

# Draft Directive 065 (released October 2022)

## What We Heard – And Our Response



We would like to thank all those who provided comments. We reviewed each one and consolidated comments covering similar issues. What follows is a summary of the issues raised 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
<p>1. Enhanced Gas Recovery</p> <p>It is believed that opportunity exists to economically sequester carbon dioxide (CO<sub>2</sub>) in depleted gas pools, with the complementary benefit of providing pressure support and enhancing the ultimate gas recovery of those pools (and associated liquids). These opportunities are particularly prevalent in the western regions of the province where the pools are more prolific, have larger vertical relief, and deep saline sequestration opportunities are limited. With the appropriate modelling to confirm, it is believed that injecting CO<sub>2</sub> into the structurally lowest portions of the reservoir would provide suitable plume containment, while providing sustained pressure support for updip wells.</p> <p>Suggestion: Modify sections 2.1.4 and 2.1.5 to clearly include applicability for enhanced recovery for natural gas and NGLs.</p>	<p>Changes to <i>Directive 065</i> for CO<sub>2</sub> EOR storage and CO<sub>2</sub> sequestration are in line with Government of Alberta (GoA) policy.</p> <p>Sections 2.1.4 and 2.1.5 are aligned with GoA’s <a href="#">Quantification Protocols for Enhanced Oil Recovery</a>.</p> <p>Unit 2 of the current <i>Directive 065</i> allows for an application for enhanced hydrocarbon recovery that also includes gas pools.</p>

Stakeholder Feedback – Issue	AER Response
<p>If a subsurface risk to the containment of the CO<sub>2</sub> EOR storage reservoir is known, interpreted, or presumed by the applicant, a groundwater monitoring program that...</p> <p>The criteria to be applied by the AER in determination of whether a groundwater monitoring program is required is unclear.</p> <p>Furthermore, requirement for a groundwater monitoring program meeting the requirements of the directive may be redundant with the MMV. Where an operator has an MMV that aligns with the principles and objectives of Alberta Energy’s <a href="#">Monitoring, Measurement and Verification Principles and Objectives for CO<sub>2</sub> Sequestration Projects</a>, this requirement should not apply.</p> <p>Provide clarification of the approach to assessment for determination of applicability of requirement 7 of the section.</p> <p>Incorporate recognition of the requirements under the MMV principles and objectives and apply those in place of the requirements under the directive either for all schemes, or for schemes where an operator has developed an MMV in accordance with the guidelines.</p>	<p>The scheme operator must submit a site-specific groundwater monitoring program above the base of groundwater protection for all CO<sub>2</sub> EOR storage schemes.</p> <p>The containment assurance requirements of a CO<sub>2</sub> EOR storage scheme are a component of MMV plan.</p>

Stakeholder Feedback – Issue	AER Response
2. Notification Requirements	
<p>Table 1 states that the notification area for CO<sub>2</sub> sequestration projects is “the maximum calculated injection fluid area plus 1.6 km. Notifications should also cover all zones that overlie and underlie the storage zone’s maximum calculated injection fluid area plus 1.6 km.” For large sequestration projects, it is possible that the notification area may be over a hundred square kilometres per well. These very large areas, coupled with the inclusion of all zones and wells “surface to basement,” creates a very onerous notification requirement. Considering that applicants will be expected to provide a robust technical case for sealing of the sequestration formation and have a rigorous MMV plan in place, the likelihood of impact to shallow formations is remote.</p>	<p>The calculated free-phase CO<sub>2</sub> fluid plume radius of influence (as described in section 4.1.7 of the draft) is a simplified analytical calculation for each proposed injection well. It is not based on complex pressure plume estimates, which could be much larger than the fluid plume.</p>
<p>Suggestion is that this be limited to the injection formation/zone consistent with requirements for acid gas disposal, which state, “If into a depleted hydrocarbon pool, the AER designated pool; if into an aquifer, a radius of 1.6 km from the section containing the disposal well.”</p>	<p>The notification requirement should also cover all zones that overlie and underlie, which is similar to the existing underground gas storage schemes.</p>
<p>Recommendation: Consider amending the parties to notify to be in line with CO<sub>2</sub> EOR storage scheme requirements. EOR scheme area of notification is the area of the designated pool, and parties to notify are all licensees of abandoned wells that penetrate the pool and licensees of wells complete in the pool. CO<sub>2</sub> sequestration schemes do not have “pools,” but will involve rigorous technical evaluation to ensure adequate sealing capabilities, as well as an approved monitoring, measurement, and verification (MMV) plan to ensure containment and conformance. Consider changing the parties to notify to be all licensees of abandoned wells that penetrate the storage complex and licensees of wells completed in the storage complex. This change would allow CO<sub>2</sub> sequestration scheme notifications to be analogous to CO<sub>2</sub> EOR storage scheme notifications. Treating them as different by requiring notifying parties above the storage complex would be onerous and inconsistent.</p>	<p>MMV plan is a life-cycle adaptive process demonstrating the safe and reliable operation of a CO<sub>2</sub> sequestration project, whereas the AER-required notifications are minimum requirements meant to address potentially directly and adversely impacted persons upfront.</p> <p>The AER does not anticipate the CO<sub>2</sub> EOR storage schemes to have the same impact and influence as potentially larger scale CO<sub>2</sub> sequestration schemes into aquifer systems. The notifications for both application types are purposefully constructed differently.</p>

Stakeholder Feedback – Issue	AER Response
<p>“The applied-for approval area and the area within 1.6 km of any proposed enhanced oil recovery injector.” The area of notification for these schemes is substantively larger than for EOR schemes without storage without clear additional risk drivers for the increased notification areas.</p> <p>It is recommended that the requirements be made consistent with those for EOR schemes. For amendments, the recommendation would be “The applied-for approval area and the area within 800 m of any proposed enhanced oil recovery injector.”</p>	<p>It is anticipated that CO<sub>2</sub> EOR storage schemes that are part of efforts for reducing emissions and offset projects can inject greater volumes of CO<sub>2</sub> than a typical CO<sub>2</sub> EOR miscible or immiscible flood. The increased scope and scale of CO<sub>2</sub> EOR storage projects aligns with the increased notification area requirement of 1.6 km of any proposed injector. Those applications that are not applying for CO<sub>2</sub> EOR storage scheme can still apply for CO<sub>2</sub> miscible or immiscible EOR under existing section 2.1.3 of <i>Directive 065</i>.</p>

Stakeholder Feedback – Issue	AER Response
3. Two-Step Process for Multi-well Schemes	
<p>It is anticipated that some sequestration schemes may have multiple (five or more) injection wells to accommodate larger CO<sub>2</sub> volumes or lower permeability formations. While the two-step process may be beneficial in some cases for advancing the construction of capture facilities and pipelines, it still leaves significant uncertainty for proponents since the second step may require additional notifications and is subject to technical assessment of suitability by the AER. Due to the very large capital requirements, CCUS project owners may be unwilling to proceed with construction until an unconditional approval for sequestration is obtained.</p>	<p>The two-step pre-drill process is optional and is designed to provide CO<sub>2</sub> sequestration scheme licensee with information on the conditions of their approval before an investment is made in drilling the CO<sub>2</sub> sequestration injection well. If this optional process is not used, the regular application process under <i>Directive 065</i> must be used, which requires that the candidate injection well be drilled before application.</p>
<p>It is also anticipated that some proponents may utilize existing wells or drill new slim-hole wells during the evaluation stage to obtain the required petrophysical data. Under the proposed guidelines, these wells would not satisfy requirements to avoid the two-step process.</p>	<p>The applicant will be required to provide proof of a valid Crown agreement or authorization to sequester CO<sub>2</sub>. There will be no requirement to apply for a <i>Directive 065</i> scheme approval during the evaluation phase. We have removed the requirement to provide a valid Crown agreement or authorization to <i>evaluate for</i> carbon sequestration.</p>
<p>Suggestion: Where geological information is available to provide a robust understanding of the sequestration complex, consider removing the requirement for all injection wells to be drilled prior to submission of the sequestration application (without utilizing the two-step process.) Once again, this would be more consistent with the requirements for a CO<sub>2</sub> EOR storage scheme. It is reasonable to expect that at least one evaluation/injection well has been recently drilled to obtain sequestration specific data (fracture gradient, core, etc.)</p>	
<p>Suggestion: As discussed above, the notification area for sequestration projects may be very large, requiring an onerous notification process. Should the two-step process be utilized, the second step is intended to be a technical confirmation of reservoir suitability. As such, it is suggested to remove the requirement to re-notify in the case of a change of ownership or if the bottomhole coordinates are moved a negligible amount (&lt;400m).</p>	

Stakeholder Feedback – Issue	AER Response
4. Finalization of the Directive 065 Changes	
<p>Applications to Alberta Energy for stage 2 of the RFPP process were due on May 2, and a public announcement of those results has yet to occur. Since many applicants are unsure of the status of their proposals, it is anticipated that they may not have focused their attention on the changes to <i>Directive 65</i>.</p>	<p>We do not plan on delaying the feedback period since there has not been multiple requests by stakeholders for a delay, and finalizing <i>Directive 065</i> is a prerequisite for other related regulatory work.</p>
<p>Suggestion: If the number of submissions to this request for feedback is small, consider delaying the updates to <i>Directive 65</i> and holding another feedback period once the successful applicants have been announced and directly notified of the proposed changes.</p>	

**Stakeholders Who Submitted Feedback** (in alphabetical order)

BlueX Energy Corporation

Canadian Association of Petroleum Producers

Carbon Alpha