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A Guide to the Alberta Mineral Resource Development Act

Dr. Chilenye Nwapi
CIRL Research Fellow

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MFH 3353, Faculty of Law, University of Calgary, Calgary, Alberta, Canada T2N 1N4
Tel: (403) 220-3200 Fax: (403) 282-6182 E-mail: cirl@ucalgary.ca Web: www.cirl.ca3

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All enquiries should be addressed to:

The Executive Director
Canadian Institute of Resources
Law Murray Fraser Hall, Room 3353 (MFH 3353)
Faculty of Law
University of Calgary
Calgary, Alberta, Canada T2N 1N4
Telephone: (403) 220-3200
Facsimile: (403) 282-6182
E-mail: cirl@ucalgary.ca
Website: www.cirl.ca

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Toute demande de renseignement doit être adressée au:

Directeur exécutif
Institut canadien du droit des ressources
Murray Fraser Hall, pièce 3353
Faculté de droit
L'Université de Calgary
Calgary, Alberta, Canada T2N 1N4
Téléphone: (403) 220-3200
Télécopieur: (403) 282-6182
Courriel: cirl@ucalgary.ca
Site Web: www.cirl.ca

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1.0 INTRODUCTION

Alberta has earned a global reputation as one of the world’s largest oil and gas producers. But not many know that the province is also home to a significant amount of “solid” minerals, which have been integral to its economy since at least the 19th century. The minerals are legion and include, coal, salt, sulphur, limestone, and silica, with exploration opportunities for other minerals, such as cobalt, copper, diamonds, iron, lithium, magnesium, nickel, potash, rare earth elements, titanium, uranium, vanadium, zirconium, and zinc.¹ Since 2016, due mainly to an increased global interest in minerals considered critical for the transition to clean energy, Alberta has focused a lot of attention on discovering lithium, which is used in manufacturing rechargeable batteries for phones, electric cars, and energy storage. As part of its responsibility to increase public geoscience knowledge in Alberta, the Alberta Geological Survey has reported high levels of lithium in geological formation waters, especially within the lithium-rich brines of Devonian aquifers in various areas of Alberta, including Fox Creek, Grande Prairie, Leduc, Red Deer, and the Swan Hills region.² Further investigations by the Alberta Geological Survey and Natural Resources Canada have revealed the likelihood of lithium-enriched waters in the subsurface oilfield waters in the Duvernay and Montney regions.³

The increasing global interest in critical minerals has led to a new wave of mineral exploration and development activities in Alberta, as in other jurisdictions, necessitating the development of a modern regulatory framework to help the province position itself as a globally attractive jurisdiction for mining. The goal is to maximize the benefits of mineral development while protecting Indigenous Peoples’ rights and promoting environmental sustainability. To that end, in 2021 the province launched a critical minerals strategy – *Renewing Alberta’s Mineral Future: A Strategy to Re-energize Alberta’s Mineral Sector*⁴ – to support the exploration and development of critical minerals. This was followed in 2021 with the enactment of the Mineral Resource Development Act, which came into force in 2023.

The purpose of the Guide is to help Alberta residents and other interested persons understand the complex regulatory framework for mineral resource development in Alberta. The Guide is intended to inform members of the Alberta public so that they may influence and participate in the decision-making processes regarding the development of critical mineral resources in the province. It explains the approval process for the grant of licences and permits and the regulations, rules and directives that guide the approval processes. The overarching goal therefore is to help create well-informed residents with regard to critical mineral resource development in Alberta.

¹ Alberta Energy Regulator, “Alberta’s Mineral Resources”, 2020, <https://ags.aer.ca/research-initiatives/mineral-resources>; Government of Alberta, supra note 12 at 10.

² Adam Leece, “Alberta’s Oilfield Brine Mineral Rights: How Regulatory Changes Are Enabling the Lithium Co-Production Scenario”, Integrated Sustainability, December 2023, <https://www.dobenergy.com/news/headlines/2023/12/12/albertas-oilfield-brine-mineral-rights-how-regulat>.

³ *Ibid.*

⁴ Government of Alberta, *Renewing Alberta’s Mineral Future: A Strategy to Re-energize Alberta’s Mineral Sector*, November 2021, <<https://open.alberta.ca/publications/renewing-albertas-mineral-future>>.

2.0 A BRIEF HISTORY OF MINERAL DEVELOPMENT IN ALBERTA

Mineral development has been integral to Alberta's economy for a long time, especially through the extraction of coal, sand, gravel, and industrial minerals. Indigenous Peoples had long known about coal seams in the region, and early settlers began mining coal in the 1800s, primarily for heating and railway transportation.⁵ In 1874, Nicholas Sheran opened Alberta's first commercial coal mine near Lethbridge, marking the beginning of significant coal production in the province.⁶ The expansion of railways in Canada during the late 1800s led to an increased demand for coal. The Canadian Pacific Railway was a major catalyst for coal mining expansion in Alberta, with numerous mines springing up to supply fuel for steam locomotives.⁷ By the early 1900s, Alberta was dotted with coal mines, particularly in the Crowsnest Pass, Drumheller Valley, and along the foothills of the Rocky Mountains. Towns like Canmore and Bellevue grew around coal mining operations, and coal became a crucial industry for Alberta's economy.⁸ After World War II, however, demand for coal began to decline due to the rise of diesel and electric trains, as well as the growing use of oil and natural gas for heating. Many coal mines were abandoned or closed, and Alberta's coal industry began to shrink.⁹

Early 20th century marked the beginning of the most significant mineral development in Alberta with the discovery of oil in Turner Valley in 1914, sparking Alberta's first oil boom. Turner Valley became a major oilfield and continued to produce oil and gas for decades.¹⁰ However, a dramatic shift in Alberta's mineral development occurred with the discovery of oil in Leduc in 1947, which transformed Alberta into a major oil-producing province. The Leduc No. 1 well marked the beginning of modern oil exploration and development in Alberta.¹¹ Alongside oil, Alberta developed extensive natural gas reserves. By the mid-20th century, natural gas had become a major contributor to Alberta's economy, with large-scale development and exportation starting in the 1950s.¹² While the oil sands in northern Alberta had been known for centuries, large-scale

⁵ Hannah S Skelding, "Uncovering Hidden Narratives of Resource Dependent Communities: Coal Mining in Alberta", A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Risk and Community Resilience, University of Alberta, 2023, 11; John Erik Meyer, *The Renewable Energy Transition: Realities for Canada and the World*, Lecture Notes in Energy, 71 (Springer, 2020) 23–70.

⁶ Ian MacLachlan, "Industrial Development of Lethbridge: A Geographer's Interpretation", Paper written as a field trip guide for the 1999 Meeting of the Canadian Association of Geographers, 2004, <https://opus.uleth.ca/server/api/core/bitstreams/96b272a4-2b9e-4de1-9588-5025980d2b62/content>.

⁷ Liza Piper & Heather Green, "A province Powered by Coal: The Renaissance of Coal Mining in Late Twentieth-Century Alberta" (2017) 98:3 *Canadian Historical Review*, 532–567.

⁸ Trevor IE Stace, "A Community in Conflict: The Crowsnest Pass' 1932 Coal Strike", A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts in History, University of Alberta, 2015.

⁹ Liza Piper & Heather Green, "A province Powered by Coal: The Renaissance of Coal Mining in Late Twentieth-Century Alberta" (2017) 98:3 *Canadian Historical Review*, 532–567; JC Herbert Emery & Ronald D Kneebone, "Socialists, populists, resources, and the divergent development of Alberta and Saskatchewan" (2008) *Canadian Public Policy/Analyse de Politiques*, 419–440.

¹⁰ Rachel Webb Jekanowski, "Fuelling the Nation: Imaginaries of Western oil in Canadian Nontheatrical Film" (2018) 43:1 *Canadian Journal of Communication*, 111–125; Laura Golebiowski, "Oil discovery in Turner Valley: Press Reactions" (2007) 55:3 *Alberta History*, 20–28.

¹¹ Eliot Tretter, "Producing Alberta's Tar Sands: Oil, Ideas, Rents, and New Enclosures" (2020) 31:1 *Capitalism Nature Socialism*, 94–113.

¹² Liza Piper & Heather Green, "A province Powered by Coal: The Renaissance of Coal Mining in Late Twentieth-Century Alberta" (2017) 98:3 *Canadian Historical Review*, 532–567.

commercial production began in the 1960s with the establishment of operations like Suncor (originally known as Great Canadian Oil Sands) in Fort McMurray.¹³ Alberta's oil sands production grew steadily, and the province is one of the largest oil producers in the world. The development of the Athabasca oil sands, combined with technological advances in oil extraction, boosted the economy and created thousands of jobs.

Thus, while coal mining declined, other mineral resources began to emerge during the energy transition. Alberta's oil sands and conventional oil production grew rapidly, overshadowing coal as the primary economic driver in the province. However, Alberta saw a resurgence in coal mining in the late 20th and early 21st centuries, primarily due to the global demand for metallurgical coal used in steelmaking.¹⁴ In addition to coal, Alberta also has abundant deposits of sand, gravel, and other industrial minerals – materials widely used in construction, infrastructure projects, and industry.

With a growing awareness of climate change and the need for a transition to cleaner energy sources, wind and solar energy projects that require rare earths have been developed in Alberta since the 1990s. The critical minerals search began in the early 2000s with the discovery of lithium in brine formations. Lithium, a key component in batteries for electric vehicles and energy storage, was found in the province's oil and gas reservoirs. This led to interest in extracting lithium from these brines, particularly in regions like the Leduc oil fields.¹⁵ By the mid-2010s, several companies began exploring the potential for lithium extraction in Alberta. These projects focused on using existing oil and gas infrastructure to extract lithium from brine, a more sustainable and cost-effective approach than traditional mining. Projects like E3 Lithium (formerly E3 Metals Corp) began conducting studies and pilot projects to assess the feasibility of lithium extraction in the province.¹⁶

Alberta's lithium brine industry has gained momentum with more pilot projects and partnerships. Companies such as E3 Lithium have progressed toward commercial-scale lithium production, focusing on developing direct lithium extraction (DLE) technologies.¹⁷ This method is seen as more efficient and environmentally friendly than conventional mining, as it avoids the significant land disturbance and surface impacts from major open pit mines.¹⁸ In addition to lithium, however, there is growing interest in Alberta's potential for rare earth elements (REEs), which are critical for electronics, renewable energy technologies, and other high-tech applications. These elements

¹³ Frank J Atkins & Alan J MacFadyen, "A Resource Whose Time Has Come? The Alberta Oil Sands as an Economic Resource" (2008) 29:1 Supp. *The Energy Journal*, 77–98.

¹⁴ Liza Piper & Heather Green, "A province Powered by Coal: The Renaissance of Coal Mining in Late Twentieth-Century Alberta" (2017) 98:3 *Canadian Historical Review*, 532–567.

¹⁵ Rudiger Tscherning & Brady Chapman, "Navigating the Emerging Lithium Rush: Lithium Extraction from Brines for Clean-tech Battery Storage Technologies" (2021) 39:1 *Journal of Energy & Natural Resources Law*, 13–42.

¹⁶ *Ibid*; Ewa Knapik, Grzegorz Rotko & Marta Marszałek, "Recovery of Lithium from Oilfield Brines—Current Achievements and Future Perspectives: A Mini Review" (2023) 16:18 *Energies*, 6628.

¹⁷ Alberta Innovates, "Alberta's First Direct Lithium Extraction Pilot", May 2022, <https://albertainnovates.ca/wp-content/uploads/2022/06/Albertas-First-Direct-Lithium-Extraction-Pilot-E3Metals-Project-Summary.pdf>;

Tscherning & Chapman, *supra* note 15.

¹⁸ Jinfeng Zhang, "Proton Conduction and Lithium Extraction in Chromium (III) Phosphonate Metal-Organic Frameworks" (Doctoral thesis, University of Calgary, Calgary), 2024.

are found in trace amounts in Alberta's coal deposits and oil sands byproducts, leading to increased critical mineral exploration efforts.¹⁹

In line with the growing global interest in “critical minerals”, the Alberta government has recognized the importance of energy transition minerals in diversifying the economy and supporting global decarbonization efforts. In November 2021 the Alberta Government developed its own critical minerals strategy called, *Renewing Alberta's Mineral Future: A Strategy to Re-energize Alberta's Mineral Sector*,²⁰ an initiative launched to support the exploration and development of critical minerals in the province. The development of the strategy is especially significant because of Alberta's global reputation for responsible mineral resource development. Despite hydrocarbon development occurring throughout Alberta, due to geology, there are currently no critical mineral mines yet in operation in Alberta.²¹ Alberta is still at an early stage in modifying its mineral regulatory regime to reflect the implementation of the critical mineral strategy. The first piece of legislation, the *Mineral Resource Development Act 2021*²² (MRDA), received royal assent in December 2021 and came into force in 2023. It has been suggested that its proclamation was deferred to allow detailed regulations to be developed that would help operationalize its provisions.²³ The MRDA reflects a significant transformation of the regulatory framework for critical mineral resource development in Alberta,²⁴ and as “an important first step” in Alberta's regulatory efforts to seize the opportunity presented by rising demand for critical minerals.²⁵

Energy transition minerals represent a dual opportunity for Alberta: reducing its reliance on fossil fuels to reduce its GHG emissions and to contribute to the global supply chain for green technologies. The development of these minerals can help create new industries and jobs, support innovation in clean energy, and further Alberta's role in the energy transition. The critical minerals sector in the province is, however, still in its early stages but shows significant promise. With growing investments in lithium extraction and exploration of rare earth elements, Alberta is working to diversify its energy portfolio and contribute to the global transition towards cleaner energy. This development aligns with Alberta's broader goals of increased sustainability, economic diversification, and leveraging its existing natural resources to meet future electricity needs for a growing population.

¹⁹ Government of Alberta, *Renewing Alberta's Mineral Future: A Strategy to Re-energize Alberta's Mineral Sector*, November 2021, <<https://open.alberta.ca/publications/renewing-albertas-mineral-future>>.

²⁰ *Ibid.*

²¹ *Ibid* at 4.

²² SA 2021, c M-16.8.

²³ Sander Duncanson, Jesse Baker and Coleman Brinker, “Alberta takes steps to encourage development of metals and critical minerals essential to energy transition”, Osler, Hoskin & Harcourt LLP, 30 June 2022, <<https://www.osler.com/en/blogs/energy/june-2022/alberta-takes-steps-to-encourage-development-of-metals-and-critical-minerals-essential-to-energy-tra>>.

²⁴ Keeley Cameron, Simon Foxcroft, Rayna Lew, Sean Assie, Deidre Sheehan and Adam Williams, “Bill 82—Laying the Groundwork for Alberta's Future as a Mineral Producer”, Bennett Jones LLP, 1 December 2021, <https://www.bennettjones.com/Blogs-Section/Bill-82-Laying-the-Groundwork-for-Albertas-Future-as-a-Mineral-Producer>.

²⁵ Duncanson *et al*, *supra* note 23.

3.0 MINERALS COVERED UNDER THE MRDA

The MRDA covers an assortment of minerals. As defined in section 1(1), “mineral resources” covered under the Act include:

all naturally occurring minerals, and without restricting the generality of the foregoing, includes gold, silver, uranium, platinum, pitchblende, radium, precious stones, copper, iron, tin, zinc, asbestos, salts, sulphur, anhydrite, barite, bauxite, bentonite, diatomite, dolomite, epsomite, granite, gypsum, limestone, marble, mica, mirabilite, potash, quartz rock, rock phosphate, sandstone, serpentine, shale, slate, talc, thenardite, trona, and volcanic ash, but excludes petroleum, oil, asphalt, bituminous sands, oil sands, natural gas, coal, ammonite shell, sand, gravel, clay, peat and marl.

Critical minerals regulated under two broad categories, namely, brine rock minerals and hard-core mineral resources, are explained in the next subsection.

3.1 Brine Mineral Development

Brine rock development refers to the extraction of valuable minerals and elements from underground brine deposits. These minerals are typically salty, mineral-rich waters trapped within subsurface formations.²⁶ The focus of brine extraction in Alberta has increasingly turned towards lithium, which is in high demand to support the transition for lithium ion battery production.

Several key points should be noted about brine fluid extraction in Alberta, including the following:

- Alberta has significant lithium-bearing brine resources, particularly in regions with saline aquifers, such as the Leduc Formation and other subsurface Devonian aquifers. The brines are often associated with legacy oil and gas wells, which offers the possibility for existing infrastructure to be repurposed for lithium extraction, reducing costs for new projects and making Alberta an attractive destination for lithium development.²⁷
- Common methods for extracting minerals such as lithium from brine include evaporation and direct extraction technologies or Direct Lithium Technologies (DLE). These methods aim to efficiently recover minerals while minimizing environmental impact. Unlike traditional mining, DLE is a less invasive process as it requires less land disruption, aligning with Alberta’s concern for sustainable mineral resource development.²⁸
- As with all mineral resource extraction, however, brine development also prompts environmental concerns. Those concerns include effective management of water

²⁶ Mattia Saccò et al, “Salt to Conserve: A Review on the Ecology and Preservation of Hypersaline Ecosystems” (2021) 96:6 Biological Reviews, 2828–2850.

²⁷ Roy Eccles & Michael Dufresne, *Geological Introduction to the Sturgeon Lake Oilfield Lithium-Brine, Leduc Property, West-Central Alberta*, Canadian International Minerals Inc, September 2016, https://www.canadianminingreport.com/company_resource/160909_NI43-101_Canad_Led_F.pdf.

²⁸ Tscherning & Chapman, *supra* note 15.

resources to mitigate negative ecological impacts. However, as noted above, brine fluid extraction generally causes much less environmental damage than hard rock extraction.²⁹

3.2 Mining Hard Rock Minerals

Hard rock mineral development refers to the extraction of valuable minerals and metals from solid rock formations, often using traditional mining techniques.³⁰ Alberta has significant potential for hard rock minerals, including granite and limestone (which are primarily in construction and industrial applications) and metals. While Alberta is not traditionally known for metal mining unlike other provinces and territories that host ore deposits in the Canadian Shield, there are deposits of copper, zinc, and rare earth elements that are being explored.³¹

Several key points are to be noted about brine extraction in Alberta, including the following:

- Alberta has diverse geology, with deposits of various minerals. Regions in the Rocky Mountains and the northeast corner of the province.
- Common methods for hard rock mining include underground mining, open-pit mining, and various milling processes to extract and refine minerals. Advanced technologies, such as remote sensing and geological modeling, are increasingly used in exploration.³²
- Hard rock mining activities can have significant environmental impacts, including land surface disturbance, habitat disruption, water quality and use issues. Environmental assessments are required under the regulatory framework to evaluate and mitigate impacts from major projects. There is also a growing emphasis in Alberta on sustainable mining practices, including minimizing waste, reducing emissions, and reclaiming mined areas. Companies are increasingly adopting greener technologies and practices in mining.

As with coal and hydrocarbons, the regulatory requirements for developing both brine-hosted and hard rock minerals resources are specified in rules and directives issued by the AER, and are explained later in this paper.

4.0 THE COMPLEX REGULATORY SYSTEM FOR MINERAL EXTRACTION IN ALBERTA

The regulatory system governing mineral extraction in Alberta is complex, involving multiple agencies, laws, and guidelines designed to manage the extraction of resources in a way that strikes a reasonable balance between economic development, environmental protection, and social responsibility. This system encompasses not only conventional energy resources like oil and gas but also coal, industrial minerals, and emerging critical minerals like lithium and rare earth elements. Below is an overview of the key components of this regulatory system.

²⁹ *Ibid.*

³⁰ Bart Lounsbury, “Digging out of the Holes We’ve Made: Hardrock Mining, Good Samaritans, and the Need for Comprehensive Action” (2008) 32 *Harvard Environmental Law Review*, 149.

³¹ Government of Alberta, *supra* note 19.

³² Yousef Ghorbani et al, “Moving towards deep underground mineral resources: Drivers, challenges and potential solutions” (2023) 80 *Resources Policy*, 103222.

4.1 Legislation and Policy Framework

Several key pieces of legislation form the foundation of Alberta's regulatory system for mineral extraction:

- **Mineral Resources Development Act** – This Act provides for the responsible development of Alberta mineral resources in the public interest and governs exploration, development, and management of mineral resources, setting standards for how mineral rights are allocated and regulated. It is administered by the Alberta Energy Regulator (AER) and applies to all naturally occurring mineral resources in Alberta; and related wells, facilities, well sites, facility sites, mines, mine sites, external mine discard dumps and processing plants throughout their life cycles, as defined in the Act. This Act is the primary focus of this Guide because of its centrality in operationalizing Alberta's critical minerals strategy.
- **Mines and Minerals Act** – This Act outlines the rights and obligations related to mineral exploration and extraction on public and private lands in Alberta. The Act provides the Government of Alberta with the authority to administer, allocate, and enter into agreements with respect to minerals. It applies to all mines and minerals and related natural resources belonging to the Crown. The Act defines mines and minerals, and then sets out how Crown agreements with respect to minerals are established, renewed or cancelled.
- **Responsible Energy Development Act** – This Act establishes the Alberta Energy Regulator (AER) as the single regulator for upstream oil, gas, oil sands and coal projects in Alberta. It also creates a registry for landowners to register private surface agreements and ensure companies comply with commitments set out in the agreements. It defines the AER's governance structure which separates corporate, operational, and governance responsibilities from adjudicative functions (i.e., hearings on energy applications).
- **Environmental Protection and Enhancement Act (EPEA)** – The Act is the primary provincial environmental protection statute under which regulatory requirements for air, water, land, and biodiversity are administered. It provides the framework for environmental regulation, requiring companies to adhere to stringent guidelines on land use, air and water quality, and reclamation. The Act supports and promotes the protection, enhancement and wise use of the environment by designating proposed activities for which an approval is required.
- **Water Act** – This Act regulates the use of water resources during mineral extraction activities, ensuring that water bodies and ecosystems are protected from depletion. It supports and promotes the conservation and management of water through restrictions on the use and allocation of water in Alberta. The Act requires the establishment of a water management framework and sets out requirements for the preparation of water management plans.
- **Public Lands Act** – This Act governs the use of public lands for multiple uses, including mining, permitting, land access, and the conditions under which mineral development can take place on Crown lands. It establishes the role of the Alberta government in managing

multiple uses of public lands and sets out the mechanisms by which rights in public land may be transferred by lease or sale. The Act controls public land use through the establishment of public land use zones, recreation areas and trails. It also provides for appropriate use and management of public lands and for the classification of the public land base in Alberta.

- **Alberta Land Stewardship Act (ALSA)** – ALSA provides for the preparation of regional land use plans and coordination of decisions concerning land, species, human settlement, natural resources and the environment while taking into account cumulative effects of human endeavours and other events.
- **Metallic and Industrial Minerals Exploration Regulation** – Created under the Mines and Minerals Act, this regulation sets out the requirements for obtaining and maintaining tenure agreements (permits, licences, leases) for metallic and industrial minerals. It also provides specific tenure requirements for the two types of metallic and industrial minerals – rock-hosted and brine-hosted minerals.
- **Brine-Hosted Mineral Resource Development Rules:** Created under the Mineral Resource Development Act, these rules establish the licensing and operating standards for brine-hosted mineral development to support the efficient, safe, orderly and environmentally responsible development of Alberta’s brine-hosted mineral resources such as lithium. The regulation establishes rules that govern well licensing and abandonment, drilling and other production operations. It also establishes administrative standards for recording, collecting, and reporting brine-hosted mineral resource well and facility data.
- **Rock-Hosted Mineral Resource Development Rules** – Established under the MRDA, the rules provide details on permitting, licensing, approval, and operating standards for rock-hosted mineral resource development to encourage the efficient, safe, orderly and environmentally responsible development of Alberta’s rock-hosted mineral resources. The rules govern approvals for rock-hosted mineral resource mine sites, external mine waste rock dumps, and processing plants. The rules also govern mine site production and closure operations, and set administrative standards for recording, collecting, and reporting rock-hosted mineral resource mine and processing plant data.
- **AER Directive 090: Brine-Hosted Mineral Resource Development** – This Directive provides a set of rules and standards that operators must adhere to when exploring or developing brine-hosted minerals.
- **AER Directive 091: Rock-Hosted Mineral Resource Development** – This Directive outlines the regulations and guidelines for rock-hosted mineral resource development.
- **AER Directive 056: Energy Development Applications and Schedules** – This Directive sets out specific licensing requirements for wells, facilities, and pipelines, including public consultation requirements for a project.

4.2. Regulatory Agencies

The following agencies collaborate to regulate critical mineral development in Alberta, as outlined below.

- **Alberta Energy Regulator (AER):** The primary body responsible for regulating energy resource development in Alberta, including hydrocarbons and critical minerals. The MRDA provides the AER with the authority to oversee the safe, efficient, orderly, and environmentally responsible development of Alberta's mineral resources. The AER is responsible for evaluating, permitting, and auditing wells, associated facilities and pipelines throughout the lifecycle of a mineral project, from initiation to decommissioning, reclamation and closure. It ensures compliance with provincial laws and sets conditions for approvals.
- **Alberta Energy and Minerals** – This is the ministry responsible for creating policies for the development of Alberta's energy and mineral resources on provincial Crown lands. It establishes, administers and monitors the effectiveness of Alberta's energy and minerals fiscal and royalty systems and encourages investment in the industry to create jobs and economic prosperity for the province. It also advocates at home and around the world for greater market access for Alberta's energy and mineral resources. Its mission is to promote sustained prosperity for Albertans through the stewardship of energy and mineral resource systems, responsible development, and wise use of the resources.
- **Alberta Environment and Protected Areas** – The ministry is responsible for enforcing environmental laws, issuing environmental approvals, and overseeing land reclamation. It plays a key role in regulating the environmental impacts of mining and ensuring sustainable practices. It works to protect and enhance Alberta's environment and ecosystems to ensure a sustainable future, improving the quality of life for Albertans. The ministry works with Albertans, including Indigenous communities and stakeholders to ensure the province's environmental, social and economic outcomes for future generations are met. It also engages Albertans to understand the challenges in ensuring Alberta's natural resources are managed using innovative and responsible approaches.
- **Alberta Indigenous Relations** – This department works to ensure that Indigenous rights and interests are respected in the development of mineral resources in Alberta. It facilitates consultations with Indigenous communities and helps manage the social and economic impacts of resource development on these populations.

4.3. Licensing and Permitting Process

The process for obtaining the necessary approvals to extract minerals is intricate and multi-staged:

- **Exploration Permits** – Companies must first apply for exploration permits to explore public lands for critical minerals and evaluate the commercial viability of developing critical mineral deposits. These permits grant temporary access to land but come with

conditions, including environmental studies and consultation with affected Indigenous communities.

- **Environmental Impact Assessments (EIAs)** – For large or environmentally sensitive mining projects, under Part 2 of EPEA, companies must conduct comprehensive EIAs to identify and evaluate potential environmental, social and cultural impacts. These assessments are reviewed by the AER and Alberta Environment, that may impose conditions or request mitigation strategies before major projects are approved.
- **Mineral Leases** – If exploration is successful, companies can apply for mineral leases, that grant the right to produce minerals. These leases come with strict conditions on land use, environmental protection, and reclamation.
- **Water and Land Use Permits** – If water is required for extraction (e.g., for processing or cooling), companies must obtain permits under the Water Act. Similarly, companies must secure land use permits under the Public Lands Act if they operate on Crown land.
- **Other Permits** – There are also a myriad of other permits or approvals that mineral resource development operators are required to obtain throughout the lifecycle of a project. Some of them relate to the installation of facilities and approvals for various plans, such as closure plans, reclamation plans, etc.

4.4. Royalties and Financial Obligations

Alberta's Crown regulatory system also includes financial obligations related to mineral extraction:

- **Royalties** – Companies extracting minerals must pay royalties to the provincial government. The rates depend on the type of mineral, market prices, and production volumes. These royalties are a significant source of revenue for the province.
- **Reclamation Security Deposits** – Companies are required to provide financial security deposits to ensure that funds are available for remediation and land reclamation when a mining project is at the end of its final commercial production. The deposits are held on behalf of the provincial government until the company satisfies the provincial reclamation standards.

4.5. Indigenous Consultation and Participation

One of the more complex aspects of Alberta's regulatory system is the requirement for Indigenous consultation. The requirement for Indigenous consultation arises from both provincial policies and federal legal obligations, including the duty to consult as confirmed by the Supreme Court of Canada.³³ This duty is rooted in the constitutional recognition of Indigenous rights and title. Thus, before proceeding with mineral exploration or extraction, companies must demonstrate that they have engaged in meaningful consultation with affected Indigenous communities if their projects impact traditional lands, water bodies, or resources used by Indigenous communities. This includes providing information about the project, its potential impacts, and seeking input from communities. The consultation process normally involves

³³ See Nigel Bankes, "The Duty to Consult in Canada Post-Haida Nation" (2020) 11 Arctic Review on Law and Politics, 256-279.

meetings and information sessions with affected Indigenous communities and the submission of written materials. It involves addressing specific concerns raised by Indigenous communities. Understanding and respect for the cultural practices, values, and traditional knowledge of Indigenous communities is crucial for effective consultation. Meaningful consultation goes beyond compliance; it requires building trust and fostering relationships.

- **Consultation Guidelines:** The consultation process is guided by government policies that ensure Indigenous peoples have a voice in decision-making. This process must be completed before regulatory approvals are granted.
- **Impact Benefit Agreements (IBAs):** IBAs may be negotiated between mineral developers and Indigenous communities. Companies enter into IBAs with Indigenous communities to share the economic benefits, such as revenue-sharing, employment, and business opportunities. These agreements are not legally required but are often used to facilitate project approvals. They have become an important instrument for companies to obtain the social licence to operate on Indigenous lands.³⁴

4.6. Environmental Stewardship and Reclamation

The focus on environmental stewardship is a critical element of Alberta's regulatory system:

- **Reclamation Requirements** – After mine production is at the end of its commercial life, under EPEA, companies are legally required to reclaim the land to its equivalent land capability (pre-mine site disturbance condition). This includes soil and water remediation, land surface contouring, replanting vegetation, and restoring ecosystems. The AER and Alberta Environment monitor reclamation efforts and release security deposits after mine reclamation standards are satisfied.
- **Ongoing Monitoring** – Even after site reclamation is complete, some sites may require ongoing environmental monitoring to ensure that ecosystems remain stable and no long-term damage occurs.

4.7. Sustainability and Innovation

As provided for under EPEA, the Alberta government is increasingly incorporating more sustainability into its mineral extraction regulatory requirements:

- **Clean Technology Incentives** – The provincial Government offers incentives for companies to adopt clean technologies and reduce their environmental impacts. This includes funding for research and development of more sustainable extraction methods, such as Direct Lithium Extraction (DLE) from oilfield brines.³⁵
- **Critical Minerals Strategy** – In line with increasing global demand for energy transition minerals, Alberta has developed and adopted a critical minerals strategy aimed at

³⁴ See Maggie Cascadden, Thomas Gunton & Murray Rutherford, “Best practices for impact benefit agreements” (2021) 70 Resources Policy, 101921.

³⁵ See Sean Ralph et al, “Richard Riegert Memorial Lecture: The Canadian Critical Minerals Strategy: Unearthing Energy Security in Canada” (2023) 61 Alberta Law Review, 385.

fostering the extraction of critical minerals like lithium, cobalt, and rare earth elements, while ensuring responsible mining practices and minimal environmental impacts. A major goal of Alberta's critical minerals strategy is to make Alberta an attractive destination for mineral investors. Given the global importance of critical minerals a more detailed discussion of the Alberta Critical Minerals Strategy is warranted and is provided in the next section.

It seems clear from the discussion in this section that the regulatory system for critical mineral extraction in Alberta is multi-layered, involving a combination of provincial legislation, regulatory agencies, permitting processes, and environmental safeguards. This system is designed to promote responsible mineral development while ensuring the economic, environmental, and social impacts are carefully managed. As the province moves toward increased diversification and the extraction of minerals critical for the energy transition, the regulatory framework continues to evolve to meet new challenges and opportunities.

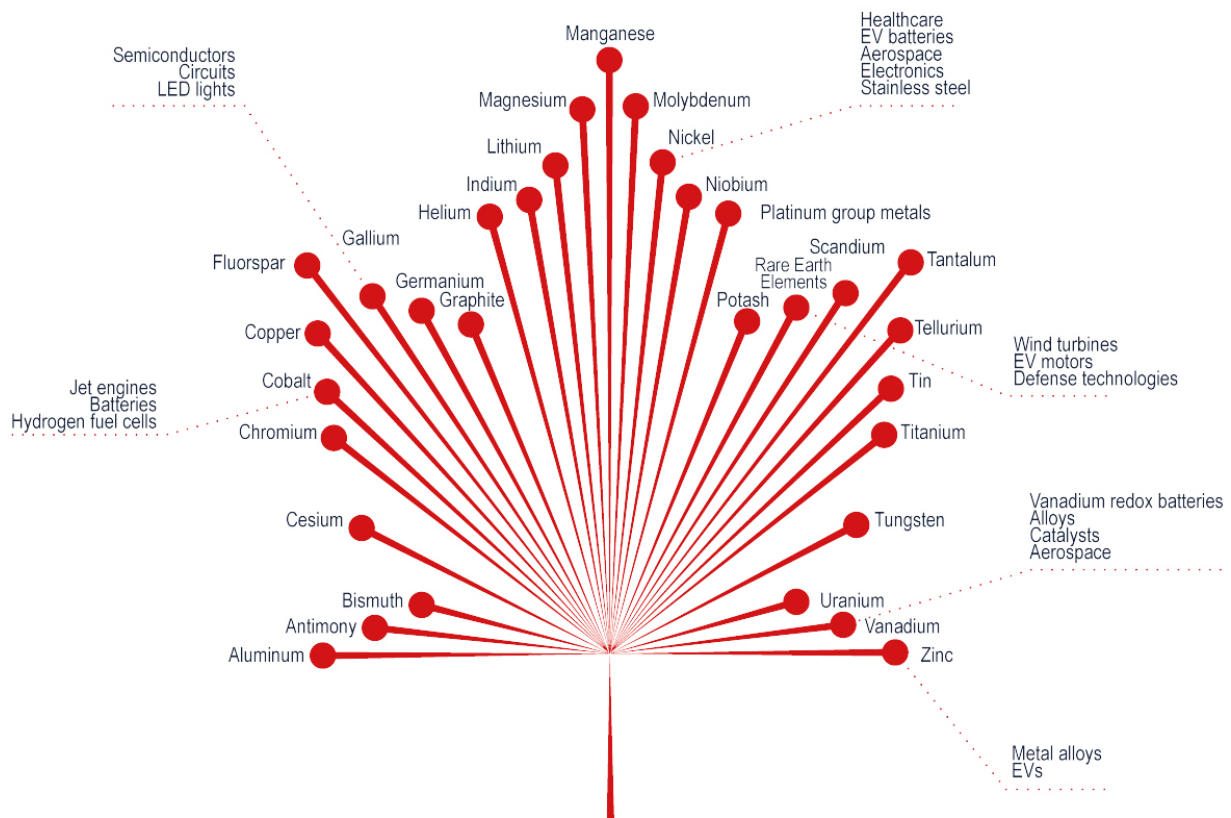
5.0 OVERVIEW OF THE ALBERTA CRITICAL MINERALS STRATEGY

5.1 What Constitutes a Critical Mineral?

What constitutes a critical mineral is jurisdiction-specific and in Canada, what makes a mineral “critical” is based on one of three criteria, namely: (1) the mineral is essential to Canada's economic security; (2) the mineral is required for Canada's transition to a low-carbon economy; or (3) the mineral represents a sustainable source of critical minerals for Canada's partners.³⁶ In addition, there is a globally shared view that critical minerals (1) have few or no substitutes, (2) are strategic and somewhat limited commodities, and (3) are concentrated in terms of where they are extracted and where they are processed.³⁷ The list of minerals that meet these criteria are not constant, but may change over time. Natural Resources Canada provides a list of 31 minerals considered critical in Canada, as shown below.

³⁶ Government of Canada, *supra* note 19 at 9.

³⁷ *Ibid* at 7.



Source: The Canadian Critical Minerals Strategy

There is a potential for some of the above listed minerals in Alberta.³⁸ However, the Alberta Strategy does not define what constitutes a critical mineral, but it does make reference to the “increasing global demand” for rare earth elements “in the areas of clean energy and national defence technologies, and the high risk for supply disruptions” as the basis for the recognition of the elements as critical minerals.³⁹ The Alberta Critical Minerals Strategy lists the following 14 mineral resources – which include minerals that naturally occur in rocks and sediments and minerals that may be recoverable as by-products of industrial processes – as potentially existing in Alberta: cobalt, copper, diamonds, iron, lithium, magnesium, nickel, potash, rare earth elements, titanium, uranium, vanadium, zirconium, and zinc.⁴⁰ A number of these minerals already exist in commercial quantities in other provinces and territories. For instance, Canada is the second largest producer of uranium in the world, hosting about 15 percent of total global production.⁴¹ Much of the uranium is mined in Saskatchewan. Studies have revealed an increased presence of rare earth elements in oil sands froth treatment tailings and other waste streams from oil sands processing in Alberta, together with titanium, vanadium, and zircon.⁴²

³⁸ Government of Alberta, *supra* note 19.

³⁹ *Ibid* at 9.

⁴⁰ *Ibid* at 10.

⁴¹ *Ibid*.

⁴² *Ibid*.

However, further studies are needed to determine the commercial viability of producing critical minerals in Alberta.

While several critical mineral exploration projects have progressed in Alberta, current attention is focused on lithium and helium, not only due to rising global demand for them but also because they are often found in Alberta's oil and gas fields.⁴³ There is an emphasis on mineral diversification and value-added products produced in Alberta.

5.2 The Vision and Principles of the Alberta Critical Minerals Strategy

The vision of the Alberta Critical Minerals Strategy is for the province to become “a preferred producer and supplier of minerals and mineral products and actively contributes to the global energy transformation.”⁴⁴ The vision uses the term “energy transformation” rather than “energy transition”. This use is likely intentional. Although the two terms are sometimes used interchangeably, energy transformation is a broader construct than energy transition and is the result or culmination of the energy transition.⁴⁵ In fact, energy transformation is “more than a simple transformation of the energy sector – it is a transformation of economies that would bring new opportunities and greater prosperity while also improving the air quality in our cities, preserving the environment and protecting our climate”.⁴⁶ Thus, the vision of the strategy is not only about transforming Alberta into a jurisdiction of choice for the production and supply of critical minerals, but also about enhancing Alberta's capacity to contribute to the increased and systemic use of renewable energy to unlock opportunities for prosperity beyond the energy sector.

Actions to realize the vision are based on six principles: (1) positioning and promoting Alberta as a global destination of choice for mineral investment, innovation, exploration, development, manufacturing and recycling; (2) ensuring environmentally and socially responsible and sustainable development that considers the entire life cycle of a project and its cumulative effects; (3) promoting innovation and opportunities for value-addition along the supply and value chains while contributing to the global transition to a low-carbon economy; (4) advancing the role, inclusion, and voice of Indigenous Peoples; (5) supporting Indigenous and non-Indigenous community engagement and partnerships; and (6) building a legacy of positive benefits for Albertans.⁴⁷ While these principles are laudable, they are rendered in the strategy without any explanation, making their scope unclear. For instance, it is not clear where certain core principles

⁴³ Alberta Energy Regulator, Critical Minerals in Alberta, 2023, <https://ags.aer.ca/research-initiatives/critical-minerals-potential#:~:text=In%20Alberta%2C%20metalliferous%20black%20shales,zinc%2C%20nickel%2C%20and%20vanadium>.

⁴⁴ Government of Alberta, *supra* note 19 at 12.

⁴⁵ Maria Pastukhova & Kirsten Westphal, “Governing the global energy transformation”. In M Hafner & S Tagliapietra (eds), *The Geopolitics of the Global Energy Transition*. (Cham: Springer, 2020) 341–364 at 345; International Renewable Energy Agency, Global Energy Transformation: A Roadmap to 2050, IRENA, Abu Dhabi, 2019, https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Apr/IRENA_Global_Energy_Transformation_2019.pdf?la=en&hash=D3AF0A4437104F4815731C932729A699A8CF753F.

⁴⁶ *Ibid* at 15.

⁴⁷ *Ibid*.

in responsible mineral development, such as transparency and respect for human rights, sit within the framework of the principles.

5.3 The Focus Areas of the Alberta Critical Minerals Strategy

The Strategy has six focus areas, namely: (1) increasing public access to geoscientific information for critical minerals, (2) improving the fiscal and regulatory environment, (3) promoting responsible development to protect the environment and maximize conservation, (4) advancing opportunities for Indigenous peoples, (5) promoting mineral literacy among Albertans and developing the mining workforce, and (6) promoting innovation and industrial development.

5.4 A General Commentary on the Concept of Critical Minerals in Alberta

As noted earlier, the Alberta Strategy does not define what constitutes a critical mineral. Instead, it makes reference to the “increasing global demand” for rare earth elements “in the areas of clean energy and national defence technologies, and the high risk for supply disruptions” as the basis for the categorization of certain minerals as critical minerals.⁴⁸ This approach mirrors the pressures that have driven many jurisdictions to rethink their mineral policies. Among the pressures are geopolitical vulnerabilities which have caused governments to evaluate the countries from which “critical” minerals are produced and supplied and the reliability of those sources. Other pressures come from public demand for action to address the climate crisis. Critical minerals having been identified as having an important role to play in accelerating the transition to clean energy. However, as Alberta joins other jurisdictions in the quest to develop critical minerals, there are important points to note in order to manage economic development expectations.

First, the category of critical minerals is not fixed and there are some variations in what mineral producing jurisdictions consider critical, revealing the geopolitical interests and national development priorities of each country. Heightening variations in geopolitical interests, as the world is currently witnessing with the war in Ukraine and conflict in Gaza, for instance, may undermine global efforts to address the climate crisis using critical minerals. This is because geopolitical interests are likely to create dependency in the supply of critical minerals, whereas addressing the climate crisis requires globally coordinated efforts to ensure the reliability of supply of critical minerals.

Second, it is not to be assumed that critical mineral deposits in Alberta will automatically attract foreign investment. Competition for investment capital will still be stiff due to the concentration of critical minerals in a few jurisdictions, and opposition from environmental groups and other civil society organisations may have a significant influence on the development trajectory of critical minerals, as is currently being witnessed in the deep seabed mining sector.⁴⁹ Furthermore, anticipated demands for some critical minerals may not materialize. For instance, while there is a shared belief that critical minerals have few or no substitutes, transformation in technology may change the demand for certain critical minerals and the current price. There are already indications that “[s]odium-ion batteries could squeeze their way into some corners of the

⁴⁸ Government of Alberta, *supra* note 19 at 9.

⁴⁹ Kathryn Abigail Miller et al, Challenging the Need for Deep Seabed Mining from the Perspective of Metal Demand, Biodiversity, Ecosystems Services, and Benefit Sharing” (2021) 8 *Frontiers in Marine Science*, 706161.

[EV] battery market”,⁵⁰ either replacing the more expensive lithium-ion batteries or at least serving as a complement for them.⁵¹ Should that be the case, the expected demand for lithium may not materialize.

6.0 GENERAL REQUIREMENTS FOR A LICENCE OR APPROVAL FOR MINERAL DEVELOPMENT

The general requirements for obtaining a licence or approval for mineral resource development in Alberta are governed mainly by Directive 067: Eligibility Requirements for Acquiring and Holding Energy Licences and Approvals, Directive 090: Brine-Hosted Mineral Resource Development Rules, and Directive 091: Rock-Hosted Mineral Resource Development Rules.

First, the person must hold a Business Associate (BA) Code, which was formerly issued by the AER but is now issued through Petrinex, Canada’s Petroleum Information Network. With the BA, the person may apply to the AER for licence eligibility. The AER will assess the information provided by the person, together with any other relevant information, to determine whether the person meets the eligibility requirements for acquiring and holding AER licences or approvals. The eligibility requirements include:

- The person must be an individual or a corporation that meets the requirements of section 9(2) of the Mineral Resource Development Act, or section 7 of the Rock-Hosted Mineral Resource Development Rules.
- The signing of a declaration attesting to the truth and completeness of the application, consenting to the release and collection of compliance information regarding the applicant from other jurisdictions and regulators, and submitting to the jurisdiction of Alberta.

In addition, the person must be a resident of Alberta. In the case of an individual, this means that the person must have their home in and be ordinarily present in Alberta. In the case of a corporation, it means having a director, officer, or employee that has their home in and is ordinarily present in Alberta and is authorized to make decisions about the licensing and operating a mineral facility, and about implementing the directions of the AER regarding the facility.⁵²

When the person is not an Alberta resident, the person must appoint an agent who is an Alberta resident and whose appointment has been approved by the AER. Alternatively, the applicant can apply to the AER for an exemption from the resident/agent requirement, under circumstances set out in section 6 of the Brine-Hosted Mineral Resource Development Rules, and section 6 of the Rock-Hosted Mineral Resource Development Rules.⁵³

⁵⁰ Casey Crownhart, “How sodium could change the game for batteries”, MIT Technology Review, 13 May 2023, [How sodium could change the game for batteries | MIT Technology Review](#).

⁵¹ Nayak, Prasant Kumar, Liangtao Yang, Wolfgang Brehm, and Philipp Adelhelm. "From lithium-ion to sodium-ion batteries: advantages, challenges, and surprises." (2018) 57:1 *Angewandte Chemie International Edition* 102–120.

⁵² Directive 067, section 4.

⁵³ Directive 076, section 4.1.

Furthermore, the person must:

- submit evidence that it has and maintains comprehensive general liability insurance with a \$1 000 000 minimum coverage
- Pay any fee that may be required, which fee may be waived or varied by the AER if in AER's view the circumstances warrant it
- submit a financial statement that demonstrates its capability to meet their regulatory and liability obligations throughout the lifecycle of the mineral development project
- in the AER's opinion, not pose an unreasonable risk to Alberta, which risk is assessed based on a comprehensive list of factors that include the applicant's experience, past history of compliance, corporate ownership, and financial health.⁵⁴

Based on the above criteria, the AER will assess the applicant's licence eligibility and make one of three determinations, namely:

- A no eligibility determination – that the applicant is not eligible to acquire or hold a mineral resource development licence or approval
- A general eligibility determination – that the applicant is eligible to acquire or hold a mineral resource licence or approval of all types, or
- A limited eligibility determination – that the applicant is eligible to acquire or hold only specified types of licences and approvals, or that its eligibility is subject to specified terms and conditions.⁵⁵

An applicant granted eligibility must maintain its eligibility on an ongoing basis throughout the lifecycle of the project and must submit its financial statement to the AER annually, before the specified deadlines. Any material change to the ownership or structure of the entity must be communicated to the AER within a specified timeline, to enable the AER to determine if such change would pose an unreasonable risk.⁵⁶

The AER can revoke or restrict a licence eligibility that it has granted. It can do so under any one of three circumstances:

- Where the person fails to provide complete and accurate information as required, or to update that information, within prescribed timelines,
- where the AER finds that the person poses an unreasonable risk, or
- where the person fails to acquire or hold licences or approvals within one year following the granting of licence eligibility.⁵⁷

Thus, a person holding general eligibility may have the licence reduced to limited eligibility, with additional terms or conditions imposed. If the person has only limited eligibility, the eligibility may be revoked or further restricted by imposing additional terms or conditions. A

⁵⁴ Directive 067, section 4.2–4.5.

⁵⁵ Directive 067, section 3.

⁵⁶ Directive 067, section 5.

⁵⁷ Directive 067, section 6.

person seeking to amend its licence eligibility may have to reapply for licence eligibility under Directive 067 and may be required to pay additional fees.

6.1 Requirements for Developing Brine-Hosted Mineral Resources

The requirements for developing brine-hosted minerals are set out under the Brine-hosted Mineral Resource Development Rules 2023,⁵⁸ Directive 090: Brine-Hosted Mineral Resource Development, issued by the AER in March 2023, and a host of other directives, including in particular, Directive 67: Eligibility Requirements for Acquiring and Holding Energy Licences and Approvals. The requirements apply to the entire life cycle of brine-hosted mineral resource development, i.e., from project initiation, construction, operation, to closure. They do not apply to minerals found in rock or extracted from rock.

6.1.1 General Requirements

The AER is legally mandated to act in compliance with approved regional plans under the Alberta Land Stewardship Act. Accordingly, the AER requires applicants seeking approval for an activity within the boundary of an approved regional plan to meet the requirements set out in section 8.5 of Directive 056: Energy Development Applications and Schedules, which sets out specific licensing requirements for wells, facilities, and pipelines.

6.1.2 Liability Requirements

Section 2 of Directive 090 requires the AER to conduct a comprehensive assessment of the licensee, covering the entire lifecycle of the mineral resource development to determine the capabilities of licensee to meet its regulatory and liability obligations under the MRDA and other applicable statutes, regulations, rules and guidelines. The ultimate goal of the assessment is to ensure the licensee's responsible management of its liability from its collective wells, facilities, pipelines, and sites. This assessment is conducted based on factors outlined in Directive 067 (earlier discussed) and more detailed factors outlined in Directive 090. The factors include:

- the licensee's financial health
- the estimated total size of liability (active and inactive) of the licensee, including abandonment, remediation, and reclamation
- the remaining lifespan of the mineral resource development and infrastructure and the extent to which existing operations may fund current and future liabilities
- the licensee's management and maintenance of regulated infrastructure and sites,
- the rate of closure activities and spending and the pace of inactive liability growth
- the licensee's compliance with administrative regulatory requirements
- any other factors that in the opinion of the AER is appropriate to be considered given the prevailing circumstances.

The outcome from the above assessment will be used by the AER to identify licensees that are or are likely to be at risk of not meeting their regulatory and liability obligations throughout the lifecycle of the mineral resource development. The AER will then utilize a Licensee

⁵⁸ Alta Reg 17/2023.

Management Program to proactively monitor licensees to support the responsible management of mineral resource development in Alberta. The program may include educating licensees on industry best practices and using other compliance assurance initiatives.

In addition to the holistic assessment of the licensee, the AER will also conduct a more specific liability assessment to understand the total liabilities associated with the mineral resource development in question, including the cost to permanently end operations, which includes abandoning, remediating, and reclaiming the mine site. This assessment is based on a set of technical factors that consider

- the geographic location of the mine (e.g., is it located near sensitive areas?)
- the hydrogen sulphide (H₂S) and carbon dioxide (CO₂) content of produced fluids
- contamination management
- site-specific reclamation considerations
- the nature of the wells involved
- the types of facilities involved
- pipelines designated as problem sites, and
- other factors affecting the cost to close infrastructure and sites.⁵⁹

The AER may require the licensee to conduct a site-specific liability assessment to estimate the cost of suspension, abandonment, remediation, or reclamation of a particular site.

The Brine-Hosted Mineral Resource Development Rules authorise the AER to require a security deposit from licensees at any time during the lifecycle of a project. The need for a security deposit and the amount will be determined by the AER based on the magnitude of the risk that the licensee is considered to pose and any other factors the AER may consider appropriate.⁶⁰

6.1.3 Mineral Wells

Directive 090 establishes a set of technical requirements for the management of mineral wells, which complement the requirements established in other applicable laws and directives, such as Directive 056, Directive 050: Drilling Waste Management, and Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry.

The requirements relate to collecting drill-cutting samples, subsurface setbacks, well types for mineral wells (e.g., inactive wells and well closures), comingling production, and conversion of oil, gas, or geothermal wells to mineral wells. For instance, a well licence issued under the Oil and Gas Conservation Act or the Geothermal Resource Development Act may be converted to a well licence issued under the MRDA for mineral resource development. However, not all wells are suitable for conversion. Therefore, a licensee must apply to the AER for approval to convert and unsuitable wells will not be approved.

⁵⁹ Directive 090, section 2.3.

⁶⁰ Directive 090, section 2.4.

6.1.4 Mineral Facilities

As in the case of mineral wells, mineral facilities are subject to a set of technical requirements provided under Directive 090 and other directives, such as

- Directive 038: Noise Control
- Directive 055: Storage Requirements for the Upstream Petroleum Industry
- Directive 056, licensing requirements in section 5 except for the sulphur recovery requirements in section 5.6
- Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry, and
- Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting.⁶¹

For a mineral facility to be approved, the applicant must provide an estimate of the liability involved and may be required to conduct an EIA. Where a mineral facility has become inactive, the licensee must suspend, abandon, or reactivate the facility. To suspend a facility, a suspension plan, that must be submitted to the AER, is required. Where a licensee suspends a facility, it must either abandon or reactivate it and reactivation must occur within 12 months of the facility becoming inactive.

To close an inactive facility (that includes abandonment, remediation, reclamation), the licensee is required to prepare and submit a closure plan to the AER. The plan must detail the site abandonment activities involved, site monitoring and maintenance activities to be carried out, environmental site assessment, remediation, and reclamation activities to be carried out, and the timelines, including proposed completion dates for abandonment, environmental site assessment, remediation, and the surface land reclamation activities proposed.⁶²

6.1.5 Pipeline Transporting Minerals

A pipeline licence is required for the construction of pipelines to transport minerals. The applicant for a pipeline licence must include the estimated liability and comply with the technical requirements established under the Pipeline Act, Pipeline Rules, and section 6.6 of Directive 056 as well as meet the design specifications in accordance with the CSA Group standard CSA Z662: Oil and Gas Pipeline Systems. Where a pipeline is to be closed, the licensee must reclaim the land on which the pipeline is sited, returning the land to its equivalent capability prior to construction of the pipeline.⁶³

⁶¹ Directive 090, section 4.

⁶² Directive 090, section 4.3.

⁶³ Directive 090, section 5.

6.1.6 Transfer of Well, Facility, or Pipeline Licences

When a licensee wishes to transfer a well, facility or pipeline licence to a third party, the licensee must apply to the AER for approval. Any agreement entered into by the licensee and any third party regarding the transfer will not be effective unless the AER has approved the transfer.

Not all licences are eligible for transfer. Only those with a licence status of “Issued”, “Amended”, “Discontinued”, “Suspended”, “Abandoned”, “RecCertified”, or “RecExempt” are eligible. Those with a licence status of “Cancelled” or “Re-Entered” are not eligible. For a transfer to be accepted, both the transferor and transferee must have AER identification codes.

An application for a licence transfer will trigger the holistic licensee assessment noted earlier with regard to both the transferor and transferee. This requirement enjoins the AER to review abandoned, reclaimed, and reclamation-exempt sites associated with the licence to ascertain whether they are held by a responsible person that can address, manage, and monitor public safety or environmental issues and conditions.⁶⁴ The AER uses a holistic assessment of the licensee to determine whether a security deposit is required from the transferor or transferee and what the amount of the deposit should be.

The licence transfer application can be submitted by either the transferor, the transferee, or an agent or consultant authorised by either party to submit the application. However, the party submitting the application must notify the other party and obtain their acceptance of the submission before the application can be processed.

6.1.7 Mineral Schemes

Under section 7 of AER Directive 090, mineral scheme approval by the regulator is required before a licensee may proceed with any subsurface injection or storage activity for produced fluids. However, the applicant for a mineral scheme approval must also meet requirements established in other directives relating to various other concerns, namely,

- Directive 040: Pressure and Deliverability Testing Oil and Gas Wells, as the AER may require this information to address concerns about over-pressurization
- Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements for injection wells meeting the requirements for class II produced water or brine equivalent
- Directive 071: Emergency Preparedness and Response, including developing and maintaining an appropriate emergency response plan for the applicant’s mineral operations.

Directive 090 establishes specific technical requirements for various mineral sub-schemes, such as,

- a Produced Fluids Injection Scheme with no Enhanced Recovery – which requires the applicant to, among other things, submit an injection scheme application submit a risk

⁶⁴ Directive 090, section 6.

assessment, and to provide technical information demonstrating the absence of an enhanced recovery potential;

- an Enhanced Recovery Scheme – that requires the licensee to submit an enhanced recovery scheme application and a risk assessment where produced fluids will be reinjected to increase or maintain subsurface pressure, displace minerals to production wells, or alter formation fluids to improve mineral brine flow and mineral recovery;
- a Concurrent Production Scheme – that requires the licensee to notify the AER where mineral resources are produced concurrently with other energy resources and to submit a concurrent production scheme, providing evidence of the right to produce minerals and hydrocarbons or geothermal energy; and
- Experimental Schemes – where the licensee intends to test untried and unproven surface or subsurface technology or to apply proven technology to a new situation for minerals recovery, extraction, or processing.⁶⁵

The applicant for an experimental scheme must further show that the time required to complete the project is no longer than necessary to test the technology, and that the scale of the project is no larger than necessary to test the technology, provide technical information supporting the unproven nature of the technology and provide the rationale for the project duration and size.

One of the purposes of the MRDA is “to provide for the timely and useful collection, appraisal and dissemination of information relating to mineral resources in Alberta.” Accordingly, the AER determines the confidentiality of information for experimental projects by balancing the need for the mineral resource development operator to have a reasonable opportunity to recoup the investment costs and benefit from the test before competitors can benefit and the public interest in others having timely and effective access to information that may speed up the commercial deployment of proven technological advances.⁶⁶

6.1.8 Risk Assessment for Scheme Approval

When a scheme approval process requires risk assessment, the applicant is required to assess the risks related to the subsurface hazards and demonstrate appropriate mitigation measures and emergency response plan it has or will create for each hazard, including:

- breach of underground formation(s)
- well integrity failure
- surface deformation
- induced seismicity, and
- any other hazards specific to the project.

The level of detail of the risk assessment must match the nature of the potential hazard. When a significant risk to public safety or the environment is likely, the applicant must develop and

⁶⁵ Directive 090, section 7.4.1.

⁶⁶ Directive 090, section 7.4.2.

implement a mitigation, monitoring, and response plan to further reduce the risk to as much as reasonably possible.

6.1.9 Data Filing, Measurement, and Reporting Requirements

Reporting requirements are established under AER Directive 090 and Directive 059: Well Drilling and Completion Data Filing Requirements and Directive 080: Well Logging, among others. The purpose of the reporting requirements is to equip the AER with information it needs to monitor environmental and public health and safety risks and ensure that operators are extracting the minerals efficiently without waste or over-extraction and in compliance with their legal obligations.

However, Directive 090 recognizes protecting legitimate commercial interests of operators may warrant some information to be treated as confidential for a limited period. Accordingly, the AER will protect some data, such as sample drill cuttings, as confidential for one year before making it publicly accessible. In addition, the operator may apply for the confidentiality period to be extended.

6.2 Requirements for Developing Rock-Hosted Mineral Resources

Unlike brine hosted critical minerals, the requirements for developing rock-hosted minerals are set out under Directive 091: Rock-Hosted Mineral Resource Development, issued by the AER in February 2024 and under the Rock-Hosted Mineral Resource Development Rules. The requirements apply to the entire life cycle of the rock-hosted mineral resource development project, i.e., from project initiation, construction, operation, to closure.

6.2.1 General Application Requirements

Mineral resource development applications are processed and evaluated following the requirements established in the relevant statutes as well as the procedures previously developed by the AER. This section provides critical information about those requirements and procedures, together with best practice recommendations. It is the responsibility of the applicant to develop their application in accordance with the requirements and procedures, which includes responding to any concerns or queries they may receive during the application review process

There are various phases in the application process for rock-hosted mineral resource development. They are discussed below:

6.2.2 Preapplication Phase

Before a prospective applicant submits an application for a mineral licence, it is expected to complete adequate groundwork to understand the application requirements and procedures and to ascertain certain information, including whether the planned mining activity is to take place within the boundaries of an approved regional plan in accordance with the Alberta Land Stewardship Act (ALSA) that governs regional plans. In determining this, the prospective applicant must assess

- whether the planned activity falls within the boundaries of a designated conservation area, a provincial park, a provincial recreation area, or public land designated for recreation and tourism, and if it does, whether the mineral rights linked to the activity could be canceled
- whether the activity aligns with the land uses defined in the relevant regional plan under ALSA or with any of the goals, objectives, and strategies outlined in that plan
- how the activity aligns with and adheres to any regional triggers or thresholds set by the management frameworks outlined in the relevant regional plan, including any notices issued due to exceeding those triggers or limits.

The applicant is required to include details about the above in its submission to the AER to show that the mineral activity in question is permissible. It should be noted that the AER does not have the power to waive or modify any restriction, limitation, or requirement related to a regional plan's land area or land use. It is therefore the responsibility of an applicant that seeks a change to the requirements of a regional plan to apply directly to Land Use Secretariat.

Another important step in the preapplication phase is the completion of an Environmental Impact Assessment (EIA), which is essential when the complexity and scale of a proposed project, technology, resource use, or site considerations introduce uncertainty about the specific environmental impacts or present a risk of significant negative environmental effects. The Environmental Assessment (Mandatory and Expected Activities) Regulations govern the determination of which activities require an EIA or require further consideration to determine if an EIA would be required. Project proponents must complete a project summary table and project location map to confirm whether the proposed project requires an EIA report and submit them to the environmental assessment unit of the AER. The AER has standard terms of reference to guide the project proponent in developing project-specific terms of reference and in the conduct of the EIA.

Before submitting an application, project proponents are encouraged to contact the AER for direction on the application requirements and processes. During this meeting, the applicant can seek clarification on any aspects of the application process or requirements that are of concern to them.

Before filing the mineral resource development application, the applicant must obtain a business associate code and a licensee eligibility attribute from AER Corporate Compliance, as well as a File Number for a Consultation Application Supplement, all of which will be submitted with the application.

6.2.3 Submission of an Application

Applicants are encouraged to submit a single, unified application that includes all activities regulated by the AER required throughout the life cycle of a mineral resource development project, whenever possible. Consolidating all applications into one allows the AER to complete a unified and administratively efficient review of all proposed activities simultaneously.

Applications are submitted electronically, and an applicant is required to retain copies of its application on the company website. An applicant can withdraw its application at any time. Administratively incomplete applications are returned to the applicant while complete ones are sent to the relevant technical experts for review.

On the other hand, applications with significant technical deficiencies, as distinct from being administratively incomplete, are closed and not returned to the applicant. However, the AER will provide the applicant with reasons for the file closure. For applications with merely minor technical deficiencies, the AER will issue a request to the applicant for supplemental technical information and may consider the application technically incomplete and closed if the applicant fails to provide the requested information within the specified timeline. Closed applications cannot be resuscitated, but the applicant can submit an entirely new application that meets the requirements.

6.2.4 Exploration Disposition Requirements

The Metallic and Industrial Minerals Exploration Regulation (MIMER) outlines rules, provisions and stipulations related to mineral exploration within Alberta. Under Directive 091, an exploration disposition under the MIMER is required for a mineral resource development applicant to carry out:

- any investigation, activity, or action aimed at determining the presence of a mineral resource that, in the AER's view, causes surface disturbance, and
- any preparatory or related operations that, in the AER's opinion, could potentially result in land surface disturbance, except for operations exempted by applicable regulations.

6.2.5 Classification of Applications under the MRDA

The AER will classify all applications submitted under the MRDA, including applications for new mining projects or for amendments to existing permits, licenses, and approvals, including the resumption of operations at a suspended site or the closure of a site. They are classified as major, operational or minor applications, based on the uncertainty of the proposed technology and risks to safety, resource conservation, environmental conditions, and stakeholder interests, which will influence the processing timeline.

- **Major** applications are for new activities or amendments to existing ones that are likely to have significant negative impacts on safety, resource conservation, environmental conditions, socioeconomic factors, or stakeholder interests.
- **Operational** applications are those involving changes to approved activities that may affect resource conservation or involve major modifications, but which are not expected to impact stakeholders or change the environmental and socioeconomic conditions assessed in the original application.
- **Minor** applications are applications for amendments to approved activities that are not expected to have significant adverse effects on safety, resource conservation, the

environment, socioeconomic conditions, or stakeholder interests assessed in the original application.

6.2.6 Mine Site Permit Applications

Directive 091 requires that before a mine site is developed, the operator must obtain a permit from the AER. A permit is also required for the operator to design and construct supporting infrastructure, such as roads, power lines, and site structures needed to operate the mine site. In the permit application, the operator must provide details of the mineralized zone or ore deposit in order to demonstrate that there is sufficient mineral deposit for economically viable mining. The permit application must also provide details regarding the processing facilities and associated infrastructure needed to develop the mine site. The permit allows for the development of a mine site up to the point of readiness to start commercial production of rock-hosted minerals.

Under the Rock-Hosted Mineral Resource Development Rules (RMR), an operator requires a permit to develop a mine or reopen an abandoned mine site.⁶⁷ After mining operations have been suspended, a permit is required to resume operations at that site. For an operator to suspend operations at a mine site for more than three consecutive months, a permit is also required.⁶⁸ A permit is also required to extend or materially alter the program of operations for which a permit had earlier been granted. Directive 091 does not allow any exemptions for mine site permits, which means the AER does not have any discretion to waive the application for a mine site permit when required by any applicable regulations. The information required in an application for a mine permit are described in the Directive. This includes

- estimates of the mineral resources and mineral reserves to be developed,
- the data upon which the said estimates are based,
- an analysis of the rock-hosted mineral resources and mineral reserves to be mined,
- a description of the mining methods to be utilized,
- a description of the infrastructure to be developed,
- geological maps of the region and area in which the development will take place,
- the environmental controls and mitigation measures to be implemented, and
- a description of the proposed abandonment and reclamation program and the proposed closure plan for the development.

6.2.7 Amending a Mine Site Permit

Directive 091 allows mine site permits to be amended in four circumstances, namely, to:

- extend or materially alter the program of operations for which a permit was granted,
- suspend or abandon all or part of the mine site,
- resume operations at a suspended mine site, or
- change the permittee's name.

⁶⁷ Section 8 and 9, RMR.

⁶⁸ Section 13, RMR.

In each case, the applicant must provide, among other information, a description of the requested amendment sought, the reasons for the change, and any additional information the AER may request.

6.2.8 Mine Licence Applications

Before an operator can commence a mining operation, it must obtain a mine licence from the AER. The mine license allows it to develop and operate surface mine pits or underground mine workings and to construct and operate external mine dumps. The design and construction of these features and the supporting infrastructure, such as roads, power, and remote facilities, is to be approved under the mine licence.

Directive 091 allows for the mine licence to be applied for together with the application for a mine site permit. An amendment to a mine licence for resuming operations at a suspended mine or to extend or materially alter a mine or external mine dump, also requires AER approval.⁶⁹ An operator that intends to suspend a mine (in part or in whole) for more than three consecutive months or to abandon (in part or in whole) a mine or external mine dump.⁷⁰ It is important to note that other regulatory agencies may have separate requirements, that must be fulfilled before the AER can issue a mine licence.

The technical requirements for a mine licence application are set out in detail in AER Directive 091, that include:

- information, including plans, about previous exploration or experimental work applied for in the area;
- geological maps showing the mine geology;
- technical details of the proposed mine design and method of development;
- estimates of the mineral resources and mineral reserves to be developed;
- the data upon which the estimates are based;
- a description of the mining methods to be utilized;
- a description of the infrastructure to be developed;
- the environmental controls and mitigation measures to be implemented;
- a description of the proposed abandonment and reclamation program and the proposed closure plan for the development, and
- any additional information the AER may request.

6.2.9 Amending a Mine Licence

Directive 091 sets out five circumstances when a mine licence may be amended, namely:

- to extend or materially alter the program of operations for which the licence was granted,
- to suspend a mine (in whole or in part) for more than three months,
- to resume operations at a suspended mine,

⁶⁹ Sections 11 and 12 of the RMR.

⁷⁰ Section 13 of the RMR.

- to abandon a mine or external mine discard dump (in whole or in part), or
- to change the name of the licensee.

An application for an amendment can be made to the AER via email. In each case, the applicant must provide, among other information, a description of the amendment sought, the reasons for the amendment, and any additional information the AER may request.

6.2.10 Abandoning Underground Mine Workings

Directive 091 sets out clear general and specific abandonment requirements for underground workings. The general requirements include the provision of a geotechnical assessment detailing the competency of the rock intended to support concrete caps and the removal of all loose rock from rock anchor leaving only competent rock. The specific requirements relate to the reinforcement of concrete caps, inspection and testing of all concrete, adits, backfilling, etc.

6.2.11 Processing Plant Applications

An operator requires AER approval to construct and operate a processing plant and associated infrastructure, including ore stockpiles, a heap leach facility, tailings management facilities, load-out facilities, and other infrastructure, such as roads and site buildings. It should be noted, however, that an operator may require the approval from other regulatory agencies before the AER can consider the application to construct or operate a processing plant. An operator therefore needs to familiarize itself with the requirements of other regulatory agencies.

Directive 091 sets out both general and technical requirements for an application to construct or operate a processing plant. For instance, the applicant must furnish the following information to the AER:

- a statement of its right to use the land surface that is associated with the processing plant site
- a legal description of the lands to which its rights apply
- the criteria used in selecting the site and the rationale for constructing the processing plant
- a general statement regarding the applicant's plans to market all products.

6.2.12 Amending a Processing Plant Approval

Upon application, an approval of a processing plant can be amended and Directive 091 sets out 5 circumstances when an amendment may be considered, namely,

- to extend or materially alter the program of operations for which the approval was granted,
- to suspend a processing plant for more than three months,
- to resume operations at a suspended processing plant,
- to abandon a processing plant, or
- to change the person named as the approval holder of the processing plant.

In each case, the applicant must provide, among other information, a description of the amendment sought, the reasons for the amendment, and any additional information the AER may request.

6.2.13 Abandoning a Mine

After a licence has been granted, the operator may for a variety of reasons decide to abandon the mine. But the operator cannot simply walk away from the mine. Directive 091 sets out the requirements for such an abandonment. The operator must lodge an abandonment application to the AER, that must contain:

- a report outlining the completed abandonment works as approved within the applicant's permission to abandon application
- details of the monitoring results showing how its mitigation measures have met the required safety factors, and for the end land use, and
- any additional information the AER may request.

6.2.14 Mine Site Closure

Operators are expected to prepare for closure throughout the life cycle of the mineral resource project, and not only from a later stage of the development process. This is in line with the concept of progressive reclamation. Approvals granted under the EPEA typically require operators to submit plans and reports to guide progressive reclamation, that will lead to closure.

6.2.15 Records, Reports, and Other Submissions

Permit and licence holders are required to keep and maintain various records and reports concerning exploration data (like samples, analysis and core segments) and the activities being carried out, and in some instances to submit those reports to the AER either within regulatorily stipulated timeframes or upon request by the AER. There are also reporting requirements under specific statutes, such as under the EPEA, the Public Lands Act, and the Water Act.

6.2.16 Emergency Management

The AER has a rigorous regulatory framework aimed at protecting public safety and minimizing the environmental effects of mineral resource development through the various phases of the emergency management cycle: prevention and mitigation, preparedness, response, and recovery. Directive 091 requires permit, licence, and approval holders to develop, implement, and update their emergency response plans in accordance with AER's Emergency Preparedness and Response guidelines. Every emergency response plan must be attuned to the risks and hazards associated with the specific mineral resource development project and must include:

- a description of how the permit, license, or approval holder will respond to incidents, and
- information about its level of preparedness to implement its emergency response plan.

7.0 CONCLUSION

Alberta's journey from a globally recognized oil and gas producer to an emerging developer of critical minerals underscores the province's adaptability and strategic foresight. While the

province's economy has historically been tied to fossil fuels, its rich deposits of solid minerals – ranging from coal, salt, and limestone to lithium, rare earth elements, and nickel – have played a vital role in its industrial development. Today, with the global transition to clean energy, these mineral resources, particularly lithium, are gaining renewed attention. The discovery of lithium-rich brines in Alberta's Devonian aquifers and the identification of promising production waters in the Duvernay and Montney regions reveal the province's significant potential in supporting the growing demand for renewable energy technologies, especially electric vehicles and battery storage systems. Alberta's focus on critical minerals aligns with global efforts to shift away from carbon-intensive industries, positioning the province to become a key player in the future green economy.

However, the path forward requires more than just resource abundance. The responsible development of these minerals is essential, particularly in ensuring that mining activities respect Indigenous rights, safeguard the environment, and contribute to long-term economic sustainability. To this end, Alberta has taken significant steps to create a robust regulatory framework that balances economic development with social and environmental responsibility. The province's critical minerals strategy, launched in 2021, highlights this commitment by prioritizing exploration, innovation, and sustainability in the mineral sector. This strategy, combined with the enactment of the MRDA, provides clear and modern governance structures that facilitate responsible mineral exploration and extraction while attracting investment and creating jobs.

In addition, the adoption of the new AER Directives 090 and 091, together with the brine and hard-rock-hosted mineral resource development rules, providing detailed information on the approval process for licences and permits and outlining the rules and directives governing mineral development, has the capacity to facilitate public participation in mineral resource decision making in Alberta.

This Guide has sought to simplify a highly complex regulatory process for the emerging critical mineral development sector in Alberta with the goal of providing members of the public and other interested parties with a useful source of information that would enable residents to contribute to an improved critical mineral development regulatory framework in Alberta. The hope is that this Guide will help in the creation of better-informed residents that would contribute to a more effective and efficient critical mineral development in Alberta.