RESTRICTED
2 September 2022

Technical Memorandum 3
Revel Ridge POX Test Work

To: Stacy Freudigmann
From: Jakolien Strauss
Date: 2 September 2022
Subject: Technical Review of 2022 Revel Ridge POX Test Work at SGS Lakefield
CC: Jan van Niekerk, Tim Robinson

1. EXECUTIVE SUMMARY

MO reviewed and commented on POX test work performed on several concentrates produced from the Revel Ridge ore. The following main conclusions may be drawn from the test results:

- A good set of technically competent results were produced by SGS Lakefield.
- The POX tests were conducted to acceptable standards.
- High sulphide oxidation extents and subsequent gold dissolution extents were attained during the test work program.
- The maximum sulphide oxidation extent was recorded as 99.7%, while the maximum gold dissolution extent was recorded as 98.8%.
- The following POX conditions may be considered for treatment of Revel Ridge:
  - Pre-acidification: pH 2
  - Pulp Density: 10-14% (depending on sulphide grade)
  - Retention time: 60-90 minutes
  - Temperature: 220-230°C
  - Hot curing of POX product: 4 hours at 95°C
- Regrinding prior to POX did not improve the sulphide oxidation kinetics, however regrinding of the POX product improved gold dissolution extents.

2. INTRODUCTION

This memorandum is the second in a series feedback memo's providing technical comments on pressure oxidation (POX) test work being performed on a gold-bearing flotation concentrate generated from ore mined at Revel Ridge, British Columbia, Canada. All test work proceeded on a pyrite (gold) concentrate which has already passed through lead and zinc concentrate removal stages per the flow sheet described in Figure 1.1.

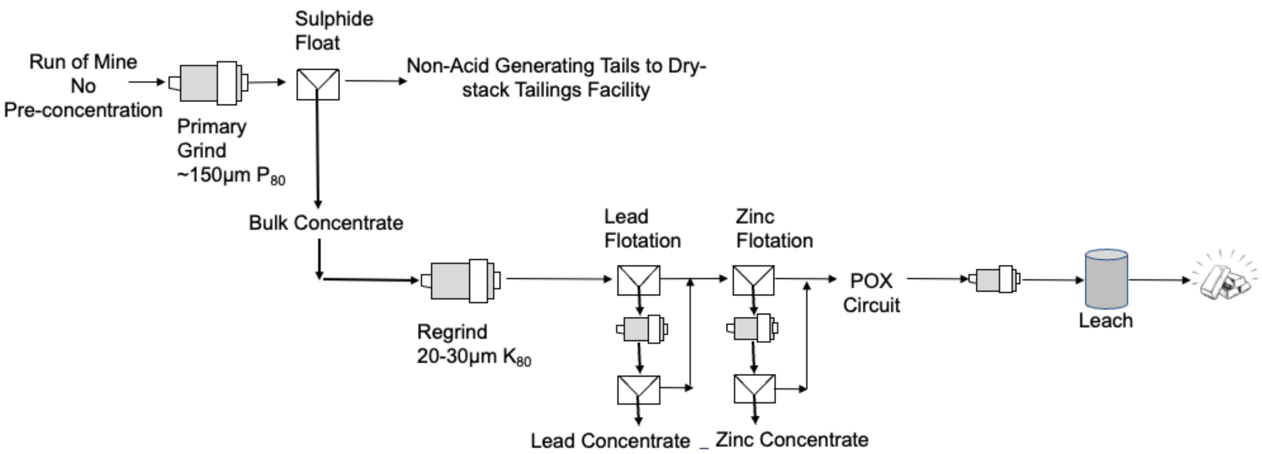

Figure 1.1 : Revel Ridge Proposed Flow Sheet

The objective of the work is to ensure the technical integrity and competence of test work results and data generated. This will enable derivation of the process design criteria for a pressure oxidation (POX) processing option/circuit at Revel Ridge.

The scope of work agreed upon with Metso Outotec includes:

- Receipt of test work program and test work results
- Technical guidance/input towards the test work program (prior to starting and ongoing)
- Ongoing and final review of the data received
- Technical interpretation and generation of an opinion/comment on the results generated
- To provide oversight in that the correct test work procedures/methodologies were implemented for evaluation of the POX process
- Offer quality control focusing on metallurgical balances and procedures
- Recommendations on future test work that should be undertaken (e.g. variability assessment)

Prior to commencement of the test work, the proposed test work matrix was reviewed and agreed upon with Canenco Consulting. The test work procedures and methods were also reviewed and commented on before the test work was initiated.

The first set of tests were conducted by Base Metallurgical Laboratories Ltd (Kamloops) and feedback was provided on the quality of results in Technical Memorandum 1 which has been communicated to Canenco Consulting on the 14th of December 2021. Base Metallurgical Laboratories Ltd subcontracted the work to Bereau Veritas and based on the results it was evident that the tests were being done under severe oxygen mass transfer limitations impacting the sulphide oxidation extents negatively. It was Metso Outotec's recommendation at that point to have the work repeated at SGS Lakefield for confirmatory purposes. The current memorandum will thus focus on reviewing the latest set of POX results generated at SGS Lakefield and to provide recommendations for test work to be undertaken going forward. Note that the scope of work excludes review of flotation test work results/processes to produce the concentrates for the POX test work.

3. SUMMARY AND COMMENTS OF SGS POX TEST WORK RESULTS

Canenco Consulting communicated the POX and cyanidation (CN) results from SGS Lakefield to Metso Outotec on the 16th of June 2022. The conditions employed in the series of Revel Ridge POX tests may be summarised as follows:

<u>Pre-acidification</u>

Temperature:	Room temperature (20°C)
Retention time:	0.25 hours
Target pH:	1 or 2

<u>POX</u>

Temperature:	220 or 230°C
O_2 Over Pressure:	6.8 bar
Retention time:	1, 1,5 and 2 hours
Grind:	Various

<u>Hot Curing (no optimisation done)</u>

Temperature:	95°C
Retention time:	4 hours

The test work proceeded on various concentrates with compositions as described in Table 1.1 below. Sulphide grades varied between 22.2% and 27.0%, while arsenic grades spanned a wider range between 11.8% and 20.6%. It is Metso Outotec's understanding that the concentrates are similar in terms of major sulphide mineralogical compositions. All concentrates contained pyrite and arsenopyrite as the major sulphide minerals. Lead and zinc are hosted in galena and sphalerite which also contributed to the sulphide mineral contents albeit in minor amounts. All concentrates/feeds listed in Table 1.1 should be amenable to POX and represents typical feeds to POX plants.

Table 1.1 : Revel Ridge Flotation Concentrate Compositions for POX Test Work

<table>
<tr><th rowspan="2">Analyte</th><th rowspan="2">UNITS</th><th>Bulk Conc 1 (BL 801)</th><th>Bulk Conc 2 (BL 801)</th><th>BL 801-16 pdts 1-4</th><th>Blend of BL 801-24 Final Tails and BL 801-25 Final Tails</th><th>Blend of Bulk Conc. 1 and Bulk Conc. 2</th></tr>
<tr><th>SGS Test 1 to 3</th><th>SGS Test 4 to 6</th><th>SGS Test 7 to 8</th><th>SGS Test 9 and 11</th><th>SGS Test 10</th></tr>
<tr><td>Au</td><td>g/t</td><td>25.5</td><td>20.7</td><td>15.3</td><td>13.0</td><td>18.6</td></tr>
<tr><td>Ag</td><td>g/t</td><td>41.0</td><td>40.6</td><td>128.0</td><td>60.0</td><td>67.4</td></tr>
<tr><td>As</td><td>%</td><td>20.6</td><td>18.0</td><td>11.8</td><td>13.2</td><td>15.9</td></tr>
<tr><td>TOT/S</td><td>%</td><td>27.3</td><td>23.7</td><td>24.2</td><td>23.0</td><td>24.6</td></tr>
<tr><td>S^{2-}</td><td>%</td><td>27.0</td><td>23.0</td><td>23.9</td><td>22.2</td><td>24.0</td></tr>
<tr><td>TOC</td><td></td><td>- (1)</td><td rowspan="5">- (1)</td><td>0.13</td><td rowspan="2">- (1)</td><td rowspan="2">- (1)</td></tr>
<tr><td>CO_3^{2-}</td><td>%</td><td>1.46</td><td rowspan="2">- (1)</td></tr>
<tr><td>Cu</td><td>mg/kg</td><td>1 350</td><td>3 640</td><td>1 248</td></tr>
<tr><td>Pb</td><td>mg/kg</td><td>23 200</td><td>52 700</td><td>7 330</td><td>27 743</td></tr>
<tr><td>Zn</td><td>mg/kg</td><td>60 200</td><td>86 500</td><td>33 700</td><td>60 133</td></tr>
<tr><td>Fe</td><td>%</td><td>30.8</td><td>28.4</td><td>22.9</td><td>25.2</td><td>26.8</td></tr>
<tr><td>Sb</td><td>mg/kg</td><td>999</td><td rowspan="8">- (1)</td><td rowspan="8">- (1)</td><td>807</td><td>903</td></tr>
<tr><td>Ca</td><td>%</td><td>1.13</td><td>3.50</td><td>2.32</td></tr>
<tr><td>Al</td><td>%</td><td>0.39</td><td>1.19</td><td>0.79</td></tr>
<tr><td>Mg</td><td>%</td><td>0.09</td><td>0.22</td><td>0.15</td></tr>
<tr><td>Ba</td><td>mg/kg</td><td>205</td><td>98</td><td>152</td></tr>
<tr><td>Ti</td><td>%</td><td>0.08</td><td>0.12</td><td>0.10</td></tr>
<tr><td>Al</td><td>%</td><td>0.39</td><td>1.19</td><td>0.79</td></tr>
<tr><td>K</td><td>%</td><td>0.20</td><td>0.58</td><td>0.39</td></tr>
</table>

Note : (1) Assays not provided

POX results as received from Canenco Consulting are included in Table 1.2 below. These were sent through in Excel spreadsheets linked to the original log sheets of each test performed. A few preliminary comments on the results:

- Feed solids concentrations were adjusted per the sulphide content of each concentrate. Metso Outotec is in agreement with the solids concentrations employed as it would give rise to near autogenous operation of the industrial autoclave.
- Short pre-acidification periods of 15 minutes at ambient temperatures were employed. Given the low carbonate content in the concentrates and other acid digestible minerals, a short pre-digestion time would be sufficient to avoid CO_2 and inert gas formation while conducting the pressure leaching tests. With the continuous venting of off-gas inert gas build-up in the pressure reactor, head space would have been minimised even further.
- The addition of 2 g/L Fe^{3+} to the autoclave during pre-acidification to prevent reductive conditions during autoclave heating was noted and such a small amount of iron addition should not change POX performance or composition of POX products.
- Batch POX tests were successful on almost all concentrates tested (sulphide oxidation extents > 97%) except for tests performed on feed BL 801-16 pdts 1-4 where lower sulphide oxidation extents of 83% and 90% were achieved.
- Previous oxygen mass transfer limitations which have been observed in tests performed by Bureau Veritas have successfully been overcome at SGS Lakefield.
- Good control of POX conditions is evident from logged/measured temperature and total pressures recorded in each test log sheet.
- POX procedures applied seem to be consistent throughout the series of tests. Slight variations in upfront acid addition during pre-acidification were noted which might impact the repeatability of tests slightly.
- Conditions during hot curing seem to have been controlled well evident by values reported in the individual log sheets. A clear increase in iron and arsenic concentrations may be observed before and after hot curing indicating dissolution of basic ferric sulphate (BFS) and basic ferric arsenate sulphate (BFAS) species. A corresponding reduction in free acid concentration before and after curing was however not noted from the log sheets – the reason is unclear.

Metso:Outotec

canenco

RESTRICTED

2 September 2022

Table 1.2 : SGS Lakefield POX Results (as received from Canenco Consulting)

	Feed	Pulp Density % solids w/w	Ground for POX	Feed K80 mm	Pre-acid pH Target	Acid Addition kg/t H_2SO_4	POX Temp. °C	POX Sat Pressure @ Temp bar(a)	POX Time at Temp. mins.	POX Average Temp. °C	POX Average Total bar(a)	POX Average Overpressure bar(a)	POX Pulp pH units	POX Pulp ORP mV	POX PLS pH units	POX PLS FAT g/L H_2SO_4	POX Residue Colour
1	BL 801 Bulk Con 1	9.1	No	28.9	1.0	959	220	23.2	120	220	30.0	6.8	0.73	802	1.08	145.1	yellow
2	BL 801 Bulk Con 1	9.0	No	28.9	2.0	66	220	23.2	120	220	29.5	6.3	1.03	776	1.66	59.1	orange
3	BL 801 Bulk Con 1	9.0	No	28.9	2.0	65	220	23.2	60	220	29.8	6.6	1.25	783	1.69	64.9	gold
4	BL 801 Bulk Con 2	9.0	No	26.0	2.0	89	220	23.2	90	220	30.1	6.9	1.05	740	1.49	54.0	orange
5	BL 801 Bulk Con 2	9.0	No	26.0	2.0	89	230	28.0	60	230	34.8	6.8	0.94	749	1.69	48.4	orange
6	BL 801 Bulk Con 2	9.0	Yes	7.7	2.0	101	220	23.2	90	220	29.9	6.7	0.99	788	1.80	48.8	yellow
7a	BL 801-16 pdts 1-4	12.0	No	184	2.0	96	220	23.2	90	220	30.1	6.9	0.96	594	1.27	55.7	red
7b	BL 801-16 pdts 1-4	12.0	No	184	2.0	78	220	23.2	90	220	30.4	7.2	1.19	528	1.30	35.7	red
8a	BL 801-16 pdts 1-4	12.0	Yes	16.3	2.0	103	220	23.2	90	220	30.3	7.1	1.15	650	1.38	56.7	brown
8b	BL 801-16 pdts 1-4	12.0	Yes	16.3	2.0	88	220	23.2	90	220	30.2	7.0	1.38	473	1.35	40.9	brown
9a	BL 801-24 Final Tails + BL 801-25 Final Tails	13.2	No	20.6	2.0	116	220	23.2	90	220	29.5	6.3	1.22	808	-	-	red
9b	BL 801-24 Final Tails + BL 801-25 Final Tails	13.2	No	20.6	2.0	97	220	23.2	90	220	30.1	6.9	1.17	854	-	-	red
	POX 9a + 9b Combined	-	-	-	-	-	-	23.2	-	-	-		1.43	715	1.41	66.2	red
10a	Blend of Bulk Conc. 1 and Bulk Conc. 2	13.2	No	27.5	2.0	94	220	23.2	90	220	29.6	6.4	-	-	-	-	-
10b	Blend of Bulk Conc. 1 and Bulk Conc. 2	13.2	No	27.5	2.0	52	220	23.2	90	220	30.2	7.1	-	-	-	-	-
11a	BL 801-24 Final Tails + BL 801-25 Final Tails	13.2	No	20.6	2.0	115	220	23.2	90	220	29.8	6.6	-	-	-	-	-
11b	BL 801-24 Final Tails + BL 801-25 Final Tails	13.2	No	20.6	2.0	100	220	23.2	90	220	30.3	7.1	-	-	-	-	-

Table 1.3 : SGS Lakefield POX Results (as received from Canenco Consulting)

	Feed	Hot Cure Time at Temp. hours	Hot Cure Average Temp.	Hot Cure PLS FAT g/L H_2SO_4	Hot Cure Residue Colour	POX PLS Fe mg/L	POX PLS As mg/L	POX PLS S by Bromine mg/L	HC PLS Fe mg/L	HC PLS As mg/L	HC PLS S by Bromine mg/L	HC Residue Fe	HC Residue As	HC Residue Ag	HC Residue $S^{=}$	HC Residue $S^{=}$ Oxd'n %	Weight loss % Overall
1	BL 801 Bulk Con 1	4	94.6	167.4	green	20 600	5 750	68 000	22900	6670	77200	21.8	28.5	58	0.43	99.3	55.3
2	BL 801 Bulk Con 1	4	94.8	59.4	orange	5 000	1 020	23 100	7520	2110	24200	27.7	22.2	57	0.44	98.8	27.8
3	BL 801 Bulk Con 1	4	95.0	58.2	org-yell	5 820	1 000	25 200	8490	2260	25800	27.7	22.9	57	0.96	97.2	21.9
4	BL 801 Bulk Con 2	4	95.6	50.2	orange	6 060	1 230	22 600	7990	2640	22300	25.7	19.2	57	0.68	97.8	26.6
5	BL 801 Bulk Con 2	4	95.0	45.0	orange	4 580	1 250	22 200	8220	3320	24500	25.8	17.55	52	0.43	98.7	29.5
6	BL 801 Bulk Con 2	4	95.4	44.3	gold	6 360	1 520	23 300	10600	3460	26900	24.8	19.5	55	0.98	96.9	27.6
7a	BL 801-16 pdts 1-4	4	95.4	42.6	red	4 080	1 690	26 900	7020	4370	24100	21.7	12.1	149	5.75	83.1	29.7
7b	BL 801-16 pdts 1-4	4	94.8	42.6	red	5 100	3 590	20 900	7020	4370	24100	21.7	12.1	149	5.75	83.1	29.7
8a	BL 801-16 pdts 1-4	4	94.8	49.5	brown	12 300	3 020	32 700	13300	5370	30200	19.3	12.0	159	3.52	90.3	34.4
8b	BL 801-16 pdts 1-4	4	94.6	49.5	brown	11 500	5 640	26 400	13300	5370	30200	19.3	12.0	159	3.52	90.3	34.5
9a	BL 801-24 Final Tails + BL 801-25 Final Tails	4	95.0	55.2	orange	9 380	2 140	32 800	16200	4320	37300	18.4	14.6	71	0.20	99.7	33.5
9b	BL 801-24 Final Tails + BL 801-25 Final Tails	4	95.0	55.2	orange	9 380	2 140	32 800	16200	4320	37300	18.4	14.6	71	0.20	99.7	33.5
10a	Blend of Bulk Conc. 1 and Bulk Conc. 2	4	95.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10b	Blend of Bulk Conc. 1 and Bulk Conc. 2	4	95.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hot Cure 10a + 10b Combined	-	-	71.3	yellow	-	-	-	13100	6470	36400	25.2	20.9	54	0.64	98.2	29.0
11a	BL 801-24 Final Tails + BL 801-25 Final Tails	4	95.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11b	BL 801-24 Final Tails + BL 801-25 Final Tails	4	94.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Hot Cure 11a + 11b Combined	-	-	50.9	orange	-	-	-	19100	3910	35500	18.0	14.6	73	0.17	99.5	32.1

Table 1.4 : SGS Lakefield Cyanidation Results on POX Products (as received from Canenco Consulting)

Test		Feed	LB, CN / CIL Test Number	Tests Applied	Ground for CN	Oxygen / Air Sparging	Size K80 mm	Reagent Addition NaCN kg/t of Cyanide Feed	Reagent Addition CaO kg/t of Cyanide Feed	Reagent Consumption NaCN kg/t of Cyanide Feed	Reagent Consumption CaO kg/t of Cyanide Feed	Final Free CN mg/L	Carbon Au Assay g/t	Barren /PLS Au Assay mg/L	Residue Au Assay g/t	Carbon Ag Assay g/t	Barren /PLS Ag Assay mg/L	Residue Ag Assay g/t	Au Extraction %	Ag Extraction %
POX	1	BL 801 Bulk Con 1	CIL-1	HC-1	No	-		24.63	14.01	4.22	13.24	1250	258	0.02	14.5	583	0.27	11.4	63.2	83.6
POX	2	BL 801 Bulk Con 1	CN-2	HC2 + HC3	No	-		48.52	2.29	6.73	1.86	2727	-	2.60	2.12	-	0.58	54.6	92.1	9.3
POX	3	BL 801 Bulk Con 1	CN-3	HC2 + HC3	Yes	-		93.66	11.42	58.11	9.78	2234	-	2.47	0.39	-	1.01	11	98.4	47.0
POX	4	BL 801 Bulk Con 2	CN-4	HC-4	No	-		51.84	4.42	8.03	3.90	2658	-	2.24	1.40	-	1.06	53.5	94.2	15.7
POX	5	BL 801 Bulk Con 2	CN-5	HC-5	No	-		53.16	4.36	9.02	3.78	2633	-	2.23	0.85	-	0.64	48.9	96.4	11.7
POX	6	BL 801 Bulk Con 2	CN-6	HC-6	No	-		51.61	3.93	6.32	3.32	2707	-	2.43	0.86	-	0.28	55.1	96.7	4.6
POX	7a	BL 801-16 pdts 1-4	LB-1, CN-7	LB-1	No	-		39.67	143	8.35	137	2699	-	1.73	2.42	-	12.9	30.2	83.1	74.9
POX	7b	BL 801-16 pdts 1-4	CN-8	HC 7a + 7b	No	-		80.43	8.57	19.22	8.57	4216	-	2.01	4.08	-	13.8	56.3	80.3	67.3
POX	8a	BL 801-16 pdts 1-4	LB-2, CN-9	LB-2	No	-		41.95	160	6.62	154	2776	-	1.66	1.48	-	12.4	22.3	89.5	81.0
POX	8b	BL 801-16 pdts 1-4	CN-10	HC 8a + 8b	No	-		58.33	5.76	14.74	5.58	2757	-	1.50	3.07	-	6.73	101.2	82.4	39.6
POX 9a + POX 9b Residue	9a	BL 801-24 Final Tails + BL 801-25 Final Tails	CN-11	POX 9a + 9b	Yes	Oxygen	12.24	68.24	41.89	47.05	41.89	1150	-	1.42	0.19	-	1.42	46.2	98.8	24.6
POX 9a + POX 9b Residue	9b	BL 801-24 Final Tails + BL 801-25 Final Tails	CN-12	POX 9a + 9b	Yes	Air	12.73	78.65	37.99	65.25	37.99	741	-	1.46	0.21	-	1.46	49.1	98.6	23.7
HC 9a + HC 9b Residue	9c	BL 801-24 Final Tails + BL 801-25 Final Tails	CN-13	HC 9a +9b	Yes	Oxygen	13.03	33.39	6.12	8.82	5.84	1398	-	1.74	0.38	-	1.74	78.8	98.0	18.8
HC 9a + HC 9b Residue	9d	BL 801-24 Final Tails + BL 801-25 Final Tails	CN-14	HC 9a +9b	Yes	Air	13.24	39.90	6.04	17.06	5.97	1365	-	1.83	0.33	-	1.83	58.1	98.3	24.0

A few notes and observations from the POX, hot cure and downstream test work results are presented below:

Effect of pre-acidification pH *(Test 1 vs. Test 2)*: In Test 1 a pH of 1 was targeted vs a pH of 2 in Test 2. The reduction in pH to 1 seemed to have required a very high acid addition which resulted in a POX solution acid concentration of 167 g/L. The high upfront acid addition would have caused high amounts of BFAS/BFS being produced during POX (evident by yellow colour of product). Gold extraction was negatively impacted possibly due to coating of particles with the hot curing step not successful in redissolution of all BFS/BFAS phases formed.

Effect of Retention Time (*Test 2 vs. Test 3):* POX retention time was reduced from 120 minutes to 60 minutes at 220°C on Bulk Con 1. As shown in Figure 2.1, almost similar sulphide oxidation extents were achieved (97.2% vs. 98.8%) in the timeframes investigated suggesting a further reduction in retention time (< 60 minutes) might still be feasible for the project. Impact on gold dissolution could not be evaluated from these two products as different NaCN dosages were applied during the cyanidations.

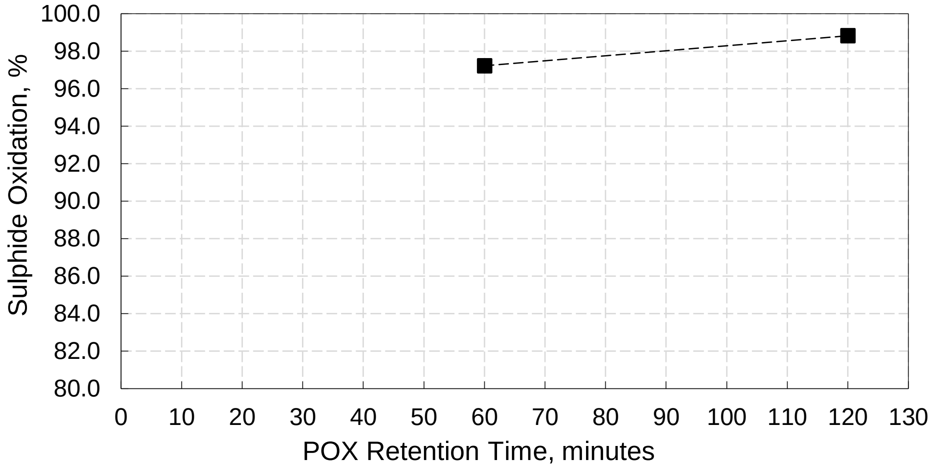

Figure 2.1 : Sulphide Oxidation vs. Retention Time

Effect of Temperature *(Test 5 vs. Test 4)*: POX temperature was increased from 220°C (90 minutes) to 230°C (60 minutes) on Bulk Con 2. Very similar oxidation extents were again observed within the two timeframes implemented. Gold dissolutions (96.4% at 230°C and 94.2% at 220°C) and both NaCN and CaO consumptions during cyanidation were also comparable (i.e. no reduction in reagent consumption) meaning similar product quality was achieved. Given these results there would not be real incentive to design at temperatures exceeding 220°C given the higher associated design operating pressure.

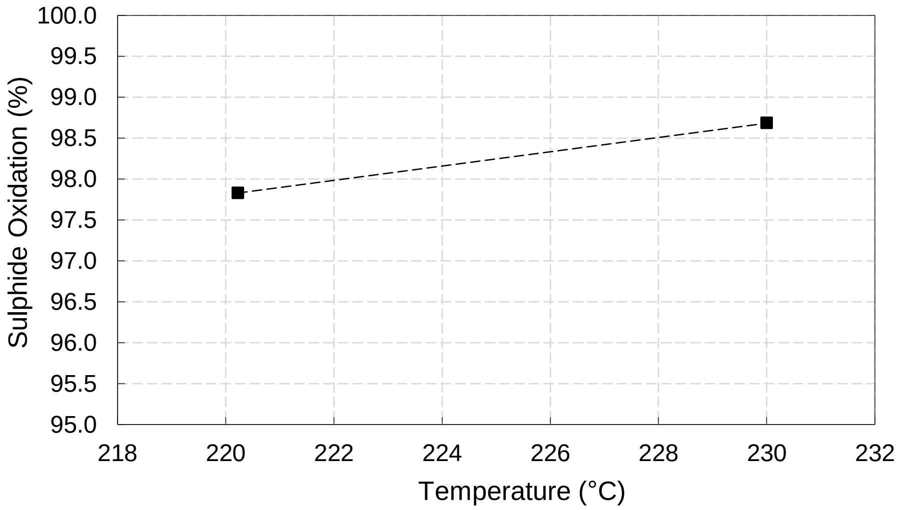

Figure 2.2 : Sulphide Oxidation vs. Temperature

Effect of Regrinding on Bulk Con 2 *(Test 6 vs. Test 4)*: Regrinding the concentrate prior to POX at 220°C within 90 minutes did not offer any benefits in terms of sulphide oxidation nor subsequent gold leaching.

Effect of Lime Boil

(Test 7a vs 7b): Duplicate POX and hot cure tests were undertaken on BL 801-16 pdts 1-4. Half of the product was submitted to Lime Boil-CN, while the other half underwent CN directly. Lime Boil impacted both gold and silver dissolutions positively offering an improvement from 80 to 83% for gold and 67% to 75% for silver.

(Test 8a vs 8b): Duplicate POX and hot cure tests were again undertaken on BL 801-16 pdts 1-4, but this round of tests saw regrinding of the concentrate prior to POX (p80 reduction from 184 μm to 16 μm). Half of the product was again submitted to Lime Boil-CN while the other half underwent CN directly. Similar to Test 7a and b, lime boiling impacted both gold and silver dissolutions positively offering an improvement from 82 to 90% for gold and 40% to 81% for silver.

Effect of Regrinding on BL 801-16 pdts 1-4 *(Test 8a vs. Test 7a)*: For treatment of BL 801-16 pdts 1-4 regrinding increased sulphide oxidation extent and consequent gold and silver dissolutions after lime boiling. That being said, the grind size considered for Test 7a and b is considered too coarse (p80 of 184 μm) for reasonable oxidation times to be attained during POX. Larger particle sizes might also cause increased wear of the autoclave agitator and internals.

Effect of hot curing *(CN Test 13 and 14 vs. 11 and 12)*: The influence of hot curing on the reagent consumption (lime and NaCN consumption) during downstream cyanidation processing was investigated on the POX product from "BL 801-24 Final Tails + BL 801-25 Final Tails". A significant drop in both NaCN and lime consumptions were noted. A reduction in lime consumption from 38-42 kg/tonne POX product to ~ 6 kg/t and a reduction in NaCN consumption from 47-65 kg/tonne POX product to 9-17 kg/tonne product were effected. The result confirms the importance of including this step in the processing flow sheet. Gold and silver dissolutions remained consistently high with or without the inclusion of the curing step.

Effect of Air vs Oxygen during Cyanidation *(Test 9a vs 9b and 9c vs 9d)*: The addition of air vs oxygen to the cyanidation tests were investigated on the POX and POX-hot cured products originating from "BL 801-24 Final Tails + BL 801-25 Final Tails". No improvement in either Au or Ag dissolution was noted for either of the metals.

It was noted that POX kinetics were slow during pressure oxidation treatment of concentrate BL 801-16 pdts 1-4 even after regrinding. A sulphide oxidation extent of only 90% was achieved after 90 minutes. A mineralogical investigation was undertaken by SGS on the POX product to understand the nature and deportment of unreacted sulphide mineral phases. This report was shared to Metso Outotec and suggests that partially unreacted arsenopyrite mineral particles were finely distributed and intergrown with other mineral phases. It would however be important to understand how BL 801-16 pdts 1-4 differ from the other concentrates in terms of arsenopyrite and pyrite deportment and association.

4. RECOMMENDATIONS

In general, a good set of technically competent results were produced by SGS Lakefield. Tests were conducted to acceptable standards and integrity of results lends itself to be used in the design of an industrial POX circuit.

- For any optimisation work to follow a bulk concentrate would need to be prepared for POX tests to be done on a consistent feed material. This will enable direct comparison of all POX tests.
- Capturing of the sulphide oxidation kinetics in the next round of tests would be important. POX kinetics are used to determine number of autoclave compartments, retention times and the utility and oxygen addition to each compartment.
- The oxidation kinetics could be captured via measuring oxygen consumption as a function of time. This could be achieved by measuring the oxygen flow rate into the reactor as the test proceeds, taking kinetic slurry samples or by conducting dedicated POX tests at each kinetic/time point of interest (i.e. a single POX test at e.g. 10 minutes, 20 minutes, 30 minutes etc.). Determination of cumulative oxygen addition to the POX reactor

might be the easiest and less labour/cost intensive option. Accurate measurement and control of vent gas flow would also be required should this option be pursued.

- Based on Metso Outotec's experience on similar concentrates near complete sulphide oxidation should be achievable in less than 60 minutes.
- As part of the test work matrix, all POX slurries were hot cured at a single set of conditions. The hot curing kinetics could be investigated as part of the next round of tests. Dissolution kinetics will assist and support the design of the hot curing circuit.
- Inclusion of a lime boil step did improve silver and gold dissolution upon treatment of the BL801-16 pdts 1-4 POX-hot cured product. The cost of additional lime added should be compared to the potential revenue from increased gold and silver recoveries. More extensive testing on the variability POX-cured products should be undertaken to verify the lime boil performance.
- There appears to be room for optimising NaCN addition during cyanidation.
- Basic static settling work on the POX-Hot Cure slurries could be considered for the next round of tests. These results would inform preliminary sizing of the CCD thickeners envisioned for thickening and washing of the POX-Hot Cure product.
- Other tests (outside of the POX optimisation) which may be considered are the following:
    - Cyanide detoxification of the cyanidation slurry i.e. should cyanidation be chosen as the leaching method
    - Basic environmental stability tests on the gold leach residue (whichever method is chosen). Special attention to be given to arsenic, lead and antimony mobility.