

2017/18 and 2018/19 Orphan Site Reclamation Fund Annual Report

BC Oil and Gas Commission



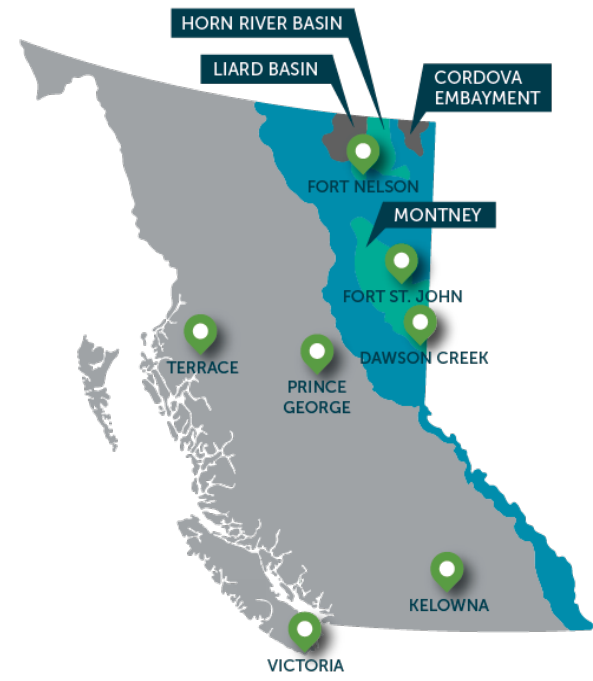
Table of Contents

About the BC Oil and Gas Commission	1
Orphan Site Reclamation Fund Overview	2
Industry Funding for Orphan Site Restoration	3
Chart: Orphan Wells as a Percentage of Total Wells	3
The Site Closure Process	4
Our Orphan Restoration Goals	5
Respecting Those Affected by Orphan Sites	5
Orphan Site Reclamation Fund Summary	6
Chart: Orphan Site Inventory	6
Orphan Site Reclamation Fund Spending Breakdown	7
Chart: Fiscal Year OSRF Program Spends	7
Chart: Total OSRF Expenditures by Fiscal Year	8
Table: 2018/19 Average Costs Per Well	8
Site Deactivation	8
Well Abandonment	8
Chart: Abandonment Progress and the Orphan Well Inventory	9
Site Decommissioning	10
Site Restoration	10
Site Administration	11
General Orphan Expenditures	11
Summary	12

About the BC Oil and Gas Commission

The BC Oil and Gas Commission (Commission) is the provincial regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission’s core services include reviewing and assessing applications for industry activity, consulting with First Nations, cooperating with partner agencies, and ensuring industry complies with provincial legislation and all regulatory requirements. The public interest is protected by ensuring public safety, respecting those affected by oil and gas activities, conserving the environment, and ensuring equitable participation in production.



Vision

Safe and responsible energy resource development for British Columbia.

Mission

We provide British Columbia with regulatory excellence in responsible energy resource development by:

- Protecting public safety,
- Safeguarding the environment, and
- Respecting those who are affected.

Values

Transparency is our commitment to be open and provide clear information on decisions, operations and actions.

Innovation is our commitment to learn, adapt, act and grow.

Integrity is our commitment to the principles of fairness, trust and accountability.

Respect is our commitment to listen, accept and value diverse perspectives.

Responsiveness is our commitment to listening and timely and meaningful action.

Orphan Site Reclamation Fund Overview

In British Columbia, oil and gas sites such as wells, facilities, pipelines and/or sites affected by oil and gas activities where the operator is insolvent or cannot be located may be designated as orphan sites by the BC Oil and Gas Commission.

Once a site has been designated an orphan, the Commission may use the Orphan Site Reclamation Fund (OSRF) to decommission and restore the site. The closure process provides assurance to stakeholders that the site has been restored in accordance with current standards and requirements, and that all known contamination risks or other hazards have been mitigated.

The Commission’s primary goal is to protect public safety and the environment, and work on orphan sites must first address these risks. Once site risks are assessed and mitigated, closure work considers planning for area-based efficiencies, the interests of impacted private land owners, the interests of impacted Indigenous communities, and stewardship goals (restoration of soils, plants and wildlife habitat).

The closure process for orphan sites is a multi-year process where some phases may take place concurrently, and in other instances, one or more phases must be complete before another phase can begin. A site that requires all work phases to be completed may take more time than a site that only requires decommissioning and surface reclamation (e.g. no equipment or contamination to address). The completion of certain phases must be coordinated, and sites will require continuous review and reprioritization.

For more information on the OSRF, and for a current list of orphan sites, please visit:

<https://bcogc.ca/public-zone/orphan-site-management>



Photo left:

An environmental consultant taking soil samples around a well centre after the excavation, cutting and capping of the wellbore.

Industry Funding for Orphan Site Restoration

The Commission's Comprehensive Liability Management Plan has been designed to ensure 100 percent of the cost of restoring oil and gas sites in B.C. continues to be paid for by industry.

The plan includes the introduction of the Orphan Levy, which replaced the former Orphan Tax. The new levy requires industry to fund up to \$15 million per year in orphan restoration work.

For more information on the Comprehensive Liability Management Plan, please visit the Commission's website:

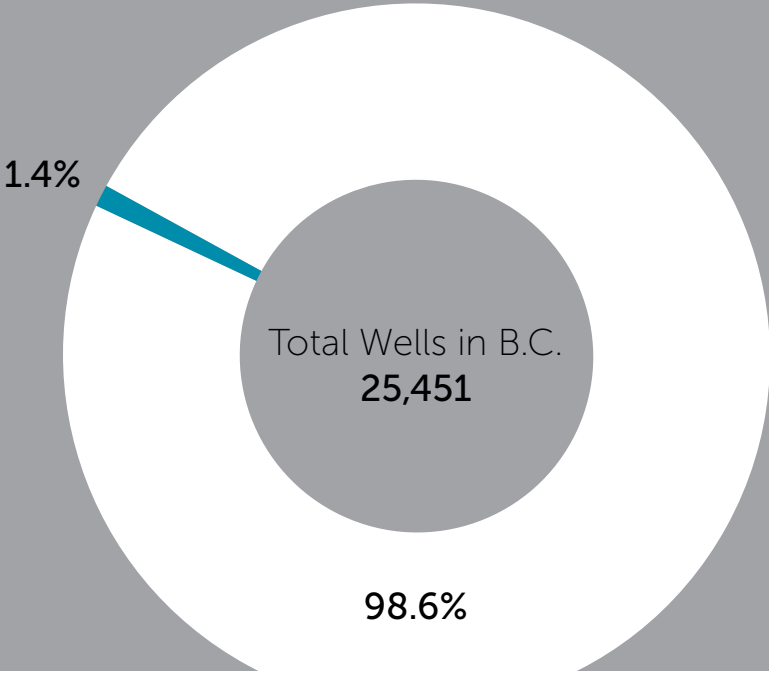
<https://bcogc.ca/comprehensive-liability-management-plan>

The Restoration Process

- 1. Site Deactivation:** The first step in achieving public and environmental safety is to ensure all wells, facilities, and pipelines are shut in, storage tanks are drained, and pipelines and facility piping are purged and depressurized.
- 2. Well Abandonment:** Orphan sites that have not been properly decommissioned require plugging (downhole abandonment) and cut and cap activities (surface abandonment), as part of the closure process. Well abandonment activities include the permanent plugging of the producing zone(s), and isolating porous formations within a well. This prevents production fluid and gasses from travelling up the wellbore to the surface or between formations.
- 3. Site Decommissioning:** Orphan sites with permitted surface and subsurface facilities require the safe removal and disposal of associated operating equipment prior to completing any intrusive soil and/or groundwater quality assessments. Decommissioning activities also include the removal of all facility flow lines, piles, concrete and debris that may also be on a site. Deactivated pipelines are removed to the site's boundary or to a depth suitable as to not impede land use, and are cut and capped below grade.

Orphan Wells as a Percentage of Total Wells

Wells Owned by a Viable Operator ●
Orphan Wells (346 Total) ●



Orphan wells make up just over **one per cent** of all oil and gas wells in British Columbia.

- 4. Investigation:** During this phase, the site undergoes intrusive soil and/or groundwater sampling to confirm if the soil, surface and groundwater quality meets the standards for final land use, or the site does not pose a significant risk to human health or the environment. Investigation at each site is subject to areas of potential environmental concern that are identified during a historical file review. Results of the investigation determine if the site is suitable for closure or if remediation is required.
- 5. Remediation:** If a site investigation identified contamination, then remediation is required prior to moving onto reclamation. Remediation may include the removal and transport of contaminated soil to a licensed facility for disposal, or treatment of the soil to reduce contaminants to concentrations less than the applicable provincial standards. Investigation and remediation activities must be overseen by a practicing professional.
- 6. Reclamation:** In the final phase of site restoration, a site is reclaimed to meet appropriate land use productivity standards. Surface reclamation commonly includes surface contouring, topsoil replacement, revegetation, and monitoring to return the site to acceptable pre-disturbance conditions.

Our Orphan Restoration Goals

It is the Commission’s mission to protect public safety and the environment. To meet this mission, we plan to deactivate pipelines and abandon high priority wells within one year of orphan designation. This ensures orphan infrastructure is left in a safe state, providing the Commission with the flexibility to plan large area-based decommissioning and restoration programs to maximize efficiencies and rates of closure.

Barring any unforeseen increases in the orphan population, the execution of these large programs will allow us to complete restoration work on orphan sites within 10 years of their designation. Monitoring and maintenance may continue to be completed prior to final closure.



Photo left:
Inactive and abandoned oil and gas sites like this one are designated orphans if the operator is insolvent or cannot be located. Just over one per cent of B.C. wells are orphans.

Respecting Those Affected by Orphan Sites

In the course of developing natural resources, an operator may become insolvent. In these cases, site maintenance, safety and restoration become the Commission’s priority. Land owners are not responsible for managing or maintaining orphan sites. Land owners can apply for compensation for outstanding rental payments or land disturbances in relation to the surface lease of an orphan site on their land.

Through the 2017/18 and 2018/19 fiscal years, the Commission paid \$808,000 in industry-funded compensation to affected land owners for missed rental payments.

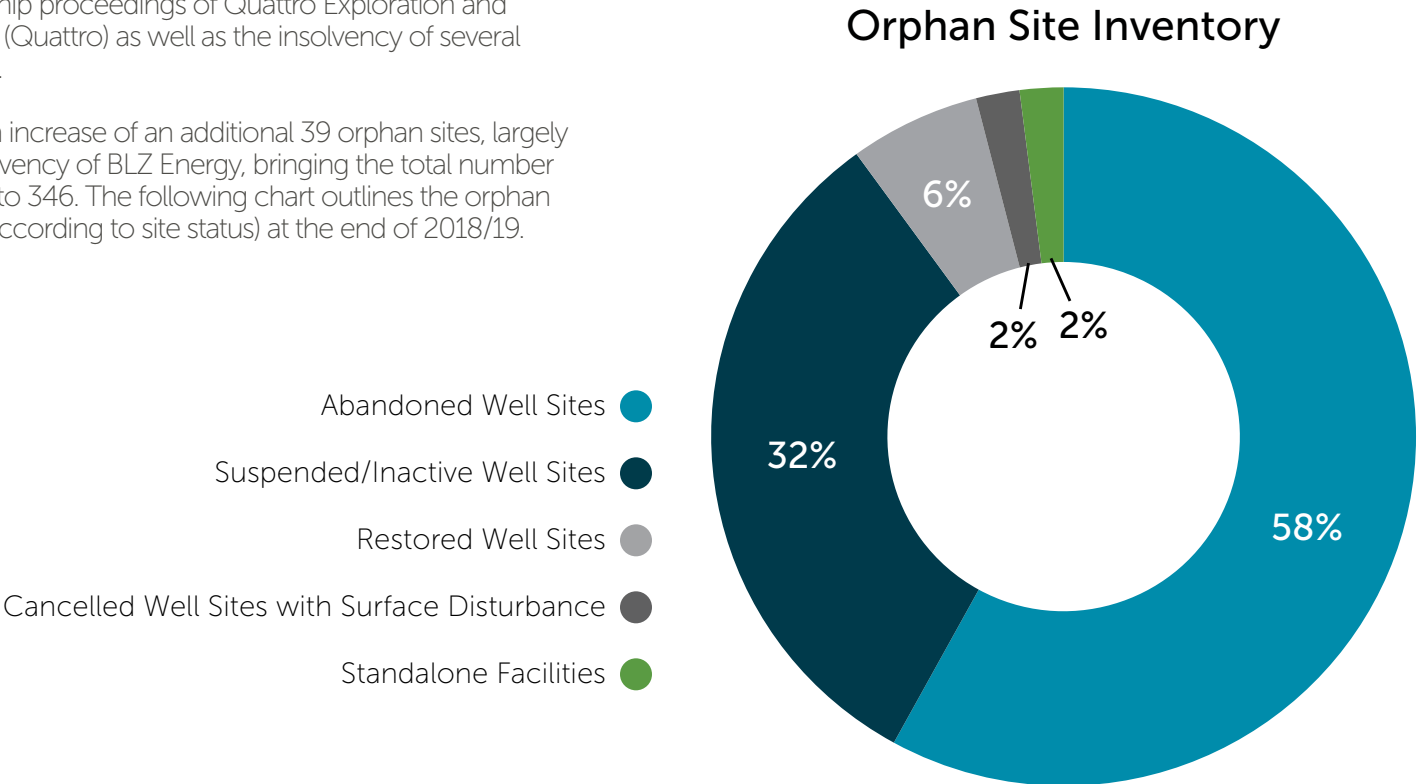
The Commission is also partnering with Indigenous communities on orphan site restoration. The overall objective of these partnerships is to support First Nations’ interests to share knowledge of restoration successes as well as areas for improvement, and provide opportunities for direct community member participation and employment in the restoration process.

Projects have been launched with Sauleau, Doig River, and Fort Nelson First Nations, and discussions have also been held with Halfway River First Nations. The Commission is looking to hold additional discussions this year with other communities interested in the program, and we are currently working to formulate a strategy for increased opportunities and participation in reclamation.

Orphan Site Reclamation Fund Summary

At the end of the 2017/18 fiscal year, there were 307 orphan sites (including well and standalone facility sites). The increase in orphans (96) during that fiscal year was due to the conclusion of the receivership proceedings of Quattro Exploration and Production Ltd. (Quattro) as well as the insolvency of several small operators.

2018/19 saw an increase of an additional 39 orphan sites, largely due to the insolvency of BLZ Energy, bringing the total number of orphan sites to 346. The following chart outlines the orphan site inventory (according to site status) at the end of 2018/19.



During the 2017/18 fiscal year, the OSRF spent \$5.69 million on decommissioning and restoration work. This increased to a spend of \$13.15 million in 2018/19.

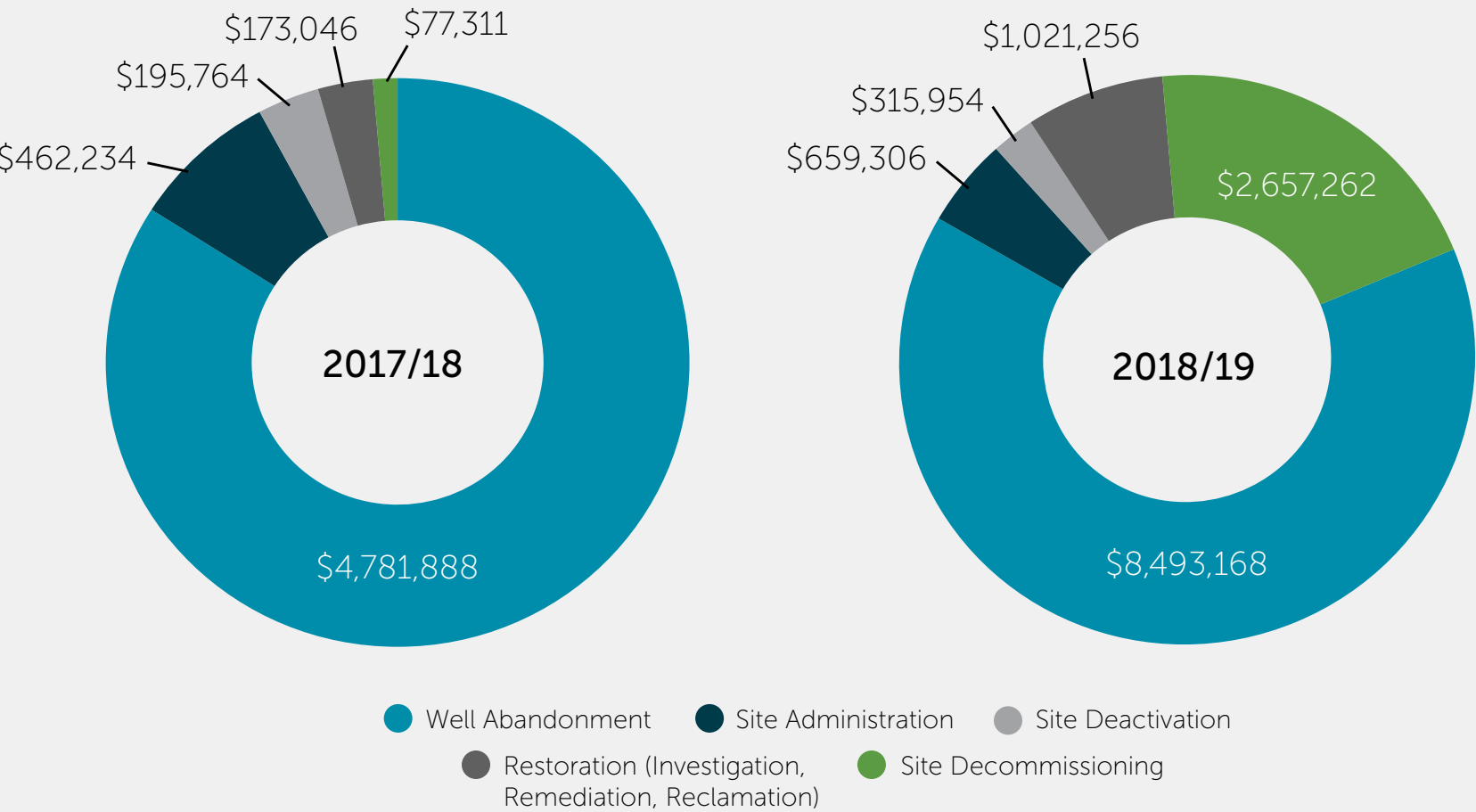
The focus of the 2017/18 and 2018/19 work plans were to complete work that was prioritized for the protection of public safety and the environment, but also to incorporate surrounding orphan infrastructure into large, area-based programs. This involved abandoning high-priority wells, draining tanks and lines on site, pigging and purging pipelines, and abandoning other near-by wells and facility equipment.

Orphan Site Reclamation Fund Spending Breakdown

Work on orphan sites is completed under the restoration process phases detailed on page 5, and site administration, which includes site maintenance, land owner compensation, and general/administrative expenditures. Spending in the 2017/18 and 2018/19 fiscal years have been broken down below.



Fiscal Year OSRF Program Spends



Total OSRF Expenditures by Fiscal Year

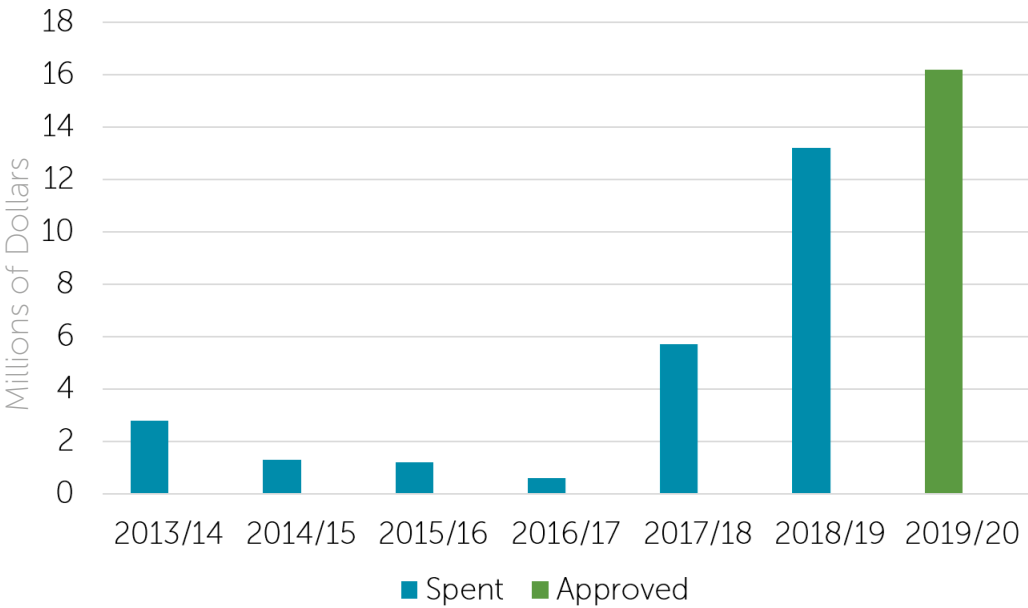


Chart left: Due to the large influx of orphan sites in the 2016/17 and 2017/18 fiscal years, spending in the OSRF was focused on well abandonment and decommissioning phases. This allows for infrastructure to be removed and provides for increased opportunities to focus on restoration phases in the coming years.

Site Deactivation

In 2017/18, 67 inactive pipeline segments and sites located in the Peace River Block (PRB) were deactivated and safe-stated.

In 2018/19, 76 inactive pipeline segments and sites located in the PRB and Beaver River fields were deactivated and safe-stated.

On average, the deactivation of a natural gas pipeline costs approximately \$5,000. However, costs will vary depending on location, size and amount of fluids.

Of the sites designated late fiscal year 2018/19, pipelines requiring deactivation will be addressed during fiscal 2019/20.

Well Abandonment

In 2017/18, 44 wells located in the Peace River Block (PRB) were downhole abandoned. Of these, 30 were cut and capped, while the remainder were to be monitored before cut and cap. Efficiencies were accomplished by targeting all wells requiring abandonment within the same field.

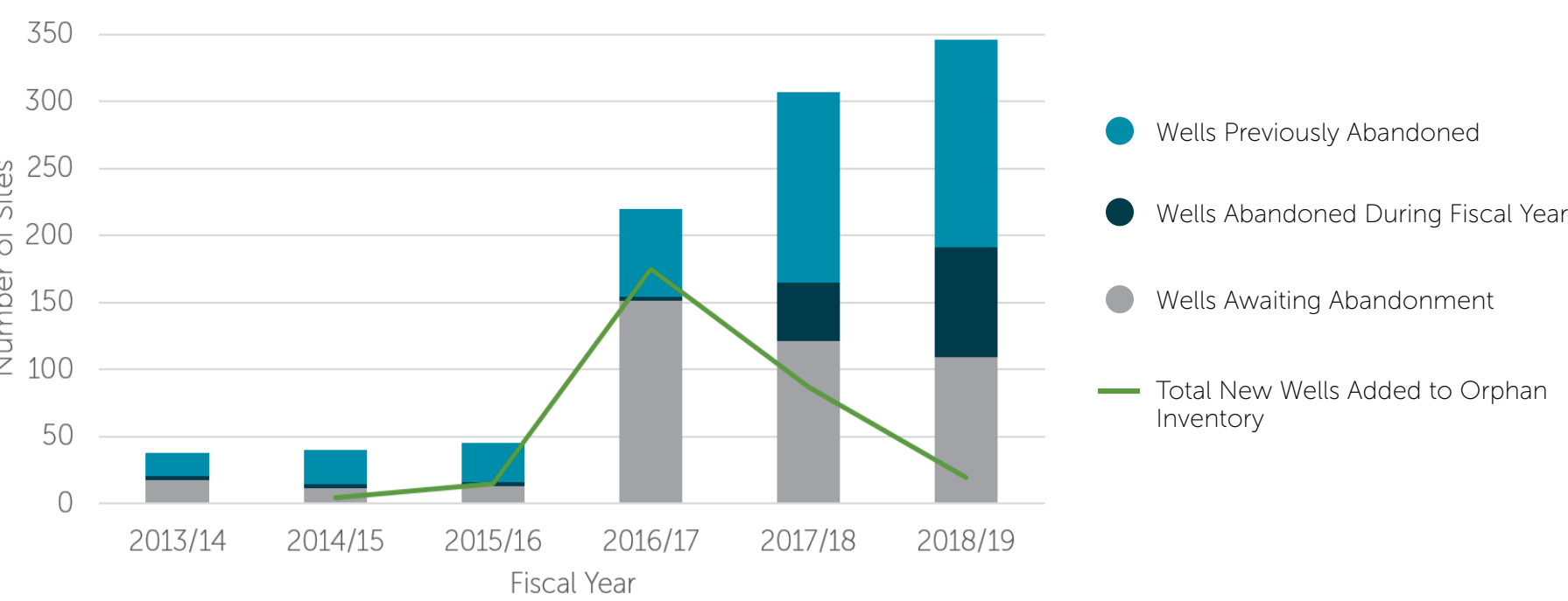
In 2018/19, 82 wells located in the PRB, Monias, Wilder, and Clarke/Milo fields were downhole abandoned. A total of 83 wells were cut and capped.

For the 2018/19 fiscal year, average costs per well are outlined in the table (right). Generally speaking, abandonment programs conducted in the summer in the PRB are considerably less costly than remote and winter programs where mobilization times are higher and/or boilers must be run. Costs are overall reduced in the abandonment programs due to their large scale, where resources and equipment can be shared amongst multiple rigs and crews.

2018/19 Average Costs Per Well

	Overall Average	Peace River Block (PRB)	Remote (Wilder, Monias)	Remote, Winter (Clarke, Milo)
Standard Abandonment (per well)	\$58,718	\$52,570	\$86,989	\$87,311
Abandonment w/ Remedial Repair (per well)	\$138,850	\$123,549	\$176,222	\$266,533

Abandonment Progress and the Orphan Well Inventory



The chart above depicts, for the past six fiscal years, the total number of abandoned wells in the orphan portfolio and the number of abandonments completed each year, compared to the total number of orphan wells awaiting abandonment and number of new well sites added to the orphan inventory.

There has been a substantial increase to the number of well abandonments completed each year, which is a response to the increased number of new orphan wells annually, and the increased annual budget. While there may be an initial increase in wells awaiting abandonment, the number of orphan wells awaiting abandonment has consistently decreased over the last three years.

Site Decommissioning

During the 2017/18 fiscal year, with the main focus of the workplan on well abandonment, only one site underwent equipment decommissioning.

2018/19 fiscal year saw a large increase in site decommissioning work as there was an increase in budget availability. In addition, the larger program provided increased efficiencies by completing the well and pipeline abandonments and site decommissioning concurrently. A total of 57 sites were decommissioned in the PRB in 2018/19.

Costs for site decommissioning can vary greatly and is largely dependent on the amount of equipment on site. Expenditures by site ranged from approximately \$1,000 for removal of pipeline risers, to approximately \$100,000 for decommissioning and removal of a compressor station. Average costs by facility type from the 2018/19 decommissioning program are outlined in the table below.

2018/19 Average Costs by Facility Type

Facility Type	Average Cost	Typical Equipment Present
Single Well Facility	\$16,093	Meter skid, small tanks/UST, shed, and/or pumpjack
Battery Site	\$34,066	Tanks/USTs, separator, meter, flare, pumpjack and/or small compressor
Compressor Dehydrator	\$103,052	Tanks/USTs, compressor, dehydrator, buildings, separator, flare stacks

Investigation, Remediation and Reclamation

Due to the influx of newly designated orphaned sites during the 2016/17 fiscal year, site restoration work was scaled back in 2017/18 and 2018/19 fiscal years to allow the Commission to focus on well abandonment, decommissioning and deactivations.

Where possible, sites were selected for restoration work based on their location (for efficiencies if other work was to be completed on it) or for nearness of restoration completion. In 2017, three sites were fully investigated and 25 well centres were sampled. The well centre sampling occurred at the same time as the cut and cap of the wellbore. This was a cost savings measure as the soil surrounding the wellbore was exposed and did not require additional equipment to complete sampling. One site was reclaimed and five sites underwent monitoring and weed control to support the closure of the sites.

Fiscal year 2018/19 saw an increase in the restoration program, largely due to an increased budget and a larger portfolio of sites ready for reclamation. Investigations were completed on 22 wells and one facility. A further three sites had undergone remediation and 11 sites had reclamation completed. Monitoring and weed control was completed on six sites.

Costs related to the site investigation phase of the restoration process may vary and will depend upon the number of areas of potential environmental concern to assess. On average, full investigations to confirm/deny the presence of contamination have cost approximately \$16,000 per site.

Remediation costs are the most varied amongst the decommissioning and restoration workstreams, as expenditures are directly related to the volume of contamination that needs to be addressed. Of the three sites remediated, the scope of work was limited due to minor amounts of soil contamination. As such, the work and costs were addressed during the reclamation activities at the site. Site remediation and reclamation has cost approximately \$60,000 per orphan site during the 2017/18 and 2018/19 fiscal years.

Site Administration

The site administration includes site inspections, maintenance (pump-offs, berm/access road and/or erosion repair, weed spraying) and land owner compensation for lease payments.

Site inspections were completed to identify risks to public safety and the environment, and issues directly affecting a land owner or impeding access to a site included in the work plan for the coming field season.

In 2017/18, maintenance was completed on 37 sites. This included surface water pump-off, berm and/or erosion repair, work to address water drainage issues, garbage clean-up and weed control. This work continued into the 2018/19 fiscal year, with 41 sites being addressed.



Photo right:
A line heater being removed during decommissioning.

Photo left:
Subsoil being redistributed during reclamation.



General Orphan Expenditures

The Orphan Site Reclamation Fund is also responsible for managing orphaned pipelines through the BC 1 Call system. All orphaned pipelines are registered with BC 1 Call following designations. The Commission responds to calls regarding ground disturbance near orphaned pipelines. For work identified within proximity to orphan pipelines, the Commission may have the pipelines marked out for the proponent(s) as per the membership responsibilities of BC 1 Call.

Other general expenditures may include Commission expenses for the management of designated orphan sites.

Summary

The end of the 2017/18 fiscal year saw the designation of 87 orphan sites, bringing the total number of sites to 307 at fiscal year-end.

The end of the 2018/19 fiscal year saw the designation of 39 orphan sites, bringing the total number of orphans to 346.

Throughout these two fiscal years, the Commission was successful in addressing high-priority well abandonments, completing required deactivations within 12 months of designation, decommissioning a number sites, and engaging with and compensating land owners.

Due to the increase in the number of orphan sites, the rate of decommissioning increased from the 2017/18 fiscal year through the 2018/19 fiscal year. The work plan focused on large-scale well and site decommissioning programs and the deactivation of remote infrastructure. Decommissioning programs were area-based to leverage efficiencies. A larger investigation and reclamation program will follow and begin to move a number of sites through the restoration process.

Outreach and engagement efforts will continue with affected land owners and Indigenous communities, and further efforts will be made to work collaboratively and streamline restoration work.



More Information

bcogc.ca

This report was published in August 2019 and is updated annually.

For specific questions or enquiries regarding this document or the Orphan Site Reclamation Fund, please contact:

Mike Janzen
Director, Orphan Planning & Restoration
BC Oil and Gas Commission
Phone: 250-419-4464

