PEMBINA Institute

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to Oil and Gas Development

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all new and revised

Section 8

Well and Pipeline Abandonment and Reclamation

photo: Roberta Franchuk, Pembina Institute

8. Well and Pipeline Abandonment and Reclamation

After a project is completed and production has ceased, a company is required to abandon and reclaim the well, pipeline, and all associated lands and facilities. This section explains the obligations a company has to abandon and cap a well, and reclaim all specified land associated with the well or pipeline. It also lays out important questions for you to consider if the company is planning on reclaiming the well site on your land. Lastly, this section introduces the Orphan Fund and the process for wells that are "orphaned" when a project is not properly abandoned and reclaimed because a company has declared bankruptcy.

What's in this section

8.1 Well abandonment

The process for shutting down dry wells and wells no longer in use is referred to as "well abandonment." The well abandonment process includes down-hole abandonment, where cement plugs are set into the hole to prevent fluids from travelling through the geologic formations; remedial cementing to secure the sheath of the well, if needed; and finally surface abandonment, where the well is closed at the surface. The Alberta Energy Regulator (AER) does not give a well the status of "abandoned" until surface abandonment is complete. AER Directive 020: Well Abandonment sets out the requirements.[1]

> Abandonment is the permanent dismantling of a well or facility. Abandoned wells are different from suspended, shut-in, and orphaned wells. See Appendix D for definitions.

There are two main types of abandonment:

- **Open-hole abandonment** refers to the down-hole and surface abandonment of a dry hole (one that was not brought into production). It is carried out after drilling is complete but before the rig is released from the site.
- **Cased-hole abandonment** refers to the down-hole and surface abandonment of a completed or cased well, which occurs when all oil or gas extraction has ceased.

Surface abandonment includes the removal of all wellhead equipment, but not the reclamation of the lease site, which occurs sometime after abandonment is complete. Reclamation is regulated by the AER, which issues reclamation certificates once certain criteria are met.

A company is required to notify all affected landowners/occupants in the area of any planned surface abandonment; however, the AER does not specify how much notice the operator must give.[2] Non-routine abandonment — which includes abandonment of wells associated with a salt cavern, re-abandonment of a well, and other situations listed in section 1.4 of Directive 020 — requires the company to get approval from the AER before starting work.

In all cases, before abandoning a well, the company must ensure that no oil or gas is flowing through the well casing that could contaminate groundwater or rise to the surface. A company has to set cement plugs — of sufficient length and number — to cover all non-saline groundwater zones to protect the groundwater. After plugging, the wellbore must be filled with non-saline water.

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[1] AER, *Directive 020: Well Abandonment* (2024). https://www.aer.ca/regulations-and-compliance-enforcement/rules-and-regulations/directives/directive-020

[2] AER, *Directive 020*, section 8.

At the surface, the well casing must be cut off at least 1 m below the final surface of the land (or at least 2 m if the well is within 15 km of urban development or where there is a special farming practice, such as deep tillage, drainage works, or peat lands). It is then capped with a steel plate that is designed to prevent buildup of pressure, while still blocking access to the casing at the surface. This surface abandonment must be completed within a year of the down-hole abandonment.[3] Directive 020 also sets out specific requirements for different types of wells and different regions of the province.

Oilsands evaluation wells and test hole wells are drilled only for core samples and are not intended to be completed. For these wells, down-hole abandonment must be completed within 30 days after drilling has finished or prior to rig release. Surface abandonment must be completed immediately after down-hole operations.

The AER's Directive 079 requires a permanent 5 m setback on abandoned wells to prevent anyone building on or near an abandoned well.[4] The directive exempts shallow wells of less than 150 m in depth, and in some circumstances exempts or reduces the setback for other wells such as oilsands evaluation wells.

8.2 Reclamation of well sites

The Government of Alberta has the online, searchable Environmental Site Assessment Repository where you can find documentation on site assessments and reclamation certificates.[5] It also has an enforcement search tool for enforcement records related to the Alberta Ministry of Environment and Protected Areas' current and past legislation.[6] Additionally, the Alberta Energy Regulator has a compliance dashboard that includes enforcement actions pertaining to reclamation, which the agency assumed responsibility for in 2014.[7]

[3] AER, *Directive 020*, section 8.

[4] AER, *Directive 079: Surface Development in Proximity to Abandoned Wells* (2022). https://www.aer.ca/regulations-and-compliance-enforcement/rules-and-regulations/directives/directive-079

[5] Alberta, "Environmental Site Assessment Repository." https://www.alberta.ca/environmental-site-assessment-repository

[6] Alberta, "Historical environmental enforcement search." https://www.alberta.ca/lookup/environmental-historical-enforcement-search.aspx

[7] AER, "Compliance Dashboard." https://www1.aer.ca/compliancedashboard/enforcement.html

8.2.1 The reclamation process

The purpose of the reclamation process is to return the land to equivalent land capability, i.e., "the ability of the land to support various land uses after conservation and reclamation is similar to the ability that existed prior to an activity being conducted on the land, but that the individual land uses will not necessarily be identical."[8] Once a well has been shut down and surface abandonment has been completed according to the AER requirements, the land can be reclaimed and a reclamation certificate issued.

It is estimated that there were 94,640 abandoned but unreclaimed wells in Alberta at the end of 2024.[9] A company has to demonstrate that it has met all reclamation criteria and show that the site was assessed to determine if contamination is present. If so, the company must also show that the site was remediated to meet remediation requirements.

The Environmental Protection and Enhancement Act, Part 5, and the Conservation and Reclamation Regulation set the standards for conservation and reclamation. The regulations apply to "specified land," which includes land that has been used for a well site, pipeline or battery. The AER's Specified Enactment Direction 002[10] sets out the actual reclamation requirements that operators must meet to obtain a reclamation certificate on cultivated lands, forested lands, and native grasslands. The AER has released the Reclamation and Remediation Fact Sheet[11] to provide information and updates on the reclamation and remediation processes.

The company is required to provide you, as the landowner or occupant, with a copy of the reclamation application package on the same day that they submit it to the AER.[12] It is very important for you to be involved and inform the company of any issues relating to the reclamation, especially in light of any responsibilities you have as a landowner with regards to abandoned wells under the Municipal Government Act Subdivision and Development Regulation. You should point out any locations where you think the ground may be contaminated and ensure that any drilling waste disposal areas are properly reclaimed.

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[8] Alberta, *Conservation and Reclamation Regulation*, Alta. Reg. 115/1993, s. 1(e). https://open.alberta.ca/publications/1993_115

[9] AER, "Well Status." https://www.aer.ca/data-and-performance-reports/data-hub/well-status

[10] AER, *Specified Enactment Direction 002: Application Submission Requirements and Guidance for Reclamation Certificates for Well Sites and Associated Facilities* (2025). https://static.aer.ca/prd/documents/manuals/Direction_002.pdf

Also see Alberta Environment and Parks, "Wellsite Reclamation Certificate Application Process: 2010 Reclamation Criteria." http://aep.alberta.ca/lands-forests/land-industrial/programs-and-services/reclamation-and-remediation/upstream-oil-and-gas-reclamation-and-remediation-program/wellsite-reclamation-certificate-application-process.aspx

[11] Fact sheets are available at https://www.aer.ca/understanding-resource-development/enerfaqs-and-fact-sheets

[12] AER, *Specified Enactment Direction 002*, sections 6.2.1 and 6.2.2.

The company is required to have documentation showing that it complied with the AER's Directive 050: Drilling Waste Management, which includes having a written agreement with the landowner. The company must also have provided to the owner of any land on which they planned to drill a copy of a document called *Information for Landowners on Consent for the Disposal, Treatment, or Storage of Drilling Wastes*.[13] If a company is unable to show that drilling waste was handled in the approved manner, it must carry out a Phase 2 environmental site assessment (discussed below).

To find more information on an application in your area, you can search the Public Notice of Application database on the AER website.[14] To access the documents related to an application, you can search the Integrated Application Registry on the AER website.[15] Information on abandonments and reclamations is only accessible to companies.

You should tell the company if you wish to keep the access road, so that it is not reclaimed, but this detail may have to be worked out as a condition of the surface agreement. In order for a road to remain after reclamation, it must be built to grade, which may not be the case if it was built as a temporary access road.[16] If a site had natural vegetation before the well was drilled, you can request that reseeding or replanting be done with native plants, rather than with cultivated varieties such as crested wheat grass and timothy.

Before a company applies for a reclamation certificate, it must carry out a Phase 1 environmental site assessment (ESA).[17] The Phase 1 ESA is meant to gather enough information to determine the likelihood and probable locations of contamination and whether further assessment is needed. This includes a review of the company's file (historical and regulatory documents maintained by the AER and the company itself that pertain to the specific site), the AER spills database and historical aerial photographs. A company representative must visit the site, take photographs and write a report that describes the site, including any pits or facilities that remain, evidence of surface spills, vegetation and land use. People with knowledge of the site, including the landowner or occupant, must be contacted for an interview. Several attempts at interviews should be made and documented by the company if the first one is not successful.[18]

[13] AER, *Directive 050*, section 1.5.

[14] AER, "Public Notice of Application." https://webapps.aer.ca/pnoa

[15] AER, "Integrated Application Registry." https://dds.aer.ca/iar_query/FindApplications.aspx

[16] Alberta Transportation and Economic Corridors is responsible for approving permanent access roads.

[17] Alberta Environment and Sustainable Resource Development, *A Guide to Remediation Certificates for Upstream Oil & Gas Sites* (2012). https://open.alberta.ca/publications/9781460105955

[18] AER, *SED 002*, section 10.8.

If the Phase 1 assessment finds that there may be contamination on the site, or that there is insufficient information to determine the likelihood of contamination at a site, the operator typically is required to carry out a Phase 2 ESA.[19] Also, if they do not have information on the contents of the drilling waste or location of the drilling waste disposal area, they are generally required to conduct a Phase 2 ESA (unless the drilling waste qualifies for an exemption).[20] A Phase 2 ESA means taking samples of soil and groundwater to determine the extent of any potential contamination. The company is required to carry out remediation and take more samples to show that the remediation objectives have been achieved.

The land has to be returned to equivalent land capability. Since relatively few sites will be audited by the AER, it is important for the landowner to check the following at the site:

- the condition of the landscape (drainage problems; evidence of erosion or unstable slopes, gravel, rocks or debris that needs removing; problems with vegetation or bare areas)
- the condition of the soil (soil depth and quality, any soil compaction)
- the vegetation (species composition and growth performance)
- weeds, invasive species, or diseases (such as clubroot)

Reclamation requirements are based on when the site was constructed. Sites are required to have at least 80% replacement of topsoil, contouring, and seeding or replanting of the surface. Every attempt must be made to use available surface soil in reclaiming a site. When complete, the land's productive capacity should be equivalent to what it was before the well site disturbance.

When the remediation and reclamation work is complete, the company can apply to the AER for a reclamation certificate. The company must supply the landowner with a copy of all their application documents for a reclamation certificate. In addition to the application, the documentation will include the Phase 1 ESA and, when necessary, also the Phase 2 ESA. You should check that the assessment shows:

- when the well was drilled
- what happened to any hydraulic fracturing fluids and drilling waste
- the location of any water well, if present
- the location of any sumps

[19] Alberta, *Environmental Site Assessment Standard* (2024). https://open.alberta.ca/publications/environmental-site-assessment-standard

[20] AER, *Assessing Drilling Waste Disposal Areas* (2014). https://static.aer.ca/prd/documents/liability/AssessingDrillingDisposaAreas.pdf

- whether there was ever a spill of any kind on the surface
- if the land was sprayed to control weeds, and if so, when and with what

The company should have information dating back to the beginning of development, even if the well changed hands several times. If the records for a Phase 1 assessment are incomplete or do not correspond with your recollection of events, you should ask the company to conduct a Phase 2 assessment before they apply for a certificate. A Phase 2 assessment should also be requested if there were any problems or leaks and complete remediation has not already been confirmed.

It is crucial to visit the site. As the landowner, your personal inspection is most important since the regulator no longer conducts a mandatory inspection of a site before granting a reclamation certificate. If you are not completely satisfied with the reclamation work done by the company, you should contact the company and have them revisit the site with you. The company is expected to make every effort to engage with the landowner and resolve any outstanding issues that they may have. However, if you still believe the work is unsatisfactory after the company has submitted their application for a reclamation certificate, submit a statement of concern (see section 10.1.3) immediately or latest by the deadline set out in the notice of application issued by the AER. The sooner you submit, the better since the application may be automatically processed and approved through OneStop.

If a reclamation certificate was issued by the AER and you are still not satisfied with how the AER or the company handled your complaint and feel that the reclamation certificate should be cancelled, contact the AER through their 24-hour response line (1-800-222-6514). Your complaint will be forwarded to the appropriate field centre. All complaints are investigated, and substantiated complaints may lead to the cancellation of the reclamation certificate. It may be prudent to submit a regulatory appeal (section 10.2) at the same time as your complaint if you are uncertain that the issues will be resolved. You can always withdraw the appeal if all your concerns about the reclamation are dealt with before the appeal date.

Until the reclamation certificate is issued, the company must continue paying any annual fees to the landowner or occupant. If the company fails to pay, the Land and Property Rights Tribunal can be asked to pay the compensation. A company may apply to pay less rent once the above-ground structures have been removed (section 9.1).

All materials from the reclamation process should be cleared away before a certificate is granted. If a company wants to leave any materials or debris for collection after the reclamation certificate is given, you should negotiate another temporary lease agreement.

The AER will conduct audits for only a small sample of the surface reclamation and/or remediation on sites issued a reclamation or remediation certificate. These are conducted randomly or targeted based on risk. An audit of a reclaimed site will include a visual inspection

of the site to determine if reclamation criteria have been met. If the site is audited for remediation, the inspector may conduct intrusive soil sampling and lab analysis on top of the visual inspection. If the audit results indicate that the site does not meet the AER's reclamation criteria or remediation requirements, the certificate may be cancelled. Additionally, you can contact the AER if you believe a company's reclamation activities aren't sufficient.

Even when a reclamation certificate has been issued, the company remains responsible for some time. At the time of writing, a company is responsible for 25 years for surface reclamation issues such as vegetation, soil texture, and drainage; and it has a lifetime liability for contamination.[21] If there is a problem with the regrowth of vegetation or the site of the sump sinks, you should notify the company and ask them to rectify it. The AER should also be notified at this time.

Well suspension: When a company has suspended operations at a well site but has not yet abandoned the site, the company must follow the requirements set out in AER Directive 013: Suspension Requirements for Wells.

8.2.2 Questions to ask about reclamation of wells and facilities

It is important to get answers to the following questions to ensure that there is no contamination left on your land. You could be held liable if you fail to tell a prospective purchaser of any known contamination.[22]

Have you been notified by a company about their intent to abandon and reclaim a well?

They should contact you before they start any reclamation work.

Have you told the company of any areas that need special attention during the reclamation process?

You should check that they locate old sumps and other areas that might need special attention.

How much topsoil will be replaced?

The percentage required will depend on when the well was drilled.

How does the company propose to verify that the surface is fully restored to equivalent land capability?

One growing season may not be enough to verify that the site is fully reclaimed.

[21] AER, *Closure – Abandonment, Reclamation, and Remediation Fact Sheet* (2025).

[22] Environmental Law Centre, *Get the Real Dirt: Contaminated Real Estate and Law in Alberta* (2000).

Have you visually checked that the work has been conducted to your satisfaction?

You should ensure that reclamation is complete and there is no contamination on your land.

After discussions, has the company failed to rectify any reclamation issues that you identified?

If so, notify the AER via the Energy and Environmental 24-hour Response Line.

Has the company done gas migration testing?

The AER requires gas migration testing to be done on all wells that do not have a surface casing vent assembly. The AER recommends that all wells be tested for gas migration prior to abandonment.[23]

Has the company given you a copy of the documents that they submitted to the AER when applying for a reclamation certificate?

You should check that you agree with the information on the reclamation application and ask for a Phase 2 assessment if there are gaps in the company's documentation or if it does not agree with your recollection of events.

8.3 Reclamation of other sites

While the previous section focused on oil and gas well sites, similar provisions apply to all oil production sites, batteries, and other facilities and pipelines. All these activities take place on specified land, which is covered by the Conservation and Reclamation Regulations.

Other specific requirements for the conservation and reclamation of oil production sites are set out in the Oil and Gas Conservation Rules.[24]

8.3.1 Pipeline abandonment

When a pipeline is no longer used, it must be abandoned according to the regulations and left in a safe condition[25] and it may be abandoned in place or completely removed. The Pipeline Act and Pipeline Rules outline the requirements for the abandonment of pipelines used for gathering and transmission.[26] Land use is the most important factor to consider in determining whether a pipeline section should be abandoned in place or removed. The potential for long-

[23] AER, *Directive 020*, section 7.

[24] Alberta, *Oil and Gas Conservation Rules*, Alta. Reg. 151/1971. https://open.alberta.ca/publications/1971_151

[25] Alberta, *Pipeline Rules*, Alta. Reg. 125/2023, s. 76(i). https://open.alberta.ca/publications/2023_125

[26] Alberta, *Pipeline Rules*, Alta. Reg. 125/2023, s. 76(i). https://open.alberta.ca/publications/2023_125

term structural deterioration of a pipeline abandoned in place — leading to ground subsidence — should also be considered. These and many other factors are evaluated in the *Pipeline Abandonment Scoping Study* commissioned by the National Energy Board (predecessor to the Canada Energy Regulator).[27]

Directive 056 requires a company to notify the AER when it has abandoned a pipeline. The company must first notify the landowners/occupants affected by the proposed removal or abandonment. If you object to removal or abandonment or are concerned about ownership or liability for the pipeline after it has been abandoned in place, you should tell the AER. The company may prefer to abandon the pipeline in place in order to minimize additional land disturbance and reduce the extent of reclamation work required.

The Pipeline Act states that, even though a company is permitted to abandon a pipeline, it remains liable for other operations that may need to be carried out.[28] However, you should ensure that the right-of-way will be properly monitored and any problems associated with the abandonment remediated. When carrying out the abandonment activities, the company should give prior written notice to the landowner and must compensate the landowner for direct expenses and any resulting damage to land, crop or livestock.

Once the pipeline itself has been abandoned, the surface right-of-way may need reclamation. The AER is responsible for ensuring the proper reclamation of a right-of-way, including the specified land associated with the pipeline.

In the past, there have been problems with the reclamation of pipelines operated by companies that are no longer in business, but pipelines are now covered by the Orphan Well Association (section 8.4).

8.3.2 Questions to ask about pipeline reclamation

It is advisable to get answers to the following questions regarding any pipeline reclamation taking place on your land.

Have you been notified by a company about their intent to abandon or remove a pipeline?

They should contact you before they start any reclamation work.

[27] Det Norske Veritas, *Pipeline Abandonment Scoping Study,* prepared for the National Energy Board (2010). https://docs2.cer-rec.gc.ca/ll-eng/llisapi.dll/fetch/2000/90463/782060/782061/795792/804521/850212/C8-5-13_-_Attachment_11_-_Pipeline_Abandonment_Scoping_Study_-_A2Y0S9_.pdf?nodeid=850222&vernum=-2

[28] Alberta, *Pipeline Act*, RSA 2000, c. P-15, s. 25. https://open.alberta.ca/publications/p15

Will the pipeline be left in the ground or removed?

Abandonment in place will result in less disturbance, but you should inform the company if you have good reasons to request the pipeline be removed. Operators are not typically required to remove the pipeline at reclamation.

Do you have any concerns about the pipeline abandonment?

If so, try to resolve them with the company and, if they cannot be resolved, inform the AER.

Do you have any concerns about the reclamation of the pipeline right-of-way?

If so, inform the AER.

8.4 Inactive wells, orphan wells and pipelines

Every year, some wells are cased-hole abandoned because a company may no longer find it economic to produce oil or gas, but may not wish to abandon and reclaim a well in case economic conditions change or technology improves to the point where productivity can increase.

As of August 2025, there were an estimated 78,446 inactive wells in Alberta,[29] and 4,699 sites (including 3,921 wells) in the orphan inventory that have not yet been decommissioned.[30]

In July 2020, Alberta introduced the Liability Management Framework and amended the Oil and Gas Conservation Rules and the Pipeline Rules accordingly. The framework replaced the AER's Licensee Liability Rating program with the Licensee Capability Assessment to evaluate a company's ability to meet liability obligations before approving an application.[31] The Licensee Capability Assessment considers financial health, closure activity rates, and other relevant factors and is set out in the AER's Directive 088.[32]

The framework also allows the AER to establish annual closure spend quotas, requiring companies to meet a minimum level of spending on closure activities each year. To drive timely decommissioning and abandonment, the AER has been implementing an industry-wide

[29] AER, "Well Status." https://www.aer.ca/data-and-performance-reports/data-hub/well-status

[30] Orphan Well Association, "Current Well Inventory." https://www.orphanwell.ca/inventory/inventory-across-alberta

[31] Alberta, *Liability Management Framework* (2020). https://www.alberta.ca/system/files/custom_downloaded_images/energy-liability-management-framework.pdf

[32] AER, *Directive 088: Licensee Life-Cycle Management* (2025). https://www.aer.ca/regulations-and-compliance-enforcement/rules-and-regulations/directives/directive-088

spending requirement. In 2023, 91% of licensees complied with their mandatory closure spending.[33]

In the early 2000s, a fund was created to properly abandon and reclaim orphan wells, pipelines, and certain facilities (including flare pits and drilling sumps), along with their associated sites, when no legally responsible party exists to deal with their closure — such as when a company declares bankruptcy. The Orphan Fund is administered by the Orphan Well Association (OWA) (Appendix B) and is a joint industry–government initiative financed by an AER levy on industry and other AER fees, so there is no cost to the landowner or occupant. The OWA has also been supported by several interest-free government loans.

A company is required to pay you, as the landowner, annual compensation for the surface lease, even if a well is not operating. If you are no longer receiving annual compensation, you should contact the Land and Property Rights Tribunal (section 9.3).

A company may try to sell off wells that are no longer very productive to smaller companies with lower operating costs in a process known as "offloading." In some cases, the company goes out of business and its wells become "orphaned." However, the AER will examine how the transfer of a well licence will affect both companies' liabilities. The AER can also designate a company's wells, pipelines, and facilities to the OWA if in the AER's opinion a company is insolvent or not financially viable but is still active on the corporate registry.

[33] AER, "Liability Management Performance Report," December 2024. https://www.aer.ca/data-and-performance-reports/industry-performance/liability-management-performance-report

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