

Policy and Process Review for Mine Reclamation Security



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September 30, 2016

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Executive Summary

This report is a characterization of current mining reclamation security (financial assurance) in six mining jurisdictions including British Columbia, Ontario, Nova Scotia, Alaska, Nevada, and Western Australia.

The reclamation security characterization is made through responses to a list of questions that were provided by British Columbia Ministry of Energy and Mines (BCMEM). Responses are provided to each of these questions for each of the six mining jurisdictions. The questions are generally designed to seek clarity on the scope of the reclamation security, allowable uses, applicability to on- and off-site impacts and immediate and long-term impacts and outcomes and liability for catastrophic events at existing operating mines. Specifically, the six questions are:

1. What is the definition of reclamation security?
2. What is it intended to cover?
3. How is it administered?
4. What is the liability for catastrophic events?
5. To what extent are the reclamation cost estimates confidential?
6. Are the detailed evaluations used to set the bond amount confidential?

The Canadian provinces were selected because they provide a range of mine-types and commodities. Two United States jurisdictions were selected because they offer a useful comparison with Canadian mining jurisdictions, by mine-type, geography, reclamation considerations and regulatory requirements, including reclamation security. Western Australia was selected because it represents a major mining state in an international jurisdiction with a different approach to mine reclamation security, compared to the mining jurisdictions we selected in North America.

Our general approach to preparing responses to the study questions was to rely on Stantec staff that work in these jurisdictions and are familiar with the reclamation security requirements. These staff made a first- pass through the questions and developed initial responses. As a second step our staff reached out to agency representatives in each jurisdiction to confirm responses or acquire answers for questions that remained unanswered or incompletely answered. As a third step our staff reviewed the applicable mining laws and referenced most of their responses with the applicable law or written policy or otherwise clarified the basis for their answer including many that are based in practice rather than law or written policy.

Reclamation security is similarly defined in the six jurisdictions as a guarantee, provided through an acceptable form of financial instrument or annual payment, that mining companies will perform the reclamation and closure activities prescribed in their reclamation and closure plans, including monitoring and other long-term obligations where they exist. The reclamation plans are also similar between jurisdictions in that they address surface reclamation and stabilization, removal of infrastructure and facilities, stabilization of mine wastes to prevent contamination

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and the monitoring required to confirm the efficacy of the reclamation and closure activities and that the site has been returned to a stable state.

Alaska, and Nevada require a reclamation security sufficient to pay 100% of the estimated mine reclamation and closure costs for the mine, subject to periodic review, including reductions where mines perform reclamation concurrent with ongoing mining operations. In British Columbia mine sites requiring long-term water treatment, or mine sites owned by a single mine company require 100% security prior to or at closure. In practice, Nova Scotia regulators aim to set reclamation security amounts equal to the total estimated reclamation cost at maximum (peak) disturbance, however, in the legislation, the security needs only to be determined by the Registrar to cover the prescribed items and be satisfactory to the Minister. In Ontario, mining companies that pass the financial test may be waived of some or all of their reclamation security obligation, depending on their financial strength. Western Australia is quite different and requires an annual payment into the Mine Rehabilitation Fund (MRF) instead of a 100% reclamation security. The MRF annual payment is calculated by applying a unit cost to each hectare in the mining lease, based on land use, to generate a liability amount, and then factoring that liability amount by 1%. As a result of this annual payment approach, 100% of the reclamation security is not required in Western Australia as it is in other jurisdictions. In Western Australia, there is also a second category of mines that are deemed to be of "state significance." These are generally the very large mines. For these mines, the terms of their mining leases, including any reclamation security requirement, is negotiated with the Western Australia government and formalized through legislation known as 'State Agreements'. Our agency contact at the Western Australia Department of Mines and Petroleum (DMP) informed us that most of these mines are not required to provide a reclamation security.

Long-term liabilities, including water treatment where it is required, are included in the calculation of the reclamation security in all study jurisdictions except Western Australia, where long-term water treatment is not a typical need owing to the arid environment.

Confidentiality of mine reclamation security calculations varies from jurisdiction to jurisdiction. Nevada and Alaska disclose them to the public and solicit public comment on the draft estimates. Ontario and Nova Scotia treat them as confidential, while British Columbia can treat them as confidential with ministry approval, but otherwise make them available on-line. Western Australia treats them confidentially.

In all jurisdictions the reclamation security estimate is subject to a review and adjustment process involving the mine company and the regulatory agencies. In jurisdictions other than Nova Scotia, the mining companies provide the first draft of the estimate. In Nova Scotia, the reclamation cost estimate is developed by the regulatory agencies, although a mining company's own estimate will be reviewed and considered, if prepared. Reclamation security adjustments are made periodically to correspond with permit renewal cycles and/or significant changes in mine operations, except that in Western Australia the payment into the MRF is recalculated annually, even in the absence of any changes to the scope or character of the mine project.

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Financial Security for catastrophic events or accidents is not included in the calculation of reclamation security in any of the jurisdictions included in this study. However, these jurisdictions do have the authority to levy penalties for noncompliance and can find the companies liable for impacts under other existing laws. In Western Australia, the MRF Act does not address catastrophic events or accidents directly, but as a matter of evolving practice the funds can be made available to mitigate these events at the discretion of the Director General of the DMP. In the US, the Environmental Protection Agency (USEPA) is developing a new rule (law) that will impose a requirement for some form of catastrophic security on hard rock mines. The draft rule is scheduled to be published for public comment in December 2016. The USEPA has communicated that the draft rule will employ a formula that assigns a liability cost to the mine on the basis of acreage, mine-type and other facility characteristics, and then reduces the liability costs by providing credits for certain best-management-practices that are being implemented at the mine. Few other details are available at this time.

The following table serves to summarize certain key aspects of reclamation security in each of the six jurisdictions.

Table 1 Policy and Process Summary of Mine Reclamation Security

Reclamation Security Question	British Columbia	Ontario	Nova Scotia	Nevada	Alaska	Western Australia
Is there law or written policy requiring reclamation security?	Yes <ul style="list-style-type: none"> Legislation: <i>Mines Act</i> (Sec. 10(5)) Policy: Mine Reclamation Security Policy in British Columbia, 1996 	Yes <ul style="list-style-type: none"> <i>Ontario Mining Act</i>, R.S.O. 1990, Chapter 14 Ontario Regulation 240/00 – Mine Development and Closure under Part VII of the Act 	Yes <ul style="list-style-type: none"> <i>Nova Scotia Mineral Resources Act</i>, Chapter 18 of the Acts of 1990 Mineral Resources Regulations made under Section 174 of the <i>Mineral Resources Act</i> <i>Environment Act</i>, Chapter 1 of the Acts of 1994-95 	Yes <ul style="list-style-type: none"> Nevada Administrative Code Chapter 519A (NAC 519A) Nevada Revised Statutes Chapter 519A (NRS 519A) 	Yes <ul style="list-style-type: none"> Alaska Statutes 27.19, 46.17 Alaska Administrative Code Title 11, Chapter 97 and Title 18 Chapter 60 Code of Federal Regulations Title 36, Section 228.13 	Yes <ul style="list-style-type: none"> <i>Mining Rehabilitation Fund Act 2012</i> Mining Rehabilitation Fund Regulations 2013
Is there law or written policy specifying a requirement that reclamation security cover 100% of the liability?	Policy: The British Columbia Advisory Council on Mining, British Columbia Mine Reclamation Security Policy - Report and Recommendations to the Minister of Employment and Investment, April 1996 Policy specifies that: <ul style="list-style-type: none"> For sites requiring long-term water treatment 100% security be required at or prior to closure (cessation of mill operations) For sites owned by single mine companies 100% hard security be required at or prior to closure (cessation of mill operations) 	Legislation: The Mine Development and Closure regulation requires that the security be adequate and sufficient to cover the cost of the rehabilitation work required to meet the regulation. Companies that pass the financial test may be waived of the security obligation for part, or all, of the mine-life.	Operational practice: The aim of regulators when setting the amount of financial security to be held is to cover the cost of reclaiming the site at the point of maximum (peak) disturbance. Legislation: The Mineral Resources Regulations require that security must include the cost for labour, supplies and services to conduct the reclamation activities prescribed by the regulations.	Legislation: Nevada Administrative Code 519A.360 requires "sufficient" surety for the entire area that you propose to disturb.	Practice: While regulations refer to "acceptable, reasonable and likely" estimates of reclamation security, the practice is to require 100% security, including for long-term water treatment.	Legislation: <i>Mines Rehabilitation Act</i> requires annual payment but not 100% reclamation security.
At what stage of mine life is security required?	Security is collected from time of initial permit issuance. Is adjusted through mine life to keep pace with liability. Policy states that 100% security is required by closure for mines requiring water treatment.	Security is collected at the same time as the Closure Plan is filed. This must be in advance of the commencement of mining activities. A phased approach may be taken and security may be adjusted up or down commensurate with reclamation obligations.	Security is collected prior to the commencement of mining operations. A phased approach may be taken if accepted with the consent of the Minister.	Security is due in advance of the State issuing a notification to proceed to the company.	Security is due at issuance of initial permits. Security may be adjusted up or down commensurate with reclamation obligations.	Security is due at issuance of initial permits. Security is recalculated annually and may be adjusted up or down commensurate with reclamation obligations.
Is long-term water treatment included in reclamation security cost estimates?	Yes	Yes	Yes	Yes	Yes	No As a practical matter water treatment for discharge is not common in WA.

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Table 1 Policy and Process Summary of Mine Reclamation Security

Reclamation Security Question	British Columbia	Ontario	Nova Scotia	Nevada	Alaska	Western Australia
Are catastrophic events covered by the reclamation security?	No The Environmental Management Act provides requires the responsible party to pay for costs of remediating environmental damage.	No	No	No	No	Yes In practice at the discretion of the MRF Director General.
Are the details of reclamation liability costing confidential?	In accordance with Part 10.1.3(i) of the Health, Safety and Reclamation Code (July 2016 revision), on approval from the Chief Inspector, cost estimates may be filed in a separate confidential report. <ul style="list-style-type: none">Estimated reclamation costs and the actual security bond held for metal and coal mines in BC are available on the BCMEM website.	Yes In accordance with <i>Mining Act</i> , R.S.O. 1990, S.145 (10).	Yes In accordance with Mineral Resources Act, Subsection 19 (9) and Section 175.	No In accordance with NAC 519A.185 draft permits are available for public review and content.	No In accordance with 46.03.110 (b) reclamation security amounts are made available for public comment for at least 30 days.	Yes In practice the liability costing is kept confidential unless a company release it independently.

Abbreviations

BC	British Columbia
BCMELP	British Columbia Ministry Environment Lands and Parks
BCMEM	British Columbia Ministry of Energy and Mines
BCMEMPR	BC Ministry of Energy and Mines and Petroleum Resources
BMRR	Bureau of Mining Reclamation and Regulation
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
Chief Inspector	Chief Inspector of Mines
DEC	Department of Environmental Conservation
DOE	Department of the Environment
DMP	Department of Mines and Petroleum
DNR	Department of Natural Resources
ECA	Environmental Compliance Approval
FOIP ACT	<i>Freedom of Information and Protection of Privacy Act</i>
FCR	fund contribution rate
ISLOC	irrevocable standby letters of credit
MNDM	Ministry of Northern Development and Mines
MOE	Ministry of Environment
MOU	memorandum of understanding
MRF	Mine Rehabilitation Fund
NAC	Nevada Administrative Code

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NDEP	Nevada Division of Environmental Protection
NSE	Nova Scotia Environment
NPV	net present value
PCB	polychlorinated biphenyls
POO	Plan of Operations
RLE	rehabilitation liability estimate
SRCE	Standardized Reclamation Cost Estimator
USA	United States of America
WA	Western Australia

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Introduction
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1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) was requested by the British Columbia Ministry of Energy and Mines (BCMÉM) to complete a review of the policy and process related to Reclamation Security (financial assurance) in leading mining jurisdictions within Canada, the United States and Australia. The review was focussed on the scope of the Reclamation Security. Specifically the allowable uses, applicability to on- and off-site impacts during both operations and closure, and the requirements for Reclamation Security to address catastrophic events.

In Canada, British Columbia, Ontario, and Nova Scotia were selected as they provide a range of mine-types, commodities, and geography. For the United States, Alaska and Nevada were selected as they offer a basis for comparison with Canadian mining jurisdictions, by mine-type, geography, reclamation considerations and regulatory requirements, including Reclamation Security. Western Australia was selected because it represents a major mining state and offers a broader international perspective on the subject of Reclamation Security.

1.1 APPROACH

To focus the review, a series of questions were developed by the BCMÉM related to closure and reclamation security. The questions were grouped into the following categories:

1. The definition of Reclamation Security
2. What is Reclamation Security intended to cover?
3. How is Reclamation Security administered?
4. What is the liability for catastrophic events?
5. To what extent are the reclamation cost estimates confidential?
6. Are the detailed evaluations (economic assumptions) used to set the bond amount confidential?

For each jurisdiction initial responses to the questions were developed based on Stantec's knowledge of the governing legislation and guidance documents related to mine closure and Reclamation Security. After the initial responses were developed, follow-up phone interviews were held with representatives in each of the jurisdictions to confirm and seek clarifications as required. Finally, Stantec reviewed the relevant legislation that was used to support the responses to the questions.

The following sections of the report present the responses to the questions developed by BCMÉM for each of the six jurisdictions.



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2.0 BRITISH COLUMBIA, CANADA

The *British Columbia Mines Act* (RSBC 1996, c. 293) governs mines in British Columbia. The Health, Safety and Reclamation Code for Mines in British Columbia (BC Ministry of Energy and Mines and Petroleum Resources [BCMEMP] 2008) specifically sets out how mine reclamation and closure, including the associated reclamation security, are prescribed and administered. The amount of reclamation security is generally site specific to mines and many of the conditions are determined during the mine permitting process. For sites requiring long-term water treatment 100% security is required at or prior to closure (cessation of mill operations). For sites without the need for long term water treatment 100% security is still required to pay the cost for reclamation for the current level of disturbance, subject to ministry review throughout the life of mine. Once a mine permit is granted, the reclamation security is reviewed every five years or sooner if a re-evaluation is deemed necessary by the Chief Inspector of Mines (Chief Inspector). The reclamation security is held in trust under the BCMEM. The reclamation security is set to capture the total estimated cost of closing and reclaiming the mine site using a phased approach and includes any associated off-site infrastructure that is listed in the mine permit. The reclamation security does include monitoring and maintenance that is to be carried out until such long term care is no longer needed. Based on operational practices, there are contingencies set aside in the reclamation security by BCMEM. A contingency is set to capture any risk for uncertainty related to the mine plan.

Reclamation security is used for financial assurance of planned events and not catastrophic events. Catastrophic events that occur on a mine site fall under the *Mines Act* (RSBC 1996, c. 293) and off-site mine effects fall under other provincial and potentially federal rules, legislation and regulations. Currently there is no statutory requirement for the mine operator to provide insurance or assurance for potential catastrophic events.

2.1 DEFINITION OF RECLAMATION SECURITY

Reclamation security is a financial security associated with mine development which is determined through a provincial regulatory mine permitting process. Sections 10.4 and 10.5 of the *British Columbia Mines Act* indicate that the permittee must provide financial security in an amount and in a form acceptable to the Chief Inspector of Mines (Chief Inspector). This security is held until the Chief Inspector is satisfied that all reclamation requirements for the operation have been fulfilled (Government of BC 2016, BCMEM 2016a).

As per subsection 10.(5) of the British Columbia Mines Act, If required by the chief inspector, the owner, agent, manager or permittee, in each year, must deposit security in an amount and form satisfactory to the chief inspector ...calculated over the estimated life of the mine.

The financial security as per subsection 10.4 is for mine reclamation, and protection and mitigation of watercourses and cultural heritage resources affected by the mine.



2.2 RECLAMATION SECURITY COVERAGE

2.2.1 Restoring disturbance on site? Offsite disturbances (e.g. loadouts, other)?

The reclamation security in British Columbia is set to cover both on and off-site (e.g., load outs) mine disturbances as outlined within the Mine Permit. The list of mine features and reclamation activities for estimating reclamation costs can be found in the "User Manual for Reclamation Costing", along with a reclamation costing spreadsheet, at http://www.em.gov.bc.ca/subwebs/mining/Project_Approvals/Annual_Report_Format/reclamation_liability_cost_estim.htm (BCMCM 2015a).

Some mine development features that were constructed for the sole purpose of supporting the mine may be classified as permanent and can have other agreements in place to transition these assets to other parties for subsequent repurposing (e.g., roads, rail lines, reservoirs and buildings). If these assets are transferred to another party they no longer fall under the responsibility of the mine and are no longer a calculated liability that goes into reclamation security.

Mine pit walls and benches, and steep sloped footwalls built in bedrock, are exempt from revegetation and are not included in the liability cost estimation that the reclamation security is based on (Section 10.7.14 of the Health, Safety and Reclamation Code for Mines in British Columbia). However, reclamation security related to pit walls does require that geotechnical stability is maintained and if maintenance is required that would be calculated as part of the liability estimation provided to MEM by the mine operator and would be considered part of the reclamation security (BCMCM 2015).

2.2.2 Restoring disturbance through normal operation?

Restoring disturbance during mine operations (i.e., progressive reclamation) is often a mine permit requirement. Reclamation security accounts for the liability of reclaiming all mine features in case the mine operator does not carry out any reclamation during the mine operations phase of the project. The cost of progressive reclamation during mine operations is covered as part of yearly mine operating costs. The reduction in reclamation security is realized when a liability has been removed (recontouring, placement of soils, backfilling of potentially acid generating waste rock into a flooded pit) or the reclaimed land meets the approved end land use and permit conditions. At the time of the 5-year mine plan update or as the Permit requires, the reclamation cost report submitted to the BCMCM will capture the reduction in liabilities which will be accounted for during the liability evaluation.

2.2.3 Removing infrastructure (e.g., roads, wharves, power generation facilities, and air strips)?

Removal of site infrastructure is based on the approved end land use (Section 10.7.4 and 10.7.5 of the Health, Safety and Reclamation Code for Mines in British Columbia). End land use goals

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are determined through consultation with regulatory agencies, stakeholders and local aboriginal communities. Road, wharves, or air strip infrastructure may be required as access to support post closure monitoring or future exploration and may remain in place. Power generation facilities or infrastructure may stay in place if required to operate post closure infrastructure such as water treatment plants or groundwater pumps to capture seepage. The facilities or infrastructure that must remain in place post closure will have reclamation security to cover any ongoing monitoring and maintenance associated with those features which will be released following final decommissioning and reclamation once they are no longer required (Howe 2016, Demchuk 2016).

2.2.4 Restoring disturbance on and / or off site due to accident or failure?

The amount of reclamation security is only calculated for expected costs (BCMEM 2015a) and does not cover accidents or failures should they occur. However the mine operator is legally liable for restoring disturbances, and will often carry insurance, but these costs are not part of the reclamation security estimate. Reclamation security is for planned reclamation (*BC Mines Act*, Section 10.4).

2.2.5 Does the security include costs to go from operations to closure (e.g. hazardous substances survey of the mine, engineering studies to determine specific closure requirements, pumping from underground until hazardous materials removed, maintaining hydro and ventilation systems etc.)

The reclamation security does include costs to go from an operating mine to closure (BCMEM 2015a). A cost for detailed closure studies and final closure design typically includes control of surface water, groundwater, aquatic, geochemical and geotechnical condition and the associated monitoring to meet the needs of the closure design.

2.2.6 Long term post closure water treatment of acid-mine-drainage or other leaching or effluent issues?

Reclamation security covers long term water treatment costs and the specific requirements are outlined within the Mine Permit. As per 10.1.16 of the Health, Safety and Reclamation Code for Mines in British Columbia the plan, prediction, and if necessary, the prevention, mitigation and management of metal leaching and acid rock drainage shall be prepared in consideration of the Guidelines for Metal Leaching and Acid Rock Drainage at Mine sites in British Columbia (BCMEM 1998).

Under existing BC legislation and policies, mining companies are fully responsible for environmental protection and reclamation at their mine sites and must demonstrate the effectiveness of their plans in the development, operation and closure phases of the mine (BCMEM and BCMELP 1998).



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2.2.7 Long-term post closure monitoring and maintenance (e.g. maintenance of cover systems, tailings dams, water treatment plants etc.; geotechnical, water quality, biological monitoring etc.)

As a condition of a *Mines Act* permit, financial assurance is required to provide sufficient funds to cover outstanding reclamation obligations including maintenance and monitoring. In some cases additional funds may be required as contingency for major repairs. As per the metal leaching and acid rock drainage guidelines and policy, the reclamation security includes both monitoring and maintenance (BCMEMP and BCMELP 1998, BCMEMP 1998).

2.2.8 Accidents? Disasters that lead to on site / off site environmental damage?

The reclamation security does not cover accidents or disasters. However, if one occurs the *Environmental Management Act* requires the responsible party to address the costs for environmental damage. For environmental damage that occurs during mine operations it is likely that the long term monitoring of the remediated accident or disaster site would be incorporated into the reclamation security after the accident or disaster was remediated (Howe 2016).

2.2.9 Are contingency costs applied? What range is applied?

Contingency may be applied and is based on the level of uncertainty associated with a mine (e.g., water treatment costs). The level of contingency is based on the state that the project is in, and is generally reduced as the project advances from design, construction, operation to post closure. In addition, contingencies may be applied by the mine operator by their estimator when completing the reclamation liability cost estimate that is submitted to BCMEMP. Based on operational practice (Demchuk 2016, Howe 2016) the range of cost contingency can range from 10 to 50%.

2.2.10 Other items?

The process of reclamation security is not applied to historical contaminated mine sites or non-permitted, uncontaminated mines on Crown Land. Historical contaminated mine sites are under the responsibility of British Columbia's Ministry of Forests, Lands, and Natural Resources Operations, Land Remediation Group. If the historical mine site (neither abandoned nor closed) is not contaminated and did not have a mine permit those sites fall under the responsibility of the Province of British Columbia (Health and Safety Issues) (Howe 2016).

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2.3 RECLAMATION SECURITY ADMINISTRATION

2.3.1 Is reclamation security administered by mining/natural resources departments or environment departments or other?

Statutory decision-makers with the BCMEM, determine the amount of security required for each mine and collect and hold the security.

2.3.2 How is reclamation security calculated? Who is it calculated by? How is company information considered and used?

Reclamation security is calculated by the BCMEM. This reclamation security considers the reclamation costing report submitted by the mine operator as well as any additional considerations determined by BCMEM (net present value [NPV] rates, contingencies, etc.) Company information is used following a set template provided by the BCMEM (BCMCM 2015). The basis of the reclamation security incorporates the reclamation costing report that is submitted by the mine operator. The mine operator may hire a third party cost estimator to complete their liability cost estimate, which includes the liability over a 5-year time frame (if applicable) and costs at post closure. BCMEM uses that as part of their internal assessment using NPV rates and will find areas that need contingency and calculation in setting the reclamation security for the mine (British Columbia Advisory Council on Mining 1996).

2.3.3 How frequently is security reviewed and recalculated? What triggers an evaluation?

The mine permit process normally has a set review time of every 5 years and at that time the liability of the mine development is recalculated and the reclamation security is re-evaluated. An evaluation of reclamation security can be triggered by BCMEM during mine permit amendments and, in some cases, at the sole discretion of the Chief Inspector of Mines.

2.3.4 What percentage of liability does the security have to cover? Is 100% of the reclamation liability required up front? What portion is required up front versus over the life of the mine?

The Mine Reclamation Security Policy (1996) specifies that for sites requiring long-term water treatment 100% security may be required at or prior to closure (cessation of mill operations). For sites owned by single mine companies, 100% hard security is required at or prior to closure (cessation of mill operations).

As the security amount may be reviewed every five years, the security may be adjusted to be commensurate with the maximum liability posed by the disturbance at the site and in recognition of reclamation work that has been performed and inspected by BCMEM. The reclamation security is set at a level that reflects all outstanding reclamation and closure obligations associated with the site. The amount of any security may be increased or decreased



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at the discretion of the Chief Inspector based on the risks at any time (Government of BC 2016, BCMEM 2016c, BCMEM 2016a, BCMEMPR 1995).

For existing mines, there is a \$1.263 billion shortfall between the total security held and the total outstanding liability (BCMEM 2016c). The BCMEM has been requiring additional security to be posted to move towards full security (Howe 2016).

2.3.5 Is long-term, post-closure liability calculated differently from operational liability? How is long term post closure liability factored into the reclamation security required for an operating mine?

As per operational practice, the long term liability costs are calculated as the NPV of the amount necessary to meet reclamation security obligations (Demchuk 2016, Howe 2016). The NPV calculation incorporates assumptions for the rate of inflation. The day to day operations during life of mine is not included as part of reclamation security. Operational liability costs related to long term site management requirements of a mine are considered as part of the reclamation security. Any reclamation activities that occur during mine operations and shortly following closure covered by the mine operator do allow for adjustments in the reclamation security for reclamation works completed.

2.3.6 How is a mine's long-term reclamation liability calculated? Over what period of time is it considered (e.g. 50 years, 100 years, other)?

Long-term liability is normally associated with ongoing maintenance of water retaining structures or treatment of metal leaching and acid rock drainage. In the case of requirements that have a clearly defined end date, the costs are estimated and the security can be determined. For issues such as treatment of acid rock drainage/metal leaching, BC has a number of examples (Sullivan, Equity Silver) where treatment may continue for 50 to 100 years (Howe 2016). The security required represents the NPV to pay the costs (BCMEM 2015). For sites that will have a liability in perpetuity a 100-year model is used because when discount rates for NPV are applied anything beyond 100 years is no longer meaningful. Every 5 years even for closed mines there is 5-year review of the reclamation security.

2.3.7 Are discount rates used to calculate the net present value of long term liabilities? What discount rates are applied, how are they determined and how often are they reviewed?

In operational practice, discount rates are used to calculate NPV of long-term liabilities. The discount rates are reviewed every 5 years in a rolling review (Howe 2016). The process of the discount rate application is outlined in the publicly available document of the Review of 2010 financial security at Equity Silver mine (Aziz and Bellefontaine 2011).

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2.3.8 Is the financial strength of a company assessed and considered? How is this done?

In some situations, such as mine sites where the company's financial strength materially exceeds the estimated liability, the BCMEM may accept less than full security. The BCMEM reviews the liability status of such mine sites and reduces bonding liability short-falls over time, as determined by BCMEM led analysis (BCMEM 2016a).

2.3.9 How is reclamation security provided by mine operators? In what forms?

The reclamation security can be set in the form of guaranteed investment certificates (for security less than \$25,000) and the principal is pledged to the Province of British Columbia. Security may also be in the form of cash and cash equivalents (certified cheques, bank drafts) or irrevocable standby letters of credit (ISLOCs) issued by financial institutions on behalf of a mine operator, or it can be in the form of reclamation surety bonds (Government of BC 2016, BCMEM 2016a). The BCMEM provides standardized forms for reclamation security and applicable forms must be filled out by the mine operator (Government of BC 2016).

2.3.10 How is reclamation security used by each jurisdiction? How is it made available for use?

The reclamation security is used by BCMEM to carry out any required reclamation activities that were not completed by the mine operator to meet the reclamation permit obligations for a mine project. The reclamation security is made available when a mine operator has defaulted on their legal obligations to meet their permit requirements. The BCMEM would have the option of completing the work, hiring a contractor or issuing a tender for completing the work and pay for it using the security.

2.3.11 How is reclamation security refunded in each jurisdiction?

As per the Health, Safety and Reclamation Code for Mines in British Columbia, Reclamation and Closure, Part 10.6.15, "on the closure of a mine, and on the chief inspector being satisfied that some or all the conditions of the permit have been complied with, the person who deposited a security under section 10 (4) or 10 (5) of the *Mines Act* shall be entitled to refund of some or all of the security and any accumulated interest, less any amount paid out under section 10 (8) of the *Mines Act*."

As per the Health, Safety and Reclamation Code for Mines in British Columbia, Reclamation and Closure, Part 10.6.16, "an application for security release or a partial security release, that details the reclamation activities that have been completed under the requirements of the act, the code, and approved reclamation plan, shall be submitted to the chief inspector."

Reclamation security can be reduced for works successfully implemented which is evaluated during the 5-year rolling review. Any long term periodic maintenance obligations at a closed



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mine will be held under a Mines Act permit and secured with the funds from the reclamation security.

2.3.12 How is progressive reclamation considered in financial security?

Mine operators which are able to close out discrete areas of surface work during life of mine by completing reclamation concurrently with mining will have cost savings applied during the reclamation liability estimation that is submitted to BCMEM. The reduction in reclamation security is realized when a liability has been removed (recontouring, placement of soils, backfilling of potentially acid generating waste rock into a flooded pit) or the reclaimed land meets end land use and permit conditions. Progressively reclaimed areas that are deemed successful with no ongoing monitoring or maintenance requirements will not be included in the reclamation cost estimate thereby creating a cost saving for the mine operator.

The reclamation security is considered for reduction at the request of the mine operator to reflect reclamation that has been satisfactorily completed (BCMCM 2015).

2.3.13 Is liability costing information allowed to be filed confidentially by companies? What information is confidential and why?

As per the Health, Safety and Reclamation Code for Mines in British Columbia, Reclamation and Closure, Part 10.1.4.8 (i) specifically relates to Cost Estimate, the following applies:

“an estimate of the total expected costs of outstanding reclamation obligations over the planned life of the mine, including the costs of long term monitoring and maintenance which, with the approval of the chief inspector, may be filed in a separate confidential report”

The information that is confidential is the reclamation liability cost estimate includes the assumptions and methods of costing as it often contains proprietary information.

In the case where a company intends to out-source some aspect of its planned reclamation plan, the company has asked the chief inspector to withhold this information from prospective bidders (MEMPR 2008).

2.3.14 Are the detailed evaluations used to set a bond amount confidential?

There is no legislation or policy pertaining to how the Chief Inspector decides on the amount of the bond.

The cost estimate, which contains a detailed evaluation, can be filed in a separate confidential submission filed to the BCMEM. As per Section 10.1.3(i) of the Health, Safety and Reclamation Code for Mines in British Columbia, “an estimate of the total expected costs of outstanding reclamation obligations over the planned life of the mine, including the costs of long term monitoring and maintenance which, with the approval of the chief inspector, may be filed in a

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separate confidential report." The liability estimate is published¹ and the reclamation security required under the Permit is also public information (MEMPR 2008).

2.4 ENVIRONMENTAL LIABILITY FOR CATASTROPHIC EVENTS

2.4.1 What type of security, environmental liability insurance, or other arrangement is in place to cover unintended, catastrophic events at mine sites during and after mining operation (e.g. failure of a tailings dam, water quality impacts etc.)?

The reclamation security does not address unintended catastrophic events at mines. It is intended to address reasonable and expected events as indicated in the five year mine plans. BCMEM does not require nor administer additional insurance. The purchase of additional insurance is at the sole discretion of the mining company (Demchuk 2016, Howe 2016).

2.4.2 How are the requirements for environmental liability associated with catastrophic events determined and administered?

The reclamation security does not address catastrophic events at mines.

BCMEM's policy has been to rely on engineering design, approval of mine plans and mine inspections to reduce the likelihood of catastrophic events (BCMEM 2016b).

2.4.3 What are companies required to pay to cover the costs for off-site impacts?

Companies are required to pay for off-site impacts that they are deemed legally responsible for. The costs for these off-site impacts are administered under *Environmental Management Act* Permits. Under The *Environmental Management Act*, a director has the authority to request security (Section 14 (1) (c), 16 (4) (c) and 21 1(u)) for the protection of the environment that the director considers advisable.

2.4.4 What are the relationships to other existing legislation for catastrophic events (e.g. a major spill) and what are associated fines.

For off-site effects to the environment there is legislation to address fines that may occur. Pollution abatement orders may be issued by the British Columbia Ministry of Environment (MOE) who operate under the *Environmental Management Act* and are responsible for managing waste discharge authorizations including off-site mine impacts to land, water and air using the permits under their jurisdiction that the mine operator is legally obligated to follow (e.g., Ministry

¹ http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/mine_reclamation_security-summary_final_may_18_2016.pdf

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of Environment Effluent Permit conditions and Pollution Prevention Orders). The Metal Mining and Effluent regulations (Section 30.1) require that an emergency response plan to manage deleterious substance by prevention or mitigation be put in place. Other legislation that may apply is the certificate under the *Environmental Assessment Act*.

For the *British Columbia Mines Act* (Section 37-3) the following fines may apply:

- (3) A person who commits an offence is liable to a fine of not more than \$1,000,000 or to imprisonment for not more than 3 years or both.

For the *Environmental Assessment Act* (Section 43) the following fines may apply:

43 A person who commits any offence under section 41 is liable,

- (a) in the case of a corporation on a first conviction, to a fine of not more than \$100,000 and, on each subsequent conviction, to a fine of not more than \$200,000, and
- (b) in the case of an individual
 - (i) on a first conviction, to a fine of not more than \$100,000 or to imprisonment for not more than 6 months or to both, and
 - (ii) on each subsequent conviction, to a fine of not more than \$200,000 or to imprisonment for not more than 12 months or to both

The associated fines for catastrophic events vary and are evaluated on a case by case basis and fall under provincial or federal law, regulations and legislation that apply to mining in British Columbia (BCMOW 2016, Metal Mining Effluent Regulations, *BC Mines Act*, *BC Environmental Assessment Act*, MABC 2016).

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3.0 ONTARIO, CANADA

The *Ontario Mining Act* (R.S.O. 1990, c. M.14) is the provincial statute through which mining is governed in Ontario. Ontario Regulation 240/00, Mine Development and Closure under Part VII of the Mining Act, is the regulation which sets out how mine closure plans and the associated financial assurance (i.e., reclamation security) are developed, assessed and administered. Financial assurance is required if the mining company is unable to pass a prescribed set of financial tests. The amount of financial assurance to be held in trust of the Ministry of Northern Development and Mines is equal to the total estimated cost of closing and rehabilitating the site as well as the subsequent monitoring and maintenance that is to be carried out until such long term care is no longer needed.

While mining companies are liable for minor and catastrophic failures that occur either on or off-site under the *Environmental Protection Act* (R.S.O. 1990, c. E.19), there is no statutory requirement for the company to provide insurance or assurance for such a failure event. If a failure were to occur during operations, details of the failure and the required rehabilitation works would be added to the closure plan when it was next revised. Financial assurance associated with performing the remediation efforts associated with any failure or accident, including water management and monitoring costs, would be added to the reclamation security.

3.1 DEFINITION OF RECLAMATION SECURITY

In Ontario, financial assurance is the term used for the financial guarantee held in trust by the Ministry of Northern Development and Mines (MNDM) to ensure that the rehabilitation work outlined in a closure plan is successfully performed, even in the event that the proponent of the exploration activity faces financial or legal troubles. Financial assurance is held in an amount equal to the estimated cost of the rehabilitation work and must be included with the submission of a closure plan.

3.2 RECLAMATION SECURITY COVERAGE

3.2.1 Restoring disturbance on site? Offsite disturbances (e.g. loadouts, other)?

The *Ontario Mining Act* and Regulation (Ontario Regulation 240/00) set requirements for on-site disturbances, including: securing and stabilizing all mine hazards and subsurface mine workings; removal of all site infrastructure, equipment and machinery; removal of all potential contaminants; soil testing and rehabilitation of contaminated soils (with polychlorinated biphenyls (PCBs), petroleum products, chemicals, etc.); rehabilitation of landfill sites; physical and chemical stabilization of mine wastes (waste rock, tailings, slag, etc.) and impoundment structures; construction of low maintenance site drainage features as required, and revegetation of disturbed areas. Ontario Regulation 240/00 does not address the topic of off-site



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disturbances, but they may be included in the reclamation security (Ontario Regulation 240/00, S.24 (2)).

3.2.2 Restoring disturbance through normal operation?

Under provincial legislation, financial assurance covers the cost of rehabilitating the entire site, without recognition of planned Progressive Rehabilitation works in advance of Closure. If Progressive Rehabilitation work is carried out, a closure plan Amendment may be filed to provide a basis for the changes including an update to the proposed financial assurance.

3.2.3 Removing infrastructure (e.g., roads, wharves, power generation facilities, and air strips)?

Financial assurance includes provisions for the removal of infrastructure to an extent that is consistent with the specified future use of the land (Ontario Regulation 240/00, S.24 (2)).

3.2.4 Restoring disturbance on and / or off site due to accident or failure?

The closure plan does not specifically include requirements for restoring disturbances on- or off-site due to an accident or failure. However, if a failure of accident does occur on and/or off-site, the mining company is legally liable for the clean-up. When the closure plan is next updated, details of the disturbance are to be included in the project description and any residual rehabilitation works and, if required, care and maintenance, will be added to the closure plan works and associated financial assurance.

3.2.5 Does the security include costs to go from operations to closure (e.g. hazardous substances survey of the mine, engineering studies to determine specific closure requirements, pumping from underground until hazardous materials removed, maintaining hydro and ventilation systems etc.)

Under legislation, financial assurance is the amount required to rehabilitate the site at the end of operations, including costs of transitioning into closure.

In practice, a phased approach may be taken with respect to providing financial assurance wherein initial phases of the mine production are permitted through the closure planning process, which each would involve successively larger financial assurance to address the liabilities associated with the permitted phase of the project. Under this approach, closure plan Amendments would be issued at specified times to provide an update to the reclamation liability estimate and accompanied by the provision of the corresponding additional financial assurance.

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3.2.6 Long term post closure water treatment of acid-mine-drainage or other leaching or effluent issues?

Under legislation, long term post closure water treatment, if required, must be included in closure plans, and therefore provisions must be made within the reclamation liability estimate to treat water. The site's Environmental Compliance Approval (ECA), as issued by the Ontario Ministry of the Environment, is the regulatory instrument through which effluent water quality limits are set.

3.2.7 Long-term post closure monitoring and maintenance (e.g. maintenance of cover systems, tailings dams, water treatment plants etc.; geotechnical, water quality, biological monitoring etc.),

Yes, long term post closure monitoring and maintenance requirements must be included within the closure plan, and therefore allowances must be made within the associated financial assurance cost estimate (Ontario Regulation 240/00, Parts 3-9).

3.2.8 Accidents? Disasters that lead to on site / off site environmental damage?

The mining company is liable for rehabilitating the site after an accident or disaster on-site and/or off-site. Any residual rehabilitation work and care and maintenance works required to address the effects of the accident/disaster are rolled in to the closure plan and associated financial assurance when it is next updated.

Allowances are made for investigating the site (typically plant site area) at closure for soil contamination stemming from spills of petroleum products, PCBs, and other chemicals on-site, and subsequently for addressing the identified the impacted soils.

3.2.9 Are contingency costs applied? What range is applied?

No formal regulatory procedure has been set for the inclusion of contingency costs within the reclamation liability cost estimate. However, contingency costs are typically applied. The value of the contingency funds is typically based on the level of design (detail) provided within the closure plan cost estimate. In practice, a contingency value of 20% is typically added to the reclamation and closure cost estimate.

3.2.10 Other items?

None

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3.3 RECLAMATION SECURITY ADMINISTRATION

3.3.1 Is reclamation security administered by mining/natural resources departments or environment departments or other?

Reclamation security is held in trust with the MNDM.

3.3.2 How is reclamation security calculated? Who is it calculated by? How is company information considered and used?

Financial assurance is calculated based on the reclamation measures set out in the closure plan. A third-party will typically prepare the closure plan and associated cost estimate, in a form that mirrors the closure plan format set out in Schedule 2 of Ontario Regulation 240/00. Costing of the reclamation measures is based on independent contractor rates and provided to the MNDM for review.

3.3.3 How frequently is security reviewed and recalculated? What triggers an evaluation?

Financial assurance is updated whenever there has been a material change in the scope of the mining project. This could include changes to the closure plan or changes due to rehabilitation work having been performed in accordance with the closure plan. This review of project scope is triggered by the submission of a Notice of Material Change which allows the MNDM to determine if a closure plan Amendment is required, or in cases of a major change, a new closure plan is required.

There is no legislative, regulatory, or written policy under which MDNM can decide to change the amount of the security unless a deviation to the mine plan or closure plan is proposed by the mining company.

3.3.4 What percentage of liability does the security have to cover? Is 100% of the reclamation liability required up front? What portion is required up front versus over the life of the mine?

The Financial assurance security must be adequate and sufficient to cover the cost of the planned rehabilitation works described in the closure plan. (*Mining Act*, R.S.O. 1990, S.12 (1.1 D)).

Financial assurance must be submitted with the Closure Plan (O. Reg. 240/00, s. 13 (2)), which must be submitted prior to the commencement of mining operations.

However, as a matter of working policy described in 3.3.3 above, a phased approach can be used, which requires that each mining phase be permitted separately and that financial assurance provisions be updated in advance of the start of each successive phase.



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There is no legislative procedure or written policy which describes how financial assurance may be limited to a maximum time period. However, as a matter of working policy, long term post-closure liabilities can be discounted to net present value.

3.3.5 Is long-term, post-closure liability calculated differently from operational liability? How is long term post closure liability factored into the reclamation security required for an operating mine?

As a matter of practice, long term, post closure liabilities (such as water treatment and monitoring) can be discounted to NPV. The discount rate is proposed by the mining company and must be approved by the MNDM. Costs for long term activities may be discounted as of the time the main closure and decommissioning works are to be completed.

3.3.6 How is a mine's long-term reclamation liability calculated? Over what period of time is it considered (e.g. 50 years, 100 years, other)?

There is no legislation or written policy which describes how financial assurance associated with long-term reclamation liability should be limited. In practice, long-term reclamation liabilities are calculated for the anticipated duration of the long term obligation whether it's monitoring or water treatment. The liability duration is based on the modeling work that is performed as part of the mine design and development of the reclamation and closure plan.

3.3.7 Are discount rates used to calculate the net present value of long term liabilities? What discount rates are applied, how are they determined and how often are they reviewed?

In practice, long term, post closure liabilities (such as water treatment and monitoring) can be discounted to NPV. The discount rate is proposed by the mining company and must be approved by the MNDM. Costs for long term activities may be discounted as of the time the main closure and decommissioning works are to be completed. The current typical discount rate is 3%.

3.3.8 Is the financial strength of a company assessed and considered? How is this done?

As described in the mine development and closure regulation (O. Reg. 240/00), a financial strength test is used to assess the mining company.

Financial strength is considered in terms of a number of stated credit rating services, including: the Dominion Bond Rating Service Limited, Moody's Investors Services Inc., and Standard and Poor's Inc. By meeting minimum criteria by two of the abovementioned credit rating services, the proponent may be considered to pass the financial strength test.

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There are two tiers to which the mine company could pass the financial strength test, which are defined by meeting minimum credit rating scores from a subset of credit rating services (as described above). By meeting the more stringent of the two financial tests, a mine operator would satisfy its financial assurance requirements and therefore be exempt from providing a reclamation security to the MNM. By meeting the criteria for the less stringent financial strength test, the mine company would be exempt from having to provide a reclamation security for the first half of the mine life but would be required to provide a reclamation security half way through the mine life.

If a mine company fails to meet the requirements of either tier, or fails to continue to meet the financial strength test at any point, then the mining company must provide a reclamation security in the amount described in the closure plan.

3.3.9 How is reclamation security provided by mine operators? In what forms?

Financial assurance may be provided to the MNM in the form of: cash, a letter of credit from a bank named in Schedule I to the *Bank Act* (Canada), a bond of an insurer licensed under the *Insurance Act* to write surety and fidelity insurance, a mining reclamation trust as defined in the *Income Tax Act* (Canada), compliance with a corporate financial test in the prescribed manner or 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 of the MNM (*Mining Act*, R.S.O. 1990, S.145 (1))

3.3.10 How is reclamation security used by each jurisdiction? How is it made available for use?

Reclamation security is not made available for use to the Mining Company for reclamation works. In the event that work is not carried out as set out in the closure plan, the Director of the MNM may use the financial assurance funds held in trust to carry out the works in accordance with the closure plan (*Mining Act*, R.S.O. 1990, S.145 [2 and 5]).

3.3.11 How is reclamation security refunded in each jurisdiction?

Reclamation security can be refunded if either progressive rehabilitation works have been carried out in accordance with the closure plan and a progressive rehabilitation report is submitted to the Director of the MNM, or if the closure works have been started and a Notice of Closure Has Begun is sent to the Director. The refunded/released reclamation security will be of the difference between the total reclamation security held and the required financial assurance to complete the remaining rehabilitation measures (*Mining Act*, R.S.O. 1990, S.144 [1] and S.145 [7]).

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3.3.12 How is progressive reclamation considered in financial security?

Progressive Rehabilitation, carried out in accordance with the closure plan and reported through a Progressive Rehabilitation Report, can be used to reduce the financial assurance held during operations to an amount commensurate with the remaining rehabilitation measures required for closure.

3.3.13 Is liability costing information allowed to be filed confidentially by companies? What information is confidential and why?

All financial and commercial information relating to the establishment of a mine company's financial assurance must be kept confidential by the Director of the MNM or any person who works for the Director's office. This information is not subject to the *Freedom of Information and Protection of Privacy Act (Mining Act, R.S.O. 1990, c. M.14, S145 [10 and 11])*.

3.3.14 Are the detailed evaluations used to set a bond amount confidential?

Yes, as described in 3.3.13 above.

3.4 ENVIRONMENTAL LIABILITY FOR CATASTROPHIC EVENTS

3.4.1 What type of security, environmental liability insurance, or other arrangement is in place to cover unintended, catastrophic events at mine sites during and after mining operation (e.g. failure of a tailings dam, water quality impacts etc.)?

No insurance or security is held under the *Mining Act* or Ontario Regulation 240/00 to account for the environmental liability of a catastrophic event.

3.4.2 How are the requirements for environmental liability associated with catastrophic events determined and administered?

Financial assurance does not address the liability associated with a catastrophic event.

3.4.3 What are companies required to pay to cover the costs for off-site impacts?

Companies are responsible to cover the costs of all off-site impacts resulting from a catastrophic impact.

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3.4.4 What are the relationships to other existing legislation for catastrophic events (e.g. a major spill) and what are associated fines.

As required by the *Ontario Environmental Protection Act*, "The owner of a pollutant and the person having control of a pollutant that is spilled and that causes or is likely to cause an adverse effect shall forthwith do everything practicable to prevent, eliminate and ameliorate the adverse effect and to restore the natural environment." (R.S.O. 1990, c. E.19, S.93(1)).

No regulatory instrument requires that insurance be maintained to address the liabilities associated with a catastrophic event at a mine site. However, insurance could be required by the Ontario Ministry of Environment in accordance with the site's application for an Environmental Compliance Approval under the *Environmental Protection Act* (R.S.O. 1990, c. E.19).

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4.0 NOVA SCOTIA, CANADA

Nova Scotia's mine reclamation security requirements derive from the *Nova Scotia Mineral Resources Act* (1990) and the Mineral Resources Regulations made under Section 174 of the Act. Reclamation securities are also a requirement of the Environment Act. The reclamation securities are intended to cover the estimated reclamation costs at the point of maximum (peak) disturbance, subject to acceptance by the Minister. Progressive reclamation is desired and reported.

The reclamation cost estimate normally includes a factor for engineering and construction management to implement the closure plan activities. The reclamation cost estimate would also include the costs for long-term water treatment, if required by the reclamation plan. Although not addressed specifically in regulation, contingency costs are applied. Reclamation security amounts are generally determined by either the Department of Natural Resources (DNR) or Nova Scotia Environment (NSE), but may be proposed by the mining company and are then reviewed and adjusted until they are acceptable to the DNR and NSE. The reclamation security does not address unintended, catastrophic events at mines. They are intended to address the Reclamation Plans submitted with Mineral Lease or Non-Mineral Registration applications.

Nova Scotia will be replacing its *Mineral Resources Act* and Mineral Resources Regulations in the near future. The new legislation, expected to be proclaimed in 2017, will affect reclamation securities for mining projects in the Province.

4.1 DEFINITION OF RECLAMATION SECURITY

The reclamation security can be cash or a financial instrument, in a form satisfactory to the Minister of Natural Resources, sufficient to cover the aggregate costs for the activities described in 4.2.1 below (*Mineral Resources Act*, Subsection 97(1) and Mineral Resources Regulations under Section 174 of *Mineral Resources Act*, Subsection 77 (2)).

4.2 RECLAMATION SECURITY COVERAGE

4.2.1 Restoring disturbance on site? Offsite disturbances (e.g. loadouts, other)?

In general, the reclamation security is required to cover the aggregate current cost for labour, equipment, supplies and services for the removal of infrastructure, removing or burying foundations, capping or filling mine openings, stabilizing disposal sites, surface contouring, establishing proper drainage and revegetation, and any other work that is necessary to reclaim any area disturbed by the holder of the Mineral Lease or Non-Mineral Registration. The language is not specific to terms of on-site and off-site reclamation (*Mineral Resources Regulations* under Section 174 of *Mineral Resources Act*, Subsection 77 (2)).



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4.2.2 Restoring disturbance through normal operation?

Progressive Reclamation should be reported in Form 16 – Annual Report on Mining Operations. The legislation and regulations state that Reclamation of an area must be completed no later than 12 months after the date that production ceases, or a longer period as may be determined by the Minister. (Subsection 75(1) of the Mineral Resources Act and Subsection 77 (4) of the Mineral Resources Regulations).

4.2.3 Removing infrastructure (e.g., roads, wharves, power generation facilities, and air strips)?

The removal of site infrastructure is based on the end land use goals. Typically, infrastructure that is required for access for post closure monitoring or future exploration would remain in place.

4.2.4 Restoring disturbance on and / or off site due to accident or failure?

The reclamation security does not make allowances for addressing an accident or failure. However, the mine operator is legally liable for these events, both during and after operations.

4.2.5 Does the security include costs to go from operations to closure (e.g. hazardous substances survey of the mine, engineering studies to determine specific closure requirements, pumping from underground until hazardous materials removed, maintaining hydro and ventilation systems etc.)

The Act and Regulations require a reclamation security that includes the aggregate costs for several typical components of mine reclamation PLUS "any work" not specifically referred to in the definition of reclamation security stated in Subsection 77 (2) (a – g) of the Mineral Resources Regulations. So the additional costs to go from operations to closure, engineering studies, pumping etc. could be included. (Mineral Resources Regulations under Section 174 of *Mineral Resources Act*, Subsection 77 (2)(h))

4.2.6 Long term post closure water treatment of acid-mine-drainage or other leaching or effluent issues?

Long term water treatment costs would be included, if required, though this is not specifically addressed in the regulations.

4.2.7 Long-term post closure monitoring and maintenance (e.g. maintenance of cover systems, tailings dams, water treatment plants etc.; geotechnical, water quality, biological monitoring etc.),

Long term monitoring costs to assess chemical, physical, and biological stability are included for the period of time that quality/stability issues are predicted to persist or for a typical minimum of



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2 years. Costs for dam safety inspections, and dam safety reviews are included on a case by case basis. Engineered drawings and descriptions of reclamation and the procedures for post-operational monitoring are required by Subsection 80 (1) (e)) of the Mineral Resources Regulations.

4.2.8 Accidents? Disasters that lead to on site / off site environmental damage?

The reclamation security is not intended to cover accidents or disasters.

4.2.9 Are contingency costs applied? What range is applied?

Contingency costs are not specifically addressed in either the Mineral Resources Act or the Mineral Resources Regulations. In practice, typically 10% is added for engineering and project management, and 20% for contingency; however, the contingency could vary from 10 to 20%.

4.2.10 Other items?

None.

4.3 RECLAMATION SECURITY ADMINISTRATION

4.3.1 Is reclamation security administered by mining/natural resources departments or environment departments or other?

Reclamation Securities may be administered by the Department of Natural Resources or Nova Scotia Environment.

4.3.2 How is reclamation security calculated? Who is it calculated by? How is company information considered and used?

Typically, reclamation cost estimates are developed by the Department of Natural Resources, based on a reclamation plan submitted by the mining company, or the estimate may be developed by Nova Scotia Environment. However, the security amount may also be proposed by the mining company or their consultants. The amount of the reclamation security must be acceptable to the Registrar of Mineral and Petroleum Titles and the Minister of Natural Resources.

In the case where a reclamation cost estimate is prepared by the mining company or their consultants, DNR and NSE review the estimate, and revisions are made until the amount of the security is acceptable to NSE and DNR. Reviews of the reclamation securities are carried out jointly with NSE and DNR. The form of the reclamation security must be satisfactory to the Minister of Natural Resources.



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4.3.3 How frequently is security reviewed and recalculated? What triggers an evaluation?

The amount of the security may be reviewed and adjusted by the Registrar every 2 years from the anniversary date of the security. (Mineral Resources Regulations under Section 174 of *Mineral Resources Act*, Subsection 77 (3))

4.3.4 What percentage of liability does the security have to cover? Is 100% of the reclamation liability required up front? What portion is required up front versus over the life of the mine?

As required by the Mineral Resources Regulations, the security amount may be reviewed every 2 years and must include the estimated aggregate current cost for labour, equipment, supplies and services to carry out the following reclamation activities: removal of buildings/structures, removal or buying of foundations, capping or filling pits, declines and shafts, stabilizing tailings disposal sites and drainage containment facilities, surface contouring, establishing proper site drainage, re-vegetation work, and any work necessary to reclaim disturbed areas. (Mineral Resources Regulations under Section 174 of *Mineral Resources Act*, Subsection 77 (2)).

In operational practice, the security is adjusted to be commensurate with the maximum (peak) liability that will be posed by the disturbance at the site and in recognition of reclamation work that has been performed and inspected by DNR and NSE.

DNR recognizes that some of the current reclamation securities, actually held, do not cover the full reclamation liabilities.

4.3.5 Is long-term, post-closure liability calculated differently from operational liability? How is long term post closure liability factored into the reclamation security required for an operating mine?

Long-term, post closure liability is calculated no differently to other reclamation costs, and is included in the overall reclamation security cost estimate.

4.3.6 How is a mine's long-term reclamation liability calculated? Over what period of time is it considered (e.g. 50 years, 100 years, other)?

No specific guidance is provided in the *Mineral Resources Act* or Regulations. Typically, reclamation cost estimates, including long term reclamation liabilities, are developed by DNR/NSE based on a reclamation plan submitted by the mining company. The mining company, or their consultants, may prepare a reclamation cost estimate and propose a reclamation security amount for consideration, however the determination of the security amount is ultimately the responsibility of DNR and NSE. Regardless of how the estimate is developed, the security amount must be accepted by both DNR and NSE.

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The time period for which long term liabilities are to be covered may extend into the future. However, the calculations for the long term reclamation liability, which are part of the overall reclamation liability, must be found to be acceptable by NSE and DNR.

4.3.7 Are discount rates used to calculate the net present value of long term liabilities? What discount rates are applied, how are they determined and how often are they reviewed?

The reclamation security is based on current day construction costs.

4.3.8 Is the financial strength of a company assessed and considered? How is this done?

There is no formal process or policy that incorporates the financial strength of the mining company.

4.3.9 How is reclamation security provided by mine operators? In what forms?

The applicant for a mineral lease, non-mineral registration or letter of authorization (or, if required by the Minister, excavation registration) shall post cash, a negotiable bond or other security, in a form satisfactory to the Minister and in an amount determined in accordance with the regulations to provide for the reclamation of the area that may be disturbed by the activities of the lessee, registrant or holder of an excavation registration or letter of authorization or an agent or assignee of the lessee, registrant or holder of an excavation registration or letter of authorization. *Mineral Resources Act*; Subsection 97 (1).

4.3.10 How is reclamation security used by each jurisdiction? How is it made available for use?

The security may be used by DNR or NSE to carry out reclamation work on those properties for which the security was provided and where the lessee or registrant has not met their obligation to reclaim. The security is not made available for prior use by the mining company, but is released following the completion of the reclamation works. In certain situations, reclamation work is carried out in phases with corresponding partial releases of the security made following the completion of each phase of work.

4.3.11 How is reclamation security refunded in each jurisdiction?

Regulations do not define this function. In practice, DNR and NSE representatives will carry out a site visit to evaluate the work that has been completed and will accordingly recommend to the Registrar a reduction in the value, or full release, of the security held. The Registrar will then release the security, in whole or in part, as appropriate.

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4.3.12 How is progressive reclamation considered in financial security?

Progressive Reclamation should be reported in Form 16 – Annual Report on Mining Operations. The reclamation security may be reduced at the request of the mine operator to reflect reclamation that has been satisfactorily completed, as inspected by DNR and NSE. Typically, reclamation costs are estimated at the peak level of disturbance; and as progressive reclamation reduces the peak level of disturbance, the reclamation cost estimate and security can be established at a lower level to cover the lower level of peak disturbance.

4.3.13 Is liability costing information allowed to be filed confidentially by companies? What information is confidential and why?

Reclamation security values are currently kept confidential by DNR. However, some mining companies will disclose this information of their own accord. Under the proposed changes to the new *Mineral Resources Act*, this information may become publicly available.

Where liability insurance is required—see Section 4.4.1—the liability insurance requirements are typically not disclosed.

4.3.14 Are the detailed evaluations used to set a bond amount confidential?

The calculations for reclamation securities are not typically disclosed by the government.

4.4 ENVIRONMENTAL LIABILITY FOR CATASTROPHIC EVENTS

4.4.1 What type of security, environmental liability insurance, or other arrangement is in place to cover unintended, catastrophic events at mine sites during and after mining operation (e.g. failure of a tailings dam, water quality impacts etc.)?

The reclamation security does not address unintended, catastrophic events at mines. It is intended to address the Reclamation Plans submitted with the Mineral Lease or Non-Mineral Registration application.

NSE may require that liability insurance be maintained by the mining company to address environmental liability for catastrophic events. The value of insurance required is evaluated on a case by case basis by the NSE. As well, in certain specific cases, Special Leases or Licenses issued under the *Mineral Resources Act* may include clauses requiring insurance coverages. Under the new *Mineral Resources Act*, Special Leases and Licenses will no longer be issued.

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4.4.2 How are the requirements for environmental liability associated with catastrophic events determined and administered?

The reclamation security does not address unintended, catastrophic events at mines. It is intended to address the costs of reclaiming the property in the case that the mining company fails to do so.

4.4.3 What are companies required to pay to cover the costs for off-site impacts?

As described above, off-site impacts are not specifically addressed in the Mineral Resources Act or regulations. In general, the reclamation security is required to cover the aggregate current cost for labour, equipment, supplies and services for the removal of infrastructure, capping mine openings, stabilizing disposal sites, establishing proper drainage and revegetation and any work that is necessary to reclaim any area disturbed by the lessee or registrant. The language is not specific to terms of on-site and off-site (Mineral Resources Regulations under Section 174 of *Mineral Resources Act*, Subsection 77 (2)).

4.4.4 What are the relationships to other existing legislation for catastrophic events (e.g. a major spill) and what are associated fines.

In the event of a catastrophic event under post-closure conditions, the holder of the Approval (issued under the Environment Act) is ultimately responsible for failures/catastrophic events. This is legislated under the Environment Act and controlled through the associated regulations made under the Environment Act.

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5.0 ALASKA, USA

Alaska's mine reclamation security requirements derive from Alaska Statutes Title 27, Chapters 5 and 19, Title 37 Chapter 14, and Title 46, Chapters 3 and 17 and the regulations that are authorized by these Statutes. In addition there are federal requirements for mine reclamation security that apply to mine projects on Federal Lands (in Alaska there are two mines on National Forest lands). Federal reclamation security requirements derive from Title 36, Section 228.13 of the Code of Federal Regulations (CFR). The State of Alaska and the United States Forest Service have executed a memorandum of understanding (MOU) so that both State and Federal obligations for reclamation security may be met by one (or one set of) financial instruments so that mines do not have to "double bond".

Alaska accepts a number of forms of reclamation security that have to be sufficient to pay for the reclamation, closure, monitoring and long term management as described in the approved reclamation closure plan. This would include long term water treatment, where required, and long term monitoring and maintenance of jurisdictional dams where those dams are to remain as such following mine reclamation and closure. Alaska Statutes do not address "catastrophic" events at mines, and therefore there are no reclamation security requirements for catastrophic events or accidents. The Alaska Department of Conservation has authority to levy fines for non-compliance (including accidents or catastrophic events). In addition, mines on State land are required to have pollution liability insurance and general liability insurance separate from any reclamation security required under the aforementioned statutes, but these amounts are not generally considered by the author to be sufficient to pay for the remediation costs of a significant catastrophic event. Mining companies are potentially liable to pay for these events. In addition, under Alaska Statute AS 46.03.822, modeled after the (Federal) *Comprehensive Environmental Response, Compensation, and Liability Act* of 1980, "persons" may be held liable for damages, costs of response, containment, removal or remedial action... resulting from an unpermitted release of a hazardous substance.

5.1 DEFINITION OF RECLAMATION SECURITY

The reclamation security is a financial guarantee in an amount not to exceed what is reasonably necessary to ensure the faithful performance of the requirements of the approved reclamation plan. (AS 27.19.040)

5.2 RECLAMATION SECURITY COVERAGE

5.2.1 Restoring disturbance on site? Offsite disturbances (e.g. loadouts, other)?

Reclamation security is intended to cover disturbance directly related to mining activities. This generally is limited to disturbance at the mine site and any infrastructure (roads, powerline, pipeline etc.) that were constructed directly for the mine development project. The term off-site



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disturbance is not specifically addressed in regulation. In practice, this has not included any off-site area that was not connected to the mine through the aforementioned infrastructure.

5.2.2 Restoring disturbance through normal operation?

Reclamation during operations is paid for by the mine out of their operating budget. However, the estimated cost to do so is included in the calculation of their reclamation security. Restoring disturbance during operations is required and is referred to informally as "concurrent reclamation". In practice, mining operations must limit disturbance to the disturbance that is actually required at any one time. By statute, a surface disturbance is considered unnecessary and undue degradation when it is greater than would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and considering site specific conditions. (AS 27.19.080)

5.2.3 Removing infrastructure (e.g., roads, wharves, power generation facilities, and air strips)?

Reclamation security generally does include the cost to remove infrastructure. A miner shall remove, dismantle, or otherwise properly dispose of buildings and structures constructed, used, or improved unless the surface owner or manager authorizes that the buildings and structures may stay. A miner shall remove or otherwise properly dispose of all scrap iron, equipment, tools, piping, hardware, chemicals, fuels, waste, and general construction debris on state land (11 AAC 97.210). In practice, and with the permission of the surface owner, infrastructure that is compatible with the intended post-mining land use may be left in-place at closure and the cost for removal may be excluded from the reclamation security calculation.

5.2.4 Restoring disturbance on and / or off site due to accident or failure?

The reclamation security does not include a calculation for accidents or failures on/off site. However, the mine operator is legally liable for these during operations and after operations but these costs are not parts of the reclamation security.

5.2.5 Does the security include costs to go from operations to closure (e.g. hazardous substances survey of the mine, engineering studies to determine specific closure requirements, pumping from underground until hazardous materials removed, maintaining hydro and ventilation systems etc.)

Yes, as a matter of practice, the reclamation security for Alaska mines (regardless of land ownership) includes the costs for any studies, maintenance, monitoring etc. that are required for the period between mine operations and final closure and security release.

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5.2.6 Long term post closure water treatment of acid-mine-drainage or other leaching or effluent issues?

Long-term (perpetual) water treatment is not defined in statute or regulation. Alaska requires monitoring of any constituents of concern that are identified for a period of up to 30 years (18 AAC 60.490) In practice, the reclamation security includes the cost of long term post closure water treatment and monitoring of other site conditions for a period of up to 30 years. For long-term (including perpetual) water treatment it includes the costs for the perpetual treatment calculated as the Net Present Value of an amount, if invested, would generate sufficient income to pay the annual treatment costs in perpetuity.

5.2.7 Long-term post closure monitoring and maintenance (e.g. maintenance of cover systems, tailings dams, water treatment plants etc.; geotechnical, water quality, biological monitoring etc.),

These costs are included in the reclamation security. Alaska requires monitoring of any constituents of concern that are identified for a period of up to 30 years (18 AAC 60.490) following closure to assure that the site is left in a stable condition. This might include any number of monitoring requirements that are site-specific, but most are directed at assuring that the land is stable relative to erosion and water quality is protected.

5.2.8 Accidents? Disasters that lead to on site / off site environmental damage?

The reclamation security is not intended to cover accidents or disasters. However, accidents that occur during mine operations, that do not result in the permanent mine closure, are mitigated by the mining company and any additional mitigation and or monitoring will become part of subsequent versions of the reclamation security calculation and their reclamation security obligation.

5.2.9 Are contingency costs applied? What range is applied?

Alaska includes a number of Indirect Costs in the reclamation security and these vary somewhat depending on land ownership and government Agency. Contingency is one of these Indirect Costs. Contingency is generally intended to include changes in scope and bid that change during the reclamation activities. Contingency values range from 6–20% of the reclamation security Direct Costs. The other Indirect Costs include Contractor Profit (10–20%), Contractor Overhead (5–10%), Performance and Payment Bonds (1.5%), Liability Insurance (1.5% of labour costs), Contract Administration (2–7%), and Engineering Redesign (3–6%). (Alaska Department of Natural Resources and Department of Environmental Conservation Draft Mine Closure and Reclamation Cost Estimation Guidelines, 2009)

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5.2.10 Other items?

None.

5.3 RECLAMATION SECURITY ADMINISTRATION

5.3.1 Is reclamation security administered by mining/natural resources departments or environment departments or other?

In Alaska the reclamation security is generally administered by the DNR. The DNR can enter into cooperative management with another state or federal agency or municipality for the purposes of implementing the Reclamation Statutes (11 AAC 97.700).

5.3.2 How is reclamation security calculated? Who is it calculated by? How is company information considered and used?

In practice, the initial estimate is provided by the mining company, supported by vendor quotes or other defensible documentation. The initial estimate is then reviewed jointly by DNR and the Department of Environmental Conservation (DEC) and the federal agency (if the mine is on federal land). Agency comments are submitted back to the mining company and the parties work to resolve differences. In the end the regulatory agencies (Director of Mining Land and Water under 11 AAC 86.805) have the final say in the cost estimate values. Alaska offers guidance for calculating the reclamation security in the draft document entitled: Alaska Department of Natural Resources and Department of Environmental Conservation Draft Mine Closure and Reclamation Cost Estimation Guidelines, 2009.

5.3.3 How frequently is security reviewed and recalculated? What triggers an evaluation?

In practice, the Security is reviewed every 5 years – coinciding with the 5-yr. term of major mine permit renewals - or whenever there is significant change in mine operations that translate into a significant change in the reclamation and closure costs (11 AAC 86.805). In practice, if a mine submits a Plan of Operations (POO) modification for agency approval; the agency will indicate whether an update to the reclamation security is required to coincide with the POO modification approval.

5.3.4 What percentage of liability does the security have to cover? Is 100% of the reclamation liability required up front? What portion is required up front versus over the life of the mine?

In Statue, the reclamation security is established by the Commissioner of the Department of Natural Resources and the amount that reflects the “reasonable and probable cost of reclamation” (AS 27.19.040). In practice, the Security covers 100% of the liability that exists at that time. Therefore, the Security amount may increase or decrease over time in response to



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increases or decreases to the estimated cost of reclamation. The agencies typically require a Security sufficient to cover the maximum anticipated liability for the next 5-year permit cycle.

5.3.5 Is long-term, post-closure liability calculated differently from operational liability? How is long term post closure liability factored into the reclamation security required for an operating mine?

Procedures for calculating long-term liability are not addressed in statute or regulation. In practice, the long term liability costs are generally calculated as the Net Present Value (NPV) of the amount necessary to meet those obligations, assuming the funds are invested in an interest-bearing financial vehicle. The NPV calculation uses a discount rate that incorporates assumptions for the rate of return, inflation and the fund management costs. The discount rate is not addresses in statute or regulation. In practice it is derived collaboratively by the agencies with regulatory authority to require a reclamation security.

5.3.6 How is a mine's long-term reclamation liability calculated? Over what period of time is it considered (e.g. 50 years, 100 years, other)?

The answer to this question is mine-specific. In the absence of statute, policy or regulation, Alaska regulators have calculated long-term liability costs in different ways depending on the anticipated duration of the monitoring and water treatment obligation at the site. In practice it has been calculated for durations of less than 50 years, for 100 years and in perpetuity, depending on the mine. If modelling of mine effluent for example suggests that water quality standards are anticipated be achieved in 60 years then the long-term water treatment and monitoring costs would be calculated for that time period. With a built-in review of monitoring data every 5 years, that 60-year number can be modified in the future. Alaska requires monitoring at all reclaimed mines (even those with no water treatment requirement following the cessation of operations) for a period of up to 30 years (18 AAC 60.490) and those monitoring costs are included in the calculation of the reclamation security amount.

5.3.7 Are discount rates used to calculate the net present value of long term liabilities? What discount rates are applied, how are they determined and how often are they reviewed?

Yes, discount rates are used to calculate the NPV. In practice, discount rates are derived by consensus each time a mine reclamation security amount is calculated. At times the state DNR and DEC have asked the Alaska Department of Revenue to provide a discount rate. In other instances the State has accepted a discount rate offered by the US Forest Service, which was generated by their consultant. Derivation of a discount rate for the purpose of developing the amount of a reclamation security is not defined in statute, regulation or written policy.

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5.3.8 Is the financial strength of a company assessed and considered? How is this done?

The financial strength of a company is only considered when the company is intending to submit a corporate guarantee for their reclamation security. While Statute (AS 27.19.040) authorizes the use of a corporate guarantee as a reclamation security, the actual financial strength criteria are not yet developed in regulation. To-date, no mining companies have satisfied their reclamation security using corporate guarantees. The following financial tests have been proposed by the DNR/Mining Section:

- Tangible net worth of at least USD\$90 million
- A bond rating of BBB or higher
- Meets at least two of the three following ratios:
 - Current assets to current liabilities of 1.5 or greater
 - Total liabilities to net worth of 2.0 or less
 - Sum of net income plus depreciation plus depletion and amortization to total liabilities of 0.1 or greater

5.3.9 How is reclamation security provided by mine operators? In what forms?

The mine operator must provide a reclamation security in one or more of these allowable forms: 1) a surety bond; 2) a letter(s) of credit; 3) a certificate of deposit, 4) a corporate guarantee, 5) payments and deposits into a trust fund established under AS 37.14.800; or 6) any form of financial assurance that meets the financial test (see 3h) or other conditions set in regulation by the commissioner of the Department of Natural Resources (AS 27.19.040).

5.3.10 How is reclamation security used by each jurisdiction? How is it made available for use?

The Security is used to perform the tasks defined in the approved reclamation and closure plan. The funds are released from the Security holder (typically the financial institution (bank) that issues the bank letter of credit) to the beneficiary—which is typically the Department of Natural Resources and the Department of Environmental Conservation—at the written request of the beneficiaries. The released security funds are managed by the Alaska Department of Revenue and released to pay the costs of the reclamation activities. Alaska's reclamation security estimation guidelines include 1.5% administration fee (as part of Indirect Costs) to pay for state government (or their designee) to manage contractor be responsible for performing the reclamation work. This is all a matter of practice, not written policy, guidance or regulation.

5.3.11 How is reclamation security refunded in each jurisdiction?

An application for release or decrease of the amount of a reclamation security can be submitted to the Department of Natural Resources and must include a sworn statement verifying that the mine has examined the requirements of the approved reclamation plan and that



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certifies that as true that all applicable reclamation responsibilities have been met. The mechanics of the release of the security varies with the financial instrument (AAC 97.435).

5.3.12 How is progressive reclamation considered in financial security?

The reclamation security may be reduced at the request of the mine operator to reflect reclamation that has been satisfactorily completed, including reclamation performed concurrent with mine operations (11 AAC 97.435).

5.3.13 Is liability costing information allowed to be filed confidentially by companies? What information is confidential and why?

The information cannot be filed confidentially.

5.3.14 Are the detailed evaluations used to set a bond amount confidential?

They are not confidential. In fact the final draft reclamation security calculations are available for public comment prior to final approval by the agencies. ADEC Statute AS46.03.100 (f)) and Regulation 18 AAC 15.050 require that mining facilities with a waste management permit have a financial assurance and 46.03.110 (b) requires that permits be available for public notice for a minimum of 30 days. ADNDR have no public-notice regulations but as a matter of practice they co-notice the security calculations to offer a degree of transparency to the permitting review and approval process.

5.4 ENVIRONMENTAL LIABILITY FOR CATASTROPHIC EVENTS

5.4.1 What type of security, environmental liability insurance, or other arrangement is in place to cover unintended, catastrophic events at mine sites during and after mining operation (e.g. failure of a tailings dam, water quality impacts etc.)?

Statute, regulation nor policy for reclamation security address unintended, catastrophic events at mines. Instead, statute, regulation and policy are directed toward reasonably anticipated events. However, mines on State land are required under the terms of their specific Mill Site Leases to maintain 1) commercial general liability insurance, 2) auto liability insurance, 3) professional liability insurance, 4) statutory workers compensation and employer's liability insurance, 5) Pollution liability insurance, and 6) all risk property insurance (including earthquake and flood). Insurance limits vary by lease, but are as much as \$25,000,000 for 1, 2, 3, and 5.

5.4.2 How are the requirements for environmental liability associated with catastrophic events determined and administered?

The reclamation security does not address unintended, catastrophic events at mines. It is intended to address reasonably anticipated events.



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5.4.3 What are companies required to pay to cover the costs for off-site impacts?

Off-site impacts are not considered as part of the reclamation security calculation.

5.4.4 What are the relationships to other existing legislation for catastrophic events (e.g. a major spill) and what are associated fines.

Catastrophic events are not addressed in the statutes, regulations or policy for mining reclamation security. However, if there is a catastrophic event there is a statute that allows the State to use the courts to hold the responsible party liable for the associated costs. This Alaska Statute, AS 46.03.822, modeled after the (Federal) *Comprehensive Environmental Response, Compensation, and Liability Act* of 1980 that has the effect of holding "persons" liable for damages, costs of response, containment, removal or remedial action... resulting from an unpermitted release of a hazardous substance... including any person who at the time of disposal of any hazardous substance owned or operated any facility or vessel at which the hazardous substances were disposed of.

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6.0 NEVADA, USA

The State of Nevada has requirements for reclamation security sufficient to pay for the full cost of reclamation and closure as contained in the project's Reclamation Plan Application. Nevada was instrumental in developing an interactive reclamation cost estimator that was developed by the Bureau of Mining Reclamation and Regulation (BMRR), the Bureau of Land Management (BLM), mining companies, and consultants in a joint cooperative effort known as the Standardized Reclamation Cost Estimator (SRCE). The SRCE spreadsheet and its support modules are available online at no charge from the BMRR and it is becoming more widely adopted by other states, if informally. SRCE is an Excel-based tool and the State provides an annually updated cost data sheet with unit costs for fuel, wages, equipment and other items.

Neither the SRCE tool nor Nevada mining regulations address reclamation security for catastrophic events or accidents but these may be addressed through actions by the Nevada Department of Environmental Protection as an enforcement action with fines, which, if not timely remediated, may include referral to the State Attorney General with subsequent hearing before the State Environmental Committee, and resultant penalties and/or criminal charges.

6.1 DEFINITION OF RECLAMATION SECURITY

Reclamation security, or reclamation surety, is a financial guarantee to ensure that the actions proposed by a mine operator do not degrade the waters of the State of Nevada and to provide for post-operations public safety and productive post-mining use of the land.

6.2 RECLAMATION SECURITY COVERAGE

6.2.1 Restoring disturbance on site? Offsite disturbances (e.g. loadouts, other)?

The amount of reclamation surety required in Nevada is codified in Nevada Administrative Code (NAC) 519A.360. The reclamation surety is intended to ensure reclamation of mining activities and more particularly as described in the Operator's Reclamation Plan Application (analogous to federal Plan of Operations) to be completed. The surety is intended to cover all reclamation costs as if performed by a third party and with agency administration, in the event of operator default through bankruptcy. This generally is limited to disturbance at the mine site and any additional infrastructure (roads, powerline, pipeline etc.) that were constructed directly for the mine development project. In practice, this has not included any off-site area that was not connected to the mine through the aforementioned infrastructure, e.g., an off-site staff office in a nearby town.

6.2.2 Restoring disturbance through normal operation?

Ongoing reclamation during operations is encouraged where feasible. It is paid for by the mine out of their operating budget. Because the disturbance is included within the identified



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operations boundary, the estimated reclamation cost is included in the calculation of the reclamation surety. Mining operations are required to limit disturbance to the disturbance that is bonded at the time. Concurrent reclamation allows them to “bank” the reclamation credit or to receive a reduction of the surety amount at their request.

6.2.3 Removing infrastructure (e.g., roads, wharves, power generation facilities, and air strips)?

Nevada's reclamation surety does include the cost to remove infrastructure. However, final removal of infrastructure is subject to the intended post-mining land use and the underlying property owner and the agencies' approvals. Although the operator may request that certain infrastructure remain as part of its approved final closure plan, the cost for removing that infrastructure must be included in the reclamation surety.

6.2.4 Restoring disturbance on and / or off site due to accident or failure?

Reclamation surety is intended to ensure reclamation of the entire area affected by the operator's project or operation. Reclamation surety is not accessed/used unless the operator abandons the project without meeting closure requirements outlined in NAC 519A. It is not intended to cover accidents or failure.

6.2.5 Does the security include costs to go from operations to closure (e.g. hazardous substances survey of the mine, engineering studies to determine specific closure requirements, pumping from underground until hazardous materials removed, maintaining hydro and ventilation systems etc.)

Yes, the surety of Nevada mines (both public and private land ownership) includes the costs for any studies, maintenance, monitoring and/or other incidental costs that are required for the period between mine operations and final closure.

6.2.6 Long term post closure water treatment of acid-mine-drainage or other leaching or effluent issues?

The reclamation bond in Nevada includes the cost of ongoing or long term post closure water treatment and monitoring of other site conditions, to ensure protection of the waters of the State (NAC 519A.360(4)(g)).

6.2.7 Long-term post closure monitoring and maintenance (e.g. maintenance of cover systems, tailings dams, water treatment plants etc.; geotechnical, water quality, biological monitoring etc.)

The reclamation surety in Nevada is to cover any ongoing or long-term activities required to maintain the effectiveness of reclamation or are necessary in lieu of reclamation; or ensure the



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continuation of post-reclamation stabilization, management, control and treatment of mine-impacted waters to protect the waters of the State, including, without limitation, periodic clean-out of sediment basins and ponds used to collect mine-impacted waters or maintenance of berms and fences which are used to prevent access to areas which pose a threat to the public safety (NAC 519A.360(4)(g)).

6.2.8 Accidents? Disasters that lead to on site / off site environmental damage?

Disasters that lead to environmental damage are not included in the reclamation surety calculations in Nevada. Disasters instead are addressed through actions by the Nevada Division of Environmental Protection (NDEP) as an enforcement action with fines, which, if not timely remediated, may include referral to the State Attorney General with subsequent hearing before the State Environmental Committee, and resultant penalties and/or criminal charges.

6.2.9 Are contingency costs applied? What range is applied?

Nevada includes seven Indirect Costs in the Reclamation Cost Estimate; Contingency cost is one of the categories. Variable rates, as percentages of the estimated Direct Costs of reclamation, are applied depending on the total of the Direct Costs. Contingency is a decreasing variable rate dependent on total amount of Direct Costs, ranging from 10 to 2%. The other Indirect Costs include Engineering, Design and Construction Plan (EDandC) (8 to 4%, decreasing); Insurance (15% of total labour costs); Performance Bond (3% of Direct Costs if those are > \$100,000); Contractor Profit (10% of Direct Costs); Contract Administration (10 to 6%, decreasing with increasing Direct Costs); and Government Indirect Cost (21% of the contract administration costs).

6.2.10 Other items?

None.

6.3 RECLAMATION SECURITY ADMINISTRATION

6.3.1 Is reclamation security administered by mining/natural resources departments or environment departments or other?

In Nevada the reclamation surety is generally administered jointly by the Division of Environmental Protection—BMRR and Division of Natural Resources—Division of Minerals. If Federal land is involved it may also be administered by the Federal agency through a MOU with the State so as to avoid the cost of the operator posting more than one reclamation surety for the same activities.



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6.3.2 How is reclamation security calculated? Who is it calculated by? How is company information considered and used?

Operators in Nevada are strongly encouraged to use the SRCE spreadsheet to develop their reclamation surety estimate. The Cost Data for SRCE is an annually updated separate spreadsheet also provided at no charge by the agencies. If the operator elects to use its own costing sources to prepare a bondable reclamation cost estimate, then it must be supported by vendor quotes and other defensible documentation. The initial estimate is then reviewed jointly by BMRR and the Federal agency (if the mine is on Federal land). Agency comments are submitted back to the operator and the parties work to resolve differences. In the end the regulatory agencies have the final say in the cost estimate values. Using the SRCE spreadsheet and support modules provides a significant time reduction.

6.3.3 How frequently is security reviewed and recalculated? What triggers an evaluation?

The reclamation surety is reviewed every 3 years (NAC 519A.380) and updated to reflect inflation, labour and supply cost changes. Each operator is also required to file an annual report detailing the status and production of its operation, as well as identify each acre of land affected and land reclaimed through the preceding calendar year (NRS519A.260).

6.3.4 What percentage of liability does the security have to cover? Is 100% of the reclamation liability required up front? What portion is required up front versus over the life of the mine?

The reclamation surety in Nevada is required to cover whatever amount of disturbance is approved for its initial stage of operation. For a single stage operation, the operator is required to post surety in an amount sufficient to ensure reclamation of the entire area to be affected by the project (NAC 519A.360(1)(a)). If an operation grows the surety would be increased to include the costs of reclamation of the larger operation (NAC 519A.360(1)(b)). Nevada's phased bonding legislation provides that sureties are adjusted to cover additional liabilities. Nevada does not allow mines to operate without having posted those sureties.

6.3.5 Is long-term, post-closure liability calculated differently from operational liability? How is long term post closure liability factored into the reclamation security required for an operating mine?

Monitoring is factored into the SRCE model. The long term monitoring cost is determined partially from supplemental information from two other spreadsheet models, the Heap Leach Draindown Estimator and the Process Fluid Cost Estimator. Both are available from the BMRR website as well. The Process Fluid Cost Estimator model is updated annually with cost data information, similar to SRCE.

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6.3.6 How is a mine's long-term reclamation liability calculated? Over what period of time is it considered (e.g. 50 years, 100 years, other)?

In effecting the permanent closure of a facility, Nevada specifies that the long term water pollution control monitoring and treatment requirements may not exceed 30 years (NAC 445.446). By that time, most or all other reclamation work—earthwork, revegetation, well abandonment, infrastructure removal—would have been completed satisfactorily. The monitoring costs are factored as straight costs in the SRCE model.

6.3.7 Are discount rates used to calculate the net present value of long term liabilities? What discount rates are applied, how are they determined and how often are they reviewed?

Discount rates are not used.

6.3.8 Is the financial strength of a company assessed and considered? How is this done?

The financial strength of a company is considered if the operator bonds with a corporate guarantee for reclamation surety. No more than 75 percent of the required surety may be satisfied by corporate guarantee. (NAC 519A.350(7)). If the reclamation surety is provided through insurance, the financial strength of the warrantor is considered in detail (NAC 519A.350(6)).

6.3.9 How is reclamation security provided by mine operators? In what forms?

The provision of the type of reclamation surety is set forth in NAC 519A.350. It may a trust fund, a bond, an irrevocable letter of credit, insurance, a corporate guarantee, or any combination of these.

6.3.10 How is reclamation security used by each jurisdiction? How is it made available for use?

In Nevada, a mine can operate only after receiving a Reclamation Permit from the State. This permit can be issued by the State as sole overseer if the operation and its infrastructure are restricted to private land. If the operation is on public land or a mix of public and private lands, then the MOU between the State and the Federal agencies governs the reclamation requirements. The MOU can be accessed on the Nevada page of the BLM website. Typically the State and the BLM accept each other's bonding guidelines, developed as SRCE. The United States Forest Service maintains its own bonding criteria.

The surety cannot be used until a determination of forfeiture. The surety is made available only after the lead agency forecloses on the surety to initiate reclamation work (NAC 519A.390). The foreclosure process is a legal procedure through which the agencies must serve notice to the



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operator of the operation's violation(s) or noncompliance(s) with permit conditions, set a hearing before the State Environmental Commission, and prove to the Commission's satisfaction that the violations have not been redressed.

6.3.11 How is reclamation security refunded in each jurisdiction?

The means to obtain release of surety is set forth in NAC 519A.385. The surety may be released wholly or partially. The operator must prove to the agencies' satisfaction that the terms of the reclamation permit have been met before the surety can be released in its entirety.

6.3.12 How is progressive reclamation considered in financial security?

Pursuant to NAC 519A.385(1) and (4), progressive reclamation may result in incremental release of the surety, but only upon physical inspection of the reclaimed area(s) and confirmation by the State and federal agencies that the operator has satisfactorily fulfilled the terms of his/her reclamation permit.

6.3.13 Is liability costing information allowed to be filed confidentially by companies? What information is confidential and why?

The treatment of information as confidential is set forth in NAC 519A.170. The operator must request it be treated as confidential at the time of application for the permit. The operator/applicant must be able to show that the information is a trade secret as that term is defined in NAC 519A.170(5), by essence being information that is economically significant and not readily discernable by a competitor.

6.3.14 Are the detailed evaluations used to set a bond amount confidential?

They are not confidential except as identified in the previous section. In fact the final draft Reclamation Cost Estimate calculation spreadsheet from which the reclamation surety is derived is available for public comment prior to final approval by the agencies.

6.4 ENVIRONMENTAL LIABILITY FOR CATASTROPHIC EVENTS

6.4.1 What type of security, environmental liability insurance, or other arrangement is in place to cover unintended, catastrophic events at mine sites during and after mining operation (e.g. failure of a tailings dam, water quality impacts etc.)?

In Nevada the reclamation bond applies to disturbance within the approved Reclamation Plan; it does not address unintended, catastrophic events at mines. It is intended to address planned disturbance within the defined operations boundary.



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6.4.2 How are the requirements for environmental liability associated with catastrophic events determined and administered?

The reclamation surety does not address unintended, catastrophic events at mines.

It is presented to ensure that reclamation can be completed in the event of financial collapse or other causes of failure of an operator to complete its reclamation obligations.

6.4.3 What are companies required to pay to cover the costs for off-site impacts?

Impacts outside of the operations boundary are not considered in the reclamation surety in Nevada. These would be addressed in subsequent legal actions.

6.4.4 What are the relationships to other existing legislation for catastrophic events (e.g. a major spill) and what are associated fines.

In Nevada, catastrophic events at mine sites are addressed apart from the reclamation surety. The bureau chiefs and staff at the NDEP discuss actions of bad-faith operators with one another for follow-up reviews and pursuit of redress. The fines can be substantial for offenders who fail to act in timely fashion to remediate environmental damages associated with their operation, as much as \$25,000 per day per offense (NRS 445A.700).

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7.0 WESTERN AUSTRALIA

Reclamation security is managed differently in Western Australia (WA) compared to the other jurisdictions included in this comparative study. In 2013, WA enacted regulations to the *Mine Rehabilitation Fund Act* (the Act) of 2012. Prior to that time, most active mines were required to provide reclamation security through one of several options ("bonds") to reflect the estimated costs for mine reclamation similar to other jurisdictions. However, those bonds were released in 2013 and operating mines were then required to make annual payment into the Mine Rehabilitation Fund (MRF) under the terms of the Act. The annual payments are calculated from a fairly simple formula that assigns a liability amount to each hectare of mine lease land, based on the category of that land use (dam, waste rock dump, sewage pond, airstrip, reclaimed etc.). The liability amount is factored by 1% to calculate the annual payment. The MRF principal is about AUS\$60M, with a target of AUS\$500M in ten years. Apparently, there is a commitment from the Western Australian legislature to provide funding for needs that might exceed the fund amount, should the need arise, including catastrophic events. The MRF funds are to be used to rehabilitate historic-abandoned mines and any new mines that default on their obligation to perform reclamation and closure. Operating mines are still expected to pay for their own reclamation and closure costs. Should mine operations begin to show weakened financial strength or fail to perform concurrent reclamation as defined in their reclamation plan, they can be assigned to a higher risk category and their annual MRF payments may be increased. In Western Australia, there is also a second category of mines that are deemed to be of "State Significance." These are generally the very large mines. For these mines, the terms of their mining leases, including any reclamation security, is negotiated with the Western Australia government and formalized through legislation known as 'State Agreements'. Our agency contact at the Western Australia Department of Mines and Petroleum (DMP) informed us that most of these mines are not required to provide a reclamation security

As in other jurisdictions considered in this study, WA mining law does not specifically require a reclamation security for accidents or catastrophic events. However, as a matter of emerging unwritten policy, the Department of Mining and Petroleum informed us that, under the advisement of the MRF advisory panel and at the discretion of the Director General, Department of Mines and Petroleum, funds from the MRF could be used to fund clean-up of accidents or catastrophic events. In addition, mining companies can be held liable through court proceedings for their liabilities stemming from an accident or catastrophic event.

7.1 DEFINITION OF RECLAMATION SECURITY

Reclamation security is a source of funding coming from the MRF to provide for the rehabilitation of abandoned mine sites and other land affected by mining operations carried out in, on or under those lands (*Mining Rehabilitation Fund Act* of 2012, Part 2, Sec. 6 [1]).

7.2 RECLAMATION SECURITY COVERAGE

7.2.1 Restoring disturbance on site? Offsite disturbances (e.g. loadouts, other)?

Language in the *Mine Rehabilitation Act* of 2012 states that:

Money standing to the credit of the Fund (whether or not it consists of or includes investment income) may be applied for these purposes—

(a) to fund the rehabilitation of —

- (i) abandoned mine sites that are, or have been, the subject of mining authorisations in respect of which the levy is, or has been, payable; and
- (ii) any affected land relating to those sites;

(*Mining Rehabilitation Fund Act*, Part 2, Section 8)

7.2.2 Restoring disturbance through normal operation?

Lands that are reclaimed during normal operations fall into the rehabilitated lands category which has the effect of lowering the annual payment for those lands (Mining Rehabilitation Fund Act of 2012, Part 2, Sec. 4).

7.2.3 Removing infrastructure (e.g., roads, wharves, power generation facilities, and air strips)?

The MRF funds may be used to remove infrastructure.

7.2.4 Restoring disturbance on and / or off site due to accident or failure?

Neither accident nor failure is specifically mentioned in the *Mining Rehabilitation Fund Act* of 2012 or the *Western Australia Mining Act* of 1978 and subsequent regulations (1981). However, as reported as emerging unwritten policy, the MRF funds could be used to restore disturbance due to an accident or failure at the discretion of the MRF Director General.

7.2.5 Does the security include costs to go from operations to closure (e.g. hazardous substances survey of the mine, engineering studies to determine specific closure requirements, pumping from underground until hazardous materials removed, maintaining hydro and ventilation systems etc.)

The *Mining Rehabilitation Fund Act* of 2012, Part 2, authorizes, among other uses, to fund programmes, or the provision of information, relating to the rehabilitation of abandoned mine sites, affected land and other land affected by mining operations (*Mining Rehabilitation Fund*

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Act of 2012 Part 2 (2)(b). In practice, this is interpreted to include engineering and environmental studies that may be required for mine rehabilitation.

7.2.6 Long term post closure water treatment of acid-mine-drainage or other leaching or effluent issues?

These costs may be covered for rehabilitation of abandoned mines under the terms of the *Mining Rehabilitation Fund Act of 2012 (Mining Rehabilitation Fund Act of 2012 Part 2 (2)(b))* but they are not part of the formula used to calculate the annual levy (payment) to the MRF and made by active mines. Post closure acid mine drainage and metal leaching are not a typical issues in arid Western Australia

7.2.7 Long-term post closure monitoring and maintenance (e.g. maintenance of cover systems, tailings dams, water treatment plants etc.; geotechnical, water quality, biological monitoring etc.).

Long-term post closure monitoring and maintenance costs may be covered for rehabilitation of abandoned mines under the terms of the *Mining Rehabilitation Fund Act of 2012 (Mining Rehabilitation Fund Act of 2012 Part 2 (2)(b))* but they are not part of the formula used to calculate the annual levy (payment) to the MRF and made by active mines.

7.2.8 Accidents? Disasters that lead to on site / off site environmental damage?

Neither accident nor failure is specifically mentioned in the *Mining Rehabilitation Fund Act of 2012* or the *Western Australia Mining Act of 1978* and subsequent regulations (1981). However as a offered by the WA Department of Mines and Petroleum, as matter of practice, the MRF funds could be used to restore disturbance due to an accident or failure at the discretion of the MRF Director General.

7.2.9 Are contingency costs applied? What range is applied?

Contingency costs are not applied directly to the levy (payment) formula for the MRF.

7.2.10 Other items?

None

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7.3 RECLAMATION SECURITY ADMINISTRATION

7.3.1 Is reclamation security administered by mining/natural resources departments or environment departments or other?

Funds in the Mining Rehabilitation Fund are administered by the Mining Rehabilitation Advisory Panel. Final decisions on use of the Fund are made by the fund's Director General (see Regulations for *Mining Reclamation Fund Act* Part 3, Section 9)

7.3.2 How is reclamation security calculated? Who is it calculated by? How is company information considered and used?

The annual levy (payment) into the MRF is calculated using the formula $RLE \times FCR = \text{payment}$, in Part 2, Section 4 of the *Mining Rehabilitation Fund Regulations*. The formula considers a rehabilitation liability estimate (RLE) that accounts for the hectares in the mining authorization and a unit rate per hectare based on the category of land use. FCR is the fund contribution rate and is set at 1% in the same regulation.

7.3.3 How frequently is security reviewed and recalculated? What triggers an evaluation?

The MRF levy amount is calculated annually in order to meet the requirement for an annual payment into the fund. Levy information is due on June 30 annually in the form of a reassessment notice (Part 2, Section 5(2) of the *Mining Rehabilitation Fund Regulations*).

7.3.4 What percentage of liability does the security have to cover? Is 100% of the reclamation liability required up front? What portion is required up front versus over the life of the mine?

As described in 7.3.2 above the annual levy (payment) to the Mine Rehabilitation Fund is a factor of the disturbance area, the type of mine facilities on the site and a multiplier of 1 percent. Under this formula the mining company is not required to provide a Reclamations Security sufficient to cover 100% of their liability. (Part 2, Section 4 of the *Mining Rehabilitation Fund Regulations*). In Western Australia, there is also a second category of mines that are deemed to be of "State Significance." These are generally the very large mines. For these mines, the terms of their mining leases, including any reclamation security is negotiated with the Western Australia government and formalized through legislation known as 'State Agreements'. Our agency contact at the Western Australia Department of Mines and Petroleum (DMP) informed us that most of these mines are not required to provide a reclamation security

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7.3.5 Is long-term, post-closure liability calculated differently from operational liability? How is long term post closure liability factored into the reclamation security required for an operating mine?

The formula in the Mine Rehabilitation Fund Regulations does not differentiate long-term liability from operational liability. (Part 2, Section 4 of the Mining Rehabilitation Fund Regulations)

7.3.6 How is a mine's long-term reclamation liability calculated? Over what period of time is it considered (e.g. 50 years, 100 years, other)?

The formula used to calculate a mine's annual MRF levy (payment) does not differentiate long-term liability from operational liability. Part 2, Section 4 of the Mining Rehabilitation Fund Regulations)

7.3.7 Are discount rates used to calculate the net present value of long term liabilities? What discount rates are applied, how are they determined and how often are they reviewed?

The annual payment formula in the MRF Regulations does not differentiate long-term liability from operational liability or use discount rates in formula. Part 2, Section 4 of the Mining Rehabilitation Fund Regulations)

7.3.8 Is the financial strength of a company assessed and considered? How is this done?

No.

7.3.9 How is reclamation security provided by mine operators? In what forms?

Since 2012 mines contribute annual levies (cash-equivalent payments) into the Mine Rehabilitation Fund.

7.3.10 How is reclamation security used by each jurisdiction? How is it made available for use?

Funds from the Mine Rehabilitation Fund are used for the following under the discretion of the Fund Advisory Panel and the Director General:

- (1) Money standing to the credit of the Fund (whether or not it consists of or includes investment income) may be applied for these purposes—
 - (a) to fund the rehabilitation of —
 - (i) abandoned mine sites that are, or have been, the subject of mining authorisations in respect of which the levy is, or has been, payable; and



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- (ii) any affected land relating to those sites;
- (b) in payment of the amount of any refund required under Part 4.
- (2) Money standing to the credit of the Fund that consists of investment income may also be applied for these purposes —
 - (a) to fund the rehabilitation of —
 - (i) abandoned mine sites other than those described in subsection (1)(a)(i); and
 - (ii) any affected land relating to those sites;
 - (b) to fund programmes, or the provision of information, relating to the rehabilitation of abandoned mine sites, affected land and other land affected by mining operations;
 - (c) in payment of the costs of administering the Fund;
 - (d) in payment of the other costs of administering and enforcing this Act.

(Mining Rehabilitation Fund Act, Part 2, Section 8)

7.3.11 How is reclamation security refunded in each jurisdiction?

There is no mechanism for refunding payments made to the MRF. It is considered a tax as described by a representative of the WA Department of Mines and Petroleum.

7.3.12 How is progressive reclamation considered in financial security?

Levies (payments) into the Mine Rehabilitation Trust Fund are calculated annually and reflect the type of facilities and use of the land within the lease. There is no payment into the trust for rehabilitated land and only a nominal fee for land that is under rehabilitation (Mining Rehabilitation Fund Regulations, Schedule 1).

7.3.13 Is liability costing information allowed to be filed confidentially by companies? What information is confidential and why?

In practice, the individual mine's annual reassessment notice (levy calculation) remains confidential and levy amount is not typically available to the public, unless the company indicates that there is no requirement for this information to be confidential, or presents it in a public document. There is no requirement for this information to be made available to the public.

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7.3.14 Are the detailed evaluations used to set a bond amount confidential?

The detailed evaluations remain confidential unless the company releases it publicly.

7.4 ENVIRONMENTAL LIABILITY FOR CATASTROPHIC EVENTS

7.4.1 What type of security, environmental liability insurance, or other arrangement is in place to cover unintended, catastrophic events at mine sites during and after mining operation (e.g. failure of a tailings dam, water quality impacts etc.)?

In practice, companies may hold their own insurance package but it is not a requirement under regulation to be insured for above events

7.4.2 How are the requirements for environmental liability associated with catastrophic events determined and administered?

There is no specific requirement for reclamation security for environmental liability associated with catastrophic events in Western Australia. Companies only pay into the Mine Rehabilitation Fund in an amount that is calculated to contribute to the cost for reclamation under a normal closure scenario.

7.4.3 What are companies required to pay to cover the costs for off-site impacts?

According to the representative from the WA Department of Mines and Petroleum, there is no specific requirement for reclamation security for environmental liability associated with catastrophic events on-, or off-site, in Western Australia. There is no language addressing catastrophic events in the Mine Rehabilitation Fund Act 2012 or the Mining Rehabilitation Fund Regulations 2013.

7.4.4 What are the relationships to other existing legislation for catastrophic events (e.g. a major spill) and what are associated fines.

Section 9A (3 and 4) of *Mine Rehabilitation Fund Act* states that each person who, on declaration day for the land, was liable to comply with an obligation under or in relation to the mining authorisation under which the mining operations were carried out; and requiring the rehabilitation of the land, is jointly and severally liable to pay to the Fund the amount applied. An amount payable under subsection (3) may be recovered by the Chief Executive Officer in a court of competent jurisdiction as a debt due to the State.

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8.0 SUMMARY

Reclamation security which is also termed financial assurance in most mining jurisdictions is often required in policy, statute and regulation for mine development projects. All of the mining jurisdictions included in this study require reclamation security in some form of financial guarantee to assure that mine reclamation is performed in the event that the mine operator fails to perform that work. The jurisdictions in this study have different requirements for the timing and amounts of financial assurances for reclamation. All jurisdictions require reclamation security in advance of mine construction. Nova Scotia, Alaska and Nevada require 100% security for the area proposed for disturbance. British Columbia, and Ontario allow a staged approach to securing financial assurances that allows the security to increase or decrease to reflect the current mine development, but still with the intent of securing sufficient reclamation security to perform the requisite work. Western Australia is different from the other study jurisdictions due to the fact that requires an annual payment into a fund that may, or may not, eventually provide sufficient financial assurance for reclamation. Significantly, none of the study jurisdictions require a financial assurance for catastrophic events on, or off, the mine sites.

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9.0 CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained.

This report provides an evaluation of mining jurisdictions at the time it was completed, based on information obtained by and/or provided to Stantec. The responses in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received provided by the contacts made within the mining jurisdictions.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report, and are based solely on the scope of work described in the report, the data available and the results of the work. This report should not be construed as legal advice. Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was prepared by Stantec. We trust this meets with your current requirements. Please feel free to contact Jack DiMarchi (jack.dimarchi@stantec.com) if you have any questions.

Respectfully Submitted,

Stantec Consulting Ltd.



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10.0 REFERENCES

10.1 BRITISH COLUMBIA, CANADA

British Columbia Advisory Council on Mining 1996. April. British Columbia Mine Reclamation Security Policy - Report and Recommendations to the Minister of Employment and Investment.

BC Environmental Assessment Act (current to June 29, 2016).
http://www.bclaws.ca/civix/document/id/complete/statreg/02043_01#section43

BCMCM (British Columbia Ministry of Energy and Mines) 1998. August. Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia.
http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/ml-ard_guidelines.pdf

BCMCM 2015a. January. Mine Reclamation Costing and Spreadsheet Version 3.5.2.
<http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/reclamation-and-closure/reclamationcostingmanualjan2015.pdf>

BCMCM 2016a. Mine reclamation security in British Columbia Factsheet.
http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/fs_mine_reclamation_security_in_bc_may_20_final.pdf

BCMCM 2016b. Government response to Mount Polley Mine tailings storage facility breach. NEWS-11360 Factsheet. June 23, 2016.

BCMCM 2016c. 2014 Mine Reclamation Securities in BC for Metal and Coal Mines.
http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/mine_reclamation_security-summary_final_may_18_2016.pdf

BCMCM and BCMELP (British Columbia Ministry of Environment, Lands and Parks) 1998. July. Policy for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia.
http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/permitting/ml-ard_policy.pdf

BCMCMPR (BC Ministry of Energy and Mines and Petroleum Resources) 1995. Province of British Columbia, Ministry of Energy, Mines and Petroleum Resources. Mine Reclamation Security Policy in British Columbia – A paper for discussion, February, 1995.



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References

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BCMEMPR (Ministry of Energy, Mines and Petroleum Resources). 2008. Health, Safety and Reclamation Code for Mines in British Columbia (2008)
http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/health_safety_and_reclamation_code_2008.pdf

BCMEMPR 2016. July 20. Part 10 of the Health, Safety and Reclamation Code for Mines in British Columbia is repealed and the following is substituted:
http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/code-review/hsrc_code_part_10_revisions_effective_july_20_2016.pdf

BC Mines Act (current to August 31, 2016).
http://www.bclaws.ca/civix/document/id/complete/statreg/96293_01

BCMOE (British Columbia Ministry of Environment) 2016. June. Water and Air Baseline Monitoring Guidance Document for Mine Proponents and Operators (Version 2).
http://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/water_air_baseline_monitoring.pdf

Government of BC. 2016. Securities. <http://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/permitting/reclamation-closure/securities>

MABC (Mining Association of British Columbia) 2016. Environmental Laws and Regulations listing.
<http://www.mining.bc.ca/our-focus/environmental-laws-regulations>

Metal Mining Effluent Regulations (current to June 6, 2016). <http://laws-lois.justice.gc.ca/PDF/SOR-2002-222.pdf>

Price, W.A., Aziz, M., Bellefontaine, K. 2011. Review of 2010 financial security at Equity Silver mine. Vancouver: University of British Columbia Library. 10.14288/1.0042602.
<http://hdl.handle.net/2429/42262>

10.1.1 Personal Communications

Demchuk, T. Deputy Chief Inspector of Mines, Compliance and Enforcement, BC Ministry of Energy and Mines, phone call and share computer screen, August 15, 2016.

Howe, D. Deputy Chief Inspector of Mines–Permitting, Mines and Mineral Resources Division, BC Ministry of Energy and Mines, phone call and share computer screen, July 21, 2016.

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10.2 ONTARIO, CANADA

Ontario Mining Act, R.S.O. 1990, Chapter 14
<https://www.ontario.ca/laws/statute/90m14>

Ontario Regulation 240/00
<https://www.ontario.ca/laws/regulation/000240>

10.3 NOVA SCOTIA, CANADA

Nova Scotia Mineral Resources Act, Chapter 18 of the Acts of 1990
<http://nslegislature.ca/legc/statutes/mineralr.htm>

Mineral Resources Regulations made under Section 174 of the Mineral Resources Act
<https://www.novascotia.ca/just/regulations/regs/mrregs.htm>

10.4 ALASKA, USA

Alaska Statutes Title 27, Chapter 19
<http://touchngo.com/lglcntr/akstats/Statutes/Title27/Chapter19.htm>

Alaska Statute Title 37, Chapter 14
<http://touchngo.com/lglcntr/akstats/Statutes/Title37/Chapter14.htm>

Alaska Statute Title 46, Chapter 3
<http://touchngo.com/lglcntr/akstats/Statutes/Title46/Chapter03.htm>

Alaska Statute Title 46, Chapter 17
<http://touchngo.com/lglcntr/akstats/Statutes/Title46/Chapter17.htm>

Alaska Administrative Code Title 11, Chapter 97
<http://www.touchngo.com/lglcntr/akstats/aac/title11/chapter097.htm>

Alaska Administrative Code Title 18, Chapter 60
<http://www.touchngo.com/lglcntr/akstats/aac/title18/chapter060.htm>

Code of Federal Regulations Title 36, Section 228.13
<http://www.ecfr.gov/cgi-bin/text-idx?SID=5740fe59ac18b46d8cd9909252b77f11&andmc=true&andnode=pt36.2.228&andrgn=div5>

Alaska Department of Natural Resources and Department of Environmental Conservation Draft Mine Closure and Reclamation Cost Estimation Guidelines, 2009 (not available on-line)



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10.5 NEVADA, USA

Nevada Administrative Code Chapter 519A (NAC 519A)

<http://www.leg.state.nv.us/nac/NAC-519A.html>

Nevada Revised Statutes Chapter 519A (NRS 519A)

<http://www.leg.state.nv.us/nrs/nrs-519a.html>

Nevada Revised Statutes Chapter 445A-Water Controls and NAC 445A – Water Controls.

<http://www.leg.state.nv.us/nrs/nrs-445a.html>

10.6 WESTERN AUSTRALIA

Western Australia Mining Rehabilitation Fund Act 2012

https://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_12984_homepage.html

Western Australia Mining Rehabilitation Regulations, 2013

https://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_13067_homepage.html

Western Australia Mining Act of 1978

https://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_604_homepage.html

Western Australia Mining Regulations, 1981

https://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_1822_homepage.html

Guidelines for Preparing Mine closure plans (DMP)

http://www.epa.wa.gov.au/EPADocLib/153549_WEB%20VERSION%20E2%80%93%20Guidelines%20for%20Preparing%20Mine%20Closure%20Plans.pdf

APPENDIX A

AGENCY CONTACTS

POLICY AND PROCESS REVIEW FOR MINE RECLAMATION SECURITY

Appendix A Agency Contacts
September 30, 2016

Appendix A AGENCY CONTACTS

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