Canada Energy Regulator | Régie de l'énergie du Canada

**Company:** Example
**Total ACE:** $253,347,195

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

*Legend: A = abandoned in place; R = removed; A+ = 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 Assumption (% 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 | 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 | 95 | 5 | 0.000 | 0.000 |
| | very small (steel) | 0.000 | 95 | 5 | 0.000 | 0.000 |
| | small | 7.000 | 95 | 5 | 0.000 | 0.000 |
| | medium | 1,264.000 | 80 | 20 | 0.000 | 0.000 |
| | large | 467.774 | 80 | 20 | 374.779 | 93.345 |
| | **sub-total** | **707.699** | | | **566.159** | **141.540** |
| 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 | 80 | 20 | 0.000 | 0.000 |
| | large | 0.000 | 80 | 20 | 0.000 | 0.000 |
| | **sub-total** | **0.000** | | | **0.000** | **0.000** |
| **Total** | | **707.699** | | | **566.159** | **141.540** |

*Land Use: Grasslands and Shrublands*

| Commodity Type | Pipeline Diameter Category | Total Actual Pipeline Length (km) | Base Case 2021 Abandonment Method Assumption (% 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 | 90 | 10 | 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 | 225.815 | 90 | 10 | 203.234 | 22.582 |
| | **sub-total** | **232.586** | | | **209.327** | **23.259** |
| 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 | 8.711 | 95 | 5 | 8.226 | 0.485 |
| | medium | 0.000 | 90 | 10 | 0.000 | 0.000 |
| | large | 0.000 | 90 | 10 | 0.000 | 0.000 |
| | **sub-total** | **8.711** | | | **8.226** | **0.485** |
| **Total** | | **241.298** | | | **217.553** | **23.744** |

*Land Use: Forested Lands*

| Commodity Type | Pipeline Diameter Category | Total Actual Pipeline Length (km) | Base Case 2021 Abandonment Method Assumption (% 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 | 95 | 5 | 0.000 | 0.000 |
| | large | 0.000 | 95 | 5 | 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 | 2.704 | 95 | 5 | 2.569 | 0.135 |
| | large | 2.253 | 95 | 5 | 2.141 | 0.113 |
| | **sub-total** | **2.971** | | | **2.822** | **0.149** |
| 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 | 95 | 5 | 0.000 | 0.000 |
| | large | 0.000 | 95 | 5 | 0.000 | 0.000 |
| | **sub-total** | **0.000** | | | **0.000** | **0.000** |
| **Total** | | **2.971** | | | **2.822** | **0.149** |

*Land Use: Wetlands - Water*

| Commodity Type | Pipeline Diameter Category | Total Actual Pipeline Length (km) | Base Case 2021 Abandonment Method Assumption (% 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 | 95 | 5 | 0.000 | 0.000 |
| | large | 0.000 | 95 | 5 | 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 | 17.089 | 95 | 5 | 16.235 | 0.854 |
| | large | 35.368 | 95 | 5 | 33.600 | 1.768 |
| | **sub-total** | **52.457** | | | **49.835** | **2.621** |
| 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 | 0.378 | 95 | 5 | 0.359 | 0.019 |
| | medium | 0.000 | 95 | 5 | 0.000 | 0.000 |
| | large | 0.000 | 95 | 5 | 0.000 | 0.000 |
| | **sub-total** | **0.378** | | | **0.359** | **0.019** |
| **Total** | | **52.834** | | | **50.194** | **2.640** |

*Land Use: Existing Developed Lands*

| Commodity Type | Pipeline Diameter Category | Total Actual Pipeline Length (km) | Base Case 2021 Abandonment Method Assumption (% 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 | 1.000 | 80 | 20 | 0.800 | 0.200 |
| | medium | 5.550 | 80 | 20 | 4.440 | 1.110 |
| | large | 0.406 | 80 | 20 | 0.325 | 0.081 |
| | **sub-total** | **1.547** | | | **1.237** | **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** | | | **1.237** | **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) |
|---|---|---|---|---|---|
| | **1807.318** | | | **838.936** | **168.382** |

**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:A+) | | 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 | 3 | 5 | 95 | 3.15 |
| medium | 173 | 5 | 95 | 8.15 |
| large | 464 | 5 | 95 | 23.20 |
| **Total** | **638** | | | **31.50** |

*Crossing Type: Paved Road Crossings*

| Pipeline Diameter Category | Total Number of Crossings (#) | Special Treatment Assumption (% A:A+) | | 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 | 14 | 100 | 0 | 14.00 |
| large | 9 | 100 | 0 | 9.00 |
| **Total** | **23** | | | **23.00** |

*Crossing Type: Unpaved Road Crossings*

| Pipeline Diameter Category | Total Number of Crossings (#) | Special Treatment Assumption (% A:A+) | | 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 | 152 | 50 | 50 | 76.00 |
| large | 7 | 50 | 50 | 3.50 |
| **Total** | **159** | | | **79.50** |

*Crossing Type: Railway Crossings*

| Pipeline Diameter Category | Total Number of Crossings (#) | Special Treatment Assumption (% A:A+) | | 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 | 1 | 100 | 0 | 1.00 |
| medium | 4 | 100 | 0 | 4.00 |
| large | 9 | 100 | 0 | 9.00 |
| **Total** | **14** | | | **14.00** |

**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) | Assumed Pipeline Length (km) or # of Crossings (#), as applicable | Subtotal ($) | Base Case 2021 Unit Cost ($/km) | Assumed Pipeline Length (km) or # of Crossings (#), as applicable | Subtotal ($) | Base Case 2021 Unit Cost ($/km) | Assumed Pipeline Length (km) or # of Crossings (#), as applicable | Subtotal ($) | |
| **Land Access and Clearup** | | $4,000 | 10.499 | $45,316 | $4,000 | 265.743 | $1,062,970 | $4,000 | 721.446 | $2,925,945 | $4,029,272 |
| **Pipeline Purging and Clearing** | oil | $3,000 | 0.000 | $0 | $8,000 | 0.000 | $0 | $12,000 | 0.000 | $0 | $0 |
| | gas | $3,000 | 10.499 | $31,497 | $8,000 | 265.743 | $2,125,944 | $12,000 | 721.446 | $17,303,063 | $19,462,504 |
| | other commodity | $4,000 | 10.499 | $45,316 | $7,000 | 0.000 | $0 | $10,000 | 0.000 | $0 | $45,316 |
| **Pipeline Abandonment in Place** | | $12,000 | 9.585 | $115,016 | $17,000 | 215.950 | $3,671,145 | $20,000 | 613.402 | $12,268,035 | $16,054,194 |
| **Pipeline Removal** | | $40,000 | 9.504 | $380,158 | $100,000 | 49.793 | $4,958,570 | $150,000 | 118.085 | $17,712,840 | $23,051,568 |
| **Remediation** | oil | $10,000 | 0.000 | $0 | $10,000 | 0.000 | $0 | $10,000 | 0.000 | $0 | $0 |
| | gas | $10,000 | 9.585 | $95,847 | $10,000 | 215.950 | $2,159,497 | $10,000 | 613.402 | $6,134,016 | $8,389,360 |
| | other commodity | $5,000 | 10.188 | $50,446 | $5,000 | 0.000 | $0 | $5,000 | 0.000 | $0 | $50,446 |
| **Reclamation and Restoration** | page assumed to be abandoned in place | $10,000 | 9.585 | $95,847 | $10,000 | 215.950 | $2,159,497 | $10,000 | 613.402 | $6,134,016 | $8,389,360 |
| | page assumed to be removed | $40,000 | 0.504 | $20,178 | $50,000 | 49.793 | $2,758,600 | $70,000 | 118.085 | $8,265,924 | $11,044,718 |
| **Special Treatment - Crossings** | water crossings | $10,000 | 0.15 | $4,000 | $40,000 | 0.00 | $0 | $150,000 | 10.50 | $1,575,000 | $1,579,000 |
| | paved road crossings | $20,000 | 0.00 | $0 | $50,000 | 8.50 | $425,000 | $150,000 | 12.00 | $1,800,000 | $2,225,000 |
| | railway crossings | $20,000 | 0.00 | $0 | $50,000 | 4.00 | $200,000 | $75,000 | 9.00 | $675,000 | $875,000 |
| **Total** | | | | **$408,154** | | | **$26,169,712** | | | **$92,854,858** | **$119,427,726** |

**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** | Valve with above-ground appurtenances | $55,000 | 27 | $1,450,000 |
| | Meter station | $100,000 | 19 | $1,800,000 |
| | Compressor Station | $1,000,000 | 5 | $5,000,000 |
| | Pump station | $150,000 | 0 | $0 |
| | Processing & storage facilities | $2,000,000 | 0 | $0 |
| | Processing plant | $1,000,000 | 0 | $0 |
| | Other: River | $25,000 | 0 | $0 |
| | Sub-total | | | $8,250,000 |
| **Above Ground Facility Remediation** | Valve with above-ground appurtenances | $12,000 | 27 | $324,000 |
| | Meter station | $60,000 | 19 | $1,140,000 |
| | Compressor Station | $440,000 | 5 | $2,400,000 |
| | Pump station | $100,000 | 0 | $0 |
| | Processing & storage facilities | $500,000 | 0 | $0 |
| | Processing plant | $500,000 | 0 | $0 |
| | Other: River | $0,000 | 0 | $0 |
| | Sub-total | | | $3,864,000 |
| **Above Ground Facility Reclamation and Restoration** | Valve with above-ground appurtenances | $15,000 | 27 | $405,000 |
| | Meter station | $30,000 | 19 | $570,000 |
| | Compressor Station | $300,000 | 5 | $1,500,000 |
| | Pump station | $75,000 | 0 | $0 |
| | Oil terminal & storage facilities | $500,000 | 0 | $0 |
| | Processing plant | $500,000 | 0 | $0 |
| | Other: River | $15,000 | 0 | $0 |
| | Sub-total | | | $2,475,000 |
| **Total** | | | | **$15,584,000** |

**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 | $146,011,126 | **$0** |
| | for pipeline systems 50 - 500 km in length | 10 | | **$0** |
| | for pipeline systems > 500 km in length | 5 | | **$7,300,556** |
| **Contingency** | | 25 | | **$36,501,391** |
| | | | | $0 of Overall Engineering and Project Management Costs Allocated to Engagement Activities with Indigenous Peoples |
| | | | | $0 of Overall Engineering and Project Management Costs Allocated to Engagement Activities with landowners and other stakeholders |

**Step 6 - Calculation of Provisions for Abandoned Pipelines**

| Monitoring Provision | 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 | | | | | | | | | | | | | |
| | Annual cost of administrative activities and signage maintenance ($/km) | Cost of a single instance of monitoring patrols ($/km) | Assumed number of years between 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 instance of monitoring patrols ($/km) | Assumed number of years between monitoring patrols | Annuity factor applied | Length of pipeline assumed to be abandoned in place (km) | Sub-total Administrative activities and signage maintenance ($) | Sub-total Monitoring patrols ($) | Sub-total ($) | Annual cost of administrative activities and signage maintenance ($/km) | Cost of a single instance of monitoring patrols ($/km) | Assumed number of years between 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 ($) | Total Cost ($) |
| | $400 | $0 | 0 | 80 | 9.585 | $306,709 | $0 | **$306,709** | $400 | $150 | 5 | 80 | 215.950 | $6,910,391 | **$13,820,781** | $400 | $150 | 5 | 80 | 613.402 | $19,628,853 | $19,628,853 | **$39,257,705** | **$53,385,196** |

| Unforeseen Event Provision | 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 | | | | | | | | | | | | |
| | 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 ($) |
| | $50,000 | 0.5 | 80 | 9.585 | $12,268 | $75,000 | 0.5 | 80 | 215.950 | $1,727,599 | $125,000 | 0.5 | 80 | 613.402 | $4,244,118 | **$5,983,984** |

**Part B - Calculation of ACE for already abandoned pipelines**

**Step 1 - Calculation of Provisions for Abandoned Pipelines**

| Monitoring Provision | Cost calculations by pipeline diameter category | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | very small (steel) | | | | | | | |
| | Base Case 2021 Costs and Assumptions | | | | | | | |
| | Annual cost of administrative activities and signage maintenance ($/km) | Cost of a single instance of monitoring patrols ($/km) | Assumed number of years between 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 ($) | Total Cost ($) |
| | $400 | $0 | 0 | 80 | 5.035 | $161,135 | $0 | **$161,135** | **$161,135** |

| Unforeseen Event | Cost calculations by pipeline diameter category | | | | | |
|---|---|---|---|---|---|---|
| | very small (steel) | | | | | |
| | Base Case 2021 Costs and Assumptions | | | | | |
| | 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 ($) |
| | $6,000 | 0.5 | 80 | 5.035 | $2,417 | **$2,417** |

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