## BOLIDEN - WESTMIN CANADA LTD

## Quality Control (January 2004)

A quality control (QA-QC) program on sample analyses recommenced during the fall of 2003 after a hiatus during 2002. A bulk ore muck sample was taken from the H 147 mining area of the Battle mine. This ore material represents muck from the Upper zones as well as the Battle Main zone. Additional andesite waste samples were collected from the Battle mine. Each month a sample was mixed with approximately 0.5 kg of material from the ore and andesite bulk samples. The ore sample was then divided into 5 splits with random tags assigned to each split. The andesite waste sample was not split. Only the geologist and buckerman know which samples are part of the test program. The assay lab did not. The sample was divided into five portions as shown on the following flow chart. It is planned to keep this mechanism for quality control in place during subsequent years.

In general there were insignificant differences between all of the assays. The only significant difference is that of Au in the first batch of samples (BG44952, BG44577, BG44777, BG44227 and BG46877). The pulp of the high grade sample, BG44952, was analyzed four more times. Three of the results showed low Au similar to the other samples. The fourth returned a value similar to BG44952. This would indicate a very high nugget effect for the material. See the following "MFO assay QA/QC - January 2004 Table" for results.

Due to a low volume of drill core samples, the typical backlog of analyses for precious metals and barite is currently not a concern. It is expected that contract geologists, assayers and buckerman may be required on a temporary basis to deal with peak demands.

The issue of full screen metallic vs. conventional fire assay was investigated during 2002. The results are attached. The findings appear inconclusive but it appears in a general sense that we may be understating the gold content of the ore by a small percentage. Work was to continue in 2003 but a lack of manpower precluded this from happening.

## BOLIDEN - WESTMIN CANADA LTD

Myra Falls Operation
January 2004 Ore Reserves


## BOLIDEN - WESTMIN CANADA LTD Myra Falls Operation January 2004 Ore Reserves



# BOLIDEN - WESTMIN CANADA LTD Myra Falls Operation January 2004 Ore Reserves 

(MFO QA/QC Program continued)
COMMENTS: Ore and barren andesite samples are from the H147 Upper Zone stoping area of the Battle mine.
These results are based on only 3 ore samples and 3 barren samples.
More data is required for better statistical results.
MFO Lab Au Assays: September values for Au are highly variable ranging between $0.5 \mathrm{~g} / \mathrm{t}$ and $11.1 \mathrm{~g} / \mathrm{t}$.
The standard deviation is greater than $100 \%$ of the mean value.
Therefore, a nugget effect is interpreted for the September 2003 QA / QC ore sample.
Au assays: October and November Au values have standard deviation values up to $0.14 \mathrm{~g} / \mathrm{t}$.
Ag assays: For all months, Ag standard deviation values ranged between $1.06 \mathrm{~g} / \mathrm{t}$ up to $9.72 \mathrm{~g} / \mathrm{t}$.
Cu assays: For all months, Cu standard deviation values were consistently $0 \%$.
Zn assays: For all months, Zn standard deviation values ranged between $0.14 \%$ and $0.37 \%$

## MFO vs Outside Lab:

Mean Au values for October-November by the MFO laboratory are up to $0.28 \mathrm{~g} / \mathrm{t}$ Au higher than outside lab value. Mean Ag values for October-November by the MFO laboratory are up to $14.8 \mathrm{~g} / \mathrm{t}$ higher than the outside lab value.
Mean Cu values by the MFO laboratory are consistent with the outside laboratory values for all months assessed.
Mean Zn values by the MFO laboratory varies between $-0.41 \%$ and $+0.20 \%$ relative to outside laboratory values.

# 17erex <br> BOLIDEN - WESTMIN CANADA LTD <br> Myra Falls Operation <br> January 2004 Ore Reserves 

Communication from Rob Eastman, MFO Sr. Assayer: Re: 2003 QA/QC

To: Albert Chong
From: Rob Eastman
Re: Analytical Error of the Boliden-Westmin (Can) Assay Lab up to June 21, 2004
Hello Albert
Our QA/QC program consists of a two pronged approach. The first part consists of data collected from Copper and Zinc Concentrate Quarterly samples that are prepared by myself and exchanged with SGS Labs. The samples are analyzed by all the Assayers and an in house standard deviation and accuracy is calculated. The data consists of results dating back to Oct. 1994.

The second part consists of "blind" samples submitted to the Buckerman who in turn prepares the raw sample. A series of splits are taken and one of the splits is sent to Chemex Labs for analysis while the others are submitted into the regular work load "blind". The comparison of the data is a measure of the complete variability of the entire process. The database for this part is relatively small at the present time.

Explanation of Abbreviations and Terms<br>$\mathrm{BOL}=$ Boliden<br>SGS = General Testing Laboratories<br>CMX = Chemex Laboratories<br>STDEV $=$ Standard Deviation<br>$\%$ Accuracy $=($ BOL Assay $)-($ SGS or CMX Assay $) /($ SGS or CMX Assay $) X 100$<br>$\%$ STDEV $=$ (Average STDEV of BOL Assays) $/$ (Assay SGS or CMX) X 100

BOLIDEN - WESTMIN CANADA LTD
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(Communication from Rob Eastman, MFO Sr. Assayer: Re: 2003 QA/QC continued):
Note:

1. The term "Accuracy" is the comparison of Boliden's assay to an independent commercial lab assay and not to the "correct value". Variations in assays do occur from one commercial lab to another.
2. When comparing the data presented here one must consider the detection limit of the assay being studied. An example would be a Au assay of $0.5 \mathrm{~g} / \mathrm{MT}+/-0.1 \mathrm{~g} / \mathrm{MT}$. This would give a possible assay variation of $+/-20 \%$ which seems large but more than acceptable by our assay standards and methods.
3. Samples containing free gold will yield "Flyer" assays that in turn significantly skew the average of a small population of assays (as in the case of the "blind" data set).

## Results

$\mathrm{Cu} / \mathrm{Zn}$ Conc. Exchange Samples with SGS Labs

## $\mathbf{C u}$ Conc. Accuracy

Au $-0.7 \%+/-2.1 \%$
Ag $2.3 \%+/-1.3 \%$
$\mathrm{Cu} \quad 0.0 \%+/-0.5 \%$
$\mathrm{Pb} \quad-2.5 \%+/-1.0 \%$
$\mathrm{Zn} \quad-0.5 \%+/-1.3 \%$
$\mathrm{Fe} \quad 1.5 \%+/-0.7 \%$
As $-11.4 \%$ +/- $7.3 \%$
Sb -20.5 \% +/- $10.0 \%$

## Zn Conc. Accuracy

Au -4.0\% +/-4.2 \%
$\mathrm{Ag}-2.1 \%+/-1.8 \%$
$\mathrm{Cu}-1.5 \%+/-1.6 \%$
$\mathrm{Pb} \quad-0.1 \%+/-1.4 \%$
$\mathrm{Zn} \quad 0.2 \%+/-0.4 \%$
Fe $0.6 \%+/-1.7 \%$
As -23.4 \% +/- $7.4 \%$
Sb $1.3 \%+/-1.4 \%$

## Average Accuracy

$\mathrm{Au}-2.4 \%+/-3.2 \%$
Ag $0.1 \%+/-1.6 \%$
$\mathrm{Cu}-0.8 \%+/-1.1 \%$
$\mathrm{Pb}-1.3 \%+/-1.2 \%$
Zn -0.2 \% +/- $0.9 \%$
Fe $1.1 \%+/-1.2 \%$
As $-17.4 \%+/-7.4 \%$
Sb $-9.6 \%+/-5.7 \%$

BOLIDEN - WESTMIN CANADA LTD
Myra Falls Operation January 2004 Ore Reserves
(Communication from Rob Eastman, MFO Sr. Assayer: Re: 2003 QA/QC; continued):
QA/QC "Blind Samples" Exchange with Chemex Labs (As per previous MFO Assay QA/QC Program Table)

| Accuracy |  |  | Accuracy Without Flyer |
| :--- | ---: | :--- | :--- |
| Au | $179.9 \%+/-330.9 \%$ | $\mathrm{Au} 25.2 \%+/-39.8 \%$ |  |
| Ag | $8.0 \%+/-$ | $4.0 \%$ |  |
| Cu | $0.3 \%+/-$ | $0.5 \%$ |  |
| Pb | $-3.3 \%$ |  |  |
| Zn | $-2.1 \%$ | $6.2 \%$ |  |
| Fe | $-15.7 \%$ | $1.9 \%$ |  |
| Ba | $0.7 \%$ | $+/-$ | $1.8 \%$ |
|  |  | $4.6 \%$ |  |
|  |  |  |  |

If you have any questions please phone me @ 215.
Rob Eastman
Senior Assayer
Boliden-Westmin (Can.) Ltd.

## BOLIDEN - WESTMIN CANADA LTD Myra Falls Operation January 2004 Ore Reserves Standard Precious Metal Assays Vs Full Screen Metallics (2002 data)

| AU NORMAL | UMETALLICS | \% DIF (NO-MT) A | AG NORMAL | AGMETALLICS | \% DIF (NO-MT) | AUNORMAL | AUMETALLICS | \% DIF (NO-MT) | AG NORMAL | AG METALLICS | \% DIF (NO-MT) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 0.3 | 0.3 |  | 16.1 | 18.9 | (14.81) | 2.8 | 2.6 | 7.69 | 146.0 | 128.1 | 13.97 |
| 18.8 | 17.3 | 8.67 | 262.7 | 266.9 | (1.57) | 3.3 | 2.6 | 26.92 | 63.8 | 83.9 | (0.16) |
| 1.8 | 2.3 | (21.74) | 236.4 | 241.3 | (2.03) | 0.9 | 2.6 | (65.38) | 174.0 | 164.8 | 5.58 |
| 1.5 | 1.3 | 15.38 | 55.4 | 58.7 | (5.62) | 1.5 | 1.2 | 25.00 | 59.8 | 53.9 | 10.95 |
| 1.3 | 2.3 | (43.48) | 58.4 | 59.0 | (1.02) | 1.3 | 1.3 | . | 110.9 | 107.1 | 3.55 |
| 1.2 | 1.4 | (14.29) | 278.4 | 282.4 | (1.42) | 1.9 | 1.8 | 5.56 | 161.6 | 155.9 | 3.66 |
| 4.8 | 8.5 | (43.53) | 228.9 | 231.3 | (1.04) | 1.2 | 1.1 | 9.09 | 50.7 | 45.8 | 10.70 |
| 0.8 | 1.4 | (42.86) | 294.4 | 291.2 | 1.10 | 0.9 | 0.8 | 12.50 | 42.2 | 39.5 | 6.84 |
| 1.4 | 1.8 | (22.22) | 212.6 | 215.1 | (1.16) | 1.5 | 1.4 | 7.14 | 145.0 | 132.6 | 9.35 |
| 1.5 | 1.6 | (6.25) | 350.4 | 359.0 | (2.40) | 0.6 | 0.6 |  | 26.6 | 38.6 | (31.09) |
| 1.3 | 1.2 | 8.33 | 127.1 | 133.1 | (4.51) | 1.3 | 1.2 | 8.33 | 89.8 | 80.2 | 11.97 |
| 1.6 | 2.5 | (36.00) | 1378 | 144.2 | (4.44) | 5.1 | 5.2 | (1.92) | 667.9 | 662.2 | 0.86 |
| 1.1 | 0.8 | 37.50 | 166.4 | 171.7 | (3.09) | 3.9 | 3.0 | 30.00 | 235.8 | 235.7 | 0.04 |
| 9.2 | 1.1 | 736.36 | 427.4 | 426.1 | 0.31 | 10.1 | 10.9 | (7.34) | 253.3 | 260.7 | (2.84) |
| 81.3 | 4.7 | 1,629.79 | 978.3 | 951.0 | 2.87 | 0.9 | 0.8 | 12.50 | 47.4 | 45.6 | 3.95 |
| 0.5 | 0.5 | - | 155.3 | 153.9 | 0.91 | 1.9 | 2.5 | (24.00) | 704.7 | 703.6 | 0.16 |
| 0.8 | 2.6 | (69.23) | 237.0 | 234.9 | 0.89 | 65.8 | 80.3 | (18.06) | 221.1 | 215.4 | 2.65 |
| 0.8 | 0.7 | 14.29 | 146.8 | 154.3 | (4.86) | 6.8 | 7.0 | (2.86) | 819.1 | 621.8 | (0.43) |
| 0.8 | 0.8 | - | 269.6 | 271.9 | (0.85) | 3.5 | 3.2 | 9.37 | 226.5 | 217.0 | 4.38 |
| 2.1 | 0.5 | 320.00 | 75.0 | 75.7 | (0.92) | 2.3 | 3.7 | (37.84) | 286.5 | 266.1 | 7.67 |
| 1.1 | 0.7 | 57.14 | 107.2 | 120.5 | (11.04) | 1.1 | 1.1 |  | 20.6 | 11.8 | 74.58 |
| 0.0 | 0.8 | $(100.00)$ | 57.2 | 60.2 | (4.98) | 0.9 | 1.5 | (40.00) | 72.7 | 59.1 | 23.01 |
| 0.4 | 0.5 | (20.00) | 79.2 | 77.6 | 2.06 | 2.3 | 2.0 | 15.00 | 140.4 | 118.6 | 18.38 |
| 0.9 | 0.9 | - | 11.8 | 12.8 | (7.81) | 1.8 | 1.7 | 5.88 | 34.9 | 23.5 | 48.51 |
| 0.7 | 0.8 | (12.50) | 80.9 | 78.6 | 2.93 | 0.9 | 1.0 | (10.00) | 16.5 | 8.6 | 91.86 |
| 1.1 | 1.4 | (21.43) | 479.8 | 476.7 | 0.65 | 1.1 | 1.1 |  | 12.0 | 10.8 | 11.11 |
| 1.9 | 1.4 | 35.71 | 237.9 | 236.6 | 0.55 | 1.3 | 1.4 | (7.14) | 19.0 | 17.3 | 9.83 |
| 0.1 | 1.0 | (90.00) | 68.3 | 86.7 | 2.40 | 0.9 | 0.6 | 50.00 | 10.5 | 6.9 | 52.17 |
| 0.4 | 0.9 | (55.56) | 86.2 | 90.2 | (4.43) | 1.2 | 2.0 | (40.00) | 211.8 | 206.7 | 2.47 |
| 1.5 | 1.6 | (6.25) | 45.0 | 44.6 | 0.90 | 0.9 | 0.9 | - | 79.5 | 74.7 | 6.43 |
| 5.6 | 4.2 | 33.33 | 119.4 | 118.0 | 1.19 | 1.4 | 2.4 | (41.67) | 629.4 | 627.6 | 0.29 |
| 11.9 | 9.5 | 25.26 | 3115.4 | 3152.9 | (1.19) | 2.1 | 2.5 | (16.00) | 64.8 | 66.5 | (2.56) |
| 3.9 | 3.9 | - | 1724.0 | 17280 | (0.23) | 1130.4 | 5457.7 | (79.29) | 2556.3 | 5378.7 | (52.47) |
| 1.2 | 1.7 | (29.41) | 56.9 | 57.4 | (0.87) | 1.5 | 6.8 | (77.94) | 426.7 | 432.8 | (1.41) |
| 5.1 | 9.2 | (44.57) | 406.8 | 407.4 | (0.15) | 2.2 | 4.4 | (50.00) | 536.4 | 555.8 | (3.49) |
| 0.0 | 0.8 | $(100.00)$ | 73.6 | 72.1 | 2.08 | 20.5 | 9.3 | 120.43 | 329.8 | 332.2 | (0.72) |
| 3.4 | 2.3 | 47.83 | 312.3 | 319.8 | (2.35) | 12.0 | 16.3 | (26.38) | 455.4 | 458.8 | (0.74) |
| 2.8 | 2.2 | 27.27 | 201.0 | 207.6 | (3.18) | 2.9 | 1.3 | 123.08 | 101.5 | 99.7 | 1.81 |
| 6.7 | 5.3 | 26.42 | 192.0 | 200.6 | (4.29) | 0.0 | 0.6 | (100.00) | 0.0 | 3.4 | (100.00) |
| 12.8 | 5.7 | 124.56 | 70.5 | 61.8 | 14.08 | 14.0 | 1.4 | 900.00 | 194.9 | 209.5 | (6.97) |
| 4.0 | 6.1 | (34.43) | 199.8 | 193.6 | 3.20 | 1.0 | 0.9 | 11.11 | 34.3 | 36.6 | (6.28) |
| 3.5 | 11.1 | (68.47) | 280.9 | 262.8 | 6.89 | 0.0 | 0.3 | (100.00) | 0.0 | 5.3 | (100.00) |
| 2.6 | 2.5 | 4.00 | 165.1 | 161.3 | 2.36 | 0.4 | 0.4 |  | 19.5 | 19.4 | 0.52 |
| 1.1 | 1.3 | (15.38) | 87.4 | 85.5 | 2.22 | 2.3 | 2.5 | (8.00) | 32.3 | 29.3 | 10.24 |
| 2.0 | 6.0 | (86.67) | 137.8 | 128.2 | 7.49 | 2.8 | 3.2 | (12.50) | 54.5 | 53.1 | 2.64 |
| 4.5 | 5.3 | (15.09) | 129.4 | 123.9 | 4.44 | 2.0 | 1.9 | 5.26 | 30.5 | 26.4 | 15.53 |
| 4.4 | 4.4 | - | 194.8 | 189.8 | 2.63 | 0.9 | 1.0 | (10.00) | 16.3 | 14.4 | 13.19 |
| 4.8 | 6.9 | (30.43) | 94.4 | 86.5 | 9.13 | 1.5 | 1.4 | 7.14 | 24.8 | 25.3 | (1.98) |
| 1.3 | 1.7 | (23.53) | 199.1 | 188.6 | 5.57 | 0.9 | 0.8 | 12.50 | 19.5 | 20.8 | (6.25) |
| 0.5 | 1.9 | (73.68) | 34.9 | 18.2 | 91.76 | 0.9 | 0.9 | . | 12.1 | 14.4 | (15.97) |
| 5.4 | 3.9 | 38.46 | 211.0 | 171.8 | 22.82 | 0.5 | 1.3 | (61.54) | 24.4 | 26.6 | (8.27) |
| 7.3 | 5.5 | 32.73 | 306.5 | 274.3 | 11.74 | 1.1 | 0.8 | 37.50 | 12.1 | 11.6 | 4.31 |
| 9.3 | 8.2 | 13.41 | 353.9 | 330.5 | 7.08 | 1.1 | 0.4 | 175.00 | 7.8 | 9.2 | (15.22) |
| 5.3 | 8.1 | (34.57) | 104.0 | 95.4 | 9.01 | 0.5 | 0.8 | (37.50) | 138 | 13.5 | 2.22 |
| 2.6 | 3.5 | (25.71) | 81.3 | 81.2 | 0.12 | 0.7 | 0.7 | . | 6.7 | 6.9 | (2.90) |
| 2.9 | 2.4 | 20.83 | 47.2 | 45.7 | 3.28 | 1.5 | 1.5 | . | 89.7 | 84.4 | 6.28 |
| 3.9 | 3.6 | 8.33 | 100.7 | 90.3 | 11.52 | 2.5 | 2.7 | (7.41) | 527.5 | 494.8 | 6.61 |

