

# SiteLine

## Joffre Site Community News

Published for the Central Alberta community by NOVA Chemicals

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### Special Edition: Annual Environment Review

#### Highlights of what's inside...

About our environment report.....	2
Water resources .....	3
Air emissions management ..	4 & 5
Noise management.....	5
GHG emissions intensity.....	5
What's the buzz? .....	6
Sponsorship to prevent marine plastic pollution.....	7
Responsible Care verification.....	8
Open House invitation .....	8



Our continuous focus is on innovation, with more than \$65 million this year alone dedicated to our Canadian research efforts. With our customers we are working on ways of downgauging as well as the development of lightweight, recyclable packaging.



## The world is talking about plastics; so are we



As we provide you this **17th annual report to our community on our environmental performance** and goals for continuous improvement at the Joffre Site, it is

an opportune time to share with you some more on NOVA Chemicals' approach to plastics sustainability.

Last spring at our Open House our community expressed a great deal of interest in this topic. Plastics were a focus this summer at the G7 Summit and at other ongoing discussions between citizen groups, businesses, non-profit organizations and governments.

NOVA Chemicals understands these concerns and we applaud the conversations. Our industry shares responsibility to be part of the solution. **Collectively we can find solutions toward a more sustainable future for plastics.**

Our industry associations — Chemistry Industry Association of Canada (CIAC) and American Chemistry Council (ACC) — recently announced new goals to recycle or recover 100% of plastic packaging by 2040. The World Plastics Council supports strategies for plastic-free oceans and we support its Global Declaration on Solutions for Marine Litter. **As a company, we have recently invested nearly \$2 million (US) into Project STOP to prevent plastic debris from reaching the ocean (page 7).**

**NOVA Chemicals' continued focus is on innovation** to reduce, reuse, recycle and recover plastic. Our Canadian research and development budget for this year is

\$65 million. Here are a few examples of what we are working on:

- Downgauging — we work with our customers to reduce materials use; and
- Development of products and packaging that extend shelf life and provide formats such as flow wrappers, pillow pouches and squeeze tubes that are lightweight and recyclable.

**Through our leaders' and employees' volunteer activities, we also target plastics sustainability.** Inside this issue we highlight some of these Taking Care initiatives — from spring roadway clean-ups to our local river clean-ups. We are also proud of the dominant sustainability story behind the upcoming Canada Winter Games and our role as Sustainability Sponsor.

At our Open House on October 17 (invitation page 8), we hope to continue this discussion with you. As always, we also welcome your comments and questions on this environment report.

Meeting our commitments to Responsible Care® and Sustainability goes hand-in-hand with continuing to engage our community and stakeholders. Not only do we look for your input into our operations and plans, but we also make a concerted effort to understand and respond to concerns and opportunities such as those presented around plastics sustainability.

Let's keep talking — and taking effective actions — so we are all part of the solution.

A handwritten signature in black ink, appearing to read 'Rick Van Hemmen'.

**Rick Van Hemmen, Joffre Site Leader**

# About our environment report and our approach to Responsible Care

**We are committed to minimizing our impact on the environment because it is the right thing to do and is key to the sustainability of our business.**

This annual *SiteLine* environment report provides our community and stakeholders with an overview of our 2017 performance in the important areas of water, air, noise management and GHG emissions. **This year's environment report now includes data from the expanded Polyethylene 1 (PE1) facility that began operations early in 2017.**

NOVA Chemicals continues to play a leadership role in the development of our industry's Responsible Care ethic and its sustainability principles. Our culture is built on the ethics and standards of Responsible Care.

Responsible Care, developed by the Chemistry Industry Association of Canada (CIAC), is the chemistry industry's approach to addressing stakeholder concerns about the potential effects of chemicals and chemical facilities on human health and the environment.

Our Taking Care model, shown to the right, frames our approach to putting Responsible Care into practice. It provides the "umbrella" for our corporate-wide Environmental Plan, and the Joffre Site environmental management system and programs.

We remain focused on meeting all regulatory requirements and ensuring emissions are below all regulatory compliance limits. **We strive for continuous improvement in our performance.**

## Taking Care

Our work at NOVA Chemicals results in plastic products that take care of food, water and other goods vital to life. To enable these products, we must first take care of the people, places, materials and processes that make them possible. We take care with respect to our operations, communities, products and the environment. Taking Care is a way to think and a way to work. It's our particular approach for putting Responsible Care® into practice.



### Operations

In our operations, we take care to attract and develop talented people committed to the safety and well-being of themselves and others. We foster relationships that promote community safety and other social and environmental values.



### Communities

In our communities, we take care to be a neighbor that promotes conversation, understanding and involvement. We contribute positively to community development, public policy and reporting.



### Products

In our products and those we enable, we innovate to improve people's lives. We take care to promote the safety, security and value of products throughout their life cycle.



### Environment

In our environment, we take care to conserve, protect and enhance natural resources. Through innovation, operational excellence and environmental stewardship, we seek to protect life and to continuously improve our environmental performance.

## Now available: NOVA Chemicals' 2017 Sustainability Report

Our 2017 report reflects our commitment to shaping a world where products vital to human health and happiness are even better tomorrow than they are today.

We invite you to review the report — both a snapshot of current company-wide performance and a commitment toward continual improvement — at [www.novachemicals.com](http://www.novachemicals.com).



## Kerry Wood Nature Centre: a great place to visit!

After a hard day of cleaning up the banks of the Red Deer River during the annual spring event, volunteers enjoyed the barbecue we sponsored at the Kerry Wood Nature Centre. Grady, one of our employee's children, later enjoyed the NOVA Chemicals Imagination Grove. We encourage you to plan a visit soon to this wonderful place.

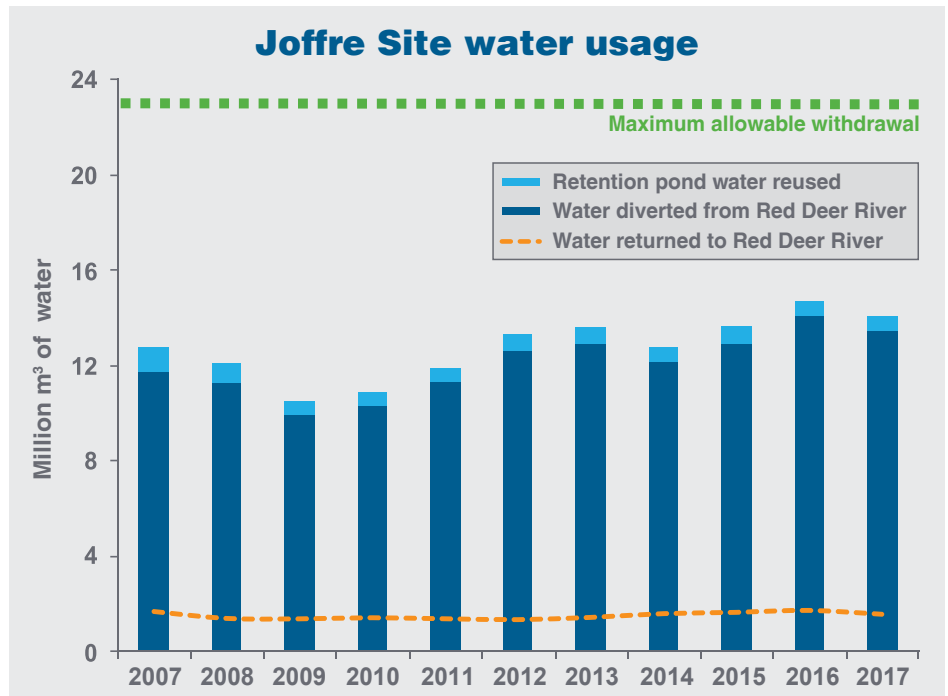
# Minimizing our impact on water resources

Water is critical to Joffre Site operations and our management programs focus on minimizing our impact on this valuable resource.

The Red Deer River has an annual flow of roughly two billion cubic metres (m<sup>3</sup>). NOVA Chemicals has water licences for approximately 23 million m<sup>3</sup> per year, which is just over 1% of the annual flow in the river.

In 2017, we withdrew almost 13.5 million m<sup>3</sup> or 59% of our allotment from the river. We also collected and used 0.47 million m<sup>3</sup> from surface runoff. We had forecast about a 10% increase in water use with the addition of the PE1 expanded facility. We are in this range.

The majority of water used in our manufacturing facilities is returned to the environment through evaporation in cooling tower plumes. The amount of water vapour released back to the ecosystem is about 80% of our intake. Water returned to the river goes through extensive testing to meet regulatory requirements and strict environmental standards before discharge.



This graph shows our water use at the Joffre Site. Generally, the greater the production rate, the greater our water use. Water use also fluctuates with other site activities such as turnarounds and weather conditions.

## New stormwater retention pond to be completed this Fall



Incorporates **best practices** to **capture run-off** from storm events

Water used in our operations

Turned over to Operations **December 2017**

Existing pond to be remediated

Scheduled commissioning completion **Fall 2018**

### Two layers of landscape fabric

- Geo-composite
- Linear Low Density Polyethylene (LLDPE)

Approximately **8,000 hand-filled sandbags** used to hold the landscape fabric in place



Pond area: **625,706 ft<sup>2</sup>** (58,130 m<sup>2</sup>)

Pond volume: **170,528 m<sup>3</sup>**

Approximately **7x** football fields

Approximately **68x** Olympic swimming pools

## Plan for remediation of existing stormwater pond

With the new stormwater retention pond now operational, we are proceeding with the remediation of the existing pond. We will be using a staged *in-situ* approach to reduce the potential for issues like odour. The existing pond has been in operation for many years and there is some contamination contained within the sediment from historical spills dating back to the early 1980s.

The first phase in the remediation program is a soils investigation. Samples of the sediment will be obtained during freeze-up in 2018 and submitted for analyses. With the findings of the soils investigation, we will finalize the detailed remediation plan. Watch for regular updates in future editions of *SiteLine*.

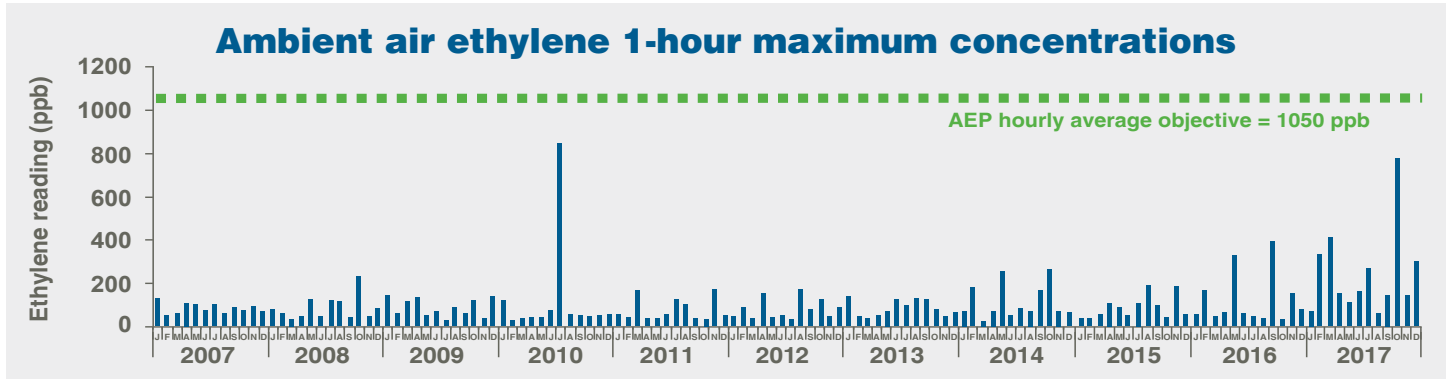


Aerial of Joffre Site highlighting the location of the existing southeast retention pond that will be remediated.

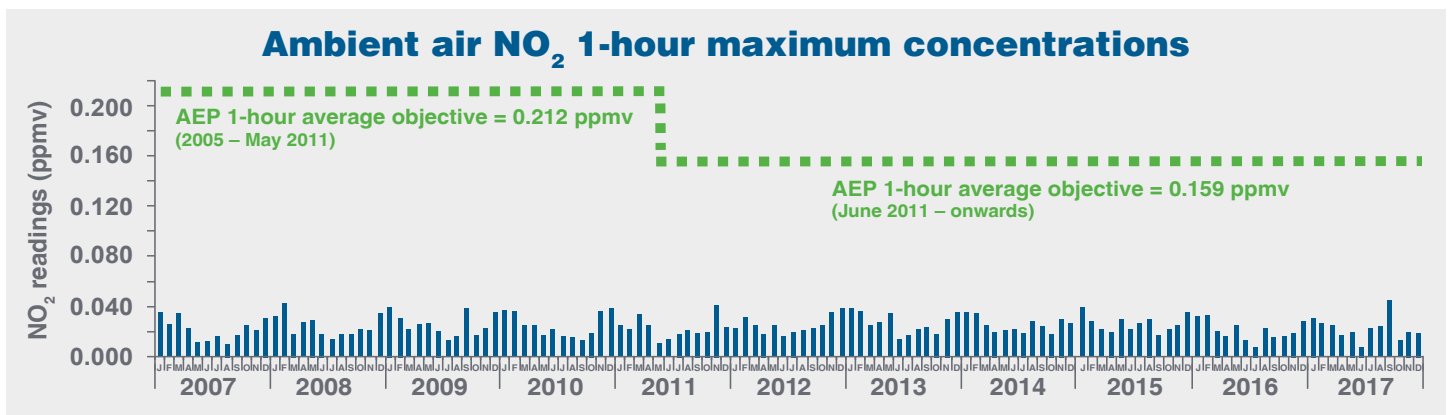
# Ensuring air emissions meet Alberta air quality objectives

Air quality management is a priority for NOVA Chemicals. Through the Joffre Site Air Emissions Management Program we strive to reduce emissions, monitor impacts and continuously review our performance. We remain focused on ensuring air emissions are below all regulatory compliance limits and air quality objectives set out by Alberta Environment and Parks (AEP).

Data related to a variety of air quality parameters, as shown in the graphs below and on page 5, indicates our concentrations and readings are consistently below established objectives. The calculated point source emissions for both ethylene and nitrogen dioxide (NO<sub>2</sub>) for the PE1 Expansion are below forecasts.



Ambient ethylene (1-hour maximum) concentrations are well below the AEP Hourly Average Objective of 1,050 parts per billion (ppb). We are seeing an increasing trend in hourly maximum ambient ethylene concentrations in 2017. We continue to investigate the potential sources including supplementing our fugitive emissions program with the use of thermal imaging infrared cameras. The spike in 2010 was the result of a leak in an INEOS LAO facility exchanger, which was promptly repaired with no adverse environmental impacts indicated through ongoing atmospheric monitoring.



Concentrations of oxides of nitrogen (NO<sub>x</sub>), specifically NO<sub>2</sub>, are consistently below regulatory limits. We have a committee focusing on a site NO<sub>x</sub> strategy, and our 2020 Environment Plan also has goals for NO<sub>x</sub> emissions reductions. The Ethylene 2 (E2) Furnace Refurbishment Project (see below) has reduced emissions as a result of furnace design improvements including new burners.

Our NO<sub>x</sub> Emissions Reduction Steering Team determines strategies for Joffre Site NO<sub>x</sub> emissions reductions activities. The team includes site leaders, technical experts and Responsible Care environmental specialists. Some of the focus areas include tracking NO<sub>x</sub> emissions performance, reviewing impacts and opportunities of site projects, and interfacing with regional groups such as the Parkland Airshed Management Zone (PAMZ).

## NOVA Chemicals presented with 2018 Blue Skies Award

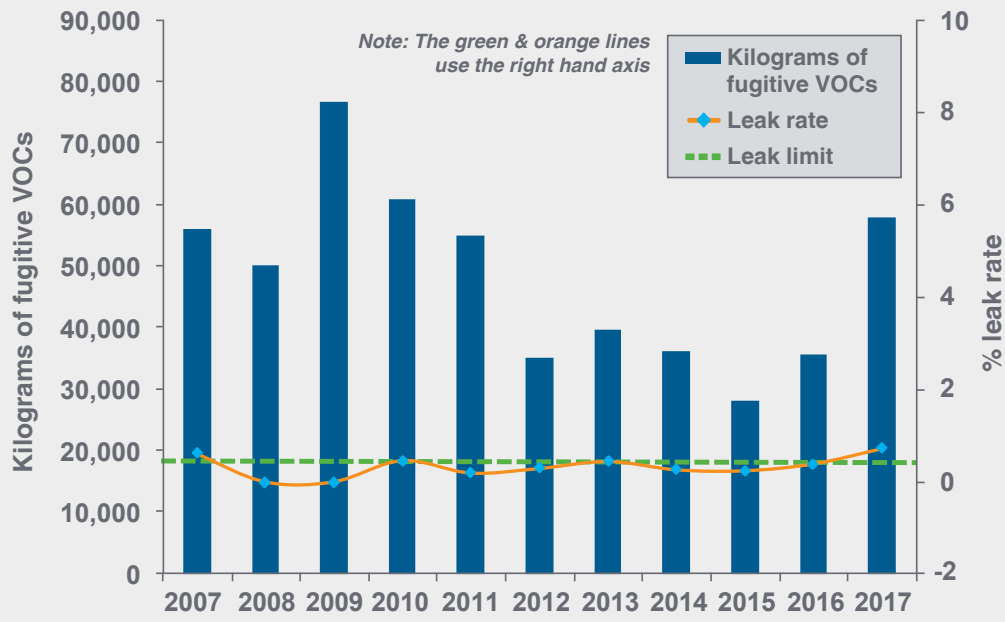
NOVA Chemicals was proud to be one of three recipients of a PAMZ Blue Skies Award to “recognize individuals and organizations taking exemplary steps to improve air quality in the PAMZ region.” Pictured is Joffre Site Operations Leader Lois Erichson accepting the award from PAMZ Board Chair Aaron Rogvaldson on June 6, Clean Air Day.

The award recognizes our work related to the E2 Furnace Refurbishment Project and our goals for reducing NO<sub>x</sub> emissions. As part of our commitment to sustainability and

continuous improvement in our operations, in 2014 we initiated the project. The goal of this eight-year project is to achieve a 30% to 40% reduction in NO<sub>x</sub> emissions. Recent stack testing at the completed furnaces confirms we are achieving this reduction. Five of 11 furnaces have now been refurbished with four of the remaining six scheduled for completion by 2021.



## Petrochemical facility fugitive VOCs



Volatile organic compounds (VOCs) emissions are hydrocarbons that can affect air quality. Our site's comprehensive Leak Detection and Repair (LDAR) program is fully implemented according to the Canadian Council of Ministers of the Environment Code of Practice. While the Code states that leaks over 10,000 ppm must be repaired, we schedule prompt maintenance for any leak over 1,000 ppm. The increasing trend in fugitive emissions we believe can be attributed to more valve packing and threaded connection leaks due to increased maintenance triggering the use of this equipment. We continue to monitor and repair leaks annually.

## Noise management update

Our noise management strategy is constantly being updated and adapted to reflect site changes. The overall goal, however remains the same: to mitigate site operating noise impacts on our neighbours.

Data from two additional continuous noise monitoring stations is now available to us. We currently have noise monitoring in each direction: north, south, east and west.

With the completion and commissioning of the PE1 Expansion Project in 2017, we validated noise sources. Modelling indicated there were a few new sources in the expansion that have higher noise results than estimated prior to construction. We are evaluating mitigation options.

The predicted expansion sound levels including background noise at residence locations show only a slight increase in noise levels that would not be an audible change. Results from our annual community noise survey completed this Summer at five residences near the Joffre Site will be shared at the October Community Open House.

Other mitigation projects include:

- The E2 Furnace Refurbishment Project (Blue Skies Award page 4) is using silencers on the new induced and forced draft furnace fans.
- Our North Rail Yard Noise Abatement Strategy is in place to meet commitments made to the community at a stakeholder workshop in 2013. The strategy is regularly assessed to ensure its effectiveness especially as increased shipments began this year.



*We now have noise monitoring in each direction: north, south, east and west.*



## Continued reduction in GHG emissions intensity at site

In 2017, we continued to reduce our GHG gas footprint. NOVA Chemicals Joffre Site has achieved a 12% reduction in our GHG emissions intensity as compared to the average emissions intensity established during the baseline period of 2003 to 2005.

Federal and Provincial governments are continuing to add and update regulations related to GHG emissions. In 2018, Alberta is making the transition to an Output-Based Allocation (OBA) approach for large industrial emitters. The new regulation is expected to move away from a facility baseline intensity-based calculation and will instead focus on emissions related to each product produced.

When facilities are not able to achieve the provincial compliance obligation, GHG offset markets, as well as technology funds that contribute to research and development opportunities, are critical tools to help meet compliance. The carbon price set by the technology fund is \$30 per tonne as of January 1, 2017.

Offsets are based on reductions of GHG emissions by parties who are not regulated, such as agricultural producers. The offsets we have purchased for our Joffre Site support the building of organic carbon in soil through low and zero-tillage practices and assist the agricultural community in advancing sustainable practices. For 2017 compliance, we used all offset credits to meet the obligations for the Joffre Site.

We are committed to continuously improve our manufacturing, energy and fuel efficiency in order to reduce the intensity of GHGs per tonne of product produced.

## What's the buzz? Educational Pollinator Trail opened this Summer

Early in our planning for the NOVA Chemicals Community Nature Trail, located just north of the Joffre Site, we received community input on the possibility of attracting bees to the area. We acted on that recommendation and last year we engaged a specialist to create an educational pollinator trail. The pollinator trail opened this Summer and is designed to raise awareness and provide an educational opportunity for our visitors.



*12 interpretive signs along the new pollinator trail provide visitors with information on the plants and the bee hotel — an ideal environment for pollinators.*

The mini-trail is looped off the east side of the main west trail system and houses a variety of plant species that increase the floral resources for pollinators. We're also excited about the inclusion of a pollinator hotel.

We invite you to come visit this newest addition to the NOVA Chemicals Community Nature Trail.



## Lacombe County officials annual Joffre Site visit

Each year we invite elected officials and staff from Lacombe County to visit the Joffre Site to meet with our leaders and staff. These visits provide an opportunity to discuss any areas of interest related to our site operations and plans, as well as collect input or concerns from the community.

This year we were excited to include a tour of the Educational Pollinator Trail (see story above). The visit also included discussions on plastics and finding collective solutions toward a sustainable future. Lacombe County, Red Deer County and Ponoka County recently introduced an agricultural plastics recycling partnership (see right).



## NATURE TRAIL PHOTO CONTEST

To celebrate the opening of the new Educational Pollinator Trail at NOVA Chemicals Community Nature Trail we're holding a photo contest. Entering is easy — simply stop by the trail, take in the natural beauty and send us a photo from your visit. Contest closes **October 31**. Winner will be announced in the December edition of *SiteLine*.

- One entry per visitor
- Send your digital image (.jpg, .jpeg, .png, .tif) to [joffresite@novachem.com](mailto:joffresite@novachem.com)
- Include your name and contact information
- A local independent photographer will judge the contest
- Winner will take home a Bee House and *The Honeybee* book



*\*Images submitted are considered property of NOVA Chemicals and we reserve the right to use them in promotion of the Trail\**

## Agricultural Plastics Recycling Program

*A partnership between Lacombe County, Red Deer County & Ponoka County*



This program is offered to ensure the proper recycling of plastic grain bags. **This service will begin in November 2018 and is offered free of charge to agriculture producers operating within Lacombe County, Ponoka County and Red Deer County.**



Lacombe County will be responsible for providing grain bag collection services. The grain bags will be processed with a grain bag roller on site and collected for eventual delivery to a plastic recycling center in Alberta.

### Requirements:

- Agriculture producers who request grain bag recycling services, must have one individual on site, capable of assisting the rolling and collection operation.
- Grain bags **MUST BE FREE** of grain, mud, dirt debris, and vermin.
- To ensure used grain bags are eligible for recycling, grain bag collection services should be **scheduled within one week of grain extraction.**

### Questions?

Dion Burlock (Lacombe County)  
403.782.8959  
Justin Babcock (Ponoka County)  
403.783.3333  
Cody McIntosh (Red Deer County)  
403.350.2165

To book, please contact Krista Pannenbecker  
403-782-8959 / [kpannenbecker@lacombecounty.com](mailto:kpannenbecker@lacombecounty.com)

# NOVA Chemicals takes action to prevent plastic debris from reaching the ocean



NOVA Chemicals announced in August a three-year investment of nearly \$2 million (US) to prevent plastic debris from reaching the ocean by investing in Project STOP. This project is a new global initiative to reduce plastic pollution especially in countries with high leakage of plastics into our oceans.

Project STOP was co-created in 2017 by Borealis, a global plastics producer and sister company of NOVA Chemicals, and SYSTEMIQ a firm that invests in innovative sustainable land use, material and energy systems.

"We understand the growing concern about marine plastic pollution and agree we must take meaningful action to address this challenge. NOVA Chemicals' investment demonstrates our commitment to shaping a world that is even better tomorrow than it is today," said NOVA Chemicals' Senior Vice President, Polyethylene Business, John Thayer. "Plastics are too valuable to be thrown away or left as litter. We're working with Project STOP to find high-impact solutions to prevent plastic pollution in critical locations around the world."

Southeast Asia has been identified as a major source of marine plastic debris as economic development and plastics

consumption have outpaced the expansion of waste management systems in the region. Project STOP has chosen Indonesia as a primary focus region. NOVA Chemicals' investment will support the first city partnership in Muncar, a coastal fishing community located in Banyuwangi, Indonesia. With minimal waste services in place, many citizens are forced to dump their waste directly into the environment. Muncar was chosen due to the seriousness of the challenge, coupled with strong leadership and environmental commitment at national, regency and local levels.

"We are delighted to work with NOVA Chemicals to stop plastic pollution from reaching the world's oceans," said SYSTEMIQ's Martin Stuchtey. "There is a great need to accelerate circular waste management solutions in Asia, and we are very excited to design and deliver this new city partnership model, working collaboratively with our global corporate partners and our government partners in Indonesia."

**For more information please see our news release of August 28, 2018 at: [www.novachem.com](http://www.novachem.com)**

## TC Taking Care In Action 2018 Team Activities

So far this year, the Joffre Site Taking Care In Action (TCIA) team has been busy organizing many community events with positive environmental impacts. The infographic below gives an overview of the activities.



### Spring Roadway Clean-Ups

**28 KM OF DITCHES CLEANED** on HWY #11 & Freedom Rd

EMPLOYEES' KIDS TEAMS PARTICIPATED

6 youth groups raised \$1,000 each



### Red Deer River Clean-Up

**18 EMPLOYEES & FAMILIES** joined 160+ community volunteers

PROUD SPONSOR OF FREE BBQ FOR ALL PARTICIPANTS

Parkland Trek helped cook/serve



### Tree Planting

21st year we've participated

**1,430 SEEDLINGS** PLANTED BY **22 EMPLOYEES & FAMILIES**

~13,000 SEEDLINGS PLANTED IN 21 YEARS

Supports Red Deer Urban Forestry Project



### Our Support Appreciated

**BLACKFALDS GIRLS U12 FASTBALL TEAM** highway clean-up fundraiser enabled the purchase of "real" uniforms and equipment

**"WE LOOK LIKE AN OFFICIAL TEAM NOW!"**



### E3 Turnaround Carpooling

**38%** of turnaround contractors participated\*

\*doesn't include bused workers

AND WE'RE NOT DONE YET!

### Our Fall activities include...

- Great Canadian ShoreLine Clean-Up
- HWY #815 Clean-Up by Parkland Trex
- Adopt-A-Highway
- Site-Wide Carpooling

## Change of pipeline operators in Joffre area

Effective this October, Pembina Pipeline Corporation, as owner of the Alberta Ethane Development Company Ltd. (AEDC), assumes operations of the Alberta Ethane Gathering System (AEGS). AEGS has north and south sections that feed into the Joffre pump station, south of the Joffre Site. Pembina acquired this asset a year ago as part of the purchase of Veresen Inc. NOVA Chemicals has operated AEGS on behalf of AEDC since 2005.

Commencing October 1, 2018, Pembina will be providing information to you and others along the AEGS route on emergency preparedness and response.

NOVA Chemicals continues to operate, and own, the Joffre Feedstock Pipeline (JFP) as well as the Ethylene Delivery System (EDS). Both these pipelines primarily share the same right of way from Fort Saskatchewan to Joffre. These pipelines safely transport the feedstocks and products essential to our operations and others in Alberta's petrochemical industry.

This Fall our representatives will be visiting residents within our 5 km zone to discuss any items you might have about these pipelines or our operations, and to provide you with updated emergency preparedness and response information.

**Please call us at any time if you have any questions, concerns or suggestions: NOVA Chemicals Toll Free, 24-hour line: 1-800-780-6682.**

## Fall 2018 Responsible Care verification

NOVA Chemicals takes part in regular verification processes since we received Responsible Care status in 1994.

The Chemistry Industry Association of Canada (CIAC) regularly assesses member companies for credibility with peers and the public, and for continuous improvement in the implementation of the Responsible Care ethic and principles.

The CIAC-appointed team includes a community representative. The Joffre Community Advisory Panel provides input into the selection of the community representative. Mike Forsyth will be the representative for this year's verification which takes place the first week of October.

As with previous verifications, we will provide more information on the outcome in *SiteLine* and at our community open houses.

### SiteLine is published by NOVA Chemicals Corporation

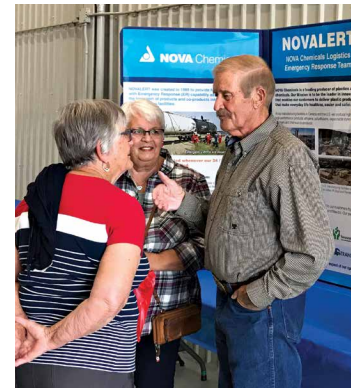
P.O. Box 5006, Red Deer, AB, T4N 6A1  
Attn. Roxann Good: 403.314.7421

### For more information, please see these websites:

- [www.novachemicals.com](http://www.novachemicals.com) | [www.novachemicals.com/Joffre](http://www.novachemicals.com/Joffre)
- Chemistry Industry Association of Canada: [www.canadianchemistry.ca](http://www.canadianchemistry.ca)
- American Chemistry Council: [www.americanchemistry.com](http://www.americanchemistry.com)



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Responsible Care® is a registered trademark of the Chemistry Industry Association of Canada (CIAC).



## August event focuses on emergency preparedness

We had our largest turn out ever this year for our annual Emergency Preparedness Awareness BBQ on August 16. More than 84 guests (adults and children) from our five km zone took part in tours of our emergency equipment, visited information booths and validated emergency response contact information. Kids enjoyed the bike rodeo, genScience table where they made "slime" and the Bronto lift rides.



## Community Open House

**Date:** Wednesday, October 17, 2018  
**Time:** 5:30 to 6:30 p.m. "Drop in to Chat"  
6:30 to 7:30 p.m. Presentation / Discussion  
**Place:** Haynes Hall (Travelling east on Highway 11, turn north (left) on Range Road 244 for 3.3 km to Township Road 390. Cross over 390 and take first left into parking lot of Haynes Hall.)

**Refreshments will be served**

**Agenda:**

- Get business and facility operations updates
- Review 17th Annual Environment Report to our community
- Provide your input and suggestions
- Fun science experiments for kids

**We hope to see you there!**

Connect with us!



**Responsible Care®**  
Our commitment to sustainability.