



Dawson Creek Reclaimed Water Project

Project Details

COMPANY

Shell Canada Limited

COUNTRY

Canada

BUSINESS SECTOR

Oil and Gas Industry

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Preserving fresh water through collaboration

THE ISSUE / CONTEXT

Shell's¹ Groundbirch venture is located in northeast British Columbia, Canada. It is an unconventional shale or "tight gas" asset situated near the communities of Dawson Creek, Fort St. John and the village of Chetwynd.

The natural gas produced at Groundbirch is situated 2,500 metres below ground, trapped within a mixture of siltstone and shale. Shell uses hydraulic fracturing, creating hairline cracks to unlock the natural gas that's tightly trapped in the tiny pores of the rock.

The Groundbirch area is prone to surface water shortages (but not prone to shortages in shallow or deep groundwater). Most local farms and ranches use surface water. Therefore, protecting and managing water are important issues for both Shell and the community.

OBJECTIVE AND PROJECT OVERVIEW

For some time, Shell had been looking to alternative sources of water that minimize Shell's impact on the environment and the community. At the same time, the city of Dawson Creek was also seeking industry support for making more of their wastewater. Shell came forward with a proposal to partner with the city and set up a project that would benefit both parties.

In order to minimize fresh water use, Shell and the City of Dawson Creek partnered to establish the Dawson Creek Reclaimed Water Project.

As part of the project, wastewater is treated to a standard that allows the city to use the water to water lawns and to service industrial users – one of them being Shell.

The city of Dawson Creek draws water for municipal purposes from the nearby Kiskatinaw River. The city's wastewater is piped to a municipal treatment facility where it passes through a multi-step lagoon filtration process. Microorganisms in the water break down any remaining bacteria, bringing it to a standard acceptable for industrial use. The water is then sent through the City of Dawson Creek Reclaimed Water Plant for final treatment to meet local regulations for industrial use.

Shell then pumps this water from the facility's pump house through an underground pipeline to storage ponds used in hydraulic fracturing and completions in Groundbirch.

THE BUSINESS CASE

The Dawson Creek Reclaimed Water Project has allowed Shell Groundbirch to reduce its use of fresh water and has created a potential revenue stream for Dawson Creek.

Utilization of the pipeline at design capacity removes over 100 water hauling trucks per day from local roads that otherwise would be required to transport water to the Groundbirch operations. This

¹ The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this document the expression "Shell" is sometimes used for convenience where references are made to those entities individually or collectively. Likewise, the words "we", "us" and "our" are also used to refer to Shell companies in general or those who work for them. These expressions are also used where no useful purpose is served by identifying specific companies.

equates to eliminating over three million kilometers a year in truck trips over the course of full gas field development.

Taking these trucks off the road reduces area traffic – and thus road safety risks – as well as dust and noise for the local community.

DECISION MAKING PROCESS

At Shell, we aim to be good neighbors and seek appropriate and effective ways to contribute to the wellbeing of the communities in the vicinity of our operations and planned future developments. We believe that resource development can coincide with environmental protection when the principles of sustainable development are applied.²

Shell’s partnership with the City of Dawson Creek to build a reclaimed water facility to treat the city’s wastewater for reuse in the industry and community is an example of our approach.

At Groundbirch, Shell works closely with the local community to drive creative solutions for issues related to the oil and gas industry. Traffic is also an issue in the community. This is why Shell constructed the pipeline from the Dawson Creek Project to our Groundbirch operations to minimize truck traffic on local roads.

PROJECT DETAILS & FINANCES

- Shell funded the majority of the city’s new multimillion dollar water treatment facility (which is owned by the city of Dawson Creek) as well as constructing the associated Shell-owned pump house infrastructure and 48-kilometre pipeline to transport the water to operations.
- The treatment facility, which is designed to produce 4,000 m3 per day of reclaimed water, became operational in May 2012.
- As part of the arrangement with Dawson Creek, Shell will have access to up to 3,400 m3 per day of the reclaimed water over the next 15 years.

PROJECT RESULTS

- Shell recycles approximately 85% of its produced water in hydraulic fracturing operations at Groundbirch. Reclaimed water is used, as needed, to supplement produced water in these operations, instead of drawing on fresh water from local sources. Though almost all of our water from completions is reused, and over the long term, we have virtually eliminated the need to draw additional water from fresh water sources, this agreement will significantly help Shell reduce fresh water draw during periods of increased drilling.
- We share water with our partners to reduce the need for water disposal. Dawson Creek Reclaimed Water Project
- The City has also begun supplying treated water to other operators in the area, resulting in greater operational sustainability and improved environmental outcome for our industry as a whole.



LESSONS LEARNED

Leveraging the learnings from Groundbirch, Shell has established relationships with other municipalities to make more out of their treated wastewater. For example, in 2012, Shell partnered with the Town of Fox Creek, in northwest Alberta, Canada, to use the town’s wastewater for their completions operations. In return, Shell funded an engineering and design study to upgrade the town’s raw water facilities and

² In support of this, Shell has five aspirational operating principles for tight/shale oil and gas, that focus on safety and protecting water, air, footprint and members of the communities where we operate - see : <http://www.shell.com/energy-and-innovation/natural-gas/tight-and-shale-gas/shells-principles-for-producing-tight-shale-oil-and-gas.html>

associated infrastructure. This alternative source of treated wastewater is preferred over withdrawing from fresh water sources in the Fox Creek area and equates to around 300,000 m³ of fresh water saved per year, and approximately 40% of the water used in the asset, as per 2015 data. Similar agreements between industry and municipal governments, and other industrial wastewater producers have been made in other parts of Alberta, but this is one of the largest amounts of treated wastewater being reused by industry in the province.

FUTURE IMPLEMENTATION AND NEXT STEPS

Shell will continue to look for opportunities to further replicate the Dawson Creek Reclaimed Water Project, enabling future operations and other users to benefit from wastewater recycling and reduced fresh water use.

REFERENCES

- www.shell.ca/groundbirch
- <http://www.shell.com/sustainability/environment/water/down-the-drain-and-into-energy-production.html>
- <http://www.shell.com/energy-and-innovation/natural-gas/tight-and-shale-gas/shells-principles-for-producing-tight-shale-oil-and-gas.html>

This case study forms part of the WBCSD Business Guide to Circular Water Management (2017), available for download [here](#).

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