Draft Directive 090: Brine-Hosted Mineral Resource Development (released September 2022)
What We Heard – And Our Response

We would like to thank all those who provided comments to the draft *Directive 090: Brine-Hosted Mineral Resource Development*. We reviewed each one and consolidated comments covering similar issues. What follows is a summary of the issues raised, in no particular order, and our responses.

Comments on grammar, punctuation, and cross-referencing have not been summarized, but changes were made where needed.

A list of the respondents is provided at the end of this document.

Stakeholder Feedback – Issue	AER Response
1. General and Definitions	
The directive referred to the *Brine-Hosted Mineral Resource Development Rules* (*BMR*). Where are those available?	The *BMR* is being developed in collaboration with the Government of Alberta and will not be released for public comment. The *BMR* will be released with the final version of *Directive 090: Brine-Hosted Mineral Resource Development* (*Directive 090*).
Provide definitions for the following terms and abbreviation: brine, *Mineral Resource Development Act* (*MRDA*), groundwater, and metallic and industrial mineral (MIM) permits and leases. Differentiate brine-hosted mineral development from other types or energy resource development. Specific mineral salts (lithium for example) should be listed within the definition of "mineral resources" in the energy resource enactments. Similarly, the definition for "brine-hosted mineral" should not only include those minerals found within the pore space of rocks but also those within open spaces.	We will use consistent terminology to clearly distinguish between energy resources and associated activities. Abbreviations are defined on first use in the directive. For example, page 3 of *Directive 090* states that "this directive is made under the *Mineral Resource Development Act* (*MRDA*) and forms part of the *Brine-Hosted Mineral Resource Development Rules* (*BMR*)." Definitions for "mineral brine," "brine-hosted mineral resources," and "groundwater" are in the *BMR*. A definition of "metallic and industrial minerals" (MIM) is in the *Metallic and Industrial Minerals Tenure Regulation*. The terms "mineral resources," "well," and "facility" are defined in Part 1 of the *MRDA* and the *Mineral Resource Development Regulation*. Although not expressly listed in the definition of "mineral resources," lithium is a mineral resource.

Stakeholder Feedback – Issue	AER Response
Standardize the definition of "well," "evaluation well," and "reservoir" in the energy resource enactments and AER rules and directives to include brine-hosted mineral development.	The energy resource enactments, AER rules, and directives will be amended as appropriate.
2. Drill Cutting Sample Requirements	
Regarding drill cutting sample requirements, there are problematic differences in well classification between *Directive 056* (table 11) and the draft brine-hosted mineral directive. They should be consistent.	Brine-hosted mineral resource development does not have designated pools or prescribed drilling spacing units. Therefore, table 11 of *Directive 056* is not applicable. The specific drill cutting sample requirements for brine-hosted mineral resources are included in *Directive 090*. Please contact us with questions related to drill cuttings at Minerals@aer.ca.
3. Freehold Mineral Rights	
Freehold petroleum and natural gas (P&NG) leases do not grant the rights to brine-hosted minerals, and there is a need to ensure that brine-hosted mineral rights are under the lease. Therefore, if a well is converted from P&NG to a brine mineral well, for example, the rights to the brine-hosted minerals must be held to avoid issues of trespass. All licensees for wells with a pool or scheme must hold the mineral rights to develop the resource. Moreover, if the P&NG lease has expired and the well is converted to develop brine-hosted minerals, the mineral owner or the regulator should be notified.	A Freehold P&NG lease or metallic and industrial mineral lease between a producer and a Freehold mineral owner is a contractual agreement between parties that the AER does not regulate. To convert a well, the applicant must satisfy the AER that they have the legal right to produce the brine-hosted mineral resource.

Stakeholder Feedback – Issue	AER Response
4. Incidental Hydrocarbons	
Approval holders will be required to cease operations if they encounter P&NG resources unless they have the right to produce them. Section 9.3, requirement 86(a), should be repealed and approval holders should follow the appropriate measurement and reporting requirements if trace amounts of P&NG are produced, based on current conservation requirements. Address the issue of P&NG trespass on mineral rights. This could be achieved by defining mineral-bearing saline aquifers as productive zones under the *Oil and Gas Conservation Rules* (*OGCR*) and putting restrictions or compensation in place for P&NG operators who are producing minerals and disposing of them without conservation. Section 15.2.9 of *Directive 017: Measurement Requirements for Oil and Gas Operations* (*Directive 017*) (Brine Production) may need to be revised to include the concept of brine-hosted minerals and subsequent requirements for trace hydrocarbon reporting. The issue of separate owners for P&NG and brine-hosted mineral rights may require an economic threshold calculation and a separate dispute resolution process.	Approval holders that hold an agreement with the P&NG mineral rights holder are not required to cease operations. We revised the directive to require the mineral licensee to hold hydrocarbon rights, either by purchase or through agreement, before producing any hydrocarbons or other energy resources. As more information becomes available following the proclamation of the *MRDA*, other AER directives will be amended as necessary to deal with such topics as drilling restrictions (i.e., drilling spacing units).

Stakeholder Feedback – Issue	AER Response
5. Cycling and Drainage	
Cycling wells promote drainage from an aquifer, which could affect the availability of brine-hosted minerals in the aquifer at different locations and affect Freehold owners. The only way to prevent drainage is to require pooling or unitization to cover the entire aquifer. Also, *Directive 056* should include notification for drainage equity.	*Directive 090*, section 7.3, "Concurrent Production Scheme," states that when producing minerals and hydrocarbons or geothermal at the same time at the same well, the applicant must provide evidence that the most restrictive well buffer zone is being proposed in the application for the resources being produced. Furthermore, *Directive 090* sets out the requirements for a produced fluids injection scheme to ensure the production of one mineral resource does not affect the future recovery of other minerals. There is insufficient information at present to determine appropriate mitigation for potential drainage of offset brine-hosted mineral rights. As more information becomes available about fluid behavior in the mineral resource-bearing zones, regulatory intervention may be designed to ensure orderly development. As set out in section 3.2.1 of *Directive 090*, we will collect information about subsurface setbacks from each well application to aid in informing this issue. *Directive 056* provides notification requirements for production wells, and *Directive 090* provides notification requirements for injection wells.
6. Subsurface Setbacks	
The draft directive as written is unclear on subsurface setbacks. Update the directive to align more closely with *Directive 056*. Recommend a 100 m setback, which is current industry practice, for brine-hosted mineral development.	Section 3.2.1 of the directive requires an applicant to propose a minimum subsurface distance to set back a mineral well or well network from the lease boundary, which the AER will assess on a case-by-case basis. This requirement is intended to prevent or mitigate the effects of the proposed well on adjacent subsurface operations authorized by the *Oil and Gas Conservation Act*, the *Oil Sands Conservation Act*, the *Coal Conservation Act*, or the *Geothermal Resource Development Act*. In addition, notification requirements are in place to ensure that potentially affected parties have an opportunity to submit their concerns before we decide on an application.

Stakeholder Feedback – Issue	AER Response
7. Mineral Prioritization	
How will energy resource development be prioritized if different rights holders are competing for the same pore space (carbon capture, utilization, and storage for example)? A single activity targeting the same formation could be linked to a single tenure document. How has this policy changed?	Tenure is managed by the Ministry of Energy. We will rely on the applicant to provide proof of having the necessary energy resource rights for the proposed activity before issuing a licence or approval. For additional information or clarification regarding tenure, contact the Ministry of Energy.
8. *Surface Rights Act*	
If the *Surface Rights Act* does not apply to geothermal resource development, why does it apply to brine-hosted mineral development?	The *Surface Rights Act* does not apply to renewable energy resources, such as geothermal, solar, and wind. Brine-hosted mineral resources are not a renewable energy resource. For more information, see the Government of Alberta surface rights and renewable energy webpage.
9. Mineral Facility Technical Requirements	
A threshold of 5000 cubic metres per day (m^3/day) has been set for mineral facilities that may require an *Environmental Protection and Enhancement Act* (*EPEA*) approval or an environmental impact assessment. This volume appears arbitrary and could discourage the use of multiwell pads. Provide additional information about the rationale for the 5000 m^3/day threshold and either remove or increase that threshold.	The requirement for an *EPEA* approval for such a facility is in the *Activities Designation Regulation* under *EPEA* (see "brine-hosted mineral resource processing plant"), which is the responsibility of the Ministry of Environment and Protected Areas.

Stakeholder Feedback – Issue	AER Response
10. Concurrent Production on an Existing Surface Lease	
Requirement 8 in section 3.1 and requirement 23 in section 4.1 about energy resource development on an existing lease would discourage different industries from collaborating in energy resource development, which may be antagonistic to the AER's proliferation requirements and resource conservation (including brine-hosted mineral resource extraction at injection wells). Section 3.1, requirement 8, should be repealed or amended to allow different energy resource development on the same lease. The AER's proliferation requirements in *Directive 056* should be updated to include all energy resource development, including geothermal, P&NG, carbon capture, utilization, and storage, and brine-hosted minerals. Furthermore, the directive should allow for brine-hosted mineral extraction at injection sites of existing oil and gas leases.	We revised *Directive 090* to exclude the requirement of a separate surface lease for brine-hosted mineral resource development in section 3.1, requirement 8 and section 4.1, requirement 23. The initial requirement intended to offer some administrative relief for liability delineation; however, *EPEA* does not consider leases in defining responsibility, and the reuse of existing infrastructure to reduce proliferation is a priority. We expect the cooperation of parties involved in energy resource development and understand that collaboration allows for innovation and optimal outcomes.
11. Licence Transfer	
Section 3.5 indicates that not all wells would be suitable for brine-hosted mineral development. However, the suitability of a well for conversion to brine-hosted mineral development may not be evident until after the transfer approval is granted, which would increase liability risks to the new approval holder. Applications for well conversion should be evaluated for brine-hosted mineral capacity in parallel with transfer applications.	Well transfers and conversions must be separate applications because until the transfer application is approved, the transferee cannot apply for conversion as they do not yet hold the well licence. *Directive 090* sets out additional technical information to be submitted during the transfer process, which we will use for a preliminary assessment of the suitability of the well for conversion, and we will share the assessment result with the transferor and transferee. *Manual 012: Energy Development Applications; Procedures and Schedules* will include information on the transfer process.
12. Updates to Existing AER Directives	
Existing directives need to be updated to include brine-hosted mineral development. These include *Directive 051: Injection and Disposal Wells – Well Classifications, Logging, and Testing Requirements* and *Directive 065: Resources Applications for Oil and Gas Reservoirs*. The energy resource enactments should also be amended to be consistent with *Directive 090*.	Consequential amendments for *Directive 051* and *Directive 065* are expected to be made in 2023 following the proclamation of the *MRDA*. Consequential amendments to other AER directives will be completed to ensure alignment with the regulatory framework for brine-hosted mineral resource development. The energy resource enactments have been amended where necessary to align with brine-hosted mineral resource development legislation and regulatory instruments.

Stakeholder Feedback – Issue	AER Response
13. Measurement and Reporting Requirements	
Are core analyses, in addition to core images, required or does section 11.030 of the *OGCR* apply to brine-hosted mineral wells? Clarify how *Directive 007: Volumetric and Infrastructure Requirements* and *Manual 011: How to Submit Volumetric Data to the AER* apply to brine-hosted mineral development. Add "oil cut or emulsion, if present" to section 9.1, requirement 80(a). Measurement and reporting requirements (including chemical composition and physical properties of brines form wells) should be extended to all activities where brines are encountered during energy resource development.	If core images are completed, they must be submitted to the AER as per section 9.1 of *Directive 090*. Section 11.030 of the *OGCR* is specific to the actual physical core. Furthermore, section 11.040(1) states that if any analyses are completed, they must be submitted to the AER for routine measurement. In addition, section 11.040(2) states that any analyses not referred to in section 11.040(1) must be submitted as required per the material sampling procedures on our website. Consequential amendments to update requirements in other directives such as *Directive 007* and *Manual 011* are expected in 2023 following proclamation of the *MRDA* and once Petrinex updates to support brine-hosted mineral production reporting have been completed. Measurement and reporting requirements for well data requirements are found in section 9.1 of *Directive 090* and *Directive 017*. For any questions regarding reporting or where to report additional substances (e.g., oil cut or emulsion), please contact WellTest-Helpline@aer.ca.
14. Existing *Environmental Protection and Enhancement Act* Approvals	
Will existing oil and gas development and brine-hosted mineral co-production require a separate *EPEA* approval for development at injection sites? Recommend that amending an existing *EPEA* approval for oil and gas to add brine-hosted mineral development be allowed to eliminate red tape.	Existing *EPEA* approvals for oil and gas sites may be amended to add brine-hosted mineral resource development. As part of our contributions towards the Government of Alberta's *Red Tape Reduction Act*, we have used existing regulatory instruments and processes to reduce regulatory burden and duplication as appropriate for brine-hosted mineral resource development.

Stakeholder Feedback – Issue	AER Response
15. Liability Management	
What are the liability requirements, and what impact do they have on smaller brine-hosted minerals development firms? The liability management requirements may be onerous for smaller firms.	Entrants into the industry must meet the requirements for licensee eligibility through *Directive 067: Eligibility Requirements for Acquiring and Holding Energy Licences and Approvals* before receiving licences or approvals.
Provide more information about the term "financial health."	Financial health is determined by analyzing the financial information required under *Directive 067*, which we will evaluate on a case-by-case basis. Widely accepted financial parameters and ratios (e.g., net profit margins, debt to equity, cash flow from operations to debt) were selected to evaluate licensees. These parameters measure a company's profitability over time, its liquidity and ability to meet obligations as they come due, and the level of debt used to finance the business. The parameters will be calculated using the information submitted directly to the AER via schedule 3 of *Directive 067*.

Stakeholders Who Submitted Feedback (in alphabetical order)

E3 Lithium Ltd.

Freehold Owners Association

Imperial Oil Limited

Indian Oil and Gas Canada

LithiumBank Resources Corp

Neolithica Ltd.

Private landowners