

# OPTIMAL EXPLOSION RISK MANAGEMENT

40  
YRS

**BBA**

CANADIAN CONSULTING  
ENGINEERING AWARDS 2020



ASSOCIATION OF CONSULTING  
ENGINEERING COMPANIES | CANADA

CANADIAN CONSULTING  
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## COMPLEXITY

**The Canadian dairy cooperative Agropur is one of the world's top processors. A recognized leader in the Québec industry, Agropur has 39 sites in North America focused on steady, healthy and sustainable growth.**

### UNFORESEEN CIRCUMSTANCES AT THE PLESSISVILLE PLANT

In the spring of 2018, a CNESST inspection questioned the method for collecting processed protein concentrates used to make milk powder.

Management was then informed of incidents having occurred at other processing plants, highlighting the risk of explosion as milk concentrate is converted to powder form. Though it may seem harmless, milk powder can become explosive when suspended in the air, just like hydrogen. Although an explosion is unlikely, the consequences can be serious.

Management was given 60 days to bring the plant up to standard and ensure the safety of its employees. This was quite a stressful situation given the extremely short time frame and the scope of work—a mandate normally ranging from 12 to 24 months. Given the urgency and the complexity of the challenge, management called on BBA.

### STRATEGIC ANALYSIS TO BEAT THE CLOCK

From the outset, BBA experts attributed the lack of a prior risk analysis to the priority of carrying out a strategic classification of equipment.

By distinguishing existing hazards to workers from other compliance changes, experts were able to demonstrate that 15 of the 30 pieces of equipment initially identified were not a priority. The schedule was mixed with temporary and permanent mitigation measures, as well as control solutions.

### MITIGATION MEASURES WITH MULTIPLE SCENARIOS

Corrective measures were taken head-on by multidisciplinary teams—made up of Agropur directors, plant managers and employees, and preferred contractors—led by BBA. This saved time and allowed for unforeseen circumstances, such as a delay in equipment delivery. Several scenarios were prepared for each solution in parallel with a pre-established sequence to maximize reaction time.

Much like an orchestra conductor, BBA set the rhythm, working with a complex score throughout the project. A detailed dashboard allowed stakeholders to coordinate their efforts using a fine-tuned project management system.



## 60-day challenge

Bring the plant up to standard by modifying equipment at risk of causing an explosion.



## MEETING CLIENT NEEDS

### CLEAR ROLES AND RESPONSIBILITIES

Bringing the plant up to standard in 60 days was nearly impossible to achieve. Management at the Plessisville plant had full confidence in BBA's experts to give clear project direction. This action plan left nothing to chance, reassuring the client and reducing the negative impact on employees.

It should be noted that this procedure was highly disruptive to the plant's daily operations.

Despite determination to achieve the objective, employee safety and well-being remained a primary concern.

### EXEMPLARY DEDICATION

At the end of the summer, 60 days after the start of the project, Plessisville plant employees were able to breathe a sigh of relief—authorities deemed the facilities fully compliant. Such an achievement was made possible thanks to the total commitment of everyone involved. The Agropur plant management team was very proud of its employees, both in preparing and executing the work, and wants to thank them wholeheartedly.



AGROPUR PLANT, PLESSISVILLE

“ BBA's experts brought a different perspective to a complex issue. They helped us make the plant safe in a short amount of time and helped us maintain the motivation and confidence necessary to make the right choices. They led this project masterfully while collaborating with our fully-committed teams.”

— DONALD LÉVESQUE, P.Eng.  
Engineering Manager - Industrial cheeses,  
Fine cheeses and Ingredients  
Agropur Canada

## ENVIRONMENTAL BENEFITS

### LIMITING FOOD LOSS

In a time when food waste is making headlines and causing widespread concern, Agropur stands out for its efforts to use all milk components. This project made it possible to continue doing so, which contributes to the environmental objectives of the 3Rs+V principle: reduce, reuse, recycle and extracting value.

Considering that a single day of interrupted production represents a loss of 600,000 litres of milk and 30,000 kg of milk protein concentrate for consumption, BBA made every effort to minimize production shutdown time to just one week.

### SUSTAINABLE DEVELOPMENT PROSPECTS

As a cooperative that belongs to all its members, Agropur's vision is based on sustainability and quality, rather than on profits by any means. BBA proposed solutions to the Plessisville plant that included long-term improvement objectives for sustainable development.

### SOCIALLY RESPONSIBLE PROJECT

By adopting a preventative approach, Agropur has proven itself a responsible corporate citizen. With BBA's support, the cooperative has implemented best practices to remedy a potentially dangerous situation, protecting citizens and surrounding farmland.



Every production day saved helped save:

- **600,000** LITRES OF MILK
- **30,000** KG OF MILK PROTEIN CONCENTRATE





## INNOVATION

### INNOVATION STARTS WITH A SOLID FOUNDATION

BBA's mandate at Agropur's Plessisville plant is a perfect example of how innovation can sometimes be achieved by going back to the basics, while creatively and strategically adapting these well-known principles.

From the start of the project, BBA experts were able to reassess the concept of risk by not allowing the urgency of the situation to distract them and by carrying out an in-depth analysis. Processes and equipment for dust collection, bagging and cooling were treated as a priority, which allowed for a realistic and fast-paced schedule.

### RETHINKING PROJECT MANAGEMENT

With considerable experience in multidisciplinary projects, BBA brought together its mechanical, automation, structural, process and project management experts who all shared the same vision for problem solving.

Together, they took an innovative approach by developing multiple scenarios for each portion of the mandate, allowing for flexibility. There were multiple parameters in the equation: scheduling, worker and equipment availability, and the plant's physical capacity.

Dairy processing, though an industrial procedure, is distinct in that employees must remain physically close to the product to ensure its quality.

One of the scenarios even proposed wearing a full-pressure suit (like a kind of diving suit) for a short period of time, but experts were able to cleverly modify the process equipment to ensure less restrictive and safer access.





## SOCIAL AND ECONOMIC BENEFITS

### A MAJOR SOCIOECONOMIC PLAYER

Agropur is owned by more than 3,160 dairy producers. "These members decided to join forces to take control of their own future and the fruits of their labour [...] Members each have one vote, regardless of the size of their farm."<sup>1</sup>

### INVESTING WISELY, DESPITE THE URGENCY

Every day, the Plessisville plant processes 600,000 litres of milk and 300,000 kg of concentrate and employs 89 workers.

BBA made every effort to design a schedule that limited plant shutdown. Each production day saved led to several thousand dollars of savings in plant employee wages and income for the families of dairy farm owners.

Despite the exceptional situation, BBA was able to draw on its experience and offer improvement solutions that will benefit Agropur both now and in the long term.

### A HAZARD BECOMES A LEARNING OPPORTUNITY

Everyone involved in the project learned a great deal from this experience. "They say you learn more in rough seas than you do in calm waters, and this mandate proves that. As an engineer, it's the type of project that transforms your career and confirms why you do this job." – Hugues Châteauneuf, BBA

<sup>1</sup> <https://www.agropur.com/en/our-cooperative>



## 89 THANK YOU'S

BBA and Agropur want to thank the 89 Plessisville plant employees who cooperated tremendously in preparing, carrying out, supervising and ensuring the safety of the project. Without them, the project could not have been completed on schedule.

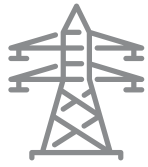


## APPENDIX 1

### BROADER THINKING. ON-POINT ENGINEERING.

BBA has been providing a wide range of consulting engineering services for 40 years. Engineering, environment and commissioning experts team up to quickly and accurately pinpoint the needs of industrial and institutional clients. Recognized for its innovative, sustainable and reliable solutions, the firm stands out for its expertise in the fields of energy, mining and metals, biofuels, and oil and gas. BBA has 12 offices across Canada to provide local support and offer clients increased onsite presence.

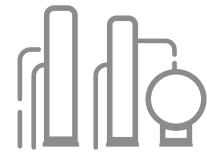
[www.bba.ca](http://www.bba.ca)



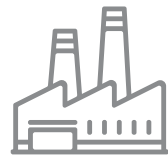
Energy



Mining and Metals



Biofuels, oil and gas



Other industries





40  
YRS

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