



3DEXPERIENCE®

# EFFICIENT DUMP DESIGN SAVES AGNICO EAGLE \$1.4 MILLION

Ore control software and services improves accuracy  
and increases output by 70,000 ounces



A view from the primary crusher pad at Agnico Eagle's Meadowbank gold mine in northern Canada looking at the conveyor system transporting crushed ore to the domed mill stockpile.



### Challenge:

Create and integrate mine design and production schedules with geological modeling to increase in-house knowledge and ensure profitability does not falter.

### Solution:

Implement GEOVIA GEMS™ SQL, GEOVIA MineSched™ and GEOVIA Whittle™ with onsite GEOVIA Services training and assistance for life of mine estimation, life of mine production scenarios, pit optimization, pit designs and ore control.

### Benefits:

A strong mine plan and streamlined operating process that decreased hauling and construction costs.

A smoother process for resource updating – rapid analysis reduced evaluation time from weeks to days.

## COMPANY PROFILE

Located in the Kivalliq region of Nunavut, about 2,600 kilometers northwest of Toronto, the Meadowbank mine is Agnico Eagle's largest gold producer, with 1.8 million ounces of gold in proven and probable reserves since the open pit began in early 2010.

## CENTRALIZED MINE MANAGEMENT

Meadowbank's technical staff use GEMS as their central geology, survey and engineering mine management software. They also use Whittle for strategic mine planning and pit shell optimization and MineSched for life of mine and medium-term planning. After struggling for over a year with a competitive software solution, Meadowbank switched to GEMS and engaged the Dassault Systèmes' GEOVIA Services team to help streamline their long-term planning. With a skilled GEMS power user onsite to train their staff, using their data, Meadowbank was pleased when the switch to and implementation of GEMS was completed successfully. Their staff use GEMS SQL for pit design and road design infrastructure, and appreciate that it can handle the large amounts of data contained in their complex operation.

GEMS SQL provides Meadowbank the tools they need for

access control and data integrity. "GEMS SQL provided a safe network-based platform with additional security. We can control access to data with read and write permissions, which is a big advantage on the geology side," says Eric Ramsay, Senior Mine Geologist. Instead of spending time transferring data between platforms, GEMS SQL helps to ensure all users are working with the correct version of the data on the same platform – be it pit shells, pit design, or a block model. "With GEMS, you quickly establish your routine process, which streamlines all of our processes," says Stephane Frechette, Engineering Assistant Superintendent.

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– Eric Ramsay, Senior Mine Geologist

## IMPROVING IN-HOUSE EFFICIENCIES AND KNOWLEDGE

With the help of GEOVIA Services staff, Meadowbank now completes all of their optimization and design work in-house and regularly performs, multi-scenario economic analyses ensuring they achieve the best results, both accurately and efficiently.

"Having a dedicated GEOVIA staff member onsite was excellent. He provided technical support which advanced our operations," says Frechette. "Working together, we surpassed last year's production targets. We provided a strong mine plan that we've been able to also surpass with clear planning for the mine operation." As a result of GEOVIA training, Meadowbank is now able to perform faster, better optimized adjustments to pit shells and pit designs by their in-house design teams. The staff has gained confidence in their tactical scheduling and planning, and now evaluates various scenarios before defining their long-term plans.

## OPTIMIZED PIT DESIGN

Pit design plays an important role in improving Meadowbank's productivity. In 2013, Meadowbank's gold production was far higher than expected as a result of creating multiple designs for different scenarios to enhance their operations and productivity. "GEMS SQL is a good tool to do the designs. We've been able to optimize our pit designs with the software," says Frechette.

At the time Meadowbank began using GEMS, they also implemented Whittle to assist with economic optimization of the pit design. "All your designs start in Whittle. You cannot work in the open pit environments without a tool like Whittle – you can't live without it," says Frechette.

## EFFICIENT DUMP DESIGN SAVES \$1.4 MILLION

Meadowbank also enjoyed significant savings by improving the layout and design of their in-pit dumps. When it came time to design the new dumps, they created several scenarios with many



The airstrip at Meadowbank is located just north of the main camp facilities and processing plant, which are bordered by the Portage Pit and Third Portage Lake.

unique filling and access options. This allowed Meadowbank to choose a design that increased the capacity of the dump by 1.7 million tonnes, which decreased hauling and construction costs, when compared to the original plan, for an overall saving over the life of mine of approximately \$1.4 million.

## IMPROVED LIFE OF MINE PLANNING

Meadowbank continually seeks to reduce production costs, and modifies the long-range plans on-the-go ensuring they are up to date with current operations. “Since we have started working with MineSched, our team training and mine planning at Meadowbank has improved significantly,” says Yvon Sylvestre, Agnico Eagle’s Senior Vice President Operations, Canada & Europe. Using MineSched, Meadowbank regularly performs rapid scenario analyses to incorporate timely adjustments to their life of mine plan, helping to ensure they are still on track. Prior to MineSched, they would spend weeks completing a CAD evaluation for just one scenario. Now, in a few minutes, MineSched can verify the effects of changing variables in schedules.

With MineSched, Meadowbank has seen significant efficiencies gained with their life of mine planning. When the unexpected loss of a truck resulted in a 5% reduction in Meadowbank’s capabilities – within a matter of days, they completed another life of mine plan, re-evaluated the impact on both their production and planning, and determined a new plan. Prior to using MineSched, this process would have taken several weeks to complete.

## RAPID SCENARIO ANALYSIS

Now using rapid scenario analysis, Meadowbank’s technical department is much more responsive and flexible to management requests and changes. When the price of gold went down, Meadowbank re-evaluated their reserves in a timely manner to ensure profitability did not falter. “Having tools like GEMS and MineSched provides a smooth workflow that allows you to quickly look at various options and evaluate several differences in designs. The smoother and faster we perform these operations in-house, the less need there is for an outside consultant to do the work for you,” says Ramsay.

## SMOOTH ORE CONTROL PROCESS

GEOVIA Services worked with Meadowbank’s Geology department to construct a short-term production block model to increase the level of accuracy of the current ore control procedures, and to provide a continually updated geological model based on daily results from the pit. Meadowbank now has a documented process that defines the boundaries of the different ore zones from blast results; tracks the daily advance within each mining block; predicts the grade and tonnage feed to the mill and dumps; and determines the remaining blasted inventory in the pit.

“GEMS Ore Control module allows all grade control data to refine the reserves. When it comes time for semi-annual or annual reserves review, all the production data is already accounted for in the reserves block model, which improves your reserves modeling. That is the really big advantage with GEMS Ore Control – it makes resource updating a much smoother process,” says Frechette.



The customizable dashboard output from MineSched enables quick and efficient results analysis.

## GREATER ACCURACY INCREASED OUTPUT BY 70,000 OUNCES

With a goal of increasing revenue generated through higher gold production, Meadowbank not only found new pockets of higher grade ore within the deposit, but also identified which areas would be best to mine. As a result of their improved accuracy in classifying pit material, they focused their fleet on the Goose pit, and increased output by 70,000 ounces in 2013.

GEMS enables Meadowbank to model all aspects of their mining operation. When higher grade ore was found, Meadowbank quickly and easily adjusted their geological models to help maximize output of the higher grade. They modified their polygons in real-time to take into consideration the higher value and quickly re-estimated the block model.

As a result, there was no delay between when they originally found the higher grade ore and when they could utilize it as high grade material. All of this was completed within a matter of weeks. Meadowbank not only defined the high grade zone, but also determined a plan to exploit the high grade material, helping to ensure that production targets were met, and in some cases surpassed – the end result was a 16% improvement in reserves grades in 2013.

## EFFICIENT PRODUCTION SCHEDULING

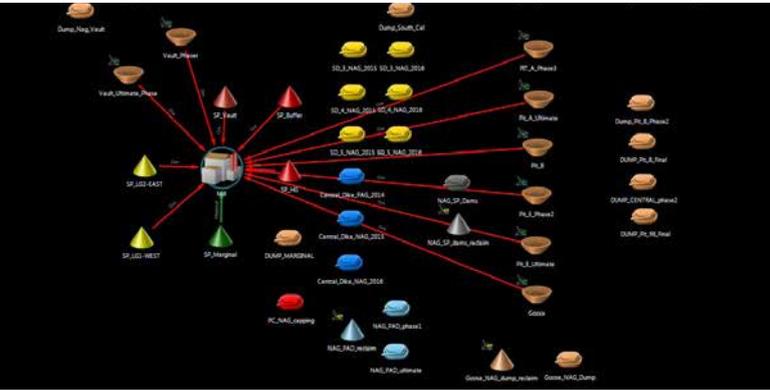
Meadowbank is one of the most complicated waste management sites in Canada with 14 dikes, 9 pits, multiple dumps and more than 100 haul routes – all of which are digitized and scheduled in MineSched.

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The interactive material management view in MineSched provides a simple interface to manage the complex design of the flow of material.

To increase operational efficiencies and reduce costs, Meadowbank modeled their entire material handling plan in a MineSched schedule. They now track how much construction and reclamation material is needed, whether they have enough material available, and when they have the capacity to move it. Thanks to accurate planning and forecasting, Meadowbank eliminated four contractor trucks from their hauling fleet, resulting in significant operational savings. Using MineSched, Meadowbank determined that they could both feed the mill and meet, or even exceed, their production schedule targets without those four trucks.

“With MineSched, we’re much more accurate in our planning and evaluation of truck hours. We’re saving on contractor costs, because this tool helps us to accurately evaluate new projects,” says Ramsay.

Previously, Meadowbank had two low grade stockpiles that occupied key locations around the site. Once the stockpiles were processed, the Engineering team was able to quickly design new waste dumps, which were configured for capacity and operational efficiency. As a result, they now include more short-haul in their waste management plan, which increased

mining capacity by focusing on the high grade areas.

Meadowbank has tracked the entire mine closure plan, as well as the life of mine operational plan, in one system. They now have peace of mind that they have the haulage and the mining capacity to maintain the production numbers, while also following through with their mine closure plan.

“MineSched is an amazing tool – if you don’t manage your time and schedule effectively, you won’t be able to meet your mine objectives. Managing all of this in a spreadsheet would be impossible,” says Frechette.

## MAINTENANCE AND SUPPORT

As a subscriber to GEOVIA’s Maintenance and Support program, Meadowbank’s Geology department regularly takes advantage of the online webinars and support. When needed, it accesses the Support website for any required support, updates, patch files, and occasionally, submits specific product use questions. “We’ll just open a support case with GEOVIA Support personnel, and it has been working pretty well,” says Frechette. “We like the quick response time with all support requests.”

## NEXT STEPS

Meadowbank plans to continue to work with the GEOVIA Services team to further refine their planning and operational activities.

### Focus on Agnico Eagle

Agnico Eagle is a gold mining company with mining operations in Canada, Mexico and Finland and exploration activities in Canada, Europe, Latin America and the United States.

**Headquarters:** Toronto, Canada

**Employees:** 5,500

**TMX Listing:** AEM  
**NYSE Listing:** AEM

**For more information**  
[www.agnicoeagle.com](http://www.agnicoeagle.com)

**Applications Used:** MineSched, GEMS SQL, Whittle

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