



**THE POLICY FRAMEWORK IN CANADA FOR MINE CLOSURE
AND MANAGEMENT OF LONG-TERM LIABILITIES:
A GUIDANCE DOCUMENT**

Prepared for:

NATIONAL ORPHANED/ABANDONED MINES INITIATIVE

By

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DISCLAIMER

This report was prepared to provide a policy framework and guidance document on mine closure and the management of related long-term liabilities. The authors assume no responsibility for actions taken by others on the basis of knowledge acquired from reviewing the material herein.

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EXECUTIVE SUMMARY

INTRODUCTION

The National Orphaned and Abandoned Mines Initiative (NOAMI) has the role of assessing key abandoned mine issues and recommending to the Mines Ministers of Canada actions, collaborative approaches and partnerships toward remediating existing abandoned mines issues and preventing/minimizing the accrual of further abandoned mines liabilities in Canada. When first formed in 2002 NOAMI developed several guiding principles, one of which relates directly to this project: *“Work toward eliminating future abandonment must continue, including the tightening of regulatory approaches.”*

This report was prepared in response to the NOAMI initiative to provide a “GUIDANCE DOCUMENT FOR MINE CLOSURE AND MANAGEMENT OF LONG-TERM LIABILITIES: EXAMINING THE POLICY FRAMEWORK IN CANADA.” The guidance document is to provide a plain language, readable text for use as a reference document by a diverse group of stakeholders including Industry, Aboriginal Canadians, Government and NGO members. For those mining jurisdictions in Canada which may need policy development in these areas, this document will provide a starting point. It examines the main components related to mine closure and post-closure site management which can include long-term maintenance and monitoring liabilities. It considers long-term care, monitoring and maintenance of mines which may cease to operate and the options whereby mining jurisdictions may accept mining lands back to the Crown.

METHODOLOGY

To execute this project a two-pronged approach was taken. Firstly, to obtain current information on how the issues under discussion are currently managed, a questionnaire was developed and sent to 17 agencies within Canada. A slightly revised version of the questionnaire was sent to some 20 foreign jurisdictions within which mining is a significant economic endeavor. Information garnered from the questionnaires was compiled and collated. Key information points or findings from the questionnaire are provided in the observations and trends below. The second step was the preparation of brief notes on potential policy elements from which guidance concepts for a policy framework could be developed. These notes provide background information for readers on issues of mine closure and abandoned mines.

OBSERVATIONS AND TRENDS FROM QUESTIONNAIRE

Results gathered from the NOAMI questionnaire provide the following snapshot of existing legislation/regulations/policies/practices in jurisdictions for mine closure. Much progress has been made in this field over the last 40 years, and continues to be made.

- Statutory authority for the requirement of closure plans by jurisdictions is now the norm.
- Some jurisdictions use the term “reclamation plan” instead of closure plan or as a precursor to the “closure plan”.
- “One window” permitting is the exception rather than the rule.

- For the most part there were few major gaps identified within/between permits by jurisdictions.
- Very few jurisdictions appear to include “exploration” as a closure plan trigger.
- Most responders appear to include every element of an active production site in closure plans.
- Little mention is made of risk imposed by third party interference with rehabilitation works.
- The Province of Saskatchewan has established a process under its “Reclaimed Industrial Sites Act” and related regulations and policies to provide an approach for long-term care and monitoring following closure. It appears to be the only Canadian jurisdiction to have done so.
- While several agencies report they will not accept properties with ongoing water treatment/contamination concerns, there is little discussion on how these sites will be maintained (funding and management) once the proponents ultimately disappear. This is a particularly important concern for the long-term care and monitoring of closed uranium mines.
- There is little discussion of catastrophic events or contingency response planning for worst-case scenarios.
- While self assurance is accepted by some jurisdictions, a number of respondents consider it to be an inadequate form of financial assurance.
- A number of agencies use spreadsheets, computer models and other tools to calculate financial assurance. This can provide consistency not only for the regulatory agency but also for the proponent.
- Not all agencies use Net Present Value as a tool to calculate long-term care and monitoring costs following closure. One respondent sees problems with this method. No widely accepted process appears to be identified for calculating long-term monitoring, care and maintenance costs.
- The main focus for Emergency Response Plans appears to be for operating mines, not for closed out sites (with limited access, infrastructure and technical/human resources).
- There is no consistent approach for storing and safeguarding critical maps and documents which also provides for rapid retrieval of information in the event of emergencies.
- There is now a greater focus on Aboriginal consultation. Several jurisdictions have created special consultation units.
- A number of responders have provision for return of mining lands to the Crown but the process appears subjective in some instances.
- Several agencies have release documents but do not/cannot grant environmental liability release. A number will not accept sites with long-term treatment facilities.

POLICY FRAMEWORK

A strong policy framework is necessary to develop a robust, effective and fair mine development, mine closure and long-term care regulatory system and to minimize the further accrual of abandoned mine features. The following sections provide a brief policy framework, which is intended to provide guidance to jurisdictions with evolving mine

closure regulatory programs. It is not intended to be an exhaustive listing of issues and “what ifs”; further guidance is provided in other sections of this report. Jurisdictions must develop their own policy direction within their “sustainable mining niche” in a global market including their level of risk tolerance or aversion. To be effective, primary policy elements/requirements must be embedded within the legislative framework.

Closure Objectives

A clear policy on the closure objectives of a jurisdiction must be in place so that a “design for closure” (or perhaps more properly “design for relinquishment”) can be implemented from cradle to grave on a consistent basis. For many situations returning the mine site to a land use compatible with the surrounding terrain will suffice. In some situations returning the site to its original state may be desirable. The spectrum of cost between “good enough” and “highly desirable” may be exponential and must be assessed within the context of the mining strategy of the jurisdiction.

Closure Plans

Closure plans must be required to ensure that mine sites will be returned to a safe, physically and chemically stable state. Plan development must utilize sound science, state of the art engineering and qualified persons with good experience and sound judgment. Because a mine site evolves with time, initial closure plans may be conceptual subject to amendment or revision on a periodic basis. In this regard closure plan development and implementation must be assured with a competent inspection and enforcement program.

Financial Assurance

Monies put forward by the proponent, to guarantee the work required by the closure plan, is an absolute must in the formation of policy and regulation of mine development and closure. It is essential to guarantee completion of the work if the proponent is unable or unwilling to do the work. The form and timing for provision of this money is an important component of the policy. Ideally, if the proponent provides 100 percent of the closure costs up front in the form of cash or cash equivalent the regulating jurisdiction acquires little or no risk; however, this may prevent the proponent from proceeding or cause severe financial constraints on the project. Some jurisdictions assume more risk and allow either deferrals in provision of funding or the provision of “soft assurance” in the form of corporate guarantees to secure economic benefits. Risk-averse jurisdictions should require hard forms of financial assurance up front and require regularly scheduled reviews of the financial assurance requirements. Periodic review of financial assurance is necessary to capture changes in the plan or to offset changes in inflation, interest rates etc. For long-term care and maintenance, and/or perpetual care, risk assessments, time frames and discount interest rates become major considerations for calculating financial assurance. These items require specific expertise. Jurisdictions should also consider providing spreadsheets, templates or other guidance for calculating costs.

Post-Closure Care

Ideally, the execution of decommissioning and rehabilitation commitments contained within the closure plan would bring to a close the need for work on the mine site. However, in many cases ongoing care and maintenance is required due to physical

structures needing inspection and maintenance or there remain chemical liabilities requiring management. Clear policy is necessary as to what is required; who is going to continue this work, perhaps in perpetuity; and who is going to pay for it and how. Jurisdictions must manage this in such a way that the principal beneficiary of the mine, the proponent, is held responsible either through continuing to manage the site while maintaining financial guarantees or through posting sufficient financial resources so that either the jurisdiction or a third party can continue the necessary work.

Relinquishment

Relinquishment of mineral title back to the Crown is the final step in closing the relationship between a proponent and a jurisdiction respecting a mining project. Jurisdictions must have clear policy on how this process will be managed in the best interests of the public. Failure to do so may result in the accrual of abandoned mines and their attendant liabilities - financial, environmental, safety. Some situations may render relinquishment unfeasible to the jurisdiction, e.g. ongoing water treatment requirements, even if the necessary financial and management guarantees are in place. Where relinquishment is a managed process, a release document specifying that they have no ongoing liabilities should be made available to the proponent to the extent permitted by law. It must be clear as to what policy and compliance measures might follow in the event that actions regarding a release become necessary, e.g. failed rehabilitation measure.

Institutional Custodianship

Institutional custodianship policy is fundamental to the management of closed out mine sites which may require some form of continuing supervision. This may range from passive controls, such as registered land use restrictions, to active controls, which may range from fencing hazards in perpetuity or water treatment for significant periods of time. Though the institutional control must be authorized by legislation, the actual work could be completed by a government department, an agency contracted by the government or some other body. Data management, funding and oversight are key components of such a system.

Consultation

Consultation with stakeholders throughout the life-cycle of a mining endeavor must be required with the responsibilities of both the proponent and the licensing jurisdiction clearly identified including mandated consultation with Aboriginal groups. Where consultation processes are complicated, jurisdictions should consider having a refereeing system which provides for the conclusion of a process.

RECOMMENDATIONS

Based upon the preceding discussions and our review of the current situation, in order to prevent further accrual of abandoned mine hazards the following recommendations are put forward:

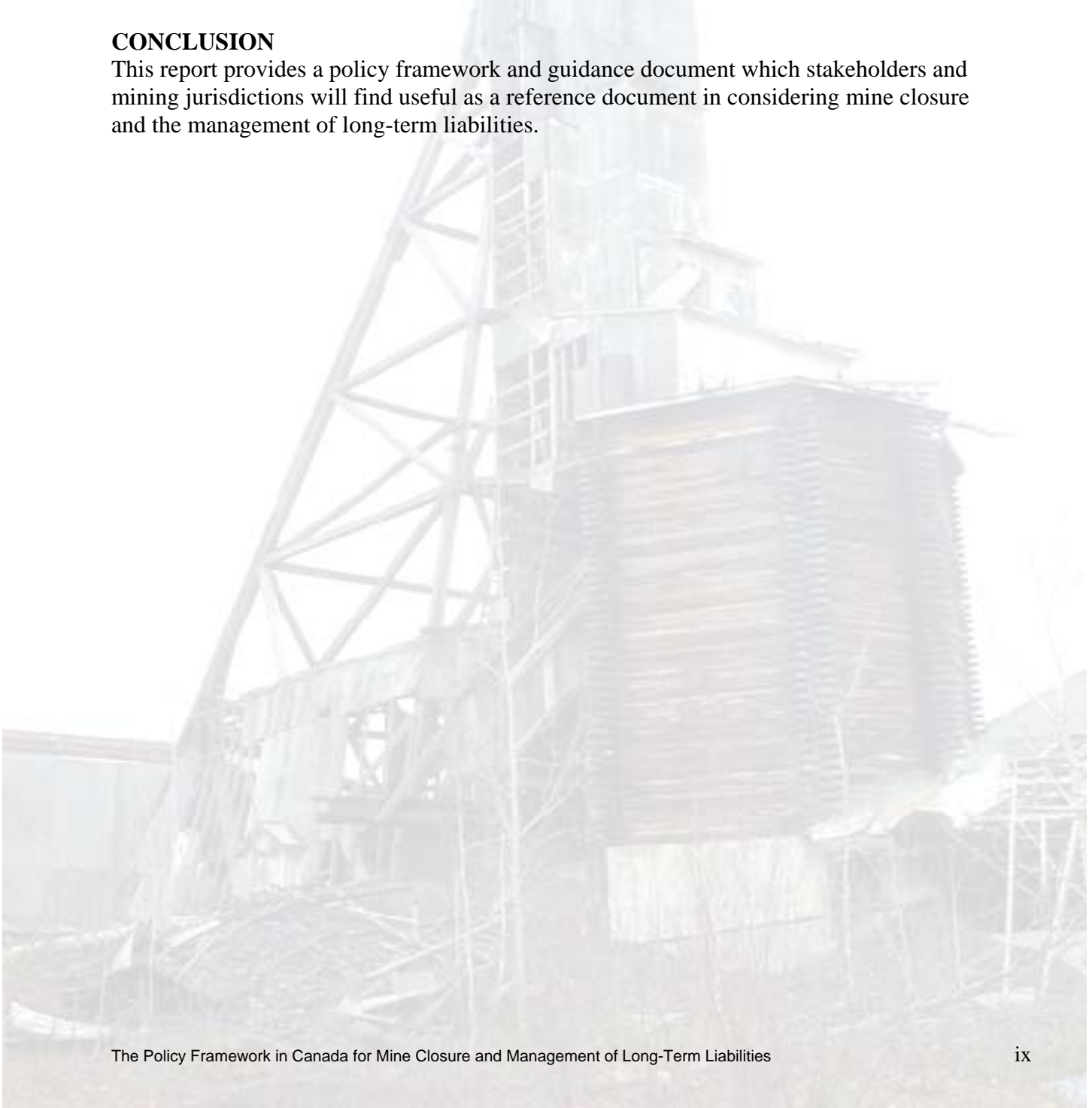
1. Greater emphasis should be placed on the development of post-closure policy, regulations and procedures. It would be useful if this were done on a Canada-wide

- cooperative basis. The existing Saskatchewan model serves as a good underpinning for this.
2. Regulations, procedures and facilities regarding institutional care need careful consideration and development by jurisdictions. This includes both passive and active care options.
 3. Jurisdictions should have a managed relinquishment process, which is clear and unfettered. Hitherto closure plans have been prepared on a “design for closure” basis. This should specifically include when and why relinquishment is not acceptable to the jurisdiction. It is suggested that a more forward-looking approach be embraced and that a “design for relinquishment” approach be adopted.
 4. Upon relinquishment the registration on title documentation and release for proponents must be unimpeachable.
 5. Jurisdictions should establish a financial assurance regimen which meets the mining strategy of the jurisdiction and its level of risk tolerance; in general self-assurance is high risk.
 6. Methods for estimating forward costs, assessing the attendant risks as well as increasing financing options require improvement. This work needs to be done by persons with appropriate financial and actuarial expertise.
 7. To provide for greater uniformity in the establishment of costs and financial assurance, development of a template for use by industry and evaluators should be considered. Both British Columbia and Nevada’s work in this area may be of benefit.
 8. To further prevent accrual of abandoned mine features, and for national consistency, jurisdictions should consider inclusion of major mineral exploration activities as part of their closure plan process.
 9. Jurisdictions should require baseline data collection and the implementation of sampling protocols and testing for ARD and other contaminants prior to any significant site disturbance in order to provide for well managed materials handling and the reduction of inadvertent, negative environmental consequences.
 10. Methodologies for closure, which do not require active treatment, require greater emphasis, e.g. the use of natural lakes for reactive tailings storage.
 11. To provide for more certainty and consistency for long-term administration of mine sites a uniform methodology for risk assessment would be beneficial across jurisdictions. This should be explored further through a working subcommittee; the CNSC process may provide a starting point for evaluation and consideration.
 12. To assist in long-term/perpetual care administration, identification and development of appropriate land use controls and mapping for public access and planning processes is recommended. Ultimately this should be compatible with other provincial/territorial systems for land use planning. Maps and accessible data of rehabilitated features, e.g. shaft caps, should be available.
 13. For sites under long-term/perpetual care the potential for physical or environmental failure remains. A risk assessment process should be employed to identify potential risks and contingency/emergency response plans should be developed.

14. Jurisdictions should foster volunteer engagement of community and other stakeholders in project development through close-out planning to enhance participation and transparency of process. Volunteer groups can be beneficial in assisting in long-term monitoring activities. Voluntary Rehabilitation legislation (a.k.a. “Good Samaritan” legislation) is recommended to protect volunteers.
15. Jurisdictions should have a sound inspection and enforcement program to support the legislation and regulations and to ensure financial assurance requirements are current. This, in conjunction with continuous improvement by mining companies in developing environmental protection strategies throughout the mining sequence, can reduce risk and provide for good practices.

CONCLUSION

This report provides a policy framework and guidance document which stakeholders and mining jurisdictions will find useful as a reference document in considering mine closure and the management of long-term liabilities.



RÉSUMÉ

INTRODUCTION

L'objectif de l'Initiative nationale pour les mines orphelines ou abandonnées (INMOA) est d'évaluer les principales questions relatives aux mines abandonnées et de recommander aux ministres des Mines du Canada des mesures, des approches concertées et des partenariats en vue de remettre en état les mines abandonnées existantes et de prévenir/réduire le nombre de responsabilités à long terme associées à ce problème au Canada. Au moment de sa création en 2002, l'INMOA a élaboré plusieurs principes directeurs, dont l'un est directement lié au présent projet : « Les activités visant à empêcher que des sites miniers soient abandonnés dans l'avenir doivent se poursuivre, ces activités consistant, entre autres, en un affermissement de la réglementation ».

Le présent rapport a été élaboré pour répondre à l'INMOA et vise à fournir un « DOCUMENT D'ORIENTATION POUR LA FERMETURE DES MINES ET LA GESTION DES RESPONSABILITÉS À LONG TERME : UN EXAMEN DU CADRE STRATÉGIQUE AU CANADA. » Ce document d'orientation présente dans un langage clair et lisible un texte de référence destiné à un groupe de parties intéressées, y compris l'industrie, les autochtones, et les membres des organisations gouvernementales et non gouvernementales (ONG). Ce rapport offre un point de départ aux provinces et aux territoires miniers au Canada qui peuvent avoir besoin de l'élaboration d'une politique dans ces domaines. Il examine les principales composantes liées aux activités de fermeture et de gestion d'un site minier après la fermeture, qui peuvent comprendre les travaux d'entretien et les responsabilités du suivi à long terme. Il considère les soins, le suivi et l'entretien à long terme des sites miniers, dont l'exploitation peut cesser, ainsi que les options des juridictions minières qui peuvent accepter de remettre les terrains miniers à l'État.

MÉTHODE

La réalisation de ce projet se fonde sur une approche à deux volets. Premièrement, un questionnaire a été élaboré et envoyé à 17 organismes au Canada pour recueillir de l'information à jour sur la façon dont les questions examinées sont gérées à l'heure actuelle. Une version légèrement révisée de ce questionnaire a été envoyée à quelque 20 juridictions étrangères pour lesquelles l'exploitation minière représente une activité économique importante. Les données recueillies ont ensuite été regroupées. Les points essentiels ou les constats sont présentés plus bas dans la section « Observations et tendances ». La deuxième étape a été la préparation de notes d'information sur des éléments stratégiques potentiels qui pourraient servir à élaborer des concepts d'orientation pour un cadre stratégique. Ces notes fournissent des renseignements de base pour les lecteurs concernant la fermeture des mines et les mines abandonnées.

OBSERVATIONS ET TENDANCES

Les résultats obtenus du questionnaire de l'INMOA permettent d'avoir l'aperçu suivant des lois/règlements/politiques/pratiques existants qui touchent la fermeture des mines

dans les juridictions. De nombreux progrès ont été réalisés dans ce domaine au cours des 40 dernières années et cette évolution se poursuit.

- L'élaboration de plans de fermeture par les administrations est une exigence légale et est désormais la norme.
- Certaines administrations utilisent le terme « plans de réhabilitation » au lieu de plans de fermeture ou comme précurseur du « plan de fermeture ».
- Le processus de délivrance de permis « à guichet unique » est l'exception plutôt que la règle.
- Dans la majorité des cas, peu de lacunes importantes ont été cernées relativement aux permis délivrés par les administrations.
- Très peu d'administrations semblent indiquer que les activités « d'exploration » constituent un déclencheur de l'exigence de préparation d'un plan de fermeture.
- La majorité des répondants semblent inclure chaque élément d'un site de production actif dans les plans de fermeture.
- On parle peu du risque découlant de l'interférence d'un tiers dans les travaux de restauration.
- La province de la Saskatchewan a établi un processus en vertu de sa loi « *Reclaimed Industrial Sites Act* » et de ses règlements et politiques associés pour offrir une approche des soins et de suivi à long terme après la fermeture. Il semble que ce soit la seule province canadienne qui ait pris cette mesure.
- Alors que plusieurs organismes signalent qu'ils n'accepteront pas de propriétés auxquelles sont associées des problèmes de traitement de l'eau et de contamination, on discute peu de la façon dont ces sites seront entretenus (financement et gestion) une fois que les promoteurs cesseront définitivement leurs activités. Il s'agit d'une préoccupation très importante qui touche les soins et le suivi à long terme des mines d'uranium fermées.
- Il est très peu question des événements catastrophiques ou de la planification de l'intervention en cas d'urgence pour les pires scénarios.
- Même si l'auto-garantie est acceptée par certaines administrations, un certain nombre de répondants considèrent qu'elle constitue une forme inadéquate de garantie financière.
- Un certain nombre d'organismes utilisent des tableurs, des modèles informatiques et d'autres outils pour calculer la garantie financière. Cette approche permet une uniformité non seulement pour l'organisme de réglementation, mais aussi pour le promoteur.
- Tous les organismes n'utilisent pas la valeur actualisée nette comme outil de calcul des coûts de soins et de suivi à long terme après la fermeture. Un répondant considère que cette méthode est problématique. Il semble qu'aucun processus ne soit largement accepté pour le calcul des coûts de suivi, de soins et d'entretien à long terme.
- Il semble que les plans d'intervention d'urgence mettent principalement l'accent sur les mines en exploitation et non sur les sites miniers fermés (des limites s'appliquent à l'accès, aux infrastructures ainsi qu'aux ressources techniques et humaines).

- Aucune approche uniforme n'a été élaborée pour entreposer et conserver des cartes et des documents essentiels permettant d'extraire rapidement l'information en cas d'urgence.
- On accorde désormais plus d'importance aux consultations auprès des autochtones. Plusieurs administrations ont mis sur pied des unités de consultation spéciales.
- Un certain nombre de répondants prévoient des dispositions pour le retour des terrains miniers à l'État, mais le processus semble subjectif dans certains cas.
- Plusieurs organisations ont des documents de renonciation, mais n'accordent pas/ne peuvent accorder la renonciation à la responsabilité environnementale. Un certain nombre d'organisations n'acceptent pas les sites où on trouve des installations de traitement à long terme.

CADRE STRATÉGIQUE

Un solide cadre stratégique est nécessaire à l'élaboration d'un système rigoureux, efficace et équitable pour l'exploitation minière, la fermeture des mines et les soins à long terme et pour réduire les responsabilités à long terme associées aux mines abandonnées. Les sections suivantes présentent un cadre stratégique succinct, qui est destiné à offrir des conseils aux administrations qui ont établi des programmes de réglementation de la fermeture des mines. Il ne constitue une liste exhaustive des questions et des hypothèses; d'autres conseils sont présentés dans d'autres sections de ce rapport. Les administrations doivent élaborer leur propre orientation stratégique au sein de leur « niche d'exploitation minière écologique » dans un marché mondial, y compris leur niveau de tolérance ou d'aversion à l'égard du risque. Pour être efficaces, les éléments/exigences principaux en matière de politiques doivent être intégrés au cadre législatif.

Objectifs de la fermeture

Il faut mettre en place une politique claire sur les objectifs de fermeture d'une juridiction afin qu'une « approche de la fermeture » (ou peut-être plus exactement une « approche de la renonciation ») puisse être appliquée de la naissance à la mort d'une mine de manière constante. Dans bon nombre de situations, il sera suffisant de ramener l'état d'un site minier à une utilisation du sol compatible avec les terrains avoisinants. Dans certains cas, il peut être souhaitable de retrouver l'état d'origine du site. L'éventail des coûts entre un état « suffisant » et un état « très souhaitable » peut varier de façon exponentielle et doit être évalué selon le contexte de la stratégie minière de l'administration gouvernementale.

Plans de fermeture

Des plans de fermeture doivent être préparés pour veiller à ce que les sites miniers soient ramenés à un état sécuritaire, dont les conditions physiques et chimiques soient stables. L'élaboration de ces plans doit s'appuyer sur des principes scientifiques éprouvés, des technologies à la fine pointe et le travail d'un personnel compétent possédant une solide expérience et un bon jugement. Un site minier évolue avec le temps et par conséquent, les plans de fermeture initiaux peuvent faire l'objet d'une modification ou d'une révision sur une base périodique. À ce propos, l'élaboration et la mise en œuvre d'un plan de fermeture doivent être associées à la garantie d'un excellent programme d'inspection et d'application.

Garantie financière

Les fonds affectés par le promoteur pour garantir les travaux requis par le plan de fermeture constituent une nécessité absolue de l'élaboration d'une politique et d'une réglementation associées à l'exploitation et à la fermeture d'une mine. Il est essentiel de garantir l'achèvement des travaux si le promoteur ne peut ou ne veut réaliser le travail. La forme que prendra l'affectation de ces fonds et son échéancier constituent une importante composante de la politique. Idéalement, si le promoteur fournit 100 pourcent des coûts de fermeture à l'avance sous forme d'espèces ou d'équivalent en espèces, l'administration responsable de la réglementation se retrouve avec peu ou pas de risques; toutefois, cette situation peut empêcher le promoteur d'aller de l'avant ou être à la source de sérieuses contraintes financières pour le projet. Certaines administrations prennent davantage de risques et autorisent soit le report de l'octroi d'une aide financière soit l'octroi d'une garantie ponctuelle sous la forme de garanties de la part de la société pour assurer des retombées économiques. Les administrations qui n'aiment pas les risques devraient exiger une garantie sous forme d'espèces à l'avance et demander des examens planifiés et réguliers des exigences liées à la garantie financière. Un examen périodique de la garantie financière est nécessaire pour prendre en compte les changements dans le plan ou pour compenser les pressions inflationnistes, les taux d'intérêt, etc. Pour les soins et l'entretien à long terme et/ou l'entretien indéfini de ces sites, les évaluations des risques, les échéanciers ainsi que les taux d'escompte et les taux d'intérêt deviennent des considérations majeures dans le calcul de la garantie financière. Ces questions nécessitent une expertise précise. Les administrations devraient aussi penser à fournir des tableurs, des modèles ou d'autres guides pour le calcul des coûts.

Soins après la fermeture

Idéalement, la réalisation des engagements liés à la désaffectation et à la remise en état, qui sont compris dans le plan de fermeture, devrait mettre un terme aux travaux sur un site minier. Toutefois, dans bon nombre de cas, des soins et un entretien à long terme sont requis en raison des structures physiques qui doivent être inspectées et entretenues ou encore, à cause du fardeau persistant de la gestion des responsabilités associées aux produits chimiques. Il faut concevoir une politique claire pour définir ce qui est requis; préciser qui sera chargé de poursuivre les travaux, peut-être à perpétuité; qui paiera et de quelle façon. Les administrations doivent gérer cette situation de façon à ce que le principal bénéficiaire de la mine, le promoteur, soit tenu responsable de continuer à gérer le site tout en maintenant les garanties financières ou en annonçant suffisamment de ressources financières qui peuvent servir soit à l'administration soit à un tiers pour poursuivre les travaux requis.

Renonciation

La renonciation à un titre minier et sa reprise par l'État est la dernière étape qui met fin à la relation entre un promoteur et une administration relativement à un projet minier. Les administrations doivent mettre en place une politique claire qui définit comment ce processus sera géré dans l'intérêt supérieur de la population. L'absence d'une telle directive peut entraîner l'augmentation du nombre de mines abandonnées et de leurs responsabilités afférentes – sur les plans financier, environnemental et de la sécurité. Dans certaines situations, la renonciation n'est pas une option pour une administration,

p. ex. des exigences continues en matière de traitement de l'eau, même si les garanties nécessaires relativement aux finances et à la gestion sont en place. Dans les cas où la renonciation est un processus géré, un document de renonciation disponible au promoteur devrait préciser qu'il n'a pas de responsabilités permanentes dans la mesure où la loi l'y autorise. Il est essentiel de préciser les politiques et les mesures de conformité devant être respectées dans le cas où des mesures liées à la renonciation doivent être prises, p. ex. dans le cas de l'échec des mesures de remise en état.

Garde institutionnelle

Une politique de garde institutionnelle est essentielle à la gestion de la fermeture des sites miniers qui peuvent nécessiter une certaine forme de supervision continue. Cette approche peut aller de contrôles passifs, comme des restrictions sur l'utilisation des terres inscrites au registre, à des contrôles actifs, qui peuvent comprendre l'installation de clôtures pour confiner à perpétuité les dangers ou le traitement de l'eau pour des périodes de temps importantes. Même si le contrôle institutionnel doit être autorisé par la loi, les travaux véritables pourraient être réalisés par un ministère, un organisme embauché sous contrat par le gouvernement ou une organisation quelconque. La gestion des données, le financement et la surveillance sont des éléments essentiels d'un tel système.

Consultation

La consultation auprès des parties intéressées tout au long du cycle de vie d'un projet minier doit être exigée, et les responsabilités du promoteur et de l'administration responsable de l'attribution des permis doivent être clairement définies, y compris la consultation obligatoire avec les groupes autochtones. Dans les cas où les processus de consultation sont complexes, les administrations devraient considérer le recours à un système d'arbitrage qui peut contribuer à la conclusion d'un processus.

RECOMMANDATIONS

En se fondant sur les discussions précédentes et notre examen de la situation actuelle, les recommandations suivantes sont mises de l'avant afin de prévenir l'accumulation des responsabilités liées aux dangers associés aux mines abandonnées :

1. Il faut accorder plus d'importance à l'élaboration de politiques, de règlements et de procédures pour les activités postérieures à la fermeture d'une mine. Il serait utile de faire ce travail sur une base de coopération pancanadienne. Le modèle actuel de la Saskatchewan est un exemple de bon principe de base.
2. Les administrations doivent examiner attentivement les règlements, les procédures et les installations associés aux responsabilités institutionnelles et procéder à leur amélioration. Cela comprend les options de soins actives et passives.
3. Les administrations devraient disposer d'un processus de renonciation pouvant faire l'objet d'une gestion et qui soit clair et sans entraves. Jusqu'à maintenant, les plans de fermeture ont été préparés selon un « modèle de fermeture ». Cela devrait décrire précisément quand et comment la renonciation n'est pas acceptable pour l'administration. Une approche plus proactive est proposée ainsi que l'adoption d'un « modèle pour la renonciation ».

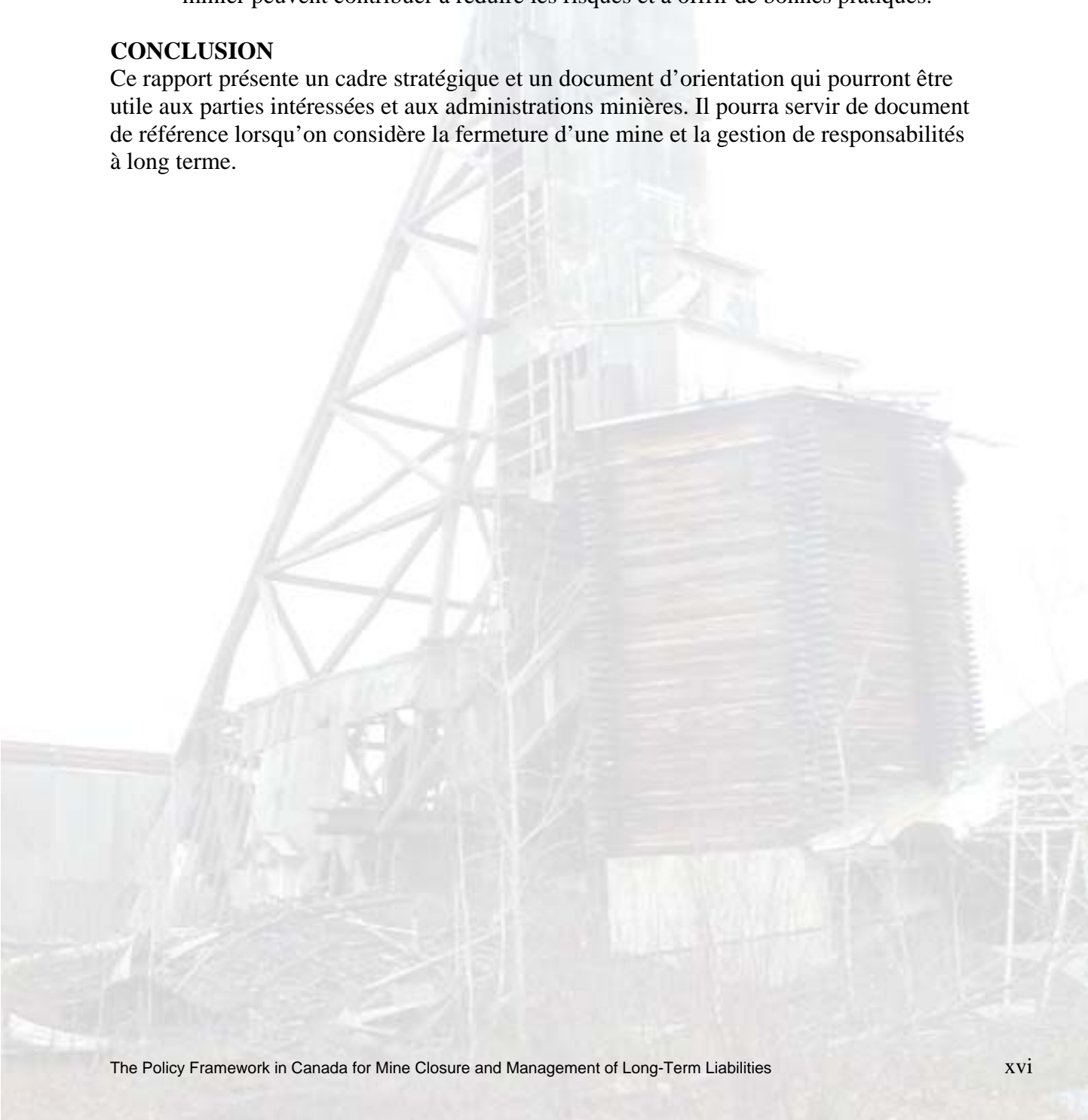
4. Au moment de la renonciation, les documents du titre de propriété et d'abandon par les promoteurs doivent être préparés de façon à ne pas faire l'objet de poursuites criminelles devant les tribunaux.
5. Les administrations devraient établir un régime de garantie financière qui est conforme à la stratégie minière de l'administration et respecte son niveau de tolérance au risque; de façon générale, l'auto-garantie présente des risques élevés.
6. Il faut améliorer les méthodes utilisées pour l'estimation des coûts futurs, l'évaluation des risques afférents ainsi que les options de financement. Ce travail doit être réalisé par des personnes qui possèdent une expertise financière et en évaluation actuarielle.
7. Afin d'assurer une uniformité accrue de l'établissement des coûts et de la garantie financière, il faudrait considérer l'utilisation d'un modèle pouvant être utilisé par l'industrie et les évaluateurs. Les travaux réalisés à cet égard par la Colombie-Britannique et le Nevada pourraient être utiles.
8. Pour prévenir l'accumulation de responsabilités associées aux mines abandonnées et pour favoriser l'uniformité à l'échelle nationale, les administrations devraient considérer l'intégration des activités d'exploration minérale avancée au processus de leurs plans de fermeture.
9. Les administrations devraient exiger la collecte de données de référence et la mise en œuvre de protocoles d'échantillonnage ainsi que des tests pour le DRA et d'autres contaminants avant toute perturbation importante d'un site de façon à assurer la bonne gestion de la manutention de matériaux et l'atténuation des effets environnementaux négatifs et involontaires.
10. On doit accorder une importance accrue aux méthodes utilisées pour la fermeture, celles qui n'exigent pas de traitement actif, p. ex. l'utilisation de lacs naturels pour l'entreposage de résidus réactifs.
11. Il serait bénéfique d'adopter une méthode uniforme pour l'évaluation des risques dans l'ensemble des gouvernements en vue d'offrir une certitude et une cohérence accrues pour l'administration à long terme des sites miniers. Cette approche devrait être approfondie par un sous-comité de travail; le processus utilisé par la CCSN peut servir de point de départ pour l'évaluation et la considération.
12. Afin d'apporter un soutien à l'administration de l'entretien à long terme/perpétuité des sites, il est recommandé de définir et de mettre en valeur des mécanismes de contrôle de l'utilisation du terrain et de cartographie qui s'appliquent à l'accès par le public et aux processus de planification. En bout de ligne, cette approche devrait être compatible avec les autres systèmes d'aménagement du territoire des provinces et des territoires. Des cartes et des données accessibles sur les caractéristiques restaurées, p. ex. les puits de mines, devraient être disponibles.
13. Des problèmes structureaux ou environnementaux potentiels demeurent dans le cas des sites faisant l'objet d'un entretien à long terme/en perpétuité. Il faudrait avoir recours à un processus d'évaluation des risques pour cerner les risques potentiels, et élaborer des plans d'intervention d'urgence.
14. Les administrations devraient promouvoir l'engagement volontaire de bénévoles de la collectivité et d'autres parties intéressées au développement du projet par le biais de la planification à la fermeture afin de favoriser la participation et la

transparence du processus. Les groupes de bénévoles peuvent apporter une contribution positive aux activités de surveillance à long terme. Il est recommandé d'appliquer les lois de la réhabilitation volontaire (aussi connue comme la loi du bon samaritain) pour protéger les bénévoles.

15. Les administrations devraient mettre en place un programme rigoureux d'inspection et d'application de la loi pour appuyer les lois et les règlements et pour veiller à ce que les garanties financières exigées soient à jour. Ces mesures appliquées de pair avec des améliorations continues de l'élaboration de stratégies de protection de l'environnement par les sociétés minières tout au long du cycle minier peuvent contribuer à réduire les risques et à offrir de bonnes pratiques.

CONCLUSION

Ce rapport présente un cadre stratégique et un document d'orientation qui pourront être utile aux parties intéressées et aux administrations minières. Il pourra servir de document de référence lorsqu'on considère la fermeture d'une mine et la gestion de responsabilités à long terme.



INTRODUCTION

The National Orphaned and Abandoned Mines Initiative (NOAMI) has the role of assessing key abandoned mine issues and recommending to the Mines Ministers of Canada actions, collaborative approaches and partnerships toward remediating abandoned mines and preventing/minimizing the accrual of further abandoned mines liabilities in Canada. When first formed in 2002 NOAMI developed several guiding principals, one of which relates directly to this project: *“Work toward eliminating future abandonment must continue, including the tightening of regulatory approaches.”*

Recently the NOAMI Advisory Committee identified new issues to pursue, including “Examining the legislative tools and policy approaches across Canada to ensure that current operating mines can be closed properly so that they do not become abandoned mines in the future.” This report is in response to the NOAMI initiative to provide a “GUIDANCE DOCUMENT FOR MINE CLOSURE AND MANAGEMENT OF LONG-TERM LIABILITIES: EXAMINING THE POLICY FRAMEWORK IN CANADA.” The guidance document is to provide a plain language, readable text for use as a reference document by a diverse group of stakeholders including Industry, Aboriginal Canadians¹, Government, and non-government organization (NGO) members. For the purpose of this report the term “stakeholder” encompasses anyone who has an interest in the issue.

For those mining jurisdictions in Canada which may need policy or legislative development in these areas, this document will provide a starting point. It examines the main components related to mine closure and post closure site management, which can include long-term maintenance and monitoring liabilities. It considers long-term care, monitoring and maintenance of mines, which may cease to operate, and the options whereby mining jurisdictions may accept mining lands back to the Crown; it also considers conditions required in release documents required by proponents.

In Canada minerals generally are constitutionally the purview of the provinces. Each is on its own to regulate the conveyance of access to mineral rights; the development of mines; the return of mineral rights and related property to the Crown (relinquishment); and, where the regulatory regime fails, the abandonment of mines which may have chemical or physical hazards requiring perpetual care. The principal exceptions to this, until recently, are the Territories north of 60 where the federal government previously oversaw the acquisition and development of minerals; recently this is in the process of being devolved to the territories. Secondly the mining and processing of radioactive minerals are primarily regulated by the federal government. Finally, minerals or mineral rights on certain Aboriginal lands are administered by the federal government.

Notably, several jurisdictions have moratoria on uranium exploration due to environmental and health concerns, e.g., British Columbia and Nova Scotia.

¹ The term Aboriginal is defined in s.35 of the Constitution Act as including Indian, Inuit and Métis Peoples.

The Canadian approach to mining and mine rehabilitation is that the project proponent is responsible for developing, operating and rehabilitating a mine site in an environmentally responsible manner at their expense. Government policies, legislation and regulations set the regulatory regimen under which the project will operate and provide environmental protection and mine site rehabilitation. In practice there is considerable exchange and negotiation during the development and issuance of various permits required for a project. Ideally, when a project is completed the site is left in a useful state and there are no residual liabilities to either the proponent or the jurisdiction within which the project is located. This has not always been the case and through inadequate regulation, inadequate management, or, in some instances bad luck, residual mining liabilities have become orphaned or abandoned to the jurisdiction. As a result there are more than 10,000 abandoned² mine sites in Canada, most relating to times when the issues of public safety and environmental contamination were poorly understood, inadequately regulated and unplanned for by either party.

Over the last 40 years most jurisdictions have implemented regulatory regimes. These regimes require mine closure planning and plans which are supported by funds put in place by the proponent and managed by the regulator for the purpose of rehabilitating a mine site should the proponent be unable to do so.

The term “mining” includes the exploration for, and the development, extraction and processing of mineral deposits for the purpose of winning minerals from the ground for human use and consumption. Mining operations typically include an extraction process, usually by underground or open pit techniques, but occasionally by subsurface solution and pumping methods; treatment of the mined materials by various washing, crushing, grinding, chemical leaching, flotation, and gravity methods to separate the sought after minerals from waste products (waste rock, tailings, liquid effluents); and in many cases a refining process to purify the commodity being mined. The mining process may create open holes and pits, underground cavities, waste rock piles, tailings stacks and liquid effluents as well as infrastructure imprints such as buildings and roads.

Mine closure is the process of winding down a mining operation on a temporary or permanent basis. It normally requires that temporary or permanent steps be taken to keep the site safe from a human health and safety perspective and from an environmental perspective. In general terms, Canadian mining regulation jurisdictions require proponents to submit “mine closure plans” prior to receiving approval to commence mining activities. Mine closure plans (also referred to as reclamation or rehabilitation plans) are normally supported with financial assurance provided by the proponent to the jurisdictional authority in various forms acceptable to that authority. This financial assurance comprises a monetary instrument (cash, bonds) or other instruments in an amount estimated to be required to execute the closure plan. When all is said and done, the closure plan and supporting financial resources is expected to ensure mine closure meets the closure objectives of the plan and the jurisdiction, and prepare the disturbed lands for other uses. In the past, closure plans were either non-existent or designed to meet the standards of the day, which set the stage for the ultimate abandonment of unsafe mine workings, and other mining related hazards,

² Orphaned or abandoned mines are those mines for which the owner cannot be found or for which the owner is financially unable or unwilling to carry out clean-up.

commonly on Crown land. The process of developing closure plans has been evolving over the last 40 years.

NOAMI proposes to review the closure plan process on a Canada-wide basis with the intent that a policy framework can be developed to provide guidance to jurisdictions lacking the necessary capacity or to jurisdictions seeking to improve their mine closure programs. Ultimately, the hope is that all Canadian mining jurisdictions can develop a sufficiently rigorous mine closure regulatory regime to ensure that no further accrual of abandoned mines takes place, i.e. no more abandoned mines.

METHODOLOGY

To execute this project a two-pronged approach was taken by the writers. Firstly, to obtain current information on how the issues under discussion are currently managed, a questionnaire was developed and sent to 17 agencies within Canada. A slightly revised version of the questionnaire was sent to some 20 foreign jurisdictions within which mining is a significant economic endeavor. Information garnered from the questionnaires was compiled and collated and is provided in Appendices C and D. Key information points or findings from these are discussed later in this report.

The second step was the preparation of brief notes on topics or potential policy elements from which guidance concepts for a policy framework could be developed. These notes provide background information for readers on issues of mine closure and abandoned mines.



POLICY ELEMENT NOTES

Introduction

This section comprises a series of short notes describing certain elements from which policy guidance can be developed. The notes are designed to be stand-alone which introduces a certain amount of repetition if one is reading several in succession.

Mine Closure Overview

The process of mine closure includes the decommissioning activities and rehabilitation work completed following the cessation of production of minerals from a mine. The closure activities and work are completed in accordance with a “mine closure plan” which is normally submitted to and approved by a government department or agency authorized to allow the commencement of mine production or other activities, such as advanced exploration, on the mining lands involved. Within the mining sequence, production follows the exploration and development phases which lead up to production whereas closure, closed out and long-term monitoring, care and maintenance follow the production phase (Figure 1).

Most jurisdictions, which have mining production within their boundaries, require the submission of a mine closure plan prior to major development works, which will lead to production. Typically mine closure plans outline how the proponent will reclaim or rehabilitate the mining works to physically and chemically stable state(s) acceptable to the approving agency. This state of acceptability is agreed to by the proponent and the licensing body and is referred to as the “closure objective” for that specific property

Closure objectives may range from the requirement to restore a site to its “original state” to rehabilitating the site to a condition compatible with the surrounding terrain. The Whitehorse Mining Initiative³ suggested the following as a goal: *“To ensure that comprehensive reclamation plans that return all mine sites to viable, and, wherever practicable, self-sustaining, ecosystems are developed, and are adequately financed, implemented, and monitored in all jurisdictions.”*

The complexities and cost differentials to complete the necessary work to a state of “suitable acceptance” versus “restore to previous condition” may be exponential depending on the scale of the project, the nature of the surrounding terrain and land use, and working conditions and practices at the time. Thus, the definition of closure objectives is fundamental to determine what is in the closure plan and how much the work required will cost. The cost of high-end closure objectives may render some projects uneconomic.

³ “The Mining Association of Canada, on behalf of the mining industry, took a suggestion for a multi-stakeholder process to the mines ministers of all senior governments at their annual conference in Whitehorse in September 1992. The ministers agreed to become co-sponsors and trustees of the process and named it the Whitehorse Mining Initiative. Representatives of five sectors of society agreed to participate. They were the mining industry, senior governments, labour unions, Aboriginal peoples, and the environmental community”.

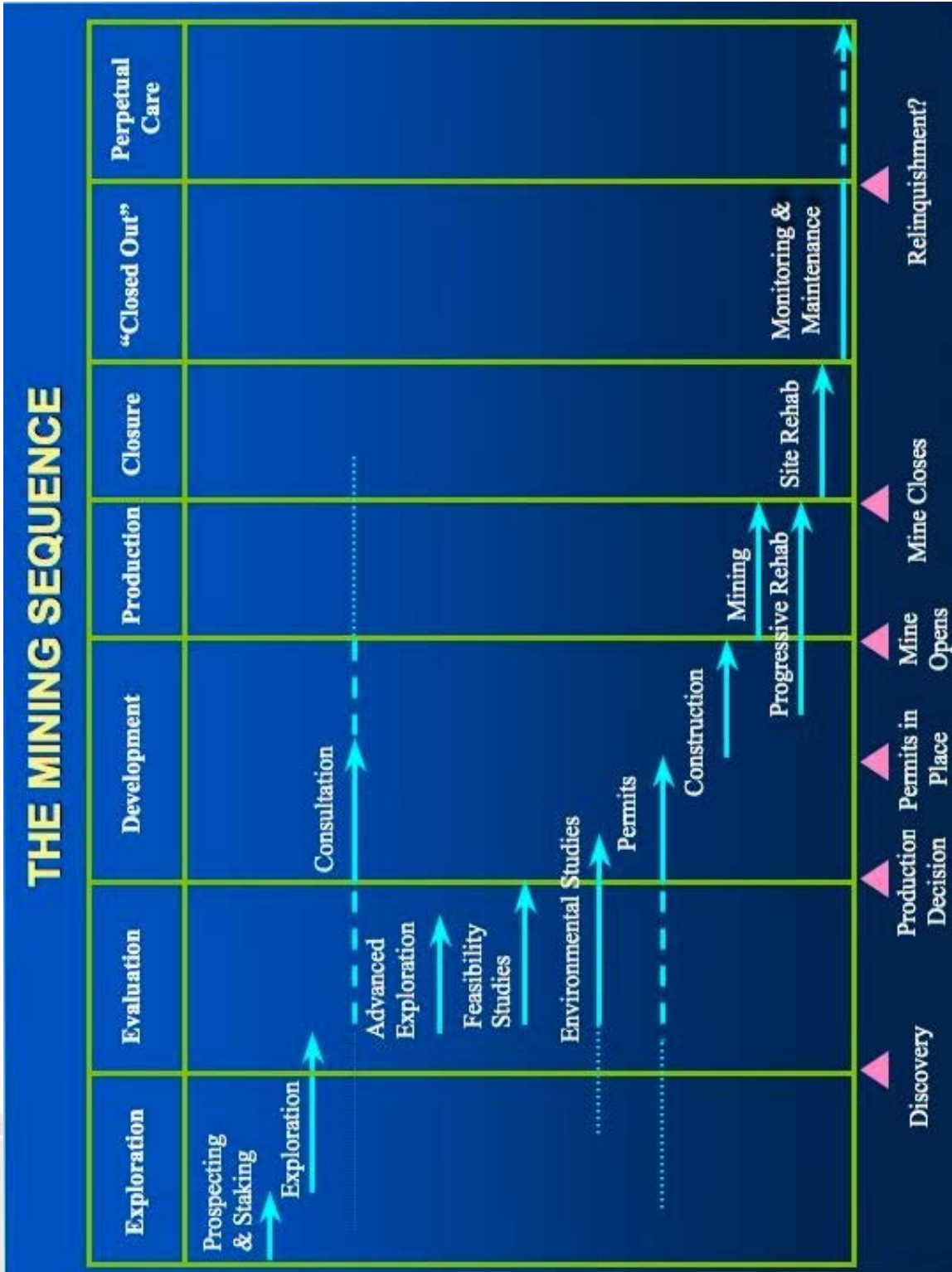


Figure 1: The Mining Sequence
 (Modified after Ontario Ministry of Northern Development, Mines and Forestry)

Closure plans are a “must require” for jurisdictions wishing to have a sustainable mining philosophy and which do not want to have any further accrual of abandoned mine hazards or features within its boundaries. A second “must” is that the closure plan for a project be supported by “financial assurance” which will guarantee that the rehabilitation works, including any necessary post-closure costs, will be completed by the proponent, the proponent’s successor or the government. Financial assurance is described in some detail in a subsequent section.

The “proponent” of the project must fit into a definition of who is responsible for the closure plan be it an owner, operator, site occupier etc., i.e. the “responsible person.” In conjunction with this a clarification of “who is not responsible” must be made within the statute or regulation under which the project will operate, e.g. secured lenders are normally excluded from the list of possible “responsible persons” unless they have taken possession of the site. Knowing who is responsible is fundamental especially if the concept of “polluter pays” is the practice of a jurisdiction.

Policy Guidance

- Legislation, regulations and administrative policies must be in place requiring mine closure plans for the entire mining sequence of the proposed operation. Where new rules are being implemented the regulator must be aware that existing operations may not have the same capacity to meet these requirements and timelines as that of a well planned new mine development. Transitional procedures and administrative policies, such as grandfathering, must be considered to accommodate this situation. In addition, staff training and guidance documents to ensure consistent application within a jurisdiction are necessary.
- Closure plans must be supported by financial assurance to guarantee the execution of the closure plan and to fund any required post-closure costs;
- Clear definitions of the owner/proponent/responsible person must be embedded in the legislated framework;
- It must be clear what is, or is not required to be included by the closure plan where there are ancillary components, e.g. off-site refining facilities, cement plants etc.
- Closure objectives set by regulators must be pragmatic if mining is to be an economic development tool in a specific jurisdiction and greater flexibility may be required; this of course may increase the ultimate risk to the tax payer respecting accrual of further abandoned mine liabilities and must be carefully considered.
- A comprehensive inspection and compliance program must be developed by the jurisdiction to support the closure plan process.
- Progressive rehabilitation (rehabilitation work completed during the operating phase) should be required where practicable. Generally this is more feasible in certain strip mining or open pit situations than in underground operations.
- Mine waste management plans including ARD/ML (Acid Rock Drainage/Metal Leaching) must be in place prior to commencement of mining as part of a comprehensive closure plan.
- Reporting of the site condition relative to the closure plan expectations must be required on a periodic basis.

Risk in Mine Closure Planning

Several types of risks must be considered from the proponents' perspective in designing closure plans and planning for closure as follows:

- Regulatory risks: this includes concerns that the “rules” might change during the development and life of the mining project; such changes could subject the project to more strict regulations with consequent financial burdens which the operation cannot withstand.
- Regulatory overlaps: this includes requirements under various pieces of federal/provincial/territorial legislation which overlap but are not coordinated or harmonized to the extent possible, e.g. Provincial and CNSC regulations. Commonly such overlaps are related to water management facilities and water quality objectives. Such overlaps, when not coordinated, can create duplication, confusion and unnecessary costs which can be very burdensome to proponents; in addition they may be counter productive to attaining intended goals.
- Financial risks: this includes calculating future costs when variables such as interest rates, inflation rates, changes in materials costs, taxation rates and other factors are “best estimates” at the time. Changes to other risk factors can cause unpredicted downstream inflation of costs as well, e.g. changes to required water monitoring frequency or compliance limits. The natural reaction to this type of uncertainty by regulators may be to request sizeable contingency payments to protect against uncertainty, to use high rates of inflation to increase the Net Present Value (NPV) or to use low discount interest rates to determine the required funding amount for long-term care requirements.
- Environmental risks: this includes risks related to environmental factors such as climate change effects which alter the predictability of certain events. For instance many technical calculations for water management may be based upon the predictability and impacts of certain natural events such as the “hundred year storm”. In some areas, the frequency and intensity of large storms appears to have altered which could have a major impact on design considerations for water storage/management facilities.
- Technical risks: this includes, but is not limited to, risk related to engineered structures which may have inadequate information required for the necessary design, inadequate designs and, perhaps, most importantly, inadequate quality assurance during construction. In the past many tailings containment facilities were expanded without having sufficient foundation information and redesign; this has led to numerous failures (Canadian Dam Association, 2007; The Mining Association of Canada, 1998). This category would also include the failure of a specific water treatment technology to purify water as intended and unpredicted chemical reactions in waste products.

- Corporate risks including bankruptcy or premature collapse of a corporation leaving no “responsible person” to manage a site except perhaps a bankruptcy trustee. Recent events have shown that corporations of great size and commercial strength can collapse overnight. Commodity price collapse or poor mineral recovery can cause mining companies to falter very quickly. As well, the capacity of a company to complete mine closure requirements varies with the size, scope and experience of the company.
- Risks related to social issues and stakeholder (communities of interest) concerns must be anticipated and mitigative activities commenced well in advance of prefeasibility studies. This could include activities related to Aboriginal rights and pursuits, potential NGO issues, labour issues etc. Failure to give these issues due recognition may result in delays, cost overruns and even project failure.
- Though the above discussion is targeted at the proponent, the issues are perhaps of equal concern to regulators and the public. Zero risk may be an unrealistic goal, which can only be achieved by securing such large financial assurance guarantees that social and economic benefits to the jurisdiction through mine development are compromised.



Photo 1: Typical layout for an underground mine site.

Risk Assessment

Introduction

Risk assessment has become a relatively common tool in the process of mine closure as it provides a numerical factor for prioritizing mine hazards and their rehabilitation methods. Classical risk assessment is a simple calculation of probability of a failure or impact occurring multiplied by the anticipated consequence. What is not so simple is the derivation of the probability and the expected consequence. Invariably the consequence is a subjective factor expressed as a cost of failure and/or an impact on public safety/loss of life/environmental impact. Ultimately the goal is to deal with the hazards in a cost effective and efficient manner utilizing accepted best practices and establish adequate closure plans to minimize future risks when the rehabilitation process has been completed. Appendix A illustrates a qualitative form of risk assessment from the South Australian Mining and Rehabilitation Program Guidelines. Numerous similar versions of this approach are available, e.g. Canadian Standards Association, Fisheries and Oceans Canada “Practitioners Guide to the Risk Management Framework for DFO Habitat Management Staff, Version 1.0. <http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14155/risk-risque/index-eng.asp>

In the case of perpetual care needs, the risk assessment process can at least provide stakeholders with a relatively sound basis and degree of certainty for determining features that may require future monitoring, maintenance and hence costing. In the past the calculation has been used both as a factor in establishing future costs but also to reduce the costs based upon low probability of occurrence. Unfortunately, a low risk does not absolutely eliminate a consequence from occurring and in today’s society there is an expectation that any such mine site failures will be addressed. If sufficient funds are not secured for this possibility an impact on the taxpayer will be the result.

In order to minimize or eliminate this occurrence, money should at some point be secured against this future potential when release of the site is considered by authorized public authorities. This should be done in a rational and consistent manner recognizing the competitive nature of the mining industry and permitting reasonable life cycle cost estimates against expected revenues.

Consideration should be given to pooling (consolidation of funds) of this type of financial assurance versus site specific application. Industry may argue against this type of approach as individual proponents would be required to provide money to ensure against possible bad practices by others. On the other hand, this may enhance the image of mine operators while at the same time spreading the risk and allowing for a more flexible approach in establishing an assurance amount for any particular site.



Photo 2: Abandoned, unprotected mine shaft works.



Photo 3: Placing a removable shaft cap.

Issues

1. Use of risk assessment in the process of determining priority of potential hazards and ultimate costing for long-term site management.
2. Use of risk assessment solely as a basis of costing long-term/perpetual care.
3. Consistent approach for use of risk assessment and application to long-term costing.
4. The issue of who manages consolidated funds to ensure their effective use is of great importance.

Policy Guidance

- Risk assessment is a useful tool from the perspective of providing guidance and confidence in establishing long-term site needs, and providing a basis for communication and discussion with stakeholders in developing closure plans. It assists in decision making from the perspective of potential risk to ultimate site owners/responsible parties. In the case of sites closed out under accepted closure plans, this assessment can be relatively focused on the major site features that remain in perpetuity and subject to “forces of nature” over time such as: crown pillars, tailings areas and open pit wall stability. Worst case scenarios such as large tailings run-outs can be evaluated and costed along with some degree of confidence of occurrence. For remaining site features such as water treatment plants, or fenced areas that require continual or periodic physical intervention, the costing is more focused on operating and capital cost requirements over time as opposed to probability of a failure.
- Ideally a uniform approach should be developed by jurisdictions that would provide consistency in the methods used and a range of acceptable risk for approval authorities, essentially establishing a formula for establishing long-term costs and acceptable levels of assurance. Mining companies would then have a degree of understanding of ultimate site costs in evaluating project viability.
- It must be kept in mind, however, that risk assessment is a subjective tool and a low risk does not eliminate the possibility of an occurrence and does not negate the need for some form of intervention. The major issue is timing of an occurrence and whether an accepted current investment will have sufficient time to grow to meet the future need.
- Risks related to size of companies (juniors, intermediate, national/international), assets (one mine operators versus multi-mine owners), financial viability, should be considered. In this regard the issue of fairness is frequently raised, as major multi-mine companies are considered to be of lesser risk and provided with certain advantages, e.g. self-financial assurance. Does a jurisdiction wish to make development available for a broad or narrow range of players?
- In addition to funding issues, a risk assessment is also essential in establishing future land use strategies and controls.

Acid Rock Drainage (ARD)

Introduction

Acid rock drainage (also referred to as acid mine drainage (AMD)) occurs when sulphidic rock and soil materials oxidize with the assistance of moisture and bacterial action to generate sulphuric acid solutions, which in turn may dissolve and transport metals. Both the acidic solution and the contained metals are detrimental to the environment and must be managed in one way or another. The geologic materials involved may be sulphide ore, non-ore rock materials, waste rock, tailings etc. Since even low sulphide content materials can generate acid and related concerns, care must be taken that all rock materials being excavated, stockpiled, processed or used for construction materials are tested at the outset for acid generating potential. This would allow the materials to be properly managed so that acid generating materials are not used inappropriately and create subsequent problems. For example, acid generating materials, such as waste rock, have been used for roads or other construction purposes creating unplanned ARD problems. In essence this means that all rock materials to be disturbed or stored on the site must be tested at preliminary stages of the project to ensure that proper handling will occur. This would provide for better management of costs related to any effluent produced on site either by process water or surface drainage.

The implications of generation of ARD are complex and potentially very costly in that some management tools require long-term or even perpetual management, which is both costly and undesirable. Some jurisdictions consider the issue to be so potentially detrimental that they have, or are considering the prohibition of mining materials from which ARD can be generated, e.g. recent efforts in Wisconsin and Minnesota (see Wisconsin Act 171, 1997: Mining Moratorium Law).

The Mine Environment Neutral Drainage (MEND) program coordinated by Natural Resources Canada (NRCAN) has been supporting research and technology transfer on this matter for more than 20 years. The objective is to determine best practices and cost-effective solutions. Price (2009) provides exceptional guidance in the prediction of ARD.

Issues

1. Establishment of ARD potential and management risks and practices.
2. Use of natural water bodies for storage of reactive tailings.
3. Long-term/perpetual care and costing for reactive waste materials including tailings, waste-rock, overburden and stored low grade ore.
4. High financial assurance costs.

Policy Guidance

- Testing protocols for rock and soil materials on a potential mine site must be well designed and carried out by qualified persons. Regulations specifying the required testing must be rigorous in order to minimize the opportunities for unpredicted acid generation and to provide optimum management designs. Such testing must consider metal leaching (ML) in non-acidic situations as well.
- Proposed testing and treatment approaches must be state of the art and designed by qualified persons.
- Failure to complete sufficient testing prior to designing management practices can/will lead to inadequate management practices and perhaps, ultimately, costly perpetual care and treatment.



Photo 4: View of acid rock drainage symptoms.



Photo 5: Severe acid rock drainage symptoms.

Financial Assurance

Introduction

Financial assurance is the cornerstone of mine closure planning. The “polluter pays principal” is the foundation for this topic of discussion. Financial assurance provided by the proponent is intended to guarantee that a mine site will be reclaimed by some party to a satisfactory state and ensures that the site will not become another abandoned mine with health, safety, environmental or financial liabilities. Simply stated, financial assurance is some form of financial instrument or combination of instruments acceptable to the regulator which theoretically guarantees that the closure plan provided by the proponent and accepted by the regulator will be funded through the guarantee provided by said instrument(s). It provides for funding of the required reclamation work by either the proponent, a third party or the government agency regulating the project. Many jurisdictions require that the financial assurance be based upon costs which would be incurred by a third party agent should the proponent be unable or unavailable to complete the work. Contractors generally require more funding than would a proponent occupying the site who has access to equipment and labour at cost. Miller (2005) provides a good overview of financial assurance issues.

Acceptable forms of financial assurance are normally described as hard (cash or cash equivalent) or soft (guarantees based upon some form of corporate guarantee). Industry advocates insist that the forms of acceptable instruments need to provide options to fit the capabilities of companies of varied financial strength. Others, such as non-government organization (NGO) advocates and some government officials, consider soft forms of guarantees as inadequate in any circumstance. If self assurance is to be considered by a jurisdiction, the capacity of the company to have limited risk must have a measuring stick acceptable to the jurisdiction. For example, Ontario uses corporate credit ratings from specified rating agencies as its primary measure of corporate financial strength.

Issues

1. Proponents proposing to initiate a project wish to keep the financial assurance at a minimal amount to reduce costs. Thus the calculation of the required financial assurance must be subject to scrutiny and verification in a manner acceptable to the regulator.
2. The cost of financial assurance is dependent on the type of instruments acceptable to the regulator, cash being the most expensive and some forms of corporate guarantee being of little or no expense. Where corporate guarantees, or other soft forms of financial assurance, are deemed to be acceptable to a jurisdiction, then the value of this liability must show up on corporate balance sheets as a liability.
3. The risk to each party varies with the type of instrument being proposed or discussed; clearly the risk to the regulator can range from zero to 100 percent based upon the nature of the guarantee it is willing to accept.
4. The risk to a proponent if 100 percent cash is required up front for a complex project is that the project may not be viable (“If you can’t afford to close a mine you can’t afford to open it.”).
5. Do highly unlikely risks need to be protected against, versus reasonably foreseeable risks?

6. Some desired reclamation measures may never be feasible, e.g. backfilling of large open-pit mines. Why include/require and financially assure rehabilitation works within closure plans if they will never be completed?
7. Can the investment climate for a jurisdiction afford to demand “gold plated” solutions? Can it afford to force premature closure? Does the jurisdiction wish to retain a friendly investment climate in a globally competitive arena in which the taxpayer may assume some risk? Are there financial incentives or off-sets elsewhere in the system, e.g. taxation benefits, infrastructure assistance such as financing road building, etc.?
8. How often will the regulator require review of cost estimates? Will the regulator demand top-ups or rebate surplus funds?
9. Who manages the financial assurance to ensure it’s availability for the purpose intended; that cash deposits are managed to ensure maximum growth; that taxation benefits and regulations are optimized; etc.?
10. What procedures are in place to deal with requests for partial return of financial assurance for progressive rehabilitation works completed?

Policy Guidance

- The provision of mine closure plans and supporting financial assurance must be required prior to commencement of production and, in some instances, advanced exploration activities.
- In a modern, global, mining investment climate, a jurisdiction wishing to have mining as an economic activity must strike a balance between requiring sufficient financial assurance to ensure reclamation measures are completed, as per the accepted closure plan, but that the requirements are not prohibitive to mining development at the cost of economic competitiveness, job losses and tax revenue losses. Risk aversion negates rewards. This is particularly important when introducing new requirements and existing operations get captured at a time when the profitability of an operation is decreasing.
- The forms of financial assurance acceptable to the government must not create unacceptable risk to the government. The forms must meet the requirements of the closure plan as well as any long-term or perpetual care requirements.
- Combinations of instruments can resolve some issues where both party’s are willing, e.g. a combination of irrevocable guaranteed letter of credit and cash payment schedule could spread the burden over time.
- Review of financial assurance and updating of cost estimates must be completed on a scheduled basis for the benefit of both parties. This should be done in conjunction with a field inspection to verify whether what’s on the ground matches the closure plan and the cost estimate. Cost estimates should be based on the premise that the work will be completed by a third party.
- Information on financial assurance related to a specific project should be available to the public, excepting information subject to protection of privacy legislation.
- Policies and procedures need to be developed respecting the timely return of surplus financial assurance following completion of the closure plan.

Cost Estimation

Introduction

Costing of mine closure activities is an integral part of regulated closure plans in order to establish appropriate financial assurance and guarantee completion of the plan components upon cessation of mining operations. Many jurisdictions provide spreadsheets, templates, codes or very prescriptive listings of items to be included in the costing to facilitate standardization and completeness. In addition it is common to compile standard unit costs for specific tasks in a specified area to facilitate cost comparison. Normally these costs are based upon third party reviews to provide for a degree of confidence in the estimates. The State of Nevada provides a sophisticated computerized system for calculating reclamation costs (Nevada Standardized Reclamation Cost Estimator: <http://www.nvbond.org/>). Proponents of proposed mine operations in Nevada are required to use this cost estimating process.

As a number of the costs are “future based,” a net present value (NPV) calculation is commonly employed to establish a current dollar value for assurance purposes. In simple terms an appropriate discount interest rate and period is applied to the future cost to provide a current value, which if invested at the rate, would provide for the funds at the time they are actually required. Appendix B outlines one approach to calculating the present value of future costs for rehabilitation works as provided by the U .S. Bureau of Land Management.

The use of the NPV approach can also assist in establishing funding requirements for long-term care and monitoring once the elements of a long-term plan are developed and agreed to. These plans should be relatively straight forward as they would be based upon the successful completion of an accepted closure plan (this is assuming no premature closure due to company failure); however, it can be complicated if, for example, ongoing water treatment is required.

The difficulties, or risks, include whether the cost estimates adequately reflect actual costs, the period over which the costs are required and the discount rate used for calculation. Industry often seeks to use an acceptable rate of return on investment; however, government regulators do not generally agree as this greatly diminishes the discounted cost and would reduce any “up-front” assurance required. This provides an unacceptable funding risk to government agencies. The discount period also plays a significant role as the longer the period the less the current value required.

The other difficulty from a long-term care perspective is unplanned events such as storm surges on tailings areas causing run-off and erosion or even a run-out of tailings. It is difficult to accurately predict what may occur, when it may occur, extent of damage and the actual cost. However some allowance should be made for contingency purposes.

Estimates of closure costs and long-term monitoring and maintenance costs are subject to much uncertainty. Jurisdictions may therefore wish to require contingency add-ons to cost estimates for financial assurance, e.g. as much as 30-50 percent has been suggested by some jurisdictions. Saskatchewan has a scaled contingency funding requirement for unforeseen

events of 10 percent (no tailings or engineered structures) or 20 percent (with tailings or engineered structures) of the present value of the future costs associated with monitoring and maintenance obligations; Fisheries Act (Canada) suggests 20 percent contingency funding in cost estimations for certain situations. The Canadian Nuclear Safety Commission (CNSC) requires contingencies for decommissioning costing between 10 percent for most accurate estimates and up to 30 percent for least accurate estimates (CNSC, 2000). CNSC (2000, p.3) suggests that where estimating is very complex and perhaps deficient “it may be cost-effective or necessary to offset these deficiencies by estimating or funding credible worst-case scenarios.”

There are also issues with how funds should be administered. Often these discussions revolve around whether funding provided by proponents should be dedicated to a proponents site as industry generally does not want to accept the payment for sins or bad practices of others. On the other hand governments may prefer a “pooled “(consolidated) resource that would provide a larger fund that would assist particularly in the event of unforeseen failures.

One final item for consideration, regardless of how funds are administered, is the fact that sufficient growth must occur at the discount interest rate to ensure the future dollars required will indeed be available. This suggests that funds should be readily identifiable in government accounts and it can be demonstrated appropriate investments are in place. This permits transparent reporting of funds and scrutiny by all stakeholders.

Issues

1. Establishing appropriate costs for long-term care to ensure the future financial burden for jurisdictions is adequately funded following completion of accepted closure activities and return of mining properties.
2. Selecting the appropriate period and using a rate calculation that is fair to all, but minimizes the financial risk for taxpayers.
3. How to assess and realistically fund unplanned events.
4. Administration of funds.

Policy Guidance

- Use of the third party (e.g. a qualified independent consultant) estimates to provide a degree of confidence in negotiating financial assurance for closure plans and post closure funding is recommended. Costs should be based upon current construction costs. There will always be an element of risk with estimated costs; however, the use of independent cost estimates should reduce that risk to an acceptable level. While governments may experience a shortfall for any particular project, this might be considered a potential cost of doing business and sharing in the risks to recognize the economic benefits overall.
- For existing closure plans, the discount rate periods can be fairly well defined based upon mine development and operating plans along with ore reserves. Most closure plan regulatory regimes require the regular updating of cost estimates and financial assurance. In the case of long-term monitoring/perpetual care the issue is more complicated. In some instances costs may continue in perpetuity (for example, maintaining fencing around an open pit, shaft cap replacement) and the period to be used in calculating an NPV becomes somewhat nebulous. The longer the period used the less the current value becomes. In order to achieve a realistic value over the foreseeable future a number of jurisdictions have unilaterally used a 50-year time frame. Of equal importance is the discount interest rate selected which should err on the conservative side to reduce ultimate risk. The Saskatchewan Institutional Care Program Model provides an excellent example for establishing this rate (Saskatchewan Ministry of Energy and Resources, 2009).
- Unplanned events such as storm surges on a tailings structure, or a failed crown pillar present a formidable challenge particularly if significant environmental impacts or public safety is threatened. Contingency plans and risk assessment for long-term elements should be an integral component following completion of closure and consideration of mining property returns to appropriate authorities. There is always an element of risk remaining regardless of the application of best science. There must be some reasonable effort developed to address this potential risk, but bearing in mind the competitive nature of the mineral industry and the desire for continued economic investment. Again, the Saskatchewan model provides a reasonable example of how this can be accomplished based upon community and industry involvement and negotiation.
- Most jurisdictions recognize that financial assurance collected as part of closure plans for projects should be held in dedicated accounts for tracking and accountability and, if required, be used against the related project. In the case of long-term/perpetual care, where the properties are returned to a responsible party, it makes imminent sense that a pool of funding would allow the spread of the risk. Industry, on the other hand feels that any funding provided should be dedicated to their specific projects. Again with the Saskatchewan model, an argument can be made and process established for a blended approach. In this case a dedicated agency or office is also established to administer the funds and oversee monitoring and any operational issue.

Perpetual Care, Long-Term Monitoring and Maintenance

Introduction

The mining industry in the past has garnered significant criticism from society for a legacy of sites that have created environmental impacts and safety issues that have become a burden for the public. While the mining industry is recognized as an important factor in the economies of a number of jurisdictions, the need to improve practices and address these issues is recognized world wide. The need for rehabilitation practices and recognition of financial responsibility became a common element in the approval of new sites and continuation of existing operations. Over the past few decades considerable scientific expertise has been developed and significant technical and legislative progress has been made by both industry and governments in dealing with these problems.

The goal of mine closure plans has been to ensure the impacts of mining are controlled and mitigated by the site owners and mining operations have been viewed as a temporary use of the land. The ultimate goal is the return of the land to original or other reasonable use with no impacts on the taxpaying public. At the same time industry, having fulfilled its closure responsibilities, would have relief from further obligations on any particular site providing a form of certainty and stability.

We know, however, that there are elements of sites closed out under acceptable technical standards and guidelines that now require long-term monitoring and maintenance in order to ensure the safeguards remain intact and are performing as intended in the closure process. These safeguards can range significantly depending on the complexity of the original mining operations but generally deal with items such as:

- pit wall stability for open pit mines
- shaft cap stability
- tailings and tailings dam stability
- waste rock/cover stability
- tailings cover integrity in relation to design for acid generation
- continued water quality within accepted standards (which may include treatment)
- crown pillar stability
- protection against vandalism
- aesthetics

Due to the lengthy geological and chemical processes involved at mine sites, these safeguards may in fact require some form of control for decades or even millennia (e.g. uranium tailings). These controls can involve both active and passive processes such as physical monitoring and construction maintenance and land use planning and restrictions. In addition, a prime area for consideration is mine records control and storage to ensure documentation for mine sites is maintained and recoverable in an efficient, timely manner. Another over-riding factor may be an emergency response planning process. These controls come with a cost. How to adequately secure and manage these costs presents a considerable challenge to satisfy all stakeholders.

Issues

1. Many current mining operations throughout the world are subject to closure or rehabilitation plans to ensure sites are restored by site owners, to pre-existing or other reasonable land use when mining operations cease. However there are elements of closed sites with currently acceptable rehabilitation practices in place that will require some form of monitoring and maintenance to ensure physical and chemical integrity of the site.
2. Providing sufficient funding to address these long-term needs is in its infancy. Estimates of these costs vary across jurisdictions and occur prior to relinquishment of lands to responsible authorities.
3. Providing for sufficient funding for unforeseen incidents.
4. Stakeholders need to be assured that funding and the appropriate application of funds is sufficient, directed to site needs, and physical/chemical issues dealt with in an effective and efficient manner.
5. Site information is complete, securely stored, maintained and easily accessible for use.



Photo 6: Construction of cap over unsafe underground workings (source MNDMF).



Photo 7: Settling houses over underground coal workings, Nova Scotia.

Policy Guidance

- Ensure all closed out site features that may present a future hazard and cost are identified in the closure plan process
- Develop a site land return process that focuses on these features/hazards to provide a degree of certainty of impacts, potential for occurrence, level of risk acceptance and method of costing. This should include worst case scenarios to assist in emergency response planning and costing.
- Establish or identify a jurisdictional body that coordinates agency/stakeholder inputs and has authority to negotiate final assurance requirements and develop appropriate inspection programs.
- Establish a recognized authority for receipt of assurance and tracking and consistent application of funds for monitoring, maintenance and emergency requirements. This should include funds dedicated to site specific features as well as funds established for unforeseen incidents.
- Ensure funds are held in dedicated accounts with appropriate investment growth potential.
- Establish a secure archiving/filing system to store mine site data for ready access.
- Ensure all land use restrictions are applied, recorded, enforced and appropriately identified in all land use planning systems such as GIS.

Corporate Failure/Premature Closure

Introduction

Corporate failure, commonly associated with the premature closure of mines, can result from many circumstances including the loss of value of the mine due to commodity price fluctuations, ore body considerations, equipment failure, flooding; failure to comply with corporate reporting requirements; adverse legal proceedings; mismanagement and other factors. In addition, mineral rights, the primary assets of a mining company, may be forfeited to the Crown compromising the corporation. For the purpose of this discussion, the ability of a corporation to meet its obligations respecting the closure plan and other permits is the issue of concern.

In the mine closure process, financial assurance is a key component. It provides for completion of rehabilitation needs in the event of failure of a project proponent. Financial assurance is routinely required in most, if not all, mining jurisdictions although the form of assurance can vary substantively from self-assurance for the most credit-worthy proponents to cash for the most risky ventures. Regulatory authorities normally require periodic review of projects to update costs, accommodate additional features and increase the assurance requirements if necessary. In the event of corporate failure secured creditors may have preferred status, and jurisdictions are at risk if full hard financial assurance is not held.

Cost Recovery

The ability to recover costs incurred by a government agency during cleanup of liabilities due to a now defunct corporation may be varied within and between jurisdictions. In a NOAMI report by Castrilli (2007), he commented as follows: Federally, under the Fisheries Act (Canada), *“cost recoveries for debt due the Crown may be effective against a mine owner or operator with other assets in Canada, or against a valuable, if closed or abandoned mine. However, such authority would not be effective in the face of an owner/operator that (1) no longer exists, (2) is judgement proof, (3) has left Canada and taken all assets with it, (4) has left inadequate security, or (5) has left damaged or contaminated property that is worth less than the costs of clean-up”*(Castrilli, 2007, p.20). He used identical language to describe the cost recovery situation for several provinces (see Castrilli, 2007, p.112, p.125, p.145).

While the financial assurance provides for the immediate rehabilitation needs of a mining project, many financial assurances do not apply to, or address long-term care and maintenance. These can become a tax burden in the event of a corporate failure.

Liability

The following quotation on mine liability is taken from Castrilli (2007, p.212):

“In general, federal-provincial-territorial jurisdictions reviewed appear to possess authority under both mining and environmental legislation to impose three types of liability with respect to mining activity: (1) quasi-criminal, (2) administrative, and (3) civil..... Quasi-criminal liability may arise from public or private prosecution of an offender in a court for violation of general prohibitions contained in mining or environmental legislation or regulations, or terms or conditions of licenses, permits, approvals, or remedial orders issued thereunder. Administrative liability may arise from the issuance by inspectors,

federal, provincial, or territorial officers, or the minister of remedial orders, suspension or cancellation of licences, permits, or approvals. Civil liability may arise from government or private citizen court actions or applications seeking damages, injunctions, cost recovery, or other remedies available under statute law, common law, or civil law (Quebec). However, imposition of liability is most effective under statute law, common law, or civil law with respect to operating, closing, or closed mines where a viable responsible party still exists against whom financial obligations or sanctions may be imposed. Authority to impose liability is not effective against orphaned/abandoned mines because either the person responsible for the site cannot be identified or is unable to pay for rehabilitation. Thus, many such facilities under most legislation revert to Crown ownership. Moreover, the only entity against whom liability may attach in these circumstances is the Crown itself. Accordingly, orphaned/abandoned mines, by definition, render ineffectual statutory regimes based solely or primarily on imposition of liability for non-compliance and current statutory regimes based exclusively on liability principles make it inevitable that the legal, financial, and technical responsibility for orphaned/abandoned sites will revert to government.”

A further factor affecting potential legal proceedings is the limitation of time of commencement of proceedings following the date the offence was committed, commonly two years.

Issues

1. Costs of rehabilitation are accurately estimated and updated on a schedule.
2. Acceptance of “soft” forms of financial assurance and creditor status.
3. Corporate failure and long-term funding following closure.
4. Jurisdictional liability for abandoned mines.

Policy Guidance

- Establish requirements for routine periodic review of closure plan elements and update of costs as part of regulatory requirements prior to closeout.
- Cost estimates should be done on a third party basis.
- Where “self-assurance” is permitted, ensure a review system is in place to flag change in corporate credit status of the proponent and provide for provision of hard forms of assurance. It should be noted there is a risk with this form of assurance as it may be difficult for a proponent to provide harder forms if their credit status drops or if corporate failure is imminent.
- Consider legislation that provides for preferred creditor status or, ideally, primary status for jurisdictions. The best approach is to require up to date hard assurance and cost estimates.
- In the case of long-term care and maintenance, consider the establishment of a general account for emergency issues in the jurisdiction. This could be funded through negotiations of land relinquishment agreements. Risk is high in initial stages as the fund would have to be established over time and become self-sustaining.

Emergency Legislation (Preparedness)

Introduction

Emergency situations may arise on mine sites during operations, closure or post-closure time frames, which require jurisdictional intervention. If not done in an expeditious manner this may lead to increased risk to public safety and serious environmental impacts. In addition the financial burden is increased. Emergency plan requirements within the closure plan may, or may not, be necessary depending on what other requirements exist within ancillary permits.

Issues

1. Ability to secure funding for emergencies.
2. Emergency procurement procedures.
3. Appropriate emergency plans.
4. Authority to access sites in emergencies.
5. Emergency plan for post-closure and relinquished sites.

Policy Guidance

- Legislation requiring mine closure plans must address issues related to emergency (real or deemed) events for all phases of mining sequence.
- Legislation authorizing operation of mines must provide for emergency access by the regulator when the proponent is not taking the necessary precautions, and actions to alleviate an emergency.
- Such legislation must also provide the regulator with authority to recover any government funds expended on the emergency from the proponent.
- Legislated provision must be in place for the regulator to access financial assurance funds in the event of emergency.

Relinquishment

Introduction

Once the commercial aspects of a mine are diminished and the site is closed out, the proponent may ultimately wish to relinquish (give-up, surrender, abandon) the mineral rights back to the Crown. The reality is: 1) the proponent may not wish to carry these properties on their books forever, especially if they are based off-shore; more importantly, 2) the proponent is ultimately going to disappear through one process or another; and 3) the mineral rights leases or permits will expire; i.e. the Crown must be prepared to either receive the lands back on their managed terms or through unplanned abandonment with time. It is therefore obvious that jurisdictions not wishing to receive such lands on terms other than those agreed upon must have the authority, policy and procedures in place as to how this will be done.

The Environment Issue Group of the Whitehorse Mining Initiative, 1994, p.19 recommended the following very eloquently:

“Governments should create a mechanism for the return of title of the closed-out mine sites to the Crown based on the following requirements:

- a) the obligations of the reclamation plan, as noted under planning, have been completed;*
- b) it has been verified that the long-term obligations of the plan can be met on a continuing basis;*
- c) adequate funding has been provided to cover post-close-out monitoring and maintenance and, where necessary, long-term treatment; and*
- d) instruments such as risk-based financial assurance vehicles*, have been established to ensure that additional funds can be accessed if the company is not able to fund required work in excess of the site-specific financial assurance.”*

**A complete return of title and liability to the Crown would only be offered in cases where the level of risk can be reasonably determined. In such cases payments, based on insurance principles and related to the risk of each case, could be made to a fund. The provisions of a risk-based insurance fund would enable the Crown to meet any site specific expenses after the return of the site.*

Issues

1. Is the site closed out as per the closure plan and are the closure objectives met?
2. Is the lease, licence or patent expired?
3. Is the site physically and chemically stable?
4. If not, what monitoring and maintenance is required; for how long; and at what cost?
5. Is the funding for above in place or available or can it be obtained?
6. Does the jurisdiction have the capacity to manage ongoing requirements?
7. Is long-term water treatment required?
8. Does the Crown have the authority to accept or refuse surrender?
9. Is there an established process supported by legislative authority?
10. Does the receiving jurisdiction provide release documents to the proponent?
11. Are there other permits still in place, e.g. under Fisheries Act (Canada)?
12. Is there an emergency response plan in place?

Effects of other permits

The above discussion considers the issue of relinquishment and raises the question of issues surrounding other permits which may be in place. Under many provincial/territorial situations the agency issuing the mining rights leases is the same one which regulates the closure plan process and therefore has some management control over the process, subject to its relinquishment requirements. However other permits such as Fisheries Act Authorizations or provincial environmental certificates/authorizations regarding effluents may still be in place. In the instance of the Fisheries Act, subsection 36(3)⁴ authorizations may remain in place if the proponent (owner/operator) so chooses and continues to meet the requirements of the authorization. Alternatively the proponent may chose to become a “recognized closed mine” pursuant to section 32 of the Metal Mining Effluent Regulations (MMER) in which case the proponent loses the authority to deposit deleterious substances and becomes subject to complying with subsection 36(3) of the Fisheries Act. Thus the proponent must make a business decision as to whether to continue under their ss.36(3) authorization or become a “recognized closed mine.”

In the instance of a proposed site relinquishment, the ss.36(3) Authorization and liability may possibly be transferred to the jurisdiction accepting the relinquished lands.

For provinces or territories any permits, licences or authorizations would most likely have to be transferred to the new owner depending on the legislation. Jurisdictions involved with closed uranium mines or the storage of radioactive wastes should be aware of Nuclear Safety and Control Act (NSCA) requirements.

Examples of relinquishment

Following are a few examples of how mining properties may be relinquished in a few jurisdictions:

Surrender by Agreement, Ontario, Canada

Authority – Mining Act Subsection 149.1

“(1) The Minister may accept a surrender of mining lands from a proponent on the conditions specified by the Minister if,

(a) the project related to the mining lands is closed out; or
(b) the project relating to the mining lands is not closed out only because it is subject to long-term maintenance and monitoring by the proponent. 2001,c.9, Sched.L, s.5

(2) Money received from the proponent of a project as part of an agreement for the surrender of mining lands shall be placed in a special purpose account for use in the rehabilitation of mining lands generally. 1996, c.1, Sched. O, s.26

(3)The cost of any work performed by the Crown or an agent of the Crown under this section shall be paid by the Minister of Finance out of the special purpose account. 1996, c. 1, Sched. O, s. 26.

⁴ Fisheries Act, subsection 36(3) states that “no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

(4) Despite subsections 7(1) and 8(1) and sections 17, 18, 43, and 44 of the Environmental Protection Act, a proponent who surrenders mining lands under this section is not liable under those provisions. 1996, c. 1, Sched. O, s.26.”

Though this provision came into force in 2001, no lands have been accepted under this clause to date. Ontario is currently working on guidelines as to the management of this process.

Acceptance Into The Institutional Control Program, Saskatchewan, Canada

Authority – The Reclaimed Industrial Sites Act (An Act Respecting the Monitoring and Maintenance of Industrial Sites after Reclamation)

Section 5 “The minister may accept a closed site into the Institutional Control Program if:

- (a) the minister is satisfied that the closed site meets the prescribed conditions; and
- (b) the site holder has paid to the minister:
 - (i) for deposit into an account of the Institutional Control Monitoring and Maintenance Fund, an amount sufficient to cover the anticipated future monitoring and maintenance costs for the closed site, determined in a prescribed manner;
 - (ii) for deposit into the Institutional Control Unforeseen Events Fund, an amount determined in the prescribed manner; and
 - (iii) the prescribed registration fee.”

Additional information requirements include:

Subsection 6(1) “6(1) For the purposes of clause 6(3) (a) of the Act, the Institutional Control Registry is to contain the following records and information submitted by a site holder:

- (a) location of the closed site;
- (b) identification of the site holder of the closed site;
- (c) a description of the closed site and the activities that were conducted on the closed site;
- (d) the release from decommissioning and reclamation issued pursuant to *The Mineral Industry Environmental Protection Regulations, 1996*;
- (e) a reference to and the location of the documents provided by the site holder pursuant to *The Mineral Industry Environmental Protection Regulations, 1996* for the purposes of applying for the release mentioned in clause (d), including a reference to and the location of a full and complete set of ‘as-built’ reports;
- (f) a description of the monitoring and maintenance obligations mentioned in subclause 3(b)(i);
- (g) a reference to and the location of the documentation provided to the site holder when the site holder is released from any surface lease agreement that governed the closed site;
- (h) in the case of a closed site that was a uranium facility, a reference to and the location of Canadian Nuclear Safety Commission licensing documentation and all Canadian Nuclear Safety Commission decisions related to the closed site;
- (i) a notation of the location of all documentation that the minister considers applicable to the closed site and that is in the control of the site holder;
- (j) surface and underground plans submitted pursuant to *The Mines Regulations, 2003* or any predecessor to those regulations.”

As well, a release is required from the Ministry of Environment and, where applicable, an exemption from licensing requirements by the CNSC. No sites requiring active treatment systems are eligible for the Institutional Control Program.



Photo 8: Control structures for engineered water cover treatment of acidic tailings.



Photo 9: Run-out of poorly managed mine tailings.

Surrender of Tenure and Environmental Authority, State of Queensland, Australia
Authority – Mineral Resources Act, 1989 – mineral tenure; Environmental Protection Act, 1994 – environmental authority

Proponent must provide:

- a Final Rehabilitation Report and other documents to obtain surrender of Environmental Authority (including landowner statement respecting transfer of ownership of infrastructure, satisfaction of rehabilitation and transfer of any management or maintenance commitments).
- Surrender application for tenure including fee.

It should be noted that most of the jurisdictions surveyed will not accept relinquishment of lands for which active treatment is required, e.g., a water treatment plant. Although the Ontario Mining Act has provision to do so, this has yet to be done.

Release Document

If and when a jurisdiction is willing to accept a parcel of land for relinquishment, the proponent will want documentation as to their release from further responsibility for that parcel. If such a release is not forthcoming, or there is remaining residual liability, then a cloud on the relinquishment process may exist. In the relinquishment example for Ontario, given in a previous section, the legislation states that if specific conditions are met then the proponent is no longer liable for certain provisions under the Environmental Protection Act (Ontario); these provisions are those which normally allow the Ministry of the Environment to apply liability retroactively. Though this process provides relief from specified legislation, it does not provide relief from other permits which may be in place, e.g. Fisheries Authorizations, which may continue to leave the proponent subject to that legislation (Fisheries Act, Canada).

In the B.C. Process, though a Mines Act Permit has been released (and the liabilities with it are released), liability may remain under the Environmental Management Act; in this instance the present owners may be subject to liability provisions which are joint and separate (several)⁵, retroactive and absolute. Thus the Mines Act Permit may only be a partial release if there remain environmental liabilities for which the proponent is deemed responsible.

Saskatchewan provides a “Release From Decommissioning and Reclamation” certificate pursuant to Section 22 of “The Mineral Industry Environmental Protection Regulations, 1996.” In this certificate the Minister issues approval for release from decommissioning and reclamation for previous mining activities on all Crown land identified in a specified surface lease. This release is very specific that it applies only to activities described in the Final Closure Report and associated required documents.

⁵ The liability of more than one individual that may be enforced against them all by a joint action or against any one of them by an individual action.

Alberta may provide a Reclamation Certificate pursuant to Section 138 of the Environmental Protection and Enhancement Act. This certificate states that a specified surface area held by a proponent “complies with the conservation and reclamation requirements of Part 6 of the Act”. The certificate is subject to cancellation if it is found that further work is required; such cancellation is appealable.

In a special case situation, Ontario and the Ontario Mining Association (OMA) created a Memorandum of Understanding to jointly finance the rehabilitation of abandoned mines owned by the Crown or controlled by the Ministry of Northern Development, Mines and Forestry. OMA funding was to be supplied through contributions of member companies. To make this work Ontario agreed to indemnify and hold harmless contributors, their heirs and legal representatives from potential legal actions resulting from the joint rehabilitation work subject to meeting specified conditions; this indemnification survives the term of the agreement. Though a very special case, this example displays how hurdles can be overcome with willing participants.

In summary, though many jurisdictions provide release documents for specific requirements, the matter of jurisdictions accepting relinquished lands with ongoing liabilities, though fully financed, is evolving.

Policy Guidance

- Jurisdictions should recognize the inevitability of mining lands returning to the Crown and provide for a managed process. Responsible persons have a finite life span.
- Policy must be in place with respect to relinquishment: (a) without ongoing responsibilities or, if accepted by the regulator, (b) with ongoing responsibilities (this may or may not include water treatment in perpetuity).
- This process should make every attempt possible to have the proponent provide the necessary financing to carry out any required long-term monitoring and maintenance, especially water treatment.
- Financial assurance in an amount and form acceptable to the regulator must be in place under an administrative scheme devised by the regulator.
- Procedures must be in place to deal with any required ancillary permits under each scheme.
- A responsible person or custodian must be in place to manage both the financial assurance and the ongoing commitments it is intended to finance.
- Where the lands are relinquished in a fully managed manner, and the Crown is satisfied that all obligations have been met, a legally binding document releasing the proponent from further obligations should be provided to finalize the process.

Consultation

Introduction

Public involvement in mining projects has become increasingly important in implementation of mining projects from exploration to full production and rehabilitation. As the closure plan process in most jurisdictions developed, the focus was originally on public notification of proposed mining projects with the ability to comment that might be considered a passive approach. Public concerns have increased dramatically with the realization that mining projects have a legacy that may remain for considerable periods of time and carry significant liability. In concert with this concern, the need to address constitutional requirements with respect to Aboriginal traditional lands and pursuits, which have been increasingly upheld by the courts, has led to a much greater need for public consultation and involvement. The need for consultation with all stakeholders is an issue that needs to be addressed at the initiation of projects; it is not simply a need for the final stages in a projects life cycle. Care must be taken to identify all stakeholders early in the process in order that their concerns can be identified and, if necessary, addressed.

There has been a great deal of effort in establishing appropriate processes for project proponents such as the Prospectors and Developers Association of Canada's, "E3 Stakeholders Engagement" guideline and ICMM's (International Council on Mining and Metals) toolkit, "Planning for Integrated Closure". While the PDAC document is primarily intended for exploration proponents, the principles can be applied to all stages of a mine's life cycle. The "Toward Sustainable Mining (TSM)" initiative of The Mining Association of Canada and the ICMM (2010) "Good Practice Guide: Indigenous Peoples and Mining" are also relevant and should be consulted.



Photo 10: Open pit mine in northern setting

Issues

1. Increased recognition with respect to Aboriginal constitutional rights.
2. Increased litigation with respect to Aboriginal constitutional rights.
3. Increased regulatory requirements for stakeholder involvement.
4. Recognition of a “social license” to operate.

Policy Guidance

- As expressed in the ICMM toolkit, a consultation plan at the very early stages of planning is a necessity. Ideally a baseline study to identify who, why, how and what possible benefits may be plausible would be completed to identify stakeholders, community impacts and net social benefits that could accrue from the project.
- In the case of Aboriginal issues, this often necessitates a separate agreement to deal with community social issues and development on a case by case basis. Consultation should be an ongoing feature if project elements change over time and any refinements are made to a closure plan.
- Transparency of process is a major goal.
- As final closure is approached, but within several years, the final rehabilitation plans should be reviewed with stakeholders to ensure that all are aware of the issues involved; that all understand the technical issues; and that community mitigation plans can be developed.
- As the closure process is completed to the satisfaction of regulatory authorities, and relinquishment is under consideration, stakeholder involvement is again a primary element to ensure their understanding of the ongoing process; the elements that may require ongoing monitoring and maintenance; the funding mechanism that is in place; and the administration of the process.
- Opportunities should be provided for stakeholders to actively participate in planning activities, which will enhance future land use opportunities.

Institutional Care

Introduction

As the name implies institutional care refers to the ongoing involvement of regulatory authorities (or others who may retain ownership for extended periods) in mine sites following completion of an authorized closure plan. This note is in reference to a controlled process, as opposed to the responsibility occurring as the result of an orphaned/abandoned mine issue.

Institutional care can take a number of forms, from passive controls to active monitoring and maintenance. In the case of passive controls this would predominantly involve land use instruments being developed and registered for a particular site reflecting any rehabilitation feature or hazard potential. These instruments may restrict access to the site, providing for review and approval of development proposals as well as providing information on title for any party interested in the site. Active controls would range from simple signage and fencing maintenance to more sophisticated activities involving scheduled monitoring, periodic expert re-evaluation of potential hazards and construction activities as warranted. Extreme situations may require continuous on-going water treatment to ensure chemical stability of site discharges. This would entail a system of administration to maintain efficient record-keeping for all sites, with the direction and authority to monitor, maintain or acquire technical expertise and ensure continued integrity of rehabilitated features.

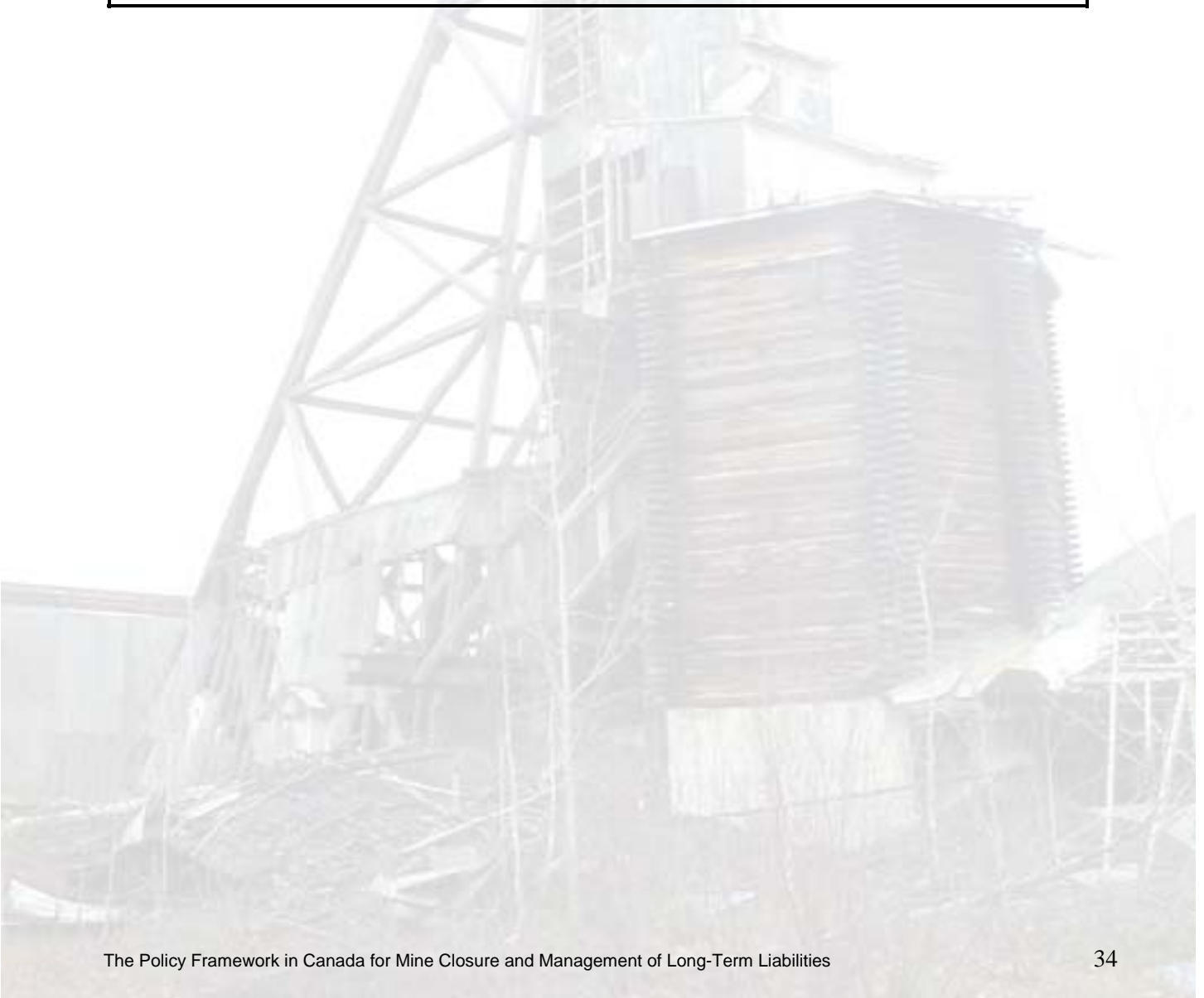
The most significant features of a mine site that commonly require ongoing controls or involvement include; fenced pit walls, with the risk of vandalism, or theft of fencing; sloughing of steep walls over time; shaft caps, as constructed caps have a finite life span and require replacement over time; tailings areas and tailings dams to ensure cover integrity and or dam stability; and crown pillar stability. As well, chemical stability of mine wastes should be subject to periodic confirmation.

Issues

1. Establishment of accurate, efficient, secure data management system.
2. Establishment of land use planning instruments and methods of documentation and notification
3. Recognition of need of central authority with direction to maintain files, establish monitoring systems and perform maintenance activities.
4. Adequate ongoing funding to carry out these activities.
5. Disturbance of rehabilitation works.

Policy Guidance

- Create a filing/database system that is accessible to all regulatory agencies as well as the general public. This system should include sufficient mine plans, surface as well as underground, and scientific and engineering information related to original mine rehabilitation which is necessary to the continued evaluation of rehabilitated hazards. GPS information for all mine feature locations is required.
- Develop land use planning restrictions and possible instruments that may be recorded in the planning system (GIS) for use of all regulatory agencies. Register appropriate instruments.
- Establish or create a recognized authority to administer the information filing system and staff for ongoing design of monitoring and maintenance systems and ensure construction needs are implemented.
- Provide for, or secure, adequate funding on an ongoing basis.
- Establish policies and legislation making it an offence to disturb or destroy rehabilitation works.



SUMMARY OF QUESTIONNAIRE RESULTS

Introduction

As described in the methodology section a questionnaire was developed to review legislation/regulations/policies/practices in jurisdictions for mine closure including, financial assurance; long-term/perpetual care and maintenance planning/regulation and funding; and release requirements for closed mine sites which the proponent wishes to return to the state (Crown).

A list of key Canadian government contacts was compiled for relevant federal-provincial-territorial government agencies in Canada. A limited number of foreign jurisdictions were included in the survey. It was understood that some jurisdictions may have more than one agency dealing with mine closure issues and checks, for example, personal telephone calls and email contacts, were made to assure that every agency having relevant data was included in the list of contacts.

The questionnaire was circulated by email to all agencies on the contact list. A covering letter, provided by the NOAMI Secretariat, was included with the questionnaire. Follow-up contact by phone calls and/or email was made after the questionnaires were circulated to ensure that the documents had been received and to answer questions. Additional contacts by phone calls and email were made to encourage participation. Subsequent information obtained by phone call and email were added to the summary and written in italics surrounded by square brackets. It should be noted that respondents to the questionnaire are not necessarily speaking for their jurisdiction but rather providing answers based upon their knowledge of practices of the jurisdiction.

The questionnaire was divided into four sections. Section 1: **Mine Closure Plans**; Section 2: **Long-Term Care and Monitoring Following Closure**; Section 3: **Return of Mined Out Lands to the Crown/State**; and Section 4: **General**. The elements for each section are listed below.

Section 1:

1. The role played for the coordination, review and acceptance of mine closure plans.
2. The statutory authority, trigger and scope.
3. Coordination with other agencies.
4. Gaps that may exist within/between permits.
5. Evaluation of risks.
6. Consideration for catastrophic events.
7. Amount, type, and timing of financial assurance.
8. Self assurance.
9. Who receives financial assurance and where is it held?
10. Potential changes to mine closure program.
11. Aboriginal consultation.

Section 2:

1. Financial assurance for long-term monitoring and maintenance.
2. When is it required?
3. Calculation of financial assurance.
4. Contingency surcharge.
5. Calculation of Net Present Value.
6. Treatment of catastrophic risk.
7. Emergency response plans.
8. Storage and retrieval of critical maps and documents.

Section 3:

1. Return of mining lands after close out.
2. Statutory authority and process.
3. Site assessment.
4. Condition for acceptance.
5. Contingency funding.
6. Release document.
7. Third party consultation.
8. Number of agencies for sign-off.
9. Acceptance of mining lands with long-term monitoring and maintenance.
10. Party responsible for long-term monitoring and maintenance.
11. Land tenure complexities and restrictions.

Section 4:

1. Is the process working?
2. Available tax incentives or support.

Results of Survey - Canadian Respondents

Table 1, on the following page, lists the agencies requested to fill out the questionnaire. Three agencies did not complete the questionnaire, as they do not have the regulatory authority for mine operations. One hundred percent of the regulatory agencies responded.

Section 1: Mine Closure Plans

A total of thirteen Canadian agencies responded to the questionnaire – see Table 1. Appendix C contains a compilation of results. All have mine closure requirements. Nine of the agencies manage the mine closure process through “mining specific” legislation. Five jurisdictions, Nova Scotia, New Brunswick, Alberta, NWT and Nunavut have two or more pieces each of legislation dealing with mine closure. An application to commence mining is the main trigger for a closure plan for all agencies; however, Ontario, Manitoba, Nunavut and the Yukon reported there are provisions for “Advanced Exploration”. Nova Scotia uses the term “reclamation plan” and British Columbia refers to “a conceptual reclamation and closure plan” rather than closure plan. All thirteen have comprehensive coverage of mine features, including infrastructure. Four agencies have informal coordination of mine closure reviews and seven agencies have a formal process. Six jurisdictions indicate they have a

“One Window” approach for coordinating mine closure reviews. Gaps within/between the different permits do not appear to be a major issue. Gaps reported include dealings with surface rights permits, federal level approvals, fish and wildlife, biodiversity, Aboriginal rights and contaminated site investigations. Overlap was reported for two jurisdictions. It was suggested that education on the part of the applicant and coordinated approach on the part of various agencies is the best way to deal with gaps/overlaps. Negotiated “Environmental Agreements” have been used in NWT to cover perceived or actual gaps.

Table 1 List of Canadian agencies and response to questionnaire

Name of Agency	Response	No response
NL Natural Resources	x	
NS Natural Resources	x	
NB Natural Resources	x	
QC Natural Resources & Wild.	x	
ON Northern Dev, Mines & For	x	
MB Innovation, Energy & Mines	x	
SK Environment	x	
AB Environment	x	
B.C. Energy, Mines & Petrol. Res.	x	
NT Minerals, Oil & Gas		N/A
NT INAC	x	
NU Minerals & Petroleum Res.		N/A
NU INAC	x	
YK Energy Mines and Resources	x	
Natural Resources Canada		N/A
Can Nuclear Safety Commission	x	
Totals	13	0

The evaluations of risks associated with closure plans are predominately completed by a number of various government officials including staff engineers and technical specialists, lawyers, auditors and assessment committees. Two agencies, MNDMF and CNSC place the onus of technical risk assessment with the proponent. Chemical and physical stability risks were the most commonly cited risks. Long-term radiological exposure, unknown contaminants and impact of effluents downstream were also mentioned. Major risks in the closure plan process include inconsistencies in following the process, political intervention, overlooking of contamination possibilities, failed technologies, bankruptcy of proponent, inadequate long-term institutional controls, inadequate input from other agencies and loss of access to site. Ontario relies on the proponent to have qualified persons follow the Provinces Rehabilitation Code. Other approaches to deal with major risk are monitoring, use of internal working groups, regular updating of closure plans and good communication and consultation with the various parties. Some jurisdictions do not include catastrophic events in the closure plan process, with the exception of the design for geotechnical structures. Ten agencies require 100 percent financial assurance up front. Cash, bonds, letters of credit and mining reclamation trust funds are the most common form of financial insurance. Some agencies are

flexible. Ontario accepts self assurance and Manitoba is currently reviewing the matter. CNSC accepts commitments made by a Federal or Provincial government. Corporate financial information inconsistencies or financial difficulties can pose problems for the use of self assurance.

All agencies indicate that the financial assurance is controlled by a government organization. “Cash” is held in general revenue by two jurisdictions and in special accounts by six jurisdictions. Alberta deposits cash in a Consolidated Investment Trust Fund. CNSC allows the cash to be held in a segregated trust account that is separate from the proponents other assets. Ten agencies indicate that financial assurance required under other permits can be coordinated with that of the closure plan. Since the closure of a uranium mine and mill requires an environmental assessment under CEAA, all other regulatory agencies are consulted. However, in practice, each authority must ensure that their own requirements are met.

Eight agencies indicate that changes are contemplated for their closure plan/financial assurance program. Many suggestions were made for the question “given the opportunity, what would you change?” These include: to extend closure liability beyond the leaseholder to include related and associated companies/shareholders/directors; inclusion of exploration sites; establishment of an abandoned mine rehabilitation fund through proceeds from companies; tightening of legal language; increase financial assurance to 100 percent. Ontario’s respondent would like to introduce a provision for the regular updating of closure costs and for the replacement of self assurance. Manitoba’s respondent would delete the acceptance of pledge of assets and self assurance. Alberta’s respondent would remove the grandfathering provision and include plant sites in the financial security estimates. Saskatchewan’s respondent is satisfied with their approach to mine closure. The NWT would like to enable a Mining Act to bring some of the legislative instruments under one Act.

Ontario, British Columbia, NWT, Nunavut and CNSC all have the requirement for Aboriginal consultation in the preparation of closure plans. Ontario requires the proponent to conduct the consultation process and the other agencies deal directly with Aboriginal groups. Six jurisdictions have a formal process in place to coordinate Aboriginal consultation across all government departments: Nova Scotia – Office of Aboriginal Affairs, New Brunswick - Aboriginal Affaires Secretariat; Manitoba – Aboriginal Consultation Unit; Saskatchewan – Ministry of First Nations and Métis Relations; British Columbia – First Nations Initiative Division; and NWT region Consultation Support Unit.

Section 2: Long-Term Care and Monitoring Following Closure

With the exception of the Yukon, all agencies indicate they require financial assurance for long-term care and monitoring of contaminants including acid rock drainage. Six agencies mention monitoring and maintenance of physical structures. Ontario and Saskatchewan include risks posed by underground workings. Up front payment of this form of financial assurance is required by six agencies, three require it by or toward the end of mining operations, and one has a variable approach.

Eleven agencies indicate that the calculations for costing out this form of financial assurance are the responsibility of the proponent. Most proponents make use of a third party. Seven agencies indicate they review these cost estimates as part of the process. The calculations are generally based on current construction rates and third party estimates. The internal review generally uses in-house expertise. External consultants are sometimes employed to assist with the reviews. British Columbia provides a spreadsheet for proponents to use. NWT makes use of a costing spreadsheet and Nunavut uses a reclamation model. Ontario does only a cursory review as the cost estimates are certified by the proponent's senior management. The CNSC makes use of a regulatory guide. Contingency surcharges are imposed or negotiated by all agencies. The amount of contingency ranges from 10 to 30 percent, depending on the degree of certainty. Net Present Value is used by most agencies. Manitoba indicates it had a case where the NPV approach was not satisfactory. Interest rates used in NVP calculations are in the 3 percent range. A one hundred year time period is the maximum cited. Saskatchewan uses a 10-year inflation average and, an inflation plus 2 percent rate of return. Newfoundland and Labrador's Department of Natural Resources interest rate is based on the rate the Province expects to receive on its investment portfolio. It is the only agency stating that it evaluates risk for potentially catastrophic failures following closure.

Eight agencies have a requirement for emergency response plans; all but MNDMF have plans for each site. Three agencies specify that the proponent must prepare the plan. Newfoundland and Labrador, although having no formal plan, indicates that an ERP is required under the Canadian Dam Safety Guidelines. MNDMF has an emergency response plan for abandoned mines.

Eight agencies indicate that they are responsible for long-term storage and retrieval of critical maps and documents for administrative and emergency purposes. For Alberta, NWT, and Yukon each ministry/department has its own filing system. The CNSC requires the proponent to maintain these documents; a duplicate set is kept in Canada's Public Archives.

Storage of critical maps and documents varies from government archives to office filing systems. Most agencies accept both digital and hard copy documents. Ontario has provision for storage of hard copy documents only. Alberta accepts microfiche format as well as hard copy and digital documents.

Section 3: Return of Mined-Out Lands to the Crown/State

All agencies provide for the return of mining lands to the Crown after close out, nine under the authority of an Act. Newfoundland and Labrador has no formal process under its Mining Act, but with the Labrador Inuit Lands Agreement a representative of the Nunatsiavut Government can sign off mineral exploration efforts. In Quebec environmental responsibility survives the certificate of release and the abandonment of the mining lease or concession under the Environmental Quality Act. The Mines Minister has the authority to sign off mining lands in Ontario. Saskatchewan handles this through its institutional control program. Oil sands mines in Alberta can be issued a reclamation certificate by an Inspector. The Mines Act in British Columbia allows the Chief Inspector to accept the return of mining lands and in the Yukon it's the Minister under the Quartz Mining Act. The Canadian Nuclear

Safety Control Act allows for the Crown to assume the regulatory responsibility for any uranium mine/mill site.

Seven agencies indicate that Aboriginal consultation occurs as part of the review process. Consultation may be triggered by other agreements and/or legislation in Newfoundland and Labrador.

Eight agencies conduct site assessments as part of acceptance procedure. Saskatchewan and Alberta check for potential surprise liabilities as part of the review. Conditions for acceptance generally follow the requirements established by the closure plans. Ontario has prepared a draft policy paper on conditions for acceptance. Quebec, Manitoba and British Columbia do not sign off on environmental liability and Saskatchewan will not accept properties with active treatment systems. As well, British Columbia does not accept back properties where a contingency fund is maintained. The Canadian Nuclear Safety Commission indicates conditions would be predetermined by the Crown agency accepting the property back.

The acceptance of contingency funding from the proponent for surprises is only accepted by three agencies. A portion of the bond may be withheld by Nova Scotia. Saskatchewan has an Unforeseen Events Fund for this purpose. Two agencies accept back on a case-by-case basis. Contingency funding for uranium properties would be determined by the accepting Crown agency, not by the CNSC.

Quebec, Ontario, Saskatchewan, Alberta and the Yukon provide release documents. Nova Scotia, Ontario, Saskatchewan and Alberta have standard clauses for release See Appendix C for details on these clauses. Nova Scotia may indicate acceptance by letter. A letter is issued to the proponent by the NWT detailing the return of fees and acknowledgement of a final land use plan. The process for issuing a Yukon reclamation closure certificate is still under development.

Third party consultation for the return of mining lands takes place in Nova Scotia (only Crown lands), Quebec, Ontario, Manitoba, Saskatchewan, Alberta and the Yukon. It is not required in New Brunswick or British Columbia (unless requested by the proponent) nor by CNSC. Newfoundland and Labrador, Quebec, Saskatchewan and Alberta have surrender procedures that require sign-off by more than one agency.

Manitoba and British Columbia will accept back properties that require monitoring and maintenance in perpetuity, however environmental liability rests with the proponent. Quebec will not accept a site back if water treatment is required. Environmental liability still rests with the proponent on properties accepted back by that Province. Saskatchewan will accept properties that require monitoring and maintenance but only passive, not active, treatment systems are accepted. In Alberta, any features to remain in place must be supported by a party willing to assume any and all liabilities.

Nova Scotia Lands (Crown Agency) is the responsible agency for that province. In Quebec, once a site is released, the Mine Site Rehabilitation Department takes charge of the monitoring. Monitoring/management of sites is conducted by the Conservation Department

in Manitoba, the Institutional Control Registry in Saskatchewan, and MEMPR in British Columbia. The Ministry of Energy and Resources administers the Institutional Control Registry in Saskatchewan. In British Columbia, under the Mines Act, closed and abandoned mines are still considered a mine, therefore MEMPR remains the responsible agency, however, the Ministry of Agriculture and Lands has a program for remediation of contaminated sites on Crown land. The NWT reports that the INAC Contaminants and Remediation Directorate operates these sites.

Land tenure issues dealing with surface and mining rights are managed under Mining Acts in Nova Scotia, New Brunswick, Ontario, Manitoba and British Columbia. Surface rights and mining rights are administered by different agencies in Newfoundland and Labrador, Saskatchewan and Alberta. The Yukon is developing policy on this issue. Eleven agencies indicate that land use restrictions can be put in place for future protection.

Section 4: General

Newfoundland and Labrador, Ontario, Manitoba and Saskatchewan respondents are reasonably satisfied that their programs will prevent further accrual of abandoned mines. Nova Scotia, New Brunswick, Quebec, British Columbia and the Yukon would like to have improvements. The Canadian Nuclear Safety and Control Act binds the Crown and the private sector equally. The Crown is therefore held responsible for all uranium mine hazards on lands acceded to the Crown.

In Ontario, expenses related to rehabilitation work done in respect of mining land reclamation on exploration sites or claims are eligible for assessment work credit. Newfoundland and Labrador is examining ways to gain allowance for equal tax treatments to all forms of financial assurance under the Mining Act.

Results of Survey- Foreign Respondents

A questionnaire was prepared for jurisdictions outside of Canada. It is similar to the Canadian questionnaire with an additional two questions included in Section 3 - Return of Mined Out Lands to the Crown/State:

- 10a) Is there a separate agency responsible for uranium mine commissioning and decommissioning?
- 10b) If yes, what is the agency?
- 10c) Are lands from decommissioned uranium mines accepted back to the State?

The questionnaire was forwarded to: **Australia** – Dept. of Resources, New South Wales Industry and Investment, Queensland Mines and Energy, South Australia Minerals and Energy Division, Western Australia Dept. Mines & Petroleum; **Brazil** – Mines and Energy; **Finland** – Employment and the Economy; **Peru** – Energy and Mines; **South Africa** – Minerals and Energy; **Sweden** – Mining Inspectorate, Environment; **United States** – Bureau of Land Management, Colorado Dept. Nat. Res., Kentucky Dept. Nat. Res., Minnesota Dept. Nat. Res., Navajo Abandoned Mining Lands, Nevada Div. Environmental. Protection, New Mexico Energy, Minerals & Nat. Res., Office of Surface Mining, and Utah Div. Oil Gas & Mining.

New South Wales, Peru and Sweden responded by providing website links to their legislation. Completed questionnaires were received from seven agencies: Colorado, Minnesota, Nevada, New Mexico, the US Bureau of Land Management (BLM), Utah and Western Australia. The seven questionnaires are compiled in Appendix D.

Section 1: Mine Closure Plans

The respondents for Colorado, Minnesota, Nevada, Utah and Western Australia report that they are responsible for closure plans. New Mexico Environmental Department has sign off authority on Mining and Minerals Division permits. The Bureau of Land Management (BLM) requires reclamation plans for mining operations on federal lands under the authority of the General Mining Law of 1872. All work comes under authority of statutes. Closure plans are triggered by application for a mining permit. All aspects of a development project are included with the exception of smelters in New Mexico. In Utah closure plans do not include secondary processes, such as smelting and refining. Although there is no “one window approach”, coordination does occur in Minnesota, Nevada, New Mexico and Utah. The coordination often occurs for large projects in Colorado. The BLM coordinates with state governments where applicable state authorities exist. Gaps exist in Colorado for water issues, air quality and dam permits. This could be overcome by combining permitting into one agency or by improving coordination amongst agencies. Elimination of gaps that exist between the reclamation standards required under existing mines vs. new mines in New Mexico would require a change to the statute. Western Australia has overlaps rather than gaps.

The most common risks include under-bonded sites, lack of resources to inspect sites, reactive and radioactive mine wastes, heavy metal dusts, geotechnical issues, operator and/or surety going out of business and lack of sufficient rainfall to ensure vegetation. Risks are evaluated primarily by agency staff, with input from proponents and third party specialists. Major risks range from unplanned mine closures, long-term stability of impoundment structures, to the assurance that there is no long-term treatment of water upon final mine closure. Having sufficient financial assurance to cover these risks is a major concern. Natural catastrophic events such as earthquakes and 100-year storm events are included in closure plans. With New Mexico, damage accruing from an event beyond a 100-year storm event must be repaired but does not fall within their enforcement provisions. The BLM and Utah do not consider catastrophic events as a regular part of a reclamation plan.

One hundred percent financial assurance is required up front in Colorado, Nevada, New Mexico, Utah and the BLM. Western Australia currently requires minimum rates (about 25%) up front. Minnesota has a formula for annual review. New Mexico calculates financial assurance on the worst case scenario within each five year permit term. Several hard forms are accepted including Cash Bonds, trust fund, irrevocable letter of credit and insurance. It is held by government agencies with the exception of Utah. In that jurisdiction financial assurance may be held by an independent financial institution or surety, but for the benefit of the state. Self assurance is accepted in all but Minnesota, the BLM and Western Australia. Utah indicated self assurance is not a good idea. “Cash” financial assurance is held in government accounts, with the exception of New Mexico. In that State the proponent sets up a special account. Western Australia does not accept “Cash”. Financial assurance required

under other permits can be coordinated with that of the closure plan in Minnesota, Nevada, New Mexico, BLM and Western Australia.

Contemplated changes in closure plan/financial assurance programs are cited, with Colorado creating more stringent rules governing in-situ uranium mining, and New Mexico developing more timely evaluation and updating of financial assurance instruments and supporting cost estimates. Western Australia plans to review environmental bond rates, and will also require that mine closure plans be submitted every three years.

Given the opportunity, Colorado would eliminate some forms of financial warranties, such as irrevocable letters of credit, deeds of trust, trust fund and first Liens. The State would also develop multiple bond calculation approaches/programs. Nevada would expand its bonding authority to cover pit lakes and acid drainage issues. New Mexico would eliminate self bonds, third party guarantees and real collateral. Utah would remove the option for collateral bonding and self bonding.

Requirements for Aboriginal consultation for closure plans exist in Minnesota, New Mexico and Western Australia. This is accomplished by issuing drafts to tribal entities in advance of public review for Minnesota and incorporating consultation (across all agencies) into the development of the closure plan for New Mexico. In Colorado, Indian Tribes have jurisdiction over mining and mine closure on Indian Lands and Federal agencies provide technical support. Utah does not regulate Aboriginal lands. The consultation process and outcomes for consultations must be reported in the mine closure plans in Western Australia.

Section 2: Long-Term Care and Monitoring Following Closure

Long-term care and monitoring hazards/risks requiring financial assurance include the long-term stability and reclamation of lands and impoundment facilities, revegetation success, water quality, and slope stability. This category of financial assurance is required in Colorado when the monitoring and maintenance period begins. Financial assurance in Utah and Western Australia does not include any additional costs associated with long-term monitoring/maintenance. The other jurisdictions require it up front. The calculations are completed by the proponent in Minnesota, Nevada, and New Mexico and for the BLM. It is prepared by government staff (sometimes with aid of consultants) in Colorado and with input from the proponent. These calculations are based on current and projected costs (using computer estimating programs), projected cost for a government agency to do the work, and worst case scenarios. Reviews are by government technical staff. Minnesota also uses a third party (chosen by the agency through a bid process and paid by the proponent). Nevada has standardized models for reclamation cost estimating. New Mexico uses specific reference manuals and tables and well as internal guidance documents.

Contingency surcharges to the cost estimates are used by the BLM, Colorado, Minnesota and Nevada, whereas New Mexico re-evaluates financial assurance on a frequent basis. Net Present Value calculations are completed by consultants in Minnesota. Nevada and New Mexico uses reference indices, reference manuals and tables. The New Mexico Mining Act Program provides a guideline specific to NPV calculations. The BLM has guidelines to determine Present Value (See Appendix B of this report). The BLM State Economist

determines the interest rate and time period. Nevada uses a 500 year time period for perpetual situations. New Mexico makes use of an “Escalation Rate” and “Discount Rate”. The time periods are never less than five years. Western Australia will consider NPV in the coming Financial Security Review.

Colorado, Nevada, the BLM and Western Australia have emergency response plans (with the exception of Colorado sites abandoned or inactive prior to 1976). This could be required as a permit condition in Minnesota. In New Mexico it would be a responsibility for all sites under the federal Mine Safety and Health Act.

Long-term storage and retrieval of critical maps and documents come under the responsibility of the various agencies. These documents are stored in various government offices. Nevada uses the State Library and Archives and Minnesota a fire proof vault. Format varies from hard copy to digital and microfilm. New Mexico has a Disaster Recovery Plan for computerized data and Minnesota regularly backs up digital data. New Mexico requires that the proponent also maintains all documents relative to a permit. Western Australia hardcopy plans are stored at a professional document storage company; PDF files of the plans are stored on the Department’s GIS server.

Section 3: Return of Mined-Out Land to the Crown/State

Minnesota provides for the return of mined out land to the State and other public/private ownership. It is handled by the federal government for public lands in Nevada. There is very little mining on Nevada state lands. In New Mexico mining projects on federal or state lands leased from the state or federal agency will be returned to the trustee agency. For mine lands owned by the State of Colorado, the State Land Board provides for the return to the State. Federal jurisdictions do the same for federal lands in Colorado; unpatented mining claims return automatically to the federal government upon expiration. Utah provides for the return of mined out land owned by the State or Federal Government. New Mexico includes Aboriginal consultation when the process affects Native Americans. In Western Australia all key stakeholders, including Aboriginal groups, are to be consulted by proponents through the mine closure process.

Colorado, Minnesota, New Mexico, the BLM, Utah and Western Australia all cite the requirement for a site assessment prior to acceptance. The inspection would be geared to the terms and conditions of the permit. No release from a permit to mine in Minnesota shall be approved for an area requiring post closure maintenance. Contingency funding from the proponent for surprises does not appear to be an issue. Colorado never issues a release document. Even after the mining lease on State Lands is cancelled or expires, the lessee is still liable for undiscovered lease violations. Minnesota, New Mexico, the BLM, Utah and Western Australia provide release documents. Colorado, Minnesota and New Mexico do not accept lands that require monitoring and maintenance in perpetuity. An exception is with existing hard rock mines in New Mexico. In this case the operator is required to do the perpetual care and maintenance. The BLM notice may contain a clause concerning residual liability. Minnesota, Utah and Western Australia release documents do not have clauses respecting residual liability.

The Colorado Department of Health and Environment, Hazardous Waste Management Division, Federal Nuclear Regulatory Commission and the US. EPA are also involved with uranium mining commissioning and decommissioning. In New Mexico conventional uranium mining is under the jurisdiction of EMNRD and solution uranium mining is permitted by the Environment Department. Uranium mining is presently not permitted in Minnesota. Decommissioned uranium mines are accepted back in New Mexico and Utah, and in Colorado if the lands are State owned. Conditions for acceptance are similar to those for other mines. There is no separate agency for Utah. The State Radiological Council is responsible for uranium mines in Western Australia.

In Minnesota, after release, surface rights and mineral rights return to the respective owner/lessor. Mining waste from state minerals is typically stockpiled on state surface rights. Some stockpiles have co-mingled ownership due to the co-mingling of mineral rights. Restrictions can be put in place for future protection in Minnesota, New Mexico, Utah and Western Australia. Restrictions in Utah would not be without compensation to the mineral owner. Another agency manages land tenure in Colorado. According to US case law, the mineral estate is superior to the surface estate. Conflicts are handled by local BLM offices. Mineral rights trump surface rights in Utah. The Mining Act and Lands Administration Act manage land tenure complexities in Western Australia.

Section 4: General

All six US agencies express satisfaction that their programs will prevent further accrual of abandoned mines. Western Australia indicates there will always be unplanned mine closure. The Australian taxation systems have incentives to help offset rigorous rehabilitation requirements.

Observations and Trends

Results gathered from the NOAMI questionnaire provide a good snapshot of existing legislation/regulations/policies/practices in jurisdictions for mine closure. Much progress has been made in this field over the last 40 years, and continues to be made. Some observations or trends from this survey are provided in the following points.

- Statutory authority for the requirement of closure plans by jurisdictions is now the norm.
- Several agencies refer to the term “Reclamation Plan” instead of, or as a precursor to, the “Closure Plan”.
- “One window” permitting is the exception rather than the rule.
- For the most part there were few major gaps identified within/between permits by jurisdictions.
- Very few jurisdictions appear to include “exploration” as a closure plan trigger.

- Most responders appear to include every element of an active production site in closure plans.
- Little mention is made of risk imposed by third party interference with rehabilitation works.
- The Province of Saskatchewan has established a process under its “Reclaimed Industrial Sites Act” and related regulations and policies to provide an approach for long-term care and monitoring following closure. It appears to be the only Canadian jurisdiction to have done so.
- While several agencies report they will not accept properties with ongoing water treatment/contamination concerns, there is little discussion on how these sites will be maintained (funding and management) once the proponents ultimately disappear. This is a particularly important concern for the long-term care and monitoring of closed uranium mines.
- There is little discussion of catastrophic events or contingency response planning for worst case scenarios.
- While self assurance is accepted by some jurisdictions, a number of respondents consider it to be an inadequate form of financial assurance.
- A number of agencies use spreadsheets, computer models and other tools to calculate financial assurance. This can provide consistency, not only for the regulatory agency but also for the proponent.
- Not all agencies use Net Present Value as a tool to calculate long-term care and monitoring costs following closure. One respondent sees problems with this method. No widely accepted process appears to be identified for calculating long-term monitoring, care and maintenance costs (see Appendix B for an example used by one agency).
- The main focus for Emergency Response Plans appears to be for operating mines, not for closed out sites (with limited access, infrastructure and technical/human resources).
- There is no consistent approach for storing and safeguarding critical maps and documents which also provides for rapid retrieval of information in the event of emergencies.
- There is a now greater focus on Aboriginal consultation. Several jurisdictions have created special consultation units.
- A number of responders have provision for return of mining lands to the Crown but the process appears subjective in some instances.
- Several agencies have release documents but do not/cannot grant environmental liability release. A number will not accept sites with long-term treatment facilities.

POLICY FRAMEWORK

A strong policy framework is necessary to develop a robust, effective and fair mine development, mine closure and long-term care regulatory system and to minimize the further accrual of abandoned mine features. The following sections provide a brief policy framework which is intended to provide guidance to jurisdictions with evolving mine closure regulatory programs. It is not intended to be an exhaustive listing of issues and “what ifs”; further guidance is provided in previous sections of this report. Jurisdictions must develop their own policy direction within their “sustainable mining niche” in a global market including their level of risk tolerance or aversion. To be effective, primary policy elements/requirements must be embedded within the legislative framework.

Closure Objectives

A clear policy on what the closure objectives of a jurisdiction are must be in place so that a “design for closure” (or perhaps more properly “design for relinquishment”) can be implemented from cradle to grave on a consistent basis. For many situations returning the mine site to a land use compatible with the surrounding terrain will suffice. In some situations returning the site to its original state may be desirable. The spectrum of cost between “good enough” and “highly desirable” may be exponential and must be assessed within the context of the mining strategy of the jurisdiction.

Closure Plans

Closure plans must be required to ensure that mine sites will be returned to a safe, physically and chemically stable state. Plan development must utilize sound science, state of the art engineering and qualified persons with good experience and sound judgment. Because a mine site evolves with time, initial closure plans may be conceptual subject to amendment or revision on a periodic basis. In this regard closure plan development and implementation must be assured with a competent inspection and enforcement program.

Financial Assurance

Moneys put forward by the proponent, to guarantee the work required by the closure plan, is an absolute must in the formation of policy and regulation of mine development and closure. It is essential to guarantee completion of the work if the proponent is unable or unwilling to do the work. The form and timing for provision of this money is an important component of the policy. Ideally, if the proponent provides 100 percent of the closure costs up front in the form of cash or cash equivalent the regulating jurisdiction acquires little or no risk; however, this may prevent the proponent from proceeding or cause severe financial constraints on the project. Some jurisdictions assume more risk and allow either deferrals in provision of funding or the provision of “soft assurance” in the form of corporate guarantees to secure economic benefits. Risk-averse jurisdictions should require hard forms of financial assurance up front and require regularly scheduled reviews of the financial assurance requirements. Periodic review of financial assurance is necessary to capture changes in the plan or to offset changes in inflation, interest rates etc.

For long-term care and maintenance and/or perpetual care, risk assessments, time-frames and discount interest rates become major considerations for calculating financial assurance. These

items require specific expertise. Jurisdictions should also consider providing spreadsheets, templates or other guidance for calculating costs.

Post-Closure Care

Ideally, the execution of decommissioning and rehabilitation commitments contained within the closure plan would bring to a close the need for work on the mine site. However, in many cases ongoing care and maintenance is required due to physical structures needing inspection and maintenance or there remain chemical liabilities requiring management. Clear policy is necessary as to what is required, who is going to continue this work, perhaps in perpetuity, and who is going to pay for it and how. Jurisdictions must manage this in such a way that the principal beneficiary of the mine, the proponent, is held responsible either through continuing to manage the site while maintaining financial guarantees or through posting sufficient financial resources so that either the jurisdiction or a third party can continue the necessary work.

Relinquishment

Relinquishment of mineral title back to the Crown is the final step in closing the relationship between a proponent and a jurisdiction respecting a mining project. Jurisdictions must have clear policy on how this process will be managed in the best interests of the public. Failure to do so may result in the accrual of abandoned mines and their attendant liabilities - financial, environmental, safety. Some situations may render relinquishment unfeasible to the jurisdiction, e.g. ongoing water treatment requirements, even if the necessary financial and management guarantees are in place. Where relinquishment is a managed process, a release document specifying that the proponent has no ongoing liabilities should be made available to the proponent to the extent permitted by law. It must be clear as to what policy and compliance measures might follow in the event that actions regarding a release become necessary, e.g. failed rehabilitation measures.

Institutional Custodianship

Institutional Custodianship policy is fundamental to the management of closed out mine sites which may require some form of continuing supervision. This may range from passive controls, such as registered land use restrictions, to active controls which may range from fencing hazards in perpetuity or water treatment for significant periods of time. Though the institutional control must be authorized by legislation, the actual work could be completed by a government department, an agency contracted by the government or some other body. Data management, funding and oversight are key components of such a system.

Consultation

Consultation with stakeholders throughout the life-cycle of a mining endeavor must be required with the responsibilities of both the proponent and the licensing jurisdiction clearly identified including mandated consultation with Aboriginal groups. Where consultation processes are complicated jurisdictions should consider having a refereeing system which provides for the conclusion of a process.

RECOMMENDATIONS

Based upon the preceding discussions and our review of the current situation, in order to prevent further accrual of abandoned mine hazards the following recommendations are put forward.

1. Greater emphasis should be placed on the development of post-closure policy, regulations and procedures. It would be useful if this were done on a Canada-wide cooperative basis. The existing Saskatchewan model serves as a good underpinning for this.
2. Regulations, procedures and facilities regarding institutional care need careful consideration and development by jurisdictions. This includes both passive and active care options.
3. Jurisdictions should have a managed relinquishment process, which is clear and unfettered and is specific about what will not be accepted. Hitherto closure plans have been prepared on a “design for closure” basis. It is suggested that a more forward-looking approach be embraced and that a “design for relinquishment” approach be adopted.
4. Upon relinquishment the registration on title documentation and release for proponents must be unimpeachable.
5. Jurisdictions should establish financial assurance regimens which meet the mining strategy of the jurisdiction and its level of risk tolerance; in general self-assurance is high risk.
6. Methods for estimating forward costs, assessing the attendant risks as well as increasing financing options require improvement. This work needs to be done by persons with appropriate financial and actuarial expertise.
7. To provide for greater uniformity in the establishment of costs and financial assurance, development of a template for use by industry and evaluators should be considered. Both British Columbia and Nevada’s work in this area may be of benefit.
8. To further prevent accrual of abandoned mine features, and for national consistency, jurisdictions should consider inclusion of major mineral exploration activities as part of their closure plan process.
9. Jurisdictions should require baseline data collection and the implementation of sampling protocols and testing for ARD and other contaminants prior to any significant site disturbance in order to provide for well managed materials handling and the reduction of inadvertent, negative environmental consequences.

10. Methodologies for closure, which do not require active treatment, require greater emphasis, e.g. the use of natural lakes for reactive tailings storage.
11. To provide for more certainty and consistency for long-term administration of mine sites, a uniform methodology for risk assessment would be beneficial across jurisdictions. This should be explored further through a working subcommittee; the CNSC process may provide a starting point for evaluation and consideration.
12. To assist in long-term/perpetual care administration, identification and development of appropriate land use controls and mapping for public access and planning processes is recommended. Ultimately this should be compatible with other Provincial/territorial systems for land use planning. Maps and accessible data of rehabilitated features, e.g. shaft caps, should be available.
13. For sites under long-term/perpetual care the potential for physical or environmental failure remains. A risk assessment process should be employed to identify potential risks and contingency/emergency response plans should be developed.
14. Jurisdictions should foster volunteer engagement of community and other stakeholders in project development through close-out planning to enhance participation and transparency of process. Volunteer groups can be beneficial in assisting in long-term monitoring activities. Voluntary Rehabilitation legislation (a.k.a. “Good Samaritan” legislation) is recommended to protect volunteers.
15. Jurisdictions should have a sound inspection and enforcement program to support the legislation and regulations and to ensure financial assurance requirements are current. This in conjunction with continuous improvement by mining companies in developing environmental protection strategies throughout the mining sequence can reduce risk and provide for good practices.

CONCLUSION

The foregoing discussion provides a policy framework and guidance document, which we believe stakeholders and mining jurisdictions will find useful as a reference document in considering mine closure and the management of long-term liabilities.

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SELECTED REFERENCES

Anonymous, 1998: Case studies on tailings management; International Council on Metals And The Environment and United Nations Environment Program, 58p.

Australian and New Zealand Minerals and Energy Council and the Minerals Council of Australia. 2000: Strategic Framework for Mine Closure.
http://www.ret.gov.au/resources/Documents/mcmp/Strategic_Framework_for_Mine_Closure.pdf
http://www.minerals.org.au/_data/assets/pdf_file/0011/7499/MineCloseFramework.pdf

Australian Government Department of Industry, Tourism and Resources, 2002: Mine Decommissioning - Best Practice Environmental Management in Mining.
www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=BAFBDBFB-E667-642E-BAB31AB04B24DDF1 [Australia]

Australian Government, Department of Industry, Tourism and Resources. 2006: Mine Closure and Completion:
http://www.dmp.wa.gov.au/documents/mine_closure.pdf

Castrilli, J.F. 2007: Report on the Legislative, Regulatory, and Policy Framework Respecting Collaboration, Liability, and Funding Measures in Relation to Orphaned/Abandoned, Contaminated, and Operating Mines in Canada.; National Orphaned/Abandoned Mines Initiative, 257p.
<http://www.abandoned-mines.org/pdfs/JurisdictionalLegislativeReview.pdf>

Canadian Dam Association. 2007: Dam Safety Guidelines;
http://www.cda.ca/cda_new_en/publications/dam%20safety/dam%20safety.html

Canadian Nuclear Safety Commission, 2000: Financial Guarantees for the Decommissioning of Licensed Activities; Regulatory Guide G-206, 12p.
http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/G206_e.pdf

Canadian Standards Association, 1991: Risk Analysis Requirements and Guidelines; CAN/CSA-Q634-M91, 42p.

Cowan, W.R. and Mackasey, W.O. 2006: Rehabilitating Abandoned Mines in Canada: A Toolkit of Funding Options; National Orphaned/Abandoned Mines Initiative, 34p.
<http://www.abandoned-mines.org/pdfs/ToolKitFundingReport.pdf>

Environment Canada, 2009: Environmental Code of Practice for Metal Mines, 102p.
http://www.ec.gc.ca/CEPARRegistry/documents/code/metal/ECP_eng.pdf

Environment Issue Group, Whitehorse Mining Initiative, 1994: Final Report; 48p.
<http://www.nrcan-rncan.gc.ca/mms-smm/poli-poli/pdf/wmi-env-eng.pdf>

European Parliament Directive 2006/21/EC and of the Council of March 15th, 2006 on the Management of Wastes from Extractive Industries and Amending Directive 2004/35/EC:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006L0021:EN:NOT>

European Commission Decision 2009/335/EC. Technical Guidelines for the Establishment of Financial Guarantees in Accordance with Directive 2006/21/EC: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:101:0025:0025:EN:pdf>

Government of Canada, 2008: Aboriginal Consultation and Accommodation: Interim Guidelines for Federal Officials to Fulfill the Legal Duty to Consult;
<http://www.ainc-inac.gc.ca/ai/arp/cnl/intgui-eng.pdf>

Heikkinen, P.M. et al, 2008: Mine Closure Handbook, Environmental Techniques for the Extractive Industries, 170p. Finland, <http://arkisto.gtk.fi/ej/ej74.pdf>

International Council of Mining and Metals, Planning for Integrated Mine Closure Toolkit,
<http://www.icmm.com/page/9568/planning-for-integrated-mine-closure-toolkit>

Kuipers, James R. and Zuzulock, Sarah: Presentation, Western Mining Activist Network, 4th Bi-annual Meeting, Vancouver, Oct. 3-5, 2003.

Leadership Council Accord, The Whitehorse Mining Initiative, 1994: Final Report; 51p.
<http://www.nrcan-rncan.gc.ca/mms-smm/poli-poli/pdf/accord-eng.pdf>

Miller, C. George, 2005: Financial assurance for mine closure and reclamation; International Council of Mining and Metals, 68p.
<http://www.icmm.com/page/1158/financial-assurance-for-mine-closure-and-reclamation>

Minerals Group, Division of Minerals and Energy Resources, PIRSA, Government of South Australia, 2008: Preparation of a Mining and Rehabilitation Program (MARP) (Extractive Mineral Operations) Regulatory Guidebook No.6, Revision 1, 7. 58p.
http://www.pir.sa.gov.au/_data/assets/pdf_file/0006/71673/6.Extractive_MARP_Guideline_V1.7.pdf

Nevada Standardized Reclamation Cost Estimator: <http://www.nvbond.org/>

Price, William A., 2009: Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials, Mine Environment Neutral Drainage Program Report 1.20.1, Natural Resources Canada.

<http://www.abandoned-mines.org/pdfs/MENDPredictionManual-Jan05.pdf>

Prospectors and Developers Association of Canada, 2007: Environmental Excellence in Exploration.

<http://www.e3mining.com/>

Queensland Mining Council, 2001. Guidelines for Mine Closure Planning in Queensland. [Australia] [www.qrc.org.au/ dbase upl/closure.pdf](http://www.qrc.org.au/dbase/upl/closure.pdf)

Saskatchewan Ministry of Energy and Resources, 2009: Institutional Control Program: Post Closure Management of Decommissioned Mine/Mill Properties Located on Crown Land in Saskatchewan, 25p.

http://www.er.gov.sk.ca/adx/asp/adxGetMedia.aspx?DocID=4819,3385,5460,2936,Documents&MediaID=27608&Filename=ICR_Report_Feb2010.pdf

Stewart, Pulles, Boer, Kirkaldy and Petit 1998: Environmental Risk Assessment as the Basis for Mine Closure at Iscor Mining, Journal of the South African Institute of Mining and Metallurgy, Jan/Feb 1998.

Swedish Environmental Code 1999: <http://www.naturvardsverket.se/en/In-English/Menu/Legislation-and-other-policy-instruments/The-Environmental-Code>

The Mining Association of Canada, 2010: Towards Sustainable Mining Progress Report 2010;

http://www.mining.ca/www/Towards_Sustaining_Mining/index.php

The Mining Association of Canada, 1998: A Guide to the Management of Tailings Facilities; http://www.mining.ca/www/media_lib/TSM_Documents/TSM_Publications/tailingsguide.pdf

van Zyl, Dirk J.A., 2001: Long-Term Liabilities, Financial Assurance and Potential Opportunities; Proc. South Africa Conference on Sustainable Development in Mining, Pretoria, ICME, 11p

Western Australia Department of Industry and Resources. 2007: Mining Environmental Management Guidelines: Calculating Environmental Performance Bonds

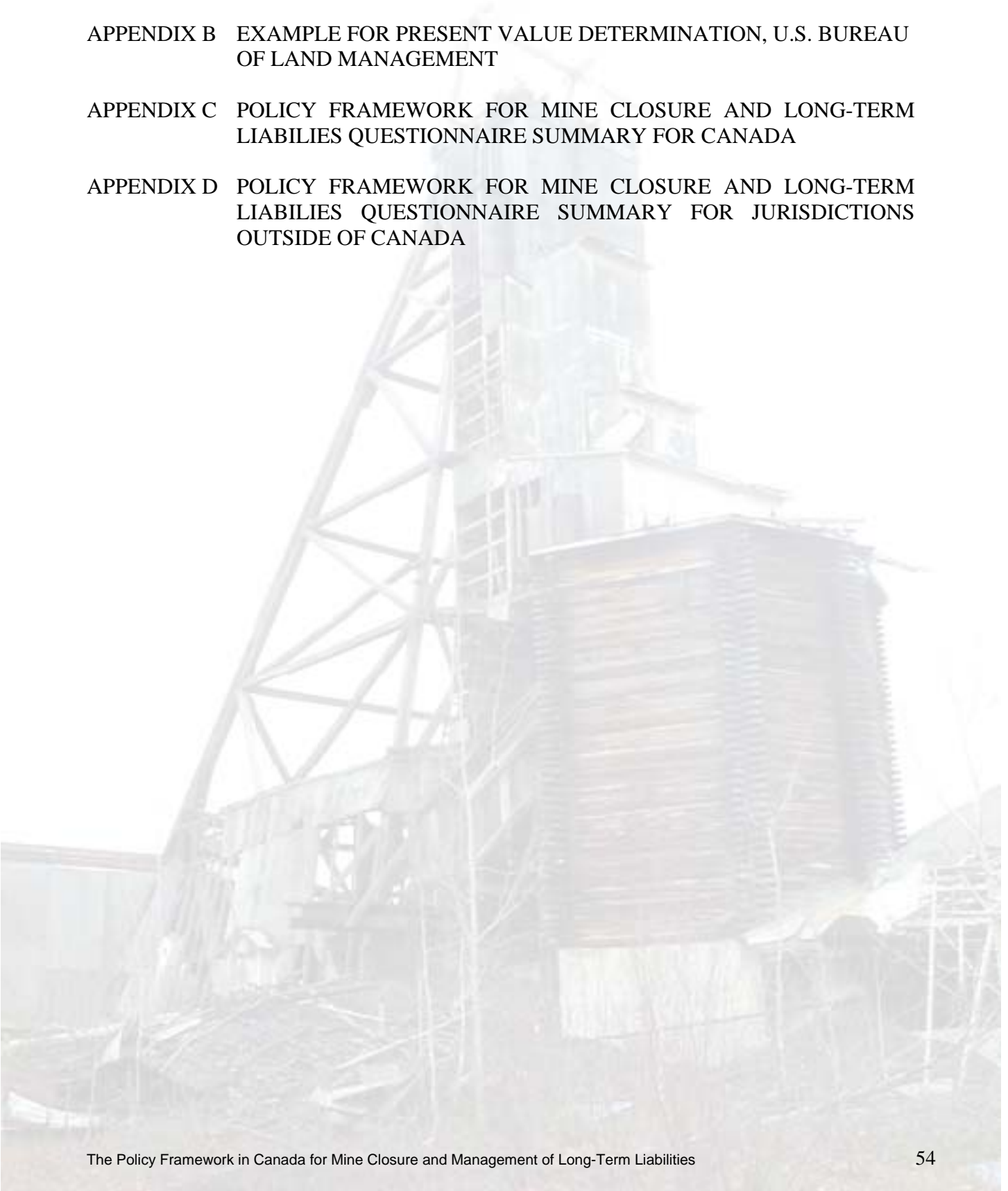
APPENDICES

APPENDIX A EXAMPLE METHODOLOGY FOR EVALUATING RISK

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APPENDIX A: EXAMPLE METHODOLOGY FOR EVALUATING RISK

The following describes one methodology for qualitative **risk** assessment that is applicable to environmental **risks** associated with mining operations (reproduced from South Australia Mining and Rehabilitation Program Guidebook page 58).

Qualitative measure of Likelihood:

Almost certain - Will occur, or is of a continuous nature, or the likelihood is unknown.

Likely - will probably occur during quarry lifetime.

Possible - Could occur in most mines.

Unlikely - Could occur in some mines, but is not expected to occur.

Rare - Has almost never occurred in similar mines but conceivably could.

Qualitative measure of Consequences:

Insignificant - Possible **impacts** but without noticeable consequence.

Minor - very local consequence with no significant long-term changes, may be simply rehabilitated or alleviated at some cost without outside assistance, not of significant concern to wider community.

Moderate - Significant local changes, but can be rehabilitated or alleviated with difficulty at significant cost and with outside assistance.

Major - Substantial and significant changes, will attract significant public concern, only partially able to be rehabilitated or alleviated. May be doubtful that it can be successfully rehabilitated, major costs involved. Changes will be substantial if cumulative effects are considered.

Catastrophic - Extreme permanent changes to social or natural **environment** (not able to be practically or significantly rehabilitated or alleviated), deaths or widespread health and economic effects on public, major public outrage or the consequences are unknown.

Risk: The risk associated with each event can be classified for comparative purposes using the following a matrix:

			Likelihood of Consequence				
			E	D	C	B	A
			Rare	Unlikely	Possible	Likely	Almost Certain
Severity of Consequence	5	Insignificant	Low	Low	Low	Low	Low
	4	Minor	Low	Low	Moderate	Moderate	Moderate
	3	Moderate	Moderate	Moderate	High	High	High
	2	Major	High	High	Extreme	Extreme	Extreme
	1	Catastrophic	High	Extreme	Extreme	Extreme	Extreme

APPENDIX B - EXAMPLE OF PRESENT VALUE DETERMINATION – U.S. BUREAU OF LAND MANAGEMENT

This appendix contains the steps to follow in calculating the present value of future costs. To establish the amount of money that needs to be invested in a long-term funding mechanism, the future costs need to be stated as a present value for the year the account will be established and start growing in value. To do this calculation, a standard present value analysis needs to be performed.

The discount rates, interest rates, and other figures used in this document are for example purposes only. In conducting a present value analysis the user must determine the appropriate inputs given the specifics of the long-term funding mechanism being established.

Discount Rate

A critical component to a present value calculation is determining the appropriate discount rate. For this type of analysis, the appropriate discount rate should reflect the anticipated net return on investment. To estimate the anticipated net return on investment, the BLM State Director must first determine what financial instruments are appropriate and acceptable for such a funding mechanism.

The choice of the discount rate to use in the analysis is not an insignificant matter and can be confusing; the responsible BLM office should consult the BLM State Office economist if there are concerns about the appropriate discount rate to use.

Interest Rates - Of the acceptable financial instruments under 43 CFR 3809.555, U.S. Treasury, Municipal, and corporate bonds are the most appropriate for this type of investment. The interest rates U.S. Treasury, Municipal, or corporate bonds carry depends on several factors, including default risk, tax status, and maturity. Generally, the higher the default risk associated with the bond, the higher the interest rate; tax exempt instruments generally come with a lower interest rate; and the longer the term of the bond, the higher the interest rate. Table 1, Reported Bond Interest Rates, provides examples of the interest rates for U.S. Treasury, Municipal, and corporate bonds reported for two time periods (May 28, 2002 and May 6, 2002).

The rates in Table 1 are actual market rates that are typically reported in the financial section of most large newspapers. These rates reflect the anticipated return on investment associated with each investment. They are reported market rates and, as such, the interest rates include the anticipated effect of inflation that is expected to occur over the term of the financial instrument, i.e., they are nominal rates.

A number of sources exist that provide assumptions on discount rates and future inflation rates. One such source is the U.S. Government's Office of Management and Budget (OMB). Among other functions, OMB provides guidance to Federal agencies on what discount rates to use when conducting benefit-cost and cost-effectiveness analyses. Although the analysis required in establishing the amount of a trust fund is not identical to a cost-effectiveness analysis, the OMB guidance is still useful and relevant.

Table 1
Reported Bond Interest Rates

Debt Securities	Interest Rate May 28, 2002	Interest Rate May 6, 2002
10-Year U.S. Treasury	5.12	5.05
10-Year AAA Municipal Bond	4.03	4.01
10-Year AA Municipal Bond	4.00	3.98
10-Year AAA Corporate Bond	5.62	5.62
10-Year AA Corporate Bond	5.91	5.99
30-Year U.S. Treasury	5.66	5.53
20-Year AAA Municipal Bond	4.88	4.83
20-Year AA Municipal Bond	4.89	4.85
20-Year AAA Corporate Bond	6.28	6.20
20-Year AA Corporate Bond	6.58	6.61

Annually OMB issues its guidance on discount rates in Circular A-94, Appendix C, Discount Rates for Cost-Effectiveness, Lease Purchase, and Related Analyses (<http://www.whitehouse.gov/omb/circulars/a094/a094.html>). Appendix C is updated annually and presents nominal and real discount rates for both public and private funded projects. For federally funded projects, the discount rate is based on the Government's current cost of borrowing, or current interest rates from U.S. Treasury notes and bonds. For example, Appendix C, revised January 2006, set the 30-year real interest rate at 3.0 percent and the 30-year nominal rate at 5.2 percent. The OMB Circular also provides discount rate guidance for private funded projects. For these projects the recommended rate is based on an estimate of the marginal pretax rate of return on an average investment in the private sector in recent years.

Fees and Taxes - Trust account management fees and income taxes potentially reduce the return on an investment. Any funding mechanism required under 43 CFR 3809.552(c) must be self-sustaining, including an approach to allow for the payment of these costs from the fund. One way to account for these costs is to adjust the discount rate to reflect these costs.

To account for a trust account management fee that is stated as a percentage of the account balance, the rate of the applicable annual management fee should be subtracted from the anticipated return on investment for the account. For example, if the return on investment is projected as 5.2 percent and the management fee is 1 percent of the total annual account balance, then the discount rate should reflect that reduction in the net return, i.e., 4.2 percent ($5.2 - 1.0 = 4.2$).

To the extent taxes reduce the effective return on investment for funds in the trust fund, they must be accounted for. However, determining the effect of taxes on the return on investment is not as straightforward as it is for the trust account management fees. The type of financial instruments that the funds are invested in will effect what taxes are due. For example, Municipal bonds are generally exempt from Federal, state, and local taxes. U.S. Treasuries are exempt from state taxes, but not Federal taxes. Corporate bonds are subject to both Federal and state taxes.

In assessing the effect of taxes, the rate at which the tax will be applied needs to be considered. One way to address this question is to consider the different market interest rates on tax exempt and non-exempt investment instruments. At the time this guidance was being prepared the average return on long-term AAA Municipal bonds was about 15 percent lower than those offered for comparable maturity U.S. Treasuries. Since the security, maturity, and state and local tax status for these two instruments are relatively similar, that 15 percent difference reflects the effect of Federal taxes on the return on investment. For example, using a 5.2 percent nominal rate and an anticipated trust account management fee of 1 percent, the return on investment in the fund is projected as 4.2 percent. That return is then reduced by 15 percent to account for Federal taxes. Fifteen percent of 4.2 percent is approximately 0.6 percent, resulting in a net return on investment for funds in the account of about 3.6 percent. Note, this calculation was provided only as an example. Consult with the Solicitor's Office to determine whether the mechanism may be considered to be a non-profit mechanism which would be exempt from Federal income tax.

Real Rates - Where the cost inputs used in the analysis are real or constant-dollar inputs, the discount rate must also be a real rate; the inflation expectation needs to be removed from the reported market rate. A real discount rate is the difference between the nominal interest rate and the assumed inflation rate. It is recommended where adjustments are necessary to eliminate the inflation assumptions from observed market rates, the BLM should consider using an established source such as OMB's inflation assumptions found in Circular A-94, Appendix C. For example, the inflation rate used by OMB in Appendix C (January 2006) was 2.2 percent per year. Using the example above, where the net return on investment, stated in nominal terms, is 3.6 percent, the real net return on investment would be 1.4 percent (3.6 - 2.2 = 1.4).

Determining the Present Value

Present Value Calculation - Once an appropriate discount rate that reflects the net return on investment has been determined, the present value of the future costs can be calculated. Table 2, Present Value Calculations, provides an example of how future costs can be discounted to determine their present value. For this example, the anticipated post-reclamation obligations run from year 30 through year 42, the hypothetical costs are presented as real (constant-dollar) costs (C), and the discount factor (DF) is based on OMB's (February 2006) 30-year published real interest rate (5.2 percent), less a 1 percent annual trust fund management fee, 0.6 percent for Federal taxes (marginal tax rate of 15 percent) and an inflation assumption of 2.2 percent. DF is calculated as $1/(1+i)^t$, where "i" is the discount rate (1.4 percent) and "t" is the year. The present value (PV) for each year's costs is the product of those estimated costs and the discount factor.

The present value of the estimated costs for year 30 is calculated as:

$$DF=1/(1+i)^t$$

$$DF=1/(1+0.014)^{30}$$

$$DF=0.6590$$

$$PV=C(DF)$$

$$PV=\$10,000(0.6590)$$

$$PV=\$6,590$$

Table 2
Present Value Calculations

Year	Estimated Constant-Dollar Costs	Discount Factor	Present Value Of Costs
30	10,000	0.6590	6,590
31	10,000	0.6499	6,499
32	10,000	0.6409	6,409
33	10,000	0.6320	6,320
34	10,000	0.6233	6,233
35	150,000	0.6147	92,207
36	10,000	0.6062	6,062
37	10,000	0.5979	5,979
38	10,000	0.5896	5,896
39	10,000	0.5815	5,815
40	150,000	0.5734	86,015
41	10,000	0.5655	5,655
42	10,000	0.5577	5,577
Total			245,257

In this example, the operator would need to deposit \$245,357 into the trust fund at the beginning of year one, in order to meet those estimated post-reclamation obligations in years 30 through 42.

In conducting a discount analysis it is important to keep in mind the uncertainties of the inputs and the sensitivity of the analysis to certain inputs. Specifically, a slight change in the discount rate can significantly change the amount of money the operator will need to commit to the fund. To demonstrate this sensitivity, by using a higher discount rate (2.5 percent versus 1.4 percent) in the example shown in Table 2 above, the operator would need to deposit \$164,802.

Period of Analysis - For trust funds or other funding mechanisms that cover post-reclamation obligations over a very long period of time, or may even need to be perpetual, determining the appropriate period of the analysis becomes problematic. Mathematically the calculations, similar to that performed in Table 2, can be made for any time period. However, the present value of the cost of any post-reclamation obligations becomes smaller and smaller the further in the future those obligations are expected to occur. For example, the present value of a \$10,000 obligation in year 30, using a 2.5 percent real discount rate, is \$4,767. If that same obligation is in year 100, the present value is \$846. For year 200, that \$10,000 obligation has a present value of \$72. At some point the calculations of the present value of obligations into the distant future are not very meaningful.

Variability in the inputs, especially in the discount rate, due to uncertainties far outweighs the added value due to extending the calculations. To demonstrate this point, instead of using a 2.5 percent discount rate, a 3.5 percent discount rate is used. For that calculation, the present value of \$10,000 obligation in year 200 is \$10. If the discount rate applied is 1.5 percent, the present value for that future obligation is \$509.

Unfortunately, there are no economic standards or rules defining when the point is exceeded when additional present value calculations do not contribute in any meaningful way to the ultimate answer. When defining the parameters for the analysis for a particular project, it is recommended the responsible BLM office consult the BLM State Office economist concerning the appropriate time period to be analyzed.

Permanent or Perpetual Fund - Where the cost of meeting the post-reclamation obligations are projected to be reoccurring costs and those costs are expected to continue indefinitely, it may be appropriate to calculate the reoccurring costs based on permanent funding needs. In such a situation, there is an alternative to conduct a discount analysis as described above. A simpler method to estimating the amount of money that will need to be deposited is to divide the estimated average annual real cost (C) by the selected real discount rate (i). For example, if the average cost to cover the operator's post-reclamation obligations is estimated to be \$10,000 per year, in constant dollars, and a 3.9 percent real discount rate is used, \$256,410 ($10,000/0.039$) would need to be deposited into the funding mechanism to establish a permanent or perpetual fund. This amount would cover the cost of those annual obligations into perpetuity without ever touching the principle.

$$PV=C/i$$

$$PV=\$10,000/0.039$$

$$PV=\$256,410$$

The example above provides for the annual dispersal of funds to begin at the end of year one. Instead the annual payments from the fund may not start until sometime in the future, e.g., year 10. In such a case, the fund would not need to be established with the full amount but rather an amount that would grow to \$256,410 by year 10. To determine the amount that would need to be deposited; the present value will need to be estimated using the discount analysis process. The present value of \$256,410 in year 10 is \$174,896 using a 3.9 percent discount rate.

$$DF=1/(1+i)^t$$

$$DF=1/(1+0.039)^{10}$$

$$DF=0.6821$$

$$PV=C(DF)$$

$$PV=\$256,410(0.6821)$$

$$PV=\$174,896$$

Phased Funding of the Account - Where the District/Field Manager determines the public's interests are adequately protected, a trust fund or other funding mechanism may be established as an escrow account with the operator depositing funds needed to address the post-reclamation obligations over time. If this escrow approach is used, growth of the fund will be from the interest gained and increase in value of the assets plus the additional funds being deposited. As such, a simple present value analysis, as discussed above, cannot be used to determine the

amount of money that will need to be deposited when establishing the fund. That analysis needs to be based on the point in time when all deposits have been made.

In the example provided in Table 2 above, if the District/Field Manager allows the operator to establish the trust fund by depositing the needed funds over a period of time, then \$245,357 would not be the initial deposit as suggested by the above present value analysis. For example, the operator is allowed to make equal deposits over a 5-year period in establishing the fund. In effect, year one of the present value analysis would actually be year five of the operation; the year the trust fund is fully funded. Table 3 – Phased Funding Calculations presents this concept.

**Table 3
Phased Funding Calculations**

Year Of Operation	Year Since Fully Funded	Estimated Constant-Dollar Costs	Discount Factor	Present Value Of Costs
30	25	10,000	0.7064	7,064
31	26	10,000	0.6966	6,966
32	27	10,000	0.6870	6,870
33	28	10,000	0.6775	6,775
34	29	10,000	0.6682	6,682
35	30	150,000	0.6590	98,845
36	31	10,000	0.6499	6,499
37	32	10,000	0.6409	6,409
38	33	10,000	0.6320	6,320
39	34	10,000	0.6233	6,233
40	35	150,000	0.6147	92,207
41	36	10,000	0.6062	6,062
42	37	10,000	0.5979	5,979
Total				262,911

In this example, the operator will need to have \$262,911 in the trust fund by year five of the operation to ensure adequate funds will be available to meet the estimated post-reclamation obligations.

To determine the required operator deposits for years one through five, a sinking-fund deposit analysis will need to be conducted. This analysis is used to calculate a uniform series of equal end-of-period payments to accumulate the required amount of money by a future year. The sinking-fund deposit factor is calculated as $[i/((1+i)^n-1)]$ where “i” is the discount rate and “n” are the number of years. To solve for the required annual payments (AP), the future value (FV) at the end of year five is \$262,911 as calculated in Table 3, the discount rate is 1.4 percent and period of analysis is 5 years.

$$AP = FV [i / ((1+i)^n - 1)]$$

$$AP = \$262,911 [0.014 / ((1+0.014)^5 - 1)]$$

$$AP = \$51,130$$

For this example, the operator will need to deposit \$51,130 into the trust fund each year for the first 5 years of operation. The combination of these deposits and an increase in the value of the funds in the account will grow to the desired amount by year five. From year five to when the funds will be needed, the account will continue to grow based on the gain in value of the funds in the account.



APPENDIX C

POLICY FRAMEWORK FOR MINE CLOSURE AND LONG-TERM LIABILITIES

QUESTIONNAIRE SUMMARY FOR CANADA

Section 1: Mine Closure Plans

1a) Does your agency coordinate the submission/review/approval of closure plans?

Newfoundland and Labrador – Yes

Nova Scotia - Yes, coordinate with N S Department of Environment.

New Brunswick - Yes, through a coordinating committee called the Standing Committee on Mining and the Environment

Quebec - Yes, under the Mine Site Rehabilitation Department

Ontario – Yes

Manitoba – Yes

Saskatchewan - Yes

Alberta – Yes, applications are submitted either individually under the Environmental Protection and Enhancement Act (EPEA) to Alberta Environment (AENV) or as part of the larger EIA process (joint submission between Energy Resources Conservation Board (ERCB) and Provincial/Federal Governments), and include the review and approval of conceptual “closure plans” and more detailed reclamation plans defining the end land use plans and how the company plans to meet them. The review of these plans is often coordinated with agencies such as the ERCB, and Alberta Sustainable Resource Development (ASRD) and aspects of the review may vary according to the department mandate, i.e. ERCB – looks at mine plans, and waste/resources such as tailings and coke, abandonment. ASRD – looks at reclamation plans/end land use goals, forestry, fisheries, wildlife. AENV – looks at reclamation plans, water quality, quantity, groundwater, soils, vegetation, air, waste.

British Columbia – Yes

Northwest Territories – INAC – Partly

Nunavut – INAC - Closure plans are received by the INAC office for activities on Crown. Review and approvals are determined through co-management regime established under the Nunavut Land Claims Agreement (NLCA). Plus, any additional approval required through the regulatory process.

Yukon – Yes

Canadian Nuclear Safety Commission - CNSC requires that the applicants submit for approval preliminary decommissioning plans, which are similar in many respects to closure plans administered by the provinces.

1b) If no, what agency does this and what role does your agency have in this process?

Newfoundland and Labrador –

Nova Scotia -

New Brunswick –

Quebec -

Ontario – N/A

Manitoba –

Saskatchewan –

Alberta – N/A

British Columbia –

Northwest Territories – **INAC** – Various public boards coordinate the submission and review processes for closure plans in the NWT however Indian and Northern Affairs is responsible for compliance issues and the INAC Minister is responsible for final approvals of several of the legislative instruments that closure plans are administered under. In addition the Government of the North West Territories administers the Mine Health and Safety Act which has requirements for closure aspects relating to mine safety issues.

Nunavut – **INAC** – Closure plans are subject to the Nunavut Planning Commission for conformity decision, Nunavut Impact Review Board for environmental assessment and an approval from the Nunavut Water Board. Plus, subject to all other authorizations Federal and Territorial.

Yukon –

Canadian Nuclear Safety Commission –

2a) Under what statutory authority are closure plans prepared?

Newfoundland and Labrador - SNL 1999 Chapter M-15. 1, Mining Act

Nova Scotia - Mineral Resources Act and Regulations and Environment Act

New Brunswick - Mining Act, Clean Environment Act

Quebec - Under the Mining Act (the Mining Act is currently under review at parliamentary commission studying Bill 79 amending the Mining Act. Answers provided below are in compliance with the current regulations)

Ontario - The Mining Act

Manitoba - The Mines and Minerals Act/Mine Closure regulation

Saskatchewan – The Mineral Industry Environmental Protection Regulations (MIEPR)

Alberta – The Environmental Protection and Enhancement Act (EPEA), and Conservation and Reclamation Regulation (C&R Regs).

British Columbia – Mines Act and Health Safety and Reclamation Code for Mines in BC

Northwest Territories – **INAC** – Closure plans are required pursuant to the Federal NWT Waters Act, the Mackenzie Valley Resource management Act and the Territorial Lands Act and associated regulations under each of these acts. As discussed above the territorial Mine Health and Safety Act also contains specific requirements for mine closure.

Nunavut – **INAC** - Closure plans are subject to all laws of general application, both territorial and Federal. The unique aspect to Nunavut would be the NLCA, which establishes the boards mentioned above. The Territorial Lands Act and applicable regulations would guide activity on Crown Land. In addition the Nunavut Waters and Surface Rights Tribunal Act would guide water use

Yukon – Quartz Mining Act

Canadian Nuclear Safety Commission - Decommissioning plans are required as part of licensing for siting, construction, operation and decommissioning. Licensing is required under Section 26 of the Nuclear Safety and Control Act.

2b) What activities trigger closure plans?

Newfoundland and Labrador – The development of a new mine OR significant changes to an existing mine operation

Nova Scotia – [A Reclamation Plan is submitted with the application for a Mineral Lease. The concept is usually outlined in the Environmental Assessment Registration documents and more details are required for the Lease application (DNR) and the Industrial Approval application (to Environment). The Reclamation Plan is reviewed by DNR and Environment prior to a proponent posting a Reclamation security with the Registrar.

The Mine Closure Plan in NS legislation refers to the Information required from a lessee when they give notice to permanently terminate mining operations. This requires info about the remaining reserves, mine plans, etc. and would include details on the final reclamation plan. The final reclamation plan for the closure would have to be approved by DNR and Environment (One Window Process).] [The proponent must give] six months notice to the Minister for permanent closure and final plan to be submitted one month before closure.

New Brunswick – Application for a Mining Lease, reopening a mine with changes, or closing a mine with changes to the original closure plan.

Quebec - The rehabilitation plan has to be filed before commencing mining activities

Ontario - Advance Exploration or Mine production

Manitoba - Advanced Exploration Project Activities are defined in the Mine Closure regulation, but generally include all activities other than Grassroots exploration or Drilling. Mine Development—Together with EAL application the proponent has to submit a closure plan this plan will include facilities, smelters, infrastructure, waste rock piles, tailings ,-----

Saskatchewan – Operation and Decommissioning and Reclamation activities.

Alberta – Typically activities associated with “specified land” (def (t) – C&R Reg (AR115/93), however in the case of large industrial projects with large footprints, these typically are coal and oilsands developments

British Columbia – [A Conceptual Reclamation and Closure Plan must be submitted with the application (prior to the start of a mine)].

[At the end of mine operation] -Notification from company

Permit condition requiring 6 months prior to closure, a plan must be provided to the Ministry

Northwest Territories – INAC – Applications for a water licences and land use permits (pursuant to the Mackenzie valley Resource Management Act, Territorial lands Act, NWT Waters Act) and surface leases (pursuant to the Territorial lands Act) all trigger some requirement for a closure plan.

Nunavut – INAC -

[An application to mine, or for advanced exploration.]

[At end of mining] Not necessarily comprehensive: 1) Proponent request, 2) Abandonment A closure plan is required for all activity (from exploration to mining)

Yukon – The application for a mine license. In the case of advanced exploration projects such things as underground exploration

Canadian Nuclear Safety Commission - Issuing a licence to prepare a site, construct, operate or decommission a uranium mine triggers the requirement for providing a decommissioning plan.

2c) What aspects of development projects are included in the closure plan, e.g., facilities, smelters, infrastructure?

Newfoundland and Labrador - The closure plan include all mine operation facilities including all buildings, warehouses, stockpiles, wharfs, road ways, waste sites, electrical supply/distribution, and all above and below grade facilities

Nova Scotia - All facilities, infrastructure and reasons for closure.

New Brunswick - Infrastructure related to the mine and mine lease area itself.

Quebec - All aspects

Ontario - All aspects of the project are included in the closure plan including smelters, infrastructure (roads, hydro corridors), tailings, openings to surface, crown pillars etc.

Manitoba – see above (2b)

Saskatchewan – All aspects that were included in the Approval to Operate, e.g. mines mills, tailings management facilities.

Alberta – All aspects are typically included (facilities, roads, transmission lines, remote facilities, shops/plants, storage areas, ponds, etc. – basically anything used for or held in conjunction with the plant and mine site), however in some cases plants can be administered through different approval numbers (in the case of coal power plants, i.e. separate approval from mines).

British Columbia – All mine components within the permitted mine area including; mine workings-open pit/ underground, tailings facility, plant facility, administration and camp facilities, linear structures, roads, water management/water treatment etc.

Northwest Territories – INAC – Closure plans cover all aspects of a mine development including post closure monitoring.

Nunavut – INAC - The closure plan needs to cover all components of the projects.

Yukon – All on site facilities and any off site facilities covered under the mine license.

Canadian Nuclear Safety Commission - All aspects of the uranium mine and mill, waste and tailings disposal, post closure monitoring and site maintenance are included in decommissioning plans.

3) Is there coordination respecting other permits required by other agencies? Is there a one-window approach?

Newfoundland and Labrador - Informal; coordination as such, is not stipulated by the Mining Act. Development and related plans are shared with interested departments (such as Environment & Conservation, Labour, etc) for their review and input. However, a formal “one-window” approach is not in place.

Part of the review process is the itemizing of potential additional approvals and the noting of them having been addressed.

Nova Scotia - Yes, DNR chairs the One Window Committee.

New Brunswick - Yes, see 1a.

Quebec - No one-window approach. The rehabilitation plan is submitted to the Ministry of Sustainable Development, Environment and Parks, for comments.

Ontario - Yes, MNDMF has a one-window approach for large mining projects entering into mine production.

Manitoba - Yes

Saskatchewan – For decommissioning, yes. Decommissioning of uranium facilities may also require cooperation with federal agencies.

Alberta – Coordination is attempted amongst projects (synonymous with “one-window approach”) however approvals, authorizations and permits can vary in terms of issuance times (typically EPEA and Water Act are signed at same time for a project). AENV typically coordinates ASRD’s feedback into the EPEA approvals. In order of timing, AENV must consider the ERCB’s Decision, the EPEA approval is issued by AENV, and then ASRD issues their lands dispositions.

British Columbia – Yes, all closure plans are referred to the regional Mine Development Review Committee (MDRC), as required by the code for major permit amendments. MDRC is a multi-agency/First Nations technical review committee.

Northwest Territories – INAC – There is to the extent that Indian and Northern Affairs is involved in all authorizations to some extent and the departments Mine Reclamation Policy is the key guidance document. However separate applications are required are for INAC authorizations (Surface leases and land use permits in some areas) and those issued by the relevant Land and Water Boards. The Territorial Mine Health and Safety Act is administered separately. So there isn’t really a one window approach. Management issues.

Nunavut – INAC - The NLCA provides for a collaborative process, under which all the regulators/public/stakeholders and Industry participate. The process allows for the overall approval for projects to proceed. This approval is contingent on an approved closure plan. However, each regulatory agency needs to issue its own approval at the end of the day.

Yukon – The Mining Lands division of Mineral Resources co-ordinates permit review with other agencies. There is no “one window” approach.

Canadian Nuclear Safety Commission – Since the closure of a uranium mine/mill requires an environmental assessment under CEAA, all other regulatory authorities are consulted. However, in practice, each authority must ensure that their own requirements are met.

4a) Are there gaps within/between the different permits?

Newfoundland and Labrador - There is the potential for gaps but the responsibility for obtaining the appropriate permits rests with the mine applicant.

Nova Scotia - No major gaps.

New Brunswick - No, if anything there is overlap.

Quebec - No

Ontario - None that I am aware of.

Manitoba - There is overlap between permits in some respects. There are no major gaps in Manitoba that have been identified

Saskatchewan – No, not provincially.

Alberta – This may be open to interpretation. Each ministry (ERCB, AENV, ASRD) has different mandates and different items associated with reviews and what may be captured in their authorization documents.

British Columbia – Environment will conduct their own review for changes to the effluent permit; however this generally does not impact the approval for mine closure.

Northwest Territories – INAC – No, the water licences, surface land leases and land use permits plus the Territorial Mine health and safety Act cover off all aspects of mine closure except for issues that are not covered by these key pieces of legislation, mostly related to wildlife

Nunavut – INAC- The process allows for a very thorough review of projects.

Yukon – There are no significant gaps due to the co-ordination of permit review between the various agencies.

Canadian Nuclear Safety Commission – No

4b) Identify major gaps.

Newfoundland and Labrador - Surface rights permits, Federal levels approvals (DFO, Environment)

Nova Scotia -

New Brunswick -

Quebec -

Ontario – N/A

Manitoba –

Saskatchewan –

Alberta – Aspects surrounding fish and wildlife, biodiversity, can often present a challenge. One may typically associate them with the environment, however they are often more inline with the ASRD ministry, but are typically included in the EPEA approvals despite having the staff in another ministry.

British Columbia – Contaminated site investigations (when required is a uncertain, although it would be prudent that the Chief Inspector requires compliance certificates before releasing the permit)

Northwest Territories – INAC – Wildlife, some socio economic issues (hunting, Aboriginal rights etc)

Nunavut – INAC –

Yukon –

Canadian Nuclear Safety Commission – N/A

4c) How can they be overcome?

Newfoundland and Labrador - Education on the part of the applicant concerning the multi-jurisdictional level approvals

Nova Scotia -

New Brunswick –

Quebec -

Ontario – N/A

Manitoba –

Saskatchewan –

Alberta – This conflict is typically overcome by coordinated approach, joint review teams (involving multiple ministries), and specific task groups/teams.

British Columbia – Coordinate better with regulatory agency responsible for contaminated site cleanup.

Northwest Territories – INAC – In the past negotiated “Environmental Agreements” have been used to cover perceived or actual gaps in regulatory requirements for closure. Attempts have been made to use these to provide some measure of coordination between the various regulatory instruments.

Nunavut – INAC - Gaps should be identified through the process.

Yukon –
Canadian Nuclear Safety Commission – N/A

5a) Who evaluates your risks?

Newfoundland and Labrador - Staff engineers, Dept of Justice lawyer, Director

Nova Scotia - DNR, Environment and Labour Departments.

New Brunswick - Risk is evaluated internally if required.

Quebec - The Mine Site Rehabilitation Department

Ontario - The proponent must use qualified professionals to certify that their plan meets the requirements of the Ontario Rehabilitation Code.

Manitoba - A technical Assessment Committee [TAC] reviews all proposals

Saskatchewan – Primarily staff from the Industrial Branch, but staff from other Branches and/or Ministries may be involved where required or requested by the Industrial Branch.

Alberta – Staff within AENV, Finance and Office of the Auditor General.

British Columbia – MMD technical review team. Geochemical specialist, geotechnical specialist, reclamation specialist and costing specialist

Northwest Territories – INAC – Risk is evaluated through the public boards review processes (regulatory or environmental assessment or both) plus internally for those areas where the department has a direct responsibility.

Nunavut – INAC - Risks are identified through out the process. It is the intention that larger projects post security to minimize risk.

Yukon – Independent consultants, First Nations and government agencies.

Canadian Nuclear Safety Commission – If you are considering human/environmental risks, the proponent provides risk assessments which are evaluated by CNSC and other government agency staff.

If you are considering regulatory risks, these are decided by senior management or the Commission on the recommendations by staff. The CNSC has a robust risk-informed decision making process.

5b) What are your most common risks?

Newfoundland and Labrador – Mine operations not in conformity with submitted and accepted Development Plans; unknown contaminants; breached facility security and attendant unlawful access to site endangering human/animal safety; site / quarry wall instability

Nova Scotia - Financial, Safety, Environmental, Engineering, Mining and Geological risks.

New Brunswick - Recognized risks are mostly financial and environmental.

Quebec - The risk that a mining company goes bankrupt before the full posting of the financial guarantee associated with the rehabilitation plan. The financial guarantee covers 70% of the estimated cost of rehabilitating the accumulation areas (tailings and waste). The government then also carries the risk over 30% of the cost of rehabilitating the accumulation areas not under the financial guarantee.

Ontario - Public safety and environmental risks.

Manitoba - Not all environmental concerns are addressed. Lack of sufficient financial security to carry out the plan.

Saskatchewan – Effluent impacts downstream and waste management.

Alberta – Common risks typically surround financial security, and contamination (not typically reflected in reclamation security – hydrocarbons, metals, water borne contaminants – e.g. selenium).

British Columbia – Long-term risks associated with MLARD, geotechnical risks associated to tailings impoundments, and post closure security estimations for long-term monitoring and maintenance requirements.

Northwest Territories – INAC – cover possible costs to the taxpayer in the event the mine operator is forced into receivership and ultimately bankruptcy.

Other risks are associated with underestimating water quality/flow and inadequate characterization of waste products (rock, tailings) and long-term stability of on site structures due to climate change over time.

Nunavut – INAC - [*Permafrost problems, ARD, loss of access such as by thawing of winter roads.*]

Yukon – Mine infrastructure failures, natural events (e.g. forest fires, flooding) and adverse economic climate (e.g. economic downturn, poor metal prices)

Canadian Nuclear Safety Commission – Human/environmental risks include long-term radiologic exposure, potential failure of safety systems (dams, covers, active or passive treatment facilities).

Financial risks include fiscal inability to meet regulatory requirements, or the risk of a licensee going out of business.

Regulatory risks: see 5c.

5c) What are the major risks in your closure plan process and how are these assessed as part of your approval process?

Newfoundland and Labrador - Failure to properly design mine/quarry site and the failure to address all aspects of the site rehabilitation and closure consistent with the planned end use of the site.

Plans are reviewed with appropriate engineering relevant to the nature of the mine operation in mind. Good and current engineering practices must be demonstrated in the development plan

Nova Scotia - The Reclamation Security funds have to be adequate to ensure proper site remediation within 12 months of the closure.

New Brunswick - These risks are not formally evaluated in our process.

Quebec - The delay between the submission of the plan and its approval, the approval triggering the beginning of the posting of the guarantee. If the mining company does not comply rapidly with requests to modify the plan, the approval is delayed.

Ontario - The Rehabilitation Code outlines all of the possible risks and ensures that the site is rehabilitated to a specific standard which is certified by a qualified professional.

Manitoba - Political intervention in the process--communication

Saskatchewan – Most closure plan issues are currently dealt with during the environmental assessment phase of a project. A draft closure plan is required as part of that process. Environmental risk assessments are conducted on older sites by the proponents where required.

Alberta – As closure plans are most often aligned with the physical disturbance, or reclamation, the unknown risks associated with contamination are often overlooked. As reclamation and remediation are intertwined as part of the overall closure plan process,

difficulties surround their review and consideration. Other risks are the possibilities that technologies do not turn out as expected – for example tailings consolidation or end pit lakes water chemistry. Approvals often require monitoring and management plans to address these risks.

British Columbia – Providing timely and appropriate level of review and follow up
Northwest Territories – INAC – Public hearings during environmental assessments and regulatory proceedings are the main forum to discuss closure issues along with closure plan working groups established as a result of the EA and Regulatory processes. Internal working groups with the Department are also used to discuss more specific issues. The department responsible for working on “Abandoned and Orphaned Sites” – the Contaminants and Remediation Directorate is also consulted

Nunavut – INAC –

Yukon – Closure plans are updated throughout the mine life specifically so that there are no surprises at closure.

Canadian Nuclear Safety Commission – Major risks include inadequate input from other Federal and Provincial authorities – consultation takes place as part of an EA. A licence to prepare a site, construct and operate is not issued without all required EA components being complete.

Inadequate long-term institutional controls (IC) – it is difficult to predict the long-term (1000s of years) hazard management scenarios for any site. Minimizing the requirement for IC is important.

Inadequate financial assurances (FA) – since estimating the value of long-term FA is difficult, minimizing the risk of major interventions is important. Working with local or Provincial authorities to increase oversight at remote sites is important.

CSNC does not currently have built in provisions for grandfathering. Each case is assessed on its own merits and senior management / the Commission determines acceptable corporate risk for non-compliant sites.

6) Are catastrophic events considered as a regular part of mine closure plans in your jurisdiction?

Newfoundland and Labrador - Reasonably foreseeable catastrophic events are considered. Remotely possible events are considered but given the weight commensurate with their potential occurrence

Nova Scotia - Not usually, the main concern is Tailings Dam stability.

New Brunswick - No.

Quebec - Yes, catastrophic events are considered in the evaluation of stability criteria for infrastructures.

Ontario - No

Manitoba - Depending on the definition

A risk based approach is used when reviewing closure plans, so items such as probability of Dam failures--, crown pillar collapse ----Flood potential ----tailings disposal are considered

Saskatchewan – No – this is addressed as part of the institutional control program.

Alberta – They are considered typically in applications, and specific ministries require plans that account for these events during the normal course of operations.

AENV has a Dam Safety Branch that looks at tailings pond dykes etc.

British Columbia – Yes in the closure design for geotechnical structures (i.e. PMF spillways). No for bonding.

Northwest Territories – INAC – Yes, depending on the project various yardsticks are used – 1 in 10,000, 1 in 1000 etc.

Nunavut – INAC - Catastrophic events are assessed during the environmental assessment lead by NIRB.

Yukon – Yes, critical structures are designed with Canadian Dam Safety Guidelines, Probable Maximum floods and Maximum Credible Earthquakes. Especially for structures that must remain in perpetuity.

Canadian Nuclear Safety Commission – Yes.

7a) Do you require 100% financial assurance up front as part of the approval process?

Newfoundland and Labrador - 100% financial assurance is required up front equal to the degree of mine life disturbance. Financial assurance must equate to the rehabilitation & closure liability at the time and not the full planned disturbance at the end of the planned mine life

Nova Scotia - Yes, allowing for progressive reclamation of site.

New Brunswick - Yes, we currently do. Historically this was not the case.

Quebec - No, posting of the financial guarantee can only start after the approval of the plan and financial guarantee covers 70% of the estimated cost of rehabilitating the accumulation areas (tailings and waste).

Ontario - Normally yes, however if new projects are broken down into various stages, then arrangements can be made that financial assurance for each stage must be provided before commencing that stage.

Manitoba - Each case is assessed independently. A staged payment schedule may be posted. Guidelines are posted on the Manitoba web—Mineral resource division web page

Saskatchewan – Yes, FA's are required before operations commence.

Alberta – Theoretically, the current process is designed to provide full-cost financial security, however there are some inconsistencies. Oil Sands Mines provide full cost reclamation security assessed forward to the maximum disturbance expected in the next year. There are 2 grandfathered mines that are secured at 3 cents per barrel of bitumen production which is not sufficient to cover full cost of reclamation. Coal Mines provide full cost reclamation security based on the maximum disturbance that did occur in the previous year. Plant sites are NOT included in the financial security estimates as per our Regulations. As outlined above, contamination (hydrocarbons, some aspects of tailings management, selenium, etc) is not typically assessed in terms of financial costs.

Security is reviewed and assessed annually.

The Government is considering changes to the current program to make it more assets/liabilities based.

British Columbia –For recently permitted mines which tend to be single mine operators the answer is yes, however the schedule for payment for the first 3 – 5 years is paced to the existing liability on site.

Northwest Territories – INAC – Yes, except for projects in place prior to publication of the mine Reclamation policy however there is only one of these left now. Security must be in place for 100 % of in place liability at any point in time so it is collected as the liability is created.

Nunavut – INAC - [100% FA required]

For larger projects we require security be posted.

Yukon – Yes.

Canadian Nuclear Safety Commission – Yes.

7b) If yes, in what forms do you accept it?

Newfoundland and Labrador - Cash; Letters of Credit, Bonds, Payments into a fund; other as approved by the Minister of Natural Resources. All cash or near-cash instruments must be with a Canadian Bank as defined by Schedule I of the Bank Act, Canada.

Nova Scotia - Cash, bond, Letter of Credit or form satisfactory to the Minister.

New Brunswick - Cash, letter of credit, negotiable bond, and insurance.

Quebec -

Ontario -

1. Cash.
2. A letter of credit from a bank named in Schedule I to the *Bank Act (Canada)*.
3. A bond of a guarantee company approved under the *Insurance Act*.
4. A mining reclamation trust as defined in the *Income Tax Act (Canada)*.
5. Compliance with a corporate financial test in the prescribed manner.
6. Any other form of security or any other guarantee or protection, including a pledge of assets, a sinking fund or royalties per tonne, that is acceptable to the Director.

Manitoba - See Guidelines---available on Manitoba website---Mineral Resource Division—Mines Branch

Saskatchewan – The form of FA is negotiable, but is required as a financial instrument rather than a corporate guarantee.

Alberta – Despite there being a variety of forms (5 types) the 2 more commonly accepted with the department include: Cash, or Letters of Credit.

British Columbia – Letter of credit is the preferred form however we have recently allowed for Qualified Environmental Trusts and funds held within the Reclamation Trust Fund. Asset agreements have been accepted in the past but are acceptable only under specific conditions.

Northwest Territories – INAC – Cash, bonds, letters of credit, reclamation security trust

Nunavut – INAC - The form is prescriptive under legislation, Nunavut Water Regulations (adopted from NWT). But usually 1) Promissory Note guaranteed by a chartered bank, 2) certified cheque, 3) bearer bond guaranteed by the Government of Canada or 4) combination of above.

Yukon – Cash, bonds and letters of credit are the most common but it can be in any form approved by the Minister under the *Quartz Mining Act*

Canadian Nuclear Safety Commission – The CNSC accepts letters of credit issued by a major bank, segregated trust funds and expressed provincial or federal commitments from the government. Other forms are possible, but they will be assessed based on liquidity, certainty of value, adequacy of value and continuity.

7c) If not, at what point do you require it?

Newfoundland and Labrador –

Nova Scotia -

New Brunswick –

Quebec - Financial guarantee has to be posted after the approval of the plan according to a schedule based on the life of mine. The guarantee has to be filed during the last 15 years of the life of mine.

Ontario –

Manitoba –

Saskatchewan –

Alberta – Security is assessed annually, unless it is a new project at which time security must be in hand prior to approval issuance.

British Columbia –

Northwest Territories – INAC –

Nunavut – INAC - The security is requested before mining starts, however it has been accepted in allotments over time to reflect the liabilities at any given time.

Yukon –

Canadian Nuclear Safety Commission – N/A

8a) Do you have provisions for self assurance?

Newfoundland and Labrador - Self assurance is not accepted under any circumstances

Nova Scotia - No, not in current legislation.

New Brunswick - No, no explicitly, although there is a catch all in the Mining Act that allows the Minister to consider acceptable forms of security.

Quebec - No

Ontario - Yes, proponents must meet a corporate financial test

Manitoba - Presently under review---discussions are ongoing with the review committee which includes Industry representatives

Saskatchewan – Not at this time. It may be considered at a future date.

Alberta – It is expected that companies are self-auditing their finances and liabilities, and the proposed changes to the financial security system will provide a greater emphasis on self assurance/auditing.

British Columbia – No

Northwest Territories – INAC – No

Nunavut – INAC - Not at this time.

Yukon – No.

Canadian Nuclear Safety Commission – Yes, but only if the commitment is made by a Federal or a Provincial government.

8b) If yes, do you think this is a good idea?

Newfoundland and Labrador –

Nova Scotia -

New Brunswick - It would be better to have a well-defined set of parameters for accepting self assurance. There are different levels of assurance that could be considered.

Quebec -

Ontario - Currently, the proponent must provide a harder form of financial assurance if the test is no longer met. However this normally means that the proponent would be in some financial difficulty and thus would be unable to provide the harder form of financial assurance, which of course would be a problem.

Manitoba - Provisions exist and have been accepted. However, in my opinion this is not a very good form of security

Saskatchewan –

Alberta – Inconsistencies in information provided by the companies in the past have challenged our confidence sometimes. If there were a better system in place for auditing by the Government (which the proposed new system will include), then there would be more confidence.

British Columbia – No, difficult to maintain a lot of administration time involved

Northwest Territories – INAC – Based on events of 2008/09, risk to minister, and past experience with mine insolvencies, not really.

Nunavut – INAC - It would have to be examined in more depth.

Yukon –

Canadian Nuclear Safety Commission – As the federal and provincial governments tend to be remediators of last resort on behalf of the Canadian public, this is acceptable.

9a) Who holds the financial assurance?

Newfoundland and Labrador - Letters of Credit, and bonds are held in a fireproof vault at the Department of Natural Resources office recorded in a separate registry of financial assurance deposits of all kinds

Nova Scotia - Registrar or Department of Finance

New Brunswick - Both the Department of Natural Resources and the Department of Environment could hold financial assurance for a mining project.

Quebec - The government or a trust fund depending on the form of the guarantee

Ontario - Letters of Credit, surety bonds, pledge of assets agreements are held by the program. Cash is held by the Ministry of Finance

Manitoba - Minister of Finance in a trust account established under the Mines and Minerals Act

Saskatchewan – The Ministry of Environment.

Alberta – The Government of Alberta holds the security.

British Columbia – Depending on form, the Provincial Treasury may hold the funds, or the funds are held by the bank under a safekeeping agreement

Northwest Territories – INAC – The Crown (Indian and Northern Affairs holds all securities

Nunavut – INAC - The Minister of INAC. Plus, other regulators such as DFO. In addition, Regional Inuit Associations require security for activity on Inuit Owned Lands.

Yukon – The Government of Yukon holds the financial assurance.

Canadian Nuclear Safety Commission – The CNSC or in certain situations the Provincial Government. However, this can only occur if there is an administrative agreement in place between the CNSC and that provincial government.

9b) How is the “cash” financial assurance held (special account, general revenue, etc.)?

Newfoundland and Labrador - Cash is recorded as a separately identified deposits in the chart of accounts with the cash itself in the general revenue bank account

Nova Scotia - Special Account

New Brunswick - General revenue.

Quebec - Special account

Ontario - Cash is placed in a special purpose account within the government’s consolidated revenue fund.

Manitoba - Special Account

Saskatchewan – A special account.

Alberta – The trust funds are put into the Consolidated Cash Investment Trust Fund (CCITF) of the Government of Alberta and is managed by Alberta Finance. The CCITF is authorized under the *Financial Administration Act* and interest earnings vary.

Investment of money

43(1) The Minister responsible may make investments on behalf of the funds in subsection (3) and when doing so shall adhere to investment and lending policies, standards and procedures that a reasonable and prudent person would apply in respect of a portfolio of investments to avoid undue risk of loss and obtain a reasonable return.

There may be a lag of several days between receipt of the funds and actual deposit into CCITF to allow for paper work.

British Columbia – Held in general revenue

Northwest Territories – INAC – Depends on the amount, sometimes a special trust account, sometimes just held in a safe

Nunavut – INAC - Very rare to receive cash, not sure how it is earmarked.

Yukon – Financial assurance is held in a special account.

Canadian Nuclear Safety Commission – Cash financial assurances are held in segregated trust accounts that are separate from the proponents other assets, and which are accessible only to the CNSC upon demand.

9c) Is financial assurance required under other permits coordinated with that of the closure plan?

Newfoundland and Labrador - Non-cash Financial Assurance instruments collected by the Department of Natural Resources is held by the department for the benefit of the relevant department.

Yes, different legislation – DFO / provincial DOE&C for specific hazards.

Currently no cash is being held on behalf of another Department’s required financial assurance.

Nova Scotia - May be required by Department of Environment for Industrial Approval.

New Brunswick - Yes, the Clean Environment Act, under conditions of the EIA approval, may require assurance for post closure monitoring, environmental protection and water treatment.

Quebec - No

Ontario - Financial assurance is required for some of the permits that are required from MoE.

Manitoba - Other agencies may request Financial Assurance i.e. Water Stewardship, Conservation –etc. However if assurance has been posted under The Mines & Minerals Act they have not requested additional security to date

Saskatchewan – For some exploration permits.

Alberta – The ERCB has the ability to secure limits funds associated with abandonment, and ASRD has the potential to also secure limited funds associated with reclamation and land disturbance, however typically defers to AENV to have adequate funds for all the liability.

British Columbia – There is a general agreement that Mines will hold the bond for all agencies. This is generally the case and the bonds are set with other agency input. However this agreement does not preclude other agencies requesting additional security.

Northwest Territories – INAC – Yes

Nunavut – INAC - All security held by INAC is for abandonment and restoration.

Yukon – Yes, the water license under the *Waters Act* requires security as well.

Canadian Nuclear Safety Commission – Any provincial permitting requirements are generally separated from the requirements of a decommissioning financial guarantee.

10a) Are any changes contemplated in your closure plan/financial assurance program?

Newfoundland and Labrador - Not at present

Nova Scotia - Mineral Resources Act to be reviewed over next year.

New Brunswick - NB will be revisiting the Mining Act and updating it in the next few years.

Quebec - Yes, see Bill 79 amending the Mining Act. The coverage of the financial guarantee in increased to 100%, covers more than just the accumulation areas and the calendar for posting of the guarantee is shortened to 5 years.

Ontario - Not in the immediate future.

Manitoba - They are presently under review by the Mining Act Review Committee which has Industry and Mining Association representation.

Saskatchewan – Currently looking at expanding to other industrial operations.

Alberta – As presented above, there is a proposed financial security system being advanced through the Government which is currently with policy division/executive.

British Columbia – Not currently

Northwest Territories – INAC – Yes, working towards a more efficient administration of return of security administration in support of encouraging progressive reclamation and holding security in regulatory instruments that afford the most flexibility for the Crown in bankruptcy situations, standardization of letters of credit.

Nunavut – INAC - INAC is currently reviewing its security policy.

Yukon – Not at this time, the EMR closure policy is up for review next year so there will likely be some changes made then.

Canadian Nuclear Safety Commission – CNSC is currently reviewing both our requirements for decommissioning plans and financial assurances. This is not specifically related to mines and mills.

10b) If you had the opportunity, what would you change?

Newfoundland and Labrador - Clarify the liability for rehabilitation and closure costs to explicitly extend it beyond the leaseholder to include related and associated companies/shareholders/directors.

At present there is no provision for the rehabilitation and closure of exploration sites.

Currently the vast majority of unremediated disturbances are associated with exploration sites. The provisions for rehabilitation and closure and associated financial assurance should be extended to include exploration sites. It should be noted that the Nunastivut Government does have such a requirement administered by the Department of Natural Resources, Mines Branch, Mineral Lands Division.

Finally, all current and future mines should be required to pay into a rehabilitation and closure fund. Such a fund would provide financial resources to, at least, partially cover the costs of the remediation of orphaned or abandoned mines.

Nova Scotia - Natural Resources Strategy 2010 to identify and recommend changes/actions.

New Brunswick - There will be lots of changes, but specifically to security or assurance, we will tighten the language and clarify how security is calculated, how it should be submitted and be specific in the form required. We will also clarify conditions on ownership and control of the security and how it is used and accessed in different scenarios for a mine project.

Quebec - See Bill 79

Ontario - Currently there is no provision for the regular updating of closure costs. The introduction of such a provision would be a top priority. To obtain a harder form of financial assurance to replace self assurance, however there has to be the political will to do so.

Manitoba - Delete the acceptance of pledge of assets and self assurance

Saskatchewan – It seems to be working well, so don't see any changes required.

Alberta – Inclusion of those items that represent a significant liability (not traditionally assessed), i.e. contamination. Removal of grandfathering, inclusion of plant sites. More consistency across the operators in detailed calculations of conservation and reclamation costs (level of detail/method of calculation).

British Columbia – More rigour around the timing and form accepted. More rigour with respect to reporting liability.

Northwest Territories – **INAC** – Enable an NWT Mining Act to bring some of the legislative instruments together under one act.

Nunavut – **INAC** - Clarify who holds security for what purpose to avoid double bonding.

Yukon – See above. (10a)

Canadian Nuclear Safety Commission – N/A

11a) Is there a requirement for Aboriginal consultation to be addressed directly in the closure plan?

Newfoundland and Labrador - Not under the Mining Act

Nova Scotia - No, Government responsible for Consultation but some issues may be identified by proponent in Environmental Assessment Registration.

New Brunswick - There is currently no specific requirements for this.

Quebec - No

Ontario - Yes

Manitoba - To date this has not been a requirement, however policy is now being developed that will require input from FN communities

Saskatchewan – No, consultation takes place prior to construction before potential infringements occur.

Alberta – Aboriginal consultation is typically more inclusive within the application submission/review process/procedures, however there may be instances of discussion surrounding the closure plan on a continuous basis with FN.

British Columbia – Absolutely

Northwest Territories – **INAC** – Extensive throughout the application process, is embedded in the Mackenzie Valley Resource management Act

Nunavut – **INAC** - The NLCA process is very inclusive of Aboriginal consultation.

Yukon – Not directly, but as government policy. Mine operators are also strongly encouraged to work with the First Nation when developing closure plans.

Canadian Nuclear Safety Commission – Yes. The CNSC ensures that all its licensing decisions under the Nuclear Safety and Control Act and environmental assessment decisions under the Canadian Environmental Assessment Act uphold the honour of the Crown and consider Aboriginal peoples' potential or established Aboriginal or treaty rights pursuant to section 35 of The Constitution Act, 1982.

11b) If yes, how is this put into practice?

Newfoundland and Labrador –

Nova Scotia -

New Brunswick –

Quebec -

Ontario - The proponent must indicate the actions taken in the CP

Manitoba –

Saskatchewan –

Alberta –

British Columbia – First Nations are invited to sit on the technical MDRC as well are provided additional ample opportunities dealing directly with government through the First Nations Initiative Division (FNID).

Northwest Territories – **INAC** – Combination of use of board processes, proponent meetings and direct crown consultation.

Nunavut – **INAC**

Yukon – Plans are forwarded to the First Nation for review and comment.

Canadian Nuclear Safety Commission – The CNSC has an Aboriginal consultation group which provides guidance on the application of CNSC Aboriginal consultation activities. In practice, first nations are consulted in parallel with both other government agencies, and public consultation. The requirements for these consultations are spelled out in the CNSC's Rules of Procedure Regulations and in the CEAA. The CNSC is also in the process of establishing a Participant Funding Program.

11c) Is Aboriginal consultation coordinated across all regulatory issues?

Newfoundland and Labrador - Not under the Mining Act. Economic Impact Agreements may be required under separate legislation/agreements

Nova Scotia - Yes

New Brunswick - In general yes, as a Crown responsibility, and also through the EIA review process.

Quebec - Yes, Aboriginal consultation is governed by the James Bay and Northern Quebec Convention or by the Interim Guide on Aboriginal Consultation, depending on the location of the mine project.

Ontario - No

Manitoba – Information.

Manitoba has established an Aboriginal Consultation Unit to facilitate Consultation with FN this unit has developed Policy and Guidelines for Departments to follow

In the case of Mines Branch is the lead agency and we co ordinate with all other agencies including Federal Government. If the Feds are involved they will sometimes accept the lead role.

Saskatchewan – The scope of the project determines the level or requirement for Aboriginal consultation. If required, it is coordinated.

Alberta –

British Columbia – Yes, BC has/is developing a “one government” approach to First Nations consultation i.e. FNID.

Northwest Territories – **INAC** – An attempt is made to do this though a new Consultation Support Unit

Nunavut – **INAC** -

Yukon – Informally through Mining Lands, but we have no formal agency that co-ordinates consultation.

Canadian Nuclear Safety Commission – Externally, no. There is currently no federal agency which assures that all other agencies perform Aboriginal consultation.

Internally, all CNSC regulatory issues are subject to Aboriginal consultation requirements. It is the responsibility of senior management to accept CNSC staff’s recommendations on the depth and scope of the consultation.

11d) If yes, what is the coordinating agency?

Newfoundland and Labrador –

Nova Scotia - Office of Aboriginal Affairs.

New Brunswick - New Brunswick Aboriginal Affairs Secretariat

Quebec - The Ministry of Sustainable Development, Environment and Parks for mining projects

Ontario – N/A

Manitoba – See above (11c)

Saskatchewan – The Ministry of First Nations and Metis Relations can coordinate or branches within each Ministry can coordinate.

Alberta – This can depend on the project and ministry, as the coordinating agency can typically vary between AENV and ASRD.

British Columbia – Ministry of Agriculture and Lands/Integrated Land Management Bureau /First Nations Initiative Division (FNID)
Northwest Territories – INAC – INAC – NWT region Consultation Support Unit
Nunavut – INAC -
Yukon – See above. (11c)
Canadian Nuclear Safety Commission – N/A

Section 2: Long-Term Care & Monitoring Following Closure

1) For what hazards/risks do you require the provision of financial assurance for long-term monitoring and maintenance?

Newfoundland and Labrador - Tailing / sediment pond dam stability, waste pile stability, ARD

Nova Scotia - Revegetation, slope stability, surface water quality/quantity, ARD , groundwater

New Brunswick - Whatever the Minister of Environment deems to be effluent or site discharge that is a risk to the environment. In particular, sources of acid mine drainage are a concern. Anywhere where water treatment would be required to protect the environment would be an indicator of this.

Quebec - Are included in the financial guarantee the amount necessary to assure water treatment and monitoring of water quality in order to comply with environmental regulations for as long as required

Ontario - The normal hazards/risks such as the monitoring of water leaving the site, tailings structures, shaft caps, etc. as well as the treatment of waters where required.

Manitoba – Long-term monitoring and water treatment if required.

Saskatchewan – Long-term monitoring and maintenance for environmental and physical risks are covered under institutional controls as per the Reclaimed Industrial Sites Act.

Alberta – Monitoring and maintenance is typically required for soil (soil monitoring directive) (areas of known/likely contamination), groundwater, surface water monitoring programs and tailings management.

British Columbia – Water treatment, (both operational and capital costs) water monitoring for as long as required, monitoring and maintenance of Dams and other required structures.

Northwest Territories – INAC – Mostly related to long-term water quality monitoring and structure stability for any containment facilities left at closure.

Nunavut – INAC - Inflationary risk.

Yukon – We don't require provision of financial assurance for long-term monitoring and maintenance. Only for monitoring and maintenance until closure has been achieved.

Canadian Nuclear Safety Commission – FA's are required to ensure that sufficient funds are available to conduct decommissioning of the facility that is set out in the preliminary decommissioning plan in the event that the proponent is no longer available to conduct the work.

In certain cases the hazards could include long-term radiological risks and risks from other associated bi-products of the mining/milling process. In these cases the financial assurance must be adequate to ensure that long-term monitoring and maintenance is maintained over the life of the potential hazard.

2) At what point in time do you require it?

Newfoundland and Labrador - Prior to commencement of mining operations

Nova Scotia - In reclamation plan and surety/bond and as a condition of mining lease.

New Brunswick - This is usually anticipated and required up front.

Quebec - It is part of the financial guarantee

Ontario - At the time the closure plan is approved.

Manitoba - Before acceptance of closure activities and release of security.

Saskatchewan – Prior to release from decommissioning and reclamation requirements.

Alberta – Varies (annually, every 2-3 years, or longer).

British Columbia – Start reviewing liabilities a couple of years prior to final closure and by closure the security is required.

Northwest Territories – INAC – Research on long-term closure impacts is encouraged throughout mine life during permit and licence renewals and implementation of commitments made during Environmental Assessments etc. The items for monitoring become more focussed as mine plan nears the closure phase. A specific licence or surface lease application may be required in advance of final closure.

Nunavut – INAC – Long-term monitoring security would be the remainder of what wasn't released after the abandonment and restoration of the site.

Yukon –

Canadian Nuclear Safety Commission – FAs are required to be in place before the CNSC will issue a licence for the proposed activity. This begins with a licence to Prepare Site.

3a) Who does the calculations for costing this out – the government, the proponent or a third party?

Newfoundland and Labrador - The proponent, certified by a “qualified person”, and reviewed by government

Nova Scotia - Proponent (or consultant) and checked by government department.

New Brunswick - The proponent does the calculation based on third party costs and the government reviews and verifies this.

Quebec - The proponent presents its cost evaluation that is reviewed by government

Ontario - The proponent who usually hires a third party.

Manitoba - Costs are developed by the proponent or Consultation 3rd party and reviewed by Government Staff

Saskatchewan – The proponent is responsible for providing cost estimates that are reviewed by the Ministry of Environment and Ministry of Energy and Resources.

Alberta – The proponent provides 3rd party assessment costs.

British Columbia – Costing is done initially by the company and reviewed by government.

Northwest Territories – INAC – Currently government, boards and proponents all prepare estimates.

Nunavut – INAC - The amount is set via environmental assessment lead by NIRB, or a Water License hearing led by the NWB. INAC consults expert advice to arrive at an estimate.

Yukon –

Canadian Nuclear Safety Commission – The proponent

3b) What are the calculations based upon?

Newfoundland and Labrador - Estimated cost of monitoring and risk assessment of event
Nova Scotia - Reclamation plan submitted; using Transportation Dept. Equipment rates and CAT performance handbook.

New Brunswick - Third party costs.

Quebec - Similar work at other locations

Ontario - Current costs to undertake the work activities

Manitoba - Costs is based on industry standards and experience in like situations.

Saskatchewan – Calculations for long-term monitoring and maintenance must be based on costs for a third party to complete the work e.g. inspection, shaft cap replacement.

Alberta – The costs are supposed to be based on the Alberta Road Builders Rates, or a confirmed contractor equivalent (3rd party rates), that the government can obtain should there be a liability assumption.

British Columbia – 3 Areas are determined: Reclamation costs (i.e. recontouring, ripping, planting seeding etc., Lump sum costs (i.e. mill decommissioning, infrastructure decommissioning, etc) and Post Closure costs (Water treatment, Monitoring etc.)

Northwest Territories – INAC – Department uses a costing spreadsheet developed by John Brodie, actual estimates are contracted out. Boards contract out to third parties.

Nunavut – INAC - Reclaim model

Yukon –

Canadian Nuclear Safety Commission – The calculations are based upon conducting the works set out in the preliminary decommissioning plan for the facility using current construction rates and third party consultants. These costs are escalated for the proposed term of the licence, regulatory and administrative fees are figured in, and then a contingency is applied based upon the quality and grade of the cost estimate.

3c) How does the government review them?

Newfoundland and Labrador - Engineering review based upon best practices

Nova Scotia - NSDNR mining engineers and NS Environment input as required.

New Brunswick - Primarily with in-house expertise, but third party review is sometimes used.

Quebec - Using costs tables and comparable sites

Ontario - Since the costs must be certified by the company's senior management and appropriate technical professionals, only a cursory review is carried out by government staff.

Manitoba - Costs are reviewed internally by staff

Based on current costing information and experience in closure activities to date. In some cases external consultants may be retained to review.

Saskatchewan – Ministry staff review estimates to ensure that sufficient detail is provided, that cost estimate have sufficient justification, and that all aspects have been covered.

Alberta – Through key staff (Ryan P, Tanya R, and others).

British Columbia – Government provides a spreadsheet to the companies to use. The calculations are compared against the planned activities for closure and ensuring third party costs are used.

Northwest Territories – INAC – Currently Govt compares against internal estimate.

Closure design and estimates are key part of EA and regulatory proceedings.

Nunavut – INAC - We contract the expert advice, and review estimate in house.

Yukon –

Canadian Nuclear Safety Commission – These are reviewed by staff at the CNSC based on guidance set out in CNSC regulatory guide G-206, Financial Guarantees for the Decommissioning of Licensed Activities and G-219, Decommissioning Planning for Licensed Activities. The cost estimates must be provided in a level of detail such that they are independently verifiable, and must use construction and consultant rates that are industry practice. Escalation rates are compared to standard inflation rates reported by the government through the CPI.

4) Do you add a contingency surcharge to the cost estimate and what are the issues around this?

Newfoundland and Labrador - Yes. Contingency based upon premium over estimated costs, usually 10% but not limited to 10%. It is dependent upon the degree of certainty of the estimated costs.

Nova Scotia - Yes, usually at 20% of material and labour/equipment costs.

New Brunswick - Typically we like to see contingency considered in the engineering estimate. The issue of this is what is an acceptable contingency amount since this will affect the amount of assurance required up front.

Quebec - Yes, a 10% contingency is added on supervision and engineering and another 10% contingency on top of everything. No issues around this.

Ontario - Although there is requirement for including a contingency surcharge to the estimated costs, most companies include a 10 – 15% contingency amount.

Manitoba - Costs are reviewed on a regular basis [At least once every 5 years] NOTE— depending on type of security this item needs to be reviewed obviously some form of escalation needs to be addressed.

Saskatchewan – Yes – amount of contingency varies depending on level of uncertainty, generally from no less than 10% up to 30%.

Alberta – Contingency is provided typically (10%) however it can vary and may include some additional costs associated with project management/plan redesign.

For the Oil Sands Mines a 10% contingency and a 10% project management cost is assigned.

British Columbia – Yes, typically 25% (added to Lump sum costs only) to ensure inclusion for soft costs i.e. engineering fees, mob-demob costs etc.

Northwest Territories – INAC – Yes. Estimate has to be based on Government doing work and no proponent on site, very little remaining useable equipment and inventory. Also has to include allowances for Govt to hire third party to perform work.

Nunavut – INAC - [*Generally add a 15 – 20% administrative fee*]

To accommodate a catastrophe? I would say not specifically. However, the security is held in a manner that doesn't fetter the Minister's discretion.

Yukon –

Canadian Nuclear Safety Commission – Since the financial assurance is always projecting future activities the proponent is requested to provide a contingency allowance, and is requested to defend it. Contingency varies from 10 to 30% based upon the relative uncertainty of the cost estimate.

5a) How do you calculate a Net Present Value (NPV) for work required?

Newfoundland and Labrador - Present value is applied to the annuity calculation to retire inflation adjusted future cost of post closure monitoring and maintenance.

Rehabilitation and closure costs are not presented as an NPV value. Costs are reviewed every 5 years or whenever there is a significant change to the Development Plan.

Nova Scotia - No,

New Brunswick - The estimates are present day but we may require adjustment for inflation either built in to the request up front amount, or be required to be topped up over life of mine.

Quebec - The plan is revised every 5 years so costs are as close as possible to their NPV. For longer term costs, an additional 3% is added

Ontario - A stream of current costs over the length of time that work is required discounted by a real interest rate of 3%.

Manitoba - Depending on the development of the overall schedule NPV calculations have been used. However in the one example we have had it has not proved to be very satisfactory –Best discussed.

Saskatchewan – Costs are calculated in current dollars and inflated to the year in which the activity would occur.

Alberta –

British Columbia – The NPV is calculated only for Post Closure costs

Northwest Territories – INAC –

Nunavut – INAC - Expert advice is sought.

Yukon –

Canadian Nuclear Safety Commission – Net present value calculations are conducted by the proponent to demonstrate that funds being set aside now for future work will provide adequate resources to conduct future decommissioning work. Depending upon the specifics of the guarantee, NPV calculations are generally only required for projects that will have a long lead time for decommissioning (i.e. Nuclear power reactors).

5b) What interest rate do you use and for what time period do you apply it?

Newfoundland and Labrador - The interest rate used is the rate that the Province expects to receive on its investment portfolio.

Nova Scotia - N/A

New Brunswick - There is no set rate we use in legislation.

Quebec -

Ontario - A real interest rate of 3% for the length of time required. If into perpetuity, then a 100 year period is used.

Manitoba - Interest rates are provided by Finance so vary depending on when Closure is anticipated

Saskatchewan – The institutional control program assigns inflation rates and rates of return at the time of application for release from decommissioning and reclamation and entry into the program. Current practice is to use a 10 year inflation average and an inflation plus 2% rate of return.

Alberta –

British Columbia – For the spreadsheet it is currently set at 3.5% over 100 years. We can/and have adjust the NPV down to 2.0% based on the RRR.

Northwest Territories – INAC – Long-term Government bond rate.

Nunavut – INAC - Security estimates are meant to be revisited every few years.

Yukon –

Canadian Nuclear Safety Commission – Since this is a future estimate, proponents generally look at the governments CPI to establish a reasonable value. The CNSC review is based on CPI trends as well. The period of application is generally the life of the revision of the proposed financial assurance, which is generally every five years.

6) Do you treat potentially catastrophic risks differently from others e.g. the collapse of a large tailings facility with significant contamination potential versus the collapse of a small crown pillar in the bush?

Newfoundland and Labrador - Risk evaluation is adjusted commensurate with the potential for an occurrence and the impact of the outcome from the event. More weight is given to events with a greater impact and a higher probability of occurring.

Nova Scotia - No

New Brunswick - We do not evaluate catastrophic risk.

Quebec - No, the requirements for infrastructure stability do not take site location into account. It is the same for safety requirements for mine openings.

Ontario - Catastrophic risks are not considered at this time.

Manitoba - No

Saskatchewan – No.

Alberta –

British Columbia – No, BC does not bond for failure

Northwest Territories – INAC –

Nunavut – INAC –

Yukon –

Canadian Nuclear Safety Commission – In the calculation of a financial assurance, the CNSC does not require that proponents account for potentially catastrophic risks. In Ontario, these events are covered by a Federal-Provincial backstop agreement. If an unforeseeable event takes place the CNSC has the power to Order any person of interest to carry out the remediation.

7a) Do you have an emergency response plan?

Newfoundland and Labrador – There is no formal plan; however, the Division responds to emergency situations as it would in planned interventions except that an emergency event is given highest action priority. The only potential issue is budgetary approvals. If there is insufficient budget available then an emergency request to cabinet for approval is sought. An ERP is required under Canada Dam Safety Guidelines.

Nova Scotia - No, not for mine closure or reclamation issues. Safety (Mine Rescue for UG Mines) and Environmental Spill Contingency plan may be required in Industrial Approval (NSE).

New Brunswick - The mine proponent is required to file an emergency response plan.

Quebec - Yes, the rehabilitation plan must include an emergency response plan

Ontario - Yes, the ministry has an emergency response plan for abandoned mine emergencies.

Manitoba - No

Saskatchewan – Each operation is required to have an emergency response plan as an Approval to Operate condition.

Alberta – This may or may not be provided as part of an application. The ERCB typically requires plans that include many of these aspects including specific codes of practice, surrounding for example, blasting, drilling, gas encounter, etc.

The municipalities or regional organizations may also require emergency response plans.

British Columbia – Yes

Northwest Territories – INAC –

Nunavut – INAC - It is a requirement for larger projects to have an emergency response plan.

Yukon – During operations and during closure, the licensee must have an emergency response plan. After closure, assuming a closure certificate or exit ticket has been granted and the site returned to the crown, government should have such a plan. We do not at this time, since no sites have been granted closure certificates.

Canadian Nuclear Safety Commission – Proponents are required to have emergency response plans in place for all stages of their operations. The CNSC has its own emergency programme that is activated during emergencies.

7b) For each site?

Newfoundland and Labrador - Yes, each site/occurrence is evaluated on its merits.

Nova Scotia - No

New Brunswick - Yes.

Quebec - Yes

Ontario – No

Manitoba - No

Saskatchewan – See 7a.

Alberta – Yes

British Columbia – Yes, as required by Health, Safety, Reclamation Code for Mines in BC

Northwest Territories – INAC –

Nunavut – INAC - All mines.

Yukon – We do not have such a plan (see above – 7a), but it would be a good idea.

Canadian Nuclear Safety Commission – Yes.

8a) For administrative and emergency purposes who is responsible for long-term storage and retrieval of critical maps and documents?

Newfoundland and Labrador - Mineral Development Division
Occupational Health

Nova Scotia - NSDNR holds info from annual reports and closure reports.

New Brunswick - Department of Natural Resources.

Quebec - The Mines Sector of the Ministry of Natural Resources and Wildlife

Ontario - MNDMF maintains critical maps and documents in hard copy format. The MNDMF is working towards a system that would maintain digital copies of critical maps and documents as well.

Manitoba - Mines Branch

Saskatchewan – Under the institutional control program, proponents and ministries are required to submit site documents applicable to operation and closure. The Registry is then responsible for the archiving and retention of the information.

Alberta – Each ministry has a filing system for each application and its content.

British Columbia – Ministry of Energy Mines and Petroleum Resources/ Mining and Minerals Division/ Health and Safety Branch

Northwest Territories – INAC – The Mine Reclamation Policy is not specific however INAC holds most records pertaining to mining. Each of the Boards maintains a public registry for each mine which is maintained until the file is closed.

Nunavut – INAC - The NWB holds the detailed engineering, as does INAC.

Yukon – Department of Environment (Water Resources) for water related structures. Department of Energy Mines and Resources for mining and non-water facilities. Often data is kept with both departments.

Canadian Nuclear Safety Commission – The proponent. (Section 27 of the NSCA)

The CNSC also has a document retention policy and maintains records off site with Canada's Public Archives.

8b) What type of facility are they stored in?

Newfoundland and Labrador - Not currently practical.

Nova Scotia - File storage cabinets in office or in central Registry for long-term. Legal files may be transferred to Justice Dept. or Land Services vaults.

New Brunswick - Our internal archives and storage.

Quebec - Regular office facilities

Ontario - They are stored in file rooms in both the main office and pertinent regional offices.

Manitoba - Mines Branch—Manitoba Archives

Saskatchewan – Registry files are stored at Ministry offices.

Alberta – Files are contained with a specific file room and media is stored in a manner such that short and long-term storage of records is addressed. Old files are archived in the Alberta Records Centre.

British Columbia – Government warehouse/ government servers

Northwest Territories – INAC – Currently records for mines are split between the board registries (paper/electronic) and the Northwest Territory Geoscience office (paper/electronic). Records for mines that have been abandoned are held by the Contaminants and remediation Directorate of Indian and Northern Affairs if they are being actively remediated. There is currently no single repository.

Nunavut – INAC - Electronic

Yukon – Filing Cabinets, shelves in offices, or paper with electronic data in more recent years.

Canadian Nuclear Safety Commission – We do not have prescriptive requirements for this.

8c) What formats do you accept these in?

Newfoundland and Labrador - Not currently practical

Nova Scotia - Paper copies or CD (CAD Dwg.files).

New Brunswick - Paper and electronic.

Quebec - Paper and digitized formats

Ontario - Documents and maps are typically submitted in a hard copy format.

Manitoba - Digital or Paper

Saskatchewan – Currently both paper and electronic are required.

Alberta – Paper, digital/electronic, microfiche.

British Columbia – Both hard copy and digital

Northwest Territories – INAC – Various, there is a move to more electronic records.

Nunavut – INAC – see 8b above

Yukon – Word, PDF – something easily referenced

Canadian Nuclear Safety Commission – We do not have prescriptive requirements for this.

Section 3: Return of Mined out Lands to the Crown/State

1a) Does your jurisdiction provide for the return of mining lands to the Crown after close out?

Newfoundland and Labrador - There is no formal process under our Mining Act. At present, after consultation with Government Services and the provincial Department of Environment and Conservation, it is assumed that once the planned rehabilitation and closure has been completed the land would become available for its planned post closure use.

Nova Scotia - Leased crown land is returned.

New Brunswick - Yes, and no, depending on the obligations being considered.

Quebec - Yes, an application for a certificate of release from the obligation of rehabilitation of a mine site can be filed after full compliance with the approved rehabilitation plan. Also, a mining lease, or a mining concession, can be abandoned. In both cases, the Ministry of Sustainable Development, Environment and Parks is consulted. Environmental responsibility survives the certificate of release and the abandonment or the mining lease or concession under the Environment Quality Act.

Ontario - The legislation provides for the return of mining lands but MNDMF has not accepted any lands under this section of the legislation.

Manitoba - Yes however the environmental liability still remains with the company Manitoba does not sign off on this at present

Saskatchewan – Yes, through the institutional control program.

Alberta – Yes, this is the intent and it is required under EPEA. Once the end land use plans/closure plan has been achieved and there is a demonstration of sustainability of the system, the reclamation certification process is commenced. Once a rec cert is issued, the lands are turned over to the crown.

British Columbia – Yes provided the conditions of the Act, Code and permit have been fulfilled to the satisfaction of the Chief Inspector (HSRC 10.7.31)

Northwest Territories – INAC – Yes to the extent that files are closed and the land reverts to the Crown (e.g. Pine Point Mine).

Nunavut – INAC - The land is currently held by the Crown and leased to the companies.

Yukon – Yes, in the form of a closure certificate.

Canadian Nuclear Safety Commission – Technically – yes. The NSCA allows for the Crown to assume the regulatory responsibility for any uranium mine/mill site. This decision is made by the Commission tribunal.

1b) Does this include Aboriginal consultation?

Newfoundland and Labrador - Aboriginal consultation is not specifically stated in our Mining Act. However, other agreements and/or legislation may apply in which case Aboriginal consultation would be established commensurate to such legal requirements.

Nova Scotia - Not normally.

New Brunswick - No.

Quebec - No

Ontario - Yes

Manitoba - Local Communities and FN are consulted

Saskatchewan – Community engagement is conducted, but return of land typically does not infringe upon on Treaty or Aboriginal rights so a Duty to Consult is typically not triggered.

Alberta – Consultation occurs during the application phase for the most part, but the potential exists for ongoing consultation, typically through ongoing industry/Aboriginal/regulatory discussions during operations. Consultation at reclamation certification is not currently considered.

British Columbia – Yes, more likely once it gets to this stage a notification letter would be sent

Northwest Territories – INAC – Yes

Nunavut – INAC - Any closure of a mine site would involve Aboriginal consultation

Yukon – Yes.

Canadian Nuclear Safety Commission – Yes.

2) If yes, under what authority is this done, what is the process, and who has the sign-off?

Newfoundland and Labrador - Under the Labrador Inuit Lands Agreement, a representative of the Nunatsiavut Government has to sign off on any rehabilitation and closure effort. However, this applies only to mineral exploration efforts within the Nunatsiavut government jurisdiction.

Nova Scotia - N/A

New Brunswick - The Mining Act allows for cancellation and ‘abandonment’ (return) of the mining lease. But this is from the tenure perspective. The company is still obligated to address environmental liabilities even in the absence of a lease. There is currently no formal process in legislation, Mining Act or otherwise, that allows for a complete sign off from this liability. DNR or DENR does sign off on certain aspects of reclamation or closure indicating the work was completed as per the plan, depending which legislation the work was requested under.

Quebec - Under the authority of the Director of Mine Site Rehabilitation. The certificate of release is only issued after an inspection confirms that all work has been done in compliance with the approved rehabilitation plan and that the site has reached an acceptable state. Same for the abandonment of a mining lease, a site inspection has to confirm that the site is in an acceptable state. Again, the Ministry of Sustainable Development, Environment and Parks is consulted prior to issuing both the release certificate and the abandonment.

Ontario - As mentioned above the authority comes from Section 149.1(1) of the Mining Act. The Minister has the authority to “accept” the return of mining lands which have been closed out.

Manitoba - No legislated authority is in place. However, as part of the closure process a review team is put together involving all potential stakeholders. One good example in Manitoba was the closure of the HBMS facilities at Ruttan Mine

Saskatchewan – Conditions and process for the institutional control program are described in the Reclaimed Industrial Sites Act (RISA) and Regulations.

Alberta – Signoff typically occurs via the reclamation certification process, and under the ASRD – MSL process (associated with the Fees and Dispositions Regulation).

In the Oil Sands Mines an Inspector designated under EPEA signs the rec cert. The Inspector receives feedback from a diverse team of experts to ensure that equivalent land capability has been met before the rec cert is issued.

British Columbia – Conditions of the Act, Code and permit have been fulfilled to the satisfaction of the Chief Inspector (HSRC 10.7.31)

Northwest Territories – INAC – Depends on which part of the territory. In some areas for Land use permits and for Surface Leases INAC closes the files. In other areas the applicable land and water Board closes the file on the advice of the INAC inspector.

Nunavut – INAC - Not 100% sure. Case by case review.

Yukon – The closure certificate is issued under the Quartz Mining Act and the Minister signs off on it. The process is still under development and will be part of the 5 year review of reclamation and closure procedures.

Canadian Nuclear Safety Commission – Section 11 of the General Nuclear Safety and Control Regulations allows the Commission to, under specific circumstances; exempt anyone from any part of the NSCA. In order for this to occur the proponent (in this case the Crown) must request the exemption and demonstrate to the Commission that the requirements of Section 11 are met.

CNSC staff would review the submission and make recommendations to the Commission, who makes the decision.

3) Is there a site assessment for performance and potential surprise liabilities before acceptance?

Newfoundland and Labrador –

Nova Scotia - Site visits and closure report is preferred practice, not a frequent occurrence.

New Brunswick - Not specifically no but the whole closure process is monitored and has a post closure monitoring period as well.

Quebec - Yes, see above (2)

Ontario - A site assessment is required before acceptance but the current policy does not look at contingencies for potential surprise liabilities.

Manitoba - Sites are inspected once closure activities have been completed and an assessment made. However in the last 10 years only 2 Mines have been closed and closure activities agreed too completed Ruttan and Namew . However it should be noted that in the case of Ruttan as per agreements with the Company ongoing and final closure is the responsibility of Manitoba.

Saskatchewan – Yes.

Alberta – There must be a site assessment to accompany the reclamation certificate application. The assessment process should identify any surprise liabilities, however if encountered during the rec cert process or inquiry, an application can be refused. Should a rec cert be issued, there still remains the MSL process with ASRD wherein direction can be provided.

For Oil Sands Mines a detailed rec cert application is reviewed by a team of technical experts and questions are asked back and forth. When the application is deemed complete a field inquiry is held to confirm the details of the application, then the rec cert is issued (this is a very short version of the process).

British Columbia – (Not sure what this means?) Is it a site inspection conducted and signed off by the inspector ... Yes

Northwest Territories – INAC – Yes there will be a final inspection and reconciliation of any land use fees received from the proponent.

Nunavut – INAC - Yes

Yukon – There is no process in place for issuing a closure certificate as yet (see 2 above)

Canadian Nuclear Safety Commission – No.

4) What are the conditions for acceptance?

Newfoundland and Labrador –

Nova Scotia - Acceptable to the Minister and/or conditions of the Lease.

New Brunswick - If requirements or targets are met according to the accepted plan.

Quebec - Full compliance with the approved rehabilitation plan, acceptable state reached by the site and OK from the Ministry of Sustainable Development, Environment and Parks.

Ontario - We have a draft policy paper that we could send to you as the conditions are quite lengthy and complex.

Manitoba - Completion of agreed to closure activities and posting of security for any ongoing inspections,--monitoring---etc.

Saskatchewan – See the “Reclaimed Industrial Sites Act” and Regulations and discussion document.

Alberta – The conditions for acceptance surround the goals of closure and how the lands align with the targeted closure plan. The target is achieving equivalent land capability, with consideration of approval requirements, approved plans, and authorizations made by the Director. The land should meet expected outcomes.

British Columbia – Conditions of the Act, Code and permit have been fulfilled to the satisfaction of the Chief Inspector

Northwest Territories – INAC – Depends on the liability.

Nunavut – INAC - Case by case review.

Yukon –

Canadian Nuclear Safety Commission – That would be predetermined by the Crown agency accepting the property back.

5) Does acceptance require contingency funding from the proponent for surprises?

Newfoundland and Labrador –

Nova Scotia - A portion of the Bond may be withheld.

New Brunswick - This would be an unusual circumstance and would be treated on a case-by-case basis. In theory we could request additional assurance or 'contingency' for such a thing.

Quebec - No

Ontario - No

Manitoba - See above (4)

Saskatchewan – Yes, it is called the Unforeseen Events Fund.

Alberta – No

British Columbia – No, the permit would remain active if security were being maintained

Northwest Territories – INAC – Part of any security deposit includes long-term monitoring.

Nunavut – INAC - Case by case review.

Yukon –

Canadian Nuclear Safety Commission – Again, this would be determined by the Crown accepting the property.

6a) Does the proponent receive a release document?

Newfoundland and Labrador –

Nova Scotia - No, a letter from DNR may indicate acceptance of the Reclamation Plan & work.

New Brunswick - The proponent may receive a document stating that the work was acceptably completed according to plan, but not necessarily a release document or waiver of future liability.

Quebec - Yes, a release certificate and/or a certificate of abandonment of the mining lease or mining concession

Ontario - Yes

Manitoba - ---No-----

Unless a separate prior agreement has been put in place between the Company & Manitoba - --- [i.e. Ruttan]

Saskatchewan – Yes.

Alberta – Yes, in the form of a Reclamation certificate.

British Columbia – No

Northwest Territories – INAC – The proponent will receive a letter detailing any refund of or request for additional land use fees to close file and acknowledging receipt of final land use plan along with return of any security deposit on file. If a board closes a file a similar procedure is followed. A final land use inspection report is also sent to the proponent. With water licences closure specific licences have been issued that are renewed until conditions established in the licence are achieved.

Nunavut – INAC - [Not at present time]

Yukon – Yes, the certificate of closure.

Canadian Nuclear Safety Commission – A Commission decision to exempt a property from CNSC licensing requirements is in the public forum. No specific certificate is issued.

6b) If yes, does it contain standard clauses respecting residual liability, release from liability, etc.?

Newfoundland and Labrador –

Nova Scotia - We usually include a clause stating “acceptance of the reclamation plan/work does not relieve the Company from future site environmental liability or other specific issues as identified.”

New Brunswick - It does not contain such standard clauses as we do not have the legislative authority to release a company from such liability.

Quebec - No, because the environmental responsibility survives under the Environment Quality Act. The release certificate pertains only to the obligation of complying with the rehabilitation obligation under the rehabilitation plan. In short, if a certificate of release is issued, it only means that the requirements under the plan were complied with.

Ontario - A proponent who surrenders lands under Section 149.1(1) of the Mining Act is not liable (subsection 149.1(4)) to subsection 7(1) and 8(1) and sections 17, 18, 43 and 44 of the Environmental Protection Act.

Manitoba –

Saskatchewan – See 6c

Alberta – Some... but they are explained in detail in the Act and the Conservation and Reclamation Regulation.

British Columbia –

Northwest Territories – INAC – Depends as instrument and project as stated above, not really general.

Nunavut – INAC –

Yukon – We are still developing the form the closure certificate will take since the Yukon Government has not had to issue one since devolution in 2003.

Canadian Nuclear Safety Commission – No

6c) Please provide these clauses.

Newfoundland and Labrador –

Nova Scotia - The specific clause(s) used varies with the site.

New Brunswick –

Quebec -

Ontario - See above. (6b)

Manitoba –

Saskatchewan – A release document states:

Whereas “the company” has applied for release from further decommissioning and reclamation pursuant to Section 22 of *The Mineral Industry Environmental Protection Regulations, 1996* (the Regulations) for the “operation”.

Pursuant to Section 22 of the Regulations, the Minister issues approval for release from decommissioning and reclamation for previous mining activities on all crown land identified in the Company’s “surface lease”.

This approval grants “the company’s” application for release from decommissioning and reclamation as per the “Final Closure Report, “operation” Decommissioning and Reclamation” report dated “xxxx”.

Alberta –

http://www.qp.alberta.ca/574.cfm?page=1993_115.cfm&leg_type=Regs&isbncln=9780779731343

See Section 15(1) for the liability period.

British Columbia –

Northwest Territories – INAC – N/A

Nunavut – INAC –

Yukon –

Canadian Nuclear Safety Commission –

7) Is there a third party consultation for return of such lands, indemnification, etc. (i.e., another government agency)?

Newfoundland and Labrador - Please see item 1b

Nova Scotia - Only Crown Lands; reviewed with other Departments in DNR and Environment if required.

New Brunswick - No.

Quebec - Yes, the Ministry of Sustainable Development, Environment and Parks

Ontario - It is likely that other ministries would be invited to comment on the site assessment prior to acceptance of return of the land.

Manitoba - The present review system is followed where a circular is sent to all appropriate agencies for input and comments.

Saskatchewan – Depends on the site. For example, for sites licensed by the Canadian Nuclear Safety Commission (CNSC), the CNSC must grant an exemption from licensing requirements before release will be considered.

Alberta – AENV works with ASRD and the ERCB

British Columbia – No, unless requested by the proponent.

(In BC, environmental liabilities related to mining properties are associated with responsibilities under the *Mines Act* and the *Environmental Management Act* (EM Act). Under the *Mines Act*, the current owner is responsible for environmental liabilities and obligations related to the mining operations. Once the *Mines Act* permit has been released the liabilities are released

However, liability provisions under the EM Act are joint and several, retroactive and absolute. This means the present owner and all previous owners of the mine are potentially responsible for any contamination related to previous mining operations.)

Northwest Territories – INAC – Each mine usually has a multi agency review team that responds to board requests so to a degree this does happen. In cases where a mine is wholly or partly on other government land (only occurs with the Government of the Northwest Territories to date) more specific consultation occurs.

Nunavut – INAC - [See questions 1a, 1b, Section 1]

Yukon – Yes.

Canadian Nuclear Safety Commission – Not as part of the CNSC process.

8) Are there one or more agencies (departments or divisions) that must sign-off on lands returning to the Crown?

Newfoundland and Labrador - Yes.

Nova Scotia - DNR Land Services

New Brunswick - Not applicable.

Quebec - Yes, both the Ministry of Natural Resources and Wildlife and the Ministry of Sustainable Development, Environment and Parks

Ontario - No

Manitoba –

Saskatchewan – The Ministry of Environment must issue a release from decommissioning and reclamation requirements before the site will be considered for institutional control. The Ministry of Energy and Resources administers the Institutional Control Program.

Alberta – Yes, the process requires ERCB abandonment acceptance, AENV reclamation certificate and return of the MSL disposition, under ASRD. If there is a dam involved there would likely also be sign off by AENV Dam Safety Branch.

British Columbia – No

Northwest Territories – INAC – Only if GNWT land is involved or another federal department owns lands.

Nunavut – INAC –

Yukon – No, the Minister of EMR signs off on the certificate.

Canadian Nuclear Safety Commission – N/A

9) Do you accept lands that continue to require monitoring and maintenance in perpetuity, e.g. water treatment?

Newfoundland and Labrador - No; not from a site which has not already been abandoned.

Nova Scotia - No, not practise. Some current Crown Lands that were used for industrial purposes in the past may require monitoring and/or remediation work.

New Brunswick – No.

Quebec - No, a release certificate can only be issued if a site requires minimum maintenance and control. If water treatment is required, the certificate will not be issued.

Ontario - No

Manitoba - Yes

Saskatchewan – No, currently only passive systems are considered. No active treatment systems are accepted, only monitoring and maintenance of site and any passive systems.

Alberta – Not at this time. The goal is that man-made structures or features requiring long-term management (e.g. facilities, structures (e.g. bridges)) are not accepted. However, in the Oil Sands, the one rec cert does have viewpoints, hiking trails, culverts, etc. that ASRD has made arrangements with the company (Syncrude) to maintain through a special disposition so that the Crown does not hold the liability for maintenance.

British Columbia – If it is a permitted mine the permit remains active and the owner is responsible for the ongoing monitoring and maintenance requirements.

On historic sites with contamination (i.e. no permit) they are still considered a mine under the *Mines Act* however the Ministry of Agriculture and Lands (MAL) has a program for the remediation of contaminated sites on Crown Land. MEMPR has deferred the cleanup of these sites to MAL.

Northwest Territories – INAC – To date no unless through court bankruptcy proceedings.
Nunavut – INAC - Not to date. *[No policy on this. Preference is for “walk away” conditions.]*

Yukon – Again, we are in the process of developing a policy on this.

Canadian Nuclear Safety Commission – N/A

10a) If yes, who will take over the monitoring/management of the site?

Newfoundland and Labrador –

Nova Scotia - N/A

New Brunswick – N/A

Quebec - If a site is released, the Mine Site Rehabilitation Department will take charge of the monitoring

Ontario – N/A

Manitoba - Monitoring of sites is carried out by Conservation, if problems occur or any remedial action is required the Company is contacted. Under The Mines & Minerals Act any security may be accessed if the Company is delinquent.

Saskatchewan – Monitoring and maintenance of site and any passive systems is administered by Institutional Control Registry which is the responsibility of the Ministry of Energy and Resources.

Alberta – Any features to remain in place must be supported by a party willing to assume any and all liabilities.

British Columbia – MEMPR remains the responsible agency for all mines

Northwest Territories – INAC – Contaminants and Remediation Directorate operates the sites.

Nunavut – INAC –

Yukon –

Canadian Nuclear Safety Commission – N/A

10b) Is there a responsible operating agency?

Newfoundland and Labrador –

Nova Scotia - Yes, Nova Scotia Lands (Crown Agency) done for SYSCO properties.

New Brunswick – N/A

Quebec - Yes, the Mine Site Rehabilitation Department

Ontario –

Manitoba – *[see above (10a)]*

Saskatchewan – Ministry of Energy and Resources

Alberta – This may depend on a number of circumstances.

British Columbia – Under the Mines Act, closed and abandoned mines are still considered a mine therefore MEMPR remains the responsible agency.

Northwest Territories – INAC – See above (10a)

Nunavut – INAC –

Yukon –

Canadian Nuclear Safety Commission – N/A

11a) How do you manage land tenure complexities, e.g. surface rights versus mining rights?

Newfoundland and Labrador - Surface rights may be handled through Crown Lands Division, Department of Environment and Conservation. In other cases Mineral Land Division, Mines Branch, Department of Natural Resources issues leases with regard to mining.

Nova Scotia - Negotiation, Land Owner consent, Expropriation , or Hearing with Minister (Sect. 100)

New Brunswick -Through the Mining Act.

Quebec - These rights are separate. The Crown holds most of the mineral rights (a few exceptions). Most mining leases are located on Crown lands. If a mining lease is located over private land, the promoter usually acquires the land by agreement. Exceptionally, the land is acquired by expropriation

Ontario - This is a very complex issue but generally speaking section 153.3(1) of the Mining Act allows that a lessee or patentee of mining rights is, unless a contrary intention is shown, liable in respect of the rehabilitation under Part VII of the Act.

Manitoba - Under present Manitoba Legislation Mineral Rights Holders are guaranteed access. If disputes arise they are referred to the Director and/or The Mining Board for resolution

Land restrictions may be put in place for future protection

Saskatchewan – Mineral dispositions are managed separately from surface rights/access rights and by separate Ministries.

Alberta – This involves various ministries including Energy.

British Columbia – Provisions are provided for access under the Mineral Titles branch, Mineral Tenure regulations.

Northwest Territories – INAC – Through negotiations with surface rights owners.

Nunavut – INAC - Case by case review.

Yukon – The process is still in development (see 9 above).

Canadian Nuclear Safety Commission – N/A

11b) Can land use restrictions be put in place for future protection?

Newfoundland and Labrador –

Nova Scotia - Yes, e.g. Special Places Act & Protected Areas

New Brunswick - Yes.

Quebec - Yes, rehabilitated lands can be the object of a State Reserve within which mining activities can be prohibited or restricted under conditions

Ontario - Yes, rehabilitated lands can be withdrawn from staking. Also Directors permission is required before a rehabilitated site can be disturbed.

Manitoba – [see above (11a)]

Saskatchewan – Yes.

Alberta –Yes, and the potential exists for the inclusion of municipalities or counties in this process.

British Columbia – Yes, restricted land reserves issued through ILMB

Northwest Territories – INAC – Yes through order in council withdrawals of surface and/or subsurface

Nunavut – INAC - There are many options to restrict land use, if needed

Yukon – Yes.

Canadian Nuclear Safety Commission – Always.

Section 4: General

1) Are you satisfied that your program will further accrual of abandoned mines, i.e., is it rigorous enough?

Newfoundland and Labrador - Our experience thus far into the current regime of our Mining Act suggests that where there is compliance with the Act there is reasonable assurance that the occurrence of future abandoned mines will be limited to a manageable level.

Nova Scotia - Yes, can be improved

New Brunswick - We are not satisfied, our Mining Act is not quite rigorous in this regard.

Quebec - No, this is one of the reasons why Bill 79 amending the Mining Act was filed

Ontario - Yes. However, it is always prudent to look for ways a program can be improved.

Manitoba - With some minor tweaking yes

Saskatchewan – Yes.

Alberta – Generally speaking yes, respecting some of the unresolved contamination issues identified (e.g. long-term selenium contribution, tailings management).

British Columbia – No, our current security policy does not have the rigour (nor acceptance) to demand full security and to keep it be maintained at a level to ensure government can reclaim/remediate a mine in the event of abandonment.

Northwest Territories – INAC – For the most part

Nunavut – INAC - Yes

Yukon – The program is coming up for review and further work is needed to ensure it is rigorous enough to prevent abandoned mines in the future.

Canadian Nuclear Safety Commission – The NSCA binds the Crown and the private sector equally. From our perspective there are no abandoned mines, since our act holds the Crown responsible for hazards on lands acceded to the Crown.

2a) Does your government have off-sets, e.g. tax incentives or infrastructure support, to rigorous rehabilitation requirements?

Newfoundland and Labrador - **No.** However, we are working with Finance to investigate amendments to our tax regimes to allow equal tax treatments to all forms of financial assurance allowed under our Mining Act.

Nova Scotia - No, not specifically.

New Brunswick - Not in particular.

Quebec - No

Ontario - Expenses related to rehabilitation work done in respect of reclamation of mining land are eligible for assessment work credit.

Manitoba - No

Saskatchewan – No.

Alberta – Not to my knowledge.

British Columbia – (Not sure what this means) No?

Northwest Territories – INAC – Not at the moment

Nunavut – INAC - No, not that I am aware of.

Yukon – No.

Canadian Nuclear Safety Commission – No, not from the NSCA.

2b) if yes, what are they?

Newfoundland and Labrador –

Nova Scotia - N/A

New Brunswick –

Quebec -

Ontario - See above. (2a)

Manitoba –

Saskatchewan –

Alberta –

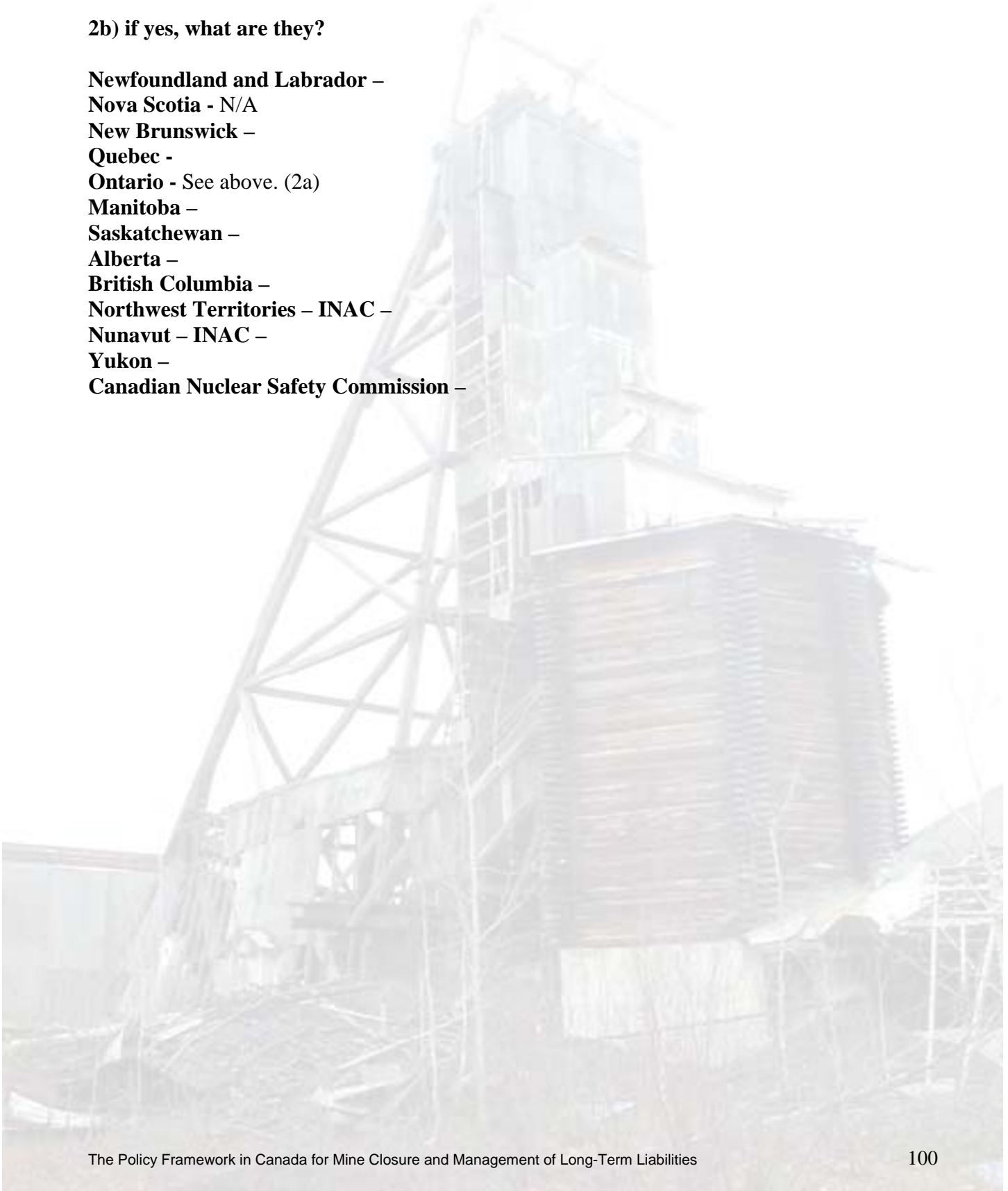
British Columbia –

Northwest Territories – INAC –

Nunavut – INAC –

Yukon –

Canadian Nuclear Safety Commission –



APPENDIX D

POLICY FRAMEWORK FOR MINE CLOSURE AND LONG-TERM LIABILITIES

QUESTIONNAIRE SUMMARY FOR JURISDICTIONS OUTSIDE OF CANADA

Section 1: Mine Closure Plans

1a) Does your agency coordinate the submission /review/approval of closure plans in your Province/ Territory/State/Country?

Colorado – Yes

Minnesota – Yes [*Please note that we have completed this questionnaire using MN Rules 6132 for Nonferrous Metallic Minerals Mineland Reclamation Rules. We also have two other sets of rules applying to ferrous operations (MN Rules 6130) and to peat mines (MN Rules 6131).*]

Nevada - Yes

New Mexico - The Mining and Minerals Division has two programs that regulate mining in New Mexico. The Mining Act Reclamation Program (MARP) regulates all commodities except for potash, coal and sand and gravel, on private, state and federal land, but not on lands part of an Indian Reservation. The Coal Mining Reclamation Program (CMRP) regulates coal mining on all lands not part of an Indian Reservation.

Non-coal mines are co-regulated with the New Mexico Environment Department (ED). ED is responsible for water quality issues. MARP is responsible for the closeout plans, but ED has sign-off authority on all MARP permits.

For Coal regulation the agencies act in an advisory role. CMRP has ultimate authority for reclamation plan approval.

US Bureau of Land Management - Reclamation plans are required for mining operations on federal lands operating under the authority of the General Mining Law of 1872. Although not referred to as a closure plan this document is given a strict environmental review to ensure compliance with the applicable regulations. Conformance to this plan is required before termination of reclamation liability occurs.

Utah - Yes

Western Australia - Yes, only in the State

1b) If no, what agency does this and what role does your agency have in this process?

Colorado -

Minnesota -

Nevada -

New Mexico –

US Bureau of Land Management –

Utah -

Western Australia - N/A

2a) Under what statutory authority are closure plans prepared?

Colorado - Coal: Title V of the U.S. Federal Surface Mining Control and Reclamation Act (SMCRA)

Non-Coal: Section 34-32-102, Colorado Mined Land Reclamation Act

[These Acts apply to new mining operations, whether they are on private property, state property, or federally managed property.]

Minnesota - MN statutes on Mineral lands, mining and land reclamation Sections 93.44 to 93.51; <https://www.revisor.mn.gov/statutes/?id=93>

Nevada - Nevada Revised Statutes 445A

New Mexico – New Mexico Surface Mining Act, NMSA 1978, Section 69-25A. New Mexico Mining Act, NMSA 1978, Section 69-36-1 through 20.

US Bureau of Land Management - Reclamation plans are required by the authority of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1732).

Utah - The State of Utah's Coal Mining and Reclamation Act reflects the federal Surface Mine Control and Reclamation Act for coal mines and the Utah Mined Land Reclamation Act for non-coal minerals.

Western Australia - Mining Act 1978

2b) What activities trigger closure plans?

Colorado - All mining requires a permit and an approved and bonded (financially warranted) reclamation (closure) plan. Reclamation is triggered when the mining plan has run its course and the operator voluntarily begins reclamation, when the operator voluntarily ceases operations and begins reclamation, or when the mining permit is revoked (non-compliance with rules, failure to perform, financial insolvency etc., etc.) and the bond for reclamation is forfeited. Then the State performs reclamation with the financial warranty and other funds if needed.

Minnesota - Environmental Review for new mining proposals, and deactivation and closure of permitted mining projects.

Nevada - Tentative Closure Plan and Temporary Closure Plan submitted with Water Pollution Control Permit application, and updated periodically.

Final Permanent Closure Plan two years prior to permanent closure.

New Mexico – For non-coal mines, the completion of mining related activities, permit expiration or enforcement actions. Contemporaneous reclamation can also be written into a closure plans.

Under the New Mexico Coal regulations reclamation is contemporaneous with mining. Each permit includes provisions for how and how much reclamation occurs each year.

US Bureau of Land Management - Reclamation plans and reclamation related performance measures are required when operations cease.

Utah - A closure plan must be included in the initial application for any type of mining or exploration.

Western Australia - Any mining proposal submitted for approval as required under the Mining Act 1978 must be accompanied by a preliminary mine closure plan. The Act is currently being amended to include the requirements for mine closure plans to be prepared in accordance with approved guidelines and be reviewed every 3 years.

2c) What aspects of a development project are included in the closure plan, e.g., facilities, smelters, infrastructure?

Colorado - All aspects of the project that were included in the permit are included in the reclamation plan.

Minnesota - All facilities and associated structures and infrastructure. (mine pits, stockpiles, tailings basins, plant buildings, roads, etc.)

Nevada - All sources: any building, structure, facility or installation from which there is or may be the discharge of pollutants. “Facility” includes all portions of a mining operation used for mining or mineral production.

New Mexico – All facilities are included as part of the permitting action. This may include ancillary processing facilities and other infrastructure. However, smelters are exempt under the New Mexico Mining Act.

US Bureau of Land Management - All aspects of the operation that have been authorized under FLPMA are included.

Utah - Closure plans include anything related to mining and primary processing (milling, concentrating) but not to secondary processes, such as smelting and refining.

Western Australia - All aspects of a mining project which are located on a mining tenement.

3) Is there coordination respecting other permits required by other agencies? Is there a one-window approach?

Colorado - Generally not, though the various agencies often do coordinate and work together on larger developments. Many other permits from other State and Federal agencies are often required to conduct mining, depending on the size and type of operation (air permits, water discharge permits, water use permits, impoundments/dam permits, injection disposal permits etc.) Obtaining these other permits is often precedent to receiving the mining permit.

Minnesota - To some degree. No [*one-widow approach*]

There is coordination with the US Army Corps of Engineers (USACOE) regarding wetland impacts. MN Pollution Control Agency (MPCA) administers permits for air and water quality. Division of Waters (DNR) administers water appropriations, dam safety, and public waters permits. Minnesota Department of Health administers several permits, as do local governmental units (cities and counties). This is not an all inclusive list.

Nevada - No formal coordination process.

New Mexico – Yes. Both Acts require coordination with other agencies, but it is not a “one window” approach. Often permitting actions are done in parallel with another agency’s process.

US Bureau of Land Management - The BLM coordinates with state governments where applicable state authorities exist. Typically there is memorandum of understanding for these jurisdictions that facilitates coordination for approval of a reclamation/closure plan and final reclamation/closure implementation once initiated.

Utah - There is no one-window approach, and other agencies’ permitting processes are generally independent from ours, though we do coordinate when needed. We do make sure that they have all necessary permits before mining, and monitoring and enforcement is coordinated with the other agencies.

Western Australia - Yes, input and endorsement from other relevant agencies are obtained before approving a mine closure plan.

4a) Are there gaps within/between the different permits?

Colorado - Yes

Minnesota - No

Nevada - Not to my knowledge.

New Mexico – All coal operators are held to the same performance standards, as specified in the regulations.

For non-coal permits, there are several different permitting categories, each with different requirements: general permits, minimal impact exploration, exploration, minimal impact mining (existing and new), regular mining (existing and new).

US Bureau of Land Management – No gaps have been identified.

Utah - Not really any gaps. There is more of a problem deciding who should write a violation when something regulated by another agency; such as the Clean Water Act, is

Western Australia - No gaps but overlaps

4b) Identify major gaps.

Colorado - Major gaps include permits for discharge of process water, storm-water permitting, consumptive use-water permits, air quality permits, dam permits for impoundments from the office of dam safety, State Engineer.

Minnesota -

Nevada –

New Mexico – Gaps exist between the reclamation standards required under existing mines vs. new mines.

US Bureau of Land Management –

Utah -

Western Australia -

4c) How can they be overcome?

Colorado - Would have to combine permitting into one agency or develop clear coordination and procedures amongst various agencies.

Minnesota -

Nevada –

New Mexico – A change to the statute would be required.

US Bureau of Land Management –

Utah -

Western Australia - We coordinate and streamline any overlapping

5a) Who evaluates your risks?

Colorado - State engineering staff evaluates the closure plans and develop costs for calculating the bond (financial warranty) amount.

Minnesota - The Department of Natural Resources and associated legal staff

Nevada – Not sure what is meant by this.

New Mexico - Each program has a staff of engineers, ecologists, geologists and hydrologists. Internal staff engineers or permit leads.

US Bureau of Land Management - Risks are evaluated internally by the Department of Interior's Office of Inspector General.

Utah - The applicant must supply information related to risks, but we evaluate the risk.

Western Australia - The State carries the risks and accepts them on the basis of the benefits of mining to the State's economy. I am not aware of any formal risk assessment or evaluation done

5b) What are most common risks?

Colorado - Under-bonded sites, and sites becoming under-bonded with time, due to many factors including illegal/un-permitted work by operator, initial bond amount calculations in error/too low, increases in reclamation costs due to inflation, failure of surety. We do not have sufficient funding or staff resources to inspect permitted non-coal operations as often as they should be checked- this lack of sufficient oversight can sometimes result in unauthorized or illegal work occurring at permitted sites (i.e. unpermitted hazardous or toxic materials on site, mining beyond permit boundary etc.).

Minnesota - Reactive mine wastes and water quality concerns associated with contact water and leachable constituents. Tailings basins can also present geotechnical risks.

Nevada -

New Mexico - By "risks", we are assuming you mean problems that could prevent a viable and stable reclamation. Stability of slopes and embankments must be maintained and verified. A big risk is the potential for toxic and acid forming materials affecting revegetation success. Another is the lack of sufficient rainfall, which may also affect long-term revegetation success. Blasting damage (air and ground vibration, and flyrock) is also a common risk. Additionally, risks on the mine site might involve heavy metal contamination to soil, water, or air. Also, where uranium mines are involved there might be a radiological risk to people and animals. Risks are addressed through permitting standards and not risk analysis.

US Bureau of Land Management - The most common risk is the adequacy of the financial guarantee amount to cover actual reclamation costs.

Utah – Operator and/or surety going out of business.

Western Australia - Public safety associated with open shafts/open cut, unstable waste dumps, unconsolidated tailings and some environmental risks associated with heavy metal dusts generated from erosion and soluble heavy metals from ARD

5c) What are the major risks in your closure plan process and how are these assessed as part of the approval process?

Colorado - Major risks include long-term stability and reclamation of lands and facilities, impoundments, and ensuring that there is no long-term treatment of water necessary upon final mine closure. Estimating and obtaining the proper bonding amount to cover these closure risks is the biggest risk in the planning process. Operators are party to the permitting process and can counter or negotiate on financial warranty amounts.

Minnesota - The potential for long-term mitigation and determining the necessary amount of and instrument(s) for financial assurance for satisfactory closure/remediation/contingencies.

An independent firm with expertise in evaluating risks and costs is hired to assist in the determination of adequacy of and the instrument(s) for financial assurance.

Nevada -

New Mexico - Slope stability, drainage control, blasting and revegetation failure are the major risks. Slopes, drainage control, and blasting are modeled and monitored by on-staff professional engineers. Overburden and soil properties are monitored by geologists, soil scientists, and ecologists. Handling procedures and revegetation methods are approved by ecologists/soil scientists. Drainage reclamation is approved and monitored by hydrologists and ecologists. These risks are assessed by ensuring that a closeout plan conforms to the rules and standards of a given permit type.

US Bureau of Land Management - The risk associated with reclamation cost estimates is reduced through the use of sound science and current cost data and by conducting collaborative reviews with state agencies.

Utah - The risk is that the operator will not be able to perform the closure due to financial insolvency. The performance bond covers our risk.

Prior to receiving any permit, the operator must demonstrate that their mine is designed in such a manner that reclamation will be successful. They are not permitted to take risks that may inhibit the ability to reclaim the mine.

Western Australia - Unplanned mine closures & inadequate research and studies to support mine closure predictions. To be addressed through requirements for material & waste characterisation upfront, ongoing rehabilitation research and trials, and financial securities (environmental bonds).

6) Are catastrophic events considered as a regular part of a mine closure plan in your jurisdiction?

Colorado - Yes. Geologic hazards including flooding, 100-year storm events, slope stability, and earthquake hazard potential are factored into required closure designs and plans.

Minnesota - No. The intention of environmental review, planning and permitting is to totally avoid catastrophic events (outside a natural event such as an earthquake). Our rules do have a provision for corrective action. If something on site does not proceed according to the mining or closure plans, additional financial assurance can be added and the plans altered to address the event.

Nevada - If appropriate.

New Mexico – Our permanent engineering structures are designed using a maximum 100-year rainfall event, by regulation. Damage accruing from an event beyond that must be repaired but does not fall within our enforcement provisions.

Certainly a drought is one of our major issues, but we have found ways to compensate for its long-term effects, such as adding flexibility to the timing of revegetation success demonstrations and grazing demonstrations.

We have incorporated geomorphic reclamation methods into our operations, with designs based on measurements of nearby drainage channels on undisturbed areas with similar slopes, substrate and watershed dimensions as envisioned for the reclamation. By designing

landforms similar to the landforms that the forces of nature have built over thousands of years, a degree of resiliency to the effects of catastrophic events is anticipated. As long as a mine is permitted there are final reclamation standards regardless of catastrophic events.

US Bureau of Land Management - Worst case scenarios are not considered as a regular part of a reclamation plan.

Utah - Catastrophic events are not anticipated – the mine design should avoid them- but if they occur, they must be taken care of.

Western Australia - Yes, but only as required in Australian Standards such as 1/100 year rainfall/flood events, storm surge data, seismic data. No tool is currently available/used to accurately consider the long-term impact of climate change.

7a) Do you require 100% financial assurance up front as part of the approval process?

Colorado - Yes

Minnesota - No. We require financial assurance based on reclamation costs for closure and post closure maintenance if operations were to cease in the upcoming calendar year. A reclamation plan that identifies these costs is required with the annual report. The amount required is reviewed and adjusted annually or as needed.

Nevada - Yes, but phased bonding is possible.

New Mexico – Yes. The FA is calculated based on the worst case scenario within each five year permit term. The bond can be increased or decreased depending on the status of reclamation.

US Bureau of Land Management - Yes 100% financial assurance is required before any operation may begin. Phased operations are permitted, but no surface disturbing activities may occur until that portion of the financial assurance is received.

Utah - Yes

Western Australia - Not yet, currently minimum rates (only about 25%) apply upfront in the form of unconditional performance bond as part of the mining proposal approval conditions.

7b) If yes, in what forms do you accept it?

Colorado - Generally the requirement is provided by a Surety or financial warrantor acceptable to the State, or a Certificate of Deposit or Cash Bond. In some cases real property, irrevocable letters of credit, deeds of trust, trust fund, salvage value, first Lien etc are instruments proposed by the operator, but these must be audited, acceptable to the State, and be convertible into cash w/ in 180 days.

Minnesota -

Nevada - Trust fund, bond, irrevocable letter of credit, insurance, corporate guarantee.

New Mexico – Cash; trusts; surety bonds; letters of credit; collateral bonds; third party guarantees; insurance; self-bonds.

US Bureau of Land Management - Regulations allow for the following forms of financial guarantees: Surety bonds, cash, Irrevocable Letters of Credit, certificates of deposit, negotiable US Government, State and Municipal securities or bond, Investment-grade rated securities (Standard and Poor's rating of AAA or AA or equivalent), and Insurance (AM best rating of "superior").

Utah - Collateral, surety bond or other form of insured guarantee, deposited securities, cash, negotiable certificates of deposit, and negotiable bonds of the US Government.

Western Australia -

7c) If not, at what point do you require it?

Colorado -

Minnesota - From time of permit issuance. See 7a.

Nevada -

New Mexico -

US Bureau of Land Management -

Utah -

Western Australia - The initial bond rates can be reviewed during the life of the project and can be increased to above the minimum rates on the basis of the closure risks. But this does not happen often.

8a) Do you have provisions for self assurance?

Colorado - Generally no, unless it passes State Mined Land Reclamation Board approval and is acceptable to the State.

Minnesota - No

Nevada - Yes, but only for projects wholly on private lands.

New Mexico - Yes.

US Bureau of Land Management - No

Utah - Yes

Western Australia - Currently No

8b) If yes, do you think this is a good idea?

Colorado -

Minnesota -

Nevada - Yes.

New Mexico - It is not the preferred option.

US Bureau of Land Management -

Utah - No

Western Australia -

9a) Who holds the financial assurance?

Colorado - State holds the Bond/ Financial Warranty

Minnesota - The State of MN must have the assurance that the funds will be available and payable to the commissioner (agency) when needed.

Nevada - Typically, the federal land management agency holds it if there is public land involved. Otherwise, we do.

New Mexico - It varies based on the instrument chosen.

US Bureau of Land Management - The Bureau of Land Management or State agency if provided for by an existing Memorandum of Understanding.

Utah - Financial assurance may be held by an independent financial institution or surety, but is for the benefit of the State. Some assurances are posted with cash that is held by the State Treasurer.

Western Australia - Usually the banks since the unconditional performance bonds are bank guaranteed.

9b) How is the “cash” financial assurance held (special account, general revenue, etc.)?

Colorado - Held in trust by the State Treasurer

Minnesota - The financial assurance is held in an instrument that meets the requirements of the rules. Namely, that the funds are 1) sufficient to cover the costs, 2) available and made payable to the commissioner [of DNR], 3) fully valid, binding, and enforceable under state and federal law, 4) not dischargeable through bankruptcy, and 5) include terms acceptable to the commissioner.

Nevada - We do not hold cash bonds. There is a state bond pool run by the Division of Minerals that can do that but it is rather small, only a few million out of \$1.2 billion total.

New Mexico – Special account that the operator will set up.

US Bureau of Land Management - Special account

Utah - A special account is created for each permit with the State Treasurer’s Office.

Western Australia - We do not accept “cash”

9c) Is financial assurance required under other permits coordinated with that of the closure plan?

Colorado - Generally not.

Minnesota - It does not have to be and the funds provided by our rules are comprehensive to the entire closure plan. We can choose to coordinate with other agencies if it is deemed appropriate.

Nevada - Yes.

New Mexico – If appropriate, yes, but not in every case.

US Bureau of Land Management – State permits.

Utah - All permits to conduct any exploration or mining activity require feasible closure plans and financial assurance.

Western Australia – Yes

10a) Are any changes contemplated in your closure plan/financial assurance program?

Colorado - Currently the program is being modified to include more stringent rules governing in-situ uranium mining.

Minnesota - Not at this time

Nevada - No, but we have made a number of changes in the past 10 years.

New Mexico – Yes, more timely evaluation and updating of financial assurance instruments and supporting cost estimates.

US Bureau of Land Management - No.

Utah - No

Western Australia - Yes, we plan to review our environmental bond rates in August 2010 to ensure their adequacy including consideration of the full cost recovery.

Also, as from August we will have the regulatory backing to require mine closure plans to be submitted every three years or as required in accordance with departmental approved guidelines.

10b) If you had the opportunity, what would you change?

Colorado - Eliminate some forms of “allowable” financial warranties, such as irrevocable letters of credit, deeds of trust, trust fund, salvage value, first Liens- so operators don’t waste time asking for these. Develop multiple bond calculation approaches/programs to develop more conservative, accurate overall estimates of closure costs. Require higher permit fees so that we can add resources to do more inspections.

Minnesota -

Nevada - We’ll probably expand our bonding authority to cover pit lakes and acid drainage issues.

New Mexico – The elimination of self-bonds, third party guarantees, and real collateral.

US Bureau of Land Management –

Utah - Remove the option for collateral bonding and self-bonding.

Western Australia - We should have prepared guidelines for mine closure earlier even without the regulatory backing.

11a) Is there are requirement for Aboriginal consultation to be addressed directly in the closure plan?

Colorado - No- State has no jurisdiction on tribal lands. Indian tribes have their own complete jurisdiction over mining and mine closure on Indian lands; Federal agencies provide any technical support needed for tribal review of the permits/closure plan.

Minnesota - Yes. They are part of the regulatory authorities review team during environmental review (ER). Formally, this is through their interaction with the federal process and NEPA, if the ER is a joint federal and state occurrence. During the permitting process they are specifically included in the public review period. Environmental Review and the Permit to Mine include a closure plan that will become more detailed as the mine approaches deactivation and closure.

Nevada - No.

New Mexico – Yes.

US Bureau of Land Management - No.

Utah - The State of Utah does not regulate Aboriginal lands.

Western Australia - Yes, all relevant stakeholders should be consulted in the preparation of a mine closure plan including the Aboriginal groups

11b) If yes, how is this put into practice?

Colorado -

Minnesota - The tribal entities are issued the draft ER chapters and draft Permit to Mine for their review and comment in advance of the public review period.

Nevada -

New Mexico – Consultation is incorporated into the development of the closure plan.

US Bureau of Land Management –

Utah -

Western Australia - We will require the consultation process and outcomes to be reported in the mine closure plans

11c) Is Aboriginal consultation coordinated across all regulatory issues?

Colorado -

Minnesota - Not coordinated per se across all regulatory issues through one agency but consultation occurs with MPCA and ACOE permits as well.

Nevada -

New Mexico – Yes

US Bureau of Land Management –

Utah -

Western Australia - No

11d) If yes, what is the coordinating agency?

Colorado -

Minnesota -

Nevada –

New Mexico - For the purposes of our permit, our agency - EMNRD.

US Bureau of Land Management –

Utah -

Western Australia -

Section 2: Long-Term Care & Monitoring Following Closure

1) For what hazards/risks do you require the provision of financial assurance for long-term monitoring and maintenance?

Colorado - Major risks include long-term stability and reclamation of lands and facilities, re-vegetation success, stability and re-vegetation of reclaimed impoundments, and ensuring that there is no continuing discharge or long-term treatment of water necessary upon final mine closure. Monitoring/ maintenance is conducted for as many years as are needed to reach a stable, reclaimed landscape, at which point the final amount remaining in the financial warranty is released.

Minnesota - Water quality, dam stability, hydrologic issues, vegetative cover, slope stability, pit filling,... essentially anything that requires long-term maintenance or monitoring that is needed to verify that the closure has been conducted according to the rules can be included in the financial assurance.

Nevada - Process fluid stabilization and any existing remedial actions.

New Mexico –

US Bureau of Land Management - Long-term monitoring can be required for any risk that has been identified during the environmental analysis. Long-term water treatment is the most common risk for which a long-term financial assurance may be required. This component of the financial assurance usually takes the form of a long-term trust.

Utah - This has not been confronted as of yet.

Western Australia - Currently our financial assurance is based on the cost of rehabilitation without taking into consideration any additional costs associated with long-term monitoring/maintenance. We should consider the additional cost in the Financial Security to deal with potential leaching/contamination of radioactive materials and heavy metals into surface and groundwater courses.

2) At what point in time do you require it?

Colorado - When the reclamation plan has been completed, the monitoring and maintenance period begins and continues until all conditions are met for final bond release.

Minnesota - From Permit issuance on. It is evaluated annually for adequacy. It can also be adjusted at any point during the year if conditions require.

Nevada - Now.

New Mexico – Financial assurance is required prior to approval of the permit.

US Bureau of Land Management - When required a long-term trust is established before plan approval.

Utah -

Western Australia - Upon completion of the rehabilitation work, before bond return

3a) Who does the calculations for costing this out - the government, the proponent or a third party?

Colorado - The government, sometimes with the aid of consultants. Proponents can argue about and seek to negotiate the bond amounts during the permitting process if they don't agree, so there is industry input.

Minnesota - The proponent with review from the government and an independent third party (chosen by the agency through a bid process and paid for by the company).

Nevada - Proponent prepares it and we review it.

New Mexico – For coal mines the operator generates a calculation that the CMRB reviews and approves. For hard rock mines the operator will generate a calculation, which is reviewed by the agency, or the agency will do the calculation. For small mines the agency generally performs the calculation.

US Bureau of Land Management - Calculations are provided by the operator and reviewed by the government.

Utah -

Western Australia - We have set a minimum bond rates per hectare, and can increase the rates for higher risks

3b) What are the calculations based upon?

Colorado - Current and projected reclamation and construction costs. Fairly elaborate computer estimating programs are used, but they need to be continually updated with new data.

Minnesota - Unit costs and time periods for distinct closure, maintenance and monitoring activities related to the specific mine operation.

Nevada - Based on what the cost would be for us or the federal land manager to perform the work.

New Mexico – The calculations are based on the worse case reclamation scenario. Costs are based on a plan to reconstruct to an approved topography, replace topsoil and reseed. **US Bureau of Land Management** - The estimate must cover costs to construct and maintain any long-term treatment facilities or post-closure structures required by the filed Notice or approved Plan of Operations.

Utah -

Western Australia -The estimated cost of rehabilitation for the first 5 years of the project commencing, assuming that progressive rehabilitation work would be conducted by the company throughout the mining operation.

3c) How does the government review them?

Colorado - The State’s technical engineering staff performs reviews of the mining and closure plan and develops the financial warranty cost estimates.

Minnesota - See 3a.

Nevada - We have standardized models for reclamation cost estimating.

New Mexico – MMD reviews calculations using specific reference manuals and tables for equipment production, labor and fuel costs, and internal guidance documents.

US Bureau of Land Management - The responsible district/field manager must verify the operator’s cost estimate to carry out those corrective actions, establish the amount of funds needed in the long-term funding mechanism, and establish the agreement with the operator covering the funding mechanism.

Utah -

Western Australia - As required, even though we try to do it every 5 years

4) Do you add a contingency surcharge to the cost estimate and what are the issues around this?

Colorado - Yes, the estimating programs commonly factor in contingency costs and inflation factors based on “state of practice” requirements.

Minnesota - We expect this to be recommended by FA consultants. In the cases of a few cost estimates we have for ferrous operations, it has been added.

Nevada - We add on for uncertainty but not pure hypothetical contingency.

New Mexico – No, the FAs are re-evaluated on a frequent basis.

US Bureau of Land Management – A contingency cost is generally included in all reclamation cost estimates to cover unforeseen cost elements. Contingency costs are calculated as a percentage of the operation and maintenance cost. Inclusion of a contingency cost may not be necessary for small, uncomplicated reclamation.

Utah -

Western Australia - No, but we can increase the standard (minimum) bond rates based on risks

5a) How do you calculate a Net Present Value (NPV) for work required?

Colorado – Not sure/don't know

Minnesota - This topic will be addressed with the consultant and may be specific to the operation under review.

Nevada - We refer to reference indices.

New Mexico - Specific reference manuals and tables for equipment production, labor and fuel costs that are updated on an annual basis. The Mining Act Program provides a guideline specific to NPV calculations.

US Bureau of Land Management - BLM has guidelines to determine Present Value. These guidelines are attached.

Utah -

Western Australia - Currently we don't but will consider NPV in the coming Financial Security Review

5b) What interest rate do you use and for what time period do you apply it?

Colorado – Not sure/don't know

Minnesota - This topic will be addressed with the consultant and may be specific to the operation under review.

Nevada - It is calculated for each project and updated periodically. Normally 500 years is used for perpetual situations.

New Mexico - Generally we use an **Escalation Rate**: The inflation rate or escalation rate is used to estimate the expected effect or rate of inflation on reclamation costs over time, and a **Discount rate**: The discount rate is used to estimate the expected rate of return to be earned from the investment of cash or cash proceeds over time, pending expenditure for reclamation.

The rate can be proposed by the operator using a number of accepted, publicly available indices. The time period is based on the amount of time it will take to perform a reclamation project, but never less than 5 years.

US Bureau of Land Management - Determined by BLM State Economist.

Utah -

Western Australia - See answer 5a)

6) Do you treat potentially catastrophic risks differently from others e.g. the collapse of a large tailings facility with significant contamination potential versus the collapse of a small crown pillar in the bush?

Colorado - Yes; risk is factored into the closure plan and financial warranty, and also determines the length of time needed to ensure a stable closure and reclamation of all facilities.

Minnesota - All events would be handled under the corrective action procedures/requirements contained in the reclamation rules.

Nevada - We don't bond for failure.

New Mexico – There are no regulations which provide for additional requirements as outlined in the question. Although the relative risk is factored into compliance with the regulations, all permits must comply with all applicable regulations.

US Bureau of Land Management –
Utah -
Western Australia - Yes

7a) Do you have an emergency response plan?

Colorado - State has emergency response plans for most types of emergencies.

Minnesota - No, but we have a corrective action procedure and requirements in the permit rules. Emergency response plans could be required as a condition of the permit.

Nevada - Yes.

New Mexico – No, that would be the mine operator’s responsibility under the federal Mine Safety and Health Administration regulations.

US Bureau of Land Management - Each plan of operation includes a water management plan, rock characterization and handling plans, quality assurance plans and a spill contingency plan.

Utah -

Western Australia - Yes, an emergency response plan is required under various statutes including the Mines Safety Inspection Act. Mining Act and Environmental Protection Act.

7b) For each site?

Colorado - All active permitted mining sites have emergency response plans. Sites abandoned or inactivated prior to 1976 before current mine permitting and reclamation requirements do not have ER plans, and would fall under the general state jurisdiction.

Minnesota - For each permittee.

Nevada - Yes.

New Mexico – For all MSHA-regulated operations.

US Bureau of Land Management – Yes

Utah -

Western Australia - Yes

8a) For administrative and emergency purposes who is responsible for long-term storage and retrieval of critical maps and documents?

Colorado - Historic coal mine maps are kept by the Colorado Geological Survey. Historic pre-1977 data from a limited number of noncoal mines is also on file at CGS. Any mine maps and critical documents post 1976 are contained in the mine permit files, which are kept by the State Division of Reclamation Mining and Safety.

Minnesota - The State of MN

Nevada - We store ours with the State Library and Archives.

New Mexico - MMD maintains a complete file on each permit and has a Disaster Recovery Plan for computerized data. However, the operator is required to maintain all documents relative to a permit.

US Bureau of Land Management - The authorized officer and his/her staff who is responsible for all aspect of administrative records management.

Utah -

Western Australia - For administrative purposes, a responsible officer in the Department is assigned for cataloguing, archiving and searching plans when they are submitted to the State Mining Engineer under Section 87 and 88 of the Mines Safety and Inspection Act 1994. The onus to submit is on the Registered Manager of the mine. The Act and associated Regulations indicate the particulars that should be included on the plans.

8b) What type of facility are they stored in?

Colorado - Government building/ offices. Most paper files have been converted into electronic scanned documents.

Minnesota - Fire proof vault and digitally with regular back up.

Nevada - Document storage.

New Mexico – File cabinets and computers.

US Bureau of Land Management - Local field office.

Utah -

Western Australia - Hardcopy plans are stored off-site at Recall. Recall is a professional document storage company. Adobe PDF files of the plans are stored on the Department's GIS Server administered by the Resources Safety Division

8c) What formats do you accept these in?

Colorado - Any format- everything hardcopy eventually gets scanned and recorded into the permit system electronically. Other electronic formats are also acceptable.

Minnesota - Most desirable is a paper/hard copy with a digital form also.

Nevada - They are eventually converted to microfilm.

New Mexico – Native file formats and Adobe Acrobat. Native formats such as Microsoft Word, AutoCAD, ESRI ArcMAP, etc...

US Bureau of Land Management – Generally all industry-standard record formats are accepted.

Utah -

Western Australia - Section 3.53 of the Mines Safety and Inspection Regs specifies the formats in which plans must be submitted. In the case of abandonment plans this is “in hard copy form accompanied, so far as is practicable, by a copy in electronic form”. The electronic format that we encourage is Adobe PDF. From time to time submissions are made in mine survey software formats such as Surpac, Vulcan, Autocad, however there is no requirement for the mines to do this and we don't encourage it.

Section 3: Return of Mined Out Lands to the Crown/State

1) Does your jurisdiction provide for the return of mining lands to the Crown/State after close out?

Colorado - No. If the mined lands are owned by the State of Colorado, the State Land Board provides for the return of the land to the State after the mining lease is terminated. Federal jurisdictions do the same for federal lands; where mining claims are unpatented, the land returns automatically to the federal government after expiration of the mineral claim.

Minnesota - Yes, and to other public/private ownership.

Nevada - This is handled by the federal government for public lands. Very little mining on state lands.

New Mexico – If the mining project was on federal or state land leased from a federal agency or the state, it will be returned to the trustee agency upon satisfactory completion of reclamation actions.

US Bureau of Land Management - Once final reclamation as been completed financial guarantee is returned and the case file is closed.

Utah - Yes, if the lands are owned by the State or Federal Government.

Western Australia - Yes

2a) If yes, under what authority is this done, what is the process, and who has the sign-off?

Colorado -

Minnesota - The reclamation rules provide for a release process. The MN DNR Lands and Minerals signs off on reclamation required by the rules.

The MPCA signs off on their regulatory authorized activities.

Nevada -

New Mexico – MMD is responsible for the performance criteria and approval of the final closeout. We invite the federal agency to participate and would take into consideration any concerns they may have.

US Bureau of Land Management - Yes, under the authority of the surface management regulations at 43 CFR 3809.590. The process generally requires a final inspection and public notification of final financial guarantee at the local field office or local paper for 30-days.

Utah -

Western Australia - Under mine closure process. Sign-off by Minister for Mines (or Minister for State Agreement Acts) and Minister for Land, and possibly Minister for Environment (if bonds are required under Environmental Protection Act)

2b) Does this process include Aboriginal consultation?

Colorado -

Minnesota - No.

Nevada –

New Mexico – When our process affects Native Americans the answer is yes.

US Bureau of Land Management – No.

Utah - Utah does not regulate any Aboriginal lands – the Federal Office of Surface Mining does.

Western Australia - Yes, all key stakeholders are to be consulted by proponents though the mine closure process.

3) Is there a site assessment for performance and potential surprise liabilities before acceptance?

Colorado - Yes, all permit and reclamation plan requirements would have to be satisfied before the mining permit is terminated and the financial warranty returned. Only then could the land be returned to jurisdiction of Federal or State land management agencies.

Minnesota - Yes.

Nevada -

New Mexico – Yes.

US Bureau of Land Management - The BLM manages the lands and regulates the surface disturbance; therefore no formal acceptance process is required.

Utah - Yes. Our agency and the landowner, whether it be private or government owned, must agree that the reclamation is adequate before bond is released.

Western Australia - Yes

4) What are the conditions for acceptance?

Colorado – Depends on permit requirements (see answers above in other sections)

Minnesota - The site is inspected to determine if all terms and conditions of the rules and permit have been satisfied. No release from a permit to mine shall be approved for a portion of the mining area requiring post closure maintenance until the necessity for maintenance ceases.

Nevada -

New Mexico – Compliance with terms of the closure plan.

US Bureau of Land Management - Reclamation completed as per reclamation plan; and financial liability has been terminated.

Utah -

Western Australia - Meeting tenement conditions and other environmental and safety conditions

5) Does acceptance require contingency funding from the proponent for surprises?

Colorado -

Minnesota - No, not according to the rules. We have not experienced this sort of release/acceptance yet.

Nevada -

New Mexico – No, MMD has not had to deal with long-term issues, such as groundwater contamination that would go beyond reclamation of surface disturbance.

US Bureau of Land Management – No

Utah - Yes, any part of the reclamation that is not fully complete remains bonded until it is complete.

Western Australia - Not currently under Mining Act

6a) Does the proponent receive a release document?

Colorado - No, State Land Board never provides a release document releasing anyone from liability. Even after a mining lease on State Lands is cancelled or expires, the lessee is still liable for undiscovered lease violations.

Minnesota - Yes.

Nevada –

New Mexico – Yes, there is a Finding of Fact, Conclusion of Law and Director Order issued for FA releases. The Findings document how the operator has complied with its regulatory responsibilities.

US Bureau of Land Management - The BLM provides written notice.

Utah - Yes

Western Australia - Yes

6b) If yes, does it contain standard clauses respecting residual liability, release from liability, etc?

Colorado -

Minnesota - No. There is not a standard format at this time. No release is approved for areas requiring post closure maintenance until the necessity for maintenance ceases.

Nevada -

New Mexico –

US Bureau of Land Management - The notice is not standardized but may contain reference to 43 CFR 3809.592, which concerns residual liability.

Utah - No

Western Australia - No

6c) Please provide these clauses.

Colorado -

Minnesota - n/a

Nevada -

New Mexico –

US Bureau of Land Management - 3809.592 Does release of my financial guarantee relieve me of all responsibility for my project area?

(a) Release of your financial guarantee under this subpart does not release you (the mining claimant or operator) from responsibility for reclamation of your operations should reclamation fail to meet the standards of this subpart.

(b) Any release of your financial guarantee under this subpart does not release or waive any claim BLM or other persons may have against any person under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. 9601 et seq., or under any other applicable statutes or regulations.

Utah -

Western Australia -

7) Is there a third party consultation for return of such lands, indemnification, etc. (i.e., another government agency)?

Colorado -

Minnesota - We will review the potential release with the MPCA before they would be released by MDNR, but the rules do not require consultation

Nevada -

New Mexico – Yes

US Bureau of Land Management - Individual BLM generally have MOUs with the state governments required some form of notification or consultancy.

Utah - Just the land-managing agency, where applicable.

Western Australia - Yes, as part of the mine closure process

8) Are there one or more agencies (departments or divisions) that must sign-off on lands returning to the Crown/State?

Colorado - Colorado Division of Reclamation Mining and Safety would have to certify acceptance of the final reclamation and release the permit and financial warranty; State or Federal land agency would then conduct their own sign off to release/terminate an unpatented claim or mineral extraction lease.

Minnesota - See above (7).

Nevada –

New Mexico – For Coal no, for Hard Rock yes.

US Bureau of Land Management – No

Utah - Yes. Our agency and the owner of the land, that could be the United States Forest Service, the United States Bureau of Land Management, the Utah State Institutional Trust Lands Administration, the Utah Division of Forestry, Fire and Sovereign Lands, or a combination of

Western Australia - Yes

9a) Do you accept lands that continue to require monitoring and maintenance in perpetuity, e.g. water treatment?

Colorado – No. Current agency permitting protocols do not allow for a closure/reclamation plan with long-term water treatment in perpetuity. Any mine where water treatment permits are needed for perpetual treatment post-closure must get and maintain the permits from the Colorado Dept. of Health and the Environment.

Minnesota - No. No release is approved for areas requiring post closure maintenance until the necessity for maintenance ceases.

Nevada –

New Mexico – No on coal mines, and new hard rock mines. Yes, on existing hard rock mines.

US Bureau of Land Management – Yes

Utah -

Western Australia - No, not through a mine closure process

9b) If yes, who will take over the monitoring/management of the site?

Colorado -

Minnesota -

Nevada –

New Mexico – Generally the operator is required to do this.

US Bureau of Land Management - The BLM and/or State agency depending on the MOU.

Utah -

Western Australia -

9c) Is there a responsible operating agency?

Colorado -

Minnesota -

Nevada –

New Mexico – Generally the NM Environment Dept.

US Bureau of Land Management - Depends on MOU.

Utah -

Western Australia -

10a) Is there a separate agency responsible for uranium mine commissioning and decommissioning?

Colorado - Yes.

Minnesota - MN Rules 6132.0300 state that until adequate studies are completed to determine the extent to which regulation may be necessary and rules are adopted, no permit to mine shall be issued under parts 6132.0100 to 6132.5300 to a mining operation that includes: (1) the mining of radioactive ores for the commercial production of uranium, thorium, or any other material that is determined by the Nuclear Regulatory Commission to be essential to the production of fissionable materials; or (2) in-situ leaching as part of the beneficiating process.

Nevada -

New Mexico – Conventional uranium mines are under the jurisdiction of this agency, EMNRD, solution uranium mining is permitted by the New Mexico Environment Dept.

US Bureau of Land Management - No.

Utah - No

Western Australia - Yes

10b) If yes what is the agency?

Colorado - The Colorado Department of Health and Environment, Hazardous Waste Management Division is also involved with permitting and reclamation of uranium mining and processing facilities, as is the Federal Nuclear Regulatory Commission, and the U.S. EPA.

Minnesota -

Nevada -

New Mexico – See above. (10a)

US Bureau of Land Management –

Utah -

Western Australia - The State Radiological Council, in addition to other responsible agencies.

10c) Are lands from decommissioned uranium mines accepted back by the State?

Colorado - Yes, if they are State owned.

Minnesota - We have not had any uranium mines in MN.

Nevada -

New Mexico – Yes

US Bureau of Land Management - Yes, under the conditions that apply at 43 CFR 3809.

Utah - Yes

Western Australia - Theoretically yes,

10d) If yes, under what conditions?

Colorado - See answer for [Sections] 3-1 and 3-8. Other State and Federal agency sign-offs would be required in the case of a reclaimed uranium mine/mill.

Minnesota -

Nevada -

New Mexico – See question #1 (*Section 3*).

US Bureau of Land Management – [see answer for 10c]

Utah – Reclaimed to the standards of the Utah State Statute

Western Australia - If meeting all regulatory requirements

11a) How do you manage land tenure complexities, e.g. surface rights versus mining rights?

Colorado - Our agency does not manage these issues. Permits require the operator to provide proof of mineral rights lease or ownership, as well as ownership or lease of surface included in the permit.

Minnesota - After a release from the Permit to Mine obligations, surface rights and mineral rights would return to the respective owner/lessor. Mining waste from state minerals is typically stockpiled on state surface. Some stockpiles have co-mingled ownership due to the co-mingling of mineral rights.

Nevada –

New Mexico - There is National legal precedent for this issue, basically the mineral owner has paramount rights to access his property. Many States have laws that provide for mineral owners to compensate surface owners to some degree.

US Bureau of Land Management – According to US case law, the mineral estate is superior to the surface estate. However conflicts are handled by the local field offices and are often adjudicated through the department's appellate review body, the Interior Board of Land Appeals.

Utah - Mineral rights trump surface rights in Utah. We require that the mineral owner have right of way from the surface owner, if there is a disagreement, they would have to resolve it in court.

Western Australia - Though Mining Act and Land Administration Act

11b) Can land use restrictions be put in place for future protection?

Colorado - Our agency is not involved with land management activities- these are done at the local county level or through federal or state land management programs.

Minnesota - Yes. For example, a conservation easement or deed restriction could be put on a wetland replacement site.

Nevada -
New Mexico - Yes.
US Bureau of Land Management - No.
Utah – Not without some compensation to the mineral owner
Western Australia - Yes

Section 4: General

1) Are you satisfied that your program will prevent further accrual of abandoned mines, i.e., is it rigorous enough?

Colorado - Mostly this is true. Regulations have been made much more protective and stringent after Colorado and U.S. taxpayers got burned at Summitville by Canadian operator Galactic Resources (an early Robert Friedland outfit).

Minnesota - Yes

Nevada - Yes.

New Mexico - Yes.

US Bureau of Land Management – Yes

Utah - Yes

Western Australia - No, there will always be unplanned mine closure

2a) Does your government have off-sets, e.g. tax incentives or infrastructure support, to rigorous rehabilitation requirements?

Colorado - No. We are a regulatory agency only; we provide no incentives or promotion of mining enterprises.

Minnesota - Not aware of any.

Nevada - We use bonding and regulatory enforcement.

New Mexico - No.

US Bureau of Land Management – No

Utah - No

Western Australia - Yes

2b) If yes, what are they?

Colorado -

Minnesota -

Nevada –

New Mexico –

US Bureau of Land Management –

Utah -

Western Australia - Not sure, but through the Australian taxation systems