeline to be removed	17.70
3	Pipelines to be abandoned in-place	170.08
4	Nitrogen fill reduction factor Option III (a)	0.9057
b. Jointly-owned facilities (30" and laterals)		
1	Total pipeline mileage	106.40
2	Pipeline to be removed	13.50
3	Pipelines to be abandoned in-place	92.90
4	Nitrogen fill reduction factor Option III (b)	0.8731

13 Remote valve sites (i.e. not located at M&R stations)

a. Wholly-owned facilities (24" and laterals)		<u>No.</u>
1	M/L remote valve sites (MLV 1,2,3,4,5,6,8,9,10,11,12)	11
2	Lateral remote valve sites (Groveton, R/J-1, R/J-2, R/J-3)	4
	Total remote valve sites:	15
b. Jointly-owned facilities (30" and laterals)		
1	M/L remote valve sites (MLV 1 through MLV 1-100)	13
2	Lateral remote valve sites (Haverhill, Newington, Westbrook)	3
	Total remote valve sites:	16

14 Cathodic protection facilities

a. Wholly-owned facilities (24" and laterals)		<u>No.</u>
1	Test sites	246
2	Rectifiers	
a.	24" mainline	5
b.	12" Rumford/Jay lateral	2
	Total:	7
b. Jointly-owned facilities (30" and laterals)		
	<u>Pipeline miles</u>	<u>Test sites/mile</u>
1	106.40	1.5
2	Rectifiers	
a.	30" mainline	12
	Total:	12

15 No. of pipeline markers per PNGTS

a. Wholly-owned facilities (24" and laterals)		<u>Pipeline miles</u>	<u>Markers/mile</u>	<u>Total</u>
1	Pipeline markers	187.78	10	1,878
b. Jointly-owned facilities (30" and laterals)		<u>Pipeline miles</u>	<u>Markers/mile</u>	<u>Total</u>
1	Pipeline markers	106.40	10	1,064

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General (continued)

16	No. of M&R stations		
	a. Wholly-owned facilities (24" and laterals)		<u>No.</u>
	1 Small (Groveton (2), Berlin, Rumford (2), Windham)		6
	2 Medium (Jay)		1
	b. Jointly-owned facilities (30" and laterals)		
	1 Small (Westbrook, Gorham, Elliott, Newington (4), Haverhill (2))		9
	2 Medium (Westbrook interchange, Mathuen, Dracut)		3
17	ROW damages related to pipe removal		
	1 Use \$4 per foot for 24" pipe		\$4
	2 Cost per mile		\$21,120

B.	Overtime factor for six 10-hour days worked per week			
		Hours	Overtime	
		Worked	Factor	Pay units
	Straight-time 8 hours/day M-F	40	1	40
	Overtime 2 hours/day M-F	10	1.5	15
	Overtime Saturday	10	1.5	15
	Total:	60		70
	Overtime factor:		1.17	

C.	Estimated no. of pipe trucks required during 24" pipe removal. A temporary pipe storage yard is estimated to be located every 50 miles.		
1	Average miles of haul to temporary pipe storage yard (one-way)		12.5
2	Pipe truck travel time and unloading time (hours)		
	a. Highway travel time round trip (hr)	25 mph	1.00
	b. Time to load truck at work site (hr)	30 min.	0.50
			Total: 1.50
3	Time to unload pipe truck at storage yard (hr)	15 min.	0.25
			Total: 0.25
4	No. of loads per day per pipe truck $10/((2)+(3))$		5.71
5	No. of pipe trucks required to keep one crane productive at storage yard $(2)/(3)$		6
6	Total no. of pipe truck loads required per day		
	a. Length of pipe removed per day (ft)		5280
	b. Pipe hauled per truck @ 6 pipe sections per load (ft)	6 x 40 ft	240
	c. No. of loads required per day (a)/(b)		22
7	Total number of pipe trucks required at 5 loads per truck per day		4.40
	Estimate that 5 pipe trucks are required.		

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - General (continued)

D. Estimated no. of dump trucks required during 24" pipe removal

1	Average miles of haul to borrow site (one-way)		12.5
2	Pipe truck travel time, loading, and unloading time (hr)		
a.	Highway travel time (hr)	25 mph	1.00
b.	Time to load truck (hr)	10 min.	0.17
c.	Time to unload (hr)	5 min.	0.08
		Total:	1.25
3	No. of loads per day per dump truck (10-hr day)		8
4	Total no. of loads required per day		
a.	Amount of borrow required per day (cy)		675
b.	Capacity of dump trucks (cy)		14
	Total no. of loads required per day (a)/(b)		48
5	Total number of trucks required at 8 loads per truck per day		6.03

Estimate that 6 dump trucks (14 cy) required

E. PNGTS pipe located in wetlands

	Pipeline Dia.	Length	Length
	(in)	(mile)	(ft)
a. Wholly-owned facilities (24" and laterals)			
1	24	44.37	234,265
2	12	6.24	32,931
		Total:	50.61      267,196
b. Jointly-owned facilities (30" and laterals)			
1	30	28.65	151,272
2			
a.	12	0.50	2,640
b.	16	0.17	898
c.	20	0.14	739
		Total:	29.46      155,549

F. Miscellaneous

1	Sales tax rate		5%
2	Grout cost per cy		\$98
3	Backfill material per cy		\$10
4	Book cost of line pack		\$826,503
5	ENR construction cost index September 2001	(per ENR 3/19/07)	6391
6	ENR construction cost index December 2007	(per ENR 1/7/08)	8089
7	Escalation factor September 2001-December 2007		1.27

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - Line pack calculation

I Wholly-owned facilities

A. Calculate pipeline volume

	Length (mile)	Length (ft)	Dia (ft)	Vol/ft (cf)	Volume (cf)
1 24" pipeline (mainline)	143.83	759,422	2.00	3.14	2,385,796
2 Laterals					
a. 8" Groveton	0.66	3,485	0.67	0.35	1,216
b. 12" Rumford	26.51	139,973	1.00	0.79	109,934
c. 12" Jay	16.78	88,598	1.00	0.79	69,585
Total:	187.78	991,478			2,566,532

B. Calculate volume of unrecoverable line pack at 200 psig abandonment pressure

1 Calculate number of moles of line pack at 60 degrees F and 200 psig in pipelines

$P_2 = 214.7$  psia  
 $V_2 = 2,566,532$  cf  
 $T_2 = 520$  Degrees Rankine = 60 degrees F  
 $R = 10.73$  Universal Gas Constant  
 $n = ?$  No. of moles  
 (See Part III below)  $z(2) = 0.97$  Compressibility Factor

Equation of state:  $PV = znRT$

$$\begin{aligned} (P_2)(V_2)/(z_2)(T_2) &= nR \\ 1,092,455 &= nR \\ 101,813 &= n \end{aligned}$$

2 Calculate equivalent volume of natural gas in pipelines at standard conditions

$P_1 = 14.7$  psia  
 $V_1 = ?$  cf  
 $T_1 = 520$  Degrees Rankine = 60 Degrees F  
 $R = 10.73$  Universal Gas Constant  
 $n = 101,813$  No. of moles  
 $z_1 = 1$  Compressibility factor

$$\begin{aligned} V_1 &= (z_1)(n_1)(R)(T_1)/(P_1) \\ V_1 &= 38,644,670 \text{ cf} \end{aligned}$$

Volume of unrecoverable line pack (scf) =  $V_1 = 38,645$  Mcf  
 Heat content per cu ft of line pack gas = 1004 Btu  
 Heat content of unrecoverable line pack = 38,799 Dth

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - Line pack calculation (continued)

II. Jointly-owned facilities (33.24%)

A. Calculate pipeline volume

	Length (mile)	Length (ft)	Dia (ft)	Vol/ft (cf)	Volume (cf)
1 30" pipeline (mainline)	100.56	530,957	2.50	4.91	2,606,328
2 Laterals					
a. 12" Westbrook	3.84	20,275	1.00	0.79	15,924
b. 16" Newington	1.20	6,336	1.33	1.40	8,847
c. 20" Haverhill	0.80	4,224	1.67	2.18	9,215
Total:	106.40	561,792			2,640,314

B. Calculate volume of unrecoverable line pack at 200 psig abandonment pressure

1 Calculate number of moles of line pack at 60 degrees F and 200 psig in pipelines

P2 = 214.7 psia  
 V2 = 2,640,314 cf  
 T2 = 520 Degrees Rankine = 60 degrees F  
 R = 10.73 Universal Gas Constant  
 n = ? No. of moles  
 (See Part III below) z(2) = 0.97 Compressibility Factor

Equation of state:  $PV = znRT$

$$\begin{aligned} (P2)(V2)/(z2)(T2) &= nR \\ 1,123,861 &= nR \\ 104,740 &= n \end{aligned}$$

2 Calculate equivalent volume of natural gas in pipelines at standard conditions

P1 = 14.7 psia  
 V1 = ? cf  
 T1 = 520 Degrees Rankine = 60 Degrees F  
 R = 10.73 Universal Gas Constant  
 n = 104,740 No. of moles  
 z1 = 1 Compressibility factor

$$\begin{aligned} V1 &= (z1)(n1)(R)(T1)/(P1) \\ V1 &= 39,755,626 \text{ cf} \end{aligned}$$

Volume of unrecoverable line pack (scf) = V1 = 39,756 Mcf  
 Heat content per cu ft of line pack gas = 1004 Btu  
 Heat content of unrecoverable line pack = 39,915 Dth

## Portland Natural Gas Transmission System Final Abandonment Estimate

### Workpapers - Line pack calculation (continued)

III. Calculation of compressibility factor (z)

Equation of State:  $PV = znRT$

60 degrees F equivalent to 520 degrees Rankine	520.0 degrees Rankine
Critical Temperature of Methane =	343.3 degrees Rankine
Reduced Temperature = $520/343.3 =$	1.515 reduced temperature
	200 psig = 214.7 psia
Critical Pressure of Methane =	673.1 psia
Reduced Pressure = $214.7/673.1 =$	0.319 reduced pressure
	0.97 z factor from chart