PetroLMI
DIVISION OF ENERGY SAFETY CANADA

WORKFORCE IMPACTS FROM ALBERTA WELL CLOSURES:

CREATING STABILITY THROUGH CYCLICALITY

SEPTEMBER 2021

Canada Alberta

The Province of Alberta is working in partnership with the Government of Canada to provide employment support programs and services.

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FOREWORD

The federal and provincial governments have created new financial initiatives and policy measures to create jobs and work with the oil and gas industry to improve the environment. Measures such as the COVID-19 Economic Stimulus Plan, the Alberta Site Rehabilitation Program (SRP) and the provincial Liability Management Framework are intended to address a significant inventory of inactive wells.

This report pulls together secondary research and findings from interviews with seven energy services companies and three industry associations to highlight the chain of activities involved in closure, as well as the key well servicing and environmental occupations involved and the competencies required—including the top in-demand roles. Also explored are the opportunities and challenges related to the SRP, Indigenous involvement, timing of the measures, labour supply and demand gaps, and the repurposing of dormant oil and gas infrastructure to develop renewable energy. The report concludes with recommendations and resources. This information is intended for displaced oil and gas workers looking for new career opportunities; post-secondary institutions, career counsellors, students, new graduates and newcomers looking to carve out or support relevant career paths; and Indigenous communities, energy companies, governments and industry associations wanting to participate or share best practices.

Closure includes the abandonment, decommissioning, remediation and reclamation of a well site.

Reclaimed and seeded access road and well site.

1. RECLAIMING A WELL SITE IN ALBERTA: CLOSURE 101

Introduction

In April 2020, the Government of Canada announced that up to $1 billion in funding would be made available to Alberta's oilfield service contractors to support well closure activities as part of the federal government's **COVID-19 Economic Response Plan**. The government also announced a $200 million repayable loan to the Orphan Well Association (OWA), which has a mandate to close wells, facilities and pipelines that do not have a solvent owner.[1] British Columbia and Saskatchewan also received financial support as part of the announcement, though to a lesser extent. In May 2020, the Government of Alberta launched the **Site Rehabilitation Program (SRP)**, which provides grants to oilfield service contractors to perform oil and gas well, pipeline, facilities and site closure and reclamation work.[2] The province also announced the extension of a $100 million payable loan to the OWA.

The SRP aims to:

- Get Alberta's specialized oil and gas labour force back to work
- Accelerate site abandonment and reclamation efforts
- Complete a high volume of environmentally significant work[3]

The program provides grants during several designated funding periods starting with Period 1, which opened May 1, 2020. The grants cover varying percentages of the total program costs depending on the specific criteria for each period. The SRP is currently expected to end in March 2022, and all work for which grants are awarded must be completed by December 2022.

"We are fortunate to have been successful in our grant applications through the SRP for site remediation and reclamation work. It has helped us sustain our staffing levels and workload in the face of producer spending that was almost zero in Q2 and Q3 of 2020."

*- **Tyler Martin**, Vice-President - External Operations, North Shore Environmental Consultants, Calgary, AB.*

The OWA and Area-Based Closure Program (ABC) were already working to address closing Alberta's approximately 97,000 inactive wells[4] and 7,200 orphan wells[5] before 2020's funding. The OWA is an independent, non-profit organization that operates under the delegated legal authority of the Alberta Energy Regulator (AER) and is funded primarily by industry. In 2017 the Government of Alberta announced a $235-million loan to the OWA to speed up the closure of orphan wells. The ABC meanwhile, is a voluntary program introduced in 2018 by the AER. The program introduced the means to accelerate the closure of sites through economies of scale achieved by area-based closure rather than closures based on time thresholds which can be more costly, especially in remote areas.[6]

The new federal funding has spurred additional activity to reduce the growing inactive well inventory and associated liabilities. The Government of Alberta estimated the SRP would create up to 5,300 jobs[7], putting oilfield service workers back to work after being hit hard by the combined effects of the COVID-19 pandemic and low oil and gas prices.

Well Speak

A suspended or inactive well is one that has not been used for production, injection or disposal for a specified amount of time (six months for high-risk wells, or 12 months for medium and low-risk wells). A producer may choose to suspend a well because it is not considered economically viable at the time but could be in the future.

An orphan well is one that no longer has any legally responsible and/or financially able party accountable for it. With the economic challenges the oil and gas industry has faced in recent years, the number of orphan wells has grown faster than in the past.

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1 Prime Minister of Canada. *"Prime Minister announces new support to protect Canadian jobs." Government of Canada, 17 Apr. 2020,* https://pm.gc.ca/en/news/news-releases/2020/04/17/prime-minister-announces-new-support-protect-canadian-jobs

2 Government of Alberta. *"$1 billion protect to create 5,300 jobs." Government of Alberta, 24 Apr. 2020,* https://www.alberta.ca/release.cfm?xID=70157C2391212-E275-B8DA-3FCC685A421CE43F

3 Government of Alberta. *"Site rehabilitation program - overview."* https://www.alberta.ca/site-rehabilitation-program-overview.aspx (accessed June 2, 2021)

4 Government of Alberta. *"Oil and gas liabilities management."* https://www.alberta.ca/oil-and-gas-liabilities-management.aspx (accessed June 2, 2021)

5 Orphan Well Association. *"Orphan inventory."* https://www.orphanwell.ca/about/orphan-inventory/ (accessed June 2, 2021)

6 Alberta Energy Regulator. *"Well Based Closure."* https://www.aer.ca/regulating-development/project-closure/liability-management-programs-and-processes/area-based-closure (accessed June 2, 2021)

7 Government of Alberta. *"$1 billion protect to create 5,300 jobs." Government of Alberta, 24 Apr. 2020,* https://www.alberta.ca/release.cfm?xID=70157C2391212-E275-B8DA-3FCC685A421CE43F

What exactly is closure anyway?

Closure is the critical last stage in the life cycle of an oil or gas well, pipeline or facility. Figure 1 shows the general stages of a well closure. Other types of infrastructure (e.g., pipelines) have different life cycles.

Well closure activities can be broken down into four stages:

1. **Abandonment:** An abandoned well is one that is taken out of service and permanently shut down, plugged, wellhead removed and is considered safe and secure by regulators.

2. **Decommissioning:** Removing as much infrastructure as possible from the site—facilities, surface pipelines, wells and so on. Only infrastructure considered to be an improvement can be left on the land (e.g., an access road left in place for the landowner's use). A landowner's written permission is required to leave any infrastructure on the land.

3. **Remediation:** Assessing a site for any contamination of soil or groundwater, and, if any contaminated materials are found, removing them and taking them to a disposal facility for treatment, or treating them on site.

4. **Reclamation:** Returning the land to its pre-disturbed state or equivalent land use through activities like replacing topsoil, landscaping and through ongoing soil and water sampling.

Figure 2 illustrates the stages of a well closure in greater detail.

Figure 1: Life cycle of a well

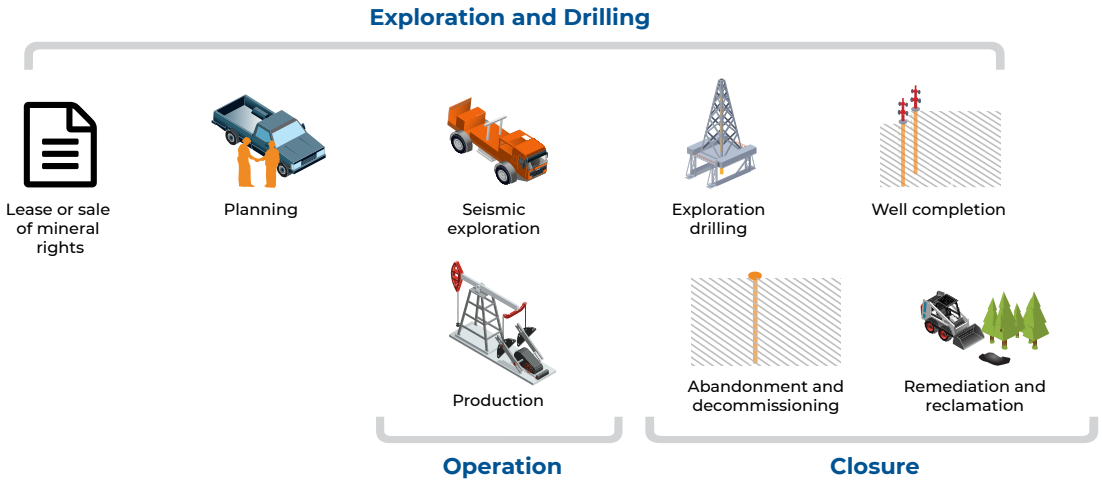
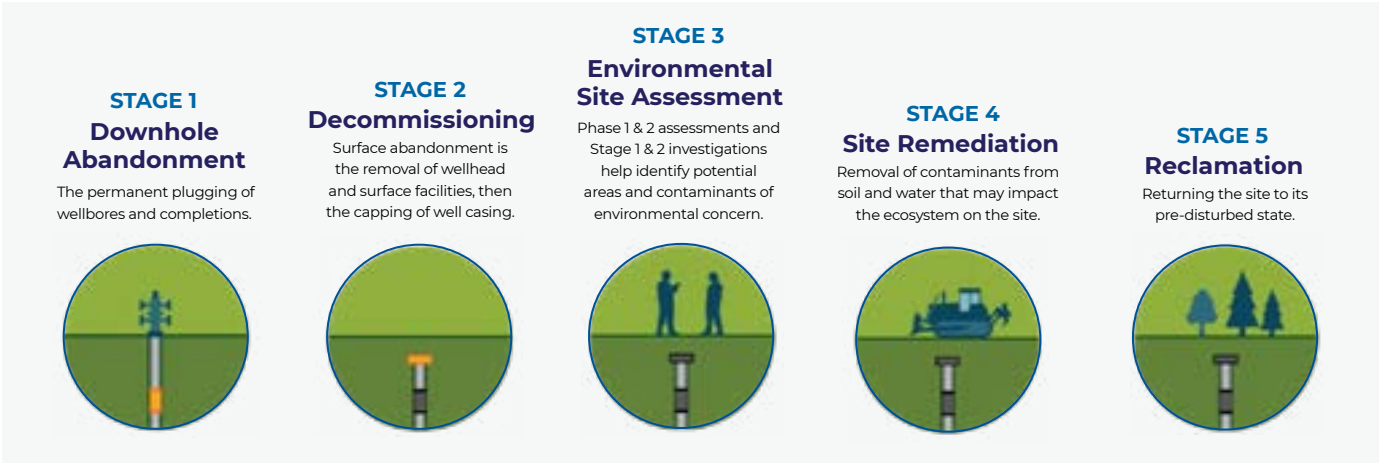


Figure 2: Stages of a well closure



Source: Adapted from Secure Energy

Curious to learn even more about well closure? Take a virtual tour of the process!

A joint effort

Many stakeholders play an active role in the management of activities related to well closure in Alberta.

- **Alberta Energy** — administers the Site Rehabilitation Program and sets the policy for Liability Management.
- **Alberta Energy Regulator** — ensures the safe, efficient, orderly and environmentally responsible development of Alberta's energy resources through regulation and enforcement.
- **Orphan Well Association** - manages the production and closure of oil and gas wells, pipelines and facilities that no longer have an owner, including remediation and reclamation work. Receives funding through the Orphan Fund Levy paid by producers.
- **Oil and Gas Producers** –are responsible for closure activities for their own well sites and pay into the Orphan Fund Levy administered by the OWA. Under the new Liability Management Framework, active site operators will have mandatory five-year rolling spending targets for site reclamation.
- **Service Companies (well servicing and environmental services)** – are contracted by producers or the OWA to complete the abandonment, decommissioning, remediation and reclamation work. Typical services include site inspection, servicing rigs, trucking and hauling, wireline operations, environmental assessments and reviews, as well as reclamation supervision (see Figure 6 for the full list of subcontracted services).
- **Indigenous Communities** – First Nations and Métis Settlements can nominate on-reserve and on-settlement sites for closure; Indigenous businesses are actively encouraged and supported to play a role in closure work.
- **Landowners** – can nominate sites for closure activities on their properties.

Well site with buried contamination being remediated

SPOTLIGHT

Orphan Well Association: Countercyclical growth

As of July 2021, the OWA's orphan well inventory sits at 2,119 wells awaiting decommissioning and 5,081 wells in the process of reclamation.[8] Executive Director Lars DePauw says the OWA has doubled its activity in the last two years and has been able to keep people working through the economic downturn and pandemic.

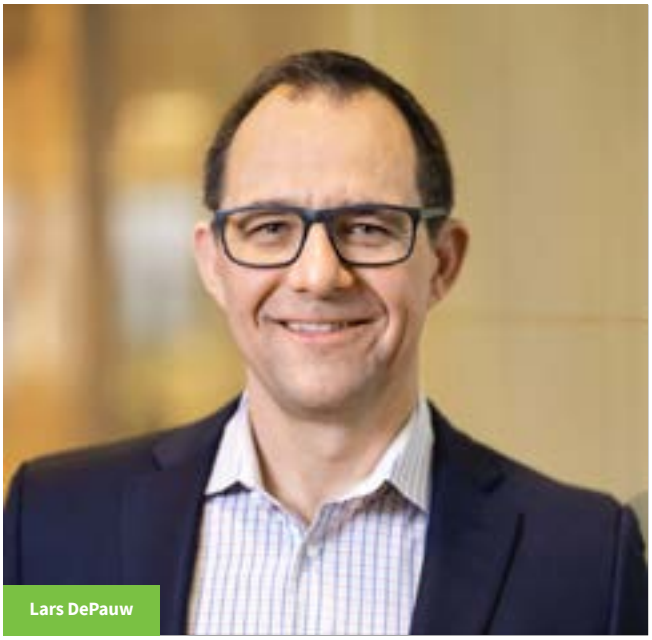
"The reality of our closure work is that it is countercyclical," says DePauw. "The economic factors that slow down parts of the oil and gas industry create more work for us, not less."

Additional federal and provincial loans to the OWA, alongside a sizeable increase to the producer orphan levy meant DePauw's annual expenditures grew by over 47% in 2020-2021 compared to the previous year. "We're running about 150 crews a day at our peak, each with one to six people, and some of our subcontracted service lines are experiencing shortages," says DePauw. To mitigate the shortages and to create efficiencies, OWA is deploying its contractors strategically, so that, wherever possible, they work on several projects in an area, approaching them as one larger initiative from a workforce and supply-chain perspective.

In the years ahead, DePauw expects the OWA's annual budget to stabilize at about $50 million, and as of March 31, 2021, the OWA's total remaining closure costs are estimated to range from $650 million to $700 million, according to OWA's annual report.[9]

Since OWA was founded two decades ago, it has decommissioned over 5,100 well sites, but 70% of the site decommissioning has occurred in the last three years, says DePauw. Reclamation certificates have been issued for approximately 1,300 sites, a number poised to dramatically increase as the OWA has an additional 1,700 sites in the re-vegetation stage with reclamation certificate applications expected to proceed within the coming years.[10]

The number of safely decommissioned wells means much of the OWA's resourcing will now move to reclamation.



Lars DePauw

> **"The reality of our closure work is that it is countercyclical, the economic factors that slow down parts of the oil and gas industry create more work for us, not less."**
>
> — **Lars DePauw**, Executive Director, Orphan Well Association

Listen to Lars DePauw's **podcast** to hear more about the OWA and how it manages Alberta's orphan wells.

[8] Orphan Well Association. *"Orphan inventory."* https://www.orphanwell.ca/about/orphan-inventory/ (accessed July 2, 2021)

[9] Orphan Well Association. *Annual Report 2020/2021* (2020). https://www.orphanwell.ca/wp-content/uploads/2021/07/OWA-Annual_2020_web2.pdf

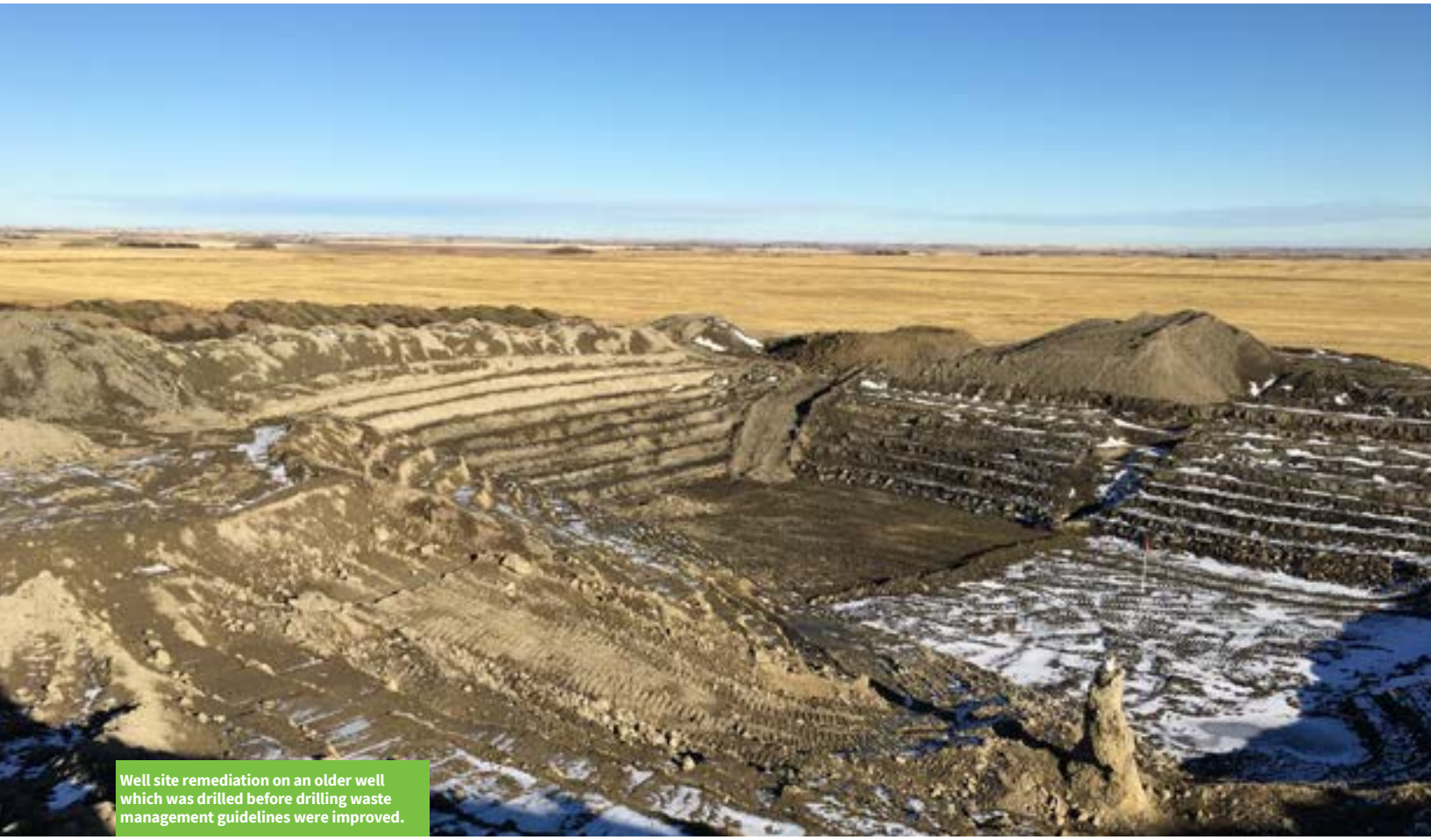
[10] Orphan Well Association. *"Orphan inventory."* https://www.orphanwell.ca/about/orphan-inventory/ (accessed July 2, 2021)

Liability Management Framework

On July 30, 2020, the Government of Alberta announced a new Liability Management Framework aimed at expediting the closure of orphan and inactive well sites. The Framework signals 'a more active approach'[11] to the reclamation and management of those sites, seeking to reduce their number while providing more flexibility and clarity to the oil and gas industry. The new Framework considers a wider range of assessment criteria and includes the following significant changes:

- Active site operators will have mandatory five-year rolling spending targets for site reclamation, to increase their financial commitments to reclamation.
- A new formal mechanism will allow landowners to nominate specific sites for closure.
- Operators that are struggling will have access to practical guidance and support to help manage their assets and maintain their active operations.
- A panel-led process will be established to determine how to fully reclaim legacy and post-closure sites to current standards, including reclamation-exempt sites (i.e., those sites that were reclaimed prior to when reclamation certificates became legally required) and abandoned sites previously operated by now-defunct companies.[12]
- The OWA will have expanded authority, with the ability to act as a commercial oil and gas operator in some scenarios, and to play a more active role in the management of struggling or abandoned oil and gas assets.

The changes apply new pressures to operators, while also attempting to provide opportunities and support to address the associated financial costs that come with site closures.



Well site remediation on an older well which was drilled before drilling waste management guidelines were improved.

[11] Martin Ignasiak, Sander Duncanson, Jessica Kennedy, Coleman Brinker. *"Alberta announces new framework to speed up oil and gas reclamation. Osler, 6 Aug, 2020*, https://www.osler.com/en/resources/regulations/2020/alberta-announces-new-framework-to-speed-up-oil-and-gas-reclamation

[12] Ibid.

2. OPPORTUNITIES

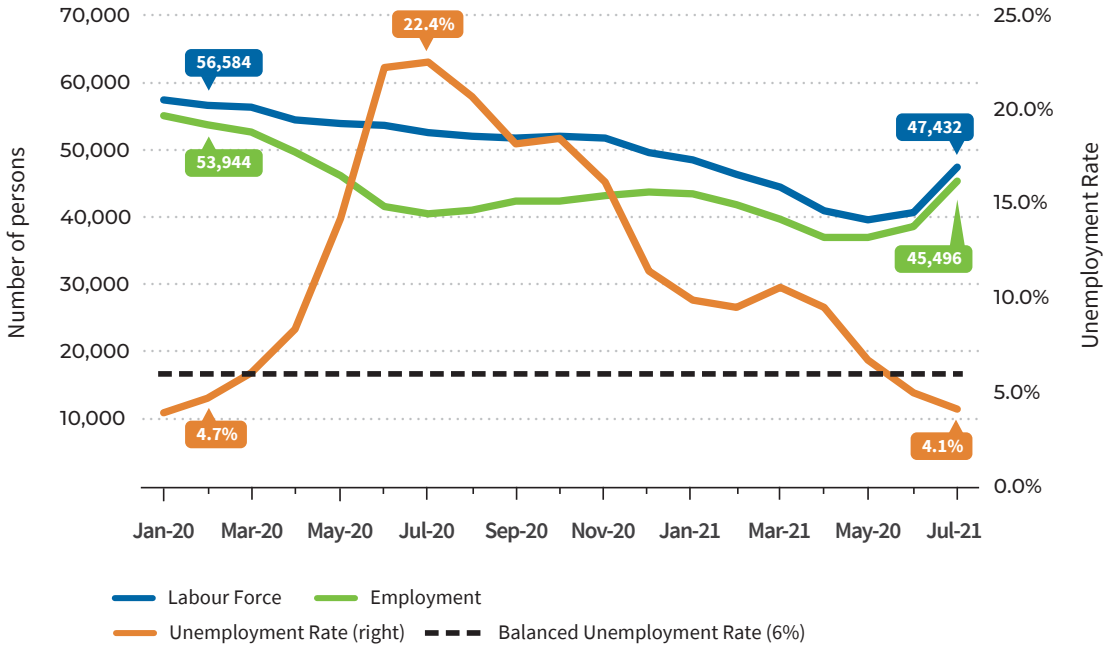
Well closure activities are poised to have a significant and lasting impact on Alberta's energy industry. With close to 105,000 inactive and orphan wells across the province, and with 35 to 50 services employing 41 to 57 workers required for closure activities per well[13] (see Figures 4 and 5 for more detail), increased closure activity is already creating or sustaining thousands of jobs while contributing to responsible resource development. In the shorter-term, the SRP will play a key role in site closure activities; over the longer-term, the opportunities for Indigenous involvement and the integration of emerging sectors like hydrogen and geothermal through the repurposing of the oil and gas infrastructure could be transformative.

Creating stability in a cyclical sector

Employment in Alberta's oil and gas services sub-sector was particularly hard hit by the economic downturn that began in late 2014 with a collapse in oil prices. Between 2013 and 2019, employment fell by 21,200, or 29%, in the services sub-sector. Then, as measures to prevent the spread of COVID-19 were implemented in March 2020, the employment situation deteriorated further. As demand for oil and natural gas declined significantly, it contributed to further job losses. In 2020, employment in the oil and gas services sub-sector in Alberta fell by another 12%--a loss of 6,300 jobs.[14]

Based on interviews with companies and industry associations, the SRP funding announced in 2020 helped to stabilize the sub-sector — sustaining jobs that may have been lost otherwise. The ongoing certainty of funding for well closure activities until the end of 2022, is providing predictability for the sub-sector. With employment increasing by 8,300 (23%) between May 2021 and July 2021, worker shortages have become a concern as the unemployment rate has declined to just 4.1%, as shown in Figure 3.

Figure 3: Labour force characteristics for Alberta's oil and gas services sub-sector, January 2020 to July 2021



Source: Statistics Canada Labour Force Survey and PetroLMI, three-month moving averages

[13] Petroleum Services Association of Canada (2019). Well Closure Workforce Study.

[14] Statistics Canada Labour Force Survey and PetroLMI, annual averages

Alberta's Site Rehabilitation Program by the numbers

49,359 APPLICATIONS SUBMITTED

49,068 APPLICATIONS PROCESSED

(covering grant periods 1 through 6)

22,951 APPLICATIONS APPROVED

- **61.8%** of approved applications for abandonment work, representing $281.8 million in funding
- **38.2 %** of approved applications for remediation and reclamation work (including Phase 1 and 2 environmental site assessments), representing $174.2 million in funding

$456M GRANT FUNDING APPROVED

- allocated to more than 500 Alberta-based companies

2,195 JOBS CREATED TO DATE

(as estimated by oilfield services companies in their applications)

To view the map of approved well, facility and pipeline applications, see here

Source: Government of Alberta. "Site rehabilitation Program – grant and funding status." https://www.alberta.ca/site-rehabilitation-program-grant-funding-status.aspx (accessed August 10, 2021)

Supporting Indigenous involvement and the journey to reconciliation

In August 2020, the Alberta government announced Indigenous support as part of its commitment to ensuring Indigenous businesses and communities play a role in Alberta's post-pandemic energy strategy. If a producer contracts an Indigenous oilfield service company to conduct closure work, it can receive up to 100% of the project value. A list of Indigenous contractors has been made available on the SRP website. Indigenous companies are also able to get advice and support with their application through the government's dedicated Indigenous liaison, as well as from the Indian Resource Council (IRC).

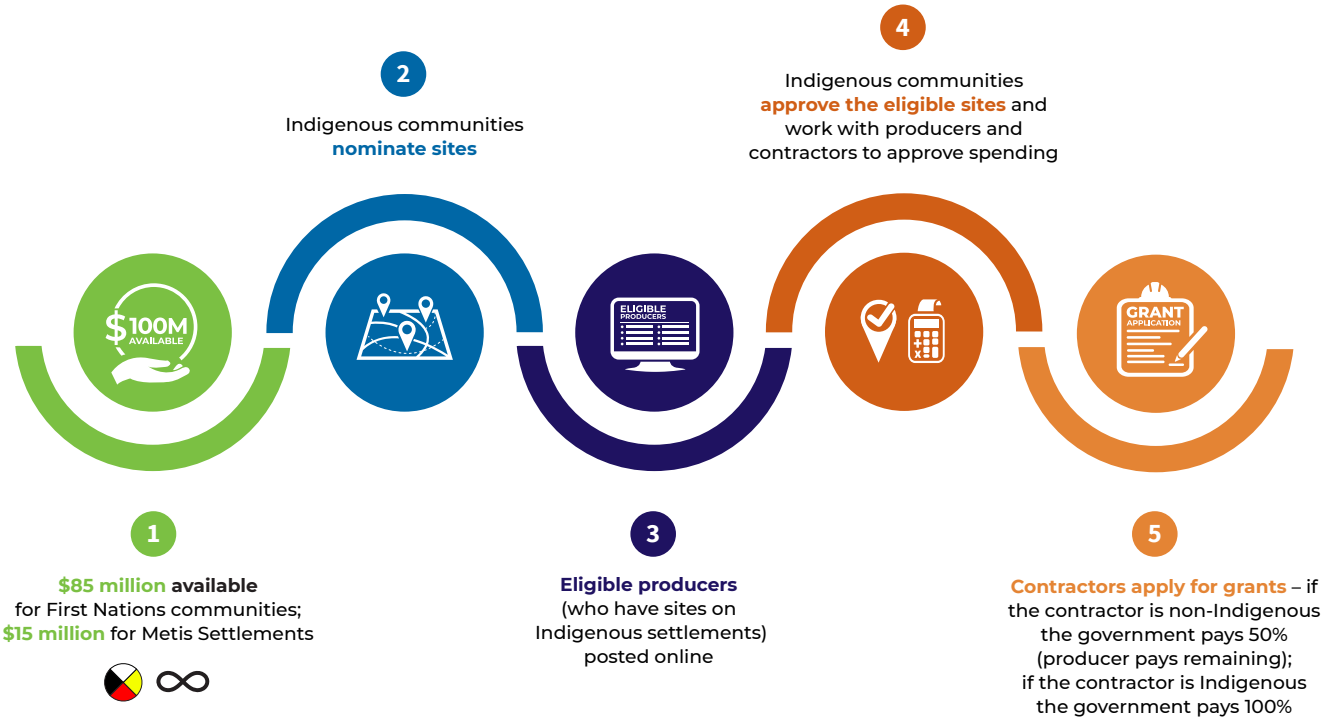
In addition, First Nations and Métis communities can nominate sites for closure on-reserve and Settlement, with $100 million available for closure activities within Indigenous communities in Alberta. Funding has been divided between eligible First Nations communities ($85 million) and Métis Settlements ($15 million). Lists of eligible producers associated with First Nations and Métis Settlements have also been posted.

First Nations communities and Métis Settlements approve the eligible sites for closure work, and work with producers and contractors to approve the spending. They can't apply to the Government of Alberta for the funding, so, once approved, contractors apply for the SRP grants.

"The Site Rehabilitation Program and well closure work is an opportunity for our Indigenous communities to continue our collaboration with industry in responsible energy development. With the SRP there is an opportunity to create new companies, continue to build capacity, learn from one another and develop new partnerships that will benefit us all."

- ***Steve Saddleback**, Director of National Business Centre of Excellence, Indian Resource Council*

Figure 4: SRP funding process for First Nations and Métis settlements



SPOTLIGHT

Arrowhead Abandonments: Building the Indigenous workforce for well closures

Arrowhead Abandonments was formed two years ago when brothers Clayton and Kevin Heck decided to combine their skills and knowledge of engineering, supervision and downhole tools into a project management and downhole abandonment company that would focus on Indigenous employment. The Hecks, from the Peepeekisis Cree Nation close to Fort Qu'Appelle, Saskatchewan, are now based in Brooks, Alberta. Actively engaged in both the SRP and a similar program, the Site Acceleration Program, in Saskatchewan, they have seen the benefits first-hand. "Our revenue has increased, and we've had to double our workforce and contractor population," says Chief Operating Officer Clayton Heck.

Starting in **Grant Period 4 of the SRP** there has been a focus on conducting business with Indigenous oilfield service providers. Heck believes that incentivizing businesses to contract Indigenous businesses is further advancing reconciliation through cooperation, respect and meaningful inclusion.

"Indigenous businesses hire other Indigenous businesses and workers, and so when you work with one, there is the potential to work with many," he says.

Arrowhead Abandonments is a primary contractor with many Indigenous communities already, among them the Frog Lake First Nation and the Peavine Métis Settlement in Alberta and White Bear First Nation in Saskatchewan. As a result, the company can tap into its extensive network of Indigenous businesses and workers across both provinces.

"We are always actively seeking working relationships with new Indigenous services. We use Band-owned businesses first, and then outside Indigenous contractors and Indigenous-owned service rigs second and make sure they have the necessary pre-qualifications and training to do the work," says Heck.

Despite their commitment to Indigenous-first, Heck acknowledges that one of his biggest hiring challenges is finding qualified workers along with the long lead-time it can take to build up a qualified Indigenous workforce. To that end, Arrowhead has been working with the Indian Resources Council (IRC) to conduct community employment training and skills readiness. Heck is also ensuring opportunities for mentorship and on-the-job training are built into his approach. For example, instead of sending out a two-person crew, he sends three, providing the 'greener' third worker with the opportunity to learn from the other more experienced two.

An additional challenge, Heck notes, is that due to the nature of work, his workers need to be willing to work off-Nations and he estimates "about a quarter to half" are not willing to do so.

While Heck says the government programs have been beneficial in the shorter-term, these programs come and go and the real long-term opportunity will be with the OWA.

"We're looking at the OWA closely and hope to build our relationship with them and other Indigenous groups in this necessary work," he says.

Brothers Clayton and Kevin Heck of Arrowhead Abandonments presenting at an Indigenous Employment conference.

Diversifying workforce skills

Well closure activities are providing oil and gas rig workers with an opportunity to diversify their skills. Closure activities use many of the same skill sets as drilling and completions work and moving workers between rig types can help to mitigate the cyclicality of services employment. A caveat, however, as noted by Melissa MacLeod, Team Lead HR & Personnel at Precision Well Servicing, is that these transfers can be challenging.

"Services rig work involves slightly different working conditions, where the gained experience working on a drilling rig doesn't immediately transfer over. We've also experienced a loss of skilled workers, which has resulted in loss of intangible knowledge built on years of specific service rig experience. So, there is a need for troubleshooting experience that is specific to a services line. All this means more on-the-job training and industry certification that are required to better prepare workers for the differences, or the transferability success rate will be low. We're invested in providing the training required for people to be successful," she adds.

Repurposing infrastructure for renewable energy

Looking beyond the benefits of the immediate well closure work occurring in Alberta, there appears to be an opportunity to repurpose a portion of these aging assets into production again in support of renewable energy development. Increasingly, entities around the world, including the World Economic Council, are calling for cross-sector collaboration to look at "the value of assets that have supported fossil fuel production…and how they can be repurposed to produce green energy that supports the world energy transition."[15] In particular, emerging industry sectors like hydrogen, lithium and geothermal hold promise to repurpose orphaned site infrastructure and the activities will require workers with the same skills as those in site closure work. While oil and gas commodities will continue to be a part of the energy mix, the addition of other energy sources as part of the energy transition will ensure that Canadian oil and gas workers, the businesses that support them, and the existing assets, have new opportunities to remain in the mix, too.

Advancing responsible resource development

Lastly, well closure activities highlight the government and energy industry's commitment to managing the full life-cycle of their energy assets, and to responsible resource development. The industry "can and will deal with its inactive and orphan wells safely and efficiently," says Lars DePauw with the OWA. "It's just a question of how quickly."

RenuWell Energy Solutions: Turning Liabilities into Assets

What's old is new again in the hands of RenuWell Energy Solutions. The Alberta company is founded on a novel idea: reusing abandoned wells as brownfield sites for solar energy development. With all the necessary infrastructure already in place — like access roads, graded well pads and electrical infrastructure — RenuWell Founder and President Keith Hirsche has found a way to create new opportunities without further environmental disturbance. "We see this as a new pathway that can help solve the problem of what to do with these sites, while creating new and necessary jobs and skills," he says.

RenuWell has partnered with Iron and Earth, a worker-led non-profit organization to provide education and training for oil and gas trade workers to prepare them for roles in renewable energy. Retraining and upskilling is available through Medicine Hat College.

"If we can transfer the skills of displaced or unemployed industry workers, we have the potential to be world leaders in the energy transition," says Hirsche. For example, electricians have transferable skills that make them particularly well-suited for work in solar energy development. Likewise, the same construction and project management expertise needed to clean-up a well site, is also required to retrofit that site for another purpose.

RenuWell is currently piloting a solar development project on an old oil and gas site in southern Alberta in partnership with the Municipal District of Taber, the Municipal Climate Change Action Centre (MCCAC) Irrigation Canal Power Co-op (IRRICAN), Canadian Solar Inc. and SkyFire Energy. Hirsche estimates that approximately 10% of Alberta's abandoned well sites are viable for conversion to solar development.

[15] World Energy Council (2019). *Innovation Insights Brief: Energy Infrastructure: Affordability Enabler or Decarbonisation Constraint?*

3. CHALLENGES

While there are opportunities related to well closure activities and the SRP, there are also challenges as identified in interviews and secondary research. These included the long lead time required to conduct remediation and reclamation work at many well sites; the labour supply gap created by workers leaving the industry and prospective workers choosing not to work in the industry; and the need to strengthen the capacity of Indigenous communities so they can fully participate in the funding and employment opportunities.

Timelines for some activities exceed program duration

Depending on the circumstances of each well site, it can take over five years for the site to re-vegetate and be ready for the detailed site assessment which is required for a reclamation certificate application and completion of the closure process.[16] The SRP's 2.5 year time frame for funding and work completion has sometimes spurred applicants to focus on shorter-term activities, specifically, the well abandonment and decommissioning stages (which are much faster than remediation and reclamation) or on 'easy to reclaim' wells. The Canadian Land Reclamation Association (CLRA) has been vocal in pointing out that 65% of the work funded under the SRP has gone to abandonment and reclamation has not received as much focus. In a letter to Alberta Energy, the CLRA expressed its concern "that the focus of the Site Rehabilitation Program on the abandonment of additional wellbores across the province does nothing to get leased and inactive well site land rehabilitated and back to the original landowner, as per the expectations of the Federal Government or taxpayers. This will lead to a growing inventory of inactive and abandoned well count throughout the province without reducing the environmental liability in place."[17] Given that the reclamation stage is the most environmentally significant aspect of well closure, shorter-term programs are not ideally suited to addressing some of the longer-term issues.

"Our members are concerned that the SRP program doesn't have enough emphasis on land reclamation activities. The perception is that the majority of funding is going to downhole abandonment."

*- **Kelly Zadko**, President – Alberta Chapter, Canadian Land Reclamation Association*

Workers leaving the sector are creating skills gaps

With employment in Alberta's oil and gas services sub-sector stabilizing, (see Figure 3) demand for skilled and experienced workers is increasing. Many services companies report that finding workers with intermediate level experience (3-7 years) has become particularly challenging. "The gap in intermediate-level experience coincides exactly with the six-year downtown," says Mark Ashton, President at 360 Energy Liability Management, a Calgary-based environmental services firm. "Also, intermediate-level workers are generally at the stage of their life where they're looking to settle down, start families, buy houses and need more stability than the oil and gas industry is perceived to provide."

Challenges attracting youth and new entrants to work in the oil and gas industry

Further still, are the challenges attracting new workers to the industry, in part due to a perception that there is a lack of innovation, poor environmental performance and that it remains their 'grandfather's energy industry'. A lack of employment stability with the industry's cyclical history of expansions and contractions is a further deterrent. To that point, a December 2020 study by the Mining Industry Human Resources Council surveyed 3,000 Canadian youth aged 15-30 on how likely they were to consider working in mining as well as a variety of other sectors. While the mining industry had the least appeal with 70% of respondents saying they probably or definitely would not consider working in the sector, the oil and gas industry was not far behind at 67%.[18] Likewise, a recent study by the Governance & Accountability Institute[19] showed that 40% of millennials would be willing to take a pay cut to work for an environmentally responsible employer and 40% already selected their employer on this basis, compared to just 17% of baby boomers. Students are not pursuing diplomas or degrees in core oil and gas disciplines — like petroleum engineering, geology and geophysics — at the same rate they used to at Canadian

[16] Orphan Well Association. *"Reclamation."* https://www.orphanwell.ca/land-owners/reclamation

[17] Kelly Zadko. *"Letter to Sonja Savage." Canadian Land Reclamation Association. 20 July 2020*, https://static1.squarespace.com/static/5977ae4ef14aa1a84a5f2bad/t/5f174da4602ac417e1110278/1595362725020/CLRA+SRP+Response+July+2020.pdf

[18] Mining Industry Human Resources Council (2021). *Mining Year in Review: National Outlook 2021. Page 20.*

[19] Governance and Accountability Institute. *"Millennials Really Do Want To Work for Environmentally-Sustainable Companies, According to a New Survey of Large Company Employees." 23 Feb 2019*, https://www.ga-institute.com/newsletter/press-release/article/millennials-really-do-want-to-work-for-environmentally-sustainable-companies-according-to-a-new-su.html

post-secondary institutions. The geology program at the University of Alberta, for instance, saw its enrollment numbers drop from 179 in 2012, to 28 in 2020 alone,[20] and the University of Calgary recently suspended its oil and gas engineering degree program due to declining demand.[21] As well, graduates in disciplines in demand across multiple industries are choosing work in areas which they perceive to have more stability than oil and gas, like agriculture.

Barriers to building capacity with Indigenous communities

While the SRP encourages more Indigenous participation, Indigenous Peoples face a unique barrier when seeking work in the energy sector – access to post-secondary education and training, which is often not available in remote communities and requires them to leave or travel long distances. This can be a deterrent to participation and can also create cultural barriers between those who leave the community and those who do not.[22] Workplace training, mentoring and employment programs, such as apprenticeships, alongside supporting Indigenous entrepreneurship, help to build capacity.

Administrative complexity challenging for smaller companies

Several companies interviewed for this report indicated the administrative requirements associated with the SRP were particularly onerous for smaller organizations. "A good chunk of our additional headcount resulting from the SRP has been in administration," says Mark Ashton, President with 360 Energy Liability Management. "The program has a lot of administrative requirements associated with the application, granting, invoicing and reporting for funding, and so a lot of our hiring has actually been for office staff in administration and accounting to manage the work involved."

The Indian Resource Council (IRC)

advocates on behalf of First Nations for greater management and control of their natural resources. The IRC supports capacity building, employment programs, education and training to help get members — particularly youth — interested in careers in energy. "I see our role as connecting the dots between communities and other players in responsible resource development," says Steve Saddleback, National Director – Business Centre of Excellence, IRC. The IRC has engaged with its membership on the SRP program and is working alongside communities to help them participate in the program. This has included helping communities nominate on-reserve sites for well closure — including application support — and running courses to train members for careers in well site abandonment and reclamation.[23] Saddleback says "CEOs are literally waiting outside the door to hire people as soon as they graduate from the program." He says over 35 First Nations have well closure activities happening on their lands, and over 50% of member communities have submitted applications.

[20] Carter Haydu. *"COVID-19 travel restrictions hit post-secondary enrollment from international students." Daily Oil Bulletin. 20 Oct 2020.*
[21] Tony Seskus. *"University of Calgary hits pause on bachelor's program in oil and gas engineering." CBC, 8 July 2021.*
[22] PetroLMI (2020). *Going Beyond: Supporting Indigenous Employment in Canada's Energy Industry Through a Pandemic and Economic Challenges.*
[23] Indian Resource Council. *"Interested in a career in oil and gas wellsite reclamation?"* http://irccanada.ca/press-release/site-rehabilitation-program-training/

4. CAREER OPPORTUNITIES IN WELL CLOSURES

There are many different opportunities for employment in the abandonment, decommissioning, remediation and reclamation of a well site. A recent report by the Petroleum Services Association of Canada (PSAC) found that between 35 to 50 services employing 41-57 workers are needed in the closure of a single well. Typical services include trucking, site inspection, wireline operations, downhole tools, service rigs, bulldozing and excavating, among many others. Figures 5 and 6 below show the workforce breakdown by stage and service type, along with key activities and occupations in greater detail.

Figure 5: Workforce and services breakdown, well closure

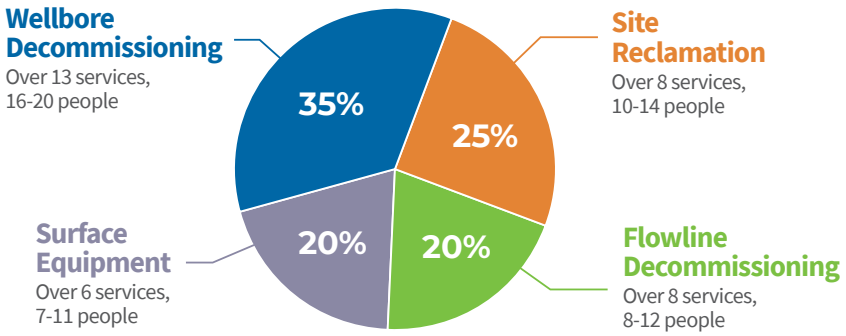


Figure 6: Services by closure stage

Wellbore Decommissioning over 13 service types

File and AFE Review, Site Inspection, Equipment Rental, Service Rig Services, Water Truck Services, Chemicals, Picker/Crane Truck Services, Trucking and Hauling, Wireline Operations, Downhole Tools, Wellsite Supervision, Medic, Water Jet Casing Cut and related

Site Reclamation over 8 service types

Bulldozer, Excavator, Trucking, Reseeding, Reclamation Supervision, Repair Fencing, Environmental Review, Regulatory Filings Work

Flowline Decommissioning over 8 service lines

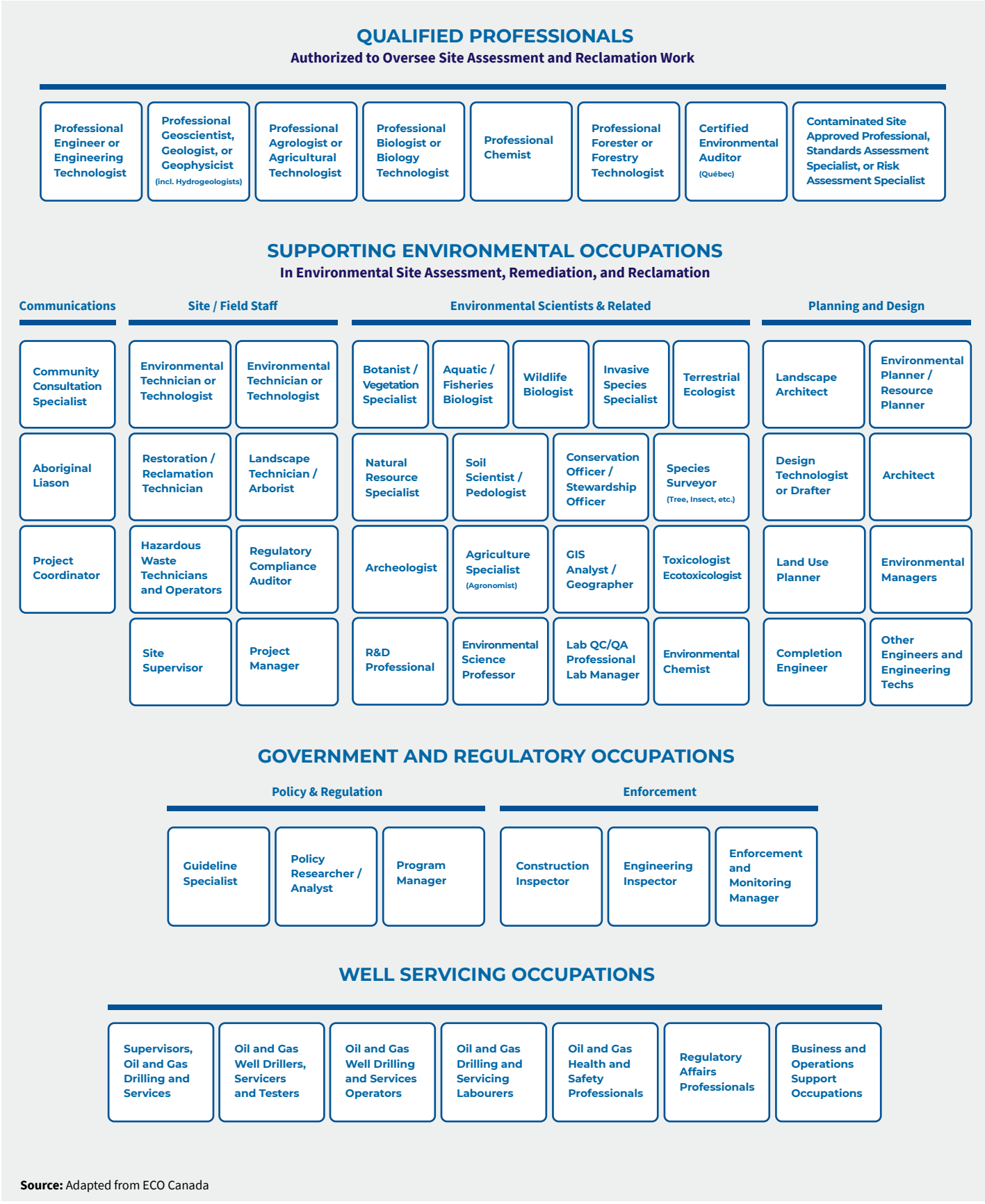
Scope of Work and Cost Estimate, Site Inspection, Supervision, Pig Pipeline Cleaning Crew, Blowdown Tank, Compression Services, Riser Cut & Plug, License Amendment

Surface Equipment over 6 service types

Scope of Work and Cost Estimate, Site Inspection, Supervision, Disposal and Hauling Crew, Excavator, Trucking

Source: Adapted from the Petroleum Services Association of Canada

Figure 7: Key occupational categories—well closure



Source: Adapted from ECO Canada

Environmental employment on the rise due to well closures

According to ECO Canada, with the current level of well closure initiatives, from 2021 to 2030 environmental employment in Alberta is expected to increase from 105,370 to 124,180 workers, or nearly 18%. If new initiatives are undertaken, employment could increase further.

Employment in environmental work related to well servicing for site assessment and reclamation is forecasted to increase by 9% from 2021 to 2025, then plateau through 2029. Occupations will be impacted by the activity differently:

In 2019, the direct workforce accounted for more than 187,600 workers.

- For oil and gas drilling and services contractors and supervisors (National Occupational Classification (NOC) 8222) employment is forecast to rise from 1,310 in 2021 to 1,561 in 2030 (or 19%).
- For oil and gas well drillers, servicers, testers and related workers (NOC 8232) employment is forecast to rise from 317 in 2021 to 343 in 2030 (or 8.2%).
- For oil and gas drilling, servicing and related labourers (NOC 8615) employment is forecast to rise from 86 in 2021 to 94 in 2030 (or 9.3%).

In environmental employment related to well-servicing administrative and support, waste management and remediation services, the forecast is:

- For oil and gas drilling and services contractors and supervisors (NOC 8222) employment rises from 105 in 2021 to 123 in 2030 (or 17%).
- For oil and gas well drillers, servicers, testers and related workers (NOC 8232) employment rises from 112 in 2021 to 138 in 2030 (or 23%).
- For oil and gas drilling, servicing and related labourers (NOC 8615) employment rises from 34 in 2021 to 44 in 2030 (or 29%).

Interested in learning more about a career in environmental services?

Read this blog post about a day in the life of an Environmental Technician.

5. IN-DEMAND OCCUPATIONS AND SKILLS REQUIRED TO WORK IN WELL CLOSURE ACTIVITIES

The table below highlights the occupations needed for well closure activity in Alberta.

Table 1: Top forecasted in-demand occupations for well closure activities

Occupation	Job Description	Education Level
Agrologist	Agrologists study commercial and native plant communities and livestock production to improve yields, while at the same time advocating sustainable farming and ranching methods. They may also study farm, urban and wilderness interfaces to find solutions to the challenge of competing demands on the land base, for example, wildlife habitat, timber, recreation, urban expansion and livestock. Most agrologists work as members of a team alongside other scientists and agriculture experts.	In most cases, the minimum education requirement to work as an agrologist is a university undergraduate degree. The following programs are most applicable: agronomy, soil science, agriculture, natural resource management, environmental management.
Drilling and Service Rig Labourer (also known as leasehand, floorhand, roughneck, roustabout, labourer)	This occupation is considered entry-level, and workers generally have a positive attitude, a willingness to learn and a strong work ethic—and are physically strong, too. In this job, workers learn the ropes. They assist operators on drilling rigs and service rigs with general labour, such as cleaning equipment to ensure it is properly functioning.	High school graduation is not required for this occupation but preferred by some employers. Experience as a labourer, working around heavy machinery and mechanical aptitude are assets.
Drilling and Service Rig Operator (also known as motorhand, derrickhand, driller, rig technician)	Drilling and service rig operators operate and maintain drilling equipment at a well site. Service rigs are used for well closure work and are brought to a site after a drilling rig's work is complete to support the well's ongoing production. Service rigs are also used to shut in a well, repair a well or do maintenance to enhance the well's production. A service rig operator may be at a well site for days or weeks, returning for ongoing maintenance or to shut-in production. Supervisory roles in this field are particularly sought after.	High school graduation is not required. However, previous experience in an entry-level labourer role, such as floorhand, is typically required. Service rig contractors have structured on-the-job training and can participate in a Service Rig Competency Program.
Environmental Advisor	With broad technical experience in environmental issues, planning, fisheries and regulatory compliance, environmental advisors conduct research and risk assessments, prepare reports, and provide advice for meeting regulatory requirements and standards. They can specialize in soil, air, water and land-related issues and are familiar with sampling, monitoring, analysis and testing tools.	This role requires an undergraduate degree or diploma in environmental or geological sciences. A post-graduate degree may be considered an asset.

Occupation	Job Description	Education Level
Environmental Engineer	Environmental engineers design and supervise a variety of industrial activities and processes in oil and gas to prevent, control or remediate potential environmental impacts. They can specialize in a specific area such as air, water or waste management. Environmental auditing, testing and regulatory compliance and reporting are key activities in this role. Work may include water and waste treatment, site investigation and remediation where environmental site assessments are completed, and pollution control. They participate in or lead regulatory processes, such as environmental impact assessments, that review facilities or field operations to ensure compliance with government regulations and permitting conditions.	A post-secondary degree in environmental engineering is typically required, but related disciplines such as agrology, biology, geology and chemistry all can lead to this profession as well. In some roles, a graduate degree in a related engineering discipline is preferred.
Environmental Technician	Environmental technicians undertake field or laboratory activities to investigate, monitor and remediate sites where the presence of hydrocarbons (e.g., diesel, gasoline, crude oil), salts or metals may have impacted soil, air and/or water quality. They may also undertake similar activities in non-hydrocarbon related sites. They are actively involved at the planning stages of projects by providing environmental information regarding existing soil, air and water quality conditions. This occupation also contributes to surveys and monitoring programs of the environment to identify potential impacts. This role tends to be heavily focused on prevention and abatement.	A two-year post-secondary diploma is typically required for a technician role. A post-secondary diploma or degree in environmental, geoscience technology or health and safety may be required by some companies to advance to a technologist role.
Health and Safety Specialist (also known as Emergency Response Plan Planner, Medic, Safety Training Specialist, Process Safety Engineer, Industrial Medic, Safety Advisor, Paramedic)	Health and safety specialists review, evaluate and analyze work environments and design programs and procedures to control, eliminate and prevent disease or injury caused by chemical, physical and biological agents or ergonomic factors. They have expertise in applicable regulations, codes and industry best practices. They may conduct inspections and enforce adherence to laws and regulations governing the health and safety of individuals.	A post-secondary degree in engineering or a technical diploma/certificate in a medical/nursing discipline is typically required, as well as experience in the industry and training in emergency response management.
Hydrologist	Hydrologists study the dynamic nature of water, for example, the forces that cause water to move in the environment and what effects this movement has. They examine issues such as precipitation pathways, the relationship between rainfall and runoff, and the effects of precipitation on soils and various landscapes. They are also involved in projects to determine and promote sustainable usage of water sources to conserve supplies. Hydrologists play a critical role in protecting Canada's water resources.	A post-secondary degree in one of these related disciplines: aquaculture, environmental science, geology, hydrology, marine biology, soil science, terrain and water, water resources.
Reclamation Specialist	Reclamation specialists identify contaminated areas, develop reclamation plans, and inspect, monitor and evaluate reclamation projects. They also provide direction to ensure compliance with applicable federal and provincial environmental regulations.	A university undergraduate degree: environmental sciences, environmental engineering, earth sciences, agriculture, hydrogeology, forestry, geography, biology and chemistry.

Occupation	Job Description	Education Level
Regulatory Affairs Professional	Regulatory affairs professionals assist in the development and implementation of corporate regulatory strategy and policy and provide support for the resolution of issues within regulatory parameters. They coordinate and document internal regulatory processes, such as internal audits, inspections, license renewals and registrations.	A post-secondary diploma or degree in a relevant field, such as business, economics, engineering, finance, law, policy, environmental sciences, biology or geology/hydrogeology (or a related discipline) is typically required. Individuals tend to work in their field to gain experience and leverage this experience to move to regulatory roles later in their career.
Transport Truck Driver	The majority of transport truck drivers are bed truck operators who operate trucks designed with a flat deck, winch and pulleys that move rig buildings, derricks, matting and other oilfield equipment. They operate crawler-tractors equipped with large front blades to move obstacles and back rippers to tear up terrain. They also clear and level dirt, sand, rock and gravel on construction and mining sites.	A high school diploma (or equivalent) is typically required.
Well Services Labourer (also known as cementing helper, fracturing operator trainee, rigger, snubbing services assistant operator, well testing assistant, wireline operator trainee, tubing helper, production testing trainee, perforator helper, well puller helper, well treatment helper)	Well services labourers are an entry-level role into a variety of well services occupations. Well services labourers check and load tools and equipment and prepare worksites. They inspect, clean, repair and maintain tools and vehicles and may drive trucks or other equipment. These workers also provide general assistance to well service operators.	A high school diploma (or equivalent) is typically preferred, and basic mechanical skills are an asset.
Wetland Biologist	Wetland specialists manage and protect wetland resources. They are responsible for implementing wetland conversation techniques, enforcing regulations, and providing consultation on construction projects in wetland sensitive areas.	A post-secondary degree in one of these programs is most applicable: wildlife biology, conservation biology, zoology, ecology, fish and wildlife, environmental science and habitat restoration.

"Our Canadian well service segment is experiencing an increase in demand driven in part by the SRP, but also due to a broad-based increase in customer demand. We're looking at stability programs like our Stability-Plus program which offers continuous pay, as well as other programs such as referral bonuses, retention bonuses, increasing competency pay and upskilling workers from within our company and industry, including new entrants. Labour has gotten very tight, especially for floorhands and derrickhands."

*- **Melissa Macleod**, Team Lead, HR & Personnel, Precision Well Servicing*

Interested in learning more about careers in well servicing?

Get a glimpse into a day in the life of a well services labourer and the key factors for success.

6. WHERE DO WE GO FROM HERE?

With the Government of Alberta, the Government of Canada and the oil and gas industry work towards reducing the inventory of inactive and orphaned wells, managing their environmental impact and furthering economic prosperity and job stability, interviews and secondary research conducted for this report offered resources and best practices to support these initiatives.

Provide a clear path forward in a post-SRP world

Alberta's SRP is targeted to end March 2022, with all work to be completed by December 2022. But what happens next? Alberta's new Liability Management Framework, the expanded role of the OWA, as well as a potential extension to the SRP could provide the industry and its workforce stability for years to come.

"We need to keep the momentum going to build a stronger skill set and labour market going forward, and to draw workers back – or engage new ones - in new and meaningful careers," says Mark Ashton, President, 360 Energy Liability Management.

A recent report by the Alberta Liabilities Disclosure Project (ALDP), estimates clean-up efforts could create a further 10,000 industry-funded jobs[25].

Promote environmental careers, particularly those which appeal to young workers

Changing technologies, including a digital transformation of the energy industry, are impacting occupations, requiring new skills and competencies and may be more appealing to a new generation of workers. So too are the growing environmental jobs in the energy industry. These young workers would benefit from being made aware of the opportunities to get out of the office and into nature and the strong link to the environmental goals driving the industry forward. World Economic Forum research into youth perspectives on energy transition found that 41% of youth indicated an employer's position on energy and environment are either a top or strong priority when determining career preferences.[26]

"While service companies may not be able to compete with producers on compensation, there are many other aspects of working for us that offer broad appeal," says Russel Orcutt, CEO, Summit Earth Services. "These include our sustainability values, our diverse projects and the opportunity to see programs through from start to completion."

More incentives for oil and gas producers to work with Indigenous services contractors

The SRP's focus on financial incentives and community initiatives to support more Indigenous involvement could prove to be a model to follow with future projects. In addition to the employment and business opportunities created for Indigenous communities, the energy industry can benefit from local Indigenous knowledge. While it remains too early to tell how successful this approach has been, more programs of this nature — supported by culturally appropriate training and mentorship — may prove to be an effective approach to supporting reconciliation efforts.

"Indigenous involvement in reclamation can be part of the journey to reconciliation, and at Summit we really see it as our duty to work with Indigenous communities and support mentorship, training and employment where we can."

*- **Russel Orcutt**, CEO, Summit Earth Services, Calgary, AB.*

Greater focus and incentivization on well site reclamation activities

With the majority of the current SRP funding supporting the well abandonment stage due to the shorter timelines, there is an opportunity to look at policy and future funding with a greater emphasis on land reclamation. "It's surface decommissioning and reclamation that is in the public eye, and we need better policy direction and incentives for this work to happen," says Orcutt.

As an example, while there are regulatory timelines guiding when abandonment work must be completed, there is no fixed timeline for reclamation work. The Canadian Land

[25] Emma Graney. *"Oil and gas well clean up can mean jobs boom for Alberta, group says." Globe and Mail, 30 June 2021.*

[26] World Economic Forum (2020). *Fostering Effective Energy Transition*.

Reclamation Association is one organization that has advocated for reclamation specialists to be added to industry advisory panels on well closure activities who can provide advice, expertise and help shape programs and policies.

Enhanced collaboration within the broader energy industry on repurposing infrastructure

As the world transitions to a lower carbon economy, other options for Canada's energy industry's assets beyond straight decommissioning and reclamation can be considered.

Policies aimed at optimizing and coordinating asset life-cycle planning and promoting cross-sector land and asset use is one approach. Hirsche with RenuWell estimates the average reclamation cost is approximately $40,000 per well in southern Alberta and even higher than that in northern Alberta, and it "can be reduced by 40-50% if a well site is converted to renewable energy development."

"While it's best to reclaim most sites to be as close as possible to their original condition, this approach can help solve the growing challenge of legacy oil and gas infrastructure with a proactive, clean-energy, community-oriented solution that turns liabilities into assets," says Hirsche.

Access road and well site that have been reclaimed and seeded

7. RESOURCES DIRECTORY

For information on the Alberta Site Rehabilitation Program

- Site Rehabilitation Program (SRP)

For information on Indigenous-specific resources/training/ programming:

- Aboriginal Futures
- Alberta Aboriginal Employment Training
- Canadian Council for Aboriginal Business
- Community Futures Treaty 7 Business Resources Group
- Indian Oil and Gas Canada
- Indian Resource Council
- Indigenous and Northern Affairs Canada
- Indigenous Resource Network
- North East Alberta Apprenticeship Initiative

General industry information, including occupational profiles

- Canadian Energy Regulator
- Canadian Association of Energy Contractors
- Canadian Association of Petroleum Producers
- ECO Canada
- Petroleum Services Association of Canada
- PetroLMI

Information on Reclamation

- Canadian Land Reclamation Association
- Orphan Well Association
- Pembina Institute — Landowner Resources

Alberta Colleges and Universities with Applicable Programs

- Lakeland College
- Northern Alberta Institute of Technology (NAIT)
- Northern Lights College
- Olds College
- Southern Alberta Institute of Technology (SAIT)
- University of Alberta
- University of Calgary

8. LIST OF FIGURES AND TABLES

Figures

Tables

9. ACKNOWLEDGEMENTS

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Photos courtesy of Arrowhead Abandonment, Canadian Association of Petroleum Producers, Canadian Association of Geophysical Contractors, CNOOC International Ltd., LNG Canada, Summit Earth Services, Syncrude Canada Ltd.

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About PetroLMI

The Petroleum Labour Market Information (PetroLMI) Division of Energy Safety Canada is your source for labour market information and trends in Canada's energy industry.

Careers in Oil + Gas is a PetroLMI initiative and is Canada's leading website for oil and gas labour market information and insights, as well as occupational tools and other resources for career and workforce planning.

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