National Energy Board | Office national de l'énergie

Reasons for Decision

Abandonment Cost Estimates

MH-001-2012

February 2013

Pipeline Abandonment – Financial Issues

Canada

National Energy Board

Reasons for Decision

In the Matter of

Alliance Pipeline Ltd., Enbridge Pipelines Inc., Enbridge Pipelines (NW) Inc., Foothills Pipe Lines Ltd., Kinder Morgan Cochin ULC, NOVA Gas Transmission Ltd., Trans Mountain Pipeline ULC on behalf of Trans Mountain LP, Trans Québec and Maritimes Pipeline Inc., TransCanada Keystone Pipeline GP Ltd., TransCanada PipeLines Limited, Trans-Northern Pipelines Inc., and Westcoast Energy Inc., carrying on business as Spectra Energy Transmission

Applications filed in November 2011 for approval of preliminary cost estimates for abandonment cost funding

MH-001-2012

February 2013

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Table of Contents

List of Appendices

GLOSSARY OF TERMS AND ABBREVIATIONS

AACEI	Association for the Advancement of Cost Engineering International
#	Number
Abandon	To permanently cease operation such that the cessation results in the discontinuance of service
Alliance	Alliance Pipeline Ltd.
Applicants	All companies which filed abandonment cost estimate applications with pipeline-specific values for Board approval. Specifically, Alliance Pipeline Ltd., Enbridge Pipelines Inc., Enbridge Pipelines (NW) Inc., Kinder Morgan Cochin ULC, Trans Mountain Pipeline ULC on behalf of Trans Mountain LP, Foothills Pipe Lines Ltd., TransCanada Keystone Pipeline GP Ltd., TransCanada PipeLines Limited, Trans Québec & Maritimes Pipeline Inc., NOVA Gas Transmission Ltd., Trans-Northern Pipelines Inc., Westcoast Energy Inc., carrying on business as Spectra Energy Transmission
Base Case	A set of preliminary assumptions (including cost parameters and physical assumptions) set out by the Board to facilitate the filing of preliminary estimates of future abandonment costs, proposals to collect abandonment funds, and processes and mechanisms to set aside abandonment costs
Base Case Unit Costs	Preliminary averages or ranges of cost factors available for use by NEB-regulated companies in order to derive abandonment cost estimates in the absence of pipeline-specific estimates. The Unit Costs presented in Table A-3 for individual cost categories constitute the Base Case Unit Costs
CAEPLA	Canadian Association of Energy and Pipeline Landowner Associations
CAPP	Canadian Association of Petroleum Producers
CEPA	Canadian Energy Pipeline Association
CEPA Report	2006 report prepared by a subcommittee of the Terminal Negative Salvage Steering Committee of the Canadian Energy Pipeline Association
Cost Category	A collection of related activities or expenses expected to be a significant proportion of a company's total abandonment cost estimate
Enbridge	Enbridge Pipelines Inc. and Enbridge Pipelines (NW) Inc.
Enbridge (NW)	Enbridge Pipelines (NW) Inc.
Enbridge Pipelines	Enbridge Pipelines Inc.
Foothills	Foothills Pipe Lines Ltd.
GIS	Geographic Information System

Group 1 companies	In general, companies that are regulated by the Board with more extensive systems and as such, subject to a greater degree of regulatory oversight on financial matters than Group 2 companies
Group 2 companies	Companies regulated by the Board, other than Group 1 companies. Group 2 companies tend to have smaller systems, with fewer shippers and are subject to a lighter degree of regulatory oversight on financial matters than Group 1 companies
Kinder Morgan	Kinder Morgan Cochin ULC
KM or km	Kilometre(s)
Large diameter pipeline	A pipeline with a diameter that is greater than 26 inches or 660 mm
LMCI	Land Matters Consultation Initiative, an NEB initiative consisting of four distinct topic streams
M&NP	Maritimes & Northeast Pipeline Management Ltd.
Medium diameter pipeline	A pipeline with a diameter that is 14 to 24 inches or 355.6 to 610 mm
MM or mm	Millimeter(s)
MPLA	Manitoba Pipeline Landowners Association
MW or mw	Megawatt
NEB	National Energy Board
NEB Act	*National Energy Board Act*
NGTL	NOVA Gas Transmission Ltd.
OPLA	Ontario Pipeline Landowners Association
Pipeline Abandonment Matrix Table	Table 1 of the CEPA Report which sets out options for pipeline abandonment for various land-use categories
RoW	Right-of-way
SAPL	Saskatchewan Association of Pipeline Landowners
Small diameter pipeline	A pipeline with a diameter that is 2 to 12 inches or 60.3 to 323.9 mm
SPLA	South Peace Landowners Association
Stream 4	The stream of the LMCI dealing with physical issues related to pipeline abandonment

TQM	Trans Québec & Maritimes Pipeline Inc.
Trans Mountain	Trans Mountain Pipeline ULC on behalf of Trans Mountain LP
TransCanada	Foothills Pipe Lines Ltd., NOVA Gas Transmission Ltd., Trans Québec & Maritimes Pipeline Inc., TransCanada Keystone Pipeline GP Ltd., and TransCanada PipeLines Limited
TransCanada Keystone	TransCanada Keystone Pipelines GP Ltd.
TransCanada PipeLines	TransCanada PipeLines Limited
Trans-Northern	Trans-Northern Pipelines Inc.
Unit Costs	Preliminary averages or ranges of cost factors for abandonment activities within various cost categories. In this report, the term covers the Base Case Unit Costs or pipeline-specific Unit Cost estimates developed by NEB-regulated companies.
UPA	Union des producteurs agricoles
Westcoast	Westcoast Energy Inc., carrying on business as Spectra Energy Transmission

Recital and Appearances

IN THE MATTER OF the *National Energy Board Act* and the Regulations made thereunder: and

IN THE MATTER OF the preliminary cost estimates for abandonment funding filed with the National Energy Board on 29 and 30 November 2011 by Alliance Pipeline Ltd., Enbridge Pipelines Inc., Enbridge Pipelines (NW) Inc., Kinder Morgan Cochin ULC, Trans Mountain Pipeline ULC on behalf of Trans Mountain LP, Foothills Pipe Lines Ltd., TransCanada Keystone Pipeline GP Ltd., TransCanada PipeLines Limited, Trans Québec & Maritimes Pipeline Inc., NOVA Gas Transmission Ltd., Trans-Northern Pipelines Inc., Westcoast Energy Inc., carrying on business as Spectra Energy Transmission, under file OF-AF-PCE 02; and

IN THE MATTER OF Hearing Order MH-001-2012 dated 10 February 2012;

HEARD in Calgary, Alberta on 30, 31 October 2012 and 1, 2, 5, 6 and 8 November 2012;

BEFORE:

R. R. George	Presiding Member
G. A. Habib	Member
L. Mercier	Member

Appearances	**Participants**	**Witnesses**
A. L. McLarty, Q.C. T. O'Leary	Alliance Pipeline Ltd.	H. Kraft K. Grant F. Paterson J. Abes
D. Crowther M. Fowke D. Foster	Enbridge Pipelines Inc. and Enbridge Pipelines (NW) Inc.	C. Hansen J. Gasser M. Hrynchyshyn T. Romaine V. Kohli A. Leggett
M. Buchinski K. Bray	Kinder Morgan Cochin ULC and Trans Mountain Pipeline ULC on behalf of Trans Mountain Pipeline LP	D. S. Stoness G. Hill B. Williams J. Swanson
M. Ignasiak T.-L. Oleniuk	TransCanada Keystone Pipeline GP Ltd., Foothills Pipe Lines Ltd., Trans Québec & Maritimes Pipeline Inc., NOVA Gas Transmission Ltd., and TransCanada PipeLines Limited	D. Kmet Y. (Bill) Liu K. Maloney G. Norton R. Phernambucq F. Pilley R. Worthingham

S. Carpenter	Trans-Northern Pipelines Inc.	M. Glass M. Speagle S. McKay
R. Kolber D. G. Davies	Westcoast Energy Inc., carrying on business as Spectra Energy Transmission	D. Cameron J. Cripps A. Good G. Metz M. Tomlinson
D. R. Core	Canadian Association of Energy and Pipeline Landowner Associations	D. R. Core
B. Woods J. Woods	Canadian Association of Petroleum Producers	
J. D. Goudy	Manitoba Pipeline Landowners Association	G. Demare D. Hacault J. Bushman D. Dechant
M. Vance	Ontario Pipeline Landowners Association	M. Vance
K. Habermehl	Saskatchewan Association of Pipeline Landowners	D. Bates K. Habermehl
D. Dechief D. R. Core	South Peace Landowners Association	D. Dechief
C. F. Ross I. Bouffard P. Lemieux	Union des producteurs agricoles	P. Lemieux
R. Kraayenbrink	Richard Kraayenbrink	R. Kraayenbrink
H. Patzelt	Hellmut Patzelt	
J. Jensen	Alberta Department of Energy	
H. Gitersos M. Watton	National Energy Board	

Chapter 1

Introduction

1.1 Background

1.1.1 Pipeline Abandonment – Financial Issues

In early 2008, the National Energy Board (Board or NEB) identified a proposed approach for the Land Matters Consultative Initiative (LMCI), consisting of four distinct topic streams. One of the streams, Stream 3, was Pipeline Abandonment – Financial Issues. The Board indicated that the key issue to be considered in respect of that stream was: "What is the optimal way to ensure that funds are available when abandonment costs are incurred?" The Board noted two key principles fundamental to its future decisions with respect to the financial matters related to pipeline abandonment. These were:

a) Abandonment costs are a legitimate cost of providing service and are recoverable upon Board approval from users of the system; and

b) Landowners will not be liable for costs of pipeline abandonment.

The Board decided to convene a public hearing to consider the financial issues related to pipeline abandonment. Pursuant to subsection 15(1) of the *National Energy Board Act (*NEB Act), the Board authorized three members to conduct the hearing and report and make recommendations to the Board in respect of the decision to be made by the Board on the issues in the hearing. The three member panel conducted the hearing, the oral portion of which was held in January 2009. The panel presented its report and recommendations to the Board in April 2009.

In May 2009, the Board issued the RH-2-2008 Reasons for Decision, adopting the panel's report and recommendations. The RH-2-2008 Reasons for Decision set out guiding principles, a five-year Action Plan for companies to follow, and a Base Case for preparing preliminary cost estimates. The Board indicated that it would hold a technical conference in November 2009 to discuss the Base Case assumptions and issue revised assumptions if necessary. The Board directed all NEB-regulated companies to begin to set aside abandonment funds no later than May 2014.

1.1.2 Development of Base Case and Unit Cost Factors

On 17 November 2009, the Board held a technical conference to discuss the Base Case assumptions. Prior to the commencement of the technical conference, the Board requested that conference participants proposing refinements to the Base Case assumptions file written submissions in advance of the conference. Companies including, but not limited to, Alliance Pipeline Ltd. (Alliance), Enbridge Pipelines Inc. (Enbridge Pipelines), Kinder Morgan Cochin ULC (Kinder Morgan), TransCanada PipeLines Limited (TransCanada PipeLines), and Westcoast Energy Inc. carrying on business as Spectra Energy Transmission (Westcoast), filed submissions, and also participated at the technical conference.

After the technical conference, the Board issued a conference report which summarized the discussion at the conference. The Board requested comments in respect of this report and cost categorizations that might be expected to comprise major proportions of total abandonment costs. The Board subsequently requested further information from conference participants on Unit Cost information.

The Board considered all the submissions received and released a revised Base Case on 4 March 2010 (Appendices II, III and V). The Base Case included physical assumptions, but not Unit Costs. The Board indicated that it would be communicating with stakeholders on a further process to develop specific estimates for unit cost factors.

On 29 March 2010, the Board released a letter indicating that Board staff would be consulting with stakeholders to assist the Board in establishing Unit Costs. The Board subsequently issued draft Unit Costs for comment. The draft Unit Costs were also discussed at a public meeting. Subsequent to that meeting, Board staff received further informal feedback from stakeholders. Comments on the second draft were received from, among others, Alliance, Enbridge Pipelines, Westcoast and TransCanada PipeLines. Based on all feedback received, in December 2010, the Board issued a letter and amended tables which contained Unit Costs (Appendix IV).

1.1.3 Process for Abandonment Cost Estimates set out in the RH-2-2008 Reasons for Decision and subsequent steps

In the RH-2-2008 Reasons for Decision, the Board stated that any process and mechanism for setting aside the funds for abandonment should have regular reviews (at least every five years) of the amount of funds set aside. The Board also said that regular reporting to the Board and stakeholders must be built into any process and mechanism.

Regarding abandonment cost estimates specifically, the Board directed each company under its jurisdiction (Group 1 and Group 2) to submit a preliminary estimate of the company's total future abandonment costs. To facilitate this filing, the Board set out the preliminary Base Case as discussed in Section 1.1.1.

The Board further indicated that companies could either file abandonment cost estimates using the Base Case or provide their own pipeline-specific estimates of abandonment costs. Pipeline-specific estimates of abandonment costs were to be accompanied by discussion and supporting evidence for any assumptions used that differed from those in the Base Case. These estimates would be subject to Board approval.

According to the five-year Action Plan, companies were required to file preliminary abandonment cost estimates with the Board no later than 31 May 2011. In January 2011, several companies requested an extension. In March 2011, the Board granted the companies a six-month extension for the cost estimates filing, to 30 November 2011. However, the Board still required a filing from each Group 1 company on their preliminary physical assumptions in May 2011.

In November 2011, Group 1 companies filed their preliminary abandonment cost estimates. Twelve of the 13 Group 1 companies filed pipeline-specific values. Maritimes & Northeast Pipeline Management Ltd. (M&NP) used the Board's Base Case and therefore, pursuant to the

Board's direction in the RH-2-2008 Reasons for Decision, does not require Board approval of its abandonment cost estimates.

On 1 May 2012, the Board decided that the oral portion of the hearing to consider the Group 1 preliminary abandonment cost estimates would commence 30 October 2012. In light of the timing of the oral portion of the hearing, the Board revised the remaining deadlines in the Action Plan on 1 June 2012 (the Revised Action Plan) (Appendix I).

Group 2 companies were also required to file their preliminary abandonment cost estimates in November 2011. The preliminary cost estimates of Group 2 companies were not considered in the same process as the estimates of the Group 1 companies.

1.1.4 MH-001-2012 Hearing Process

The Board issued Hearing Order MH-001-2012 for the preliminary abandonment cost estimates of all Group 1 companies (other than M&NP) on 1 February 2012. The Hearing Order also included a draft Scope of the Proceeding. The Board finalized the Scope of the Proceeding in its Procedural Update, dated 1 May 2012 (the Procedural Update).

To assist with the hearing process, the Board held information sessions for parties interested in participating in the hearing. Sessions in French and English were held on 22 March 2012 and English-only sessions on 27 March 2012 and 26 September 2012. French-only sessions were held on 24 May and 30 August 2012. The purpose of these sessions was to share information about the Board's role in the hearing and how to participate in the process.

On 14 June 2012, the Board determined that the oral portion of the MH-001-2012 hearing would be held in Calgary. The Board further decided to provide video and teleconferencing as well as webinar in order to facilitate the participation of intervenors.

Written evidence was filed by, among others, the Canadian Association of Petroleum Producers (CAPP), Canadian Association of Energy and Pipeline Landowner Associations (CAEPLA), Manitoba Pipeline Landowners Association (MPLA), Ontario Pipeline Landowners Association (OPLA), Saskatchewan Association of Pipeline Landowners (SAPL), South Peace Landowners Association (SPLA), l'Union des producteurs agricoles (UPA), as well as Richard Kraayenbrink and Hellmut Patzelt.

A number of other persons intervened or participated by submitting a letter of comment.

The oral portion of the hearing commenced in Calgary, Alberta on 30 October 2012 and finished on 8 November 2012.

1.2 Reasons for Decision MH-001-2012

These Reasons for Decision provide an overview of the matters considered by the Board in reaching a decision in respect of the abandonment cost estimates applications filed by Alliance, Enbridge Pipelines, Enbridge Pipelines (NW) Inc. (Enbridge NW), Kinder Morgan, Trans Mountain Pipeline ULC on behalf of Trans Mountain LP (Trans Mountain), Foothills Pipe Lines Ltd. (Foothills), TransCanada Keystone Pipeline GP Ltd. (TransCanada Keystone), TransCanada PipeLines, Trans Québec & Maritimes Pipeline Inc. (TQM), NOVA Gas Transmission Ltd.

(NGTL), Trans-Northern Pipelines Inc. (Trans-Northern) and Westcoast (collectively, Applicants).

In the Scope of Proceeding, the Board indicated that it would consider the reasonableness of each Applicant's cost estimates, including but not limited to:

A. Reasonableness of each Applicant's assumptions regarding the proposed abandonment methods, including environmental considerations (depth of cover, ground subsidence, remediation, crossings, erosion, reclamation) for each land-use category:
    i. agricultural (including cultivated and non-cultivated);
    ii. non-agricultural (including developed land, and land expected and not expected, to be developed); and
    iii. other (environmentally sensitive and crossings).

B. Scope and rationale for each abandonment activity considered for estimating costs for:
    i. cleaning of facilities;
    ii. pipeline abandonment-in place;
    iii. special treatment;
    iv. pipeline removal;
    v. above-ground facilities; and
    vi. engineering and project management.

C. Approach to estimation of:
    i. contingency; and
    ii. provisions for post-abandonment.

In reviewing the cost estimates applications, the Board considered whether each Applicant's estimates, as filed, were reasonable. The Board also considered Applicants' cost estimates applications in the context of the principles and considerations set out in the RH-2-2008 Reasons for Decision. Details of the Board's assessment of the issues identified by the Board or by parties to the proceeding are set out in this decision.

As already stated in the RH-2-2008 Reasons for Decision, the Board indicated that the process and mechanism for setting aside the funds for abandonment should have regular reviews (at least every five years). The Board's conclusions in these Reasons for Decision are based on the evidence submitted at this proceeding and therefore are the Board's conclusions at this time. Where the Board concludes that Applicant-specific assumptions are reasonable, such determinations have been based on, and are applicable only to, the Applicant-specific and pipeline-specific information considered during this proceeding. The Board anticipates that future developments in research, technology, information sharing and actual abandonment experience will lead to greater precision in the estimation of future abandonment costs, likely informing future initiatives and decisions in these matters.

In reaching its conclusions, the Board considered all of the evidence on the record related to this matter. The regulatory documents on file in the MH-001-2012 proceeding are available on the Board's website, www.neb-one.gc.ca. Significant rulings made by the Board during the hearing are contained in Appendix VII.

Chapter 2

Land-use Designation

The designation of land-use, both existing and future, is an important consideration when determining physical methods of abandonment of a pipeline or facility, and when determining preliminary cost estimates. Land-use categorization includes identification of land characteristics and uses of the land (that is, areas that are sensitive to land disturbance, slopes, mountainous terrain, parks, cultivated lands, developed areas, etc.).

The Board's 4 March 2010 letter included Table A-1. This table was developed to assist companies in determining the length of pipeline and number of facilities in each land-use and pipeline diameter category, for the purposes of estimating preliminary cost estimates. The framework of Table A-1 was based on the pipeline abandonment matrix provided in Canadian Energy Pipeline Association's (CEPA) 2006 report entitled *Pipeline Abandonment Assumptions* (CEPA Report). Table A-1 is contained in Appendix II.

Table A-1 provides for different pipeline diameters: small (2 to 12 inches, 60.3 to 323.9 millimetre (mm)); medium (14 to 24 inches, 355.6 to 610 mm); and large (>26 inches, >660 mm). It also provides for land-use categories and sub-categories as described below:

- Agricultural
    - Cultivated;
    - Cultivated with special features (depth of cover considerations such as tree farms, turf farms, deep-tilling operations); and
    - Non-Cultivated (native prairie, rangeland).
- Non- Agricultural
    - Existing Developed Lands (commercial, industrial, residential);
    - Prospective Future Development (commercial, industrial, residential); and
    - No Future Development Anticipated (for example, forest areas).
- Other Areas
    - Environmentally Sensitive Areas (including parks, wetlands, natural areas, species at risk habitat);
    - Roads and Railways;
    - Water Crossings (streams, rivers, lakes, canals); and
    - Other Crossings (utilities, other pipelines).

This chapter discusses the methodologies used by Applicants to determine land-use categorization for the lands traversed by their pipelines. It also considers the manner in which Applicants have ascertained and assigned the number of kilometres (km) of pipeline in each of the land-use categories. A summary of the physical information filed by Applicants is included in Appendix VI.

Views of the Applicants

Alliance

Alliance submitted that it acquired all of its pipeline data during the construction of its pipeline system. The data included pipe size and pipeline boundaries and was put into a Geographic Information System (GIS) database. Alliance stated that it maintains an imagery database that is updated periodically. For the purposes of establishing its abandonment cost estimates, Alliance used its integrated database to virtually 'fly' the line and determine land-use types by quarter section for the entire Canadian portion of its pipeline system. In addition to identifying land-use type, environmentally sensitive areas were flagged, and road, railway and water crossing lengths were determined.

Alliance stated that the figures contained in its sub-category of "Prospective Future Development" were determined based on its knowledge of the routing, the proximity of the pipeline to populated areas, and a generous approach to potential growth of these populated areas. Within this sub-category, Alliance made a distinction between prospective future residential development and prospective future industrial development. Alliance noted it had difficulty predicting the type of future industrial development and stated that it would determine the abandonment method at the time of development in consultation with the particular developer.

Alliance categorized lands within its "No Future Development Anticipated" sub-category based on aerial imagery. Alliance noted that this sub-category primarily consisted of forested non-agricultural lands.

In response to SAPL's questioning regarding the categorization of privately-owned native prairie lands under the "Agricultural, Non-Cultivated" sub-category, Alliance stated that native prairie under private title would fall within this sub-category. However, Alliance noted that, depending upon the land disposition, native prairie lands could also be categorized under the sub-category "Environmentally Sensitive Areas."

Enbridge Pipelines and Enbridge Pipelines (NW) (Enbridge)

Enbridge developed definitions for each land-use category using those outlined in the CEPA Report. Definitions were then entered into Enbridge's GIS system. Data from each province and territory was acquired and assigned to a land-use category in order to calculate the number of kilometres of Enbridge's pipeline system within each land-use.

For the land-use sub-category "Prospective Future Development," Enbridge used Canada Land Inventory data and assumed that current town, city and village limits would be the extent of future development.

Kinder Morgan

Kinder Morgan conducted a land-use study that provided some of the data required to prepare its preliminary abandonment cost estimates. The study provided input on land-use; reviewed available land-use planning documents for lands crossed by the Kinder Morgan pipeline; identified areas where removal is recommended based on foreseeable land-use change; calculated the total length of pipeline recommended for removal; and reviewed easement requirements for potential abandonments.

Kinder Morgan modified Table A-1 to better reflect, in its view, the way it collected and categorized land-use and other data. The main modifications include moving the "Environmentally Sensitive Areas" sub-category to the "Other Areas" category and placing roads, railways and utilities in separate sub-categories within a new category entitled "Road, Railway and Utility Crossings"; changing the "Water Crossings" sub-category to a category entitled "Watercourse Crossings" with sub-categories for rivers, creeks and wetlands; moving the "Above-Ground Facilities" category from a column to a row and renaming it "Facilities"; and adding new sub-categories for terminals, pump stations and block valves.

Trans Mountain

Trans Mountain collected land-use data using a combination of in-house resources and external consultants. TERA Environmental Consultants was contracted to conduct a Land Use Study (TERA Study) and OSD Pipelines was contracted to conduct a Road, Railway, and Utility Crossing Study. Both consultants used a combination of Trans Mountain GIS data and other sources of information (government data, Google Earth, etc.). The TERA Study included collection of data on watercourse crossings and special land features.

Trans Mountain modified Table A-1 to better reflect the way that Trans Mountain collected and categorized land-use and other data. The main modifications include adding a "Prospective Future Development" sub-category to the "Agricultural" land-use category; moving the "Environmentally Sensitive Areas" sub-category to the "Other Areas" category; combining the "Roads & Railways" and "Utilities" sub-categories; changing the "Water Crossings" sub-category to a category and adding new sub-categories for "Rivers, Creeks and Wetlands"; moving the "Above-Ground Facilities" category from a column to a row and renaming it "Facilities"; and adding new sub-categories for terminals, pump stations and block valves.

TransCanada PipeLines, Foothills, NGTL, TQM, TransCanada Keystone (TransCanada)

TransCanada undertook a land-use analysis to classify the land along their pipeline system and to determine the length of pipe located within each land-use category. TransCanada stated that they used in-house facility location data from TransCanada's Orion Database as well as data from GeoBase20, which is a government initiative administered by the Canadian Council on Geomatics. The land-use categories derived from Orion and GeoBase were applied and a subsequent desktop review was completed to further delineate land-use categories.

TransCanada stated that their land-use categories differed from the matrix provided in the CEPA Report in some ways. TransCanada created a separate sub-category entitled "Public Gravel Road Crossings" since they assumed that pipelines of less than 12 inches in diameter which traverse gravel road crossings would be abandoned-in-place without fill material.

Trans-Northern

Trans-Northern assembled a panel of subject matter experts (SMEs) who had knowledge of its pipeline route, land-use and land character. The SMEs reviewed Trans-Northern's photo-alignment sheets, Google Earth satellite and Street-View images. In addition, Trans-Northern noted land characteristics and land-uses such as urban, cultivated and uncultivated farmland, forest, and scrubland.

Trans-Northern deemed the "Prospective Future Development" sub-category to be lands in urban areas that are subject to in-fill and zones where expansion has taken place and is progressing outward from city cores. Trans-Northern included forested areas, environmentally sensitive areas, wetlands, parklands, and utility corridors in the "No Future Development Anticipated" sub-category.

Westcoast

Westcoast submitted that it used a GIS which incorporated aerial photography to view and measure its pipeline system. The GIS was used to calculate the length of pipelines within each land-use category.

Westcoast used the land-use categories set out in Table A-1, with the exception of the "Environmentally Sensitive Areas" category. Westcoast included environmentally sensitive areas in its "Agricultural" and "Non-Agricultural" categories. Westcoast noted that it provided the number of crossings by type, rather than by length. Westcoast stated that it believes this approach forms a more appropriate basis for estimating the abandonment costs associated with crossings. In addition, Westcoast stated that it did not provide a breakdown of the crossings by pipe diameter as it is proposing a similar method of abandonment for crossings regardless of pipe size.

Westcoast, through a detailed examination of its pipeline and the communities along its pipeline route, identified areas that would fall in the sub-category of "Prospective Future Development". Westcoast considered a number of factors including ownership, current land-use, existing dwellings, and growth patterns to determine whether an area should be included as prospective for future residential, commercial, or industrial development. Natural barriers such as watercourses and steep terrain, as well as the presence of other utilities such as railway lines and overhead high voltage power lines, were also considered when defining the boundaries of areas of potential future development. Westcoast stated that it used a conservative approach in allocating sections of pipeline to the "Prospective Future Development" sub-category so that the estimate for pipeline removal would not be understated.

Views of the Intervenors

Both CAEPLA and SAPL submitted that most privately-owned pasture land could be cultivated at any time, and as a result, there should be no differentiation made between cultivated and non-cultivated lands in the "Agricultural" category. SAPL submitted that land which is not presently cultivated can be cultivated by the landowners in the future, and that there is currently a transition underway toward cultivating more of those lands.

Views of the Board

The Board assessed the reasonableness of the methodologies used by Applicants to assign the number of kilometres of pipeline in each of the land-use categories. The Board also considered the reasonableness of Applicants' land-use categories. The Board compared the Applicants' land-use designation with those described in Table A-1 of the Board's 4 March 2010 letter. In cases where Applicants used a different approach, the Board assessed the reasonableness of the rationale provided.

With respect to the methodologies used by Applicants to assign the number of kilometres of pipeline to each of the land-use categories, the Board recognizes that the methodologies used are based on each Applicant's current knowledge and databases of their own pipeline systems. The Board finds that Applicants have justified the methodologies used, and accepts them as reasonable.

With respect to designation of land-use categories, the Board notes that Applicants used different approaches. For example, some Applicants, like Enbridge, used the land-use categories provided in Table A-1 of the Board's 4 March 2010 letter. However, some Applicants modified the land-use categories provided in Table A-1 based on the results of pipeline-specific land-use studies or the proposed abandonment method for a specific category or sub-category. The Board is of the view that for the purposes of designating land-use categories, Applicants are best positioned to categorize the land-use along their pipeline systems. Therefore, the Board finds that each Applicant's designation of land-use categories is reasonable. The Board's specific comments in respect of some Applicants' approaches are discussed below.

Alliance separated "Prospective Future Residential Development" and "Prospective Future Industrial Development" into different sub-categories. The Board finds this approach to be reasonable. However, the Board's views on Alliance's proposed abandonment method assumptions are discussed in detail in Chapter 3.

Trans-Northern included environmentally sensitive areas in the "No Future Development Anticipated" sub-category. Westcoast also included environmentally sensitive areas in the "Agricultural" and "Non-Agricultural" categories. The Board is of the view that these approaches are reasonable, as long as environmentally sensitive areas are accounted for in the land-use analysis, and costs associated with an appropriate abandonment method are allocated for that category. As Trans-Northern and Westcoast have accounted for environmentally sensitive areas and properly allocated costs for each category, the Board accepts their modifications.

TransCanada created a separate sub-category entitled "Public Gravel Road Crossings." Private road crossings are also included in TransCanada's cost estimates. The Board accepts the rationale for the separate sub-category provided by TransCanada and finds the modification to be acceptable.

The Board considered the views of the intervenors on the usage of "Agricultural, Cultivated" versus "Agricultural, Non-Cultivated" lands. In particular, the Board notes that CAEPLA and SAPL were of the view that most privately-owned pasture land could be cultivated at any time, and as a result, no differentiation should be made between "Agricultural, Cultivated" versus "Agricultural, Non-Cultivated" lands. The Board

accepts that a portion of privately-owned pasture land, whether cultivated or non-cultivated, could be cultivated at a future point in time. It is the Board's view that transitions between land-uses in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories are likely to be based on economic factors.

The Board commends Kinder Morgan and Trans Mountain for conducting comprehensive pipeline-specific land-use studies for the purposes of determining and categorizing land-use. In the Board's view, more of these types of studies would assist Applicants in designating land-use in a more transparent manner. The Board encourages all Applicants to conduct pipeline-specific land-use studies.

The Board is of the view that land-use categories will continue to be refined as new information becomes available. The Board accepts all Applicants' methodologies for land-use designation, but notes that Applicants' cost estimates will be regularly reviewed (at least every five years). The Board encourages Applicants to collaborate and, where possible, standardize the land-use categories with the input of landowners, regional and municipal planners, or by conducting pipeline-specific land-use studies. Consistency, where possible, among companies would assist all parties and the Board.

Chapter 3

Physical Assumptions Regarding Abandonment Methods

One of the key assumptions made by Applicants when calculating preliminary cost estimates is the proposed abandonment method. Proposed abandonment method assumptions may vary with land-use category.

Table A-2 (Appendix III) of the Board's 4 March 2010 letter provides the Base Case abandonment method assumptions for each land-use category. Abandonment assumptions include abandonment-in-place, abandonment-in-place with special treatment, and removal. The Board stated in its 4 March 2010 letter that, for the purposes of estimating costs for the sub-categories of "Agricultural, Cultivated"; "Agricultural, Non-Cultivated"; and "Non-Agricultural, No Future Development Anticipated," the Base Case assumption would be 80 per cent of pipeline to be abandoned-in-place and 20 per cent to be removed in all three sub-categories.

In the RH-2-2008 Reasons for Decision, the Board noted that companies should use the Base Case assumptions if they are not able to determine reasonable pipeline-specific assumptions to calculate their preliminary estimates. The Board also stated that pipeline companies would be required to justify to the Board any assumptions used to calculate pipeline-specific estimates if they differed from the Board's Base Case assumptions.

This chapter outlines the Board's consideration of the assumptions regarding each Applicant's proposed abandonment method, by pipeline diameter, and in each of the land-use categories (land-use categories are discussed in further detail in Chapter 2), along with the submissions made on these issues by all intervenors. This chapter also outlines the environmental considerations such as depth of cover, ground subsidence, remediation, crossings, erosion, and reclamation that were discussed during the MH-001-2012 proceeding, as these considerations relate to Applicants' proposed abandonment method.

Views of the Applicants

Each Applicant filed its own version of Table A-2 that either followed the Base Case or modified the Base Case to reflect Applicant-specific assumptions. A summary of each Applicant's physical assumptions can be found in Appendix VI.

Alliance

Alliance submitted that any buried piping would be abandoned-in-place in an environmentally responsible manner. It did not assume removal of any buried pipe in the "Agricultural, Cultivated"; "Agricultural, Non-Cultivated"; and "Non-Agricultural, No Future Development Anticipated" land-use sub-categories.

Alliance indicated that it would consider pipeline removal only in extraordinary circumstances, such as in areas of reasonably foreseeable future residential development. For future industrial development, Alliance noted that the determination of whether to remove the pipe would be made in consultation with the developer.

Alliance stated that in special cases, such as roadway or railway crossings, it would likely abandon pipelines in place with special treatment. Alliance indicated that any future abandonment plan would involve the removal of any above-ground facilities such as meter stations, compressor stations, and valve sites. Alliance submitted that any large-scale removal of buried piping would be cost-prohibitive, and suggested that environmental disturbance associated with abandonment-in-place would be far less disruptive to landowners and other stakeholders.

Alliance further stated that the potential for any risks associated with leaving the pipe in the ground are minimal. With respect to easement agreements, Alliance noted that it took into account the land rights provisions described in its right-of-way (RoW) and easement agreements to determine pipeline removal proportions. Alliance further noted that these agreements do not require pipeline removal, and in no way prohibit abandonment-in-place.

Alliance also emphasized that its preliminary abandonment cost estimates are consistent with the analysis and recommendations in the CEPA Report. Alliance stated that removal costs resulting from site-specific assessments were not specifically taken into account in its cost estimates since what may or may not occur in the future is speculative. Alliance noted that removal costs from site-specific activities would be captured in its contingency fund. Alliance emphasized that it would have an opportunity to re-examine its cost estimates within a five-year period.

Alliance included in its evidence a landowner survey conducted by CEPA, which indicated that 49.7 per cent of landowners surveyed had concerns with the pipeline being left in the ground. However, Alliance submitted that it relied on its own landowner survey when preparing its cost estimates. Alliance's survey indicated that of 170 landowners surveyed, 38 per cent had no concerns with abandoning the pipe in place, 15 per cent preferred to leave the pipe in the ground, eight per cent wanted the pipe removed and the remainder of the landowners did not want to participate in the survey. Alliance stated that it has a comprehensive public awareness plan which follows a lifecycle approach through pipeline construction, operations and abandonment, and includes public involvement.

Enbridge

Enbridge Pipelines assumed abandonment-in-place of pipelines in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" land-use sub-categories. Enbridge Pipelines assumed removal of pipelines in the "Agricultural, Cultivated with Special Features" sub-category.

For pipelines in the "Non-Agricultural" land-use category, Enbridge Pipelines assumed abandonment of pipelines in place in the "Existing Developed Lands" and "No Future Development Anticipated" sub-categories, and the removal of pipelines in the "Prospective Future Development" sub-category.

Enbridge (NW), in its Table A-2, assumed abandonment-in-place in the "Environmentally Sensitive Areas" sub-category.

Enbridge assumed that 25 per cent of standard road crossings (two-lane gravel, dirt, alley), as well as all highway (paved two or four-lane) and railway crossings would be cut, capped and filled (abandoned-in-place with special treatment). Enbridge submitted that all utility crossings would be located within the road allowance RoW. Therefore, Enbridge accounted for utility crossings in the "Roads and Railways" sub-category. Enbridge further assumed that all river and creek crossings would be cut and capped with no fill (abandoned-in-place).

Enbridge noted that while they estimated costs for abandonment funding with zero per cent removal (with the exception of prospective future development), they included costs for monitoring in perpetuity. Monitoring would include any remediation required as a result of events occurring post-abandonment.

Enbridge used the CEPA Report to guide the abandonment strategies for all land uses. Enbridge indicated that the primary reason for following CEPA's Pipeline Abandonment Matrix Table with respect to the "Agricultural, Cultivated" sub-category was to minimize any disruption to landowners and the environment.

Enbridge submitted that with the implementation of proper environmental management measures, the long-term impacts of abandonment-in-place and removal will not differ materially. In the absence of differences in long-term effects, Enbridge's view was that minimizing near-term effects should be the priority.

Enbridge justified the assumptions behind their cost estimates by quoting portions of the CEPA Report which stated that subsidence is known to be highly dependent on pipe diameter, depth of cover, and local soil conditions. Enbridge stated that the CEPA Report indicated that while there would be some degree of subsidence associated with larger diameter pipeline, it may be sufficiently small-scale so as to be in a tolerable range. Enbridge clarified that site-specific conditions at the time of abandonment would be important to determine the tolerable range. Enbridge also stated that the tolerability of subsidence would be defined by whoever is using the land in the future.

Enbridge stated that Cost Category 5a (Pipeline Removal) would be utilized for pipeline removal in the event that site-specific issues arise at the time of abandonment, and also recognized that the allowance made for that cost category is a lower percentage. Enbridge noted that this proposed cost category also included a provision for pipeline removal in the "Non-Agricultural, Prospective Future Development" sub-category.

Enbridge submitted that they conducted two consultation workshops (one in Edmonton, Alberta and one in Montreal, Québec) for landowners, landowner associations, and government representatives regarding methods of abandonment. Enbridge stated that they considered the feedback received as a result of these workshops in developing their preliminary cost estimates. Enbridge acknowledged that there were landowners who took part in the workshops that did not support the methodology of abandoning-in-place proposed by Enbridge. In addition, similar to Alliance, Enbridge also included in their evidence a landowner survey conducted by CEPA, which indicated that 49.7 per cent of landowners surveyed had concerns with the pipeline being left in the ground.

Enbridge argued that at the time of abandonment, there will be site-specific assessments as well as consultation with landowners. Enbridge further argued that at that time, there will be an opportunity to address site-specific concerns, such as interference with irrigation and tile drainage.

Enbridge stated that there are limitations in the availability of current scientific studies and that there is a lack of practical experience regarding large-scale pipeline abandonment. Enbridge submitted that they are committed to advancing research through the LMCI Stream 4 process and other scientific research. Enbridge stated that in the future, they will update their cost estimates to reflect any new technical knowledge and to incorporate advancement of acceptable industry best practices. In response to the concerns raised by the landowners regarding lack of participant

funding to participate in processes such as this hearing, Enbridge noted that CEPA has committed funds to start a foundation. One of the goals of that foundation is to ensure that there is more outreach to stakeholders such as landowners.

Enbridge submitted that there are several programs in place to deal with potentially contaminated sites. Enbridge indicated that site-specific assessments carried out at the time of abandonment will make sure that they have identified any contaminated sites that may have been missed during operations. Enbridge noted that site-specific assessments would also make sure that they are in regulatory compliance, and that there are no adverse effects on the environment or human health at the time of abandonment.

Kinder Morgan

Kinder Morgan did not assume removal of any pipe in the "Agricultural, Cultivated"; "Agricultural, Non-cultivated"; "Non-Agricultural, Existing Development Lands"; and "Non-Agricultural, No Future Development Anticipated" land-use sub-categories. Kinder Morgan noted that there are no remaining areas of prospective future development and no other areas crossed by its pipeline that warrant special consideration for pipe removal.

Kinder Morgan emphasized that its initial assessment of cost estimates is based on the recommendations of the CEPA Report, which recommends abandonment-in-place for small diameter pipelines. Kinder Morgan noted that it has not seen any real impediments to agriculture as a result of its current operations, and that therefore, it did not see why it would encounter any impediments to land-use in the foreseeable future.

Kinder Morgan assumed that five per cent of its watercourse crossings would need to be cut, capped, and filled. Kinder Morgan stated that it did not consider special treatment for roads, railways and other crossings (utilities). In Kinder Morgan's view, this approach was consistent with the CEPA Report and the 1996 Industry Discussion Paper on Pipeline Abandonment,[1] which indicated that ground subsidence for pipelines with diameters of 12 inches and smaller would be negligible.

Kinder Morgan also assumed removal of all above-ground pump stations and buried block valves.

Kinder Morgan stated that it did not currently know of any locations crossed by its pipeline that may necessitate site-specific considerations. It would use contingency funds to cover any site-specific issues arising at the time of abandonment. However, Kinder Morgan stated that there are no additional funds for potential removal costs included in the contingency funds.

Trans Mountain

Trans Mountain stated that its primary deviations from the Base Case assumptions were: zero per cent pipeline removal planned in "Agricultural, Cultivated"; "Agricultural, Non-Cultivated"; and "Non-Agricultural, No Future Development Anticipated" sub-categories; the addition of an "Other Land Features" category where some pipe removal was planned (this includes sub-categories "High-hazard Locations"; "Special River Crossings"; "Timber Harvesting Areas"; and "Environmentally Sensitive Areas"); some special treatment for pipe in the "Non-Agricultural,

[1] Prepared for the Pipeline Abandonment Steering Committee (comprised of representatives from CAPP, CEPA, the then-Alberta Energy and Utilities Board (now the Energy Resources Conservation Board and the Alberta Utilities Commission), and the National Energy Board).

Existing Developed Lands" sub-category; and special treatment of pipe at some watercourse crossings.

Trans Mountain noted that its fundamental premise was that unless there is a compelling reason to remove pipe (that is, unless the overall benefits of removal outweigh the benefits of abandonment-in-place), pipe should be abandoned-in-place. Trans Mountain was further of the view that compelling reasons for pipeline removal do not exist for all but a small percentage of the lands across which the Trans Mountain pipeline traverses.

Trans Mountain assumed that 116 facilities (including remote trap sites and block valves and their associated infrastructure) would be demolished and removed.

Trans Mountain submitted that its initial assessment is based on the recommendations contained in the CEPA Report. Trans Mountain considered this document to be the most comprehensive study on pipeline abandonment available. Trans Mountain also submitted that the TERA Study identified "high hazard" locations; "Special River Crossings"; and "Timber Harvesting Areas" where it recommended additional pipeline removal. Trans Mountain noted that it assumed removal of 4.7 km of pipeline in these areas.

Trans Mountain included in its evidence a landowner survey conducted by CEPA, which indicated that 49.7 per cent of landowners surveyed had concerns with the pipeline being left in the ground. With respect to easement agreements, Trans Mountain noted that it had taken into account the terms of these agreements in preparing the estimates.

Trans Mountain stated that it would expect the amount of removal recommended by site-specific assessments carried out at the time of abandonment to be very small, and noted that a small amount of contingency could be used to cover such uncertainties. Trans Mountain further stated that funds from other areas (for example, road crossings and environmentally sensitive areas) could be utilized in cases where the treatment method at the time of abandonment was determined to be different from the assumed method. Trans Mountain noted that the principles guiding the usage of the contingency do not include funding large scope changes.

TransCanada

TransCanada submitted that the most appropriate method of abandonment in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories is to abandon the pipelines in place. TransCanada noted that there are more significant safety concerns that arise from pipeline removal when compared with abandoning the pipelines in place. TransCanada also noted that the removal of the pipeline would disrupt cultivation activities for significant time periods.

TransCanada assumed removal of the pipeline in agricultural cultivated areas with special features. Accordingly, TransCanada agreed with the Base Case assumption for the "Agricultural, Cultivated with Special Features" sub-category.

TransCanada stated that their assumption for the "Non-Agricultural, No Future Development Anticipated" sub-category is to abandon the pipeline in place. TransCanada noted that the risk analysis for this sub-category is similar to that applied to agricultural areas that are not cultivated. Based on this risk analysis, TransCanada concluded that leaving the pipe in place is the most appropriate abandonment solution. TransCanada stated that they were not aware of evidence supporting removal of pipeline in areas where there is no anticipated future development.

TransCanada assumed abandonment with special treatment of pipelines located at public paved roads and railway crossings, as per the Base Case. However, TransCanada noted that pipelines with a diameter of 12 inches or less at gravel road crossings will not need to be filled with concrete to maintain structural integrity. Accordingly, TransCanada assumed abandonment-in-place with no fill for pipelines located at these crossings.

TransCanada planned to abandon-in-place all pipe located at utility crossings. TransCanada did not propose special treatment at these crossings. TransCanada noted that filling medium and large diameter pipelines with concrete material could potentially impact the stability of the utility facilities, since in the majority of instances, the utility being crossed lies below TransCanada's pipelines. TransCanada further noted that any potential long-term subsidence associated with abandonment of the pipeline in place would not likely create risks to the utility being crossed. For water crossings, TransCanada planned to abandon the pipeline in place and to segment the pipeline at appropriate locations by cutting and capping it to reduce the potential water conduit issues. TransCanada stated that they did not propose to fill the pipe with any substance at these water crossings.

TransCanada assumed that all above-ground facilities would be removed. TransCanada proposed a matrix for determining abandonment methods that was slightly modified from the Pipeline Abandonment Matrix Table originally proposed in the CEPA Report. TransCanada modified the assumptions regarding public gravel roads, watercourse crossings and utility crossings.

TransCanada held a consultation workshop regarding methods of abandonment. TransCanada held the workshop in Calgary, Alberta for landowner associations, Aboriginal groups, municipal government, the Alberta provincial government, CAPP, members of Synergy Alberta, and other individual landowners. TransCanada stated that one of the objectives of the workshop was to obtain key stakeholder feedback to consider and incorporate into TransCanada's abandonment cost estimates.

TransCanada submitted that easement agreements generally are either silent with respect to abandonment or have a provision which states that TransCanada can choose to either abandon the pipeline in place or remove the pipeline. TransCanada noted that they did not take into account the terms of the agreements in preparing the proposed removal proportions.

TransCanada noted that they had not specifically earmarked contingency funds to allow for changes in the scope, in the event that site-specific assessments at the time of abandonment suggest a change in the abandonment method. TransCanada further noted that their cost estimates would be refined in the future to reflect the learnings from site-specific assessments.

With respect to the issue of potential contamination, TransCanada stated that it is unknown to what extent Polychlorinated Biphenyls (PCBs) might be present in old asphalt or coal tar-type pipeline coatings. TransCanada noted that there is a potential to have PCBs in pipelines from compressor oils breaking through seals on compressors. TransCanada further noted that asbestos was occasionally used as reinforcement in bituminous coating like coal tar.

Trans-Northern

Trans-Northern assumed that pipelines in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories would be wholly abandoned-in-place. Trans-Northern assumed that pipelines in non-agricultural areas would be abandoned-in-place except any in the "Prospective

Future Development" sub-category with depth of cover less than one metre. Pipeline with depth of cover less than one metre would be removed.

Trans-Northern submitted that it assumed mostly abandonment-in-place because a large portion of its network is located in densely populated urban areas within utility corridors and with a depth of coverage greater than one metre. Trans-Northern also noted that the CEPA Report recommended that pipelines in agricultural areas (cultivated and non-cultivated), non-agricultural areas and developed areas, be left in place as removal would have a greater environmental impact than abandoning-in-place.

Trans-Northern stated that it did not assume special treatment for road crossings on agricultural areas (cultivated and non-cultivated) and for areas where no future development was anticipated. Trans-Northern noted that approximately 80 per cent of its pipelines in these areas are small diameter and that subsidence issues associated with small diameter pipeline are negligible.

For road crossings in existing developed lands, Trans-Northern assumed that a portion of the crossings would be abandoned-in-place with special treatment. The remaining crossings would be abandoned-in-place with no special treatment since accessing pipelines at road crossings in densely populated urban areas or utility corridors for special treatment would be impractical and unwarranted. Trans-Northern noted that all above-ground facilities, including pump and meter stations, would be removed.

With respect to the issue of potential contamination, Trans-Northern stated that it is currently using some leak detection technologies and has not yet studied the application of that technology on its entire system.

Trans-Northern stated that it reviewed a selection of typical easement agreements and determined that the agreements permit abandonment-in-place. Trans-Northern further stated that it has taken into account the terms of the agreements in preparing its estimates.

Trans-Northern stated that its cost estimates are based on its own company-specific information and the best information available on abandonment currently available. Trans-Northern further stated that it is committed to the LMCI Stream 3 and 4 processes and that its cost estimates would be continually reviewed over time.

Westcoast

Westcoast assumed abandonment-in-place for the majority of its pipeline. Westcoast assumed removal of sections of pipe in areas where the RoW may be subject to special land-use features in the "Agricultural" land-use category. It also assumed removal in areas that may be subject to prospective future development in the "Non-Agricultural" land-use category.

Westcoast stated that it would fill medium and large diameter pipe under road crossings with concrete slurry or grout. It noted that pipe with a diameter of 12 inches or less would not be filled, as the deterioration of small diameter pipe is not expected to result in significant subsidence.

Westcoast assumed removal of pipe from its casing under rail crossings. Westcoast submitted that it planned to fill the casing with a concrete slurry or grout. Westcoast did not propose any special treatment to pipe crossing third party utility pipelines or other conduits. Most third party pipelines cross underneath Westcoast's pipe. In addition, the deterioration of the pipe and subsequent filling of the cavity with soil is not expected to impose any additional loads on these crossings. Westcoast

planned to isolate and cap all pipe crossing under water courses. It further planned to perforate the pipe to allow water ingress and prevent the pipe from rising to the surface.

Westcoast assumed removal of all above-ground facilities and appurtenances, with the exception of the processing plants and compressor stations located on its own lands. Westcoast submitted that the extent to which compressor stations, processing plant equipment, structures, and buildings on Westcoast lands are removed will vary on a facility-by-facility basis.

Westcoast stated that abandonment-in-place would be less disruptive to soil, drainage, slope stability, environmentally sensitive areas, and present and future land-uses. Westcoast noted that most of the incidents it has encountered during operation of its pipeline are related to changes in watercourses and slope movement that could result in the exposure of the pipeline. Westcoast further noted that it included a provision in its abandonment plan to remove exposed sections of abandoned pipe which may become a hazard.

Westcoast stated that it chose to follow the primary options presented in the CEPA Report because 81 per cent of its pipeline traverses lands in the "Non-Agricultural, No Future Development Anticipated" sub-category. Westcoast recognized that the CEPA Report indicated that site-specific assessment may override any of the primary options recommended in CEPA's Pipeline Abandonment Matrix Table. Westcoast noted that in cases where it may have to deviate from the primary options, the costs that would be incurred for removal are considered outside the contingency. Westcoast further stated that contingency is not designed to address such unforeseen unknowns. Westcoast commented that it would rely on the LMCI process and the periodic five-year updates in order to make any necessary changes to its cost estimates.

Westcoast submitted that it has taken into account the terms of its easement agreements in developing its abandonment plans, including the proposed pipeline removal proportions.

Views of the Intervenors

CAEPLA

CAEPLA was of the view that removal of pipelines is the only way to find the historical contamination along a pipeline and to prevent landowners from bearing the risk or costs for abandonment. CAEPLA described how pipe removal activities would impact landowners, noting there could be crop loss for the first years while the soil settles and possible impacts caused by the imposition of importing soil to the land. However, CAEPLA argued that issues related to soil importation could be accommodated and that there would be no long-term impacts from the removal of the pipelines.

CAEPLA emphasized that abandonment of pipelines in place is not appropriate on agricultural lands. CAEPLA noted that pipelines can corrode and collapse and landowners would then bear the safety risks. CAEPLA voiced concerns about historical contamination and submitted that pinhole cracks could cause a leak or contamination that would not be identified at the time of abandonment, but would be noticed later by landowners. CAEPLA submitted that this scenario would make landowners responsible for environmental issues.

CAEPLA submitted that the pipeline can act as a water conduit and that the impact of such a situation would depend on the soil type. CAEPLA indicated that for clay-type soils, the soil could act as a funnel and the water would naturally erode topsoil, eventually filling the pipe. Landowners would then have to deal with the loss of their topsoil. Also, CAEPLA submitted that

the pipe would act as a conduit to move water from one landowner's property to another and potentially cause subsidence.

MPLA

MPLA was of the view that Applicants' physical plans for abandonment, and the cost estimates upon which they are based, are unreasonable. This is because they provide for virtually no removal of pipelines from agricultural lands and no ongoing corrosion protection for any pipelines abandoned-in-place.

In MPLA's view, landowners are only protected from future liability associated with pipeline abandonment when pipelines are either removed or maintained in perpetuity. Any other option leaves landowners open to the risks associated with pipeline corrosion.

MPLA submitted that Enbridge Pipelines' proposal to abandon its pipelines in place in agricultural lands will result in continuing interference with land-use far into the future. MPLA also submitted that landowners are prepared to deal with the short-term disruption of pipeline removal in order to avoid the long-term interference with land-use and exposure to future liability associated with abandonment-in-place.

MPLA noted that tile drainage is common in Ontario and is being promoted in Manitoba and other provinces. MPLA submitted that abandoned pipelines will present physical barriers to tile drainage systems. MPLA further submitted that, with the risk of the presence of historical contamination in and around pipelines, landowners and tile drainage contractors risk liability when installing, operating, and maintaining tiling equipment.

MPLA submitted that undiscovered contamination is a major concern for MPLA members. MPLA also stated that pinhole leaks in pipelines can exist for long periods of time before being discovered. Accordingly, in MPLA's view, areas contaminated by Enbridge pipelines may not be discovered until some undetermined time in the future.

MPLA noted that they were advised by the Government of Manitoba that if contamination related to abandoned pipelines was discovered on a property, or if contamination moved from one property to an adjacent property, provincial environmental laws would be enforced against the landowner from whose property the contamination had originated.

MPLA stated that the risk of subsidence and collapse of pipelines that are abandoned-in-place are major concerns. They submitted that areas of corrosion in pipelines will allow topsoil to penetrate into the pipe, resulting in a loss of useable soil. In addition, corrosion will leave a depression in the land. MPLA also noted that landowners are concerned that subsidence of the surface will pose a safety hazard for workers operating equipment over the abandoned pipelines.

MPLA expressed concern regarding the considerable amount of soil that will need to be imported to replace topsoil that has infiltrated into an abandoned pipe. MPLA was also concerned about where replacement topsoil would be sourced. In MPLA's view, importing soils could introduce damaging diseases such as clubroot disease, or invasive weeds like scentless chamomile and leafy spurge. To avoid the issue of subsidence and pipe collapse, MPLA submitted that pipelines should be removed and that trenches left by pipelines should be filled with soil that was displaced during the original construction.

MPLA indicated that in June 2007, MPLA commissioned a telephone survey of 112 MPLA and SAPL landowners on the topic of abandonment. Ninety-five per cent of respondents said they

were concerned about future abandonment of Enbridge pipelines on their properties. MPLA stated that all landowners who participated in the telephone survey indicated they were concerned about safety and landowner liability.

MPLA submitted that Enbridge's proposed physical plan for abandonment does not reflect Enbridge's contractual commitments to landowners to remove and/or maintain in perpetuity, pipelines upon abandonment. MPLA noted that most Enbridge easement agreements, including those between Enbridge and MPLA landowners, provide for the removal of pipelines from a RoW upon abandonment unless, in certain cases, the pipelines are maintained with cathodic protection. MPLA submitted that most easement agreements state that a RoW is to be restored to its prior condition so far as it is practicable to do so, and noted that the term "prior condition" would not have included abandoned pipelines.

OPLA

OPLA noted that a pipe that has corroded and collapsed would leave a depression on the surface of the land. Furthermore, collapse is likely to occur when heavy farm machinery passes over the pipe, endangering the equipment operator.

OPLA noted that a pipeline left in place without proper cleaning will eventually contaminate soil and water, potentially costing companies far more in remediation costs than removal. OPLA further noted that an abandoned pipe is an ideal conduit to contaminate waterways. Rusty, perforated pipe will become a conduit for larger and larger amounts of sub-surface and surface water under periods of heavy rainfall. OPLA stated that since pipelines are usually lower than municipal drains, if municipal drains cannot properly drain large amounts of water, blowouts and crop damage could occur.

OPLA indicated that in Ontario and Québec, systematic tile drainage of fields is very common. OPLA noted that when the pipeline rusts away and collapses, the support that keeps the clay tile in place will be gone. According to OPLA, on many farms, the tile drainage system would be compromised and would not remove water as it was designed to do. If this scenario occurred, each section of tile could sag and would be vulnerable to blow out.

In OPLA's view, pipelines should be 100 per cent removed in agricultural, cultivated and non-cultivated lands. While OPLA noted that there would be some short to long-term impacts on landowners as a result of removal, in their view, once removed, there would be no liability to the landowners.

SAPL

SAPL stated that pipelines on agricultural land should be 100 per cent removed because there is potential for historical contamination.

SAPL stated that the medium-term impact of abandoning pipelines in place is that these pipelines start to collapse and encounter pin holes. In the longer-term, these pipelines become a conduit and create problems. SAPL indicated that agriculture continues to change over the course of the years with machinery getting bigger. Also, if pipeline remains in the ground and there is an increase in drainage and tiling, it will create future problems.

SPLA

SPLA submitted that if the pipe is abandoned-in-place on agricultural land, there will be subsidence issues when the pipe collapses. SPLA also stated that collapse or disintegration of the pipe would create a void in the soil, with the size of the void dependent on the size of the pipeline.

According to SPLA, remediating subsidence when short areas of pipe collapse would require numerous intrusions over time to haul in and spread loads of subsoil and topsoil onto the farmland. Compaction, because of the hauling, would also occur along areas of the pipeline that had not yet subsided. SPLA indicated that it would be necessary to re-seed some crops and to compensate farmers for crop loss. In SPLA's view, the pipe would likely collapse in stages as it corrodes and rusts out, requiring fill material multiple times on the same pipe joint or section.

SPLA indicated that the safety issues would be enormous when the pipe collapses under legally loaded tractors, trucks and other machinery. SPLA submitted that the corroded and rusted old pipe would gradually weaken to the point where it would collapse suddenly under a heavy load. According to SPLA, incidents of the pipe collapsing suddenly would occur during the busiest seasons; planting and harvest. In SPLA's view, there would be a higher risk of property damage, personal injuries and deaths occurring by abandoning the pipe in place than complete removal of the pipelines. SPLA stated that in order to counteract these risks, farmers would need to operate their machines at lower than normal field speeds, possibly for decades, thus incurring higher costs for labour, fuel, and depreciation.

SPLA submitted that it would be much more practical to remove the entire pipe at once and return the land to as close to original conditions as possible. SPLA indicated that the potential impacts of removal of pipelines include crop loss and damages. However, SPLA submitted that pipeline trench contamination could be discovered and remediated when the pipe is removed. SPLA noted that removal would eliminate a percentage of future liability issues, because excavations that would be necessary to remove contamination from a pipeline abandoned-in-place would virtually be eliminated.

UPA

UPA submitted that an assumption of complete pipeline removal in Applicants' cost estimates would be more equitable. UPA stated that knowledge regarding pipeline abandonment is changing. Information yet to be gathered could show that certain pipelines on agricultural and forestry lands need to be removed.

UPA submitted that once an abandoned pipeline is no longer monitored or supervised, the depth of soil cover gradually decreases. UPA noted that tractors, trucks, tilling equipment, and other machinery used by agricultural and forestry producers are getting heavier and are working the soil to greater depths. UPA submitted that these changes, combined with potential frost heaving of the pipeline, will increase the chances of farming or forestry equipment coming in contact with the pipeline, particularly an abandoned pipeline that is not as clearly marked. In UPA's view, over time, this will result in equipment damage and additional costs to agricultural and forestry producers.

UPA argued that with the effects of climate change, agricultural producers will have to increase irrigation to make sure that the quality of their products remains consistent and that they achieve projected yields. In UPA's view, this will require digging wells and building retention ponds.

Agricultural and forestry producers will be inconvenienced by the abandoned pipelines and will incur additional expenses.

UPA indicated that a number of agricultural and forestry lands have drains. UPA noted that while other lands do not have drains currently, they may need them in future. UPA stated that when drains are being installed or repaired, the presence of an abandoned pipeline complicates these activities, resulting in additional work and expenses.

According to UPA, small leaks would be harder to detect in forested areas than in agricultural environments due to fewer people being present. In UPA's view, one of the only ways to determine whether there has been contamination is to remove the pipeline. UPA noted that the risks of oil contamination are even greater and the environmental requirements today are more demanding when soil has been contaminated.

UPA expressed concern that pipelines may become water conduits and could significantly change the productivity of the forest. In addition, if water got into a ruptured or collapsed pipeline, it could flow to neighbouring properties and result in lawsuits between producers.

UPA expressed safety concerns about the lands where no future development is expected, generally forestry areas. UPA noted that in terms of forestry production (such as maple syrup), where foresters use large machinery in many cases, they are concerned about possible ruptures or depressions in the ground and overturned machinery. Forestry workers often work alone on their woodlots and if there was an accident, foresters could be trapped for a fairly long time before being discovered.

Richard Kraayenbrink

Mr. Kraayenbrink argued that there would be risks to landowners if pipelines are abandoned-in-place. In his view, these risks include historical damage or contamination, subsidence, impacts to drainage system, crop losses, safety concerns related to damaged machinery, operator injury or death. In Mr. Kraayenbrink's view, there is only one solution to eliminate any risk or cost to landowners and that is absolute removal of pipe.

Mr. Kraayenbrink stated that land is a landowner's pension fund and argued that abandonment-in-place steals from that pension fund by leaving landowners with liabilities and risks that belong to the pipeline companies.

Hellmut Patzelt

Mr. Patzelt submitted that an abandoned pipeline would presumably act as a drainage system due to the conduit it creates. He further indicated that this scenario would be further exacerbated by perforation or collapse or other conditions. Mr. Patzelt noted that the pipe could act as a new and different conduit and that if the pipeline contains contaminants, it may cause unnatural changes in the flow of water, or bring unwanted products and materials.

Views of the Board

Assumptions made by Applicants with pipe in "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories

In its 4 March 2010 letter, the Board provided the Base Case assumption for all pipeline diameters in the two land-use sub-categories of "Agricultural, Cultivated" and

"Agricultural, Non-Cultivated" as 80 per cent abandoned-in-place and 20 per cent removed. In this proceeding, Applicants advocated an assumption of 100 per cent abandonment-in-place for each of these land-use sub-categories. The Board considered Applicants' submissions, as well as those of the intervenors in this proceeding, who advocated for removal. The Board also considered concerns raised by intervenors regarding Applicants' abandonment method assumptions and the potential impacts of abandoning the pipelines in place in these land-use sub-categories. Potential impacts described by intervenors included, but were not limited to, subsidence, contamination, crop loss, erosion, interference with drainage systems, corrosion and collapse, safety concerns, and introduction of invasive weeds and disease.

The Board heard views from Applicants and intervenors about the impacts of abandonment-in-place versus removal. Enbridge stated that there is no material difference in long-term impacts of abandonment-in-place versus those for removal and, hence, they focused on minimizing short-term effects. Alliance and Enbridge also argued that the assumption of abandoning the pipeline in place would minimize the disruption to landowners and the environment. As a result, these Applicants did not assume removal for the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. Trans-Northern further stated that removal of pipelines would have a greater impact than abandoning the pipelines in place. However, CAEPLA and MPLA stated that landowners are prepared to deal with the short-term disruption of pipeline removal in order to avoid the potential impacts of abandoning pipelines in place, as well as the long-term interference with land-use.

The Board also heard views from Applicants and intervenors regarding easement agreements as well as landowner consultation and landowner surveys. With respect to easement agreements, the Board notes MPLA's argument that some landowner easement agreements refer to possible removal of pipelines at the time of abandonment. With respect to landowner surveys, the Board notes that the CEPA landowner survey filed in this proceeding demonstrates that approximately 49.7 per cent of landowners have concerns with the pipeline being left in the ground. The Board further notes that MPLA's telephone survey indicated that 95 per cent of MPLA and SAPL landowners were concerned about future abandonment of Enbridge pipelines on their properties. While the Alliance study indicated that eight per cent of the landowners preferred the pipelines to be removed, this study nonetheless shows that some landowners have concerns with leaving pipelines in the ground.

The Board finds that all landowner surveys submitted in this proceeding show that some landowners have concerns with leaving pipelines in the ground. Moreover, intervenors participating in this proceeding have indicated that some landowners are concerned about pipeline abandonment-in-place. These landowners would be prepared to deal with the short-term disruption of pipeline removal rather than accept abandonment-in-place. However, notwithstanding the feedback received from landowners, Applicants chose to assume zero per cent removal. Given the nature of the feedback received, and the presence of easement agreements referring to possible pipeline removal, the Board finds that scenarios may occur in the future where pipelines may have to be removed. Accordingly, the Board finds this to be contrary to Applicants' assumption of zero per cent removal.

During this proceeding, there was discussion on the degree of subsidence associated with small, medium and larger diameter pipelines. The Board heard evidence from Applicants that subsidence for small diameter pipelines would be negligible. The Board notes that the CEPA Report also indicates this. With respect to medium and large diameter pipelines, Enbridge stated that the degree of subsidence associated with these pipelines may be sufficiently small so as to be in a tolerable range, and that site-specific conditions at the time of the abandonment would be important to determine the tolerable range. While the Board recognizes that such a position is based on statements in the CEPA Report, in the Board's view, no Applicant provided evidence clearly showing that subsidence in medium and large diameter pipelines would be similar to that of small diameter pipe, such that an assumption of no removal would be applicable to all pipeline diameters. Having reviewed the evidence in this proceeding, the Board accepts that subsidence for small diameter pipelines is likely to be negligible. However, the Board finds that it is not conclusive that subsidence for medium and large diameter pipelines would be negligible. Therefore, the Board is of the view that an assumption of zero per cent removal for medium and large diameter pipeline cannot be supported given the evidence presented.

The Board recognizes that in determining their abandonment method assumptions, all Applicants relied to varying degrees on the CEPA Report, including the Pipeline Abandonment Matrix Table, which sets out primary options for pipeline abandonment for various land-use categories. For example, in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories, the primary option is abandonment-in-place. The Board notes that there are several assumptions made in the Pipeline Abandonment Matrix Table, one of which is that site-specific assessments may override the primary options recommended in the table. Specifically, the CEPA report states that:

> ...site-specific assessments may determine that a combination of abandonment options be performed for the various land-use categories. In doing so, pipeline companies may determine a percentage split between the primary options in the matrix and any potential secondary option.

While all Applicants recognized that some site-specific assessments are likely to recommend that pipeline be removed, none of the Applicants accounted for removal in their cost estimates. The Board is of the view that Applicants' cost estimates have failed to adequately consider the potential for secondary options, such as removal, as identified in the CEPA Report. The Board recognizes that several Applicants stated that they would have an opportunity to refine their cost estimates in the future to reflect new learnings. However, given the Applicants' recognition that removal is likely to occur as a result of site-specific assessments, the Board would have expected Applicants' cost estimates to transparently account for this.

Several Applicants stated that their assumptions were based on the best currently available information, for example, the CEPA Report. The Board notes that the date on the CEPA Report is September 2006 – April 2007. The Board also notes that the studies referenced within the CEPA Report were carried out prior to the mid-1990's. Despite the date of the CEPA Report and the studies referenced within, no Applicant brought forward newer studies supporting an assumption of zero per cent removal on agricultural cultivated and non-cultivated lands for medium and large diameter pipelines. In the

Board's view, there has been ample opportunity for industry to initiate research in advancing the science related to abandonment. Such research would have provided better information to aid Applicants in establishing their abandonment assumptions. In any case, absence of such research and studies does not mean that the default assumption should be abandonment-in-place.

While none of the Applicants accounted for removal, the Board recognizes that Kinder Morgan, Trans Mountain, and Alliance stated they would utilize Cost Category 7 (Contingency) in the event that site-specific assessments at the time of abandonment suggested removal of pipeline. While Enbridge stated that they would use Cost Category 5a (Pipeline Removal), as described in Chapter 4, in these cases, Enbridge recognized that their allowance for that cost category is a lower percentage. TransCanada and Westcoast indicated that they had not specifically-earmarked contingency funds to allow for changes in scope such as for removal of pipe due to site-specific assessments. As indicated above, the Board expects that funds for removal of pipeline be provided for in a transparent manner.

Several Applicants argued that all pipelines are not equal and that each pipeline system has different features and characteristics such as terrain, land usage, pipe diameter, product carried, depth of cover, pipeline wall thickness, and pipe coatings. Applicants further argued that the individual characteristics of the various pipeline systems are critical to the appropriate abandonment methodologies and cost estimates. The Board is of the view that while this may be the case, Applicants have not adequately justified how they considered these and other factors described earlier in determining the abandonment method assumptions.

The Board is satisfied that Applicants' assumptions of zero per cent removal for small diameter pipelines in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" land-use sub-categories are acceptable. As described above, the Board is of the view that subsidence for small diameter pipelines is likely to be negligible. In the Board's view, site-specific assessments that may necessitate pipeline removal at the time of abandonment are substantially less likely to occur for small diameter pipelines. In addition, the Board finds that the concerns described by intervenors that may necessitate pipeline removal at the time of abandonment are less likely to be relevant for small diameter pipelines.

However, in the Board's view, the evidence in this proceeding shows that an assumption of zero per cent removal for medium and large diameter pipeline in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" land-use sub-categories is not reasonable. The Board is further of the view that reasonable removal proportion assumptions for medium and large diameter pipeline in these land-use sub-categories are more than zero per cent. Accordingly, the Board must now turn to the determination of what would be a reasonable assumption for these sub-categories.

The Board notes that its Base Case assumed 80 per cent abandonment-in-place and 20 per cent removal for the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" land-use sub-categories. While Applicants that filed pipeline-specific values do not have to prove that the use of the Base Case assumptions is inappropriate, the Board is guided by the RH-2-2008 Reasons for Decision. The RH-2-2008 Reasons for Decision indicates

that pipeline companies choosing to file their own pipeline-specific estimates should be prepared to justify any deviations from the Base Case assumption.

The Applicants have not successfully justified their deviation from the Base Case assumption for medium and large diameter pipe in these two land-use sub-categories. During the course of the MH-001-2012 hearing, all Applicants made submissions to the Board as to why the Base Case assumptions of 80 per cent abandonment-in-place and 20 per cent removal should not be imposed. The Board considered these comments but does not find them convincing. In addition, the Board also considered Applicants' responses to a Board request made during the course of the hearing. Applicants were asked to provide recalculated cost estimates for three theoretical scenarios – 10, 20 and 30 per cent removal on "Agricultural, Cultivated" and "Agricultural, Cultivated and Non-Cultivated" sub-categories, using their own methodologies. Finally, the Board considered the issues described above regarding easement agreements, landowner surveys, and the lack of provision for any site-specific issues that may necessitate removal. The Board has exercised its judgment in determining a reasonable assumption for medium and large diameter pipelines in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. In the Board's view, 20 per cent removal for medium and large diameter pipe in these land-use sub-categories is a reasonable, prudent and adequate starting point for estimating purposes.

As noted in Chapter 2, the Board found that a portion of privately-owned pasture land, whether cultivated or non-cultivated, could be cultivated at any time. In light of this reason, as well as the reasons described above, the Board has decided that it is reasonable to maintain consistency in removal assumptions for the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories.

The Board agrees with Applicants that the cost estimates will be regularly reviewed (at least every five years). The Board heard from Applicants that they were committed to advancing studies and research on the physical issues of pipeline abandonment, particularly in respect of Stream 4. The Board also heard from Applicants that as new technologies and best practices continue to evolve, there are opportunities to learn and revise the estimates accordingly. The Board notes that any new evidence justifying a different assumption can be brought forward during regular review of the cost estimates. As the Board stated in the RH-2-2008 Reasons for Decision, regular reviews will also mitigate the under or over-collection of funds.

The Board reiterates that the above assumptions are provided for use in the development of preliminary estimates of abandonment costs; they do not prescribe the ultimate method of physical abandonment that may be undertaken by a company. In addition, the above assumptions do not fetter the Board's discretion in terms of its assessment of the appropriate method of abandonment, or where appropriate, decommissioning or deactivation, during the course of a specific application.

Accordingly, the Board directs all Applicants who have medium and large diameter pipelines to re-file their cost estimates by 16 April 2013 based on a 20 per cent removal assumption for medium and large diameter pipelines in the land-use sub-categories "Agricultural, Cultivated" and "Agricultural, Non-Cultivated." The Board recognizes that some Applicants may have combined other sub-categories into these two sub-categories

and notes that the 20 per cent removal assumption would only apply to the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" land-use sub-categories.

Assumptions made by Applicants with pipe in "Non-Agricultural, No Future Development Anticipated" sub-category

For the "Non-Agricultural, No Future Development Anticipated" land-use sub-category, the Board notes that all Applicants assumed 100 per cent abandonment-in-place. The Board accepts the Applicants' assumptions for pipelines they own in this land-use category. The Board is not persuaded that an assumption of more than zero per cent removal for this sub-category is necessary. The Board reiterates that cost estimates will be regularly reviewed (at least every five years). Any new evidence regarding this land-use sub-category can be brought forward at that time.

Assumptions made by Applicants with pipe in "Non-Agricultural, Prospective Future Development" sub-category

For the "Non-Agricultural, Prospective Future Development" land-use sub-category, all Applicants, other than Kinder Morgan and Alliance, assumed 100 per cent removal.

The Kinder Morgan pipeline is a small diameter pipeline which traverses 7.1 km of prospective future development lands. Given the small diameter and length of the pipeline in this sub-category, the Board finds Kinder Morgan's assumption of abandoning-in-place an acceptable starting point for estimating purposes.

As stated in Chapter 2, Alliance separated "Prospective Future Residential Development" and "Prospective Future Industrial Development" into different sub-categories. For these sub-categories, Alliance considered removal only in extraordinary circumstances, that is, in the "Prospective Future Residential Development" sub-category. Alliance indicated that the question of whether to remove pipeline in the "Prospective Future Industrial Development" sub-category would be determined in consultation with the developer. The Board is not persuaded by Alliance's justification for its abandonment-in-place assumption for "Prospective Future Industrial Development." In particular, the Board is of the view that Alliance has failed to adequately justify why areas of prospective industrial future development would not require pipeline removal. The Board therefore directs Alliance to re-file its cost estimates based on 100 per cent removal for medium and large diameter pipeline for both "Prospective Future Residential Development" and "Prospective Future Industrial Development." The Board notes that Alliance has 2.4 km of small diameter pipeline in this sub-category. Therefore, the Board is of the view that Alliance's assumption of abandoning-in-place small diameter pipeline is an acceptable starting point for estimating purposes.

By the time Alliance's and Kinder Morgan's cost estimates are next reviewed, the Board would expect that they both consider whether their current assumptions for prospective future development for small diameter pipeline continue to be appropriate. If they determine that the current assumptions are appropriate, the Board would expect them to justify why this remains the case.

The Board accepts all other Applicants' assumptions for pipelines they own in this land-use category.

Assumptions made by Applicants with pipe in "Roads and Railways" and "Other Crossings (utilities, other pipelines)" sub-categories

The Board notes that Enbridge assumed that 25 per cent of standard road crossings would be cut, capped and filled instead of 100 per cent, which is the Base Case assumption described in the Board's 4 March 2010 letter. The Board acknowledges the pipeline-specific analysis conducted by Enbridge and the justifications provided in its evidence. The Board is of the view that Enbridge's assumptions for road crossings are reasonable.

The Board notes that TransCanada, Westcoast, Kinder Morgan and Trans-Northern assumed abandonment of small diameter pipeline in place without special treatment under road crossings. These Applicants justified their assumptions on the basis that subsidence in these cases is expected to be minimal. The Board accepts this rationale and is therefore of the view that this assumption is reasonable.

The Board notes that TransCanada assumed abandonment-in-place without special treatment of pipelines at utility crossings. As rationale for this assumption, TransCanada indicated that any concrete fill material could potentially impact the stability of utility facilities, since in the majority of instances, the utility being crossed lies below TransCanada's pipeline. The Board accepts this justification and finds that TransCanada's assumption is reasonable.

Finally, the Board accepts as reasonable all other assumptions proposed by the Applicants for roads and railways and for other crossings (utilities).

Assumptions made by Applicants with pipe in "Agricultural, Cultivated with Special Features"; "Non-Agricultural, Existing Developed Lands"; "Other Areas, Environmentally Sensitive Areas"; and "Other, Water Crossings" sub-categories

The Board notes that all Applicants, with the exception of Kinder Morgan, have assumed 100 per cent removal for pipelines in the "Agricultural, Cultivated with Special Features" sub-category. The Board finds that the assumptions proposed by these Applicants in this sub-category align with the Base Case. The Board finds that these assumptions are reasonable and accepts the Applicants' assumptions as filed.

With respect to Kinder Morgan, the Board notes that it has assumed 100 per cent abandonment-in-place for this sub-category. The Board further notes that Kinder Morgan has 0.8 km of pipeline in this sub-category, all of which is small diameter. Given the small diameter and length of the pipeline in this sub-category, the Board finds Kinder Morgan's assumption of abandoning-in-place acceptable.

The Board notes that all Applicants have assumed 100 per cent abandonment-in-place in the "Non-Agricultural, Existing Developed Lands" and "Other Areas, Environmentally Sensitive Areas" sub-categories (with or without special treatment). The Board finds that the assumptions proposed by Applicants for pipelines they own in these two sub-categories are consistent with the Base Case. In the Board's view, these assumptions are reasonable. The Board accepts the Applicants' assumptions for pipelines they own in these sub-categories as filed.

For the "Other, Water Crossings" sub-category, the Board notes that all Applicants assumed abandonment-in-place with or without special treatment. The Board notes that

Kinder Morgan proposed abandonment-in-place with special treatment (cut, cap and fill) for five per cent of the total water course crossings traversed by its pipeline, and that Trans Mountain assumed abandonment-in-place with special treatment for five per cent of its medium and large diameter pipelines. The Board's views on assumptions proposed by the Applicants are discussed in detail in Chapter 4.

Assumptions made by Applicants in the "Above-Ground Facilities" category

The Board notes that all Applicants, with the exception of Westcoast, have assumed complete removal for above-ground facilities. The Board finds the assumptions proposed by these Applicants for this category to be consistent with the Base Case. In the Board's view, the assumptions are reasonable. The Board accepts these Applicants' assumptions as filed.

As noted in the Board's RH-2-2008 Reasons for Decision, above-ground facilities on company-owned land will also need to be abandoned at some point, and therefore, the Board expects Applicants to provide for costs associated with removal of above-ground facilities on company-owned land in their abandonment cost estimates. Westcoast stated that the extent to which the above-ground facilities located on its lands (for example, compressor stations and processing plants) are removed would vary on a facility-by-facility basis. Nevertheless, the Board is of the view that Westcoast did provide for the costs associated with removal and disposal of all processing solutions and hazardous materials; removal of above-ground facilities that could pose a threat to the safety of the public; and remediation of soils.

Given the above, the Board accepts Westcoast's rationale as an adequate starting point for estimating purposes. However, by the time Westcoast's cost estimates are next reviewed, the Board would expect Westcoast to consider whether its current assumptions for above-ground facilities continue to be appropriate. If Westcoast determines that its current assumptions are appropriate, the Board would expect Westcoast to justify why this remains the case.

Comments made by Applicants on Pipeline Abandonment Physical Issues Research in respect of LMCI Stream 4

Most Applicants indicated during the course of the hearing that they were committed to advancing studies and research on the physical issues of pipeline abandonment. In particular, many Applicants made reference to LMCI Stream 4 studies.

In March 2012, the Board indicated on its website that it has followed through on all of the actions it had identified in its May 2009 LMCI Final Report for Stream 4. Accordingly, the Board considers the LMCI project to be closed for Stream 4.

However, the Board is strongly of the view that the issues identified through LMCI Stream 4 require further research and a multi-stakeholder approach to help resolve or fill the gaps in current knowledge relating to physical issues of pipeline abandonment. In this regard, the Board notes that, as stated above, most Applicants indicated during the course of the hearing that they were committed to advancing studies and research on the physical issues of pipeline abandonment. The Board encourages efforts by CEPA and its member companies to advance these studies and research.

Chapter 4

Abandonment Costs

Applicants' preliminary abandonment cost estimates consist of individual cost categories, a number of which relate specifically to the estimated costs for physical abandonment activities. Applicants used pipeline features, pipeline-specific abandonment assumptions, and other physical assumptions to arrive at preliminary abandonment cost estimates in total and by cost category.

The Board issued Table A-3 with its 4 March 2010 letter to provide definitions and a framework for these cost categories. Following input from stakeholders, the Board issued an amended version of Table A-3 (Appendix IV), adding ranges of Base Case Unit Costs for each cost category based on the specifics of the facilities to be abandoned.

This chapter outlines the Board's consideration of the Applicants' proposed physical abandonment costs as defined in Table A-3 (Appendix IV), with the exception of Cost Category 7 (Project Contingency) and Cost Category 3b (Provision for Post-Abandonment Activities). "Project Contingency" and "Provision for Post-Abandonment Activities" are further discussed in Chapters 5 and 6, respectively. This chapter also outlines the Board's consideration of the submissions made on the cost categories (except Cost Categories 3b and 7) by intervenors. A summary of the Applicants' submissions is contained in Appendix VI.

4.1 Engineering and Project Management

In its March 2010 letter, the Board defined the "Engineering and Project Management" cost category to include regulatory, legal and finance support, external relations and land support, environment, health and safety support, operations support, stakeholder consultation, detailed cost estimates, planning, applications, detailed engineering and environmental studies, engineering and project management, construction management, and project and cost control.

Table A-3 includes Base Case cost factors ranging from 20 per cent for pipeline abandonment projects less than 50 km in length, to five per cent for projects greater than 500 km in length. This cost factor is applied to the total costs estimated for Cost Categories 2 (Abandonment Preparation), 3a (Basic Pipeline Abandonment-in-Place), 4 (Special Treatment), 5 (Pipeline Removal), and 6 (Above-Ground Facilities).

Views of the Applicants

Alliance

Alliance submitted an overall estimated cost factor value of 4.8 per cent of its overall cost estimate for the "Engineering and Project Management" cost category.

Enbridge

Enbridge submitted that they used the Base Case assumption of five per cent of the total costs (excluding contingencies and post-abandonment provisions) to develop their estimates for this cost category.

Kinder Morgan

Kinder Morgan stated that it agrees with the Base Case of five per cent of the total costs (excluding contingencies and post-abandonment provisions) for this cost category, and based its estimates on this approach.

Trans Mountain

Trans Mountain stated that it used a different approach than the cost factor value to estimate costs in this category. Trans Mountain used a bottom-up approach to calculate costs for project management, engineering and survey, and field management and inspection categories, which, when added, are approximately 12 per cent of total engineering and construction costs. Trans Mountain stated that the approach it used is representative of expected costs and is a reasonable methodology for estimating this cost category.

TransCanada

TransCanada stated that project management, engineering, and construction management costs total five per cent of the overall costs for pipeline abandonment. TransCanada submitted that they relied on their historical experience with pipeline maintenance projects to determine these costs.

Trans-Northern

Trans-Northern submitted that it used the Base Case assumptions to develop its estimates for this cost category.

Westcoast

Westcoast applied a 10 per cent factor to the total of all abandonment cost items excluding "Provision for Post-Abandonment Activities" (Cost Category 3b) and "Contingency" (Cost Category 7). Westcoast stated that this factor reflects the economies of scale achieved when undertaking the abandonment of large parts of the pipeline system and is consistent with Westcoast's experience with large projects.

Views of the Board

The Board finds reasonable those estimates where Applicants have used the Base Case cost factor value of five per cent for this cost category (Enbridge, Kinder Morgan, Trans-Northern, and TransCanada). Where Applicants differed from the Base Case cost factor value (Alliance, Trans Mountain and Westcoast), sufficient justification has been provided in the form of past company experience or a rigorous analysis to support those estimates. The Board is therefore of the view that the cost estimates as filed by all Applicants for the "Engineering and Project Management" cost category are reasonable as a starting point for estimating the future costs of these activities. The Board approves these costs as filed.

4.2 Abandonment Preparation

The cost category "Abandonment Preparation" in Table A-3 consists of:

- Land access and cleanup: access rights and permits, temporary work space, damages, re-establishment of survey markers, as-built survey, update GIS, discharging rights.
- Pipeline purging and cleaning: pumping or drawing down gas; pipeline pigging, cleaning and purging, including pre-cleaning pig runs; isolating pipe sections, testing pipe for cleanliness; final cleaning pig runs, waste storage and disposal; cleanliness verifications (testing and analysis).

Table A-3 also presents Base Case Unit Costs for "Abandonment Preparation" that have low to high ranges based on factors such as pipeline terrain and product shipped. The "Abandonment Preparation" Base Case Unit Costs also vary with pipeline diameter. The ranges are: $4,000-$6,000 per km for small diameter, $6,000-$16,000 per km for medium diameter, and $12,000-$18,000 per km for large diameter pipeline.

Views of the Applicants

Alliance

Alliance stated that because of the predominantly flat terrain which its pipeline traverses, the average abandonment costs will generally be on the low side or low end of the Base Case Unit Cost ranges. Alliance submitted Unit Costs of $3,150 per km for land access and clean up, and $7,500 per km for pipeline purging and cleaning.

Enbridge

Enbridge stated that they used the Base Case scope of work for this cost category and developed Enbridge-specific cost estimates based on the pipeline terrain (flat) and product shipped (liquid hydrocarbons). Enbridge indicated that their costs are estimated on a per diameter-inch-km basis. Enbridge stated that since their systems are primarily comprised of larger sizes of pipe, their Unit Costs for this category are at or above the high end of the Base Case range. Enbridge Pipelines and Enbridge NW proposed a cost of $500 per diameter-inch-km for this category.

Kinder Morgan

Kinder Morgan stated that it included environmental activities, land preparation, and pipeline purging and cleaning in this cost category. Based on recent purging activities, Kinder Morgan was of the view that Unit Costs per km are relevant for estimating purging materials costs, but the cost of the other activities associated with this work would be a one-time set-up cost for the entire pipeline purge. Kinder Morgan estimated the overall cost, based on recent purging operations along the Cochin pipeline, as $295.60 per km.

Trans Mountain

Trans Mountain submitted that abandonment preparation includes the activities necessary to purge and clean the pipeline and that these activities are similar in nature to those required to prepare an in-service pipeline for cut-outs, tie-ins, and decommissioning. Trans Mountain included environmental assessment, land access, acquisition of temporary work space, venting of

the cleaned pipeline to reduce pressure, disposal of waste materials, and verification of cleanliness in the scope of work for this cost category. Trans Mountain provided a Unit Cost of approximately $16,900 per km.

TransCanada

For purging and cleaning work, TransCanada submitted that the cost estimates included costs for drawing down pipeline pressure using a pull-down compressor unit and venting the remaining gas to atmosphere; making sure of the removal of any liquids within the line via a bi-directional cleaning pig; using air or gas as the pressure medium; and if deemed necessary, conducting an additional cleaning pig run. TransCanada noted that all cleaning procedures and standards would be in accordance with clause 10.16.2 of the Canadian Standards Association Z662 standard, *Oil and Gas Pipeline Systems*.

TransCanada stated that cost estimates for purging and cleaning are based upon past and recent experience with pipeline cleaning activities. TransCanada further stated that they have performed this type of activity on several different segments and different pipe diameters within the TransCanada system of pipelines, and notably, as part of the scope of work for the transfer of the TransCanada Mainline Line 100-1 to the Keystone Pipeline Project. Another recent project cited by TransCanada involved cleaning a 30 km section of NPS 20 pipeline on the TransCanada Mainline in Ontario. TransCanada concluded that these projects provide a reasonable basis for extrapolating purging and cleaning costs. TransCanada proposed approximate costs for abandonment preparation of: $5,700 to $16,600 per km for TransCanada PipeLines; $15,100 per km for TransCanada Keystone; $16,100 per km for Foothills; $4,900 to $13,900 per km for TQM; and $4,700 to $14,500 per km for NGTL.

Trans-Northern

Trans-Northern submitted that Unit Costs were applied at the low end of the Base Case range. Trans-Northern further submitted that the lower end of the Base Case range was selected for its cost estimate as these costs best consider the type of product transported (refined products), and the flat terrain traversed by the pipeline. Trans-Northern estimated $4,000 and $6,000 per km for small and medium diameter pipeline, respectively.

Westcoast

Westcoast submitted that prior to the abandonment of any pipeline, regardless of land-use, it would undertake pipeline purging and cleaning activities as outlined in the CEPA Report. Costs of this type are for preparing a section of pipe between two booster or compressor stations and do not vary with the diameter of the pipe. Westcoast stated that section lengths are typically 40 km in its gathering system and 80 km in its transmission system, and that on a per km basis, costs for preparing pipe in its gathering system are approximately double those for its transmission system. Westcoast based its Unit Cost factor estimate for this cost category on its experience with pipeline replacement projects and pigging operations. Westcoast submitted costs of $7,200 per km for its gathering and processing facilities and $3,600 for its transmission facilities.

Views of the Board

The Board accepts as reasonable the estimates of those Applicants that have used Unit Costs predominantly within the Base Case ranges for the various pipe diameters in their respective systems (Alliance, Trans Mountain, Trans-Northern and TransCanada).

The Board notes that Enbridge submitted its Unit Costs for this category on a per diameter-inch-km basis as opposed to dollars per km for each diameter. In the Board's view, the inputs and methodologies used by Enbridge result in a Unit Cost that is reasonable.

Where Applicants have proposed estimates which are below the Base Case range (Kinder Morgan and Westcoast), these Applicants have used past purging and cleaning costs to develop their respective estimates. The Board is of the view that the use of these costs is a reasonable approach.

The Board accepts as reasonable the cost estimates filed by all Applicants for the "Abandonment Preparation" cost category. In the Board's view, these costs are a reasonable starting point for estimating the future costs of these activities. The Board approves these costs as filed.

4.3 Basic Pipeline Abandonment-in-Place

The "Basic Pipeline Abandonment-in-Place" cost category is applicable to all kilometres of pipeline abandoned-in-place. The Board defined "Basic Pipeline Abandonment-in-Place" to include installation of plugs to prevent water movement, removal of some underground components attached to the pipeline, and backfilling and reclamation of dig sites. Unit Costs range from $10,000 to $25,000 per km, the higher end of which would be applicable for challenging terrain that may require more frequent plugs.

Views of the Applicants

Alliance

Alliance stated that buried piping would typically be abandoned-in-place in an environmentally responsible and safe manner. Alliance further stated that the isolation and filling of pipe at road and railway crossings, together with the capping of adjacent pipe, will help prevent water conduit effects. Alliance included the costs for these activities in Cost Category 4 (Special Treatment). Alliance was further of the view that the isolation and capping of pipe at areas where mainline block valves are removed will also help prevent water conduit effects. Alliance included the costs for these activities in Cost Category 6 (Above-Ground Facilities).

Alliance submitted that over and above these water flow impediments, its cost estimate provides an allowance for the isolation and capping of the pipeline every 10 km on average, with the result being an allowance of segmentation activities at approximately every two km. Alliance incorporated a provision within its estimate for this work. Alliance submitted a Unit Cost for the "Basic Pipeline Abandonment-in-Place" cost category of $6,400 per km. Alliance stated that because of the predominantly flat terrain which its pipeline traverses, the average abandonment costs will generally be on the low end of the Base Case Unit Cost ranges.

Enbridge

Enbridge submitted that the activities in this category, as described by the Board, are intended to segment a pipeline to prevent water movement. Enbridge stated that Cost Categories 4 (Special Treatment) and 6 (Above-Ground Facilities) include segmentation activities and related costs, and that therefore, Enbridge did not include costs for the "Basic Pipeline Abandonment-in-Place" cost category. Enbridge noted however, that final pipeline segmentation decisions will be determined at the time of actual abandonment and would be based on the results of site-specific risk assessments.

Enbridge further noted that the approximate average distances between impediments to flow on their systems considered for this proceeding are 10.6 km for the Enbridge NW line and 2.5 km for other lines. With respect to Enbridge NW, they noted that the general spacing assumption of 10.6 km is reasonable. This is because the variability of land-use in the north is less than arable land in the south and that discontinuous permafrost conditions limit the potential for water movement. Given Enbridge's existing provision for segmentation activities, Enbridge stated that, should additional plugs be required for site-specific reasons, these costs would be insignificant and contingency funds would be available if required.

Kinder Morgan

Kinder Morgan did not include costs in the "Basic Pipeline Abandonment-in-Place" cost category. Kinder Morgan submitted that due to the segmentation activities at block valves and the cutting and capping activities planned at six of 118 water crossings (five per cent of the total water crossings), additional plugs were not considered necessary, especially in light of the gentle terrain which its pipeline traverses. Kinder Morgan further submitted that segmentation activities at block valves were included in Cost Category 6 (Above-Ground Facilities) and that cutting and capping activities at select water crossings were included in Cost Category 4 (Special Treatment).

Kinder Morgan stated that segmentation activities at block valves alone would provide a frequency of flow impediments approximately every 16 to 22 km. Kinder Morgan further stated that it did not consider property boundaries in its analysis of whether the distance between flow impediments was appropriate.

Trans Mountain

Trans Mountain did not include costs for the installation of plugs to prevent water movement in the "Basic Pipeline Abandonment-in-Place" cost category. However, Trans Mountain included costs for special treatment in this category. Trans Mountain stated that based on the number of road, railway, and utility crossings, in addition to the special treatment for water bodies in its system, abandonment would require approximately 3,500 cut-and-cap locations. Trans Mountain further stated that given the average 400-metre spacing between these cut and cap locations, it is not necessary to include additional plugs in its estimate. Trans Mountain noted that at the time of abandonment or perhaps before, a risk assessment may be conducted on cut-and-cap locations. Some of these cut-and-cap locations could be considered superfluous and therefore could move to other locations which might be better suited for considerations of the hilly terrain that the Trans Mountain system traverses.

TransCanada

TransCanada submitted that installing plugs to prevent migration of water in abandoned pipelines would be unnecessary as TransCanada assumed that pipe at pipeline crossings will be filled with concrete at highways, railways, paved roads, and gravel roads crossed by pipelines with a diameter of 355.6 mm (NPS 14) or greater. TransCanada included the costs for this activity in Cost Category 4 (Special Treatment). TransCanada also submitted that the extensive number of crossings present on the TransCanada systems, combined with the projected physical removal of pipeline in certain locations, would be adequate to prevent water conduits.

TransCanada noted that the distance between flow impediments would range from approximately one km on the TransCanada Mainline to 5.9 km on the Foothills system, but that site-specific assessments would take place at the time of abandonment with respect to segmentation activities. TransCanada stated that the cost estimates for these activities are sufficiently conservative to provide for variances to the number of segmentation points required as a result of site-specific assessments at the time of abandonment.

Trans-Northern

Trans-Northern stated that it applied the Base Case Unit Costs to all pipeline segments. Trans-Northern further stated that in accordance with the Base Case, it determined the Unit Cost for plug installation based on pipeline terrain. As the terrain crossed by the Trans-Northern system is predominantly flat, Trans-Northern used the low end of the Base Case Unit Cost range. Trans-Northern noted that challenging terrain sections were generally encountered in conjunction with crossings of commercially navigable waters and were provided for within its estimates for water crossings, covered under Cost Category 4 (Special Treatment). Trans-Northern proposed costs for this category of $10,000 per km.

Westcoast

Westcoast stated that the activities included in its estimate for this cost category are limited to the installation of water movement plugs, as the costs related to crossings are covered under Cost Category 4 (Special Treatment). Westcoast's removal of underground components is included in Cost Category 6 (Above-Ground Facilities). Westcoast further stated that the treatment at crossings and the removal of other facilities is expected to limit water movement, as the average distance between these segmentation activities is approximately 390 metres on the Westcoast system.

However, to provide for areas where a risk of environmental degradation or slope erosion due to the migration of water inside the pipe exists, Westcoast provided for the placement of foam water movement plugs installed using the methodology outlined in the CEPA Report. Westcoast submitted that while the cost of the fill material varies directly with the volume required and therefore with pipe diameter, this cost comprises only a small portion of the total cost for this Unit Cost factor, most of which does not vary with pipe diameter. Consequently, Westcoast used a single Unit Cost estimate of $270 per km of pipeline abandoned-in-place for all pipe sizes.

Views of the Intervenors

Some intervenors questioned the effectiveness of the segmentation activities proposed by Applicants to prevent water movement. Intervenors also raised concerns about the frequency of segmentation as it related to the potential transport of contaminants along pipelines. Intervenors

expressed fear that they would be held responsible for the effects that water conduits resulting from abandoned pipe may have on neighbouring properties. MPLA stated that capped pipe may burst if stagnant water inside the pipeline freezes, thus rendering capping ineffective in preventing abandoned pipe from being a conduit.

Views of the Board

The primary activity contemplated in the "Basic Pipeline Abandonment-in-Place" cost category is the mitigation of unwanted water movement in pipeline that is abandoned-in-place. Therefore, as part of its assessment for this cost category, the Board considered whether Applicants have reasonably provided for segmentation activities so as to appropriately mitigate unwanted water movement. The Board then assessed whether Applicants have reasonably estimated costs for conducting segmentation activities at regular intervals.

Provision for Segmentation Activities

Most Applicants indicated that segmentation would be finalized at the time of abandonment and would be based on the results of a site-specific assessment. The Board accepts that a site-specific assessment would assist in determining specific intervals between segmentation activities prior to the abandonment of a specific pipeline. However, the Board is of the view that until a site-specific analysis is completed, the most robust approach is for Applicants' estimates to include a suitable approximation of the distance between segmentation activities. While Applicants used different approaches for determining an appropriate interval between segmentation activities, most Applicants' proposals ranged from approximately 400 metres to six km. Based on the evidence in this proceeding, the Board accepts that while a 400-metre or similar interval may be necessary for pipelines traversing more challenging terrain or areas with a greater amount of infrastructure (for example, roads and railways), a larger interval between segmentation activities may be adequate in other cases. Therefore, the Board is of the view that a reasonable distance between segmentation activities could range between 400 metres to six km.

Enbridge NW proposed an interval between segmentation activities of 10.6 km. As justification, Enbridge NW stated that the variability of land use in the north is less than land in the south. While this figure is outside the range described above, the Board accepts this justification and is of the view that the proposal of 10.6 km is reasonable for Enbridge (NW).

Kinder Morgan's proposed interval between segmentation activities at block valves is between 16 to 22 km, with an additional six activities planned for water crossings. The Board notes that this proposed interval is considerably larger than the intervals proposed by other Applicants. In support of its approach, Kinder Morgan noted that additional plugs were not considered necessary in its initial estimate, especially in light of the gentle terrain which its pipeline traverses. The Board is not persuaded by this rationale, particularly since Kinder Morgan is proposing pipeline abandonment-in-place for all its system, and that special treatment is proposed for five per cent of water crossings. The Board therefore finds that Kinder Morgan's proposed interval between segmentation activities is not reasonable.

As described above, the Board finds that an interval between segmentation activities of 400 metres to six km is reasonable. Given the reasons previously described, the Board is of the view that an interval within this range is also a reasonable, prudent and adequate starting point for Kinder Morgan. The Board notes that cost estimates will be regularly reviewed (at least every five years). Accordingly, Kinder Morgan may bring forward any new evidence justifying a different interval between segmentation activities during regular review of the cost estimates. As the Board stated in the RH-2-2008 Reasons for Decision, regular reviews will also mitigate the under or over-collection of funds.

The Board concludes that the approaches to segmentation proposed by Alliance, Enbridge, TransCanada, Trans Mountain, Trans-Northern and Westcoast are reasonable. Kinder Morgan is directed to include in its cost estimate a provision for segmentation activities at an interval between 400 metres and six km, as described below.

Costs for Conducting Segmentation Activities

All Applicants proposed costs for conducting segmentation activities to some degree. Some Applicants were of the view that the segmentation activities proposed in other cost categories are appropriate such that additional funds are not needed for this cost category (Enbridge, TransCanada). Other Applicants (Trans Mountain) included costs relating to special treatment in this cost category, and submitted that these segmentation activities were sufficient such that no additional plugging was required. In the Board's view, the approaches proposed by Enbridge, TransCanada and Trans Mountain are reasonable. The Board accepts that no additional costs are required in addition to what has been estimated by these Applicants. For the Board's assessment of the costs proposed by Trans Mountain for special treatment, see section 4.4.

Alliance and Westcoast proposed segmentation activities in Cost Categories 4 (Special Treatment) and 6 (Above-Ground Facilities). Nonetheless, these Applicants included some degree of additional plugging in this cost category. The Board considered the costs included in this category and is of the view that they are reasonable. The Board approves the estimates of Alliance and Westcoast for this cost category as filed.

Trans-Northern applied the Base Case methodology and costs for this cost category. The Board finds that the costs provided by Trans-Northern in this cost category to be reasonable. The Board approves the estimates of Trans-Northern for this category as filed.

Kinder Morgan did not include costs in this cost category. Kinder Morgan submitted that no costs in this category were necessary due to segmentation activities at block valves (captured in Cost Category 6, Above-Ground Facilities) and cutting and capping activities planned at six water crossings (captured in Cost Category 4, Special Treatment). Given the Board's decision regarding the reasonableness of Kinder Morgan's proposed interval between segmentation activities, the Board finds that Kinder Morgan must include costs to account for more frequent segmentation.

The Board therefore directs Kinder Morgan to re-file cost estimates which include costs for segmentation activities at an interval between 400 metres and six km by 16 April 2013. Kinder Morgan should provide reasons for the interval selected. Costs for the segmentation activities shall be calculated based on the Unit Cost submitted by Kinder

Morgan for cutting and capping activities at water crossings. If Kinder Morgan is of the view that a different cost is more appropriate for these segmentation activities, Kinder Morgan shall provide additional justification, explaining why this is the case.

The Board notes landowner concerns regarding segmentation and the potential liabilities associated with abandoned-in-place pipelines becoming a conduit for water and potentially contamination. The Board is of the view that such concerns are legitimate. However, for the reasons described above, the Board finds that the estimates of the Applicants (with the exception of Kinder Morgan) in respect of segmentation to be a reasonable starting point. Nevertheless, Applicants should not take the Board's approval to suggest that the current approach to mitigating water movement will be acceptable to the Board on an indefinite basis. The Board is of the view that future research on segmentation activities is warranted to test the effectiveness of the proposed methodologies, and to identify better technologies, as well as, where possible, any solutions related to concerns expressed by landowners in this proceeding. The Board further expects that Applicants provide information to inform the Board's further consideration of these issues the next time cost estimates are reviewed.

4.4 Special Treatment

Table A-3 defines this category to include cut, cap and fill with cellular material at road, rail, and utility crossings. In Table A-3, the Board noted that until possible future clarification from the Board on any differences between default handling at river crossings and other crossings, parties should use the low end of the road, rail, and utility crossings for river and other crossings. The Base Case Unit Costs for this cost category range from $30,000 to $85,000 per crossing, varying with pipe diameter.

Views of the Applicants

Details regarding the Applicants' physical assumptions with respect to road, railway, utility and water crossings are contained in Chapter 3.

Alliance

Alliance noted that any pipeline that is abandoned-in-place with special treatment (that is, pipe at road and railway crossings) is planned to be isolated and filled with a cellular material such as concrete. Adjacent piping at these crossing sites is assumed to be capped.

The Unit Costs per crossing submitted by Alliance ranged from $15,400 for small diameter pipe to $51,400 for large diameter pipe.

Enbridge

To estimate costs for this cost category, Enbridge stated that it created bottom-up estimates that combined Enbridge's historical dig program costs and Enbridge's proprietary Dig Estimating Tool. Enbridge submitted Unit Costs for the "Special Treatment" cost category at the low end of the Base Case range and below. Enbridge further stated that while the Board provided a range of costs for small to large diameter pipelines, Enbridge determined that differences are less material for this category than for some others, and therefore, Enbridge's costs are closer to the costs set out by the Board for small diameter pipelines.

Enbridge Pipelines and Enbridge NW submitted costs for this category of $1,331 per diameter-inch-crossing for cut, cap and fill activities at road, rail and utility crossings, and $989 per diameter-inch-crossing for cut and cap activities at water crossings.

Kinder Morgan

Kinder Morgan did not include costs for special treatment of road and railway crossings. Based on its experience with an abandoned 10 and 12-inch pipeline system, Kinder Morgan submitted that it has no reason to believe there would be issues with these types of crossings. Based on a tabletop evaluation of the 118 water crossings traversed by its pipeline system, Kinder Morgan assumed that five per cent of these crossings would need to be cut, capped, and filled, for a total of six sites. The cost submitted by Kinder Morgan for this activity was $25,000 per site.

Trans Mountain

Trans Mountain provided its process for estimating special treatment costs, which included the development of semi-detailed estimates of the work to be completed at different types of crossings.

Trans Mountain stated that special treatment was not itemized and categorized as an individual cost but rather bundled in the costs of other abandonment tasks. In particular, Trans Mountain noted that as part of Cost Category 3a (Pipeline Abandonment-in-Place), Trans Mountain considered pipeline crossings at infrastructure such as roads, railways and utilities, and environmentally sensitive areas like water crossings. Trans Mountain stated that special treatment will occur at all 1,255 named road, railway and utility crossings, and at 355 of 929 (38.2 per cent) watercourse crossings.

Trans Mountain submitted costs ranging from $13,170 to $35,860 per crossing.

TransCanada

TransCanada stated that their cost estimates for all crossings requiring special treatment are based on cost quotations obtained from a representative concrete product manufacturer and include the cost for concrete pumps, either truck mounted or transported to site. TransCanada added that these estimates also include the cost associated with cutting and capping the pipe.

TransCanada proposed a range of costs for activities at crossings: from $1,342,000 to $3,443,000 per km for TransCanada PipeLines; $1,187,000 to $2,352,000 per km for TransCanada Keystone; from $1,775,000 to $2,704,000 per km for Foothills; from $206,000 to $2,494,000 per km for TQM; and from $1,076,000 to $5,957,000 per km for NGTL.

Trans-Northern

Trans-Northern stated that block and check valves are located on either side of major water crossings, and costs for removal of these facilities are included in Cost Category 6 (Above-Ground Facilities).

Trans-Northern stated that it used the low end of the Base Case for special treatment costs due to the close proximity of fill sources to its pipeline system. Trans-Northern submitted per crossing costs ranging from $30,000 (small diameter pipeline) to $35,000 (medium diameter pipeline).

Westcoast

Westcoast stated that its Unit Costs have been prepared from activity-based engineering estimates using data from comparable projects already undertaken by Westcoast, and from contractor estimates. Westcoast submitted special treatment Unit Costs ranging from $15,000 to $38,900 per crossing.

Views of the Board

As stated in Chapter 3, the Board accepts as reasonable the assumptions proposed by Applicants for roads, railway and utility crossings.

With regards to the assumptions made by Applicants for water crossings, the Board notes that a variety of assumptions have been proposed. For example, Alliance proposed abandonment-in-place with no special treatment. Enbridge, TransCanada, Trans-Northern and Westcoast did not propose filling the pipeline with cellular material, but indicated that the pipe would be cut and capped, while Kinder Morgan and Westcoast proposed special treatment at certain crossings with the remainder of pipeline to be abandoned-in-place (no special treatment). The Board is of the view that the decisions regarding special treatment at a given water crossing are pipeline-specific and site-specific in nature. The Board is further of the view that at the time of abandonment, there may be some flexibility as to the location of segmentation activities. Such flexibility would result from situations where crossings occur in close proximity to one other, for example, a water body adjacent to a road crossing. Some of these situations may allow for a reduction in the total number of segmentation activities. Given the flexibility as to location of segmentation activities, the Board is of the view that the assumptions made by Applicants for watercourse crossings are sufficient. The Board accepts as reasonable the assumptions proposed by Applicants for the "Other, Water Crossing" sub-category.

In addition to the assumptions made by Applicants for roads, railway, utility and water crossings, the Board also considered the Applicants' cost estimates for the special treatment of these crossings. Trans-Northern used the Base Case Unit Costs. The Board accepts Trans-Northern's Unit Costs as reasonable. All other Applicants' estimates are predominantly outside the Base Case range. However, the Board is of the view that sufficient justification has been provided for these Applicants' estimates, in the form of semi-detailed estimates, contractor estimates or company experience. The Board therefore accepts as reasonable the estimates filed by Alliance, Enbridge, Kinder Morgan, TransCanada, Trans Mountain and Westcoast for the "Special Treatment" cost category. In the Board's view, these estimates are a reasonable starting point for estimating the future costs of these activities. For this category, the Board approves all Applicants' estimates as filed.

The Board notes that a variety of approaches and costs were proposed for this cost category. In the Board's view, this is indicative of the need for future collaborative study in this area. The Board encourages all Applicants to work together in this area to determine the safest and most effective practices upon which to base future cost estimates.

4.5 Pipeline Removal

This cost category applies to all pipelines proposed to be removed, as contemplated in the Base Case; for example, pipelines in areas of prospective future development. In addition to the costs of pipeline removal, the category also includes costs for backfilling the cavity and restoration of the land, including activities such as: removing impediments and topsoil stripping; excavation; cutting and capping of pipelines; cutting of pipeline sections and removal to stockpile; loading and hauling of removed lines; disposal of lines; coating and associated facilities; backfill; compaction; restoration; reclamation and remediation of contamination; fencing and clean-up; soil decompaction; re-vegetation; and inspection of removal activities. In Table A-3, the Board presented Unit Cost ranges for pipeline removal on a per km basis for small ($100,000 - $250,000), medium ($300,000 - $800,000), and large diameter pipe ($450,000 - $900,000).

Views of the Applicants

Alliance

Alliance submitted Unit Costs for pipeline removal that are within the Base Case Unit Cost ranges. Alliance proposed costs for this category of $320,000 and $480,000 per km for medium and large diameter pipelines respectively.

Enbridge

Enbridge Pipelines provided their methodology for estimating pipeline removal costs, which included modifying cost data from recent construction projects to simulate the scope of pipeline removal, and creating a bottom-up cost estimate using Enbridge's proprietary Cost Estimating Tool for validation purposes.

Enbridge Pipelines stated that their experience suggests that the estimates provided in the Base Case for pipeline removal and backfilling are more reflective of the cost of constructing a pipeline than for abandonment. For the purposes of preparing the cost estimates, Enbridge Pipelines removed or reduced elements that are unique to construction activities. Although the resulting cost estimates are below the Base Case range, Enbridge Pipelines was of the view that the rigour used to establish the cost estimates justifies the departure from the Base Case range.

Enbridge (NW) did not file costs for the "Pipeline Removal" cost category while Enbridge Pipelines proposed a cost for this category of $7,273 per diameter-inch-km.

Kinder Morgan

Kinder Morgan proposed no pipe removal during abandonment due to the lack of prospective future development sites along its pipeline and the absence of other areas that warrant special consideration for pipe removal. Accordingly, Kinder Morgan did not file costs for the "Pipeline Removal" cost category.

Trans Mountain

Trans Mountain stated that the tasks assigned to this cost category align with those listed in Table A-3. Pipeline removal activities considered include: ditching, pipe cutting and hauling, and backfilling, along with intermediate steps required to complete these activities. Costs for RoW restoration were also included in the estimates. In addition to the costs associated with pipe

removal, Trans Mountain also estimated salvage value. Trans Mountain acknowledged that the Base Case does not include salvage value. However, Trans Mountain was of the view that it is appropriate to include this salvage value in its estimate. Trans Mountain set the salvage value at approximately 0.9 per cent of the total cost of pipeline removal.

Trans Mountain provided an estimate for this cost category of $560,000 per km of pipe removed.

TransCanada

TransCanada stated that their cost estimates for pipeline removal and land reclamation are based, generally, on actual experience with pipeline replacements where old pipe must be physically removed prior to the installation of new pipe, as well as experience in remediation and reclamation efforts after pipeline installation. TransCanada further noted that in their experience, pipeline removal is less expensive than construction.

TransCanada provided four examples of recent (carried out in the last 10 to 15 years) pipe replacement projects that, in their view, provide a reasonable basis for extrapolating the costs associated with removal activities.

TransCanada proposed a range of costs for pipeline removal and associated activities for its pipelines as follows: from $198,100 to $386,900 per km for TransCanada PipeLines; from $204,500 to $303,700 per km for TransCanada Keystone; from $255,400 to $368,200 per km for Foothills; from $186,000 to $394,400 per km for TQM; and from $104,100 to $322,400 per km for NGTL.

Trans-Northern

Trans-Northern submitted that its Unit Cost for this cost category was based on actual costs (adjusted for inflation). Trans-Northern stated that examination of the pipeline removal costs for its NPS 10 Prescott Lateral pipeline, inflated to today's dollars, revealed that these costs were well below the Base Case. Additionally, Trans-Northern applied size factors to other pipeline diameters found in its system to develop the Unit Costs.

Trans-Northern's pipeline-specific Unit Costs for small and medium diameter pipelines were $25,000 and $75,000 per km, respectively.

Westcoast

Westcoast's Unit Costs for removing pipeline include provisions for additional soil to fill the cavity previously filled by the pipe proposed to be removed; replacement of topsoil; re-vegetation of the RoW; and compensation to landowners for two years of crop or pasture losses.

Westcoast stated that its pipeline removal costs are based on applying its contractor's Unit Costs for equipment and labour to the scope of work involved in removing pipe. Westcoast stated that it refined its estimates following participation in the technical workshop that led to the Base Case range of costs. Westcoast stated that its Unit Costs for pipeline removal are below the Base Case range for medium and large diameter pipeline.

Westcoast provided costs for pipeline removal and associated activities of $250,000, $269,000, and $330,000 per km for small, medium, and large diameter pipelines respectively.

Views of the Board

The Board notes that Applicants submitted cost estimates for the removal of pipe in some, but not all, of the land-use categories for which pipeline removal was contemplated in the Base Case; for example, the "Non-Agricultural, Prospective Future Development" category.

Alliance and Trans Mountain filed Unit Costs for the "Pipeline Removal" cost category within the Base Case range. Therefore, the Board accepts these Applicants' Unit Costs as reasonable and approves them as filed.

Trans Mountain assumed a salvage value of 0.9 per cent of pipeline removal costs. The Board notes that the Base Case assumes a salvage value of zero. The Board is of the view that the inclusion of this salvage value is minor in the context of Trans Mountain's total abandonment cost estimate and therefore accepts Trans Mountain's approach to salvage value on this basis.

Enbridge Pipelines, TransCanada, Trans-Northern and Westcoast have filed estimates which are outside the Base Case range for this cost category. However, the Board is of the view that these Applicants have provided sufficient justification for their estimates in the form of bottom-up estimates, past pipeline replacement or removal costs, or modified construction costs. The Board therefore accepts these Applicants' cost estimates for the "Pipeline Removal" cost category as a reasonable starting point for estimating the future costs of these activities. The Board approves these costs as filed.

Kinder Morgan and Enbridge (NW) did not file cost estimates for pipeline removal. All of Enbridge (NW) and Kinder Morgan's pipelines is small diameter. As described in Chapter 3, the Board determined that an assumption of zero per cent removal for small diameter pipelines is acceptable. Given the above, the Board accepts Kinder Morgan's and Enbridge (NW)'s approach to the "Pipeline Removal" cost category as reasonable.

4.6 Above-ground Facilities

Table A-3 defines the "Above-Ground Facilities" cost category to include purging and cleaning; piping and fabrications; site reclamation (remediation of contamination, re-contouring, replacement of topsoil, re-vegetation); demolition (as applicable); hauling material away and removal of associated underground tanks. Unit Costs for this cost category include restoration of land as close as possible to the surrounding land. They do not include the value of any above-ground facilities that may be salvaged and re-used. Table A-3 (Appendix IV) sets out Unit Costs for a range of facilities, but acknowledges that the list of facilities is not exhaustive and that companies should also provide estimates for other unlisted facilities.

Views of the Applicants

Details regarding Applicants' physical assumptions for above-ground facilities are contained in Chapter 3.

Alliance

Alliance submitted that the Unit Costs proposed for above-ground facilities listed in the Base Case are within the Base Case Unit Cost ranges. Alliance further submitted that its estimate was

derived in a bottom-up fashion, utilizing individual cost component forecasts specific to Alliance. For example, Alliance provided costs of $26,800 per mainline block valve.

Enbridge

Enbridge estimated their Unit Costs for this category by using historical removal costs where the data was available. The Enbridge proprietary Cost Estimating Tool was used for activities where historical cost data was not available. For certain facilities that the Cost Estimating Tool was not designed for, Enbridge stated that a bottom-up cost estimate was produced.

Enbridge Pipelines and Enbridge NW's resulting Unit Cost estimates for facility-types included in the Base Case ranged from the low end of the Base Case Unit Costs for pump stations ($200 per horsepower) to higher than the Base Case range for block valve assemblies ($56,000 to $71,000). Enbridge Pipelines and Enbridge NW also submitted costs for facility-types not included in the Base Case, for example, $3.50 per barrel for above-ground tanks.

Kinder Morgan

Kinder Morgan was of the view that the "Above-Ground Facilities" cost category includes the removal of all above-ground pump stations and buried block valves. Cost estimates for block valves and pump stations were based on recent construction activities completed and are within the Base Case range. For example, Kinder Morgan proposed a cost of $40,000 per block valve.

Trans Mountain

While not all of the components of mainline block valves and stand-alone trap facilities are above-ground, Trans Mountain stated that it included these facilities in this cost category rather than in the category of "Pipeline Abandonment-in-Place" (Cost Category 3a).

Trans Mountain submitted that the "Above-Ground Facilities" cost category as presented in Table A-3 did not specifically consider terminals as a separate category. Trans Mountain further submitted that its system has terminals located in Edmonton, Alberta and Burnaby, British Columbia and intermediate delivery points at Kamloops and Sumas, British Columbia, which are considered terminals for the purposes of the estimate. Trans Mountain also noted its 25 pump stations (including those located at Edmonton, Alberta and Kamloops and Sumas, British Columbia).

Trans Mountain indicated that estimates for all facilities were done on a site-by-site basis. For terminals and stations, costs were included for cleaning of tanks and piping, and allowances were made for contaminated soil and scrap value.

Trans Mountain submitted costs for facility-types that are both included and not included in the Base Case. Trans Mountain's preliminary cost estimates for pump station demolition, which is a facility-type included in the Base Case, averaged approximately $567,000 per station. The highest cost item in this category submitted by Trans Mountain is for the demolition of its terminals, which is not included in the Base Case, at approximately $9.1 million per terminal.

TransCanada

TransCanada stated that their scope of work for above-ground facilities is in line with that of the Base Case.

TransCanada stated that their cost estimates for removal of above-ground facilities are based on their experience with the retirement of compressor stations and metre station facilities. TransCanada further stated that, since 1995, they have retired seven compressor stations in Saskatchewan, Manitoba and Ontario, as well as approximately 150 metre stations on the NGTL gas pipeline system.

TransCanada stated that their costs for above-ground facility-types included in the Base Case are generally within the Base Case range. For example, proposed costs for removing meter stations were (on a per station basis): $104,700 for TransCanada PipeLines; $114,100 for TransCanada Keystone; $114,700 for Foothills; $88,500 for TQM; and $104,600 for NGTL.

Trans-Northern

Trans-Northern submitted that its cost estimate for above-ground facilities included costs associated with abandonment of pump stations, meter stations, block valves, and junctions. Trans-Northern further stated that the Base Case Unit Cost ranges were validated by a third-party demolition contractor, and that for the most part its estimates for typical facility types fall within the Base Case Unit Cost range. Trans-Northern applied decommissioning costs to each of its facilities, while additional charges (for example, remediation) were based on site-specific factors. Trans-Northern stated that its "Above-Ground Facilities" Unit Cost was generally within or above the Base Case Unit Cost range. For example, Trans-Northern submitted costs of $33,600 per block valve.

Westcoast

Westcoast stated that cost estimates for its processing facilities (Fort Nelson, McMahon, Pine River, Sikanni, Kwoen, Patry and Aitken Creek, British Columbia) and for three compressor stations, have been prepared based on site drawings, equipment lists and aerial photos. Westcoast used the representative compressor station estimates to apply factored estimates to its remaining compressor stations. Westcoast assumed that some compressor equipment and generation sets will have value in the used equipment market and therefore can be sold at the time of abandonment. Westcoast further stated that cost estimates for the other above-ground facilities were derived based on Westcoast's experience in the engineering and construction of these facilities. Westcoast submitted that the Unit Costs provided for above-ground facilities are generally within the Base Case Unit Cost range. Westcoast proposed costs for facility-types included in the Base Case, for example, from $200,000 to $4.9 million per compressor station. Westcoast also proposed costs for facility-types not included in the Base Case. For example, for processing plants, Westcoast proposed from $700,000 to $36 million per processing plant.

Views of the Board

Applicants' physical assumptions for above-ground facilities are discussed in Chapter 3. Applicants' proposed costs for "Above-Ground Facilities" are discussed below.

The Board notes that all Applicants have proposed estimates for facility-types that are referenced in the Base Case. Examples of such facility-types include block valves, meter stations, compressor stations and pump stations. The Base Case sets out Unit Costs for these facility-types. All Applicants, with the exception of Kinder Morgan, also proposed estimates for facility-types that are not referenced in the Base Case, such as gas plants.

For facility-types included in the Base Case, the Board is satisfied with the level of detail that Applicants have provided to support the estimates presented. The Board is further of the view that the inputs and methodologies used by Applicants result in Unit Costs that fall predominantly within the Base Case ranges. The Board finds that the estimates proposed by all Applicants for facility-types included in the Base Case are reasonable.

For facility-types not included in the Base Case, the Board is of the view that Applicants have justified their proposed costs by using site-specific or facility-type specific estimates, contractor estimates or company experience. The Board finds that the estimates proposed by Applicants for facility-types not included in the Base Case to be reasonable.

As discussed in Chapter 3, Westcoast has not accounted for complete removal of above-ground facilities. By the time Westcoast's cost estimates are next reviewed, the Board would expect Westcoast to consider whether these current cost estimates for above-ground facilities continue to be appropriate. If Westcoast determines that its current cost estimates are appropriate, the Board would expect Westcoast to justify why this remains the case.

Trans Mountain and Westcoast assumed some salvage value in this category. However, neither Applicant indicated the figure that they assumed for salvage value. While the Board has accepted the costs proposed by Trans Mountain and Westcoast, it did not assess the impact of salvage value on the estimates in this category. If salvage value is to be included in future estimates, the Board expects Applicants to provide a more detailed accounting and further justification for its inclusion.

Given all of the above, the Board approves Applicants' estimates for the "Above-Ground Facilities" cost category as filed.

Chapter 5

Contingency Costs

The "Project Contingency" cost category (Cost Category 7), like all Unit Costs, directly impacts the overall estimated costs for physical abandonment activities.

Table A-3 (Appendix IV), which defines the Base Case contingency as 25 per cent of estimates flowing from Cost Categories 2 (Abandonment Preparation), 3a (Basic Pipeline Abandonment-in-Place), 4 (Special Treatment), 5 (Pipeline Removal), and 6 (Above-ground Facilities). Cost Categories 2, 3a, 4, 5 and 6 are discussed in Chapter 5. Table A-3 also indicates that contingency allowances are influenced by many factors, including the quality of the project cost estimate. In its 21 December 2010 letter, the Board stated that, in the interest of transparency, it finds it useful to see contingency as a separate line item in cost estimates, even when the cost has been developed from individual cost categories.

This chapter sets out the Board's assessment of Applicants' proposed approach to the "Project Contingency" cost category for abandonment projects (Cost Category 7). Contingency related to post-abandonment handling of remediation events (Cost Category 3b) is discussed in Chapter 6.

Alliance

Alliance considered its estimate to be a Class IV estimate under the Association for the Advancement of Cost Engineering International (AACEI) classification system. Based on its experience, Alliance stated that a Class IV estimate could provide a certain level of comfort. Alliance further stated that its cost estimating approach focused primarily on the uncertainty of costs for abandonment activities that are already known or expected to be part of abandonment projects.

Alliance assumed a total contingency amount of $35.9 million. Alliance stated that this amount represents 19.3 per cent of Alliance's overall cost estimate. Alliance applied contingency levels across each one of the cost categories. Alliance stated that contingency levels range from 17 to 50 per cent, and were dependent on Alliance's comfort level with the activity and what the prospective activity may be. For example, Alliance included a contingency of 50 per cent for Cost Category 3b (Provision for Post-Abandonment Activities) and 17.5 per cent for Cost Category 5a (Pipeline Removal). Alliance submitted that its proposed contingency is more than the Base Case.

Enbridge

Enbridge applied a proprietary Systematic Contingency Estimating Tool to determine the appropriate contingency amount for their abandonment cost estimates. Enbridge stated that the Systematic Contingency Estimating Tool is updated quarterly based on learnings from past projects. Enbridge further stated that this estimating tool is used on all projects of all sizes. Enbridge submitted that the Systematic Contingency Estimating Tool indicated that their cost estimates would fall under a Class III estimate using the AACEI classification system. However, since the actual occurrence of events would not be until many years in the future, Enbridge upgraded the estimate to a Class IV estimate.

Enbridge stated that their approach for estimating contingency costs took into account unforeseen unknowns which may impact the scope of abandonment projects.

Enbridge assumed a 13 per cent contingency with a 50 per cent probability of over-run or under-run. Enbridge Pipelines assumed a total contingency amount of $54.5 million. Enbridge NW assumed a total contingency amount of $29.7 million.

Kinder Morgan

Kinder Morgan submitted that it had successfully used an average 10 per cent contingency in past projects. Kinder Morgan further stated that even though this contingency amount is less than the Base Case, it is consistent with Kinder Morgan projects in Canada. Kinder Morgan indicated it does not typically follow the approach of adding a large contingency to cover scope changes. Instead, Kinder Morgan stated that it prefers to better define the scope at the appropriate time in the life-cycle of an undertaking. Kinder Morgan assumed a total contingency amount of $791,100, or 10 per cent.

Trans Mountain

Trans Mountain considered its cost estimate to be a Class IV estimate under the AACEI classification system. Trans Mountain chose Class IV based on its own internal standard for identifying or associating the class of estimate with the nature of the estimating methodology.

Trans Mountain stated that it does not typically follow the approach of adding a large contingency to cover scope changes, preferring instead to better define the scope at the appropriate time in the life-cycle of an undertaking.

Trans Mountain indicated that it typically funds projects at the P65 cost level, meaning there would be a 65 per cent chance that its actual costs would be less than the estimated costs and a 35 per cent chance that its actual costs would be more than the estimated costs. Trans Mountain indicated that the Class IV AACEI cost risk profile allows for a 15 per cent contingency. Trans Mountain further stated that allowances for insurance and taxes for its entire cost estimate were also included in the contingency category. Trans Mountain submitted that the elements in this category make up 22.3 per cent of its total abandonment cost estimate, or $48.0 million.

TransCanada

TransCanada considered their cost estimates to be a Class V estimate under the AACEI classification system. TransCanada noted that the overall project scope of the estimates is defined by the abandonment methodology, the length and diameter of pipe to be abandoned, and the number of facilities to be abandoned. However, TransCanada stated that there are still project definition deliverables that have not been determined at this time. TransCanada further stated that additional project definition work would be necessary to advance their cost estimates to a Class IV.

TransCanada did not include any unforeseen unknowns related to a change in project scope in their cost estimates. TransCanada expected that they would have the opportunity to re-evaluate the cost estimating approach and cost estimates on a periodic basis.

TransCanada assumed a contingency of five per cent for all their cost estimates. However, this contingency was not shown as a separate line item. TransCanada provided three reasons to

justify their contingency. First, in TransCanada's view, the overall scope of the project is known. Second, the Class V estimate typically would account for a 15 per cent contingency. However, there are additional risks with new pipeline construction that are not applicable to abandonment, including steel price fluctuations, schedule risks that could impact an in-service date, and a more complex work scope (for example, directional drills and crossings). Third, TransCanada noted that a number of conservative assumptions were built into the existing estimate, for example, no economies of scale and no large-scale productivity or technology improvements. TransCanada submitted that the AACEI was not the driving factor in determining the five per cent contingency. However, based on the variability of the estimate as defined by AACEI and TransCanada's knowledge of the project and type of work, TransCanada submitted that a five per cent contingency was appropriate.

Trans-Northern

Trans-Northern stated that its proposed contingency was based on its experience with other pipeline projects, including pipeline maintenance and facility projects. Trans-Northern submitted that the assumed contingency did not account for changes in project scope. Trans-Northern was of the view that if there was significant change in technology or scope, it would continually update its estimate over time to reflect these changes. Trans-Northern assumed a contingency of $6.5 million or 15 per cent.

Westcoast

Westcoast applied a contingency allowance based on a high level of certainty regarding the quantity and type of pipeline assets, the comprehensive scope of abandonment work identified in the CEPA Report, and Westcoast's experience in the maintenance, construction, and replacement of pipelines. Westcoast assumed a contingency of 10 per cent of its abandonment cost estimate. Westcoast also assumed a final contingency of $24.8 million for its gathering and processing facilities, and a final contingency of $21.0 million for its transmission facilities.

Views of the Board

The Board recognizes that all Applicants have used different methodologies to determine their proposed contingency. Despite these different methodologies, the Board is of the view that each Applicant has adequately justified their proposed contingency. The Board therefore finds that each Applicant's contingency is reasonable and approves each Applicant's contingency as filed.

The Board finds that Alliance's methodology was particularly transparent and commends Alliance for its approach to contingency. The Board encourages all Applicants to work towards a more transparent and rigorous approach to calculating contingency in their cost estimates. Where possible, the Board would also encourage Applicants to work together to collaboratively develop a consistent approach to contingency that is suitable for all companies.

Enbridge's contingency estimates provide for unforeseen unknowns due to potential changes in project scope. Such unforeseen unknowns may include the possibility of removal of medium or large diameter pipeline on agricultural cultivated and agricultural non-cultivated lands as a result of a site-specific assessment conducted at the time of abandonment. In addition to the Base Case, Alliance's contingency estimate includes a

contingency of 50 per cent for Cost Category 3b (Provision for Post-Abandonment Activities). As described in Chapter 3, the Board has directed Applicants to re-file their cost estimates based on a 20 per cent removal assumption for medium and large diameter pipelines in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" land-use sub-categories. As described in Chapter 6, the Board directed Applicants to re-file their financial provisions for post-abandonment to provide for perpetual monitoring and perpetual remediation. Given this direction, the Board is prepared to allow Applicants that provided in their contingency for the possibility of additional removal being required at the time of abandonment, or for additional contingency greater than the Base Case, to adjust their contingency accordingly. The Board reiterates that adjustments should only be made to account for the Board's direction to assume, for cost estimating purposes, 20 per cent removal of medium and large diameter pipe on agricultural cultivated and non-cultivated lands or perpetual post-abandonment monitoring and remediation. Any Applicant that wishes to make such an adjustment as described above should file this adjustment with justification by 16 April 2013.

Trans Mountain included an amount for taxes and insurance as part of its contingency. The Board notes that taxes and insurance are currently not included in the Base Case. The Board accepts Trans Mountain's addition of taxes and insurance on the basis that such costs are likely to have an impact on contingency. The Board encourages other Applicants to consider the necessity of taxes and insurance in future estimates.

The Board notes that TransCanada's proposal of five per cent contingency is the lowest filed by any Applicant. The Board further notes the extensive expertise of all Applicants in estimating contingencies, including TransCanada, as well as the rationale provided by TransCanada in support of its contingency estimate. Finally, the Board notes that cost estimates will be regularly reviewed (at least every five years). Accordingly, by the time TransCanada's cost estimates are next reviewed, the Board would expect that TransCanada will have considered the methodologies provided by other Applicants in this proceeding and determined whether these methodologies or portions thereof are appropriate for TransCanada. If, at that time, TransCanada determines that its current contingency continues to be appropriate, the Board would expect TransCanada to justify why this remains the case.

The Board also notes that TransCanada's contingency was not included as a separate line item in their cost estimates. In the RH-2-2008 Reasons for Decision, the Board stated that funds for abandonment should be collected and set aside in a transparent manner. The Board continues to recognize the value of transparency and therefore directs TransCanada to submit revised cost estimates, reporting contingency as a separate line item, by 16 April 2013.

Chapter 6

Financial Provision for Post-Abandonment Activities

Financial provisions for post-abandonment activities apply to all pipelines proposed to be abandoned-in-place.

In Table A-3, the Board stated that post-abandonment activities may include financial provisions for periodic monitoring and for contingencies, such as later removal of some pipeline or associated facilities if remediation events occur. Remediation events include subsidence issues, pipe rising to the surface, or discovery of contamination. The Board also stated that this cost category would include costs for line locations, as needed; maintenance of signage; erosion and subsidence; frost heave control; pipe displacement at slopes or river crossings; remediation of contamination; the creation of waterways or soil damage problems; weed control (where not dealt with under an easement agreement); or any other problems created by the presence of a pipeline.

The post-abandonment financial provisions in the Base Case would provide for perpetual monitoring of pipelines abandoned-in-place. These provisions would also provide for an allowance to cover remediation events into perpetuity, taking into account the likely frequency and cost of remediation events. With respect to monitoring, a financial provision of $13,333 was derived, using an annuity factor of 66:1 to cover an estimated cost of $200 per km per year. Including an estimated allowance for remediation events brings the total financial provision to $20,000, $60,000 and $97,000 per km of small, medium and large diameter pipe, respectively.

This chapter discusses Applicants' financial provisions for post-abandonment activities. A summary of the Applicants' submissions is contained in Appendix VI.

Views of Applicants

Alliance

Alliance submitted that its provisions for post-abandonment activities are assumed to include one-calls, annual signage maintenance, annual aerial surveillance, and pipeline remediation events.

Alliance estimated the cost of monitoring activities at $1.54 million per year, or approximately $680 per km per year. Alliance stated that its estimate reflects an allowance of six remediation events per year in respect of any significant ground subsidence encountered on agricultural lands. Each remediation event was allocated $100,000. Alliance stated that its current provision for post-abandonment activities would provide for approximately 10 years of monitoring. Alliance was of the view that the pipeline should be in a benign state post-abandonment after that 10-year timeframe. Therefore, if any monitoring activities are required, Alliance indicated that they should be captured within the contingency amounts of the cost estimate.

Alliance stated that its cost estimate covers remediation activities for an indefinite period. However, Alliance expected its monitoring activities to be minimal after the 10-year post-abandonment monitoring period. Alliance estimated the total cost for post-abandonment activities to be approximately $24.3 million.

With respect to cathodic protection, Alliance was of the view that after the first 10 years subsequent to abandonment, the pipeline will be in a benign state. Alliance was further of the view that allowing the pipe to eventually degrade does not cause any problems or environmental issues. Consequently, Alliance stated that there is no point in maintaining cathodic protection.

Alliance stated that future ground subsidence will occur over a long period of time. Alliance further stated that perforations in the pipe would start as small holes, at which time soil and water would seep in. Before there are large perforations in the pipe, several decades may have elapsed. Over that period of time, any soil seeping into the pipe would have minimal visible effects on the surface, due to natural and agricultural activities acting to spread the soil. Therefore, Alliance did not envision a scenario where a void on the surface would suddenly be created.

Enbridge

Enbridge estimated costs for post-abandonment activities on the basis of the Base Case method. Enbridge took this approach in response to the input they received during their stakeholder workshops. However, the Enbridge Unit Cost factor for removal was substituted for the Base Case Unit Cost factor for removal.

Enbridge submitted that the cost estimates for post-abandonment activities include periodic monitoring and any remediation required as a result of events occurring post-abandonment. Enbridge was also of the view that the cost estimates for post-abandonment activities reflect contingencies such as future removal or contamination clean-up.

Enbridge assumed monitoring in perpetuity and an annual monitoring cost of $200 per km. Enbridge indicated that the expected cost of a remediation event for a small diameter pipe would be $104,731 per km.

Enbridge Pipelines also indicated that the expected cost of a remediation event for medium and large diameter pipe would be $174,552 per km and $314,194 per km respectively. Enbridge Pipeline's total cost estimate for provisions for post-abandonment activities was $284.3 million. Enbridge NW's total cost estimate for provisions for post-abandonment activities was $14.6 million.

Enbridge stated that programs for detection, remediation and restoration of hydrocarbon contamination have already been implemented. In Enbridge's view, these programs will reduce the potential for residual contamination clean-up requirements during the post-abandonment phase. Enbridge noted that they intend to clean the pipelines at the time of abandonment and leave them in a state with no contamination. Enbridge further noted that they have allowed for a provision to remediate any previously unknown contamination after abandonment.

Enbridge's plan is to cathodically protect their pipelines in their abandoned state in perpetuity. Enbridge submitted that an advantage of maintaining cathodic protection is that it provides an ability to determine if there are issues with pipeline coating, which potentially could allow Enbridge to conduct remediation activities. Costs associated with these activities fall within Enbridge's provision for post-abandonment activities. Enbridge noted that the costs for cathodic protection on their entire system are very low, and insignificant in terms of the overall cost estimates filed.

Regarding ground subsidence, Enbridge stated that based on the scientific information available today, they expect corrosion to occur in a non-uniform manner, maintaining the structural integrity of the pipe, making a subsidence scenario unlikely.

Kinder Morgan

Kinder Morgan stated that funding is required for the on-going monitoring and mitigation of issues that arise after completion of the abandonment project work. Kinder Morgan was of the view that there should be a five-year limitation on annual monitoring. Kinder Morgan did not consider funding for perpetual monitoring, as it did not feel that an active monitoring program would be necessary.

Kinder Morgan suggested that it might be helpful for the Board to suggest time periods or a range of time periods for the duration of monitoring and post-monitoring activities.

Kinder Morgan assumed an annual rate of one incident per year over the next 40 years, with an estimated cost of $25,000 per incident. It stated that this approach aligned closely with the approach taken by other Kinder Morgan pipelines. Kinder Morgan submitted total costs of $1.18 million or $1,163 per km for post-abandonment monitoring.

Kinder Morgan did not provide for cathodic protection, or its maintenance, in its cost estimate. Kinder Morgan agreed with Trans Mountain's views as to the challenges and impracticalities associated with maintaining cathodic protection on abandoned pipelines.

Trans Mountain

Trans Mountain stated that its approach to estimating post-abandonment provisions is directionally consistent with the Board's approach, particularly with respect to the frequency of and the costs for post-abandonment incidents. Trans Mountain submitted that its approach differed from the Board's in three ways: annual monitoring was limited to five years; post-abandonment incidents were divided into those that require pipeline removal and those that do not; and the post-abandonment period was divided into distinct stages, with no incidents requiring pipeline removal within the first 40 years after abandonment. Trans Mountain's estimate used a threshold of 500 years to provide for post-abandonment remediation events.

Trans Mountain noted that the period of active monitoring would include aerial patrols, signage maintenance and touch-up environmental remediation of areas disturbed and remediated during abandonment. Trans Mountain further submitted that after a five-year monitoring period, active monitoring measures would no longer be in place. Any incidents or problems that arose after this period would be addressed by the post-abandonment provisions which would continue in perpetuity.

Trans Mountain submitted that its methodology resulted in a post-abandonment cost estimate of $26,000 per km or $37.7 million.

Trans Mountain's estimate did not include cathodic protection or cathodic protection maintenance. Trans Mountain argued that the purpose of abandonment is to discontinue practices of an operating pipeline, so a pipeline that is abandoned need not be actively maintained. Trans Mountain also stated that it largely followed the guidance of the CEPA Report, which recommends cathodic protection be discontinued upon abandonment. Trans Mountain noted that ongoing management of cathodic protection or its maintenance may become impractical in the

long-term as a result of other abandonment activities (for example, removal of power and control facilities, and segmentation of the pipeline). Trans Mountain further noted that maintaining cathodic protection post-abandonment could become very complex over time, and that, in its view, maintenance of cathodic protection into perpetuity is highly impractical.

Trans Mountain was of the view that structural failure of pipelines abandoned-in-place would not occur within the first 40 years after abandonment. Trans Mountain stated that these failures would not occur due to pipeline design and the effectiveness of the external coatings and nitrogen fill upon abandonment.

TransCanada

TransCanada stated that their post-abandonment provisions include: first call services; maintenance of internal databases such as GIS; aerial patrols of all abandoned pipelines on an annual basis; maintenance of appropriate signage; maintenance and administration of third party crossings of the abandoned pipelines; and on-going payment of property taxes. TransCanada further stated that environmental monitoring would be required for specific sites where remediation of slope failures, soil subsidence, and other similar issues are carried out.

In TransCanada's experience, three years of post-abandonment monitoring which demonstrates no residual contamination effects is adequate to meet current environmental regulations. However, as a conservative measure, TransCanada included costs to cover 10 years of post-abandonment monitoring. TransCanada also stated that while the 10-year post-abandonment period was included in their estimates, they are likely to still have obligations as a result of contractual relations with landowners. TransCanada stated that these obligations would be respected.

TransCanada's allowance for remediation activities was calculated as 35 per cent of the total cost of their monitoring activities. TransCanada stated that their estimate of post-abandonment costs is not based on an estimate of the number of remediation events. In TransCanada's view, the number of remediation events anticipated annually and the average cost of remediation events are difficult to estimate due to the lack of available data. TransCanada submitted that the 35 per cent allowance for remediation events was determined using TransCanada's estimating expertise, and that it was an appropriate amount to carry forward.

TransCanada acknowledged that their cost estimates do not anticipate significant post-abandonment items. In TransCanada's view, any issues would be addressed before or when abandonment occurs. TransCanada was also of the view that after the 10-year post-abandonment period, any affected parties with an issue or concern would approach TransCanada to discuss those concerns. TransCanada expected that accountability for any unresolved concerns would be determined on the facts, the applicable law and the operative regulatory requirements at that time.

TransCanada submitted estimates to cover a 10-year period of post-abandonment activities, with totals as follows: $21.3 million for TransCanada PipeLines; $1.9 million for Foothills; $4.2 million for TransCanada Keystone; $970,000 for TQM; and $37.6 million for NGTL.

TransCanada stated that their pipelines would be cleaned and purged to the applicable standards at the time of abandonment. TransCanada noted that any residual contaminants within the pipeline would be at trace levels. TransCanada did not expect residual contaminants to lead to contamination of surrounding soils or water. TransCanada stated that they provided for

remediation of any unresolved contamination issues in the post-abandonment monitoring provision of their cost estimates.

TransCanada believed that the use of cathodic protection would only delay the eventual demise of pipelines abandoned-in-place. In TransCanada's view, the vast majority of the surface of pipeline abandoned-in-place would not suffer external corrosion due to the presence of external pipeline coating. TransCanada noted that while pitting corrosion occurring in random localized areas would occur, depending on pipe wall thickness, it may take decades for perforation of the pipeline to occur. TransCanada stated that structural integrity of their pipelines would be maintained for at least 100 years since most of the pipe wall thickness will remain either un-corroded or will not suffer substantial metal loss. TransCanada acknowledged that there will be areas where small amounts of soil will infiltrate the pipeline, but submitted that infiltration will not lead to any kind of large-scale subsidence. For agricultural and non-agricultural lands, TransCanada expressed the view that natural processes or farming practices would work to level out any subsidence.

Trans-Northern

Trans-Northern submitted that it based its estimate for post-abandonment activities on the diameter of the pipeline, as per the Base Case.

Trans-Northern used the approach in Table A-3, and assumed 0.5 remediation events per year per 100 km. Based on this formula, Trans-Northern assumed four remediation events per year. Trans-Northern stated that it understands that, across Canada, liability always stays with the owner of the pipeline in perpetuity. Trans-Northern provided a final post-abandonment provision estimate of $24.1 million.

Trans-Northern stated that it has an extensive integrity management program. Trans-Northern further indicated that it has an in-line inspection program, and carries out other surveillance and maintenance activities. Trans-Northern indicated that it would identify all of its historical leak sites through the abandonment planning and application process. However, Trans-Northern advised that it intends to deal with any unidentified contamination through the post-abandonment provisions of its cost estimate.

Trans-Northern stated that it would not maintain cathodic protection on its abandoned pipelines. Trans-Northern submits that in its past experience with pipeline that has been abandoned-in-place without cathodic protection, no significant environmental or engineering issues arose in the 44 years since abandonment. Trans-Northern noted that its assumption of not maintaining cathodic protection on abandoned pipelines is consistent with the CEPA Report.

Westcoast

Westcoast developed a cost estimate based on pipeline monitoring, maintenance and a provision for post-abandonment remediation activities over a period of 50 years of monitoring costs. Westcoast stated that while it considered a perpetual post-abandonment period, it is of the view that 50 years is reasonable considering when Westcoast would expect activities that require remediation in a post-abandonment period. Westcoast stated that over the 50-year period it would continue to administer third party crossing requests, participate in a first call dig request program and maintain signs on all of its RoWs.

Westcoast estimated the costs associated with post-abandonment monitoring activities for its transmission facilities to be $341,000 per year, decreasing to $208,000 per year after an initial five-year period. The costs associated with post-abandonment monitoring activities for its gathering and processing facilities were estimated at $894,000 per year, decreasing to $797,000 per year after the initial five-year period. Westcoast also included a provision for repairing river banks at two pipeline locations each year and for removing pipeline at one river crossing every five years. Based on the number of river crossings on the system, Westcoast included a provision for remediation events of $211,000 per year for its transmission facilities and $249,000 per year for the gathering and processing facilities.

Westcoast also included a provision for monitoring for erosion on slopes and for water scour along portions of its RoW where the pipe would be abandoned-in-place. In addition, Westcoast included a provision for an annual aerial patrol of the entire pipeline RoW and for continued monitoring of soils at its compressor stations, processing plants, and pigging barrel sites. Westcoast submitted that it fully expects to see any results of soil disturbance due to abandonment treatment within the first three to five years after abandonment. In its view, monitoring and ground water monitoring would taper off.

Westcoast estimated the costs for post-abandonment pipeline maintenance activities to be $275,000 per year for its transmission facilities and $450,000 per year for its gathering and processing facilities.

Westcoast did not anticipate carrying out significant remediation activities on its pipe after abandonment. However, it included a provision for some remediation of pipe exposed by water scour where it may pose a hazard to navigation. With respect to processing plant, compressor station and pigging barrel sites, Westcoast included a provision for soil remediation at the time of abandonment. Westcoast did not include an allowance for the remediation of soils during the period following abandonment of the pipe and facilities. Westcoast argued that given the cleaning procedures conducted prior to or at the time of abandonment, it is unlikely that soils along the pipeline right-of-way would require remediation post-abandonment.

Westcoast provided a total estimate for post-abandonment provisions of $39.0 million for its gathering and processing facilities, and an estimate of $18.4 million for its transmission facilities.

With respect to cathodic protection, Westcoast cited an example of a 26-inch pipeline that it abandoned-in-place 42 years ago without cathodic protection. Westcoast was of the view that this pipe is, for all intents and purposes, fairly whole. Westcoast stated that due to the slow corrosion process, the filling of the soil in the corroded pipe as well as the surface masking processes (that is, cultivation, root growth, and frost cycles) would have minimal effect on the surface.

Westcoast was of the view that an allowance to provide for post-abandonment activities to address subsidence issues was not necessary. Westcoast stated that it considers the surface effects of soil subsidence resulting from the deterioration of abandoned pipe to be insignificant for all but the largest diameter of pipe. Further, Westcoast did not include an allowance to either remove or re-bury pipe that rises to ground surface over time.

Views of the Intervenors

Several intervenors raised concerns about physical issues related to abandoning the pipe in place. Concerns raised include subsidence, safety risks, the potential for water conduits, as well as contamination, corrosion and the need for cathodic protection.

Intervenor concerns relating to subsidence, safety risks and the potential for water conduits are discussed under Views of the Intervenors in Chapter 3. Intervenor concerns related to contamination, corrosion and cathodic protection are discussed in both Chapter 3 and below.

MPLA

MPLA stated that undiscovered contamination is a major concern. MPLA submitted that pinhole leaks in pipelines can exist for long periods of time before being discovered, and that areas contaminated by Enbridge pipelines may not be discovered until some undetermined time in the future. MPLA also stated that contamination resulting from a slow oil leak may not be discovered until after a pipeline is abandoned.

With respect to corrosion, MPLA's expert, Mr. Bushman, was of the view that large diameter pipeline that has been abandoned-in-place, unless it is fully maintained, would eventually corrode to the point that soil overburden will lead to collapse, resulting in ground subsidence. MPLA's other expert, Mr. Dechant, stated that with expected wall thinning as a result of corrosion, live loads could cause pipeline collapse, especially in cases of reduced depth of cover.

Mr. Bushman also provided his opinion that where multiple pipelines exist in a common corridor, it is imperative that cathodic protection be maintained and monitored on pipelines abandoned-in-place in order to prevent problems for operating pipelines. Where effective cathodic protection cannot be maintained, Mr. Bushman was of the view that pipelines abandoned-in-place in common corridors should be removed. Mr. Bushman stated that cathodic protection system maintenance, monitoring, and replacement or upgrading into perpetuity are not trivial activities.

Other Intervenors

CAEPLA supported Mr. Bushman's analysis regarding corrosion and cathodic protection.

Several intervenors also described concerns relating to the impacts of corrosion and eventual perforation of pipelines abandoned-in-place. A number of intervenors stated that movement of soil into pipelines abandoned-in-place would result in a loss of productive topsoil. In addition, intervenors submitted that the influx of material into a corrosion-perforated pipe could lead to the transport of contaminants and accompanying liability issues. Some intervenors stated that subsidence and collapse of pipelines abandoned-in-place could result in a safety hazard when operating farm equipment or working in the vicinity of the pipeline.

UPA raised concerns regarding a scenario where companies have provided funds for a limited amount of time in the post-abandonment period. UPA did not want landowners to assume any risk in terms of post-abandonment liability with respect to pipeline collapse or water conduits.

Views of the Board

One of the key principles discussed in the RH-2-2008 Reasons for Decision was that landowners will not be liable for the costs of pipeline abandonment. The Board reiterates

its commitment to this principle, and continues to be of the view that implementation of the RH-2-2008 Framework and Action Plan, as revised on 1 June 2012, is a significant step toward attaining this goal. In this regard, the Board notes that its 4 March 2010 letter revised the title of the post-abandonment cost category from "Perpetual Maintenance" to "Provisions for Post-abandonment Activities." As the Board has previously stated, this change was made to reflect the concept of ensuring that certain funds be made available at the time of abandonment to cover the costs of post-abandonment activities. The Board reiterates that the post-abandonment provisions cost category is intended to include funding to monitor and address events that require remediation.

Financial Provisions for Monitoring and for Remediation Events

The Board notes that for the purposes of estimating costs for post-abandonment activities, the duration of monitoring proposed by Applicants varies, as does the period for which Applicants presumed responsibility for remediation events. The monitoring period proposed by Applicants ranged from five years to perpetuity, while the length of presumed responsibility for remediation events ranged from 10 years to perpetuity.

In support of the proposed monitoring periods and length of presumed responsibility for remediation events, many Applicants indicated that they did not expect to see any events requiring remediation after their respective proposed time periods. Most Applicants were also of the view that impacts of pipeline abandonment-in-place would be minimal over time. In contrast, intervenors were of the view that landowners would be impacted as a result of pipeline abandonment-in-place. Intervenors expressed concerns about physical issues relating to pipeline abandonment-in-place, including corrosion, subsidence, and contamination.

Regarding corrosion and subsidence, the Board notes that Applicants were generally of the view that it may take decades for perforations of abandoned pipe to occur. In most Applicants' views, sudden collapse of a pipeline as a result of corrosion is not a concern. Once a pipeline corrodes to the extent that it loses its structural integrity, collapse is prevented by the volume of soil that would have infiltrated the pipe. Intervenors expressed the view that corrosion would lead to pipeline perforation and collapse, which would result in a variety of adverse impacts on landowners, such as loss of productive topsoil.

The Board is of the view that the nature of corrosion may be dependent on a variety of site-specific factors. The Board is also of the view that all pipelines abandoned-in-place will eventually corrode. The timing of corrosion is uncertain and subject to many variables (such as the condition of pipeline coating at the time of abandonment). As acknowledged by some Applicants, this could occur well into the future. The Board is further of the view that corrosion, when it does occur, could lead to perforation of pipe, resulting in some infiltration of soil or other materials. Accordingly, the Board finds that there may be some subsidence resulting from perforation of the pipe and the infiltration of material. The Board also finds that the timing of subsidence, like corrosion, is uncertain and subject to many variables.

The Board acknowledges that, as described by intervenors in this hearing, landowners may be adversely impacted if corrosion and subsidence occurred, particularly corrosion

and subsidence of medium and large diameter pipeline. The Board is of the view that the timing of impacts to landowners is uncertain and could occur well into the future. However, the Board is of the view that while small diameter pipelines will undergo corrosion, perforation and material influx, the subsidence expected at the surface is likely to be negligible.

With respect to contamination, several Applicants indicated that they have extensive integrity programs that continue through the operating life of their systems, and that any contamination issues would be identified during site-specific assessments carried out at the time of abandonment. These Applicants do not expect to encounter contamination after their pipelines have been abandoned. However, the Board notes the concerns expressed by intervenors relating to the potential for discovery of contamination after the pipeline has been abandoned.

While the Board recognizes that Applicants have integrity programs in place to address contamination issues prior to abandonment, the Board accepts intervenor submissions that there remains a potential to discover contamination post-abandonment. The Board is also of the view that the timing of any post-abandonment contamination, if it were to occur, is subject to uncertainty. Similarly, the Board is of the view that the timing of its discovery is subject to uncertainty. The Board accepts that if contamination is discovered after abandonment, but not addressed due to lack of financial provisions, landowners may be negatively impacted.

The Board recognizes that Applicants have proposed various monitoring periods and periods of responsibility for remediation of unforeseen post-abandonment events. However, as mentioned above, there is uncertainty regarding the timing of corrosion, subsidence and contamination and the possible impacts on landowners. These events could occur well after the end of the monitoring period and the length of presumed responsibility for remediation events proposed by the majority of Applicants. Accordingly, the Board is of the view that the monitoring period and the length of presumed responsibility for remediation events proposed by the Applicants, with the exceptions of Enbridge and Trans-Northern, do not adequately account for the possibility that post-abandonment events and their resulting impacts on landowners could occur well into the future. Accordingly, the Board finds that the monitoring periods and the length of presumed responsibility for remediation events proposed by Alliance, Kinder Morgan, Trans Mountain, TransCanada and Westcoast insufficient and therefore not reasonable.

Perpetual monitoring would decrease the likelihood of impacts to landowners resulting from post-abandonment events as these would be detected at an earlier stage. Financial provision for perpetual remediation would mean that funds remain available to remediate post-abandonment events on a perpetual basis. The Board therefore directs all Applicants to make financial provision for perpetual monitoring and perpetual remediation where pipelines are abandoned-in-place. The Board is not prescribing the manner in which monitoring and remediation should be undertaken, or by whom. The issue of access to funds will be considered as part of the Board's assessment of companies' set-aside mechanism.

Applicant Monitoring and Remediation Costs

The Board is of the view that the monitoring and remediation costs proposed by Alliance, Kinder Morgan, Trans Mountain and Westcoast for estimating post-abandonment provisions are reasonable, as they are based on these Applicants' previous operating history or experience. The Board approves these costs as filed. These costs are to be used by Applicants in calculating post-abandonment provisions into perpetuity.

The Board is also of the view that while TransCanada's monitoring costs are reasonable, their remediation costs are not reasonable for the reasons described below under the heading "Applicant Methodologies." The Board approves TransCanada's monitoring costs as filed.

Enbridge and Trans-Northern used the Base Case monitoring costs. Trans-Northern also used the Base Case remediation costs. The Board is of the view that the monitoring costs proposed by Enbridge and Trans-Northern are reasonable. The Board is further of the view that the remediation costs proposed by Trans-Northern are reasonable. The Board approves these costs as filed.

To calculate their remediation costs, Enbridge used their own unit removal costs in combination with the Base Case methodology for post-abandonment provisions. The Board is of the view that the remediation costs proposed by Enbridge are reasonable. For further information on Enbridge's unit removal costs, see Chapter 4.

Applicant Methodologies

The Board finds that the methodologies used by Alliance, Kinder Morgan, Trans Mountain and Westcoast for estimating post-abandonment provisions are reasonable. The Board also finds that these Applicants reasonably estimated the number of remediation events per year and the costs associated with those events. The methodologies used by these Applicants in determining their monitoring and remediation cost estimates were based on past operating and maintenance experience, as well as specific knowledge of their pipeline systems and the terrain traversed by those systems.

The Board notes that Enbridge and Trans-Northern used the Base Case post-abandonment methodology. In the Board's view, the methodology used by these Applicants is reasonable.

TransCanada expressed the cost for remediation events as a percentage (35 per cent) of their annual cost of monitoring. The Board notes that TransCanada's methodology does not provide information on the frequency and cost of post-abandonment remediation events. The Board is of the view that TransCanada's approach of expressing remediation costs as a function of annual monitoring costs is not sufficiently justified. Furthermore, the Board is not convinced that funds for remediation events should be calculated based solely as a function of monitoring costs. The Board would have expected TransCanada to include other additional factors, for example, the expected frequency of remediation events, in the calculation of remediation costs. Accordingly, the Board is not persuaded that TransCanada's methodology is reasonable. Given the Board's decision about TransCanada's methodology, the Board also finds that TransCanada's methodology will

not allow for sufficient funds to be available to address potential remediation events after abandonment.

As TransCanada has failed to justify their deviation from the Base Case, the Board must consider what remediation costs and methodology are reasonable. The Board has considered TransCanada's response to a Board request, made during the course of the hearing, to provide an estimate using the Base Case assumptions. This estimate included the Base Case methodology for post-abandonment provisions. The Board has also considered TransCanada's comments that it had difficulty estimating remediation events due to the lack of available data. However, given all of the above, the Board is of the view that the Base Case approach to calculating remediation and methodology is a reasonable, prudent and adequate starting point for TransCanada's post-abandonment provision. The Board directs TransCanada to use the Base Case methodology. The Board notes that cost estimates will be regularly reviewed (at least every five years). Accordingly, if TransCanada wishes to adopt a different methodology for determining remediation costs, they may do so in future filings. However, as the Board stated in the RH-2-2008 Reasons for Decision, pipeline companies choosing to file their own pipeline-specific estimates should be prepared to justify any deviations from the Base Case assumption.

Post-Abandonment Provisions Filed by Applicants

Given all of the above, the Board approves Trans-Northern and Enbridge's post-abandonment provisions as filed. The Board directs Alliance, Kinder Morgan, Trans Mountain and Westcoast to re-file their post-abandonment provisions using their own methodology for determining monitoring and remediation costs, but adjusting these costs to provide for perpetual monitoring and perpetual remediation.

Finally, the Board directs TransCanada to re-file their post-abandonment provisions using their company-specific monitoring costs. For the portion of post-abandonment provisions related to remediation events, TransCanada is directed to apply the Base Case methodology using their own assumptions for the unit removal costs. TransCanada is also directed to provide post-abandonment monitoring and remediation provisions into perpetuity.

Cathodic Protection

The Board notes that some Applicants have included, or may include in the future, financial provisions for cathodic protection in their cost estimates. The Board acknowledges the evidence provided in this proceeding which describes the challenges and practicalities associated with continuing cathodic protection post-abandonment.

The Board is of the view that decisions regarding financial provision for the continuance of cathodic protection at the time of abandonment are best assessed on a case-by-case basis. For example, in some instances, Applicants, in consultation with stakeholders, may determine that cathodic protection is appropriate for pipelines that are abandoned-in-place in order to prevent negative impacts to other infrastructure in shared RoWs. The continuance of cathodic protection may be a consideration of particular importance for pipeline systems with multiple pipelines in a shared RoW, if these pipelines are unlikely to be abandoned simultaneously. In other cases, cathodic protection may be required in accordance with contractual obligations.

Chapter 7

Other Issues Raised

7.1 Landowner Issues

7.1.1 Background

Throughout this proceeding, the Board received submissions from Applicants and intervenors. The Board recognizes and appreciates all forms of participation. The Board notes that, because this hearing was not an oral facility hearing, participant funding was not available pursuant to the Board's Participant Funding Program, and that no financial support was otherwise made available for intervenor participation.

The submissions of intervenors have been incorporated in several chapters of these Reasons for Decision. Intervenor submissions regarding the distinction between cultivated and non-cultivated agricultural lands are discussed in Chapter 2. Landowner views pertaining to easement agreements and physical plans for abandonment, particularly where pipelines are proposed to be abandoned-in-place, are discussed in Chapter 3. Landowner concerns about contamination, subsidence, and corrosion are described in Chapters 3 and 6.

In addition to the submissions of intervenors addressed in preceding chapters, a number of issues were raised by intervenors throughout the proceeding that go beyond the scope of this hearing. Some of these issues are described below.

7.1.2 Uncertainty about current and future regulatory oversight, legal requirements and potential legal liability

Intervenors expressed concern about what happens if the Board no longer has jurisdiction over an abandoned pipe. They submitted that there is an ongoing need for regulatory oversight, particularly where one pipeline remains in a RoW in which multiple lines may have already been abandoned.

Landowners described their fear that any facilities abandoned-in-place may be left to decay and contaminate their land and soils. Landowners also expressed apprehension about being left without recourse to pursue resolution of post-abandonment issues in such circumstances.

Intervenors stated that they are concerned that future regulatory requirements at the time of abandonment might leave them with risks or costs that they would then have to incur.

Intervenors also raised concerns about various provincial safety and environmental laws that may apply to their property and to their farming operations. In Saskatchewan and Ontario, for example, landowners indicated that they must prepare and seek approval of environmental farm plans. Landowners described their concern that pipelines abandoned-in-place on their property would subject them to the same legal risks and liabilities as other potential sources of underground contamination, such as fuel tanks, under provincial legislation.

7.1.3 Other Financial Implications

Landowners spoke of the stigma attached to lands containing pipelines as a type of damage which they incur. They stated that lands with pipelines running through them are generally devalued compared to similar lands without pipelines. Landowners suggested that in situations where pipelines do not run in a straight direction, or where they otherwise complicate farming operations, the perceived value of the land can be lower still.

UPA described difficulties associated with borrowing from financial institutions that require environmental assurances about lands. SAPL described landowner experiences with lending institutions, and noted that landowners are required to submit updated environmental farm plans and copies of easement agreements when applying for credit and using their lands as collateral. Mr. Kraayenbrink stated that the requirement of lending institutions for environmental inspections is a common concern for landowners when considering a sale of their lands.

7.1.4 Further research and study

In response to Applicants' recognition of the need for further research and studies about the technical aspects of abandonment, landowners stated that they are interested in participating and expect their input to be considered in such future efforts.

Views of the Board

The Board recognizes intervenor concerns regarding future regulatory oversight. As the Board has previously stated, its jurisdiction over a pipeline continues only until the coming into effect of the order which authorizes the abandonment of that pipeline. Abandonment orders usually contain conditions with which companies must be fully compliant before an order can come into effect. In other words, the Board's jurisdiction will continue until compliance with all conditions is achieved.

In the Board's view, intervenor concerns discussed in this section are relevant to the broader discussion of pipeline abandonment, and to the relationship between landowners, companies and others. In Chapter 3 of these Reasons for Decision, the Board stated that the physical issues of pipeline abandonment require further research as well as a multi-stakeholder approach to help resolve or fill knowledge gaps. The Board therefore encourages all persons participating in any research relating to abandonment to further consider ways in which the concerns described by landowners in this proceeding could be mitigated or addressed.

7.1.5 Consultation and Communication Programs and Relationships

Some intervenors expressed concerns about the financial barriers to participating in company-led consultation efforts. Landowners also expressed concerns about participation in company surveys, and whether such surveys are a genuine reflection of landowner opinions pertaining to pipeline projects or abandonment issues. Landowners also expressed a general sense of a power imbalance between them and companies, citing negotiations and rights of entry as examples.

SAPL described some improvements that companies have made in their consultation processes, citing the Alberta Clipper project as a recent example.

Views of the Board

The Board considers consultation and communication between companies and landowners to be highly important for all phases of a pipeline, from construction to after abandonment. The Board recognizes the concerns expressed by intervenors, and notes SAPL's comment that in some cases, improvements have been made in regards to consultation and communication between companies and landowners. The Board notes that Enbridge stated there will be opportunities to support landowner engagement and that industry has committed funds to make sure there is more outreach to stakeholders.

With respect to the goal of having all NEB-regulated companies begin to set aside abandonment funds, the Board notes that this proceeding is only one step in an ongoing process. As discussed in Chapter 3, some Applicants carried out landowner consultation prior to submitting their cost estimates. As Applicants' cost estimates will be regularly reviewed (every five years), the Board encourages Applicants to consider the comments provided by landowners in this proceeding regarding consultation and communication programs, and, where possible, to refine their consultation efforts bearing these comments in mind. The Board further encourages Applicants to actively consult landowners and landowner associations well in advance of the next review of their cost estimates, specifically with respect to the criteria upon which these costs are based.

7.2 Next Steps

The Board's five-year Action Plan, initially included in the RH-2-2008 Reasons for Decision, set out steps with the goal of having all companies begin to set aside abandonment funds no later than five years from the date of that decision. The Action Plan was revised on 1 June 2012 and is contained in Appendix I. While the time frame for the Action Plan is from May 2009 to 2014, the Board expects, as stated in its 4 March 2010 letter that the process for ensuring that funds are available, and the information upon which the process may depend, will continue to evolve through and beyond the time frame for the Action Plan.

7.2.1 Consistency in Future Abandonment Cost Estimate Filings

In these Reasons for Decision, the Board identified a number of areas where some consistency among Applicants would be helpful for future reviews of cost estimate filings, for example, land-use definitions. These areas are discussed in Chapters 2, 4, 5 and 6 of this decision.

The Board strongly encourages companies to work together with Board staff, landowners (or their associations) and other interested persons to, where possible, achieve consistency in land-use designation and cost estimate methodology. The Board notes that such coordination would be particularly helpful to the Board prior to any regular Board review of cost estimates filings. In addition to the areas identified in these Reasons for Decision, the Board also encourages companies to address any other topics where they are of the view that consistency could be useful.

7.2.2 Other Areas for Future Collaboration

In addition to areas where consistency would be useful, the Board identified other topics in these Reasons for Decision where collaboration among companies, Board staff, landowners (or their

associations) and other interested persons would be beneficial. For example, the Board indicated in Chapter 3 that further research on physical issues of pipeline abandonment is needed to better understand the implications of abandoning pipelines in place. The Board encourages companies to consider other areas that could benefit from additional research and follow up, for example, adequate segmentation, and minimizing impacts of corrosion and subsidence.

In its 4 March 2010 letter, the Board stated that its objective is to update the Base Case for as long as it is useful in preparing, revising and evaluating early estimates of costs for abandonment funding. The Board also stated that it intends to revisit the Base Case assumptions at least every five years. The Board notes that Applicants in the MH-001-2012 hearing used the Base Case for certain elements of their cost estimates, and filed pipeline-specific information for other elements. If maintaining and updating the Base Case is useful, as better information becomes available, the Board will work with companies, landowners and other interested persons to make any appropriate changes.

7.2.3 Action Plan and other Additional Actions

There are a number of steps in the Action Plan which have not yet occurred. The Board is committed to meeting the timelines for all steps set out in the Action Plan.

Since the Board's issuance of the Action Plan, the Board has identified additional actions that will be necessary in the future. The following table includes future milestones identified by the Board to date.

Topic	**Action**	**Party**	**Expected timing**
Set-aside mechanism	Filing of proposed set aside mechanisms	Group 1 companies	No later than 28 Feb 2013
Revised abandonment cost estimates	Companies file revised abandonment cost estimates in accordance with the Board's direction in these Reasons for Decision	Group 1 companies	No later than 16 April 2013
Collection mechanism	Filing of proposed collection mechanisms. These filings should use abandonment cost estimates based on the direction from these Reasons for Decision	Group 1 companies	No later than 31 May 2013
Regular reporting	Companies report to the Board on progress of collection and fund performance, as contemplated in the Board's 4 March 2010 letter	All regulated companies	TBD
Updates to abandonment cost estimates	Updates to abandonment cost estimates filings to incorporate new information	All regulated companies	TBD

Chapter 8

Direction and Disposition

The foregoing chapters constitute the Board's Reasons for Decision in respect of the applications considered in the MH-001-2012 proceeding. Subject to the Board's directions to the Applicants below, the Board approves the Applicants' cost estimates as filed. Approval of these estimates has been based on, and are applicable only to, the Applicant-specific and pipeline-specific information considered during this proceeding. Applicants that are required to submit revised cost estimates to the Board shall do so by 16 April 2013.

8.1 Alliance

The Board directs Alliance to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium and large diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" land-use sub-categories. Alliance's revised cost estimates shall also be based on an assumption of 100 per cent removal of medium and large diameter pipeline for both industrial and residential development in the "Non-Agricultural, Prospective Future Development" sub-category. Finally, Alliance shall adjust Cost Category 3b (Post-Abandonment Provision) to provide for perpetual monitoring and perpetual remediation, using its own methodology (as approved by the Board in Chapter 6), for determining monitoring and remediation costs. The Board approves all other aspects of Alliance's cost estimates as filed.

8.2 Enbridge Pipelines

The Board directs Enbridge Pipelines to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium and large diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. The Board approves all other aspects of Enbridge Pipelines' cost estimates.

8.3 Enbridge (NW)

The Board approves the cost estimates of Enbridge (NW) as filed.

8.4 Foothills

The Board directs Foothills to submit to the Board revised cost estimates assuming 20 per cent removal of large diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. Foothills shall also adjust Cost Category 3b (Post-Abandonment Provision) to provide for perpetual monitoring and perpetual remediation, using its company-specific monitoring costs (as approved by the Board in Chapter 6) and unit removal costs (as approved by the Board in Chapter 4), but using the Base Case methodology. Finally, the Board directs Foothills to report contingency as a separate line item in its revised cost estimates. The Board approves all other aspects of Foothills' cost estimates as filed

8.5 Kinder Morgan

The Board directs Kinder Morgan to submit to the Board revised cost estimates in which Cost Category 3b (Post-Abandonment Provision) is adjusted to provide for perpetual monitoring and perpetual remediation. In adjusting the revised Post-Abandonment Provision, Kinder Morgan shall use its own methodology for determining monitoring and remediation costs, as approved by the Board in Chapter 6.

The Board also directs Kinder Morgan to include in its revised cost estimates, costs for segmentation activities at an interval of between 400 metres and six km. Kinder Morgan should provide reasons for the interval selected. Costs for the segmentation activities shall be calculated based on the Unit Cost submitted by Kinder Morgan for cutting and capping activities at water crossings and approved by the Board in Chapter 4. If Kinder Morgan is of the view that a different cost is more appropriate for these segmentation activities, Kinder Morgan shall provide additional justification, explaining why this is the case.

The Board approves all other aspects of Kinder Morgan's cost estimates as filed.

8.6 NGTL

The Board directs NGTL to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium and large diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. NGTL shall also adjust Cost Category 3b (Post-Abandonment Provision), to provide for perpetual monitoring and perpetual remediation, using its own company-specific monitoring costs (as approved by the Board in Chapter 6) and unit removal costs (as approved by the Board in Chapter 4), but using the Base Case methodology. Finally, the Board directs NGTL to report contingency as a separate line item in its revised cost estimates. The Board approves all other aspects of NGTL's cost estimates as filed.

8.7 TQM

The Board directs TQM to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium and large diameter pipe in the "Agricultural, Cultivated" sub-category. TQM is further directed to adjust Cost Category 3b (Post-Abandonment Provision), to provide for perpetual monitoring and perpetual remediation, using its own company-specific monitoring costs (as approved by the Board in Chapter 6) and unit removal costs (as approved by the Board in Chapter 4), but using the Base Case methodology. Finally, the Board directs TQM to report contingency as a separate line item in its revised cost estimates. The Board approves all other aspects of TQM's cost estimates as filed.

8.8 Trans Mountain

The Board directs Trans Mountain to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium and large diameter pipe in the "Agricultural, Cultivated" sub-category and medium diameter pipe in the "Agricultural, Non-Cultivated" sub-category. Trans Mountain is further directed to adjust Cost Category 3b (Post-Abandonment Provision), to provide for perpetual monitoring and perpetual remediation, using its own methodology and monitoring and remediation costs (as approved by the Board in Chapter 6). The Board approves all other aspects of Trans Mountain's cost estimates as filed.

8.9 TransCanada Keystone

The Board directs TransCanada Keystone to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for large diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. TransCanada Keystone is further directed to adjust Cost Category 3b (Post-Abandonment Provision), to provide for perpetual monitoring and perpetual remediation, using its own company-specific monitoring costs (as approved by the Board in Chapter 6) and unit removal costs (as approved by the Board in Chapter 4), but using the Base Case methodology. Finally, the Board directs TransCanada Keystone to report contingency as a separate line item in its revised cost estimates. The Board approves all other aspects of TransCanada Keystone's cost estimates as filed.

8.10 TransCanada PipeLines

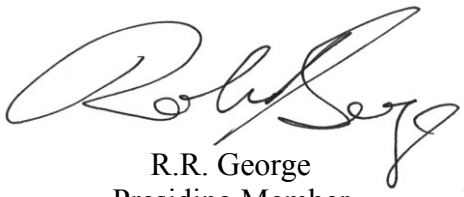
The Board directs TransCanada PipeLines to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium and large diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. TransCanada PipeLines is further directed to adjust Cost Category 3b (Post-Abandonment Provision), to provide for perpetual monitoring and perpetual remediation, using its own company-specific monitoring costs (as approved by the Board in Chapter 6) and unit removal costs (as approved by the Board in Chapter 4), but using the Base Case methodology. Finally, the Board directs TransCanada PipeLines to report contingency as a separate line item in its revised cost estimates. The Board approves all other aspects of TransCanada Pipelines' cost estimates as filed.

8.11 Trans-Northern

The Board directs Trans-Northern to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. The Board approves all other aspects of Trans-Northern's cost estimates as filed.

8.12 Westcoast

The Board directs Westcoast to submit to the Board revised cost estimates based on an assumption of 20 per cent removal for medium and large diameter pipe in the "Agricultural, Cultivated" and "Agricultural, Non-Cultivated" sub-categories. The Board also directs Westcoast to submit to the Board a revised cost estimate in which Cost Category 3b (Post-Abandonment Provision), is adjusted to provide for perpetual monitoring and perpetual remediation, using its own methodology and monitoring and remediation costs (as approved by the Board in Chapter 6). The Board approves all other aspects of Westcoast's cost estimates as filed.



R.R. George
Presiding Member

G.A. Habib
Member

L. Mercier
Member

Appendix I

Revised Action Plan

Table 4-1 from RH-2-2008 Decision Action Plan, Remaining Deadlines As Revised 1 June 2012			
Action	**Objective**	**Participants**	**Timing**
5. NEB consideration of Group 1 companies' preliminary estimates that use pipeline-specific assumptions or a combination of pipeline-specific and Base Case assumptions	NEB decisions on Group 1 companies' preliminary estimates	NEB	See MH-001-2012 Hearing Order and 1 May 2012 procedural direction
6a. Group 1 companies each develop and file, **for approval**, a proposed process and mechanism to set aside the funds	Filing of proposed set aside mechanisms	Group 1 companies	No later than 28 February 2013
6b. Group 1 companies each develop and file, **for approval**, a proposal for collection of funds	Filing of proposed collection mechanisms	Group 1 companies	No later than 31 May 2013
7 (completed)			
8. Group 2 companies that charge tolls each develop and file a proposal for collection of funds	Filing of proposed collection mechanisms	Group 2 companies that charge tolls	No later than 31 May 2013
9. Group 2 companies each file with the Board a proposed process and mechanism to set aside funds	Filing of proposed set aside mechanisms	Group 2 companies	No later than 31 May 2013
10. NEB consideration of Group 1 companies' proposals for collection and set aside mechanisms	NEB decisions on Group 1 companies' mechanism for collection and set aside of funds	NEB	By 31 May 2014

Appendix II

Table A-1

Step 1: Land-use analysis – Use the following table to determine the number of kilometers of pipeline in each land-use and pipeline-diameter category. For the Above-Ground facilities, determine the facilities and the units (for example, number of tanks or compressors) to be abandoned.

Table A-1: Framework for Land-Use Analysis, For the Purposes of Estimating Preliminary Cost Estimates

Land Use		Pipeline Diameter			Above-Ground Facilities
		2" to 12" 60.3 to 323.9mm	14" to 24" 355.6 to 610 mm	>26" >660 mm	
Agri-cultural	Cultivated				
	Cultivated with special features				
	Non-Cultivated				
Non-Agri-cultural	Existing Developed Lands				
	Prospective future development				
	No future development Anticipated (e.g. forest)				
Other	Environmentally Sensitive Areas				
	Roads & Railways				
	Water Crossings				
	Other Crossings (Utilities)				

Appendix III

Table A-2

Step 2: If using the Base Case, apply the entries in Table A-2 to the entries in Table 1 to determine the Method of Abandonment for the purposes of cost estimation.

Table A-2: Physical Assumption by Land Use and Facility For the Purpose of Estimating Preliminary Cost Estimates

Land Use		Pipeline Diameter			Above-Ground Facilities
		2" to 12" 60.3 to 323.9mm	14" to 24" 355.6 to 610 mm	>26" >660 mm	
Agri-cultural	Cultivated	A: 80% (R: 20%)	A: 80% (R: 20%)	A: 80% (R: 20%)	R
	Cultivated with special features	R	R	R	R
	Non Cultivated	A: 80% (R: 20%)	A: 80% (R: 20%)	A: 80% (R: 20%)	R
Non-Agri-cultural	Existing Developed Lands	A	A	A	R
	Prospective future development	R	R	R	R
	No future development Anticipated (e.g. forest)	A: 80% (R: 20%)	A: 80% (R: 20%)	A: 80% (R: 20%)	R
Other	Environmentally Sensitive Areas	A	A	A	R
	Roads & Railways	A+	A+	A+	R
	Water Crossings	A	A	A	R
	Other Crossings (Utilities)	A	A+	A+	R

Legend: A = Abandon in place, A+ = Abandon in place with special treatment[2], R = Removal

Step 3: Use the cost definition grid from Table A-3 to determine a cost estimate per category for abandonment.

[2] CEPA defined A+ as pipeline is abandoned in place with special treatment to prevent potential ground subsidence (e.g. fill pipe with concrete)

Appendix IV

Table A-3

Unit Costs for Abandonment Activities

Table A-3 (with definitions issued 4 March 2010) now includes the Unit Costs developed during 2010.

Amended Table A-3

Table A-3 Base Case Cost Definition Grid					December 2010				
	Broad Category	**Method[1]**		**May Include**	**Estimated Cost Factor Value[2] (2010 C$)**				
1.	Engineering & Project Management	A	R	Regulatory, legal and finance support, external relations and land support, environment, health and safety support, operations support, stakeholder consultation. Detailed cost estimates, planning, applications, detailed engineering and environmental studies. Engineering and project management, Construction management, project & cost control.	Apply the factor shown to sum of costs in categories (2a, 2b, 3a, 4, 5a, 5b and 6)				
					If pipeline abandonment project[3] is	Apply			
					<50 km	20%			
					50 to 500 km	10%			
					>500 km	5%			
	Pipe diameter definitions used in estimates below (as set out in Table A-1 of 4 March 2010 release)				Pipe Diameter	Small	Medium	Large	
					Imperial	2" to12"	>12" to <26"	≥26"	
					Metric	60.3 to 323.9mm	>323.9mm to <660mm	≥660mm	
2.	**Abandonment Preparation[4]** Factors combine 2a and 2b, applicable to all km of pipe, removed or left-in-place.								
2a.	Land access and clean up	A	R	Access rights & permits, temporary work space, damages, re-establish survey markers, as-built survey, update GIS, discharge rights.	Unit Cost per kilometer		Pipe diameter		
							Small	Medium	Large
					Range	low	$4,000	$6,000	$12,000
						high	$6,000	$16,000	$18,000
2b.	Pipeline Purging and Cleaning	A	R	Pump or draw down gas; Pipeline pigging, cleaning and purging, including pre-cleaning pig runs. Isolate pipe sections, test pipe for cleanliness. Final	This factor may be strongly influenced by pipeline terrain and by the product shipped. Those using the Base Case may choose to refine their estimates as follows:				

[1] Method A, A+ or R respectively: Abandon in place; Abandon in place with special treatment; and Removal. For purposes of the preliminary cost estimation, the cost factors described here would be applied by companies using the Base Case. For pipelines that are abandoned in place all rows with an A or A+ are applicable, for pipelines that are removed all rows with an R are applicable.

[2] Cost estimates or ranges are intended as typical averages for a pipeline system. For individual segments within the system, actual unit costs may vary more widely.

[3] Pipeline Abandonment project may include the whole pipeline system or smaller sections abandoned as separate projects.

[4] The a and b breakdowns in some Broad Categories were expected to only be necessary until further exploration of dollar values for costs took place. Current estimates have removed some of the (a) and (b) breakdowns.

Amended Table A-3							
Table A-3 Base Case Cost Definition Grid					**December 2010**		
	Broad Category	**Method**[1]		**May Include**	**Estimated Cost Factor Value**[2] **(2010 C$)**		
				cleaning pig runs (in N_2), waste storage and disposal. Cleanliness verifications (testing and analysis). [5]	**Pipeline Terrain**	**Gas** Shipped	**Oil** Shipped
					Flat or downhill	Low end	Mid Range
					Mountainous or uphill	Mid range	High End
3	**Pipeline Abandonment-in-Place**						
3a.	Basic Pipeline Abandonment-in-Place	A	n/a	Install plugs to prevent water movement, removal of some underground appurtenances, backfilling and reclamation of dig sites.[6] At the 9 September 2010 meeting, parties discussed whether to include removal of underground appurtenances in category 3a or in 6. The estimates shown to the right include removal of underground appurtenances.	Applicable to all km left-in-place.		
					Unit Cost per kilometer. Unit costs depend less on pipe diameter and more on distance between plugs. High end of range is more applicable for challenging terrain, with more frequent plugs.		
					Range	Low	$10,000
						High	$25,000
3b.	Provision for Post abandonment activities	A and A+	n/a	Financial provisions for periodic monitoring and for contingencies, such as later removal of some pipeline/associated facilities if problems occur. Events include subsidence issues, pipe rising to surface, or discovery of contamination[7]	See footnote for description of approach.[8]		
					Assumed annual monitoring costs $100,000 per 500 km pipe.		
					Pipe diameter	Small	Medium / Large
					Assumed # of Events per year per 100 km		
						0.5	0.5 / 0.5
					Assumed ratio of Event to unit cost 5(a&b) of planned removal & restoration of 1 km of right-of-way		
						0.1	0.2 / 0.3
					Resulting Estimate of Provision, in $ per kilometer		
						$20,000	$60,000 / $97,000

[5] Pigging costs are dependent on the pipeline length and volume (i.e., the square of pipe diameter). Estimates shown take the volume into account.

[6] The number of plugs to be used is related to the length and angle of the slope, soil type and land use. In theory, the cost of plugs is dependent on volumes of material to be used, and therefore could be related to pipeline diameter squared. However crew mobilization drives costs more than pipeline volume, and the pipe diameter distinction has been removed.

[7] Includes line locations, as needed, maintain signage, erosion and subsidence, frost heave control, pipe displacement at slopes or river crossings, remediation of contamination, the creation of waterways, or soil drainage problems, weed control (where not dealt with under easement agreements), or any other problem caused by the presence of a pipeline.

[8] Annual monitoring is set at $200 per km based on the assumption shown in the table. An annuity factor (66:1) is applied to derive the initial financial provision at the time of abandonment to fund each dollar needed over the subsequent years, with inflation, i.e., an initial amount of $66 is required to generate an annual flow of $1 per year, inflating. This factor 66 uses the 1.5% (3.5% return on funds less the 2% inflation) set out in the 4 March 2010 Revised Base Case. As a result $13,333 per km should be set-aside at the time of abandonment to cover future monitoring of pipe left in place.

Contingency is (the number of remediation events per year per km of pipe left-in-place) x (the cost of one remediation event relative to the average cost of one km of planned removal for that pipe diameter). This average annual contingency amount is grossed up with the 20% project management and engineering applicable to small projects. The result is an average annual contingency allowance of $105, $700 and $1255 per km for small, medium and large diameter pipe respectively. These annual estimates are multiplied by the same 66:1 annuity factor as above to derive the amount needed at the time of abandonment.

Combining the monitoring and contingency amounts result is the $20,000, $60,000 and $97,000 respectively for the pipe diameters as shown in the table.

Amended Table A-3									
Table A-3 Base Case Cost Definition Grid					**December 2010**				
	Broad Category	**Method[1]**		**May Include**	**Estimated Cost Factor Value[2] (2010 C$)**				
4	Special treatment	A+	n/a	Until possible future clarification from the NEB on any differences between default handling at river crossings and at other crossings, use the low end of 'cut, cap and fill' range provided for road, rail and utility crossings.	Pipe diameter		Small	Medium	Large
					Unit cost per crossing of utility corridor				
				Cut, cap and fill with cellular material at crossings – road, rail, utility.[9]	Range	Low	$30,000	$35,000	$50,000
						High	$45,000	$60,000	$85,000
				Other environmentally sensitive areas. Further study is needed on types of environmentally sensitive areas, appropriate treatment and costs.	Until further study is done, a placeholder unit cost of $50,000 per km of environmentally sensitive area may be used for all pipe diameters.				
5	**Pipeline Removal**								
5a	Pipeline Removal and backfilling	n/a	R	Remove impediments and topsoil stripping, excavation, cutting and capping of pipelines, cutting of pipeline sections and removal to stockpile, loading and hauling of removed lines, disposal of lines, coating and associated facilities, backfill, compaction. Mobilization and demobilization may further increase costs, particularly for remote areas.	Cost applicable where pipe removed. Apply 100% of the unit cost for the first pipe and 25% of the unit cost for subsequent pipe, owned by the same company, in the same ditch.[10]				
					Diameter of largest pipe in ditch		Small	Medium	Large
					Unit cost per kilometre of pipe.				
					Range	Low	$100,000	$300,000	$450,000
						high	$250,000	$800,000	$900,000
5b	Pipeline Removal – land restoration	n/a	R	Restoration, reclamation and remediation of contamination, fencing and clean-up, soil decompaction, re-vegetation, inspection of removal activities.[11,]	Costs to restore simpler terrain are assumed to be already included in averages for 5a above, rough or mountainous terrain may add a further 10-15% to costs estimated for category 5a				
6	**Above-Ground Facilities**								
6a.	All above ground	A	R	Purging and cleaning piping and fabrications. Site reclamation, (remediation of contamination, re-contouring, replacement of topsoil, re-vegetation). This includes restoration of land as close as possible to the surrounding land	6 (a) and (b) applicable to all above-ground facilities.		Range $ per unit except as noted		
							Low		High
					Block valve assemblies		$15,000		$55,000
					Meter station (gas)		$ 50,000		$250,000

[9] Fill volume (or pipeline volume) depends on crossing length and pipeline diameter squared. Unit cost of concrete, if used, depends on the hauling distance from the batching plant. Remote locations would attract costs at the higher end of the range. The low end of the range is only applicable where the majority of the fill locations are close to fill sources.

[10] For example, for a 10km ditch with 2 parallel large diameter pipes the calculation would be: 10km x $450,000 + 10km x ($450,000x0.25)

[11] Clearing, stripping and grading work is related to the width of right-of-way and temporary work space. Excavation and backfilling depends on to the pipeline volume and depth of cover. Pipeline cutting, removal, loading, hauling and disposal depend on pipeline diameter and wall thickness.

Amended Table A-3							
Table A-3 Base Case Cost Definition Grid					December 2010		
	Broad Category	Method[1]		May Include	Estimated Cost Factor Value[2] (2010 C$)		
				Excludes the value of any above-ground facilities that may be salvaged and re-used.	Meter station (oil)[12]	$ 50,000	$500,000
					Maintenance Base	$50,000	Could be salvaged
6b	Portions removed	n/a	R	Demolition (as applicable), haul material away Removal of associated underground tanks.	Compressor station per mw[13] *Applicable to stations of*	*Under 5mW*, use up to $400,000 for *over 5mW*, use up to $120,000	
					Pump Station [14]	$300,000	$1,500,000
6c	Portions left in place	A	n/a	Securing any facilities left in-place. (Not applicable, as all above ground, to be removed)	Other facilities [15] Reclamation [16]		
7	Contingency			Contingency allowances are influenced by many factors, including the quality of the project cost estimate. Companies using the Base Case Unit Costs should apply a contingency factor as shown, as each of the individual Unit Cost estimates has considerable uncertainty in its estimation.	Applicable to estimates flowing from cost factors 2, 3a, 4, 5(a&b) and 6.	approximately 25%	

Some reminders regarding the use of this guidance for filing estimates of pipeline abandonment costs:

- Where cost ranges are provided, a company relying on the Base Case should use a Unit Cost approximately in the middle of any range provided, unless they have reason to support selecting a Unit Cost elsewhere in the range.
- The pipeline company remains responsible for appropriate financial preparation for future abandonment activities. (see RH-2-2008)

[12] The low end of the Unit Cost range is only appropriate where there are no additional facilities at any oil meter stations in a pipeline system.

[13] Industry suggests using unit cost per installed horsepower/megawatts, with range to cover electric, gas or other turbines. Scope includes all units, yard piping, concrete foundations to 1m below grade, buildings removed

[14] Factors affecting this cost could be number of pumps, number of buildings and types of foundations.

[15] Companies should also provide estimates for other above ground facilities not listed here, such as gas plants, batteries; tanks or tank farms; booster pumps, sending and receiving pipeline barrel assemblies, communication facilities, power generation equipment, or other above ground facilities. These are not listed in the table, as no generic estimates are yet available these facilities.

[16] Site reclamation is assumed to be included in the unit costs for above ground facilities shown.

Appendix V

Table A-4

Step 4: Add up the rows of estimated costs to get total estimated costs

Table A-4 Total Estimated costs						
	Broad Category	**Method[14]**		**Pipeline Features[15]**	**Average Cost[16]**	**Cost by Category[17]**
1	Engineering & Project Management	A	R	n/a	E.g. 20-30 per cent	
2	**Abandonment Preparation**					
a.	Land access and clean up	A	R	X (Km)		
b.	Pipeline Purging and Cleaning	A	R			
3	**Pipeline Abandonment-in-Place**					
a.	Basic Pipeline Abandonment-in-Place	A	n/a	Y (Km)		
b.	Provision for Post abandonment activities	A and A+	n/a	Y+ ST (Km)		
4	Special treatment	A+	n/a	ST (Km)		
5	**Pipeline Removal**					
a.	Pipeline Removal and backfilling	n/a	R	X - (Y+ST) (Km)		
b.	Pipeline Removal – land restoration	n/a	R			
6	**Above-ground facilities**					
a.	All facilities	A	R	___C_ #		
b.	Portions removed	n/a	R	___C_ #		
c.	Portions left in place	A	n/a	____ #		
Total Cost (e.g. in 2010 dollars) for future abandonment activities						

For example, for a 425 km pipeline with 25 km under roads, and 3 compressors:

X = 425 km
Y = 320 km, or 80% (X-ST) using 80% of 400 from Table A-2
ST = 25 km
X-(Y+ST) = 80 km, or 425 – (320+25)
The 3 compressors to be removed would be entered as C

[14] Method A, A+ or R respectively: Abandon in place; Abandon in place with special treatment; and Removal.

[15] Either linear kilometers or count by facility type. Table A-2 facilitates estimating the entries to this column.

[16] Entries in this column may come from Table A-3 when available.

[17] If using the Base Case cost assumptions, entries in this column are the product of the previous two columns. If using pipeline specific cost estimation, enter the total for each category.

Appendix VI

Summary of Applicants' Physical Information and Estimated Costs

This Appendix provides Applicants' physical abandonment assumptions for each land-use category, the total number of kilometres of pipe within each land-use category, and the number of facilities within each land-use category. Where there are no abandonment assumptions or where the number of kilometres of pipeline is not shown in the physical assumptions tables, Applicants either do not have pipe in that land-use category or do not have pipeline of that diameter.

This Appendix also provides the Applicants' proposed abandonment cost estimates. This Appendix should be read in conjunction with the Applicants' filings and the various sections of these Reasons for Decision, as not all assumptions made by Applicants are fully reflected.

The abandonment method assumptions used by Applicants are as follows (unless otherwise noted):

A	Abandon in place
A+	Abandon in place with special treatment
R	Removal

The pipeline diameter categories used by the Applicants are as follows:

Small	2 to 12 inches (60.3 to 323.9 mm) outside diameter
Medium	14 to 24 inches (355.6 to 610 mm) outside diameter
Large	Greater than or equal to 26 inches (660 mm outside diameter)

The data contained in the following tables were extracted directly from Applicant submissions with some exceptions. In some instances, certain figures were derived by the NEB using the data provided in Applicant submissions. In the event of a discrepancy between any such derived figure and an Applicant submission, the latter should prevail.

Alliance

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A 95.7	A 136.8	A 1105.2	
	Cultivated with Special Features	A ---	A ---	A ---	
	Non-Cultivated	A 15.2	A 27.6	A 87.4	
Non-Agricultural	Existing Developed Lands	A ---	A ---	A ---	
	Prospective Future Development	A 2.4	A/R 5.9	A/R 13.4	R 68
	No Future Development Anticipated	A 149.8	A 234.1	A 290.0	
Other	Environmentally Sensitive Areas	A 7.8	A 19.5	A 24.1	
	Roads & Railways	A+ 4.3	A+ 5.3	A+ 28.4	
	Water Crossings	A 1.0	A 6.9	A 10.9	
	Other Crossings – Utilities	A+ ---	A+ ---	A+ ---	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[1]
1	**Engineering & Project Management**	8,830	21,900
2	**Abandonment Preparation**	24,190	24,140
	2a. Land Access and Clean up	7,130	7,080
	2b. Pipeline Purging and Cleaning	17,060	17,060
3	**Pipeline Abandonment-in-Place**	38,800	34,390
	3a. Basic Pipeline Abandonment-in-Place	14,470	12,990
	3b. Provision for Post-Abandonment Activities	24,320	21,400
4	**Special Treatment**	48,720	48,720
5	**Pipeline Removal**	4,390	128,820
	5a. Pipeline Removal and Backfilling	4,000	117,240
	5b. Pipeline Removal – Land Restoration	390	11.580
6	**Above-Ground Facilities**	24,930	24,930
	6a. All Facilities	6,880	6,880
	6b. Portions Removed	18,050	18,050
	6c. Portions Left in Place	Nil	Nil
7	**Contingency**	35,940	61,230
Total Cost		**185,800**	**344,130**

[1] These figures were provided by Alliance in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

Enbridge Pipelines

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities[2]
		small	medium	large	
Agricultural	Cultivated	A 3.3	A 2321.8	A 2805.4	
	Cultivated with Special Features	R ---	R ---	R ---	
	Non-Cultivated	A ---	A 144.0	A 236.1	
Non-Agricultural	Existing Developed Lands	A ---	A 53.2	A 44.5	
	Prospective Future Development	R ---	R 14.5	R 31.7	R 897
	No Future Development Anticipated	A ---	A 4.6	A 5.4	
Other	Environmentally Sensitive Areas	A 29.8	A 615.0	A 794.3	
	Roads & Railways	A/A+ 0.3	A/A+ 147.5	A/A+ 167.6	
	Water Crossings	A 0.4	A 71.3	A 101.8	
	Other Crossings – Utilities	A/A+ ---	A/A+ 156.7	A/A+ 225	

[2] Total number of facilities, excluding above-ground tanks, booster pump stations and pump stations. Above-ground tanks, booster pump stations and pump stations were filed by Enbridge Pipelines in terms of barrels or horsepower, rather than as a physical count.

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[3]
1	**Engineering & Project Management**	21,299	32,000
2	**Abandonment Preparation**	115,648	115,700
	2b. Land Access and Clean up	115,648	115,700
	2a. Pipeline Purging and Cleaning		
3	**Pipeline Abandonment-in-Place**	284,302	244,700
	3a. Basic Pipeline Abandonment-in-Place	284,302	244,700
	3b. Provision for Post-Abandonment Activities		
4	**Special Treatment**	93,512	93,500
	4a. With Fill	86,612	86,600
	4b. Without Fill	6,900	6,900
5	**Pipeline Removal**	9,222	223,900
	5a. Pipeline Removal and Backfilling	9,222	223,900
	5b. Pipeline Removal – Land Restoration		
6	**Above-Ground Facilities**	201,144	201,200
	6a. Meter Manifolds	9,954	10,000
	6b.Valve Manifolds	7,300	7,300
	6c. Electrical Buildings	11,020	11,000
	6d. Maintenance buildings	9,000	9,000
	6e. Above Grade Tanks	53,963	54,000
	6f. Booster Pump Stations	10,712	10,700
	6g. Below Grad Sump Tank	754	800
	6h. Mainline Valve (Remote Control)	25,844	25,800
	6i. Mainline Valve (Manual Control)	15,624	15,600
	6j. Mainline Instrumentation Building	3,268	3,300
	6k. Pig Trap Assembly	9,328	9,300
	6l. Pump Station	44,377	44,400
7	**Contingency**	54,538	82,500
Total Cost		**779,666**	**993,500**

[3] These figures were provided by Enbridge Pipelines in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

Enbridge (NW)

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities[4]
		small	medium	large	
Agricultural	Cultivated	A	A	A	
		---	---	---	
	Cultivated with Special Features	R	R	R	
		---	---	---	
	Non-Cultivated	A	A	A	
		---	---	---	
Non-Agricultural	Existing Developed Lands	A	A	A	
		---	---	---	
	Prospective Future Development	R	R	R	R
		---	---	---	99
	No Future Development Anticipated	A	A	A	
		---	---	---	
Other	Environmentally Sensitive Areas	A	A	A	
		869	---	---	
	Roads & Railways (#)	A/A+	A/A+	A/A+	
		40	---	---	
	Water Crossings (#)	A	A	A	
		2	---	---	
	Other Crossings - Utilities (#)	A	A+	A+	
		---	---	---	

[4] Total number of facilities, excluding above-ground tanks, booster pump stations and pump stations. Above-ground tanks, booster pump stations and pump stations were filed by Enbridge (NW) in terms of barrels or horsepower, rather than as a physical count.

Estimated Costs[5]

#	Cost Category	As filed in November 2011 ($000)
1	**Engineering & Project Management**	623
2	**Abandonment Preparation**	5,214
	2b. Land Access and Clean up	5,214
	2a. Pipeline Purging and Cleaning	
3	**Pipeline Abandonment-in-Place**	14,620
	3a. Basic Pipeline Abandonment-in-Place	14,620
	3b. Provision for Post-Abandonment Activities	
4	**Special Treatment**	327
	4a. With Fill	303
	4b. Without Fill	24
5	**Pipeline Removal**	0
	5a. Pipeline Removal and Backfilling	0
	5b. Pipeline Removal – Land Restoration	
6	**Above-Ground Facilities**	7,250
	6a. Meter Manifolds	316
	6b.Valve Manifolds	0
	6c. Electrical Buildings	0
	6d. Maintenance buildings	2,430
	6e. Above Grade Storage Tanks	0
	6f. Booster Pump Stations	0
	6g. Below Grad Sump Tank	156
	6h. Mainline Valve (Remote Control)	1,775
	6i. Mainline Valve (Manual Control)	1,848
	6j. Mainline Instrumentation Building	0
	6k. Pig Trap Assembly	528
	6l. Pump Station (3 Stations)	197
7	**Contingency**	1,663
Total Cost		**29,697**

[5] Enbridge (NW) does not have any medium or large pipe.

Kinder Morgan

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A	---	---	
		860.0	---	---	
	Cultivated with Special Features	A	---	---	
		0.8	---	---	
	Non-Cultivated	A	---	---	
		109.9	---	---	
Non-Agricultural	Existing Development	A	---	---	
		3.3	---	---	
	Prospective Future Development	A/R	---	---	R
		7.1	---	---	42
	Undeveloped	A	---	---	
		---	---	---	
Other	Environmentally Sensitive Areas	A/A+	---	---	
		34.3	---	---	
Road, Railway & Utility Crossings	Roads (#)	A/A+	---	---	
		720	---	---	
	Railways (#)	A/A+	---	---	
		37	---	---	
	Major Utilities (#)	A	---	---	
		809	---	---	
Watercourse Crossings	Rivers (#)	A/A+	---	---	
		7	---	---	
	Creeks (#)	A/A+	---	---	
		111	---	---	

Estimated Costs[6]

#	Cost Category	As filed in November 2011 ($000)
1	**Engineering & Project Management**	396
2	**Abandonment Preparation**	300
	2a. Land Access and Clean up	0
	2n. Pipeline Purging and Cleaning	300
3	**Pipeline Abandonment-in-Place**	1,181
	3a. Basic Pipeline Abandonment-in-Place	0
	3b. Provision for Post-Abandonment Activities	1,181
4	**Special Treatment**	150
5	**Pipeline Removal**	0
	5a. Pipeline Removal and Backfilling	0
	5b. Pipeline Removal – Land Restoration	0
6	**Above-Ground Facilities**	6,280
	6a. All Facilities	1,280
	6b. Portions Removed	5,000
	6c. Portions Left in Place	0
7	**Contingency**	791
Total Cost		**9,100**

[6] Kinder Morgan does not have any medium or large pipe.

Foothills

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A	A	A	
		---	---	563.9	
	Cultivated with Special Features	R	R	R	
		---	---	0.7	
	Non-Cultivated	A	A	A	
		---	---	244.3	
Non-Agricultural	Existing Developed Lands	A	A	A	
		---	---	8.3	
	Prospective Future Development	R	R	R	R
		---	---	17.3	45
	No Future Development Anticipated	A	A	A	
		---	---	362.9	
Other	Environmentally Sensitive Areas	A	A	A	
		---	---	32.0	
	Public Paved Road & Railway Crossings	A+	A+	A+	
		---	---	0.4	
	Public Gravel Road Crossings	A	A+	A+	
		---	---	0.5	
	Water Crossings	A	A	A	
		---	---	2.8	
	Other Crossings - Utilities	A	A	A	
		---	---	0.7	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[7]
1	**Engineering & Project Management**	1,851	4387
2	**Abandonment Preparation**		
	2a. Land Access and Clean up	1,544	1,544
	2b. Pipeline Purging and Cleaning	19,762	19,762
3	**Pipeline Abandonment-in-Place**		
	3a. Basic Pipeline Abandonment-in-Place	3,820	2972
	3b. Provision for Post-Abandonment Activities	1,930	1,930
4	**Special Treatment**	7,035	7,035
5	**Pipeline Removal**		
	5a. Pipeline Removal and Backfilling	3,736	39,505
	5b. Pipeline Removal – Land Restoration	1,116	6,972
6	**Above-Ground Facilities**		
	6a. All Facilities	57,325	57,325
	6b. Portions Removed	incl. in 6a	incl. in 6a
	6c. Portions Left in Place	N/A	N/A
7	**Contingency**	N/A	N/A
Total Cost		**98,119**	**141,432**

[7] These figures were provided by Foothills in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

NGTL

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A 4400.6	A 3019.9	A 2575.7	
	Cultivated with Special Features	R 57.0	R 39.1	R 33.4	
	Non-Cultivated	A 1185.5	A 813.5	A 693.9	
Non-Agricultural	Existing Developed Lands	A 36.6	A 25.1	A 21.4	
	Prospective Future Development	R 17.1	R 11.7	R 10.0	R 1362
	No Future Development Anticipated	A 3532.2	A 2424.0	A 2067.4	
Other	Environmentally Sensitive Areas	A 1311.6	A 900.1	A 767.7	
	Public Paved Road & Railway Crossings	A+ 20.8	A+ 14.3	A+ 12.2	
	Public Gravel Road Crossings	A 14.4	A+ 9.9	A+ 8.4	
	Water Crossings	A 19.3	A 13.2	A 11.3	
	Other Crossings - Utilities	A 82.4	A 56.5	A 48.2	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[8]
1	**Engineering & Project Management**	32,246	49,666
2	**Abandonment Preparation**		
	2a. Land Access and Clean up	25,214	25,214
	2b. Pipeline Purging and Cleaning	203,755	203,755
3	**Pipeline Abandonment-in-Place**		
	3a. Basic Pipeline Abandonment-in-Place	95,114	91,729
	3b. Provision for Post-Abandonment Activities	37,600	37,600
4	**Special Treatment**	284,045	284,045
5	**Pipeline Removal**		
	5a. Pipeline Removal and Backfilling	29,579	358,279
	5b. Pipeline Removal – Land Restoration	7,217	44,358
6	**Above-Ground Facilities**		
	6a. All Facilities	308,529	308,529
	6b. Portions Removed	included in 6a	included in 6a
	6c. Portions Left in Place	N/A	N/A
7	**Contingency**	N/A	N/A
Total Cost		**1,023,300**	**1,403,175**

[8] These figures were provided by NGTL in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

TransCanada Keystone

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A	A	A	
		---	---	974.6	
	Cultivated with Special Features	R	R	R	
		---	---	11.0	
	Non-Cultivated	A	A	A	
		---	---	176.6	
Non-Agricultural	Existing Developed Lands	A	A	A	
		---	---	9.3	
	Prospective Future Development	R	R	R	R
		---	---	10.4	88
	No Future Development Anticipated	A	A	A	
		---	---	5.4	
Other	Environmentally Sensitive Areas	A	A	A	
		---	---	31.8	
	Public Paved Road & Railway Crossings	A+	A+	A+	
		---	---	2.8	
	Public Gravel Road Crossings	A	A+	A+	
		---	---	7.4	
	Water Crossings	A	A	A	
		---	---	3.4	
	Other Crossings - Utilities	A	A	A	
		---	---	6.3	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[9]
1	**Engineering & Project Management**	2,897	5,629
2	**Abandonment Preparation**		
	2a. Land Access and Clean up	722	722
	2b. Pipeline Purging and Cleaning	18,709	18,709
3	**Pipeline Abandonment-in-Place**		
	3a. Basic Pipeline Abandonment-in-Place	4,164	3,392
	3b. Provision for Post-Abandonment Activities	4,200	4,200
4	**Special Treatment**	27,606	27,606
5	**Pipeline Removal**		
	5a. Pipeline Removal and Backfilling	4,894	68,647
	5b. Pipeline Removal – Land Restoration	952	7,122
6	**Above-Ground Facilities**		
	6a. All Facilities	50,555	50,555
	6b. Portions Removed	incl. in 6a	incl. in 6a
	6c. Portions Left in Place	N/A	N/A
7	**Contingency**	N/A	N/A
Total Cost		**114,699**	**186,582**

[9] These figures were provided by TransCanada Keystone in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

TransCanada PipeLines

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A 111.1	A 660.6	A 6181.8	
	Cultivated with Special Features	R 3.8	R 22.5	R 210.3	
	Non-Cultivated	A 9.0	A 53.4	A 499.7	
Non-Agricultural	Existing Developed Lands	A 14.6	A 86.5	A 809.4	
	Prospective Future Development	R 8.6	R 51.4	R 480.8	R 383
	No Future Development Anticipated	A 66.4	A 394.5	A 3691.4	
Other	Environmentally Sensitive Areas	A 6.9	A 41.0	A 383.6	
	Public Paved Road & Railway Crossings	A+ 1.0	A+ 6.1	A+ 57.3	
	Public Gravel Road Crossings	A 1.2	A+ 6.9	A+ 64.9	
	Water Crossings	A 1.1	A 6.5	A 60.9	
	Other Crossings - Utilities	A 0.8	A 4.5	A 42.3	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[10]
1	**Engineering & Project Management**	58,548	92,609
2	**Abandonment Preparation**		
	2a. Land Access and Clean up	36,494	36,494
	2b. Pipeline Purging and Cleaning	222,784	222,784
3	**Pipeline Abandonment-in-Place**		
	3a. Basic Pipeline Abandonment-in-Place	90,993	67,193
	3b. Provision for Post-Abandonment Activities	21,333	21,333
4	**Special Treatment**	567,347	567,347
5	**Pipeline Removal**		
	5a. Pipeline Removal and Backfilling	175,500	606,856
	5b. Pipeline Removal – Land Restoration	77,848	190,285
6	**Above-Ground Facilities**		
	6a. All Facilities	386,801	368,801
	6b. Portions Removed	included in 6a	included in 6a
	6c. Portions Left in Place	N/A	N/A
7	**Contingency**	N/A	N/A
Total Cost		**1,637,648**	**2,191,702**

[10] These figures were provided by TransCanada PipeLines in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

TQM

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A 19.8	A 273.0	A 23.3	
	Cultivated with Special Features	R 0.5	R 6.4	R 0.5	
	Non-Cultivated	A ---	A ---	A ---	
Non-Agricultural	Existing Developed Lands	A 3.6	A 49.5	A 4.2	
	Prospective Future Development	R 2.8	R 38.1	R 3.3	R 25
	No Future Development Anticipated	A 7.1	A 98.2	A 8.4	
Other	Environmentally Sensitive Areas	A 0.6	A 7.7	A 0.7	
	Public Paved Road & Railway Crossings	A+ 0.6	A+ 8.4	A+ 0.7	
	Public Gravel Road Crossings	A 0.2	A+ 2.1	A+ 0.2	
	Water Crossings	A 0.6	A 8.0	A 0.7	
	Other Crossings – Utilities	A 0.2	A 2.9	A 0.2	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[11]
1	**Engineering & Project Management**	2,824	3,895
2	**Abandonment Preparation**		
	2a. Land Access and Clean up	1,392	1,392
	2b. Pipeline Purging and Cleaning	6,470	6,470
3	**Pipeline Abandonment-in-Place**		
	3a. Basic Pipeline Abandonment-in-Place	1,619	1,614
	3b. Provision for Post-Abandonment Activities	970	970
4	**Special Treatment**	30,388	30,388
5	**Pipeline Removal**		
	5a. Pipeline Removal and Backfilling	9,223	24,783
	5b. Pipeline Removal – Land Restoration	7,381	13,397
6	**Above-Ground Facilities**		
	6a. All Facilities	8,356	8,356
	6b. Portions Removed	included in 6a	included in 6a
	6c. Portions Left in Place	N/A	N/A
7	**Contingency**	N/A	N/A
Total Cost		**68,623**	**91,265**

[11] These figures were provided by TQM in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

Trans Mountain

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A	A	A	
		---	84.2	3.6	
	Cultivated with Special Features	R	R	R	
		---	---	---	
	Non-Cultivated	A	A	A	
		---	101.1	---	
	Prospective Future Development	R	R	R	
		---	8.4	---	
Non-Agricultural	Existing Development	A/A+	A/A+	A/A+	
		---	98.8	20.3	
	Undeveloped	A	A	A	
		---	840.4	294.8	
	Prospective Future Development	R	R	R	
		---	30.6	0.8	
Other Land Features	High Hazard Locations	A/R	A/R	A/R	
		---	0.6	---	
	Special River Crossing	A/R	A/R	A/R	R
		---	3.0	0.6	116
	Timber Harvesting Areas	A/R	A/R	A/R	
		---	0.4	0.2	
	Environmentally Sensitive Areas	A/R	A/R	A/R	
		---	---	---	
Road, Railway & Utility Crossings	Roads (#)	A+	A+	A+	
	Railways(#)	A+	A+	A+	
	Major Utilities (#)	A	A+	A+	
Watercourse Crossings	Rivers (#)	A/A+	A/A+	A/A+	
	Creeks (#)	A/A+	A/A+	A/A+	
	Streams (#)	A/A+	A/A+	A/A+	
	Wetlands (#)	A/A+	A/A+	A/A+	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[12]
1	**Engineering & Project Management**	28,850	33,304
	Project Management	14,620	17,200
	Engineering & Survey	2,300	2,668
	Field Management & Inspect	11,930	13,436
2a	**Land Access and Clean Up**	6,008	7,493
	Environment (Including Application Support)	5,280	6,577
	Land Access	0,728	917
2b	**Pipeline Purging and Cleaning**	19,116	19,116
3a	**Pipeline Abandonment-in-Place**	35,215	35,215
	Road Crossings	22,419	22,419
	Railway Crossings	1,629	1,629
	Utility Crossings	3,770	3,770
	River Crossings	2,725	2,725
	Creek Crossings	674	674
	Stream Crossings	171	171
	Wetland Crossings	3,827	3,827
3b	**Provision for Post-Abandonment Activities**	37,690	36,842
4	**Special Treatment**	0	0
5a	**Pipeline Removal and Backfilling**	25,069	44,801
	Mobilization/Movers/Demobilization	1,358	1,414
	Removal	21,833	40,416
	Net Salvage	-218	-399
	Restoration	2,096	3,371
5b	**Pipeline Removal – Land Restoration**	incl in 5a	incl in 5a
6	**Above-Ground Facilities**	84,958	84,958
	Block Valve and Remote Traps	4,021	4,021
	Purging and Cleaning	8,843	8,843
	Pump Stations	13,614	13,614
	Terminals	45,515	45,515
	Contaminated Soil Allowance	12,965	12,965
7	**Contingency**	48,037	53,571
	Insurance & Taxes	15,786	17,250
	Contingency	32,250	36,321
Total Cost		**284,943**	**315,300**

[12] These figures were provided by Trans Mountain in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

Trans-Northern

Physical Assumptions

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A	A	A	
		227	49	---	
	Cultivated with Special Features	R	R	R	
		---	---	---	
	Non-Cultivated	A	A	A	
		90	13	---	
Non-Agricultural	Existing Developed Lands	A	A	A	
		160	52	---	
	Prospective Future Development	R	R	R	R
		10	---	---	73
	No Future Development Anticipated	A	A	A	
		171	72	---	
Other	Environmentally Sensitive Areas	A	A	A	
		---	---	---	
	Roads (#)	A+	A+	A+	
		322	106	---	
	Railways (#)	A+	A+	A+	
		50	23	---	
	Water Crossings (#)	A+	A+	A+	
		---	---	---	
	Other Crossings - Utilities (#)	A	A+	A+	
		---	3	---	

Estimated Costs

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[13]
1	**Engineering & Project Management**	2,169	2,221
2	**Abandonment Preparation**	3,747	3,747
	2a. Land Access and Clean up	3,747	3,747
	2b. Pipeline Purging and Cleaning	Included in 2a	Included in 2a
3	**Pipeline Abandonment-in-Place**	32,481	31,613
	3a. Basic Pipeline Abandonment-in-Place	8,339	8,215
	3b. Provision for Post-Abandonment Activities	24,142	23,398
4	**Special Treatment**	15,780	15,780
5	**Pipeline Removal**	256	1,185
	5a. Pipeline Removal and Backfilling	256	1,185
	5b. Pipeline Removal – Land Restoration	Included in 5a	Included in 5a
6	**Above-Ground Facilities**	15,245	15,471
	6a. All Facilities	15,245	15,471
	6b. Portions Removed	Included in 6a	Included in 6a
	6c. Portions Left in Place	Nil	Nil
7	**Contingency**	6,506	6,661
Total Cost		**76,184**	**76,678**

[13] These figures were provided by Trans-Northern in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

Westcoast

Physical Assumptions – Gathering and Processing

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A	A	A	
		112	162	30	
	Cultivated with Special Features	R	R	R	
		---	---	---	
	Non-Cultivated	A	A	A	
		23	23	6	
Non-Agricultural	Existing Developed Lands	A	A	A	
		1	12	31	
	Prospective Future Development	R	R	R	R/R+[14]
		---	---	5	521
	No Future Development Anticipated	A	A	A	
		1238	1465	17	
Other	Environmentally Sensitive Areas	A	A	A	
		---	---	---	
	Road Crossings (#)	A	A+	A+	
		1186	1153	173	
	Railway Crossings (#)	A+	A+	A+	
		10	14	11	
	Water Crossings (#)	A	A	A	
		2016			
	Other Crossings - Utilities (#)	A	A+	A+	
		192			

[14] Westcoast defined R+ as being partial or complete removal.

Estimated Costs – Gathering and Processing

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[15]
1	**Engineering & Project Management**	24,800	26,100
2	**Abandonment Preparation**	22,500	22,500
3	**Pipeline Abandonment-in-Place**	39,800	39,600
	3a. Basic Pipeline Abandonment-in-Place	800	800
	3b. Provision for Post-Abandonment Activities	39,000	38,800
4	**Special Treatment**	66,700	66,700
5	**Pipeline Removal**	1,800	14,100
6	**Above-Ground Facilities**	156,600	156,600
7	**Contingency**	24,800	26,100
Total Cost		**337,000**	**351,500**

[15] These figures were provided by Westcoast in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

Westcoast

Physical Assumptions – Transmission

Land-Use Categories		Abandonment Method / Total km or #			
		Pipelines (by diameter category)			Number of Above-Ground Facilities
		small	medium	large	
Agricultural	Cultivated	A	A	A	
		48	32	394	
	Cultivated with Special Features	R	R	R	
		---	---	10	
	Non-Cultivated	A	A	A	
		7	9	133	
Non-Agricultural	Existing Developed Lands	A	A	A	
		1	2	99	
	Prospective Future Development	R	R	R	R/R+[16]
		---	---	60	468
	No Future Development Anticipated	A	A	A	
		117	63	1980	
Other	Environmentally Sensitive Areas	A	A	A	
		---	---	---	
	Road Crossings (#)	A	A+	A+	
		66	71	3162	
	Railway Crossings (#)	A+	A+	A+	
		---	2	68	
	Water Crossings (#)	A	A	A	
		1707			
	Other Crossings - Utilities (#)	A	A+	A+	
		1269			

[16] Westcoast defined R+ as being partial or complete removal.

Estimated Costs - Transmission

#	Cost Category	As filed in November 2011 ($000)	As filed with 20% Removal ($000)[17]
1	**Engineering & Project Management**	21,000	24,700
2	**Abandonment Preparation**	10,300	10,300
3	**Pipeline Abandonment-in-Place**	19,200	19,000
	3a. Basic Pipeline Abandonment-in-Place	800	700
	3b. Provision for Post-Abandonment Activities	18,400	18,200
4	**Special Treatment**	109,500	109,500
5	**Pipeline Removal**	23,300	60,200
6	**Above-Ground Facilities**	66,600	66,600
7	**Contingency**	21,000	24,700
Total Cost		**270,900**	**315,000**

[17] These figures were provided by Westcoast in response to a request made by the Board, during the course of the MH-001-2012 hearing, to provide recalculated cost estimates for a theoretical scenario with an assumption of 20 per cent removal for medium and large diameter pipeline in the "Agricultural Cultivated" and "Agricultural Non-Cultivated" sub-categories.

Appendix VII

Key Rulings

Westcoast request for exemption from set-aside and collection mechanism – letter dated 1 June 2012

Decision of the Board

As mentioned above, the Board's Action Plan, which contains the filing requirements that the above companies seek exemption from, is set out in the RH-2-2008 Reasons for Decision. In addition to the two key principles noted by parties above, this decision also contains several comments that the Board finds relevant to these requests.

The RH-2-2008 Reasons for Decision indicated that while a company must report on the funds set-aside to cover the abandonment-related liability, it is not obligated to collect these funds through tolls. However, the pipeline company is responsible to demonstrate that the funds, whatever their source, are set aside in a manner consistent with the principles in the decision.

Accordingly, with respect to Westcoast's and AltaGas' comments that they are not able to increase the tolls charged to account for abandonment costs, the Board is of the view that collection of funds through tolling is not the only methodology for accumulating abandonment costs. These companies need not increase their tolls to demonstrate that the funds for abandonment will be set aside.

Westcoast and AltaGas also submitted that their ability to compete with provincially-regulated pipelines would be impacted if they were required to set aside funds for abandonment. The Board has considered this impact in light of the key principles and considerations set out in the RH-2-2008 Reasons for Decision. In respect of Westcoast, the Board has also taken into account that, in its letter, Westcoast stated its intent to manage its costs and revenue to ensure funding.[3] The Board is not persuaded that the competitive impacts described by either Westcoast or AltaGas are reason to back away from the objective of companies demonstrating that funds will be available when needed for future abandonment costs.

The Board also notes that Westcoast indicated that it is and will remain Westcoast's obligation to manage its costs and revenues to ensure that it has sufficient funds to pay the costs of retiring its gathering and processing facilities, when those costs need to be incurred. The Board reiterates its view, as expressed in the RH-2-2008 Reasons for Decision, that the future costs of abandonment do not need to be fully funded immediately. Instead, companies are expected to provide an orderly plan which demonstrates how future costs will be covered by set-aside funds as part of the filings.

In the RH-2-2008 Reasons for Decision, the Board directed that funds for future abandonment costs be protected from creditors and be used only for abandonment. The Board further

[3] In page 3 of its letter, Westcoast stated that it will need to recover future abandonment costs, together with all its other costs of providing service, from the toll revenue it collects from shippers through individual contract negotiations.

indicated that funds for future abandonment costs should not be commingled with other corporate funds. In the Board's view, these statements are particularly relevant to the comments in the requests made by FortisBC, which submitted that an exemption was warranted as its facilities are the responsibility, either directly or indirectly, of its affiliate, and Union Gas, which submitted that it has a parental guarantee when or if required. Consistent with its comments in the RH-2-2008 Reasons for Decision, the Board is of the view that lands owned by a pipeline company or its affiliate should not be exempted from future requirements to undertake abandonment activities. Regardless of the number of facilities located on these lands, any future abandonment activities associated with these lands carry costs that create a liability.

The Board notes the comments made by AltaGas that it is recording liabilities under GAAP. The Board further notes the comments of Union Gas, which stated that funds for future abandonment are being considered and collected through a depreciation study. In the Board's view, neither GAAP nor the collection of revenue through depreciation provide sufficient assurance that abandonment funds will be available when needed, unless the collected funds are set aside consistent with the principles of the RH-2-2008 Reasons for Decision.

In the case of FortisBC and its request that it be exempted from setting up a trust fund, the Board notes that the Action Plan does not require a trust fund to be established. Instead, the Action Plan requires the filing of a set-aside mechanism. While a trust account may be an example of a set-aside mechanism, FortisBC is welcome to submit any alternative set-aside mechanism that would be more cost-effective. The RH-2-2008 Reasons for Decision provided examples of other options, including the posting of bonds or letters of credit.

Disposition

Given all of the above, the Board denies the requests made by AltaGas, FortisBC, Union Gas and Westcoast. AltaGas, FortisBC, Union Gas and Westcoast are directed to file the collection and set-aside mechanism by the date indicated in the Board's Revised Action Plan.

MPLA Motion – letter dated 9 August 2012

1. MPLA request that the Board direct Enbridge to provide full and adequate responses to certain MPLA IRs

The Board has stated in the past that when considering a motion to compel full and adequate responses to IRs, the Board looks at the relevance of the information sought, its significance and the reasonableness of the request. The Board has further stated that it seeks to balance these factors so that the purposes of the IR process are satisfied, while preventing an Intervenor from engaging in a "fishing expedition" that could unfairly burden an applicant. The Board has applied this test in reaching its decision on this portion of the MPLA Motion.

(a) IRs 1.7, 1.9 and 1.11

MPLA IRs 1.7(a), 1.9(a) and 1.11(a) request Enbridge to provide calculations for its unit cost estimate for special treatment, pipeline removal and contingency cost estimates. IRs 1.7(b), 1.9(b) and 1.11(b) request details of Enbridge's Dig Estimating Tool, Cost Estimating Tool and Contingency Estimating Tool. IRs 1.7(c) and (d) request historical dig program costs and that the differences between the unit costs and the historical costs be explained. Enbridge refused to

provide the information requested on the basis that the information is confidential and proprietary.

The Board finds that calculations for the unit cost estimates and details of Enbridge's estimating tools are relevant. The Board also finds that details about Enbridge's historical dig program costs are somewhat relevant, as these costs were used in estimating Enbridge's unit cost estimate for special treatment. Nevertheless, the Board does not find either the calculations or the details about Enbridge's estimating tools to be significant. Furthermore, the Board is not persuaded that the details requested by MPLA in respect of Enbridge's historical dig program costs are significant. Disclosure of this information is not necessary for the Board to determine whether Enbridge's abandonment cost estimates, as filed, are reasonable. The Board therefore denies MPLA's request in regards to IRs 1.7, 1.9 and 1.11.

(b) IRs 1.14(a)-(b) and (d)

MPLA IR 1.14(a) requested copies of each of the forms of easement agreement or other authorization by which Enbridge obtained land rights for all its pipelines. In IR 1.14(b), MPLA asked whether the language in the agreements allows for the abandonment-in-place of a pipeline without ongoing maintenance. Finally, IR 1.14(d) asked whether Enbridge agreed that it is practicable to remove a pipeline. Enbridge provided forms of easement and right-of-way agreements applicable in Manitoba. Enbridge also answered MPLA's question about language in agreements only with reference to the MPLA/SAPL Settlement Agreement. With respect to the question of whether Enbridge was of the view that it is practicable to remove a pipeline, Enbridge responded that it may be possible to remove a pipeline.

The Board is not persuaded that all of Enbridge's pipeline-specific easement or other authorizations are relevant to this proceeding. In the Board's view, the information contained in the form of agreements or authorizations that would have been provided by Enbridge in response to IR 1.4(a) is general in nature and will not help the Board assess Enbridge's abandonment cost estimates. Given the Board's view regarding IR 1.14(a), the Board also finds that the request in IR 1.14(b) is not relevant and not significant. In the Board's view, the issue of what percentage of pipeline should be removed is relevant. The Board notes that Enbridge's application indicated that the language in all easement agreements allows for removal of the pipeline at Enbridge's option. The Board therefore denies MPLA's request with respect to 1.14(a) and 1.14(b).

With respect to the question posed in IR 1.14(d), the Board has determined that Enbridge has already responded to MPLA's request in respect of this topic. MPLA asked if Enbridge agreed that it is practicable to remove a pipeline. Enbridge indicated that while it may be possible to remove a pipeline, removal of the pipeline is not the method supported by most current scientific studies and is not accepted industry practice. Enbridge also referred to its application which describes its view as to why abandonment-in-place is acceptable. Accordingly, the Board denies MPLA's request with respect to IR 1.14(d) on the basis that the IR has already been answered. The Board notes that additional, more detailed follow up in respect of all relevant issues may be undertaken by all parties at the oral portion of the hearing.

(c) IRs 1.15, 1.16, 1.20, 1.26, 1.28(a), (b) and (d)

These IRs seek information from Enbridge regarding who will be responsible for post-abandonment where Enbridge's relationship to the pipeline and/or the landowner may have changed (for example, sale of the pipeline, release or surrender of the easement, bankruptcy). Enbridge did not respond to these information requests on the basis that the requests seek information that is not relevant to the MH-001-2012 proceeding.

The MH-001-2012 proceeding deals with the abandonment cost estimates of pipelines currently owned by Enbridge.[1] In contrast, the IRs posed by MPLA deal largely with legal issues related to responsibility, Enbridge's ability to transfer pipelines post-abandonment and the applicability of the *National Energy Board Act* after abandonment. The Board agrees with Enbridge that the answers to these questions are not necessary for the Board to make a decision as to whether Enbridge's cost estimates, as filed, are reasonable. The Board therefore finds that, with the exception of the IRs set out below, the questions posed in the IRs are only marginally relevant and not significant. The Board denies MPLA's request in respect of IRs 1.15, 1.16(b), 1.20, 1.26, 1.28(a) and 1.28(d).

MPLA IR 1.16(a) requests Enbridge to describe how its abandonment cost estimates address the issue of responsibility for contamination discovered after abandonment. The Board finds the post-abandonment cost estimated by Enbridge for contamination to be relevant and significant. Therefore, Enbridge is directed to respond to IR 1.16(a).

MPLA IR 1.28(b) relates to the manner in which Enbridge's cost estimate provides for post-abandonment damage to farm equipment. The Board finds this issue relevant and significant, as it relates to the question of whether post-abandonment funding should be available for such damages. The Board notes that Enbridge has provided a response to this IR. However, Enbridge has not directly indicated whether its cost estimate addresses such damages and why or why not. Accordingly, Enbridge is directed to provide further response to IR 1.28(b).

As indicated above, many of the questions posed by MPLA relate to the question of whether landowners have legal responsibility over an abandoned pipeline. In this regard, the Board reiterates one of the key principles articulated in the RH-2-2008 Reasons for Decision, that landowners will not be liable for costs of pipeline abandonment. Consistent with this principle, the Board directed companies to comply with the Board's Action Plan, which included the filing of abandonment cost estimates and the Board's assessment of these estimates, which is being carried out in the MH-001-2012 proceeding.

With regard to the issue of post-abandonment jurisdiction over pipelines and NEB consultation on this issue, the Board released an advisory letter on 2 February 2009 clarifying the Board's jurisdiction post-abandonment. In that letter, the Board indicated that once all NEB-ordered conditions are met, NEB jurisdiction ends and the NEB will no longer oversee and regulate the abandoned pipeline or facility. However, the money set aside for abandonment must include financial provision for monitoring and any unforeseen events which occur after the NEB jurisdiction ends. The issue of post-abandonment jurisdiction is further being dealt with in Stream 4 of the Land Matters Consultation Initiative, with the involvement of landowners, other

[1] In addition to Enbridge, the MH-001-2012 proceeding also deals with the abandonment cost estimates of all Group 1 companies which have not used the Base Case in their assessment.

jurisdictions, industry and NEB staff. In addition, the Land Matters Working Group oversees studies on gaps in knowledge on physical pipeline abandonment issues.

(d) IR 1.24(b)

The MPLA IR asked Enbridge whether it would recommend removal of a pipeline where it would interfere with the installation of tile drainage. Enbridge responded that landowner input will be included and considered in the site specific assessment at the actual time of abandonment.

In the Board's view, Enbridge has already provided a response to the question. Therefore, the Board denies MPLA's request in respect of IR 1.24(b). The Board notes that additional, more detailed follow up in respect of all relevant issues may be undertaken by all parties at the oral portion of the hearing.

2. MPLA request that the Board direct Enbridge to provide responses to additional information requests arising from Enbridge's response to MPLA IR 1.4(a)

In its Motion, MPLA requested leave to file additional IRs to Enbridge regarding a 72 kilometre section of Line 13 (Follow-up IRs). In its application, Enbridge had incorrectly identified this section of pipe as having been deactivated. However, in its response to MPLA IR 1.4(a), Enbridge acknowledged that it had erroneously included this section Line 13 in its list of deactivated pipelines included in its application. Enbridge further indicated that this section had in fact been abandoned pursuant to NEB Orders MO-21-75 and MO-22-75. MPLA submitted that if the correct information had been provided by Enbridge in its application, MPLA would have filed additional IRs on 1 June 2012.

In its reply submissions, MPLA stated that NEB Orders MO-21-75 and MO-22-75 make reference to certain submissions and affidavits provided to the NEB in 1975. To the extent these submissions and affidavits are not already covered by the MPLA Motion, MPLA also requested that the NEB compel Enbridge to produce these documents.

MPLA has requested the opportunity to ask Enbridge further IRs. This request has come after the 1 June 2012 deadline set by the Board for IRs to the applicants. When considering late requests for IRs, the Board takes into account a variety of factors, including whether the requesting party has persuaded the Board that the requests are relevant, the extent of prejudice resulting to any party to the proceeding and whether there is a justification for the late request. The Board has considered these factors in making its decision on this part of the Motion.

The Board recognizes the error in Enbridge's application regarding the 72 kilometre section of Line 13. The Board therefore accepts MPLA's submission that they would have filed the Follow-Up IRs on 1 June 2012 had they been aware that the Line 13 section was abandoned. Accordingly the Board has determined that MPLA's late request is justified.

With respect to prejudice, the Board notes that the oral portion of the hearing will commence on 30 October 2012, and that therefore, there is some flexibility to alter the filing deadlines prior to the oral portion of the hearing. Therefore, the Board has determined that parties will suffer minimal prejudice if the Board were to allow MPLA to ask additional IRs.

In the Board's view, Follow-Up IRs 2.1(g)-(i), (k), (m)-(p) and (u) relate to Enbridge's experience with post-abandonment issues and costs. Historical information related to experience with the post-abandonment costs is useful to the Board in its assessment of companies' abandonment cost estimates. The Board therefore finds Follow-Up IRs 2.1(g)-(i), (k), (m)-(p) and (u) to have probative value.

The Board is further of the view that the information to be provided in response to these Follow-up IRs may take some time for Enbridge to retrieve. Accordingly, these questions are more appropriately asked as IRs rather than during the course of the oral portion of the hearing.

However, the Board finds that the other Follow-Up IRs, as well as the request for information set out in MPLA's reply submission, are of minimal relevance and no probative value. In the Board's view, the majority of the Follow-Up IRs do not relate to Enbridge's experience with post-abandonment activities. For example, Follow-up IRs 2.1(a)-(e) are very specific to the regulatory process associated with taking Line 13 out of service. Follow-up IRs 2.1(f) and (l) are related to the easements on Line 13. IR's 2.1(q)-(t) relate to specific details of the physical activities related to taking Line 13 out of service. Given the above, the Board denies MPLA's request in respect of Follow-Up IRs 2.1(a)-(f), (j), (l) and (q)-(t) as well as the request contained in MPLA's reply submission.

Given all of the above, the Board directs Enbridge to respond to MPLA's Follow-Up IRs 2.1(g)-(i), (k), (m)-(p) and (u). The Board also directs Enbridge to provide the technical specifications of the abandoned section of Line 13, including but not limited to wall thickness and depth of cover, to the extent that these specifications would help inform Enbridge's responses.

3. MPLA request that the Board amend the MH-001-2012 Hearing Order to extend the time for filing of Intervenor Written Evidence by two weeks to 10 August 2012

As previously stated, on 25 July 2012, the Board extended the deadline for Intervenor Written Evidence.

However, given the Board's decision on the MPLA Motion, the Board has decided to alter the deadlines in the MH-001-2012 process as follows:

Responses to MPLA Information Requests filed (Enbridge)	22 August 2012
Written Evidence of Intervenors	29 August 2012
Information Requests to all Intervenors filed	5 September 2012
Intervenor Responses to Information Requests filed	21 September 2012
Applicants Reply Evidence	12 October 2012

Clarification of Procedural Update (in response to Review and Variance application by Enbridge Pipelines, Alliance and Kinder Morgan) – letter dated 23 October 2012

The Board welcomes this opportunity to provide clarification in respect of its Procedural Update.

In the RH-2-2008 Reasons for Decision, the Board committed to assessing the abandonment cost estimate (ACE) filings, in addition to all other filings made by regulated companies, in light of the principles and considerations set out in that decision, as well as the requirements set out in the NEB Act. The RH-2-2008 Reasons for Decision stated that access to accumulated funds should generally not be permitted for decommissioning or deactivation of facilities, unless the Board authorizes the access on the facts of a particular case before it.

Considering that the RH-2-2008 Reasons for Decision left open the possibility of companies accessing funds for decommissioning and deactivation of facilities if authorized by the Board, it follows that a company's ACE may include such costs. The Board therefore clarifies that it is considering all the ACE filed by the Group 1 company applicants, which may include estimates of decommissioning activities to the extent that these costs are included in company applications. This is consistent with the RH-2-2008 Reasons for Decision.

Accordingly, portions of the Procedural Update which limit the Board's consideration to abandonment costs should be interpreted broadly to include any cost accounted for in a company's application. Similarly, any reference in the Procedural Update to companies' ability to draw on funds to finance decommissioning should be read in a manner that is consistent with the RH-2-2008 Reasons for Decision. For greater certainty, access to accumulated funds should generally not be permitted for decommissioning or deactivation of facilities, unless the Board authorizes the access on the facts of a particular case before it.

The Board notes that although it is considering all companies' ACE as filed, its consideration of these costs does not mean that the Board is considering the merits of any particular deactivation, decommissioning or abandonment project. These projects are dealt with on a case-specific basis.

Accessing Funds

The Board's above confirmation should not be interpreted to suggest that the Board is, at this time, approving general access to funds for any particular project or group of projects. Consistent with the RH-2-2008 Reasons for Decision, the Board will consider the issue of access to funds as part of its assessment of companies' set-aside mechanism. The Board stated in the RH-2-2008 Reasons for Decision that the process for accessing the funds must be clearly set out in the set-aside mechanism filed by companies.[1]

Accordingly, the Board will not consider the manner in which funds can be accessed in the MH-001-2012 proceeding.

[1] The Board's revised Action Plan requires Group 1 companies to develop and file, for approval, a proposed process and mechanism to set aside funds by no later than 28 February 2013. Group 2 companies must file by no later than 31 May 2013.

Conclusion

The Board notes that the Applicants sought relief through a review and variance of the RH-2-2008 Reasons for Decision and the Procedural Update, or, in the alternative, through corrections to the Procedural Update. In the Board's view, given the above clarification to the Procedural Update, there is no reason to further address the application as filed.

Should the Applicants or any other party continue to have unresolved concerns in respect of the Board's comments in RH-2-2008 Reasons for Decision on access to funds for the purposes of decommissioning or deactivation, they may file a revised application setting out these concerns as well as all relevant legal argument.

Objection by MPLA to TCPL Opening Statement

5230. THE CHAIRMAN: Mr. Ignasiak, before we proceed, we do have a ruling on Mr. Goudy's objection to part of the Opening Statement.

5231. The Board is of the view that the information about cathodic protection which was provided last Friday in the Opening Statement of the TransCanada Group of Companies is sufficient at this time.

5232. To the extent that other participants in this hearing have further questions in the area of cathodic protection, the TransCanada witnesses would have an opportunity to further elaborate under cross-examination.

5233. Therefore, our intention is to leave the record as it currently stands, but subject to any other portions of the Opening Statement related to topics which form part of the application of the TransCanada Group of Companies, we will proceed to cross-examination of the witness panel.

Motion by Mr. Core to strike the CEPA report from the record

THE CHAIRMAN: Mr. Core, the Board has decided to deny your motion to strike the CEPA report from the record. In determining whether to allow or disallow evidence, the Board's overriding consideration is to have a complete record on which to base its decision.

4003. In this hearing, the Board is considering the reasonableness of the cost estimates as filed. Companies have proposed cost estimates and in many cases cited the CEPA report in support of those cost estimates. One applicant has filed the report as an exhibit.

4004. As a result, the Board is of the view that the CEPA report is directly relevant to this proceeding and therefore should not be struck from the record.

4005. Now, the Board notes what Mr. Core has pointed out, the record is a draft and that its authors are not subject to cross-examination in this hearing. And as per the disclaimer in the front, companies are relying on the report at their own risk.

4006. Parties can rest assured that as part of its decision that, as with any piece of evidence, the Board considers the appropriate weight which it should place on this report.

4007. Thank you.

Ruling on TCPL Filing

7162. THE CHAIRMAN: Okay, thank you. We promised you a ruling this afternoon.

7163. In this proceeding, the Board is considering the reasonableness of each company's cost estimates. This includes the reasonableness of each company's assumptions regarding the proposed abandonment methods, the scope and rationale for each abandonment activity and the approach to estimation.

7164. Each company was given the choice of either using the Boards Base Case or using their own abandonment cost estimates. The companies that chose to use their own cost estimates, as the TransCanada group has chosen to do, must justify their departure from the Base Case.

7165. The Board remains of the opinion that our original request will help us in assessing the reasonableness of TransCanada's Application. Therefore, we direct the TransCanada group of companies to file the documents as we requested.

7166. To be clear, one table should include 10 percent, 20 percent and 30 percent on agricultural cultivated lands. The second table should include 10 percent, 20 percent and 30 percent on agricultural cultivated combined with agricultural non-cultivated lands and I believe, if more direction is needed, you will find it in the transcripts as to what we requested.

7167. MR. IGNASIAK: Im not -- Mr. Chairman, I think the specific direction we would require is whether you require us to use the exact same sub-categories as have been used in tables by the other companies. That's really the issue.

7168. THE CHAIRMAN: That is correct.