

Overview of Our Application to Alberta Environment and Parks for Renewal of Operating Approval 48309-01 (as amended)

under the *Alberta Environmental Protection and Enhancement Act (EPEA)*

April 2018



Background

NOVA Chemicals Corporation (NOVA Chemicals) owns and operates a petrochemical manufacturing complex referred to as the “Joffre Site” in Lacombe County, approximately 20 kilometres (km) east of the City of Red Deer. The Hamlet of Joffre is the closest population centre, located approximately three km north on Highway 815.

NOVA Chemicals has had petrochemical operations at the Joffre Site since 1979. Today, through ongoing capital investment, enhancement and continuous improvement of our processes, the Joffre Site is one of the largest ethylene and polyethylene complexes in the world. NOVA Chemicals directly employs more than 1,300 people and hundreds of contract personnel in Alberta.

Operating Approval #48309-01 (as amended) was issued in September 2009, and since that time we received several amendments to reflect operational changes. Our current Operating Approval expires in 2019. Our Application for Renewal of this Operating Approval was submitted to Alberta Environment and Parks (AEP) in accordance with *EPEA* in April 2018.

Since the 2009 Operating Approval was issued, the general state of the environment in the vicinity of the Joffre Site has not changed significantly. For example, there has been no residential development nearer to the Joffre Site, water usage within the Red Deer River has not expanded significantly, and there has been limited industrial growth.

Our Application for Renewal includes:

- A description of our operations, manufacturing processes and supporting infrastructure at the Joffre Site;
- A review of our environmental management programs and systems (air, water, waste, soil and groundwater, and conservation and reclamation), including our commitment to Responsible Care® and sustainability, health, safety and the environment;
- An overview of the Joffre Site’s environmental performance in key areas since the last renewal (2006 to 2016), along with continuous improvement measures we have implemented; and
- Highlights of our public consultation and communications program related to this application.

Public Consultation and Communications related to this Application

NOVA Chemicals continues to be open to input on any aspect of our operations, and we continue to consult with stakeholders so that identified mitigation measures are effective, and any new issues and / or opportunities are addressed.

In the course of consultation related to this application, no new issues were identified through discussion and contact with stakeholders.

Through our ongoing consultation and communications program, we continue to manage — with ongoing stakeholder input — issues and opportunities we know are priorities for our community. These include plant reliability and related flaring issues such as noise, management of increased rail traffic to and from our site, local business and employment opportunities and plastics recycling and product sustainability. We regularly report to stakeholders on our environmental and issues management programs through communications tools such as our Community Open Houses and our newsletter *Siteline*.

Public Review of Our Application for Renewal

Once our application to AEP is deemed complete by the Department, notices will be placed to allow for public review of the application.

If you have any comments or questions on our application or about the information in this fact sheet, please contact us:

Community Relations
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Overview of Environmental Performance 2006 to 2016 and Continuous Improvement Measures

A review of our environmental performance is a key component of our Application for Renewal. To reflect this, our consultation and communications program with key stakeholders in 2017 focused on this content from 2006 to 2016 and provided opportunities for review and discussion.

The following is an overview of the information we provided to stakeholders and which we have included in detail in our Application for Renewal. (Our September 2017 Annual Environment Review edition of *SiteLine*, our community newsletter, included graphs and more information on key performance indicators.)

Comprehensive Air Emissions Management Program

Our Joffre Site program includes targets for emission reductions, monitoring and testing to ensure emissions are below compliance limits, and strategies to achieve continuous improvement in performance. In addition to ambient monitoring data, air dispersion model results indicate that all parameters (sulphur dioxide, nitrogen dioxide, particulate matter, carbon monoxide and ethylene) are consistently below the respective Ambient Air Quality Objectives set by AEP except for two exceedances of ethylene recorded at our ambient air monitoring stations tied to two release events. Our model also indicated the potential for exceedance of the three-day ethylene result. The modeling used approval limits or maximum historical emissions. We believe, however, that aside from these rare exceedances, we can continue to operate under air quality objectives at full production rates.

We have undertaken a series of continuous improvement measures with respect to air emissions since our last renewal, for example:

- Modifications to equipment and systems have resulted in a significant reduction in the total volume flared and the reduction of start-up flaring by over 90% from 2002 levels at our Ethylene 3 (E3) facility.
- We continue to pursue flaring reductions at Polyethylene 1 (PE1). In 2009 we began operation of a monomer recovery system on one reactor;
- Our Ethylene 2 (E2) Furnace Refurbishment Project began in 2014, with five of the 11 furnaces now upgraded and modernized. We incorporated best available technology low nitrogen oxide burners and confirmatory stack tests to date have demonstrated expected reductions in nitrogen oxide levels. Planning is now underway for phase two, which will include four of the remaining six furnaces.
- We have seen a 42% reduction in total emissions from fugitive volatile organic compounds (VOCs) since 2006.

To improve on our ambient air monitoring program, we would like to consolidate our analyzers with our two southerly stations and remove the station that is within the fence line.



Greenhouse Gas (GHG) Emissions Intensity Reductions

NOVA Chemicals Joffre Site has achieved nearly a 4% reduction in GHG emissions intensity as compared to average emissions intensity established during the baseline period of 2003 to 2005. In relation to new provincial and federal GHG emissions regulations, NOVA Chemicals continues to focus on energy efficiency strategies and technology investment in order to attain continuous improvement in our GHG emission intensity goals.

Water Management Programs

To minimize our impact on this resource, we continue to focus on compliance with all water discharge requirements, as well as responsible water use which focuses on recycling/reuse of this resource. Water is either diverted from the Red Deer River or collected from precipitation on-site. The amount of water diverted has been relatively stable, and remains under our licensed water allocations from the Red Deer River. In 2016, for example, we withdrew almost 14.1 million cubic metres (62%) of our allotment from the river.

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In terms of continuous improvement in our water management programs:

- We constructed a new retention pond which will be fully operational in 2018. The new pond allows for more surface water storage for the site and additional water that can be reused in our operations.
- We introduced zinc chloride as a corrosion inhibitor in our cooling water systems resulting in reducing phosphate dosages by more than 30%.
- A 2012 process change in the cleaning of our lime/phosphate ponds using a centrifuge has resulted in a 42% reduction in moisture of the spent lime sludge. Our Joffre Soil Enhancement Program uses the spent lime from water treatment operations as a beneficial soil amendment on local area farm land. The reduced water content means a reduced number of truck loads of this material and easier spreading of the lime.

Waste Management Program

Our comprehensive Waste Management Program emphasizes minimization, and where possible, total avoidance of waste generation. The program is assessed annually for effectiveness.

We have implemented a number of continuous improvement measures in our waste reduction efforts:

- With an approximate 50% reduction of the number of decokes in our E1 furnaces as a result of furnace improvements, we have significantly reduced the amount of coke sludge waste produced and shipped off-site.
- Over the last 11 years we have also reduced the amount of ethylene sludge from our manufacturing facilities by 48%.
- We have improved our on-site staging areas for waste collection.

Soil and Groundwater Management and Monitoring Program

Our focus is on the prevention of spills and releases, control or elimination of sources of contamination and removal of the possibility of contamination through the use of best available technology in new facilities. An extensive monitoring program is in place to understand and manage risks. Overall compliance monitoring results indicate that while there are some identified areas of contamination associated with operation of the Joffre Site, they are localized and not migrating horizontally from the industrial area delineated by the Joffre Site fence line or vertically to the underlying bedrock.

Conservation and Reclamation Plan

In keeping with the requirements of our Application for Renewal, we have a Conceptual Reclamation Plan to address the end of life of the site. While NOVA Chemicals plans to operate the facilities

at the Joffre Site for the foreseeable future, at such a time as we engage in the decommissioning of the plants we will reclaim the site to comparable or improved land use compatible with surrounding agricultural land use. Minimizing the impacts on all natural resources, including land, is an important consideration in our operations. Documented conservation and reclamation activities include the locations of topsoil and subsoil that have been stockpiled for future site reclamation.

Noise Management Strategy

Our strategy is constantly being updated and adapted to reflect site changes. The overall goal, however, remains the same: to mitigate site operating noise impact on our neighbours. With the completion and commissioning of the PE1 Expansion Project in 2017, we have validated noise sources. Modeling indicates there are a few noise sources with higher noise results than estimated prior to construction. Results indicate only a slight increase in noise levels that would not be an audible change at nearby residential locations. We are, however, evaluating mitigation options to reduce these noise levels.

Light Management

In 2017 measurements were taken to assess light trespass, glare and sky glow. Both light trespass and glare values were low. Sky glow values were as expected for this type of facility and there have been no significant changes since the 2002 assessment.

Emergency Response

To protect the health and safety of workers, the public and environment, NOVA Chemicals has an integrated site emergency response plan developed to respond to any emergencies on-site including environmental emergencies. The plan is reviewed and updated annually.

