Canada

Land Matters Consultation Initiative

Stream 3: Financial Issues Related to Pipeline Abandonment

Discussion Paper

March 2008

National Energy Board

Office national de l'énergie

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Abbreviations

ARO	Accounting for Retirement Obligations
CEAA	*Canadian Environmental Assessment Act*
CNSC	Canadian Nuclear Safety Commission
CSA	Canadian Standards Association
ERCB	Energy Resources Conservation Board
LLR	Licensee Liability Rating
LMCI	Land Matters Consultation Initiative
NEB	National Energy Board
NEB Act or Act	*National Energy Board Act*
NRC	U.S. Nuclear Regulatory Commission
OPR	On Shore Pipeline Regulations
OSLTF	Oil Spill Liability Trust Fund
QET	Qualifying Environment Trust
TNS	Terminal Negative Salvage
U.S.	United States

Glossary of Terms

Abandon	To permanently cease operation such that the cessation results in the discontinuance of service.
Accounting For Retirement Obligations	This term is used in accounting standards in Canada and the U.S. to describe the standards of disclosure and treatment on balance sheets.
Accumulate Savings	A phrase used in the discussion paper to describe a process of setting aside explicit funds toward a stated goal of end-of-pipeline (net) clean-up costs.
Book Value	The amount at which an item appears in the books of account and financial statements.
Cost of Capital	The overall return on a company's investment in a pipeline. Similar to Rate of Return.
Cost of Service	The total cost of providing service, including operating and maintenance expenses, depreciation, amortization, taxes, and return on rate base. Generally, the cost of service is the same as revenue requirement.
De-Activate	To temporarily remove facilities from service.

Death Spiral	A term used in economics to describe the situation in which a declining volume bears the burden of paying a pipeline's cost of service, resulting in increasing per unit charges, which make it difficult to competitively price the commodity in the market. This leads to further volumes declines and worsens the problem.
Decommission	To permanently cease operation such that the cessation does not result in the discontinuation of service, e.g., when a tank is removed from operation on a pipeline and the pipeline continues to operate without the tank.
Depreciation	A non-cash expense charged against earnings to write off the cost of an asset during its estimated useful life.
Discontinuance of Service	Discontinuance of Service results when customers no longer receive hydrocarbons from a pipeline or branches or extensions thereof.
External Sinking Fund	A sinking fund is established by a company to accumulate funds toward the retirement of a debt issue when it matures. External implies that it is invested at arm's length, for example, in a bank's securities and with restrictions on its redemption.
Extraordinary Retirement	A retirement of depreciable plant that results from causes not reasonably assumed to have been anticipated or contemplated in prior depreciation or amortization provisions, including such causes as fire, storm, flood, premature obsolescence or unexpected and permanent shut down of an entire operating assembly for reasons other than ordinary wear and tear. NEB *Uniform Accounting Regulations*, s. 40(1).
Intergenerational Equity	A broad principle that users in any period are generally required only to pay for the costs of providing them with services in that period.
Levy	A term typically used to describe a charge imposed over and above normal costs, and designated in how the revenue is handled thereafter. For example the Canadian Goods and Services Tax is a levy attached to purchase, and revenue collected is re-directed to the government. In this document the term is used to imply a unit surcharge, or rider not dependent on current period costs.
Monte Carlo Simulations	A technique that involves modelling many possible combinations of inputs (such as costs) using random numbers and probability to produce an array of outcomes (such as net future liability) with probabilities.
No-Cost Capital	Represents costs collected from customers to cover future expenditures. These entries are the opposite of rate base items, in

	that they are subtracted from the capital base of the pipeline.
Orphan Facility	An orphan oil and gas facility is one that is deemed to have no legally responsible and financially viable owner.
Rate Base	The amount of investment on which a return is authorized to be earned.
Rate Levelling	Ratemaking techniques used to defer costs traditionally recovered through tolls in the early years of a pipeline's life to later years in order to level out tolls over time.
Retirement	A generic term used in this paper to encompass all actions taken when a pipeline is not operated, inclusive of decommissioning and abandonment.
Retirement Obligations	This term is used in accounting standards in Canada and the U.S. to describe the estimated amount of money to shut-down and clean up a facility site, subject to applicable regulations and standards.
Salvage	The value at removal of plant, pipe and facilities.
Straight Line Depreciation	One method of recovering the original cost of a facility, this method applies the same depreciation each year so that the remaining undepreciated value decreases in a straight not curved line.
Surety	Something that provides security against damages, loss or default.
Terminal Negative Salvage	Total costs incurred to abandon a pipeline less the value obtained from salvaging equipment and pipe for re-use.
Time Value of Money	A dollar today is worth more than a dollar tomorrow. Dollars in future years are typically 'discounted' to a value in the present year.
Unconditional Performance Bond	A performance bond is a contract between parties (A, B and C) whereby B (e.g. a bank) will pay certain charges to A (e.g. a government) if C (e.g. a company) fails to carry out certain activities to an agreed-upon standard.
User Pay Principle	A broad principle that those who most directly benefit from a service pay the cost of providing the service.
Value At Risk	A term and technique used, particularly in banking or investment, to describe the maximum possible loss of a portfolio under certain conditions. There are banking industry standards for computation of this number.

1. Summary

Pipeline companies have a responsibility to undertake certain activities at the end of each pipeline's economic life. These activities can be grouped under the terms abandonment and decommissioning, or generically referred to as retirement. These activities may generate some cash from re-sale of pipe and equipment ("salvage"), but there are shut down, clean up and other costs. If the costs exceed the salvage, they give rise to Terminal Negative Salvage (TNS) costs potentially at a time when the pipeline no longer has volumes or shippers, and so methods (other than collecting from shippers at that time) must be considered to ensure that funds are available when these costs are incurred. There are accounting regulations which govern the recognition of these retirement obligations. This paper discusses how these retirement obligations could be funded and is intended to form a common basis for discussion of the issues during the Board's public hearing process.

The Board has decided to hear evidence to determine whether funds should be collected and, if so, how best to ensure that funds will be available when retirement obligations are incurred. The paper provides a brief summary of a 1985 Board staff paper which covers many of these issues. Next, brief observations are provided about some pre-funding approaches in other jurisdictions. Most of these approaches relate more to unexpected future costs (such as spillage) rather than end-of-life costs. Most also address retirement of upstream facilities rather than large-inch transmission lines.

There is a great deal of uncertainty involved with retirement obligations as the end of most pipelines' economic life is many years into the future. Some simplifying assumptions are needed in order for preliminary estimates of net retirement obligations to be created, and to be understood readily by all parties. Some possible approaches to funding might be insurance, depreciation and accumulated savings. Some features of these approaches are described in this paper, without implying that these are the only possible approaches. The approach of accumulating savings is described in more detail, as a reference point for discussion and comparison to other approaches. The approach of accumulating savings raises a number of questions, including the appropriate governance for any reserves held, whether they should be held in company accounts, separately or commingled, and whether they should be pooled across the industry.

Most approaches considered would lead to many other questions, such as the role of taxation relative to any revenue collected prior to expenditure; and the degree of consistency between companies with respect to the material filed with the Board on estimation of retirement obligations and funding them. There is also the issue of whether all pipeline companies under the Board's jurisdiction should be required to start estimating retirement obligations, and to start financial planning for funding these obligations. Further, addressing the inherent uncertainty with respect to the timing and costs of retirement may require regular revision of cost and funding provisions. Some form of probability modeling of funding mechanisms and future costs might also be useful in determining with confidence that funds will be available when costs are incurred.

2. Background and Jurisdiction

2.1 Introduction

When an energy pipeline comes to the end of its economic or useful life, it will be "abandoned" or decommissioned. In everyday language, abandon can imply neglect. However the implication for pipelines is not neglect. Abandonment may, as directed by the Board, involve physically removing the pipeline from the ground or leaving it in place, with environmental reclamation and other appropriate measures taken in either case to minimize the overall impact on the environment and users of the lands. The costs associated with that abandonment and reclamation work are called TNS costs, as the costs will likely exceed the salvage value of the material removed for scrap or use by others. A significant concern of all parties is that financial reserves are available to the pipeline company to cover the costs of the necessary work.

As part of the Land Matters Consultation Initiative (LMCI), the Board has decided to address the policy question: What is the optimal way to ensure that sufficient financial reserves are available when TNS costs are incurred? The process to address this policy question will include an opportunity for interested parties to file evidence and submissions with the Board prior to a Board decision.

In its 17 January 2008 letter, the Board articulated the following potential outcomes of the LMCI:

- *Development of a set of principles which will guide the Board in its future decisions with respect to the financial matters related to pipeline abandonment;*
- *Preliminary mechanism to begin setting aside funds for abandonment costs is identified;*
- *Identification of technical abandonment assumptions to be used to estimate abandonment costs; and,*
- *An action plan is developed to move forward on remaining financial issues including issues unique to each pipeline company.*

This Discussion Paper is provided to frame some of the discussion during the LMCI process. References are also provided at the end of the paper.

2.2 NEB Act

Pursuant to section 74 of the Act, an application is required when a company is seeking leave of the Board to "abandon the operation of a pipeline". An application under section 74 of the Act may not be required to remove or retire pipeline components if the action does not result in a discontinuance of service. If there is no discontinuance of service, a pipeline company may seek to remove or retire pipeline components and the Board may approve the removal or retirement pursuant to the proposed decommissioning provision of the *Onshore Pipeline Regulations, 1999*[1] *(OPRs)*.

[1] The proposed amendments to the Onshore Pipeline Regulations were published in Part I of Canada Gazette for comments on 10 November 2007. The comment period closed on 10 December 2007. Once the amendments are

Pursuant to the *Canadian Environmental Assessment Act* (CEAA) and the *Law List Regulations* made under CEAA, an environmental assessment is required for an application under paragraph 74(1)(d) of the Act. Depending on the nature of an application to remove or retire pipeline components, an environmental assessment pursuant to the CEAA may be required. Regardless of whether the CEAA applies, companies should address environmental considerations in any application.

2.3 Regulations

Section 50 of the OPRs states that "An application made by a company under section 74 of the Act for leave to abandon a pipeline or a section of one shall include the rationale for the abandonment and the measures to be employed in the abandonment."[2]

An application to abandon or decommission[3], the operation of a pipeline should include an abandonment plan that is tailored to the individual project. In respect of such an application, the Board will make a determination regarding those facilities that are to be abandoned in place and those to be removed. This determination will be based on the application and evidence before the Board, including the comments of affected stakeholders.

Whether a pipeline is to be removed or abandoned in place will require assessment of the impacts on the environment, users of the lands, safety, and other relevant matters. If the pipeline is to be abandoned in place, the company should refer to the applicable provisions of Canadian Standards Association (CSA), currently CSA Z662 Clause 10, for minimum engineering requirements. The application may also address reclamation of sites where surface facilities have been or will be removed.

The plan should provide the opportunity for stakeholder input, including landowners, occupants, land managers, lessees, municipal agencies and upstream and downstream users. Comments from stakeholders should be included and considered in the application for abandonment, and incorporated, where appropriate, into the abandonment plan.

For additional information on issues to be addressed when abandoning a pipeline, applicants should refer to any relevant Board publications, including the Board's *Filing Manual, Guide B*; as well as other publications that may be of interest, such as *Pipeline Abandonment - A Discussion Paper on Technical and Environmental Issues,* both of which are available on the Board's website at www.neb-one.gc.ca.

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published in Canada Gazette, Part II, assuming the regulation is made effective in its present form, companies may apply for decommissioning under this new section in the OPR.

[2] The proposed regulations, discussed *supra* note 1, will amend section 50. The wording contemplated in Part I of the Canada Gazette is as follows:

> **50.** A company shall include in an application made under section 74 of the Act for leave to abandon a pipeline or part of one the reasons, and the procedures that are to be used, for the abandonment.

Similar information will be required for decommissioning applications under the OPRs (proposed s. 45.1).

[3] See notes 1 and 2 above.

2.4 Core Concepts and Terms

There are three particular terms relevant to handling of pipeline facilities that are not in use. Pipeline deactivation is a temporary state. Costs associated with pipeline care during deactivation are typically handled by the pipeline owner. Decommissioning may complete the use of one (large or small) part of a system. Handling of costs could depend on the role of the abandoned portion in relation to the system as a whole. Abandonment may apply when all or a large area of a pipeline system is finished its useful life. Costs to fund abandonment (and possibly decommissioning) could be incurred when there may not be sufficient company revenue to cover them. Hence, funding in advance is an important consideration. The generic term 'retirement' is used to include both abandonment and decommissioning activities.

The future potential use of a pipeline system or its components is a relevant issue. If a pipeline is deactivated, its most likely future use may be a return to its prior service. But in the case of decommissioning or abandonment, its other uses might be in-place, or components may be removed (salvaged) and re-deployed or sold. The value of such future use can be credited against the costs of the other retirement activities. The net cost is the TNS. The pipeline company has a financial obligation for these net costs. The costs are part of the full life-cycle cost of providing the service of transmitting hydrocarbons.

Although the focus of this background paper is primarily abandonment or TNS costs, the more generic term of 'retirement obligations' is used. This term may cover decommissioning costs, depending upon the time decommissioning occurs (e.g. very close to the end of the operation of a pipeline system) and the extent of the pipeline system being decommissioned. This term also aligns with the phrase "Accounting for Retirement Obligations" (ARO) used in accounting standards in Canada and the U.S. to describe standards of disclosure and treatment on balance sheets.

2.5 The 1985 NEB Paper

In 1985, the NEB issued a staff paper[4] which addressed the financial issues associated with pipeline retirement obligations. In response to concerns from the pipeline companies under its jurisdiction, the paper considered the issues associated with pipeline abandonment and potentially significant negative salvage costs. This section summarizes some aspects of that paper.

A number of principles or criteria emerged from relevant applicable regulatory decisions, and were discussed in the paper, including: assurance of availability of funds; cost to ratepayers; flexibility to adapt to changing costs; and equity to ratepayers.

Estimating Financial Exposure

The paper noted that available pipeline abandonment options included removal of pipe; abandonment in place with continuing maintenance; and outright abandonment in place.

[4] National Energy Board (1985), Background Paper on Negative Salvage Value, September, 1985.

Regulated pipelines anticipated that abandonment would involve costs that would significantly exceed the potential salvage value of the pipe and associated facilities, although, up to 1985, the industry had submitted only a few widely varying cost estimates, primarily for removal.

Based on this limited experience in estimating costs, the NEB concluded that, to that time, "... *approaches used by companies to prepare estimates are generally inconsistent."* However, the Board was prepared to articulate five potential starting points for future cost estimation, including:

- Base pipe salvage value on five-year average market prices for scrap steel with prices for sulphur contaminated steel also to be sought;
- Base compressor station and process plant salvage values on a similar approach;
- Seek industry consensus on labour requirements and costs for removal of both compressor stations and pipelines;
- Credit the estimated value of owned land associated with facilities proposed for retirement against negative salvage costs; and
- Credit values associated with alternative uses for above ground buildings against negative salvage costs.

Key Questions

The paper identified five key questions relating to financial aspects of pipeline abandonment and associated options that may be open to the National Energy Board and the pipeline companies it regulates.

a) How should abandonment and funds collected for abandonment be accounted for?

Under the Board's *Uniform Accounting Regulations*, when a pipeline asset is taken out of service both the asset account and the accumulated depreciation account are reduced by the original cost. Losses recorded as part of an ordinary retirement (i.e., negative salvage value) stay in the rate base. If recorded as an extraordinary retirement[5], losses would be transferred from accumulated depreciation to the extraordinary plant losses account and the Board would determine the appropriate disposition of the loss.

If negative salvage is provided for as a component of depreciation, then the current regulations would be sufficient. However, if negative salvage is not provided for through depreciation, amendments to the regulations may be required.

b) When should collection of funds for negative salvage begin?

The paper examined the impact of delaying collection of abandonment charges for 10 to 20 years versus collecting the charge over the full 30-year life (assumed) of the pipeline. Delayed collection was found to be a viable option albeit with increased abandonment related costs for later users. For example, depending on the cost recovery method used, a 10-year delay would increase annual charges by 20 to 147 percent compared to annual charges collected over a 30-

[5] See Glossary.

year period. A 20-year delay would increase annual charges by 97 to 684 percent over the 30-year option.

c) How should payments be calculated?

The paper suggested that there was a choice between collecting once, at the start of pipeline operations, or periodically, such as annually or less frequently. Unlike traditional depreciation provisions where the asset value to be depreciated remains constant, estimates of abandonment costs will fluctuate with changing expectations for inflation, estimated service life, interest rates, technology, regulatory requirements and other factors. These variables suggest that periodic revision of abandonment estimates may be appropriate. However, there could be funding options that involve a single front-end collection, in which case the calculation could be done only at the start of operations.

d) What should be the time distribution of the cost of recovery?

One option addressed was a prepayment of abandonment funds at the outset of pipeline operations. At start-up, funds are deposited to be managed by either the company or an independent fund manager. The amount deposited is based on the forecast negative salvage value net of expected interest, inflation and taxes. With this approach, some form of rate levelling may be required to ensure that early users do not pay more than their share of the required funding.

The alternative was annual payments, either straight line payment computation or some form of rate levelling. The straight line method is the most common approach for recording depreciation. However, because negative salvage values will generally be periodically revised to reflect changes in interest rates, inflation, etc., pipeline companies need not be restricted to this approach. It can also be argued that if tolls are based on straight line depreciation, it is inequitable because early shippers pay the rate of return on the original, higher rate base while later shippers will pay based on a depreciated rate base.

Rate levelling could be considered where it was appropriate that early shippers not be disadvantaged at the expense of later users. Some portion of the costs recovered for abandonment could be shifted to later in a pipeline's life by delaying the start of cost recovery (see Question b, above) or by inflating the original annual amount over time. For example, annual payments could be periodically increased by the rate of inflation or by an amount that reflects the resultant loss in purchasing power.

e) How should collected funds be managed?

The options considered in 1985 included the following:

- Internal company unfunded reserve, accessible for general corporate purposes. While the utility gains the benefits of investing the funds in other assets, mismanagement or insolvency could limit fund availability when required.
- Internal company funded reserve, where payments collected would be placed in a fund with restricted usage.

- A general industry insurance fund could collect and manage abandonment premiums for all pipeline companies.
- A funded, external reserve with payments set aside to be managed by an external fund manager and abandonment costs to be paid from the accumulated capital and investment income.
- An abandonment or negative salvage tax established to fund the government in return for assuming responsibility for some or all negative salvage costs.

Issues & Implications

Income tax treatment of the various funding options could cause different impacts on the cost of service resulting from each option. The paper assumed revenues and taxes related to negative salvage would be treated as follows:

- Depreciation charges for negative salvage that are collected before they are spent are taxable in the year collected.
- Income earned on funds pre-collected for negative salvage is taxable in the year earned.
- Plant removal costs are deductible for income tax purposes in the year(s) costs are actually incurred.

In 1985, the overall impacts to the cost of service were estimated by the NEB to be minor. For example, based on a recovery period of 30 years, NEB staff estimated the first year cost of providing negative salvage funds for three companies under two scenarios:

- Removal of 100 percent of all above-ground facilities and below ground pipe- Estimated negative salvage costs as a percent of 1984 cost of service ranged from 1.5 to 5.3 percent.[6]
- Removal of 30 percent of below ground pipe and all above ground facilities- Estimated negative salvage costs as a percent of 1984 cost of service ranged from 0.5 to 1.7 percent.

In 1985, the Board noted that the most realistic scenario was for removal of all above ground facilities, removal of 20 percent of below ground pipe and perpetual maintenance of the remainder.

In a letter dated 19 February 1986, the Board noted that its preliminary view was that negative salvage should be separated from depreciation as an element of cost of service, and that funds collected on account of negative salvage should be segregated from general corporate funds and possibly administered by an independent trustee.

[6] The NEB noted that these ballpark estimates did not make provisions for the effects of inflation, interest or taxes.

3. Practices Elsewhere

A brief review has been undertaken to look at relevant practices in some other jurisdictions. In addition to pipeline-specific models, the review also looked at regimes put in place for other oil and gas, nuclear and mining facilities, each of which faces long-term retirement issues. It is apparent that arrangements around the world vary in complexity, in approach to the security of funds, and in the funding timeline, i.e., the extent to which estimated retirement obligations must be matched by funds early in the life of the project. A few examples are cited here as a starting point for discussion.

Parties are encouraged to table other examples, briefly describing their history and how they work. It would also be of value for parties to explain the extent to which practices in other arenas may provide relevant considerations for NEB-regulated pipeline facilities, what adaptations would be needed for them to be relevant choices for NEB-regulated pipelines, and the reasons for that opinion.

3.1 Canadian Energy

For upstream oil and gas operations, B.C., Alberta and Saskatchewan each have regimes in place to fund the costs of decommissioning orphaned well sites, as well as other orphaned oil and gas facilities, including (generally small-inch) pipelines. Each of the programs is funded by a levy on all operators. In addition, to reduce the risk of future well and facility unfunded abandonments, Alberta and Saskatchewan also collect security deposits from new licensees.

Alberta's regime is the oldest program, established in 1994. Funds are collected by the Energy Resources Conservation Board (ERCB) and both the security deposit and the orphan well levy are based on a Licensee Liability Rating (LLR), which estimates each producer's risk of leaving unfunded liabilities. In Alberta, an arm's length organization, the Orphan Well Association, manages the collected funds, identifying and abandoning high priority orphaned wells. Orphan well levies are collected in one year and spent the next, simplifying the task of funds management.

The Independent Oil & Gas Association of Canada, representing the smallest companies in the industry, has protested that Alberta's LLR-based deposits are just another barrier to entry that they cannot afford[7]. The concern is based on the funds being tied up with the ERCB (estimated at $50 million as of 2003). In addition, since the LLR rating is publicly available, this potentially affects a company's public reputation and its ability to attract capital.

3.2 Energy Industries Outside Canada.

A common U.S. model for addressing social and environmental costs of energy production is a combination of excise taxes and associated trust funds. For example, the federal Oil Spill Liability Trust Fund (OSLTF) established in 1986 is funded by a levy on all oil produced in or imported to the U.S. and is available to fund the costs associated with oil spill clean-up and some

[7] Jaremko, Gordon (2003), Fired Up: Orphan Well Policy Ignites Protest Movement. Oilweek, Volume 54, Issue 5, February 3rd, 2003.

related administration costs for agencies, such as the Coast Guard. One of the pipeline-specific funding mechanisms identified, the Trans-Alaska Liability Fund, was absorbed into the OSLTF when it was established.

Funding regimes for oil and gas facility decommissioning[8] outside of Canada appear focused primarily on offshore oil and gas facilities. Similar to Alberta and Saskatchewan, a number of countries including the United Kingdom, Netherlands, Vietnam and Malaysia seek financial guarantees (including security deposits, bank letters of credit and similar) from new licensees. The guarantees are obtained at the outset of field development to ensure funds are available for decommissioning.

Most recently, the United Kingdom has proposed amendments to its *Energy Act* that would formalize requirements for security guarantees for operators estimated to have an elevated risk of default on decommissioning costs. Their *Energy Act* is expected to be passed into law in 2008.

3.3 Other Industries

Nuclear

Decommissioning has been a significant concern right from the outset of nuclear power generation and funding regimes appear well developed. In Canada, the Canadian Nuclear Safety Commission (CNSC)[9] requires financial guarantees based on the full estimated decommissioning cost prior to development of any nuclear facilities. While the CNSC is prepared to accept a variety of financial instruments to address its requirements, in practice, most reactors in Canada are owned and operated by governments or crown corporations. The CNSC requires that decommissioning plans, cost estimates and financial guarantees be reviewed and updated at regular intervals. Licensees are not permitted to access these funds for any purposes other than decommissioning.

In the U.S., private sector utilities own and operate most of the more than 100 licensed reactors. Decommissioning requirements are based on the *Atomic Energy Act*, first passed in 1954. Like the CNSC, the U.S. Nuclear Regulatory Commission (NRC) requires that fully funded financial security be in place at the start of a reactor's life. Acceptable options include prepayment of a deposit into a segregated account or trust fund; surety, insurance or parent company guarantee; or external sinking fund, outside of the licensee's control plus a surety or insurance guarantee so that the total of both meets the estimated costs of decommissioning.

In Belgium, unlike North American jurisdictions, nuclear facilities must make payments into a single decommissioning fund that is intended to fund both decommissioning and ongoing recovery of spent fuel. The single fund is held by a subsidiary of the national electricity utility, with oversight by a Surveillance Committee to meet certain guidelines, including guidelines regarding funds held in cash versus funds that can be invested in unrelated assets and those that

[8] In other jurisdictions and in other industries in Canada, abandonment is often referred to as decommissioning.

[9] International Atomic Energy Agency (2005), Financial Aspects of Decommissioning: Report by an expert group. IAEA-TECDOC-1476, November 2005.
http://www-pub.iaea.org/MTCD/publications/PDF/te_1476_web.pdf

can be invested in the parent utility. The adequacy of decommissioning funding is determined by Belgium's Waste Management Agency and the Federal Agency for Nuclear Control.

Mining

Although the mining industry is not rate-regulated, it does offer some potential comparisons in its provisions for reclamation costs. In the Canadian mining industry, site reclamation is under provincial jurisdiction, with each province establishing its own, albeit similar, requirements for financial security to cover any default in paying the reclamation costs. Generally, applicants must post financial guarantees; many establish trusts or bank letters of credit for some or all of the estimated cost of reclamation prior to starting mine development.

The Canadian *Income Tax Act* has some reclamation-related provisions for the mining industry. Under certain conditions (control, beneficiary and types of investment), mining industry trusts can be "Qualifying Environmental Trusts" (or QETs) and can deduct from taxable income the funds set aside for reclamation. Taxes are due on withdrawals from the trusts, and on the funds that are accumulated.

Australian states require an "environmental performance bond" from prospective mine developers to protect against the risk of default prior to completion of decommissioning. Guidelines developed for Western Australia[10] outline acceptable options, including: unconditional performance bonds, or securities and bank guarantees where project disturbances are small. Bonds are provided before the start of operations and can range from 25 percent of estimated decommissioning costs in Western Australia to 50 percent in Queensland.

In Australia, a joint effort by industry and government has produced scoping documents which address planning for the end of project life. Among the principles addressed is the need for pre-construction economic feasibility assessments to include costs for eventual cleanup. Also, there are models for tracking and monitoring accumulating financial reserves against potential future costs that might prove useful.

[10] Department of Industry & Resources (2006), Mining Environmental Management Guidelines: Review of Environmental Performance Bonds in Western Australia. December, 2006. http://www.doir.wa.gov.au/documents/environment/ED_Min_GL_ReviewOfEnvPerformanceBonds_Dec06.pdf

4. Potential Approaches

The NEB has the authority to direct the collection of funds to deal with funding for retirement obligations. The NEB has achieved efficiency in its regulatory role by focusing on goal-oriented regulation, which entails establishing the desired outcome and hearing proposals by stakeholders for how they will reach that outcome. However, some issues, like cost of capital, have been substantially progressed by setting generic approaches, which provide a context for negotiation between parties.

On the issue of financing retirement obligations, some of the possible approaches are listed below, with some preliminary questions to spark discussion.

4.1 Permit Pipelines Companies to Apply When Appropriate

The Board could allow pipeline companies to seek permission to begin collecting retirement obligations costs when they deem it prudent to do so. With this approach, a number of questions arise, including: would the competitive energy market cause a shift in shipments of hydrocarbons away from pipelines that collect these costs before others? If the Board were to allow pipelines companies to apply to begin collecting these funds at a time when they deemed appropriate, what factors impacting timing should be considered by the companies?

4.2 Standardize Cost Calculations

The Board could require all pipelines companies to file basic cost information related to eventual abandonment and reclamation and a plan for funding those future costs. By setting initial cost assumptions, such as cost per kilometer of pipe removed, cost per kilometer of pipe abandoned in place, as well as initial physical assumptions, such as 30 percent of pipe being removed, it may be possible to speed both the preparation and the review of initial estimation of retirement obligations.

If the Board were going to require all pipelines to commence collecting funds for retirement obligations, what time frame for filing initial cost information would be reasonable?

4.3 Standardize Funding Approaches

There are several approaches to funding the eventual costs: such as, accumulated savings, insurance, and enhanced depreciation. There may be other approaches.

The first approach, accumulated savings, has many parallels to personal planning for retirement, e.g., combinations of sources are possible, and longer lead times reduce annual savings relative to the payout period.

The second approach, buying insurance policies, has obvious parallels to life insurance policies. A terminal payout is fairly certain, if the policy is maintained to the point of all necessary work being completed, but the timing is not certain. Regular revision of payout would still be required as new information became available. This would effectively be an outsourcing of the accumulation of funds to experts in the insurance industry.

The third approach, using enhanced depreciation, may suggest a link between the retirement obligations and the original or remaining book value of pipeline facilities. It may be difficult to maintain concurrently two different methods of depreciation, if it were determined that something other than straight-line depreciation were more appropriate for the retirement obligations.

It will be useful for parties to submit comparisons of the benefits and constraints offered by these or other approaches. It will also be important to consider whether all pipelines need to be on the same approach for consistency and oversight.

Even if all used the same approach, such as accumulating savings, there is a further question of the degree of consistency required in related assumptions, such as inflation and rate of return on reserves.

4.4 Direct the Pooling of Funding Mechanisms

The NEB could allow each company to maintain its own arrangements for funding. For example, each company could establish their own funding reserves, or companies could combine funds. Pooling of plans offers some apparent benefits, such as efficiency in governance and some risk pooling.

Parties are invited to explain the benefits and constraints that may accompany a pooled approach as opposed to separate company plans. Pooling is not necessarily linked to a tax-based approach with the pooled reserve managed by government (similar to the Canada Pension Plan); a pooled reserve could be managed by an appropriate governing body, with oversight.

4.5 Set a Default

There may be benefit to establishing a default methodology or even a default charge (in units such as dollars per volume unit per kilometer), with provisions setting out any conditions that may allow for variation from the default. While review provisions always exist for NEB toll or tariff orders, this approach would attempt to streamline the calculation of appropriate charges, with some pre-specified criteria for variation. If this approach were taken, what criteria would be appropriate for variation? Or is this a feasible approach for an interim period until individual system estimates can be provided?

5. Estimating Future Retirement Obligations

Some common understanding of the eventual costs of retirement is key to any of the funding approaches, whether insurance, savings or other.

5.1 The Starting Point

Many questions below hinge on the order of magnitude of the eventual cost of retiring a pipeline. At this point, there would be considerable uncertainty in any estimate. Cost and financial assumptions, as well as basic technical assumptions are outlined below. What other information is needed to start estimating costs?

5.2 Cost and Financial Assumptions

Industry input is essential to develop estimates for standard cost elements. Estimates could include cost per kilometer of pipe removal and cost per kilometer of pipe abandoned in place. Cost estimates could be updated on pre-specified intervals.

As future inflation can only be forecast, thus contributing to forecasting error, the retirement obligations could be estimated for a specified year, such as 2008, and then used without inflation, discounting for the time-value of money at a specified real interest rate.

5.3 Technical Assumptions

Some basic technical abandonment assumptions are necessary for companies to estimate abandonment costs. However, some assumptions are more important than others in determining the total retirement obligations. A starting assumption could follow the observations on physical considerations from the 1985 NEB paper, in a much simplified form, by providing the total length of each diameter of pipe on each system, an estimate of the proportion which passes through various types of land, the proportion of above ground and below ground facilities, and so on. This could enable easy computation of a preliminary estimate of the cost of pipeline retirement. Interested parties are invited to propose other basic assumptions that would assist in creating an initial estimate of future costs, indicating both the method for estimating and their suggestion for the preliminary estimated value.

5.4 Changes over the Economic Life

The length of time before the potential end of a pipeline's economic life will impact many practical elements. For example, with long lead times, not only is there more time to accumulate funds, but there is greater uncertainty about technologies and regulations that will be in place at the end point.

Further, the length of likely remaining life will influence the amount of information needed about future plans. As an example, a rudimentary framework could be part of the Board's filing guidance for an application to include an amount for retirement obligations in tolls. Additional or alternative filing guidance could be provided for pipelines within 10 years of the end of its economic life.

For example, the grid shown in Table 1 below, and based on the 1985 paper, could be a framework for pipeline companies to submit details of their own system. Then industry standard costs per kilometer would be assigned to the distances in each of the grid spots. This would provide a finer detail for estimating retirement obligations, but allow time for pipelines to gather system details. This stage of detail may be appropriate to estimate retirement obligations during a mid-range of pipeline life. Interested parties are invited to recommend alternatives, and the period of time to which it would be a useful aide for estimating retirement obligations.

Table 1: Potential Level of Detail for Second Stage Estimation
Illustrative Default Abandonment Assumptions[11]

<table>
<tr><th colspan="2" rowspan="2">Land Use</th><th colspan="4">Pipeline Diameter</th></tr>
<tr><th>60.3 to 203 mm
(2” – 8”)</th><th>273 to 550 mm
(10” to14”)</th><th>406 to 550 mm
(16” – 20”)</th><th>610 to 1219 mm
(24” to 48”)</th></tr>
<tr><td rowspan="2">Agricultural</td><td>Crop [a]</td><td>R</td><td colspan="3" rowspan="2">R</td></tr>
<tr><td>Pasture [b] & Other Crop [c]</td><td>A</td></tr>
<tr><td rowspan="2">Non-Agricultural</td><td>Rock, Till, Cohesive Soil, Granular Soil</td><td colspan="3">A</td><td>A+</td></tr>
<tr><td>Wetlands</td><td colspan="3">A+</td><td rowspan="2">A+
A+</td></tr>
<tr><td rowspan="2">Urban</td><td>Suburban & Park</td><td rowspan="5">A</td><td>A</td><td>A+</td></tr>
<tr><td>Urban & Industrial</td><td>A+</td><td colspan="2">S**</td></tr>
<tr><td rowspan="3">Crossings</td><td>Secondary Road, Sewer & Cable</td><td>A</td><td colspan="2" rowspan="2">A+</td></tr>
<tr><td>River, Rail & Road</td><td>A+</td></tr>
<tr><td>Pipeline & River Approaches</td><td colspan="3">S**</td></tr>
</table>

[a] with depth of cover considerations
[b] inc. native prairie & rangeland
[c] without depth of cover considerations

R: Remove
A: Abandon in place
A+ Abandon in-place with special treatment to prevent ground subsidence
S** site specific assessment

[11] This illustration is based on the 1985 Paper. It is premature to assume that appropriate abandonment tactics would be set now to this level of detail for estimation of preliminary cost estimates.

6. Accumulating Reserves

This section provides brief observations on some of the details relevant to one possible approach to funding the future retirement obligations. This approach has many similarities to an individual saving for their own retirement: an individual sets aside a sum each year and invests, choosing from various investment opportunities or savings accounts. Revisions are made periodically to the amount set aside in the remaining years after reviewing the success of the investment choices, as well as any new information about the costs of retirement and the expected working life. As with planning for retirement, the longer action is delayed, the greater the savings must be to reach the target reserves by the time needed. Even if the ratepayers are the same later as they would have been at an earlier time, there is a greater likelihood of disruption to the market by imposing higher unit surcharges at a later point. If the imposition of a unit cost is deferred, the necessary unit rate will inevitably rise.

6.1 Taxation

Typically, costs are only tax deductible when they have been incurred. Reserves set aside for future costs are only tax deductible in certain circumstances. If not tax deductible, funds collected for reserves would need to be higher than would be needed if there were favorable tax consideration.

Are there alternatives that could be considered in this regard? Would an add-on levy, incorporation in tolls or some other mechanism best facilitate appropriate tax treatment? What are the pros and cons of collection through enhanced depreciation rates, particularly as it relates to taxation?

6.2 Governance

If a pipeline company explicitly set aside funds for retirement obligation costs, there are choices to be made concerning the appropriate governance. Pension funds involve pension beneficiaries, which are the employees, in fund governance. Are parallels appropriate here? For example, would it be appropriate for those overseeing the funds, the board of directors, to include representation from the pipeline industry, the shipper industry, the landowner community, as well as the banking and the insurance community?

If funds are not pooled, could efficiencies in governance be gained by designating committees to oversee suites of funds? Parallels in the management of mutual funds or pension funds could provide potential insights.

6.3 Investment Policies

If funds for retirement obligations are managed within a trust fund, what investment flexibility would be available for the reserves? Added returns are usually only available with additional risk. What investment policies would provide sufficient confidence that funds would remain available for future obligations? How would these investment policies interact with federal and provincial income tax provisions?[12]

[12] In the mining industry, funds in QETs must be invested in specific types of securities.

6.4 Reporting and Transparency

What level of transparency is required? How would this translate to reporting requirements for the funds? How can compliance with the investment policies be assured? How should the Board carry out its regulatory oversight related to such funds? Are there other organizations that are better positioned to carry out such oversight? What level of filing would be required to withdraw funds from the reserve?

6.5 Separation of Funds

Should the funds be maintained in a separate trust account or should they form part of general corporate revenue under each company's own management? What are the pros and cons of each? Is a combination feasible?

7. Alternatives

In section 4 on potential approaches, three approaches to funding were noted: accumulating savings, insurance and enhanced depreciation. Other approaches may emerge through consultation. Section 6 explained some of the details for consideration relative to the accumulated savings approach. Any approach considered may necessitate a similar level of probing on its characteristics. This section deals with some issues common to all approaches, as well as the criteria for choosing among the approaches.

7.1 Criteria for Considering Methodologies

Criteria are needed to evaluate different approaches. The table below lists as criteria several issues discussed in this paper. Are there other criteria that should be considered?

	Accumulating Savings	Arm's Length Insurance	Enhanced Depreciation	Other?
Certainty of fund availability				
Taxation Efficiency				
Governance				
Investment Policies				
Reporting and Transparency				
Interim Provisions				
Other?				

The row-headings above may provide a starting point for the comparison of approaches. For example, if an arm's length insurance approach were considered, are there ways to compare the transparency of this approach to the transparency under the accumulated savings approach?

If an insurance approach were used, there may be clear implications for tax treatment. If an enhanced depreciation approach were used, there may be implications for no-cost capital on the balance sheet of the regulated entity.

Additional ‘columns’ for other approaches may be suggested; parties may also recommend additional ‘rows’ or criteria for differentiating or evaluating approaches.

7.2 Interim Provisions

Dependent on the answers to some of the questions raised, resolution may require a few years of an interim approach. How can the issue best be progressed in the interim? Is one approach preferable to another during an interim phase?

7.3 Ongoing Refinement

Estimates of the cost of abandonment will change over time. Technologies will change, as will the cost estimates of applying those technologies, and the expectations of stakeholders. Orderly review and revision of payments and reserves would likely be appropriate at regular intervals (e.g., every five years) or as otherwise required in the circumstances. This may allow all parties to plan for the expense of participating in occasional reviews of estimates, resulting from changing costs or technologies.

7.4 Other

A number of questions remain:

- Are there categories of pipelines (such as Group 1 versus Group 2; small versus large diameter pipe system, transmission versus gathering system) which would attract different approaches or different reporting obligations
- Are there particular approaches that would encourage decommissioning, abandonment and reclamation to be completed in a cost-effective and timely manner?
- Are there feasible financial incentives for pipeline companies for their management of the reclamation issue? Or, is the pipeline company’s residual obligation for clean-up sufficient incentive for the pipelines to plan and execute the pipeline system’s retirement well?
- At what point would regulations or criteria need to be established for withdrawal of funds from any reserves established?

8. Collecting

The ‘user pay’ principle is a broad principle that those who most directly benefit from a service should pay the cost of providing the service. Intergenerational equity is a broad tolling principle that users in any period are generally required only to pay for the costs of providing them with services in that period. Each of these principles influences how costs are allocated among pipeline shippers.

If retirement obligation funds are collected from shippers through tolls, many questions still need resolution:

- Is the same structure or methodology appropriate to all pipelines?
- Are there any circumstances that would justify a tolling methodology distinct from the tolling methodology in place for other costs of providing service?

- What approach would least impact competitive playing fields among pipeline companies? Or is this a valid consideration?
- What relation would these costs have to existing or future negotiated settlements?

Industry's input is critical on these questions, as there will be some who may gain compared to others under any potential methodology. For example, if a pipeline were to approach the end of its economic life, volumes may decline. This can conceptually lead to a 'death spiral', where spreading the standard revenue requirement over dwindling volumes raises the unit cost and can price certain services out of the market. If a pipeline is nearly fully depreciated, the revenue requirement may not be much more than operating costs and the 'death spiral' effect could be small. However, funding for retirement obligations may not be shrinking at that point, and recovering annual funding for retirement may exacerbate any death spiral effect. Use of a unit-of-throughput computation or other approaches could mitigate this risk.

9. Accounting for Uncertainty

There are many uncertainties involved in estimating costs for financing retirement obligations including remaining economic life of a pipeline; the cost at the end of life; the returns or interest on accumulating funds; as well as inflation and volumes in any given year. If single point estimates of costs are used, some probability-based information would still be important to gain shared understanding of the adequacy of funding. Some form of risk assessment may be better than single point estimates to assure all parties that the goal of ensuring funds are available when costs are incurred will be achieved. Methods in the energy industry or in other industries such as banking or insurance may provide guidance or useful tools. Risk-based methods such as Value-at-risk, Monte Carlo simulations or others may contribute to the ability to understand uncertainties.

Comments are invited on how risk and uncertainty can best be incorporated into basic considerations and on any common standards that would be useful.

References

1985	NEB Staff paper entitled: Background Paper on Negative Salvage Value, September 1985
1986	NEB follow-up letter dated February 19, 1986
1996	Pipeline Abandonment, A Discussion Paper on Technical and Environmental Issues, November 1996
1996	NEB Reasons for Decision MH-1-96 Manito Pipelines Ltd., Facilities Abandonment, July 1996
1996	NEB Reasons for Decision MH-3-96 Yukon Pipelines Limited, Facilities Abandonment, September 1996
1997	Legal Issues Relating to pipeline Abandonment: A Discussion Paper, May 1997
1999	Pipeline Investigation Report P99H0021
2004	Short description re NEB regulatory improvement workshop
2005	Proceedings from NEB regulatory improvement workshop
2007	Decommissioning: A Three Part Article in the Oil & Gas Journal
	NEB's *Filing Manual, Guide B*

Appendix A: One Example of Rudimentary Details for Levy Estimation

The calculations below provide an example of the early stage level of detail to estimate the retirement obligations and the unit impact of funding them.

This level of detail may be sufficient when the pipeline is more than 15 – 20 years from the end of its economic life. As a pipeline gets closer to that point, greater detail may be required. A rudimentary framework such as this (as refined by this Board process) could be part of filing guidance for the submission of a levy for approval. Additional or alternative filing guidance could be provided for pipelines within 10 years of the end of its economic life.

a) Estimation of Retirement Obligations
The right hand column provides standard or average industry factors. The left hand column lists pipeline-specific parameters.

One individual Pipeline *Could be revised on fixed cycle (e.g. every 5 years) and when major changes are made to the pipeline*	**Industry factors** *Could be revised on fixed cycle (e.g. every 5 years)*
Has **Y1** km of pipe	
Expects to remove **P**% of pipe	$**X1** / km to remove pipe
Expects to abandon in place (1-p)% of pipe	$**X2** / km to abandon pipe in place
Has **Y2** pump stations to remove	$**X3** / pump station to remove
Multiply and total for total future cost in current dollars	**Y1** (($**X1 * P) + (**$**X2 * 1-P))** + ($**X3 * Y2)**

The parameters in the left hand column could provide a framework for dialogue between a pipeline and landowners. For example, such a framework could be helpful in determining the sections of land on which it would be better to remove the pipe and the sections on which it would be better to abandon the pipe in place, by sealing it.

b) Estimation of a Unit Levy
The parameters necessary to estimate initial collection rates are illustrated below:

Individual Pipeline factors	**Industry Factors**
Estimated **N** years of economic life	
Shipping throughput **V** in barrels or Mcf per day.	
	Annual Inflation set at zero
	r, discount rate (excluding inflation) set at 4% per year. R=1.04 and r = .04
Compute **U,** cost of future abandonment obligations per unit of throughput	

The annual calculation is

Annual = (Estimated Retirement Obligation) x r / [(R^N) – 1]

If there is inflation, the cost of the retirement obligation will increase, but also the expected return on financial reserves will increase.

Accumulation of Reserve	**Example**	**Units** [13]
To achieve a reserve of	$1,000	million dollars
Over a useful life of	25	Years
If accumulated at	4.0%	Real rate of return
Requires setting aside	$24	million dollars per year
A pipeline		
Shipping capacity	500 000	Units per day
Aggregate annual utilization of capacity	90%	utilization factor
Annual volume[14]	164.25	million of units per year
Surcharge[15]	0.146	$/unit

If a charge were set at $0.15 per unit and volumes were 165 million units per year, then $23.98 million would be collected each year. This collection would accumulate as follows over the first five years:

	Collected that year	Estimated Return or Interest earned that year	Estimated End of year balance
Year 1	24.75	0	24.8
Year 2	24.75	1.0	50.5
Year 3	24.75	2.0	77.3
Year 4	24.75	3.1	105.1
Year 5	24.75	4.2	134.1

Year 5 could be a revision point at which the future retirement obligations are re-estimated with new, updated information. A revised per unit charge could be calculated based on funding the revised reserve (less the actual value of funds collected and invested).

[13] The rates are 'scalable' –to consider a line with estimated retirement obligations of $500 million, with a current capacity of 100 000 barrels per day, then 0.146 x ($500/$1000) x (500/100) = 2.5 x 0.146= .365 $/unit. It is not scaleable by the year variable.

[14] 500 000 x 365 x .9 = 164 250 000 units per year

[15] $24 million / 164.25 million units = $0.146 per unit