

Process automation worth its weight in gold

Memosens pH sensors improve processes at Agnico Eagle



Agnico Eagle Gold Mine, Kittilä, Finland

Agnico Eagle was founded in 1957 and is today one of the largest gold mining companies in the world. The Kittilä mine in northern Finland is the largest primary gold producer in Europe. The mine extracts and processes about 4,000 tonnes of ore per day, which results in the production of approximately 200,000 ounces (or 6,000 kg) of gold per year.

“With Memosens we are able to run the process at tighter limits and therefore more precisely and reliably.”

Jussi Ruokanen
Metallurgist, Agnico Eagle



Jussi Ruokanen



The Kittilä mine in northern Finland

Customer challenge

The ore at the Kittilä mine goes through a treatment process of grinding, flotation, pressure oxidation and treatment in carbon-in-leach circuits. A pressure oxidation circuit (autoclave) is required because of the ore's refractory nature. Gold from the leach circuit is stripped from the carbon and recovered from the solution using electrowinning.

The primary chemical used in the separation process is cyanide, which due to its highly toxic nature places strict reliability and accuracy demands on pH measurements. An inaccurate or incorrect reading could result in a potentially hazardous situation. At the very least such an occurrence would result in difficulties, delays and higher costs.

Agnico Eagle was not fully satisfied with the functionality and reliability of its existing instruments at the time. Inaccuracies in pH measurements resulted in diminished safety and process efficiency. Also, the calibration of instruments was taking up a considerable amount of time and resources. Therefore, the company wanted to significantly boost process control with measurements and at the same time improve the maintenance of the measurement devices.



Our solution

Agnico Eagle carried out an extensive year-long field trial with various manufacturers. Endress+Hauser came up on top, largely thanks to its high-performance instruments, its know-how as well as the friendly and competent service that accompanies the products. The process in the Kittilä mine is not an easy one for measurement and analysis devices, and there are no simple solutions. The discovered technical issues have been solved through close cooperation between the Agnico Eagle and Endress+Hauser teams.

Our Memosens and Liquiline platforms are used as a solution for the challenges concerning pH measurements. The Liquiline digital transmitters and the Memosens sensors are the perfect set-up for demanding liquid analysis. The Memosens sensors perform **reliable**

measurements even in extreme conditions and in demanding applications. The non-contact digital signal between the sensor and the transmitter is very reliable and is not disturbed by any external factors, such as moisture. Calibration can already be performed outside of harsh field conditions. Furthermore, the devices facilitate preventive maintenance.

Correct calibration is the basis for reliable measurements and analysis. Thanks to the Memosens technology **calibration is easier than ever before**, and no longer needs to be carried out in difficult and hazardous field conditions.

A perfect complement is the calibration diagnostics and lab measurement software Memobase Plus. It allows for a connection

between your computer and the Memosens sensor via USB port, giving you virtually instantaneous access to the sensor condition and diagnostics information.

For **grab sample measurements**, Agnico Eagle decided to use Liquiline To Go. The handheld allows to use the same sensor types for grab sample measurement as in the process. This eliminates deviations resulting from the use of different sensor technologies.

The **cleaning of devices** positioned outdoors was difficult, time consuming and inconvenient, especially during the -40°C winter months. The automatic cleaning feature of our instruments provides Agnico Eagle measurable improvements in terms of both efficiency and staff satisfaction.

✓ The results

- The time spent on calibrations and field repairs was reduced from 2200 to approximately 240 labor hours per year. This means a reduction of 90%.
- The released time and labor resources can now be used for more productive tasks.
- With the use of Memosens and Liquiline instruments maintenance activities no longer have to be carried out under difficult conditions in the field so that working safety and convenience have been improved.
- Using the same measuring technology for manual and inline measurements led to complete data consistency and, thus, to more confidence in the measuring results.
- The consumption of chemicals such as the expensive sodium metabisulphite was reduced by up to 50% – because of the more accurate pH measurements. The optimized dosing saves money and increases process as well as occupational safety.

Thanks to the achieved process improvements Agnico Eagle has grown considerably.

“The maintenance efforts for calibrating the pH loops could be reduced drastically. In the past, pH calibration took us 2200 hours each year. With Memosens technology we were able to decrease the time needed to 240 hours per year. This means over 2000 hours less work. With Memosens there is no need to stay in the field for the pH electrode calibration. This is a huge improvement for safety.”

Reijo Mämmioja
Senior Instrumentation Engineer, Agnico Eagle



“Reliable pH measurement allows us more precise dosing of chemicals and therefore substantial cost savings.”

Annika Niiranen
Metallurgist, Agnico Eagle



Liquiline To Go CYM290

Delivered solution components

- Electromagnetic flowmeters
Promag 50P and Promag 55S (100 pcs)
- Coriolis mass flowmeters
Promass 80A and Promass 80F (20 pcs)
- Thermal mass flowmeter and ultrasonic flowmeters
t-mass A, Flowphant T and Prosonic Flow 93 (20 pcs)
- Microwave and capacitive level transmitters
Micropilot FMR50, FMR52, FMR56, FMR57, FMP51 and Liquicap FTI51 (30 pcs)
- Level limit switches
Liquiphant FTL51 and Soliwave FDR50/FQR50 (20 pcs)
- Pressure transmitters
Cerabar M PMP/PMC51, Cerabar S PMP/PMC71, Deltabar S PMD75, Deltabar FMD72 and FMD77 (60 pcs)
- Thermometers
Omnigrad M TR10 and TR13 (30 pcs)
- Analytical instruments (40 pcs)
pH sensors: CPS11D, CPS91D and CPF81D
ORP sensors: CPS92D
Turbidity sensors: CUS51D
Sludge level sensors: CUS71D
Transmitters: Liquiline CM44
Assemblies: CPA140, CPA450 and CPA472D
Accessories: Liquiline To Go CYM290 and Memobase Plus CYZ71D

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