THE BURNABY REFINERY'S

Neighbourhood News

A NEWSLETTER FOR OUR NEIGHBOURS

SUMMER 2016 - ISSUE 50

Water Conservation Initiatives

Hot, dry summers are becoming the norm in Metro Vancouver, as are water restrictions. Facilities like the Burnaby Refinery use a significant amount of H2O and our staff are determined to do our part to proactively reduce water use.

This is an area where Lead Process Engineer Kel Coulson and Process Engineer Mack Atkinson spend a great deal of time seeking out new opportunities. They gave a presentation about these initiatives to the refinery's Community Advisory Panel as well as to other staff members recently.

Where the Refinery Uses Water

Refineries use water primarily in their cooling towers and boilers, the areas that keep all other systems in the plant running. Water is used to add – and later remove – heat to the process streams, remove salt and impurities from crude oil, protect equipment from corrosion, control product quality, and to clean and maintain equipment.

Just how much water does it take to do all this at the Burnaby Refinery? The answer is close to one million gallons a day – which is significantly less than what many other refineries require.

"There are a number of reasons for this, particularly the high quality of water in the region," explained Kel. "Because our water is softer, there is less scaling and equipment corrosion. That means we can recycle more water than refineries where water hardness is higher. We've optimized our systems to recognize that we have a higher quality of water and use it accordingly."

The Burnaby Refinery's cooling towers are able to cool water that is recycled back as opposed to facilities that operate with a once-through cooling system. This means we reuse 98 to 99 per cent of our cooling water (one to two per cent is lost through the process including evaporation).

Boilers use water to generate steam for the refining process. After use, it condenses and is returned to the boilers. The Burnaby Refinery has a high condensate recovery; 67 per cent of the condensate in our steam system is recovered – double the industry average of 20 to 45 per cent.

Innovative Initiatives

While the Burnaby Refinery uses a large number of methods to reduce water consumption, there are three that Kel and Mack highlight as the most inventive: stripped sour water reuse; surface condenser improvements; and seasonally increasing cooling water conductivity.

"Sour" water is created when water is injected into pipes in the distillation columns to wash out corrosive materials present in the hydrocarbon.

"Previously, after sour water was used, it was discharged into Chevron's wastewater treatment plant," said Mack. "However, through our process optimization initiatives, we're able to reuse sour water. We're currently reusing between 60 to 70 per cent of the stripped sour water, which has reduced our demand for fresh water by approximately 30 million gallons a year. The volume of stripped sour water that we reuse has more than doubled since 2010/11."

The water savings from surface condenser improvements came about when the refinery was searching for energy savings.

"We replaced the ejectors in the surface condenser to improve its vacuum in an effort to reduce its energy consumption," said Kel. "This is one of the largest steam users in the refinery. As a result of the upgrades, steam demand was reduced by 556 gallons per hour. That's equal to conserving 4.9 million gallons of water each year. It was great to get both energy and water savings out of one project and that experience has triggered us to look for similar opportunities elsewhere."

Higher temperatures in the summer months increase the rate of water evaporation from the cooling towers. In order to optimize the processes for water conservation, the refinery has increased the set point for conductivity which allows for higher concentrations of minerals in the system, therefore reducing the demand for fresh water to be added while still maintaining conductivity levels that will protect the equipment.

"This decreases the requirement for make-up water," said Mack. "We tried this last year for about a month and a half and reduced the volume of fresh water by 1.5 million gallons. We've already made the change this summer and anticipate our water reductions will likely be three times higher."

Striving for Water Conservation

Just as Burnaby residents are looking for ways to reduce water consumption around the house, so too are refinery staff.

"Over the last 10 years there's been a real effort to seek out opportunities," said Kel. "Previously, a lot of effort went into reducing the amount of waste water we produced; now the focus has shifted to minimizing the amount of fresh water we use in the first place. The new initiatives we're pursuing could lead to an annual reduction of 21.7 to 23.9 million gallons of water annually."

Manager's Message

Steve Parker, General Manager

It is no secret that the drop in the price of crude oil has created a volatile oil and gas industry over the past year or so. This has led to pressure on the sector as shareholders look to optimize their investments, with many people buying and selling stocks. As a result of this active market, Chevron Canada's board has decided that it is prudent to investigate whether assets such as the Burnaby Refinery and its associated marketing system are worth more on the market than they are to shareholders. The result is that Chevron Canada is soliciting "expressions of interest" to see if there is anyone interested in purchasing these assets.

This has not come about because of a shift in Chevron Corporation's strategic direction, nor is it because of a performance deficit. Indeed, the refinery is a strong business performer and its valuation reflects that. It is simply a case of testing the waters. It will take at least until the end of 2016 to make a final determination.

In the meantime, it is business as usual at the Burnaby Refinery and it is a credit to all our employees how well they are handling the news. Their maturity and professionalism was tested twice recently: during a shutdown in June which was handled safely and within full compliance of our environmental permits; and, on Fathers' Day, when an external total power outage required five days of steady work to safely restore full refinery operations.

Two of our specialists recently had the opportunity to give a presentation on the refinery's water consumption following a question about this from our Community Advisory Panel. Water use is an area of growing concern for the entire region and everyone was pleased to learn that our water consumption is the lowest of all refineries across Canada (see this issue's cover story). This is due in part to the excellent water quality in our region but also because of a number of projects that have been put in place here over the last few years.

Our water consumption is the lowest of all refineries across Canada

Another area where Chevron leads the way is in safety. In my 35-plus years with the company I've seen continuous improvements in this regard and I'm proud that Chevron has the lowest incidence of injuries in the oil and gas sector worldwide. One of our core values is to be incident and injury free and to achieve this we've searched for the best of the best practices. The Human Performance approach – which you can read about in our Safety Matters article – has a framework that reduces the number of injuries and I'm excited about what it can offer.

Refineries throughout North America are coming to grips with capital investments that will be required to reduce the sulphur content in gasoline to meet new federal specifications (see our Tech Talk article). Again, the Burnaby Refinery is well positioned and we are benefiting from the foresight of previous investments that mean we will be able to meet the requirements with a relatively low capital cost.

In all our work, we seek to minimize our impact on the community. To that end, we're spacing out our major turnarounds so there will be more years where there will be no major turnaround activity. Next year, 2017, will be such a year. Our next scheduled shutdown period will be in February 2018, so neighbours can expect things to be quiet until then.

Safety Matters Human Performance

Mistakes are part of what make us human. The Burnaby Refinery uses a way of thinking about safety that understands this. Called Human Performance, it acknowledges that errors are going to happen and, rather than asking why something went sideways, it asks how it occurred. This approach focuses attention on being a learning organization and finding system solutions to enable success.

"We have many tools, programs and procedures that contribute to the refinery's safe operations," said Manager of OE (Operational Excellence) Special Projects, Jill Donnelly. "Human Performance safety is just one of these, and we believe it is taking the refinery to the next level in terms of safety performance."

Human Performance Safety Principles

The refinery has adopted seven Human Performance safety principles. Of these, Jill says the first and the last are particularly noteworthy.

"The first principle is that "people make mistakes," so we need to acknowledge that," she said. "And the last principle is that "your response to an event matters." You need to make sure you care for the people involved first and foremost."

The refinery has been gradually adopting Human Performance safety concepts for about a year, with all supervisors having received training. Now Chevron Canada's entire workforce (including all its contractors) is in the process of being trained.

"A large part of Human Performance safety is designing systems that make it easy to do things right and difficult to do things wrong," said Jill. "An example of this is the way USB sticks are made so you can't put them in upside down. Another example of a system that is designed to make it harder to do things wrong is the "Are you sure you want to delete?" prompt on our computers. By training all workers in Human Performance safety, we're finding new ways to use the concepts to prevent incidents from happening."

Human Performance Safety in Action

Examples of Human Performance safety applications at the refinery include things as simple as the reduction of speed limits to increase onsite motor vehicle safety.

"Another example is something we've been doing for years when we work at heights and use scaffolding," said Jill. "All our scaffolds have toe boards on them as well as netting below. That way, tools shouldn't roll away or fall off the scaffold – and potentially onto anyone who happens to be working below. No one would intentionally drop a tool, but it could happen. With these measures in place, if someone does drop a tool, it stays on the platform."

She added, "Using Human Performance safety measures has made for more successful incident investigations and created better solutions. The system has empowered workers – even those with many years of experience – to realize it's OK to ask for help when faced with a new situation."

Tech Talk Tier 3 Gasoline

Government, industry and automakers are working together to improve the environmental performance of transportation fuels. Chevron has contributed to these objectives over the past two decades by removing greater than 95% of the sulphur from gasoline and greater than 99% of the sulphur in the diesel produced from the Burnaby refinery. Federal regulations in both Canada and the US are requiring transition to lower the maximum sulphur content of gasoline from 30 ppm to 10 ppm starting now with the full transition complete by January 1, 2020.

Preparing for Change

The Burnaby refinery is well positioned to meet this challenge as the facility's gasoline pool has been between 15 to 20 ppm since 2012, well below the current limit, said Facilities Planning Engineer Marisa Christensen. "We've been considering a number of alternatives and have determined the best choice for our site is to optimize our existing process units (namely our FCC gasoline hydrotreaters and our LPG treating units) to maximize sulphur removal from these gasoline blendstocks. We are planning to use an adsorption catalyst technology which will extract sulphur molecules from the gasoline."

"We were concerned about the impact the removed sulphur would have on the environment because we didn't want to create a new emission source or a new waste stream," said Marisa. The removed sulphur will adhere to the catalyst. The base metal content of the catalyst makes it attractive to steel foundries. "We were pleased to find recyclers were interested in utilizing the spent catalyst as a feedstock for their facilities. It's a win-win for the environment."

Marisa notes that the Burnaby Refinery is well positioned for the regulatory change, having anticipated regulations would go below the 30 ppm sulphur content limit set in 2005.

"We invested wisely at that time in future flexibility and are consequently well set for achieving the new specifications," she said. "The solution we're able to pursue will involve running piping to an existing unit. That is a much better option for us and for our community than having to build an entire new production facility"

Construction will begin in 2018 with initial work occurring during our 2018 refinery turnaround. The new technology will be commissioned in the second or third quarter of 2019 in order to make sure it is fully functional before 2020.

Federal Restrictions

"The Burnaby Refinery is committed to adhering to the regulations set out by Environment Canada," said Marisa, "The federal government is committed to improving environmental performance through regulation and increasingly stringent product specifications.

Marisa and her colleagues see the requirements as a good step forward.

"These regulations are impactful to all Canadians," she said. "It's important we show leadership to improve emissions performance from the transportation fuels we produce".

Across the Fence

Confederation Park
Pipeline Maintenance Update
With the drier summer weather, work has ramped up on pipeline maintenance along the refinery's right of way in Confederation Park. The pipes here are assessed on an ongoing basis to determine which ones require replacing in advance of them becoming an operational concern. Chevron is working closely with regulators including the City of Burnaby and is modernizing design and layout as part of the replacement project.

Neighbours will continue to have good access to the park, similar to the access provided in summer 2015. Temporary fencing is in place in the areas where work is ongoing to ensure public safety and signage is posted along the two park entrances along Penzance Drive.

If you have any questions about this project, please call our Community Contact Line: 604-257-4040.

Turnaround Updates
The refinery took advantage of a window of opportunity in early June for a short turnaround in order to replace equipment that was due for replacement. We also replaced catalyst in our diesel hydrotreater reactors to ensure that we reliably produce on-spec, high quality diesel products for our customers. This maintenance shutdown was completed safely, with no incidents or injuries, and on schedule. We appreciate our neighbours bearing with us during this short period when there was an increase in traffic while we accommodated some additional workers being on site.

Planning is well underway for the refinery's next scheduled major turnaround in the first quarter of 2018. This refinery-wide event will be a large shutdown and will involve seven major units including the flare and utilities systems.

"We've shifted to a turnaround planning cycle where we are clustering our events and spacing them out every two to three years rather than doing smaller ones every year," said IMPACT Team Lead Gord Bruce. "We have teams dedicated to turnaround planning, with the 2018 event projected to be bigger than our turnaround in spring 2015. It will be a longer event and there will be a significant number of workers on site. As always, lessening our impact on the community is built in to all our plans."

Community Corner

Burnaby Blues & Roots Festival

Chevron is proud to also be a sponsor of another of Burnaby's favourite summer events: the Burnaby Blues & Roots Festival, August 6th at Deer Lake Park. This year's headliners include Colin James, Frazey Ford, Cyril Neville and Royal Southern Brotherhood, Como Mamas, Lindi Ortega, and Billy Dixon on the Main Stage. You can also catch Dawn Pemberton, Ben Rogers, and Wes Mackey on the Chevron Garden Stage.

Tickets are on sale now. Find out more at **www.burnabybluesfestival.com.**

BURNABY BLUES + FESTIVAL 2016 ROOTS

Community Corner

Hats Off 2016

The beautiful summer weather this past June 4th drew record crowds to the Heights' annual Hats Off Day festivities. No matter where you were along Hastings Street between Boundary and Gamma, neighbours were out meeting neighbours and having a great time. Refinery staff who volunteered at the Chevron Station also had a wonderful time – we all enjoy being part of the community and supporting endeavours to engage in the neighbourhood. Children were lined up all day for the special activities we presented and it was a great party atmosphere with lots of music and plenty of giveaways. Can't wait to do it all again next year!

Looking Back Chevron Burnaby Refinery Site Construction, Circa June 1954

Community Contact Line

(604) 257-4040

Chevron's Burnaby Refinery welcomes your calls and feedback. If you have any comments or concerns, please do not hesitate to call our Community Contact Line: 604-257-4040.

This line is staffed on weekdays between 8 am and 4:30 pm. Your call will be directed to the most appropriate person who can respond quickly. In the event of an emergency, or significant maintenance work underway that may contribute to unusual operating conditions, information and regular updates for the public are made available.

If you are calling after hours or on a weekend, please follow the paging instructions. Your call will be forwarded to our on-duty shift supervisors. If you would like to report an odour or if you notice anything that you think is unusual, please let us know. Your calls are very important to us and we will respond as quickly as possible.

To contact the Metro Vancouver air quality officer **604-436-6777**

For the refinery website, visit **www.chevron.ca/operations/refining**

For information about the Chevron/ North Burnaby Community Advisory Panel, visit **www.chevroncap.com**

Neighbourhood News is a quarterly newsletter produced by Chevron's Burnaby Refinery for residents of the Heights, Capitol Hill and surrounding areas of North Burnaby.

We invite your comments, questions or suggestions for future articles.

Please contact us at Neighbourhood News, Chevron Canada Limited, Burnaby Refinery, 355 North Willingdon Avenue, Burnaby, BC, V5C 1X4.

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