
22 October 2024

Alternative Cochrane Hill Project Design Commences Leveraging successful ore sorting technology trial

Highlights

Following a successful trial of sorting technology on Cochrane Hill's gold ore, St Barbara is undertaking an evaluation of an alternative design approach which would process the ore through the proposed 15-Mile process plant.

- Cochrane Hill Ore Reserve is currently 15.4 Mt at 1.0 g/t Au for 510,000 ounces of gold.
 - Key design changes being considered include:
 - A quarry-style satellite operation at Cochrane Hill, with sorted ore transported approximately 70 km by road to the proposed 15-Mile processing facility for conventional Carbon-in-Leach (CIL) processing for anticipated improved gold recoveries;
 - No processing plant or tailings management facility required at Cochrane Hill, resulting in a more capital efficient project that would also have reduced environmental and social impacts;
 - Utilisation of ore-sorting technology at Cochrane Hill to reduce overall ore haulage and processed tonnages, which appears possible after very successful bulk trials;
 - Optimising the open pit design to eliminate the need for the relocation of a public road;
 - Significantly reduced water usage during construction, commissioning and operations; and
 - Optimised long term waste rock management plans to further reduce the footprint and improve the final landform design post-reclamation.
 - Ore sorting results to date are very promising:
 - Ore sorting trial undertaken on an 840 kg sample using XRT (x-ray transmission) technology;
 - Test work resulted in the concentration of 89.7% of the gold from the bulk sample into 54.3% of the sample mass for a reduction of approximately half of the material requiring transportation and processing with a 1.65 times uplift of the head grade in the resultant concentrate; and
 - Testing conducted with joint funding from the Nova Scotia Department of Natural Resources and Renewables, through the Mineral Resources Development Fund.
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St Barbara Limited ("**St Barbara**" or the "**Company**") (ASX: SBM) advises that it has commenced the evaluation of an alternative design approach for the Cochrane Hill Gold Project in Nova Scotia which would process the ore through the proposed 15-Mile process plant.

St Barbara Managing Director and CEO Andrew Strelein said *"The promising results from the recent ore sorting test work will be incorporated into an evaluation of an alternative design concept for the Cochrane Hill project. This redesign will not only enhance the economic potential of the project by improving the operating costs and minimising capital investment, but it will also make a dramatic improvement in the surface area impacted, water extraction and in impositions upon the community during construction and operation of the project."*

“We are committed to integrating advanced technologies, such as the XRT ore sorting process, which if implemented would allow us to minimise our environmental footprint by using less energy and water and reducing tailings. We are confident that this will generate well paid jobs in rural Nova Scotia and business opportunities more broadly across the province, while maintaining excellence in environmental management.”

Design Opportunities

The current Cochrane Hill Ore Reserve is based on the generation of a float and gravity concentrate from a new processing facility at Cochrane Hill with the concentrate then trucked to the Touquoy plant to produce gold doré (noting the proposed relocation of the Touquoy plant to 15-Mile has already shortened the trucking distance by 44 km).

The encouraging results from the XRT ore sorting trials suggest there is potential to develop the project without building processing and tailings facilities at Cochrane Hill, and instead truck crushed and sorted ore to 15-Mile for conventional CIL processing. In addition to potentially providing a more capital efficient outcome, this design change will also facilitate better environmental outcomes with a reduction in the disturbance footprint at Cochrane Hill and removal of the necessity for any substantial water extraction and no tailings management facilities.

As part of the evaluation the Company also intends to re-optimize the open pit to avoid the need for any relocation of the nearby highway.

Next Steps

Metallurgical test work is nearing completion and an options review will be undertaken to ensure the optimal design is selected for development. The redesign is expected to be completed in Q4 FY25.

The preparation of an Environmental Assessment document will not proceed until there are clear signs of an improved outlook for permitting and regulation from the Nova Scotia Department of Environment and Climate Change (NSECC). In the meantime, Atlantic Mining will prioritise engagement with the community and First Nations.

Test work and results

Ore sorting

Ore sorting is a physical processing method that uses various methods to separate mineralised material from non-mineralised material by testing each individual rock as to its physical characteristics. As part of the ore sorting process, XRT technology can be used to classify the density of the ore and separate the waste material from the mineralised material. In the testing phase mineralogy and metals analysis is performed after XRT classification to confirm if there is a relationship between the density/mineralogy of both of the sorted products.

Test work summary

The Company engaged TOMRA Sorting Solutions (“TOMRA”) to conduct a trial of its ore sorting technology on Cochrane Hill’s ore, to determine if it could reliably sort mineralised material from non-mineralised material. The goal of the testwork was to determine if there are Cochrane Hill ore characteristics that can effectively be identified, delineated and separated using ore sorting technology to deliver material of an upgraded value.

Drill core samples from the Cochrane Hill deposit were carefully selected to represent varying gold concentrations within the ore zone and waste material. These samples were shipped to TOMRA’s ore sorting facility in Wedel, Germany. The samples were passed through TOMRA’s XRT and electromagnetic sensors to classify the materials by its relative density. Subsequent gold and mineralogy analysis was

completed by Wardell Armstrong International Ltd. at its laboratory in Cornwall, England on each product stream from the ore sorting process. The results of the gold and mineralogy laboratory testing showed that there is a reasonable correlation between sulphide minerals and contained gold. The results indicated that the material containing sulphide minerals can be effectively separated using XRT technology.

Results and discussion

Two tests were conducted at the TOMRA Sorting Mining Test Centre in Wedel, Germany on Cochrane Hill material to test its amenability to ore sorting. The first test consisted of sending small rock samples from drill core in order to develop algorithms that would categorise the material based on its relative density. The goal of the first test was to determine if a correlation existed between gold bearing material and density and to train the sensors to delineate the relative densities effectively for future bulk testing.

The second test consisted of sending approximately 840 kg of drill core sample representing the ore and waste zones of the Cochrane Hill deposit. The bulk sample head grade was calculated at 0.57 g/t. The current Ore Reserve average head grade of 1.0 g/t is significantly higher than the material tested however this was intentional as the ore sorting testwork required waste material to be included in the testing to allow for undesirable gold concentration material to be separated and rejected as waste. The sample was crushed to -35 mm and screened at 10 mm. The +10 mm/-35 mm size fraction weighing approximately 555.5 kg was prepared for six stages of ore sorting. The sensors used were the XRT and electromagnetic (EM) sensor. The six stages, defined by algorithms developed in the first testing stage, were (i) inclusions, (ii) small inclusions, (iii) high grade sulphides, (iv) low grade sulphides, (v) quartz, and (vi) conductive. The six resulting product streams from the ore sorting test were imaged with XRT and sent for mineralogy and gold analysis at Wardell Armstrong International Ltd. ("Wardell Armstrong") in Cornwall, England. The mass balance on the ore sorting streams including sulphides and gold concentrations is shown in *Table 1 – Ore Sorting Testwork Results Mass Balance*

Table 1 – Ore Sorting Testwork Results Mass Balance

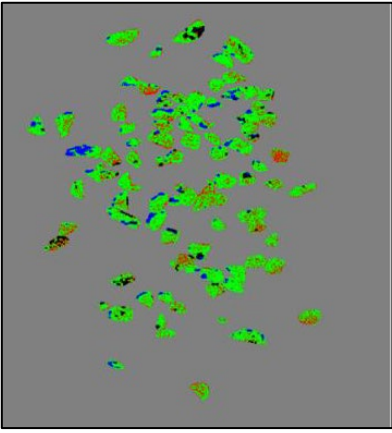
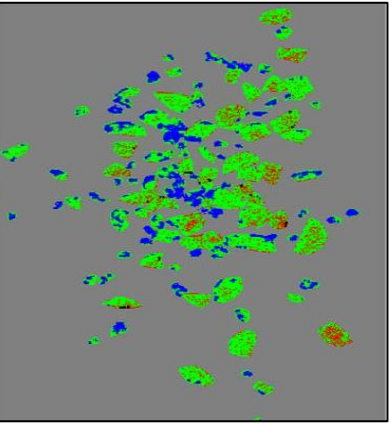
Product Streams	Product Description	Mass		Gold		Sulphide Minerals	
		Weight (kg)	Distribution (%)	Grade (g/t Au)	Distribution (%)	Grade (%)	Distribution (%)
1.0	Screened fines	285.0	34%	0.50	31%	1.9%	42%
1.1	Inclusions	96.5	12%	1.74	36%	3.4%	26%
1.2	Small Inclusions	10.2	1%	3.64	8%	2.8%	2%
1.3	High grade sulphides	57.1	7%	1.26	15%	1.5%	7%
1.4	Low grades sulphide	88.5	11%	0.23	4%	1.4%	10%
1.5	Quartz	5.5	1%	0.08	0%	0.1%	0%
1.6	Conductive	13.4	2%	0.16	0%	3.2%	3%
1.7	Drop waste	270.0	33%	0.09	5%	0.5%	10%
	Total or Weighted Average	826.2	100%	0.57	100%	1.5%	100%

The streams of interest are streams 1.1, 1.2 and 1.3. These streams contain 59.1% of the gold and 35.0% of the sulphides in 19.8% of the feed mass with calculated grades of 1.69 g/t Au and 2.7% sulphides. Adding the -10mm fines back with these streams results in a concentrate containing 89.7% of the gold and 77.3% of the sulphides in 54.3% of the mass resulting in grades of 0.94 g/t Au and 2.2% sulphide. Combining screened fines with ore sorting products is a common ore sorting flowsheet.

The sorting streams 1.1, 1.2 and 1.3 effectively concentrated gold and sulphide minerals. Combining the selected sorting streams with the screened fines resulted in an increase in gold head grade by a factor of 1.65 times while rejecting 46% of the mass. The results show a reasonable association between gold and sulphide minerals. Other mineralogies were analysed as part of the testwork, however no discernible trends were identified from those.

Table 2 – Sorted Product Streams Pictures and Processed XRT Images illustrates the selected product streams 1.1, 1.2 and 1.3 after undergoing the XRT classification and sorting process. The pictures and XRT images are separate and distinct grab samples from each product stream and are shown to provide a representation of how the overall bulk samples were classified. The legend associates the colours shown within the XRT image and what comprises the individual rocks as classified by the XRT sorting equipment.

Table 2 –Sorted Product Streams Pictures and Processed XRT Images

	Product 1.1 – Inclusions	Product 1.2 – Small Inclusions	Product 1.3 – High Grade Sulphides
Sample			
Processed XRT Image			
 Inclusions  Small inclusions  Sulphides  Medium Density (Waste)  Low Density (Quartz)			

Potential application at Cochrane Hill Project

The promising ore sorting testwork results from Cochrane Hill open up new strategies for developing the project with the potential for improved economic performance and reduced environmental disturbance. At an operational level, the potential flowsheet at Cochrane Hill would consist of crushing, screening of fines, XRT sorting of coarse product, followed by re-combination of fines and sorted products to create an upgraded concentrate. The addition of ore sorting equipment to the potential project flowsheet has capital cost and material handling cost implications, however the location of Cochrane Hill relative to nearby St Barbara project sites opens up new opportunities for processing the material without the need of a standalone processing facility. At an operational level, this approach would reduce material haulage and water demand required to produce a saleable gold product and alleviate the need for a standalone tailings management facility at Cochrane Hill.

Third party assistance

The Company worked closely with TOMRA to develop the ore sorting protocols to be tested on the sample material based on TOMRA's industry experience and St Barbara's understanding of the Cochrane Hill deposit's geological characteristics. The testing performed at TOMRA's facilities was undertaken by TOMRA and observed by Company personnel.

Wardell Armstrong International Ltd. performed the third party assaying of gold and mineralogy on each of the sorted product streams at their laboratory in Cornwall, England.

The ore sorting and assaying testwork protocol was reviewed by Ausenco Engineering Canada ULC (Ausenco).

Partial funding for the ore sorting and assaying testwork was provided by the Nova Scotia Department of Natural Resources and Renewables through their Mineral Resource Development Fund by way of an awarded Innovation Grant. The Mineral Resource Development Fund supports projects in the mining sector that attract investment, help grow Nova Scotia's economy and create jobs, especially in rural areas. (Reference: <https://novascotia.ca/natr/meb/mrdp.asp>).

Current Mineral Resource

The Mineral Resources for the Cochrane Hill Project is 21 Mt @ 1.0 g/t Au containing 690,000 ounces of gold (reported as at 31 December 2023).

Table 3 - Cochrane Hill Mineral Resource

Project	Measured			Indicated			Inferred			Total		
	Tonnes (Mt)	Grade (g/t)	Ounces ('000)	Tonnes (Mt)	Grade (g/t)	Ounces ('000)	Tonnes (Mt)	Grade (g/t)	Ounces ('000)	Tonnes (Mt)	Grade (g/t)	Ounces ('000)
Cochrane Hill	10.7	1.1	370	7.7	1.0	240	2.6	1.0	80	21.0	1.0	690

Notes:

1. Rounding may result in apparent summation differences between tonnes, grade and metal contained

Current Ore Reserve

The Ore Reserve for the Cochrane Hill Project is 15.4 Mt @ 1.0 g/t Au containing 510,000 ounces of gold (reported as at 31 December 2023).

Table 4 - Cochrane Hill Ore Reserve

Project	Proved			Probable			Total		
	Tonnes (Mt)	Grade (g/t)	Ounces ('000)	Tonnes (Mt)	Grade (g/t)	Ounces ('000)	Tonnes (Mt)	Grade (g/t)	Ounces ('000)
Cochrane Hill	10.2	1.1	350	5.1	1.0	160	15.4	1.0	510

Notes:

1. Rounding may result in apparent summation differences between tonnes, grade and metal contained.

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JORC Code Compliance Statements

The information relating to Mineral Resources and Ore Reserves contained in this announcement is extracted from the following report:

- “Mineral Resources and Ore Reserves Statement as at 31 December 2023” released to ASX on February 13, 2024

These reports can be viewed on the company’s website [here](https://stbarbara.com.au/investors/announcements/):
<https://stbarbara.com.au/investors/announcements/>

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and, in the case of estimates of Mineral Resources or Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person’s findings are presented have not been materially modified from the original market announcement.