Canada Energy Regulator / Régie de l'énergie du Canada

Company: Example
Total ACE: $55,547,136

Part A - Calculation of ACE for Pipelines and Above-Ground Facilities that are Operational and Decommissioned

Legend: a = abandoned in place; R = removed; ro = abandoned in place with special treatment

Step 1 - Categorization of company's pipelines by land use and determination of the assumed lengths of pipeline to be abandoned in place and removed for purposes of calculating the ACE

Land Use: Agricultural/Cropland

Commodity Type	Pipeline Diameter Category	Total Actual Pipeline Length (km)	Base Case 2021 Abandonment Method Assumptions (% A/R)		Pipeline Length Assumed to be Abandoned in Place (km)	Pipeline Length Assumed to be Removed (km)
			a	R		
oil	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
gas	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	259.574	90	10	231.582	27.992
	large	703.534	80	20	562.827	140.707
	sub total	**962.108**			**794.410**	**167.698**
other commodity	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
Total		**962.108**			**794.410**	**167.698**

Land Use: Grasslands and Shrublands

Commodity Type	Pipeline Diameter Category	Total Actual Pipeline Length (km)	Base Case 2021 Abandonment Method Assumptions (% A/R)		Pipeline Length Assumed to be Abandoned in Place (km)	Pipeline Length Assumed to be Removed (km)
			a	R		
oil	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
gas	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	6.771	90	10	6.094	0.677
	large	215.915	80	20	203.164	21.582
	sub total	**222.686**			**209.258**	**22.259**
other commodity	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
Total		**222.686**			**209.258**	**22.259**

Land Use: Forested Lands

Commodity Type	Pipeline Diameter Category	Total Actual Pipeline Length (km)	Base Case 2021 Abandonment Method Assumptions (% A/R)		Pipeline Length Assumed to be Abandoned in Place (km)	Pipeline Length Assumed to be Removed (km)
			a	R		
oil	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
gas	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	5.718	90	10	5.725	0.028
	large	2.103	80	20	1.677	0.419
	sub total	**7.821**			**7.402**	**0.448**
other commodity	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
Total		**7.821**			**7.402**	**0.448**

Land Use: Wetlands - Water

Commodity Type	Pipeline Diameter Category	Total Actual Pipeline Length (km)	Base Case 2021 Abandonment Method Assumptions (% A/R)		Pipeline Length Assumed to be Abandoned in Place (km)	Pipeline Length Assumed to be Removed (km)
			a	R		
oil	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
gas	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.000	95	5	0.000	0.000
	medium	1.000	90	10	0.900	0.100
	large	50.457	80	20	40.365	10.091
	sub total	**51.457**			**41.265**	**10.191**
other commodity	very small (not steel)	0.000	95	5	0.000	0.000
	very small (steel)	0.000	95	5	0.000	0.000
	small	0.176	95	5	0.019	0.019
	medium	0.000	90	10	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.176**			**0.019**	**0.019**
Total		**52.634**			**41.284**	**10.210**

Land Use: Existing Developed Lands

Commodity Type	Pipeline Diameter Category	Total Actual Pipeline Length (km)	Base Case 2021 Abandonment Method Assumptions (% A/R)		Pipeline Length Assumed to be Abandoned in Place (km)	Pipeline Length Assumed to be Removed (km)
			a	R		
oil	very small (not steel)	0.000	80	20	0.000	0.000
	very small (steel)	0.000	80	20	0.000	0.000
	small	0.000	80	20	0.000	0.000
	medium	0.000	80	20	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
gas	very small (not steel)	0.000	80	20	0.000	0.000
	very small (steel)	0.000	80	20	0.000	0.000
	small	0.000	80	20	0.000	0.000
	medium	0.000	80	20	0.000	0.000
	large	1.476	80	20	0.221	0.295
	sub total	**1.547**			**1.327**	**0.309**
other commodity	very small (not steel)	0.000	80	20	0.000	0.000
	very small (steel)	0.000	80	20	0.000	0.000
	small	0.000	80	20	0.000	0.000
	medium	0.000	80	20	0.000	0.000
	large	0.000	80	20	0.000	0.000
	sub total	**0.000**			**0.000**	**0.000**
Total		**1.547**			**1.327**	**0.309**

Totals	Total Length of Pipeline System (km)			Total Assumed Pipeline Length to be Abandoned in Place (km)	Total Assumed Pipeline Length to be Removed (km)
	1047.718			846.598	201.302

Step 2 - Total number of crossings by crossing type and determination of the assumed number of crossings that will be abandoned in place with special treatment for the purposes of calculating the ACE

Crossing Type: Water Crossings

Pipeline Diameter Category	Total Number of Crossings (#)	Special Treatment Assumption (% a+ro)		Number of Crossings Assumed to have Special Treatment Applied (#)
		a+	a	
very small (not steel)	0	0	100	0.00
very small (steel)	0	0	100	0.00
small	2	5	95	0.10
medium	175	5	95	8.75
large	451	10	90	45.10
Total	**628**			**53.95**

Crossing Type: Paved Road Crossings

Pipeline Diameter Category	Total Number of Crossings (#)	Special Treatment Assumption (% a+ro)		Number of Crossings Assumed to have Special Treatment Applied (#)
		a+	a	
very small (not steel)	0	0	100	0.00
very small (steel)	0	0	100	0.00
small	0	0	100	0.00
medium	14	100	0	14.00
large	0	100	0	0.00
Total	**14**			**14.00**

Crossing Type: Unpaved Road Crossings

Pipeline Diameter Category	Total Number of Crossings (#)	Special Treatment Assumption (% a+ro)		Number of Crossings Assumed to have Special Treatment Applied (#)
		a+	a	
very small (not steel)	0	0	100	0.00
very small (steel)	0	0	100	0.00
small	0	0	100	0.00
medium	72	50	50	36.00
large	36	50	50	18.00
Total	**108**			**54.00**

Crossing Type: Railway Crossings

Pipeline Diameter Category	Total Number of Crossings (#)	Special Treatment Assumption (% a+ro)		Number of Crossings Assumed to have Special Treatment Applied (#)
		a+	a	
very small (not steel)	0	0	100	0.00
very small (steel)	0	0	100	0.00
small	0	100	0	0.00
medium	13	100	0	13.00
large	0	100	0	0.00
Total	**13**			**13.00**

Step 3 - Calculation of Pipeline Abandonment Activity Costs

Cost Categories		Cost Calculations by Pipeline Diameter Category										
		small			medium			large				Total Cost ($)
		Base Case 2021 Unit Cost ($/km)	Assorted Pipeline Length Data or Number of Crossings, as applicable	Subtotal ($)	Base Case 2021 Unit Cost ($/km)	Assorted Pipeline Length Data or Number of Crossings, as applicable	Subtotal ($)	Base Case 2021 Unit Cost ($/km)	Assorted Pipeline Length Data or Number of Crossings, as applicable	Subtotal ($)		
Land Access and Clearup		24,000	0.000	-	54,000	201.753	11,042,070	26,000	73,486	32,925,945	54,026,172	
Pipeline Purging and Cleaning	gas	24,000	0.000	-	27,000	201.753	5,445,582	110,000	73,486	8,083,460	13,529,042	
	other commodity	24,000	0.000	-	27,000	201.753	5,445,582	110,000	73,486	8,083,460	13,529,042	
Pipeline Abandonment in Place		192,000	0.000	-	217,000	403.506	87,571,242	220,000	146,972	32,330,840	119,902,082	
Pipeline Removal	gas	192,000	0.000	-	217,000	201.753	43,785,621	220,000	73,486	16,165,420	59,951,041	
	other commodity	192,000	0.000	-	217,000	0.000	0	220,000	0.000	0	0	
Remediation	gas	31,000	0.000	-	31,000	201.753	15,120,713	35,000	73,486	22,027,452	34,996,165	
	other commodity	31,000	0.000	-	31,000	0.000	0	35,000	0.000	0	0	
Reclamation and Restoration	gas assumed to be abandoned in place	154,000	1.500	231,000	186,347	153,000	21,350	11,218,487	153,000	32,452,460	65,206,810	
	gas assumed to be removed	146,000	0.504	135,178	231,000	48,753	12,768,609	575,000	118,085	38,306,928	111,024,716	
	other commodity	146,000	0.000	0	231,000	0.000	0	575,000	0.000	0	0	
Crossings	road crossings	145,000	0.00	0	193,000	0.00	0	575,000	18.00	17,595,000	103,000,000	
	railway crossings	195,000	0.00	0	192,000	9.00	1,728,000	575,000	4.00	2,276,000	10,500,000	
Total				**366,178**			**304,398,743**			**192,854,608**	**519,825,128**	

Step 4 - Calculation of above-ground facility abandonment activity costs

Cost categories:	Above-ground facility type:	Base Case 2021 Unit Cost ($/site)	Number of Facility Sites (#)	Total Cost ($)
Above Ground Facility Removal	Value with above-ground appurtenances	350,000	17	11,550,000
	Meter station	100,000	19	13,800,000
	Compressor station	1,000,000	0	0
	Pump station	1,000,000	0	0
	Oil terminal & storage facilities	11,000,000	0	0
	Processing plant	1,000,000	0	0
	Other - Plant	100,000	0	0
	Sub total			25,350,000
Above Ground Facility Remediation	Value with above-ground appurtenances	112,000	17	3,696,000
	Meter station	380,000	19	12,540,000
	Compressor Station	640,000	5	12,480,000
	Pump station	640,000	0	0
	Oil terminal & storage facilities	3,600,000	0	0
	Processing plant	3,600,000	0	0
	Other - Plant	36,000	0	0
	Sub total			28,716,000
Above Ground Facility Reclamation and Restoration	Value with above-ground appurtenances	112,000	17	640,000
	Meter station	156,000	19	560,000
	Compressor Station	256,000	5	1,280,000
	Pump station	256,000	0	0
	Oil terminal & storage facilities	1,440,000	0	0
	Processing plant	1,440,000	0	0
	Other - Plant	14,400	0	0
	Sub total			2,479,000
Total				**56,545,000**

Step 5 - Calculation of Engineering and Project Management and Contingency costs

Cost Categories		Base Case 2021 Percentage (%)	Sum of the total abandonment activity costs calculated in Steps 3 and 4	Total Cost ($)
Engineering and Project Management	for pipeline systems > 50 km in length	15	$546,051,526	**[illegible]**
	for pipeline systems 50 - 50 km in length	20		**[illegible]**
	for pipeline systems < 50 km in length	25		**$7,406,506**
Contingency		25		**$56,505,763**
CA of Overall Engineering and Project Management Costs Allocated to Engagement Activities with Indigenous Peoples				$1,712,742
CA of Overall Engineering and Project Management Costs Allocated to Engagement Activities with Landowners and other stakeholders				$1,712,742

Step 6 - Calculation of Provisions for Abandoned Pipelines

Cost calculations by pipeline diameter category																								
	small								medium								large							
	Base Case 2021 Costs and Assumptions								Base Case 2021 Costs and Assumptions								Base Case 2021 Costs and Assumptions							
Monitoring Provision	Annual cost of administrative activities and signage maintenance ($/km)	Cost of a single monitoring patrol ($/km)	Assumed number of annual monitoring patrols	Annuity factor applied	Length of pipeline assumed to be abandoned in place (km)	Sub-total Administrative activities and signage maintenance ($)	Sub-total Monitoring patrols ($)	Sub-total ($)	Annual cost of administrative activities and signage maintenance ($/km)	Cost of a single monitoring patrol ($/km)	Assumed number of annual monitoring patrols	Annuity factor applied	Length of pipeline assumed to be abandoned in place (km)	Sub-total Administrative activities and signage maintenance ($)	Sub-total Monitoring patrols ($)	Sub-total ($)	Annual cost of administrative activities and signage maintenance ($/km)	Cost of a single monitoring patrol ($/km)	Assumed number of annual monitoring patrols	Annuity factor applied	Length of pipeline assumed to be abandoned in place (km)	Sub-total Administrative activities and signage maintenance ($)	Sub-total Monitoring patrols ($)	Sub-total ($)	**Total Cost ($)**
	1400	50	6	80	0.000	0.000	2166,700	0	2000	1000	6	80	201.753	806,701,000	96,912,241	903,613,241	2400	1000	6	80	612.487	1519,812,812	110,525,812	1630,337,706	**[illegible]**

Cost calculations by pipeline diameter category																								
	small								medium								large							
	Base Case 2021 Costs and Assumptions								Base Case 2021 Costs and Assumptions								Base Case 2021 Costs and Assumptions							
Unforeseen Event Provision	Cost to address an unforeseen event ($/event)	Assumed Number of Unforeseen Events per year per 100 km	Annuity factor applied	Length of pipeline assumed to be abandoned in place (km)	Sub-total ($)	Cost to address an unforeseen event ($/event)	Assumed Number of Unforeseen Events per year per 100 km	Annuity factor applied	Length of Pipeline Assumed to be Abandoned in Place (km)	Sub-total ($)	Cost to address an unforeseen event ($/event)	Assumed Number of Unforeseen Events per year per 100 km	Annuity factor applied	Length of pipeline assumed to be abandoned in place (km)	Sub-total ($)	**Total Cost ($)**								
	250,000	0.1	80	0.000	312,268	375,000	0.1	80	210.950	11,727,198	2125,000	0.7	80	612.483	38,244,118	**[illegible]**								

Part B - Calculation of ACE for already-abandoned pipelines

Step 1 - Calculation of Provisions for Abandoned Pipelines

Cost calculations by pipeline diameter category									
	very small (steel)								
	Base Case 2021 Costs and Assumptions								
Monitoring Provision	Annual cost of administrative activities and signage maintenance ($/km)	Cost of a single monitoring patrol ($/km)	Assumed number of annual monitoring patrols	Annuity factor applied	Length of pipeline abandoned in place (km)	Sub-total Administrative activities and signage maintenance ($)	Sub-total Monitoring patrols ($)	Sub-total ($)	**Total Cost ($)**
	1400	50	6	80	0.000	0.000	1583,128	0	**1583,128**

Cost calculations by pipeline diameter category							
	very small (steel)						
	Base Case 2021 Costs and Assumptions						
Unforeseen Event	Cost to Address Single Event ($/event)	Assumed Number of Unforeseen Events per year per 100 km	Annuity factor applied	Length of pipeline abandoned in place (km)	Sub-total ($)	**Total Cost ($)**
	36,000	0.1	80	0.000	32,417	**32,417**

Note - values in ACE tables may not sum due to rounding.