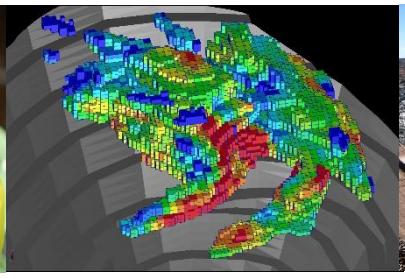
# QAQC Technical Report

Thursdays Gossan Deposit

Stavely Project – Western Victoria

Effective Date: 31/05/2022

Prepared for: Stavely Minerals


Cube Project: 2022_054

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# 1. Executive Summary

- Only data from Stavely DDH and Sonic drilling was analysed. Although previous operators AC holes will be used in the MRE (mainly for the chalcocite blanket), there was no accompanying QAQC data for these holes.
- A large number of different CRMs (16) were used, which is considered a positive action. Most of the CRMs contained enough data points to conduct a meaningful analysis.
- The performance of Au in the CRMs is considered moderate to good with only four failing a precision test and no accuracy test failures. Two CRMs showed a consistent bias (one negative and one positive), but other CRMs with similar certified values did not show the same result. Some time-based biases were observed, but these were minor and only present for short period of time, hence there was a good general spread around the mean.
- The performance of Cu in the CRMs is considered to be moderate to good. There were several precision test failures, but no accuracy test failures. Two showed a negative bias, however other CRMs with similar grades did not show a bias, therefore it could be considered that the certified value for those CRMs may be comprised. Apart from the two CRMs that showed a consistent negative bias, there was generally no shorter time frame biases.
- The pure statistical performance of Ag is considered moderate to poor, with the majority failing a precision test. As the vast majority of CRMs used contained very low levels of Ag (< 4 g/t), this would be considered normal due to the Ag being close to the level of detection and hence is not considered to be an issue of concern. OREAS-604B which has a relatively high level of Ag (493 g/t), showed a strong positive bias, but as the number of Ag values within the drilling database at these levels are extremely limited (there are only seven values > 400 g/t Ag), this is not considered an item of concern.
- The use of ½ or ¼ core as field duplicates has limited value as a QAQC tool, however an analysis was conducted for the sake of completeness. The vast majority of the field duplicates were ¼ core from DDH (~1,900), with a further 288 from sonic. The average RMPD% for all elements are very low, and all show no perceptible grade-based biases.
- No coarse reject samples were analysed. In most situations this type of check can provide an insight into QAQC performance, however due to the nature of the Thursdays Gossan mineralisation the impact of not doing this QAQC check is limited.
- There was no blind re-submission of pulps back to the same laboratory or the use of an umpire laboratory. Cube considers that a high quality QAQC program and analysis would include these types of samples.
- The use of uncertified blanks has resulted in not being able to determine if contamination has occurred in the sample preparation process.

# 2. Introduction

QAQC data was supplied to Cube by Stavely within an Access database (*Stavely_Resource_Area_20220416.accdb*) on 12 April 2022. Relevant data was contained within 'Duplicate', 'Standards' and 'Standard_Ref_Values' tables.

Although the database contained drilling information from previous operators, probably stretching back to the 1970s and 1980s, accompanying QAQC data was not available. Only data collected by Stavely and from diamond and sonic drilling was used.

Due to time constraints in regards to the release of the MRE, QAQC data from hole SMD182, although used in the estimate, was not analysed.

All samples in this analysis were prepared at ALS laboratory in Adelaide and analysed in the ALS facility in Perth. The analysis method for Cu and Ag was a four-acid digestion followed by ICPES (4A-ICPES), while Au analysis was completed by 50 g Fire Assay (FA50). There is some CRM data from previous operators, but this was not analysed as the analysis method is unknown.

# 3. Certified Reference Material (CRMs)

## 3.1. Introduction

All CRMs were sourced from OREAS. The list of CRMs utilised by Stavely are tabulated in Table 3-1.

**Table 3-1: List of CRMs by laboratory used in CRM performance**

| CRM ID | Cu (%) | | Ag (g/t) | | Au (g/t) | |
|---|---|---|---|---|---|---|
| | Cert. value | SD | Cert. value | SD | Cert. value | SD |
| OREAS-166 | 8.82 | 0.27 | 0.778 | 0.128 | 0.248 | 0.01 |
| OREAS-501b | 0.26 | 0.011 | 0.778 | 0.128 | 0.248 | 0.01 |
| OREAS-501c | 0.276 | 0.008 | 0.461 | 0.053 | 0.221 | 0.007 |
| OREAS-503b | 0.531 | 0.023 | 1.54 | 0.19 | 0.695 | 0.021 |
| OREAS-503c | 0.538 | 0.015 | 0.83 | 0.089 | 0.698 | 0.015 |
| OREAS-503d | 0.524 | 0.01 | 1.34 | 0.066 | 0.666 | 0.015 |
| OREAS-504b | 1.11 | 0.042 | 3.07 | 0.225 | 1.61 | 0.037 |
| OREAS-504c | 1.11 | 0.03 | 4.22 | 0.288 | 1.48 | 0.045 |
| OREAS-52pb* | 0.3338 | 0.0077 | - | - | 0.307 | 0.017 |
| OREAS-53pb* | 0.546 | 0.013 | - | - | 0.623 | 0.021 |
| OREAS-54a* | 1.55 | 0.02 | - | - | 2.9 | 0.11 |
| OREAS-604b | 2.12 | 0.036 | - | - | 1.69 | 0.047 |
| OREAS-605b | 5.03 | 0.109 | - | - | 1.72 | 0.066 |
| OREAS-991 | 20.66 | 0.053 | 48.1 | 0.90 | 47.04 | 0.219 |

*some of these were used during BCD AC drilling but were not used in the analysis

## 3.2. CRM Performance

A summary of CRM performance according to accuracy and precision tests for Au, Cu and Ag (where available) is tabulated in Table 3-2.

**Table 3-2: CRM performance**

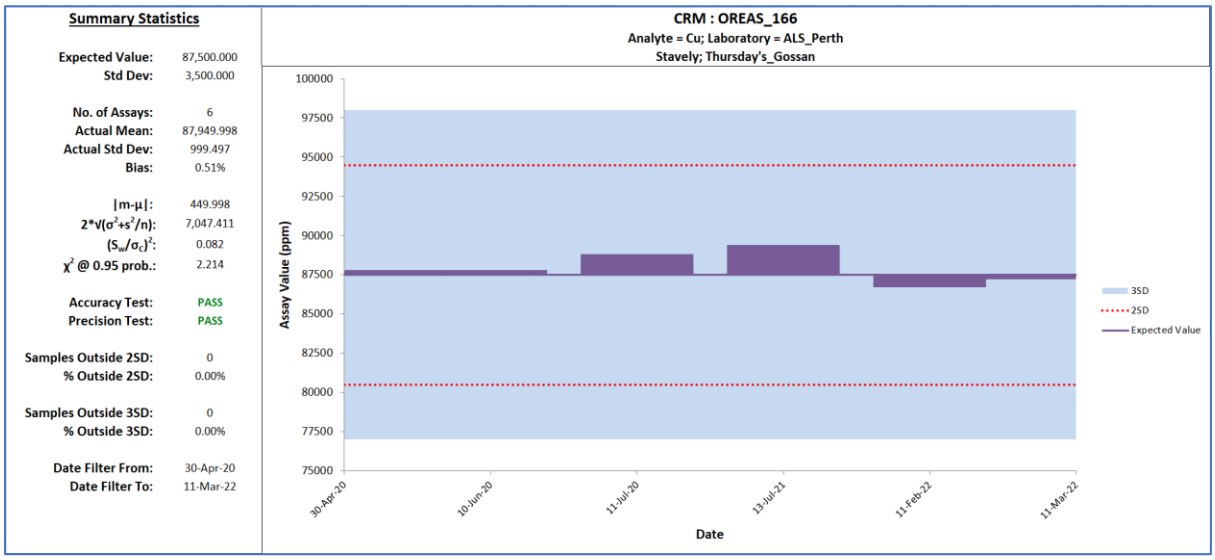
| CRM ID | Period of Use | Accuracy Test (Au; Cu; Ag) | Precision Test (Au; Cu; Ag) |
|---|---|---|---|
| OREAS-166 | 2020-2022 | __; Pass; Pass | __; Pass; Pass |
| OREAS-152A | 2020-2022 | Pass; Pass; Pass | Pass; Fail; Pass |
| OREAS-501b | 2014-2019 | Pass; Pass; Pass | Pass; Pass; Fail |
| OREAS-501c | 2017-2020 | Pass; Pass; Fail | Pass; Pass; Fail |
| OREAS-503b | 2017 | Pass; Pass; Pass | Pass; Pass; Pass |
| OREAS-503c | 2017-2020 | Pass; Pass; Pass | Fail; Fail; Fail |
| OREAS-503d | 2017-2022 | Pass; Pass; Pass | Fail; Fail; Fail |
| OREAS-504b | 2014-2020 | Pass; Pass; Pass | Fail; Pass; Fail |
| OREAS-504c | 2019-2022 | Pass; Pass; Pass | Pass; Pass; Pass |
| OREAS-505 | 2018-2022 | Pass; Pass; Pass | Pass; Fail; Fail |
| OREAS-52pb | 2014 | Pass; Pass; __ | Pass; Pass; __ |
| OREAS-53pb | 2014 | Pass; Pass; __ | Pass; Fail; __ |
| OREAS-54pa | 2014 | Pass; Pass; __ | Pass; Fail; __ |
| OREAS-604b | 2020-2022 | Pass; Pass; Pass | Pass; Pass; Fail |

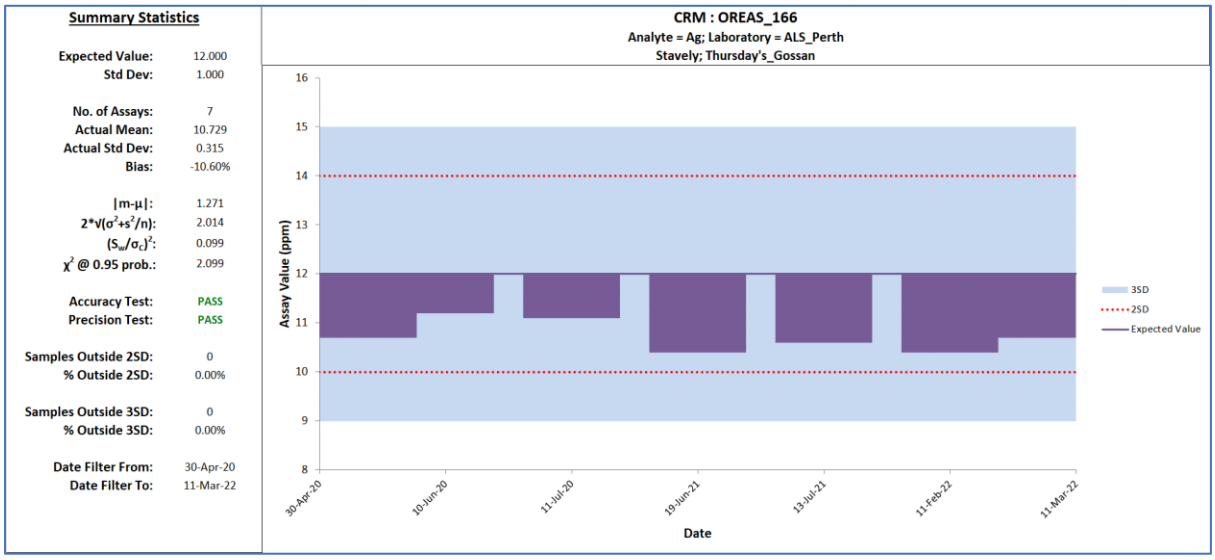
| CRM ID | Period of Use | Accuracy Test (Au; Cu; Ag) | Precision Test (Au; Cu; Ag) |
|---|---|---|---|
| OREAS-605b | 2020-2022 | Pass; Pass; Pass | Fail; Pass; Pass |
| OREAS-991 | 2020 | Not enough samples (1 only) | To effectively review. |

### 3.2.1. OREAS-166

Comments:

- Has no Au certification.
- Accuracy and precision tests passed.
- Only six CRMs used, not statistically relevant.

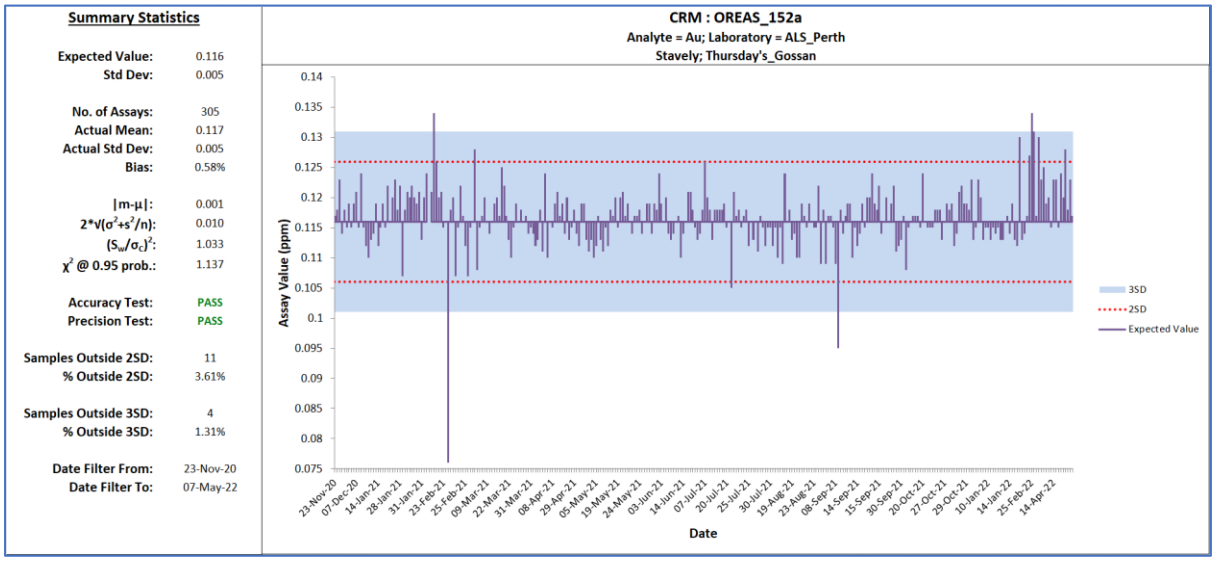


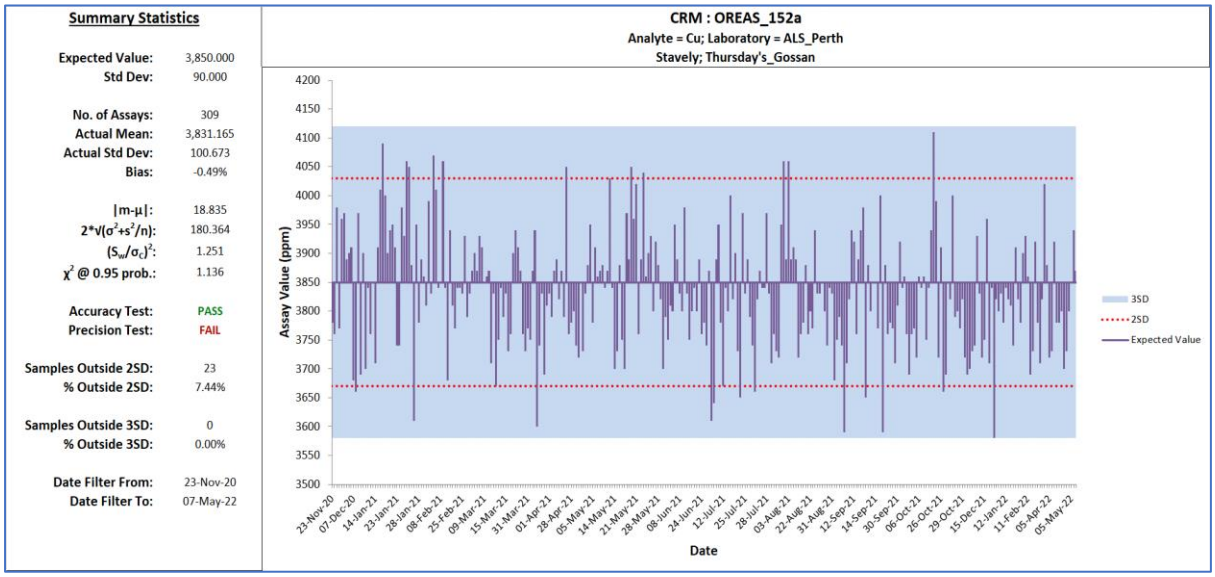



### 3.2.2. OREAS_152A

Comments:

- No Ag certification.
- One potential misclassified CRM removed.
- Four accuracy failures.
- Precision test failure.
- No time-based biases.



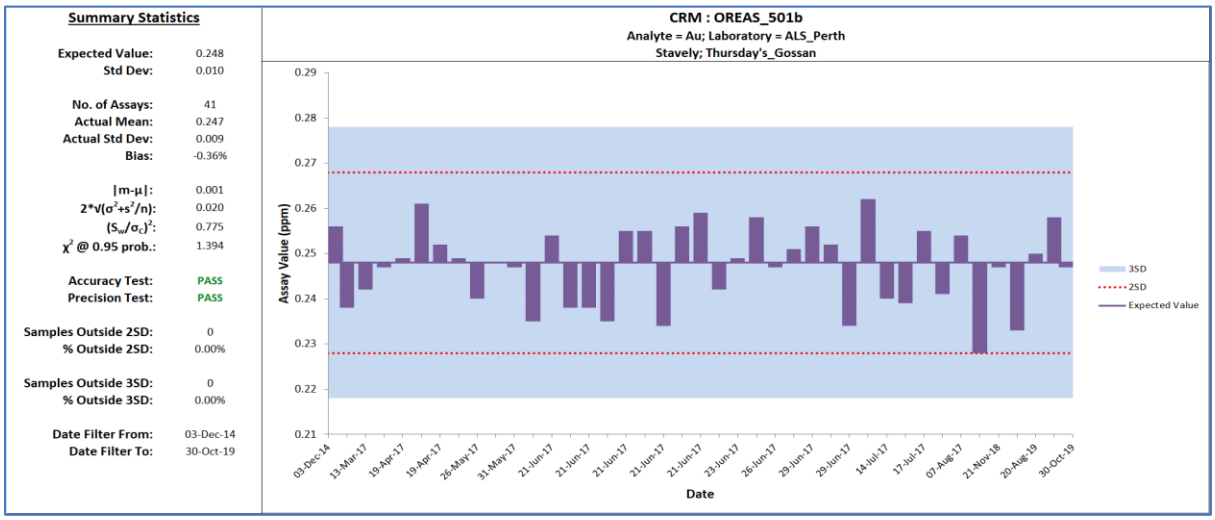



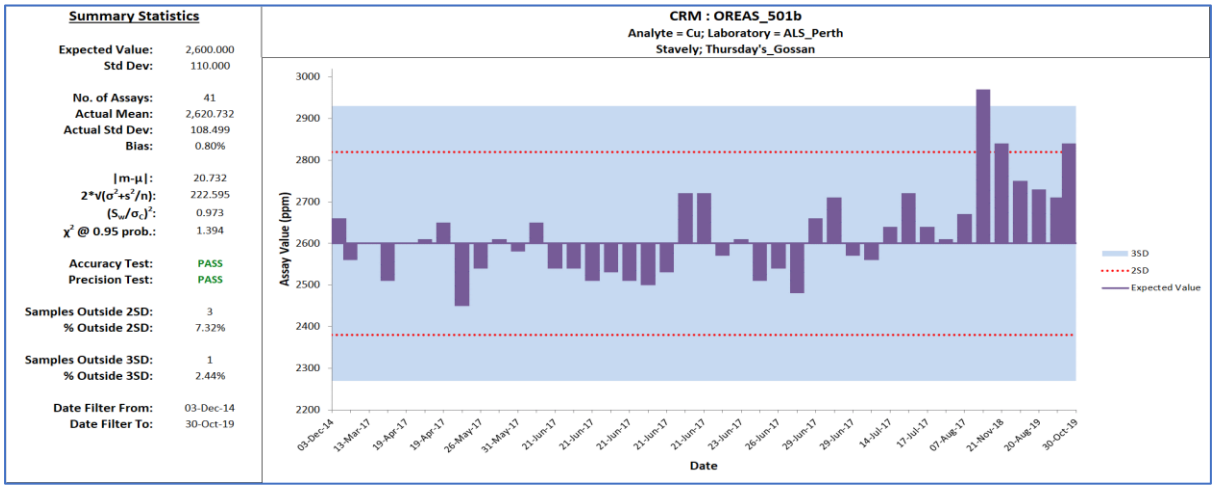

### 3.2.3. OREAS-501B

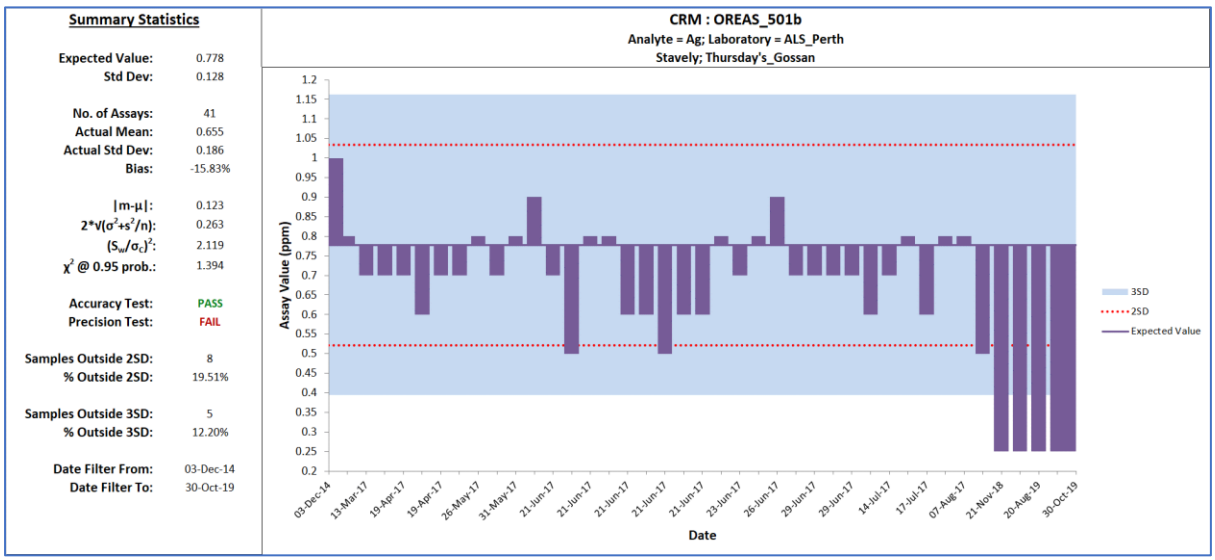
Comments:

- Accuracy test passes for all elements, but precision for Ag failed.

- Only one failure for Cu and four for Ag.
- No time-based biases.
- General undercall bias for Ag.



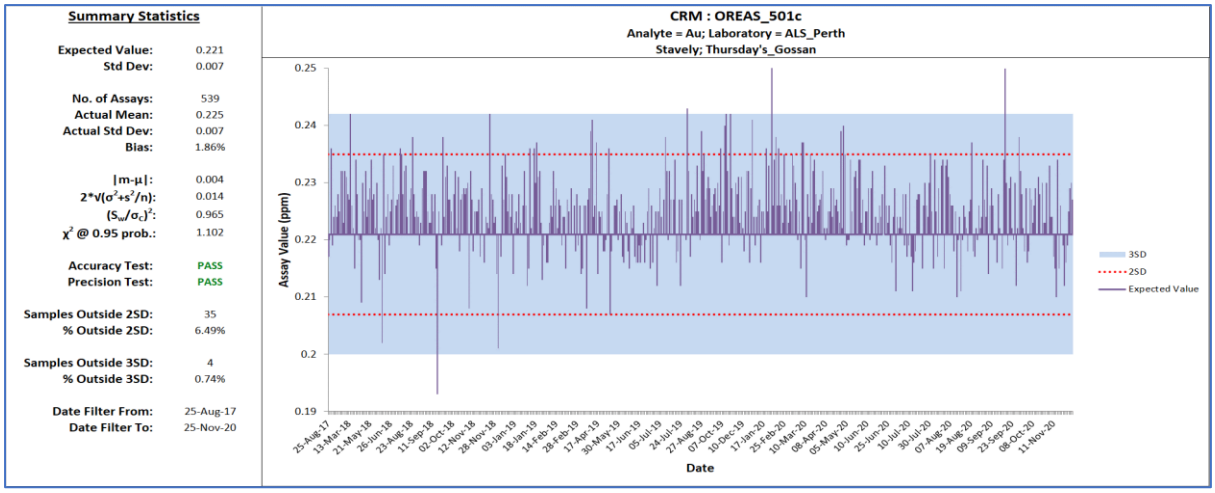



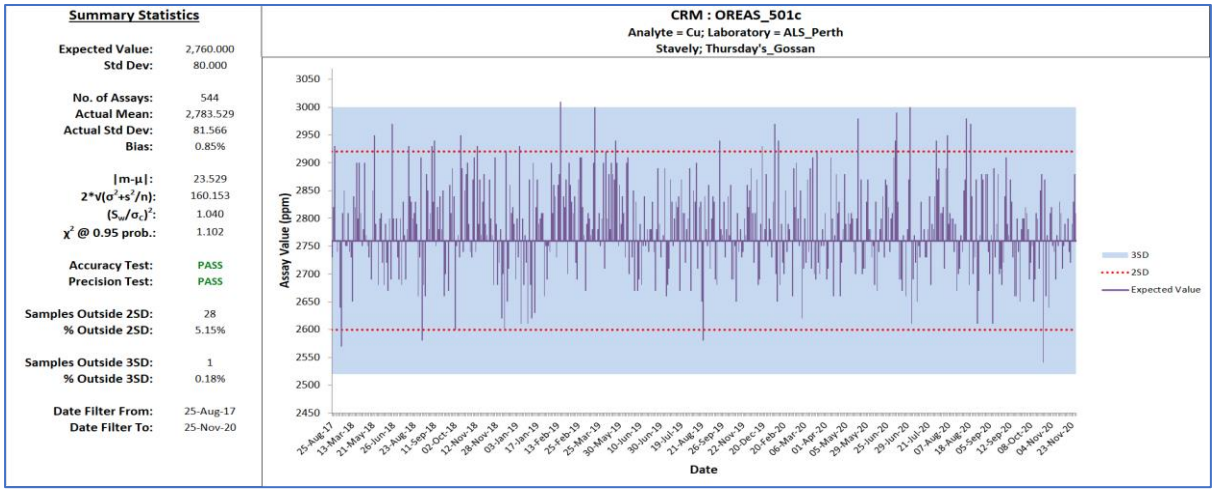



### 3.2.4. OREAS-501C

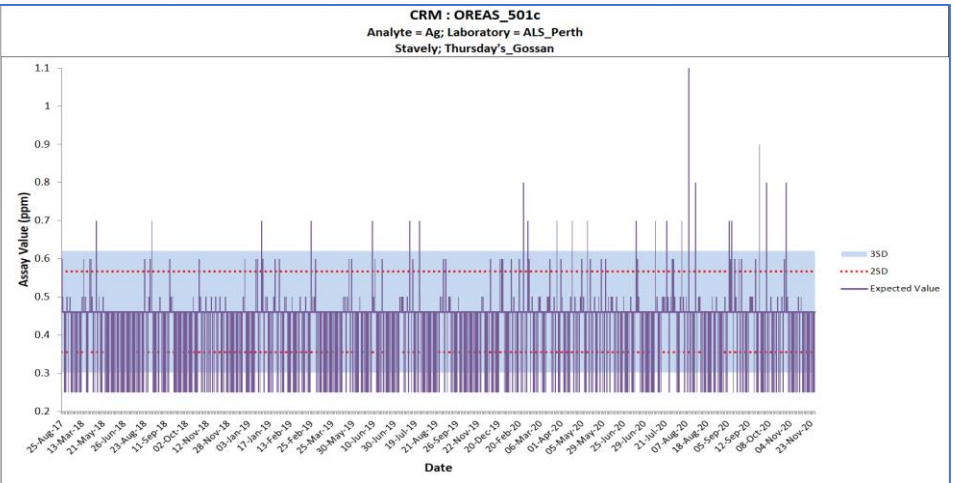
Comments:

- One Au outlier removed – potential misclassification.
- Au and Cu pass precision and accuracy test.
- Four and one failure for Au and Cu respectively.
- Ag fails precision and accuracy tests.
- Over 400 failures for Ag.
- No apparent time-based biases.
- General overcall bias for Au.



| Summary Statistics | |
|---|---|
| Expected Value: | 0.461 |
| Std Dev: | 0.053 |
| No. of Assays: | 544 |
| Actual Mean: | 0.341 |
| Actual Std Dev: | 0.151 |
| Bias: | -25.93% |
| $\|m-\mu\|$: | 0.120 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.107 |
| $(S_m/\sigma_c)^2$: | 8.122 |
| $\chi^2$ @ 0.95 prob.: | 1.102 |
| Accuracy Test: | FAIL |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 452 |
| % Outside 2SD: | 83.09% |
| Samples Outside 3SD: | 408 |
| % Outside 3SD: | 75.00% |
| Date Filter From: | 25-Aug-17 |
| Date Filter To: | 25-Nov-20 |

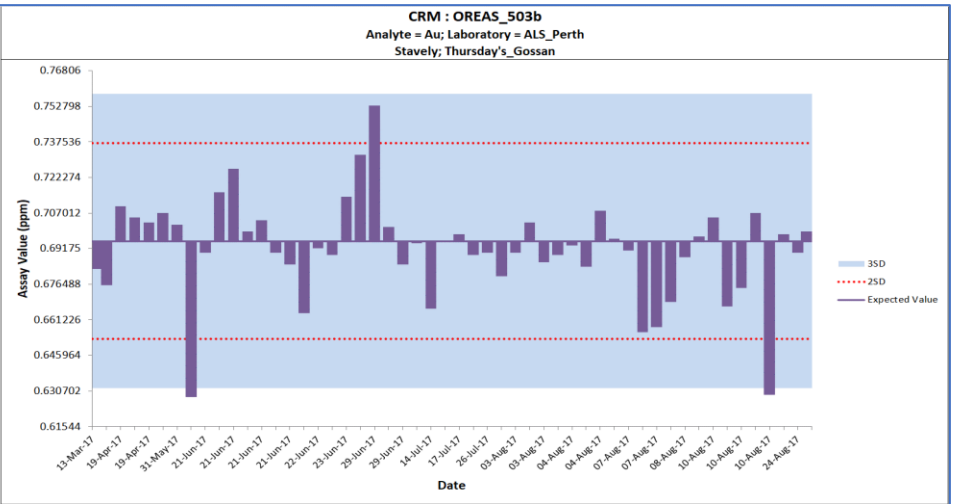



### 3.2.5. OREAS-503B

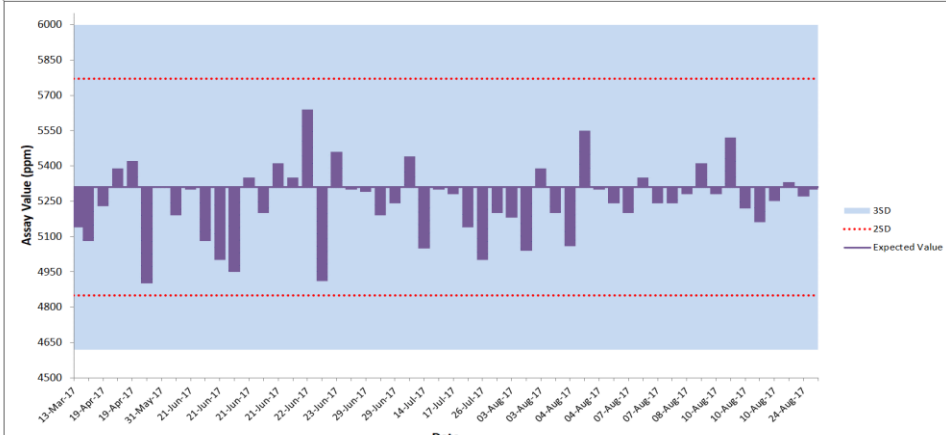
Comments:

- Two failures for Au, but passed precision and accuracy test.
- Good performance on Cu.
- One outlier removed from Ag, one failure.
- All elements passed precision and accuracy tests.
- Reasonably consistent undercall for Ag.

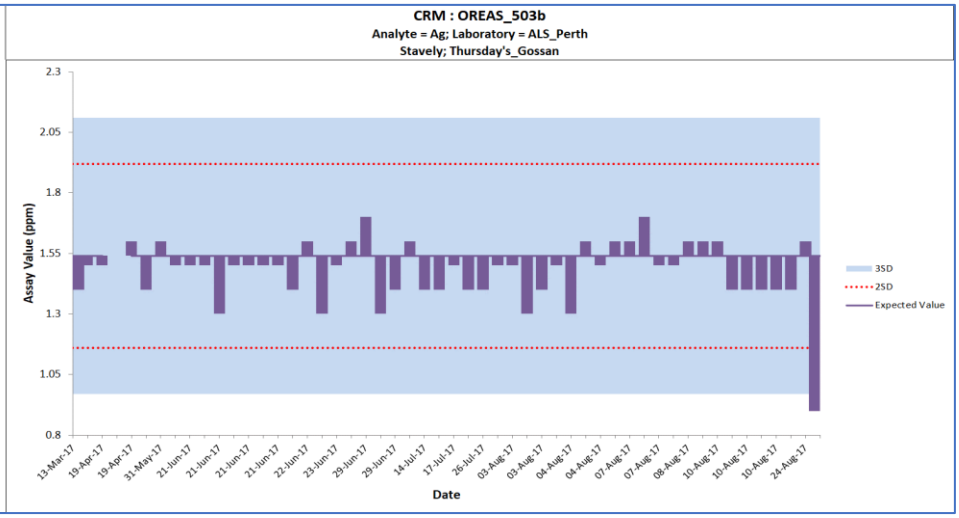
| Summary Statistics | |
|---|---|
| Expected Value: | 0.695 |
| Std Dev: | 0.021 |
| No. of Assays: | 52 |
| Actual Mean: | 0.691 |
| Actual Std Dev: | 0.022 |
| Bias: | -0.54% |
| $\|m-\mu\|$: | 0.004 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.042 |
| $(S_m/\sigma_c)^2$: | 1.060 |
| $\chi^2$ @ 0.95 prob.: | 1.346 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 3 |
| % Outside 2SD: | 5.77% |
| Samples Outside 3SD: | 2 |
| % Outside 3SD: | 3.85% |
| Date Filter From: | 13-Mar-17 |
| Date Filter To: | 24-Aug-17 |



| Summary Statistics | |
|---|---|
| Expected Value: | 5,310.000 |
| Std Dev: | 230.000 |
| No. of Assays: | 52 |
| Actual Mean: | 5,245.192 |
| Actual Std Dev: | 157.037 |
| Bias: | -1.22% |
| \|m-μ\|: | 64.808 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 462.057 |
| $(S_m/\sigma_c)^2$: | 0.466 |
| $\chi^2$ @ 0.95 prob.: | 1.346 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 0 |
| % Outside 2SD: | 0.00% |
| Samples Outside 3SD: | 0 |
| % Outside 3SD: | 0.00% |
| Date Filter From: | 13-Mar-17 |
| Date Filter To: | 24-Aug-17 |




| Summary Statistics | |
|---|---|
| Expected Value: | 1.540 |
| Std Dev: | 0.190 |
| No. of Assays: | 51 |
| Actual Mean: | 1.473 |
| Actual Std Dev: | 0.131 |
| Bias: | -4.38% |
| \|m-μ\|: | 0.067 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.382 |
| $(S_m/\sigma_c)^2$: | 0.477 |
| $\chi^2$ @ 0.95 prob.: | 1.350 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 1 |
| % Outside 2SD: | 1.96% |
| Samples Outside 3SD: | 1 |
| % Outside 3SD: | 1.96% |
| Date Filter From: | 13-Mar-17 |
| Date Filter To: | 24-Aug-17 |

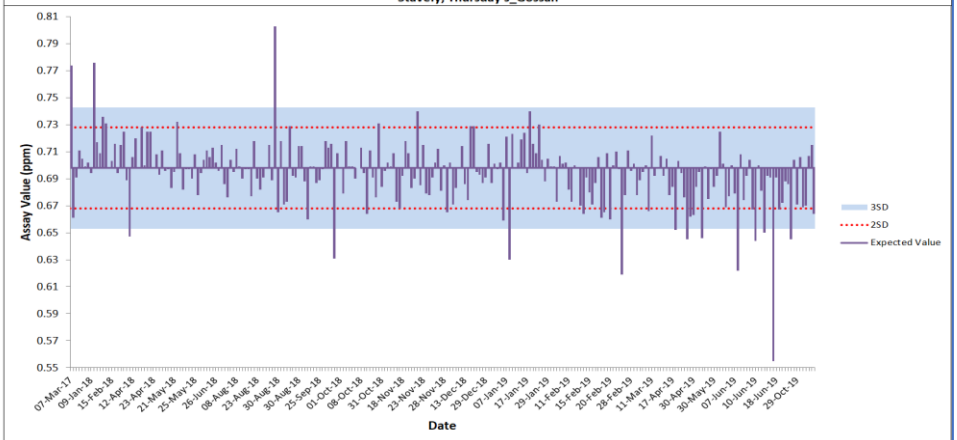



### 3.2.6. OREAS-503C

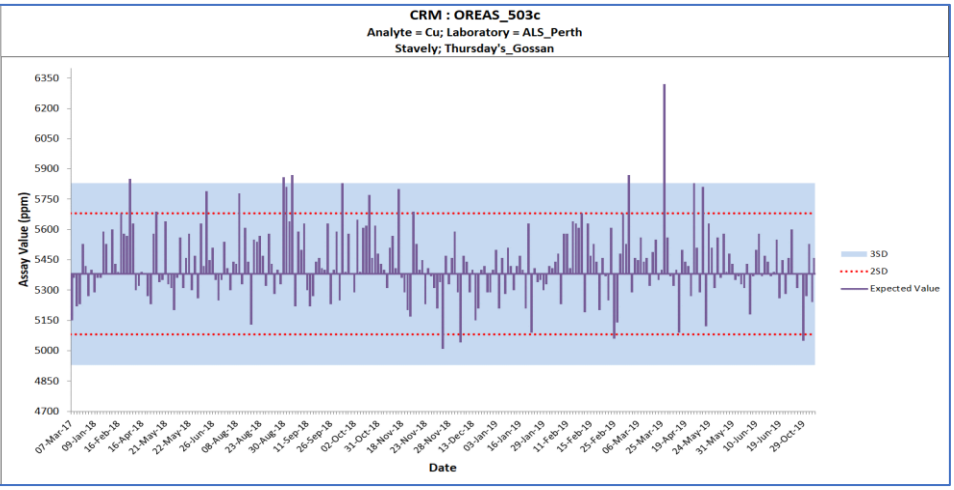
Comments:

- One outlier removed from Au.
- Eleven failures for Au and precision test fail.
- Five Cu failures, resulting in precision test failure.
- Five outliers removed from Ag dataset.
- Ag has 14 failures, resulting in precision test failure.
- An undercall bias for Au commencing from the end of January.

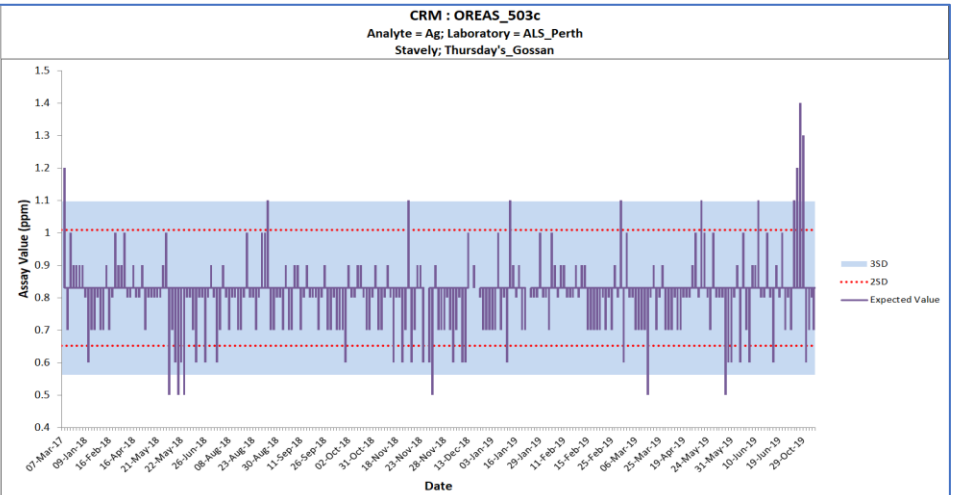
| Summary Statistics | |
|---|---|
| Expected Value: | 0.698 |
| Std Dev: | 0.015 |
| No. of Assays: | 251 |
| Actual Mean: | 0.694 |
| Actual Std Dev: | 0.025 |
| Bias: | -0.56% |
| $\|m-\mu\|$: | 0.004 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.030 |
| $(S_m/\sigma_c)^2$: | 2.688 |
| $\chi^2$ @ 0.95 prob.: | 1.152 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 41 |
| % Outside 2SD: | 16.33% |
| Samples Outside 3SD: | 15 |
| % Outside 3SD: | 5.98% |
| Date Filter From: | 07-Mar-17 |
| Date Filter To: | 12-Jul-20 |




| Summary Statistics | |
|---|---|
| Expected Value: | 5,380.000 |
| Std Dev: | 150.000 |
| No. of Assays: | 253 |
| Actual Mean: | 5,430.079 |
| Actual Std Dev: | 173.104 |
| Bias: | 0.93% |
| $\|m-\mu\|$: | 50.079 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 300.789 |
| $(S_m/\sigma_c)^2$: | 1.332 |
| $\chi^2$ @ 0.95 prob.: | 1.151 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 19 |
| % Outside 2SD: | 7.51% |
| Samples Outside 3SD: | 5 |
| % Outside 3SD: | 1.98% |
| Date Filter From: | 07-Mar-17 |
| Date Filter To: | 12-Jul-20 |




| Summary Statistics | |
|---|---|
| Expected Value: | 0.830 |
| Std Dev: | 0.089 |
| No. of Assays: | 248 |
| Actual Mean: | 0.794 |
| Actual Std Dev: | 0.140 |
| Bias: | -4.34% |
| $\|m-\mu\|$: | 0.036 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.179 |
| $(S_m/\sigma_c)^2$: | 2.474 |
| $\chi^2$ @ 0.95 prob.: | 1.152 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 40 |
| % Outside 2SD: | 16.13% |
| Samples Outside 3SD: | 17 |
| % Outside 3SD: | 6.85% |
| Date Filter From: | 07-Mar-17 |
| Date Filter To: | 12-Jul-20 |



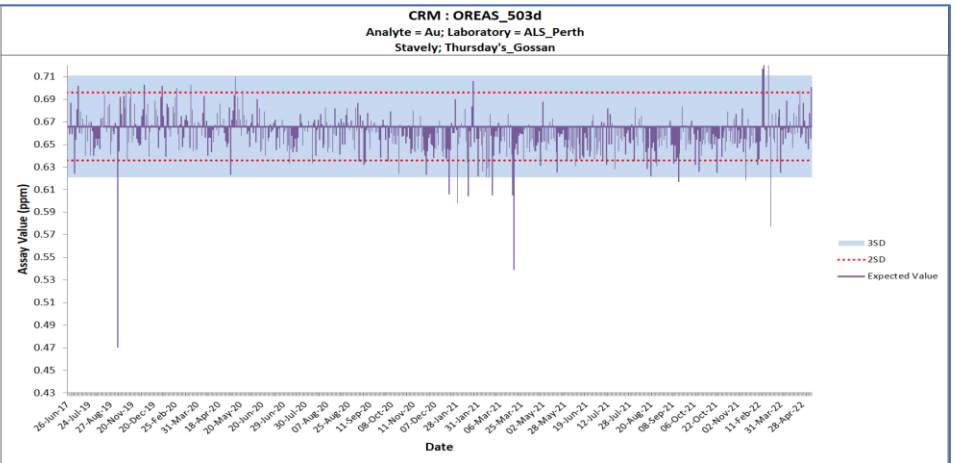

### 3.2.7. OREAS-503D

Comments:

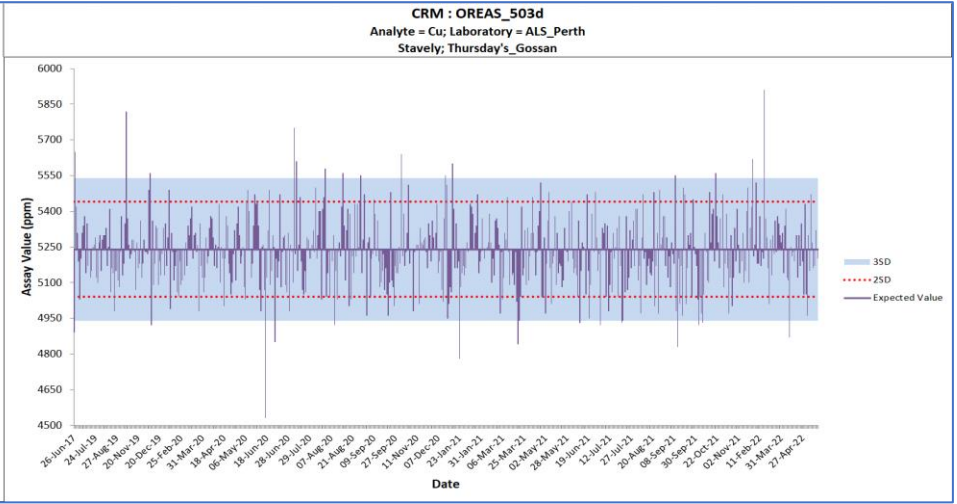
- Two outliers removed from Au dataset.
- 13 failures (~2%) for Au and resultant precision test fail.

- 21 failures for Cu and precision test failure.
- No perceptible time-based biases for Cu and Ag, however there is a noticeable bias for Au from around middle of June 2020 to February 2022.
- Poor performance for Ag with 121 failures (~19%).

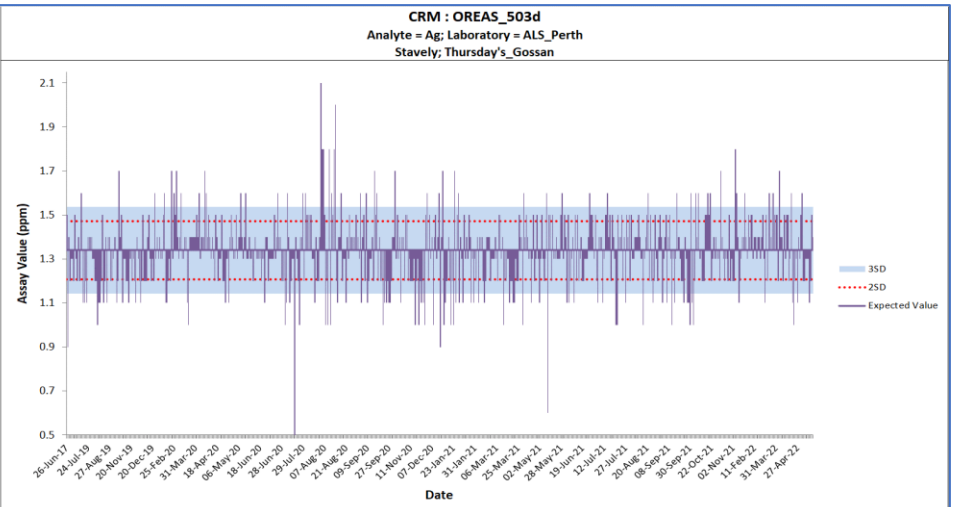
| Summary Statistics | |
|---|---|
| Expected Value: | 0.666 |
| Std Dev: | 0.015 |
| No. of Assays: | 619 |
| Actual Mean: | 0.658 |
| Actual Std Dev: | 0.019 |
| Bias: | -1.20% |
| $\|m-\mu\|$: | 0.008 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.030 |
| $(S_m/\sigma_c)^2$: | 1.679 |
| $\chi^2$ @ 0.95 prob.: | 1.095 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 59 |
| % Outside 2SD: | 9.53% |
| Samples Outside 3SD: | 13 |
| % Outside 3SD: | 2.10% |
| Date Filter From: | 26-Jun-17 |
| Date Filter To: | 07-May-22 |




| Summary Statistics | |
|---|---|
| Expected Value: | 5,240.000 |
| Std Dev: | 100.000 |
| No. of Assays: | 626 |
| Actual Mean: | 5,227.029 |
| Actual Std Dev: | 152.368 |
| Bias: | -0.25% |
| $\|m-\mu\|$: | 12.971 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 200.371 |
| $(S_m/\sigma_c)^2$: | 2.322 |
| $\chi^2$ @ 0.95 prob.: | 1.095 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 103 |
| % Outside 2SD: | 16.45% |
| Samples Outside 3SD: | 29 |
| % Outside 3SD: | 4.63% |
| Date Filter From: | 26-Jun-17 |
| Date Filter To: | 07-May-22 |



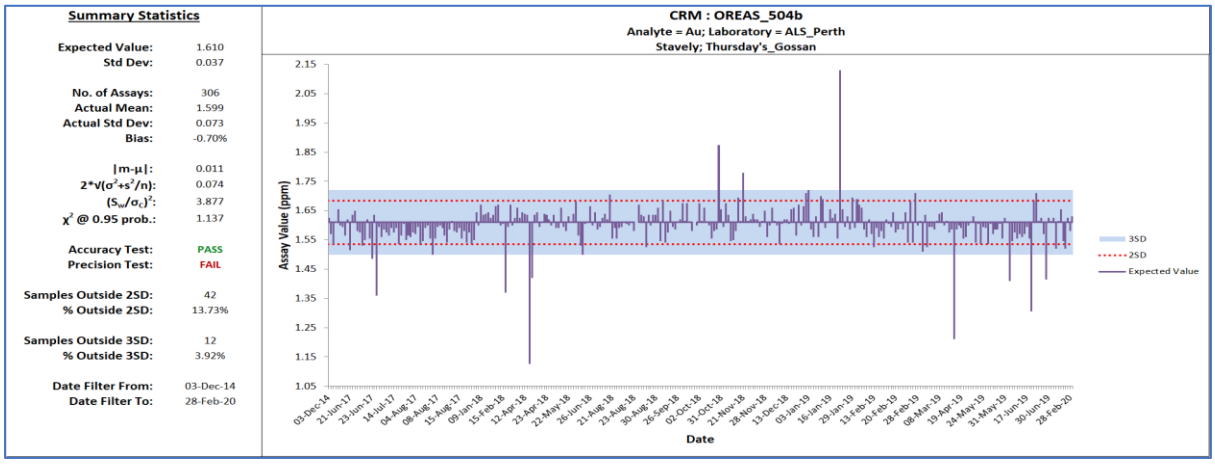

| Summary Statistics | |
|---|---|
| Expected Value: | 1.340 |
| Std Dev: | 0.066 |
| No. of Assays: | 626 |
| Actual Mean: | 1.328 |
| Actual Std Dev: | 0.176 |
| Bias: | -0.86% |
| $\|m-\mu\|$: | 0.012 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.133 |
| $(S_m/\sigma_c)^2$: | 7.131 |
| $\chi^2$ @ 0.95 prob.: | 1.095 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 353 |
| % Outside 2SD: | 56.39% |
| Samples Outside 3SD: | 151 |
| % Outside 3SD: | 24.12% |
| Date Filter From: | 26-Jun-17 |
| Date Filter To: | 07-May-22 |

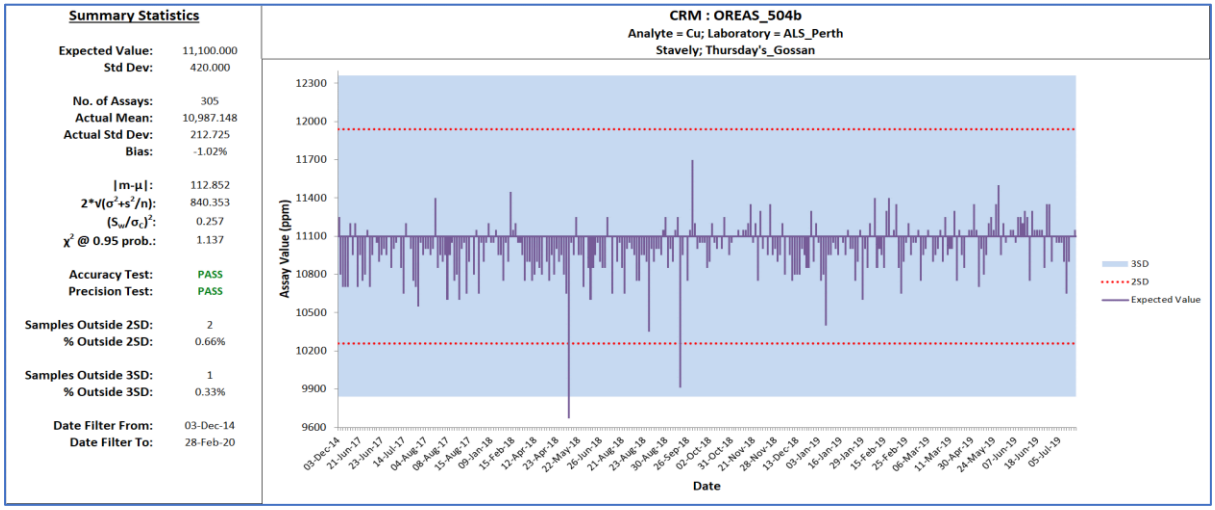


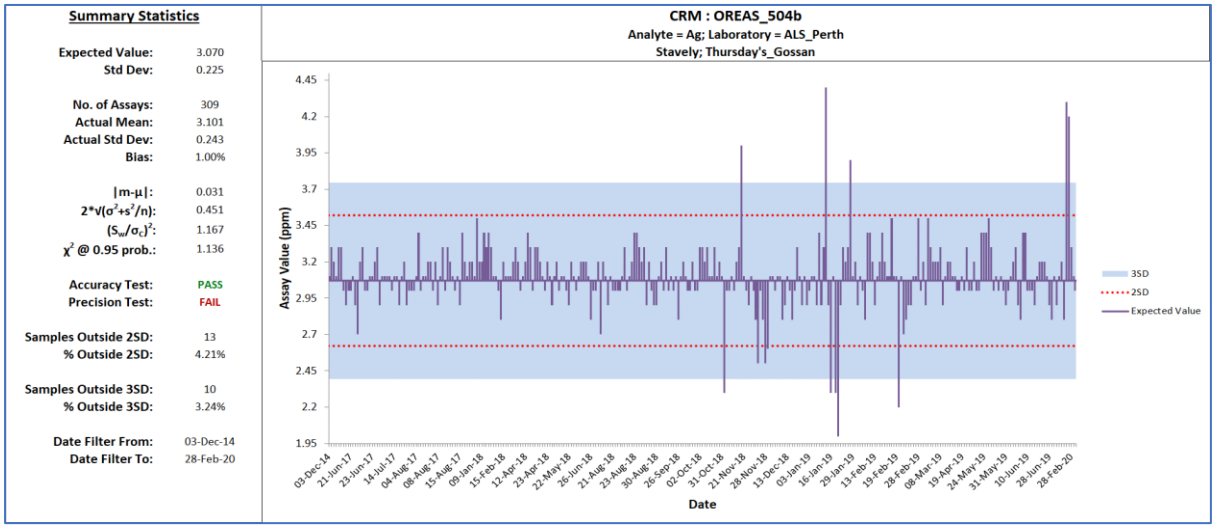
### 3.2.8. OREAS-504B

Comments:

- For Au, one potential mis-assigned CRM removed and one outlier removed.
- Noticeable abrupt change in Au bias when CRM was re-introduced in January 2018.
- Good performance on Cu with only one failure and only one outside 2SD.
- Precision test failure and ten failures for Ag, with a noticeable change in precision from October 2018..
- Reasonably consistent undercall on Cu.



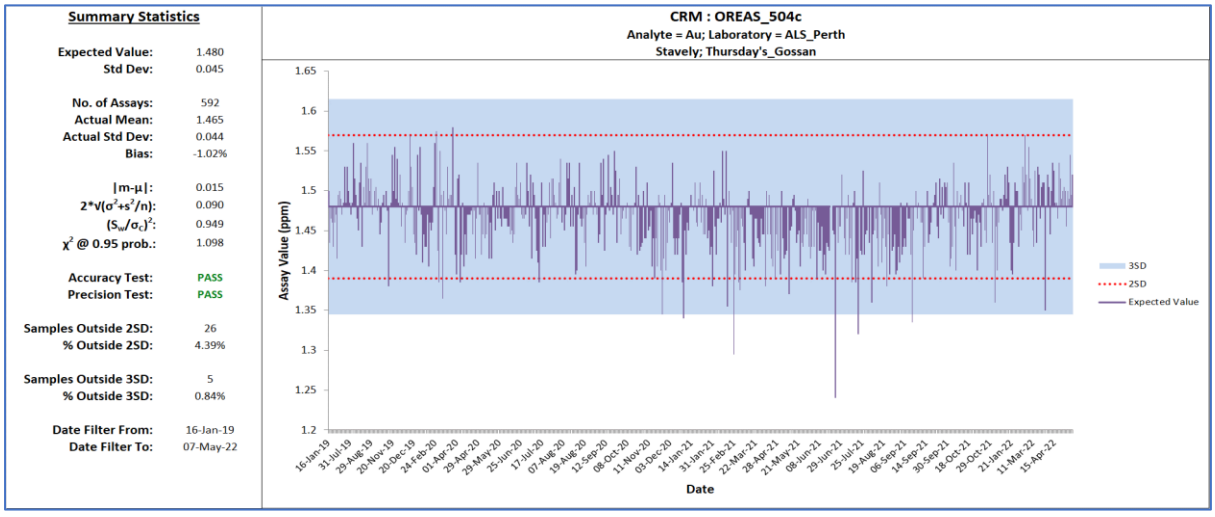





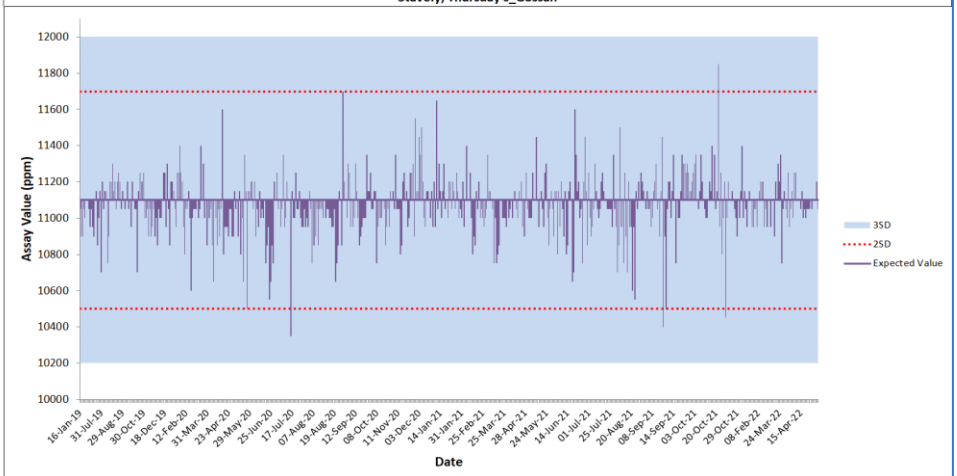

### 3.2.9. OREAS-504C

Comments:

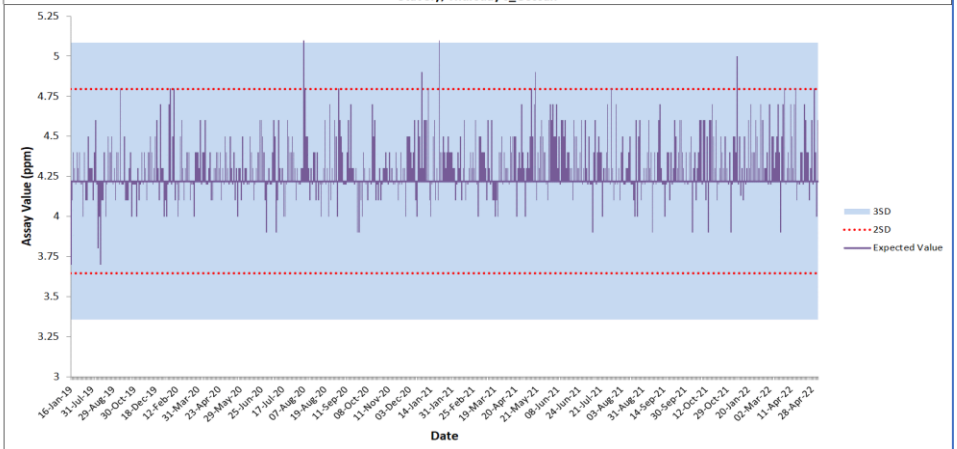
- Two potential mislabelled CRMs for Au removed.
- Five Au failures, but pass precision and accuracy tests.
- Weak cyclical nature to Au results, with a under-call bias from February 2021 to September 2021.
- Good Cu performance.
- Two Ag failures with a general positive bias.



| Summary Statistics | |
|---|---|
| Expected Value: | 11,100.000 |
| Std Dev: | 300.000 |
| No. of Assays: | 593 |
| Actual Mean: | 11,064.165 |
| Actual Std Dev: | 171.495 |
| Bias: | -0.32% |
| \|m-μ\|: | 35.835 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 600.165 |
| $(S_m/\sigma_c)^2$: | 0.327 |
| $\chi^2$ @ 0.95 prob.: | 1.097 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 4 |
| % Outside 2SD: | 0.67% |
| Samples Outside 3SD: | 0 |
| % Outside 3SD: | 0.00% |
| Date Filter From: | 16-Jan-19 |
| Date Filter To: | 07-May-22 |




| Summary Statistics | |
|---|---|
| Expected Value: | 4.220 |
| Std Dev: | 0.288 |
| No. of Assays: | 601 |
| Actual Mean: | 4.336 |
| Actual Std Dev: | 0.207 |
| Bias: | 2.75% |
| \|m-μ\|: | 0.116 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.576 |
| $(S_m/\sigma_c)^2$: | 0.517 |
| $\chi^2$ @ 0.95 prob.: | 1.097 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 16 |
| % Outside 2SD: | 2.66% |
| Samples Outside 3SD: | 2 |
| % Outside 3SD: | 0.33% |
| Date Filter From: | 16-Jan-19 |
| Date Filter To: | 07-May-22 |

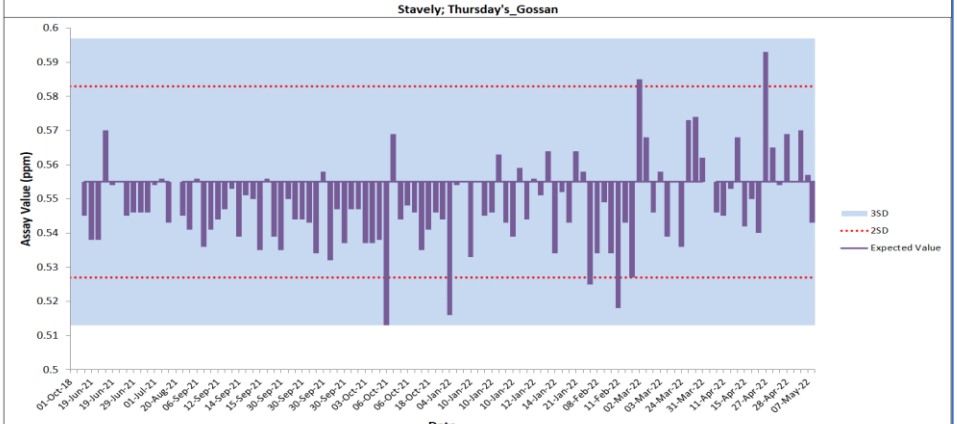



### 3.2.10. OREAS_505

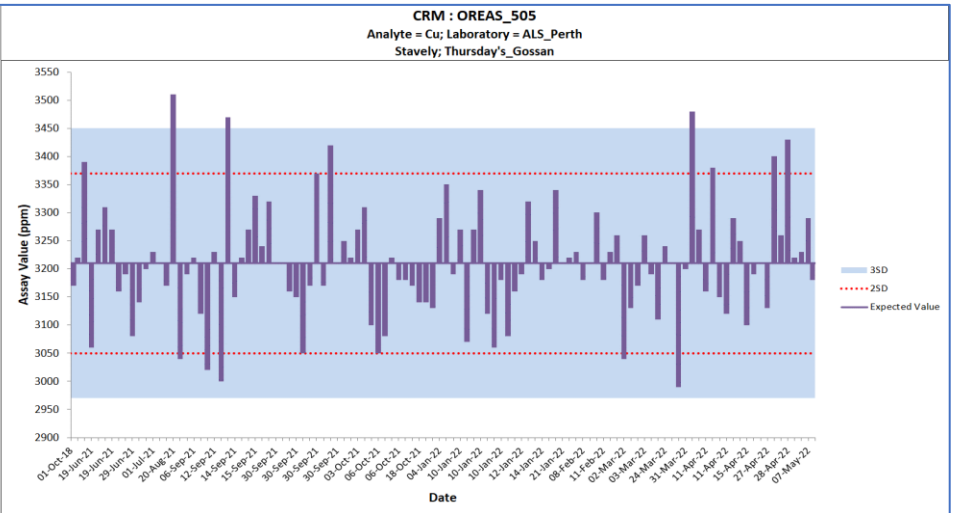
Comments:

- Four Au outliers removed – a high number.
- A strong negative bias for Au from start of use (October 2018) to March 2022, but passed precision and accuracy tests.
- Three failures in Ag dataset, resultant precision test failure.
- No time-based biases for Cu and Ag.
- Poor performance of Ag with around 10% failure rate, even after four outliers removed.

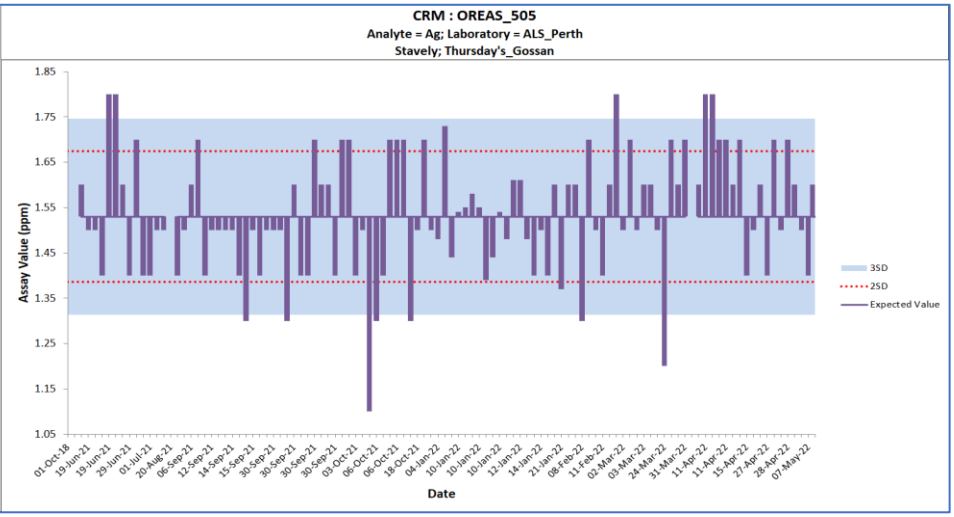
| Summary Statistics | |
|---|---|
| Expected Value: | 0.555 |
| Std Dev: | 0.014 |
| No. of Assays: | 103 |
| Actual Mean: | 0.548 |
| Actual Std Dev: | 0.013 |
| Bias: | -1.28% |
| $\|m-\mu\|$: | 0.007 |
| $2*v(\sigma^2+s^2/n)$: | 0.028 |
| $(S_m/\sigma_c)^2$: | 0.878 |
| $\chi^2$ @ 0.95 prob.: | 1.241 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 6 |
| % Outside 2SD: | 5.83% |
| Samples Outside 3SD: | 0 |
| % Outside 3SD: | 0.00% |
| Date Filter From: | 01-Oct-18 |
| Date Filter To: | 07-May-22 |




| Summary Statistics | |
|---|---|
| Expected Value: | 3,210.000 |
| Std Dev: | 80.000 |
| No. of Assays: | 110 |
| Actual Mean: | 3,210.182 |
| Actual Std Dev: | 101.004 |
| Bias: | 0.01% |
| $\|m-\mu\|$: | 0.182 |
| $2*v(\sigma^2+s^2/n)$: | 161.155 |
| $(S_m/\sigma_c)^2$: | 1.594 |
| $\chi^2$ @ 0.95 prob.: | 1.233 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 13 |
| % Outside 2SD: | 11.82% |
| Samples Outside 3SD: | 3 |
| % Outside 3SD: | 2.73% |
| Date Filter From: | 01-Oct-18 |
| Date Filter To: | 07-May-22 |




| Summary Statistics | |
|---|---|
| Expected Value: | 1.530 |
| Std Dev: | 0.072 |
| No. of Assays: | 106 |
| Actual Mean: | 1.534 |
| Actual Std Dev: | 0.138 |
| Bias: | 0.25% |
| $\|m-\mu\|$: | 0.004 |
| $2*v(\sigma^2+s^2/n)$: | 0.146 |
| $(S_m/\sigma_c)^2$: | 3.670 |
| $\chi^2$ @ 0.95 prob.: | 1.237 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 32 |
| % Outside 2SD: | 30.19% |
| Samples Outside 3SD: | 12 |
| % Outside 3SD: | 11.32% |
| Date Filter From: | 01-Oct-18 |
| Date Filter To: | 07-May-22 |

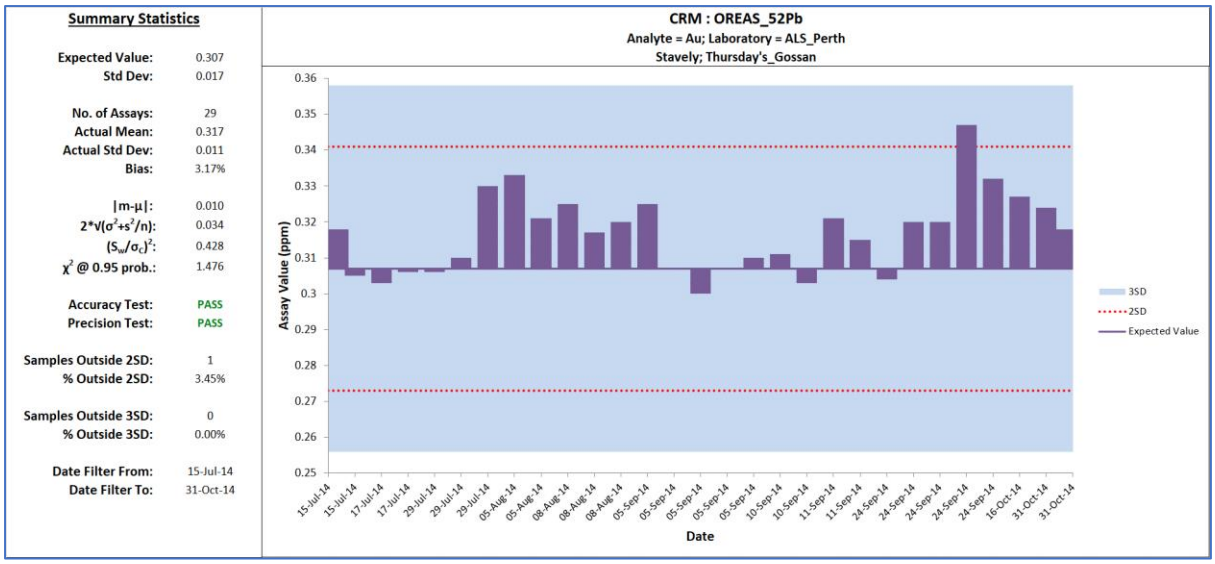


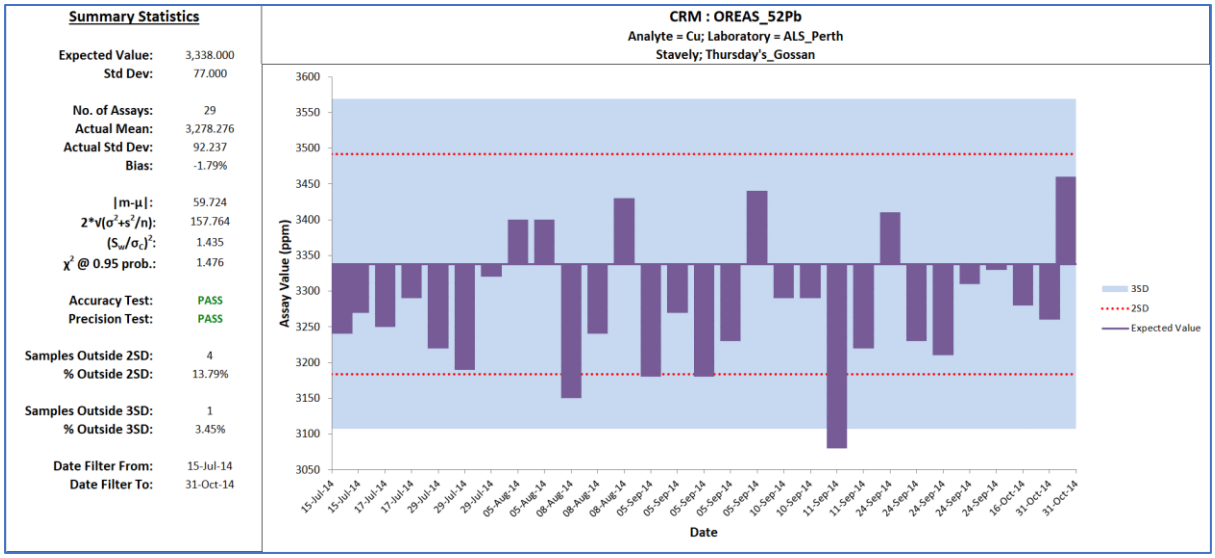

### 3.2.11. OREAS-52PB

Comments:

- No Ag certification.
- Good performance as only one failure for Cu.

- Positive bias for Au.

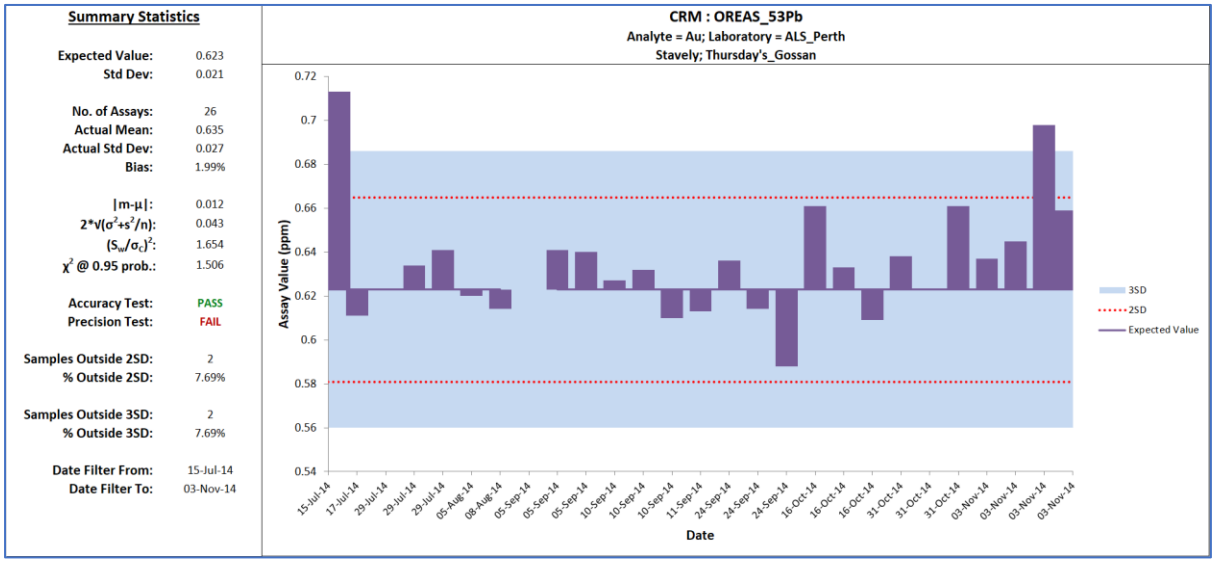


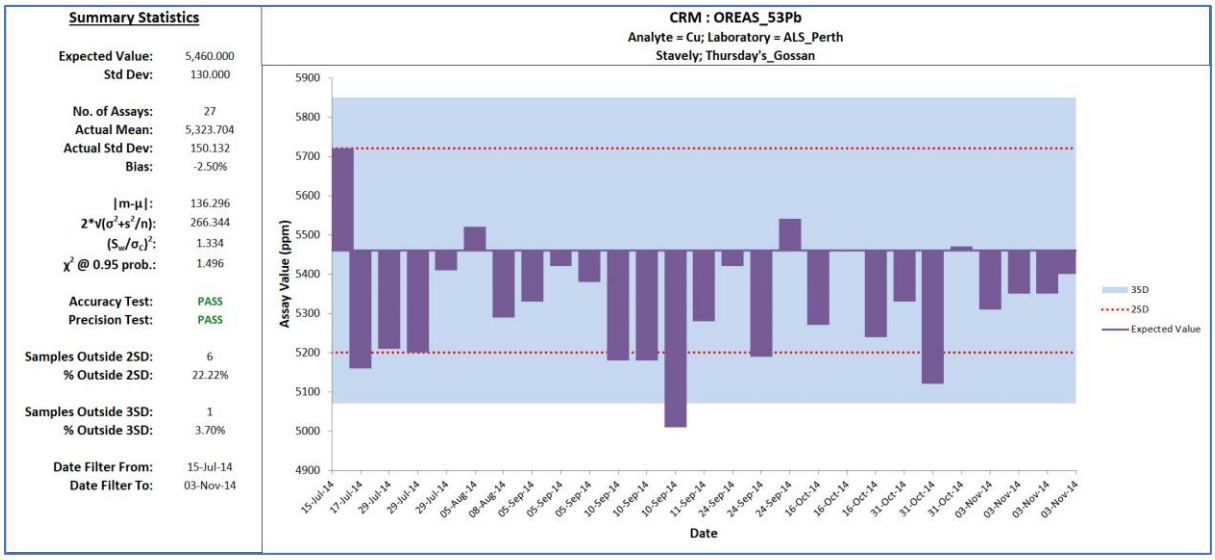




### 3.2.12. OREAS-53PB

Comments:

- Relatively low number (26) of CRMs used, hence definitive conclusions hard to justify.
- No Ag certification.
- Au failed precision test and two failures.



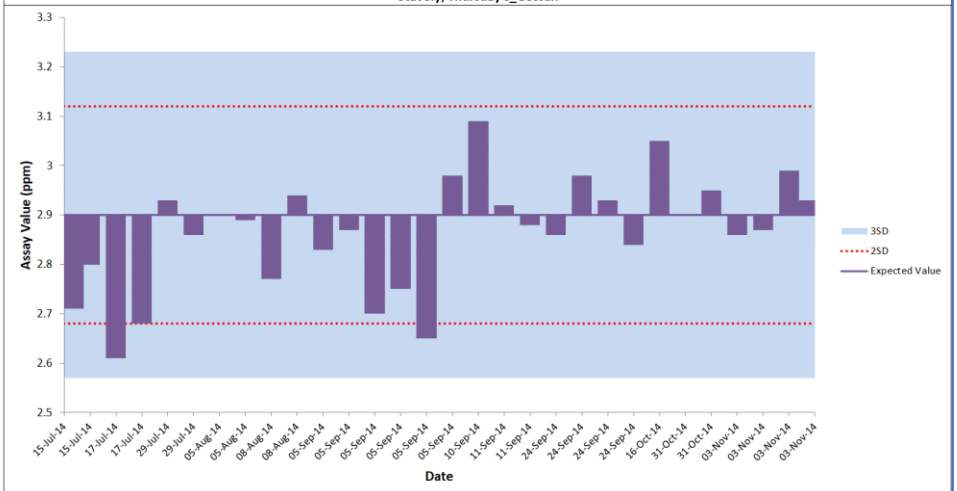




### 3.2.13. OREAS-54PA

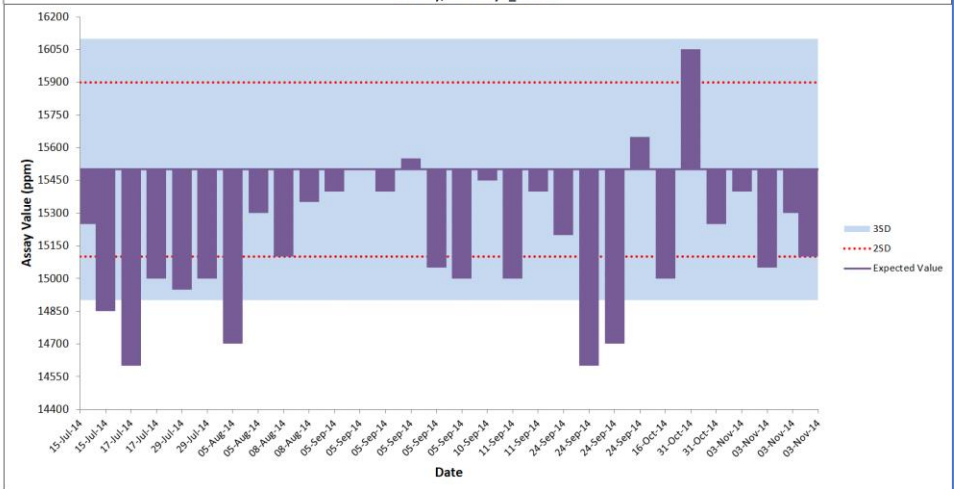
Comments:

- No Ag certification.
- Relatively low number (30) of CRMs used, hence definitive conclusions hard to justify and older data

| Summary Statistics | |
|---|---|
| Expected Value: | 2.900 |
| Std Dev: | 0.110 |
| No. of Assays: | 30 |
| Actual Mean: | 2.864 |
| Actual Std Dev: | 0.115 |
| Bias: | -1.24% |
| $\|m-\mu\|$: | 0.036 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.224 |
| $(S_m/\sigma_c)^2$: | 1.094 |
| $\chi^2$ @ 0.95 prob.: | 1.467 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 2 |
| % Outside 2SD: | 6.67% |
| Samples Outside 3SD: | 0 |
| % Outside 3SD: | 0.00% |
| Date Filter From: | 15-Jul-14 |
| Date Filter To: | 03-Nov-14 |




| Summary Statistics | |
|---|---|
| Expected Value: | 15,500.000 |
| Std Dev: | 200.000 |
| No. of Assays: | 30 |
| Actual Mean: | 15,171.667 |
| Actual Std Dev: | 324.485 |
| Bias: | -2.12% |
| $\|m-\mu\|$: | 328.333 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 417.179 |
| $(S_m/\sigma_c)^2$: | 2.632 |
| $\chi^2$ @ 0.95 prob.: | 1.467 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 14 |
| % Outside 2SD: | 46.67% |
| Samples Outside 3SD: | 5 |
| % Outside 3SD: | 16.67% |
| Date Filter From: | 15-Jul-14 |
| Date Filter To: | 03-Nov-14 |

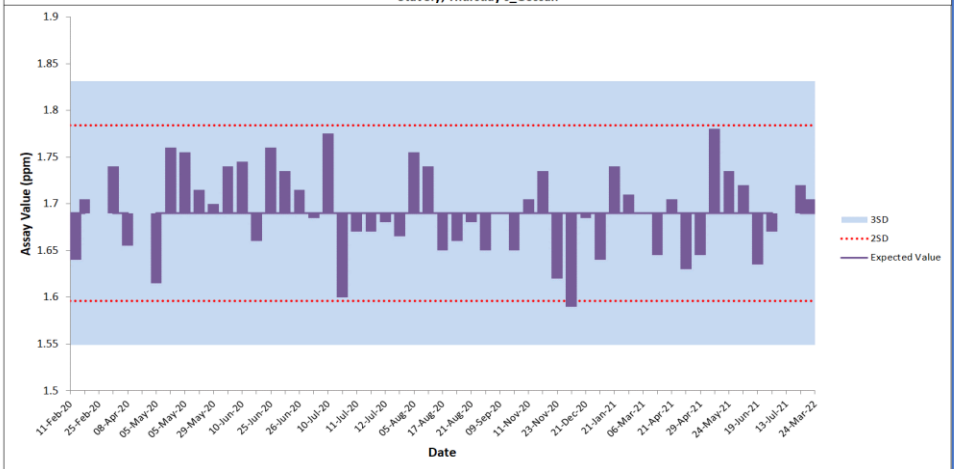



### 3.2.14. OREAS-604B

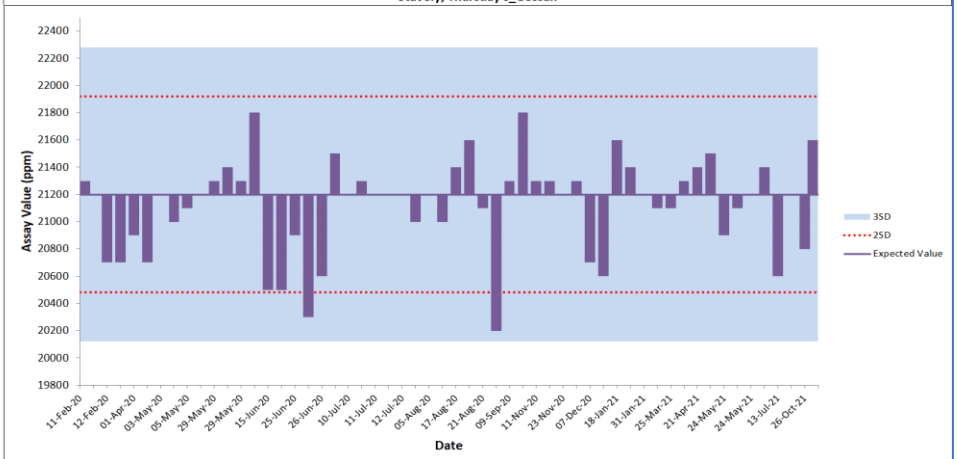
Comments:

- After three outliers removed from Au dataset, an acceptable performance and with no time-based bias.
- Two failures for Cu.
- Very strong positive bias for Ag with a precision test failure.

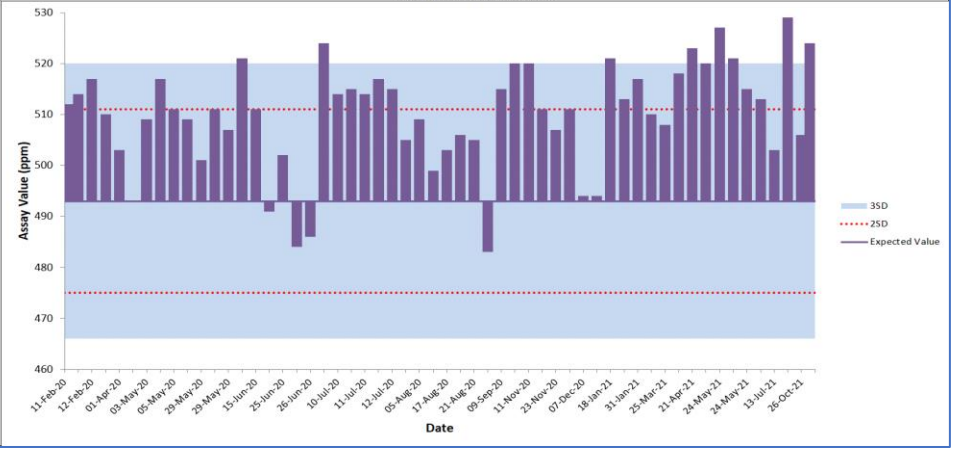
| Summary Statistics | |
|---|---|
| Expected Value: | 1.690 |
| Std Dev: | 0.047 |
| No. of Assays: | 50 |
| Actual Mean: | 1.691 |
| Actual Std Dev: | 0.048 |
| Bias: | 0.08% |
| \|m-μ\|: | 0.001 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.095 |
| $(S_m/\sigma_c)^2$: | 1.028 |
| $\chi^2$ @ 0.95 prob.: | 1.354 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 1 |
| % Outside 2SD: | 2.00% |
| Samples Outside 3SD: | 0 |
| % Outside 3SD: | 0.00% |
| Date Filter From: | 11-Feb-20 |
| Date Filter To: | 24-Mar-22 |




| Summary Statistics | |
|---|---|
| Expected Value: | 21,200.000 |
| Std Dev: | 360.000 |
| No. of Assays: | 56 |
| Actual Mean: | 21,117.857 |
| Actual Std Dev: | 350.639 |
| Bias: | -0.39% |
| \|m-μ\|: | 82.143 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 726.073 |
| $(S_m/\sigma_c)^2$: | 0.949 |
| $\chi^2$ @ 0.95 prob.: | 1.333 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 2 |
| % Outside 2SD: | 3.57% |
| Samples Outside 3SD: | 0 |
| % Outside 3SD: | 0.00% |
| Date Filter From: | 11-Feb-20 |
| Date Filter To: | 24-Mar-22 |




| Summary Statistics | |
|---|---|
| Expected Value: | 493.000 |
| Std Dev: | 9.000 |
| No. of Assays: | 56 |
| Actual Mean: | 509.964 |
| Actual Std Dev: | 10.420 |
| Bias: | 3.44% |
| \|m-μ\|: | 16.964 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 18.214 |
| $(S_m/\sigma_c)^2$: | 1.341 |
| $\chi^2$ @ 0.95 prob.: | 1.333 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 26 |
| % Outside 2SD: | 46.43% |
| Samples Outside 3SD: | 8 |
| % Outside 3SD: | 14.29% |
| Date Filter From: | 11-Feb-20 |
| Date Filter To: | 24-Mar-22 |

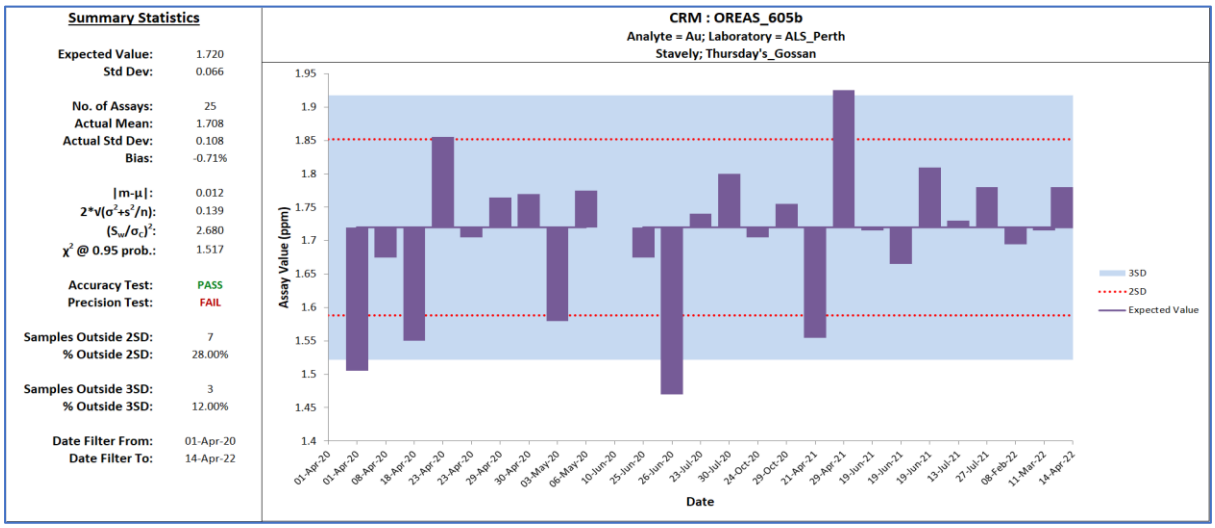



### 3.2.15. OREAS-605B

Comments:

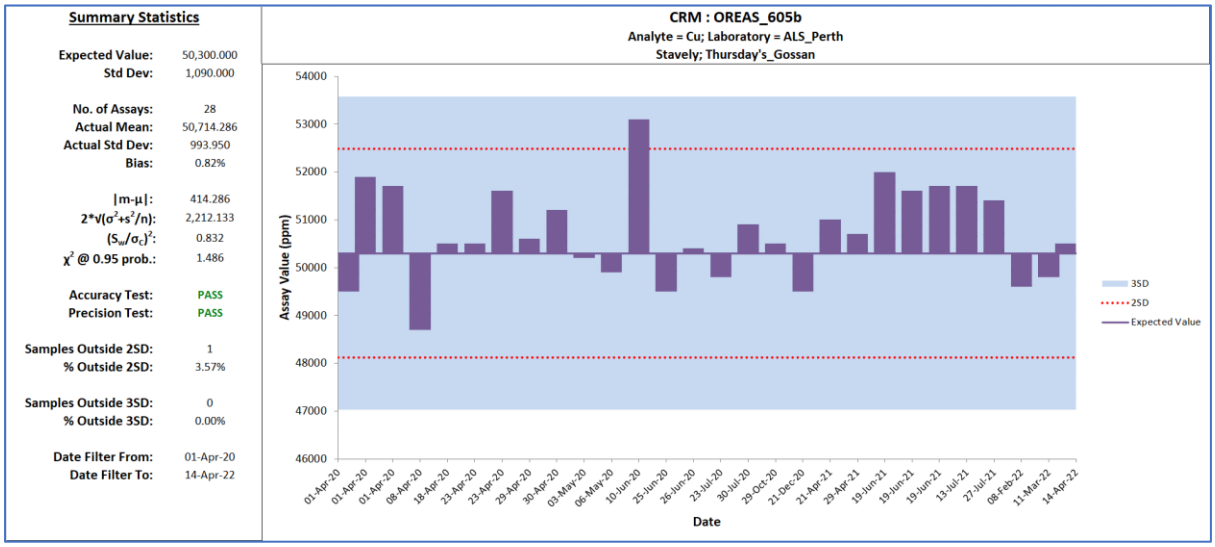
- Relatively low number (25) of CRMs used, hence definitive conclusions hard to justify.

- Precision test failure for Cu.
- Very strong and consistent positive bias for Ag.
- 2 outliers removed; 3 failures observed; Precision test failure.

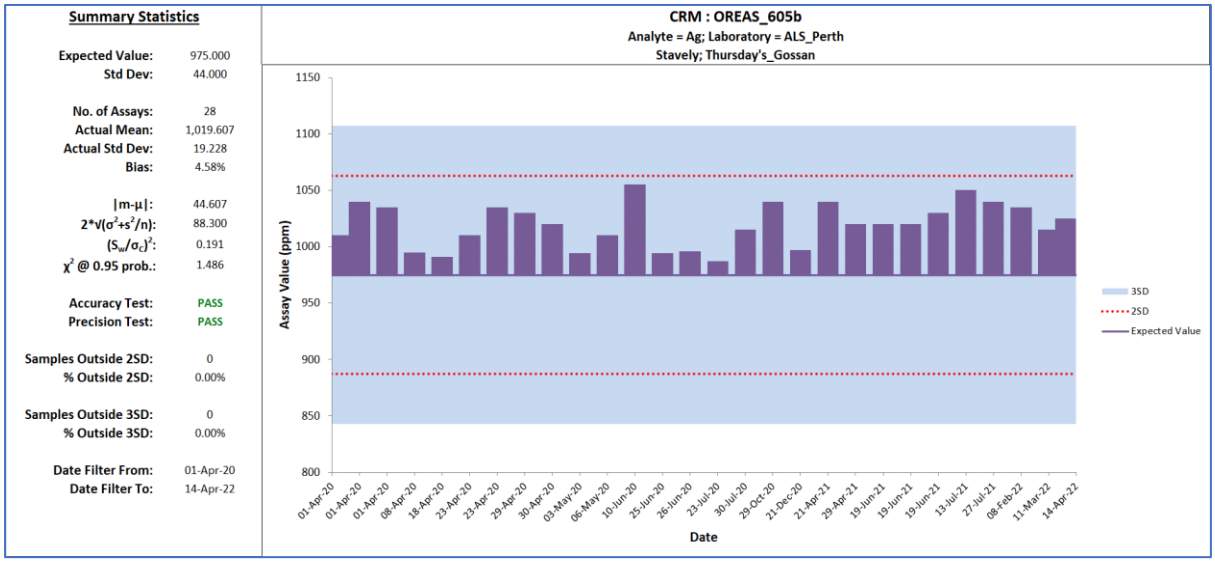


| Summary Statistics | |
|---|---|
| Expected Value: | 1.720 |
| Std Dev: | 0.066 |
| No. of Assays: | 25 |
| Actual Mean: | 1.708 |
| Actual Std Dev: | 0.108 |
| Bias: | -0.71% |
| \|m-μ\|: | 0.012 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 0.139 |
| $(S_w/\sigma_c)^2$: | 2.680 |
| $\chi^2$ @ 0.95 prob.: | 1.517 |
| Accuracy Test: | PASS |
| Precision Test: | FAIL |
| Samples Outside 2SD: | 7 |
| % Outside 2SD: | 28.00% |
| Samples Outside 3SD: | 3 |
| % Outside 3SD: | 12.00% |
| Date Filter From: | 01-Apr-20 |
| Date Filter To: | 14-Apr-22 |





| Summary Statistics | |
|---|---|
| Expected Value: | 50,300.000 |
| Std Dev: | 1,090.000 |
| No. of Assays: | 28 |
| Actual Mean: | 50,714.286 |
| Actual Std Dev: | 993.950 |
| Bias: | 0.82% |
| \|m-μ\|: | 414.286 |
| $2*\sqrt{(\sigma^2+s^2/n)}$: | 2,212.133 |
| $(S_w/\sigma_c)^2$: | 0.832 |
| $\chi^2$ @ 0.95 prob.: | 1.486 |
| Accuracy Test: | PASS |
| Precision Test: | PASS |
| Samples Outside 2SD: | 1 |
| % Outside 2SD: | 3.57% |
| Samples Outside 3SD: | 0 |
| % Outside 3SD: | 0.00% |
| Date Filter From: | 01-Apr-20 |
| Date Filter To: | 14-Apr-22 |




### 3.2.16. OREAS-991

Only 1 sample for this CRM, hence not enough data to effectively review.

# 4. Duplicates

The use of half or quarter core as a measurement of QAQC performance is limited. It is more of a measure of mineralisation distribution, which may be of some assistance when determining confidence levels in the estimate. For completeness, the core duplicates have been analysed, both on element (Cu, Au and Ag) and drilling type (DDH and sonic).

A summary of the duplicate type by drilling method is summarised in Table 4-1.

**Table 4-1: Duplicate type by drilling method**

| Duplicate Type | Drilling Method | | Total |
|---|---|---|---|
| | DDH | Sonic | |
| Half core | 23 | 0 | 23 |
| Quarter core | 1,922 | 288 | 2,210 |
| **Total** | **1,945** | **288** | **2,233** |

## 4.1. Half Core Duplicates

### 4.1.1. DDH

The low number of samples (23) for this dataset makes it difficult to make any definitive conclusions. Regardless, generally there is acceptable performance, except for Ag, which shows a consistent positive bias towards the duplicate sample. This is reflected in the average RMPD% of 18.4. As Ag is only a minor economic component of the deposit, there is a very low level of concern about this result.

#### 4.1.1.1. Cu

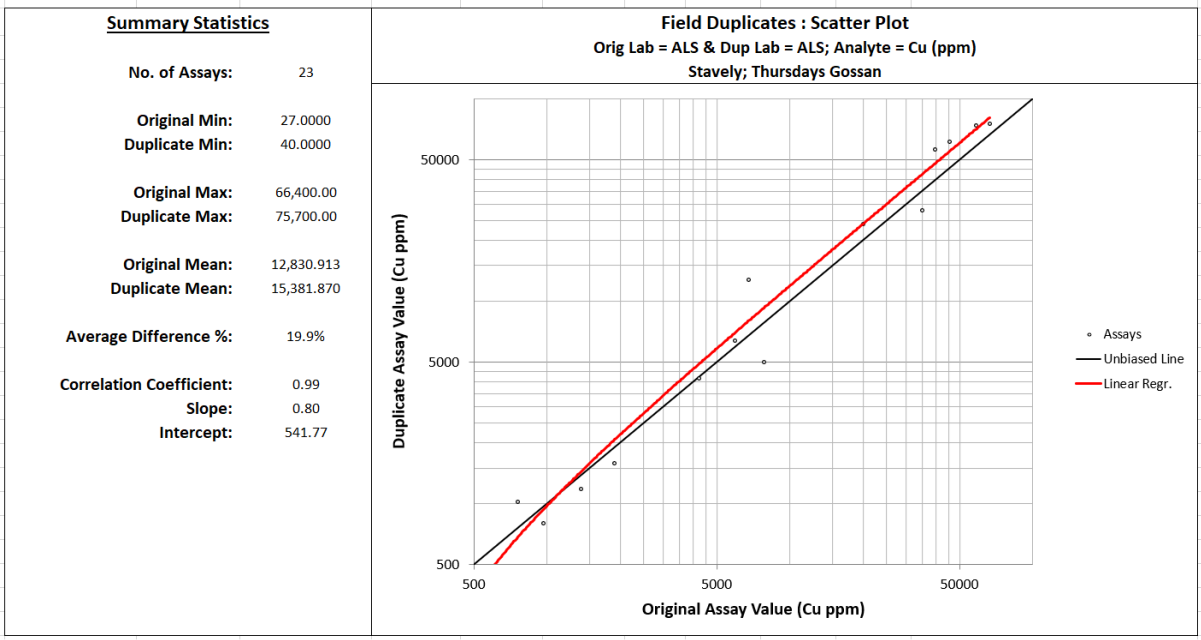



**Figure 4-1: Scatter plot for Cu on half core DDH duplicates**

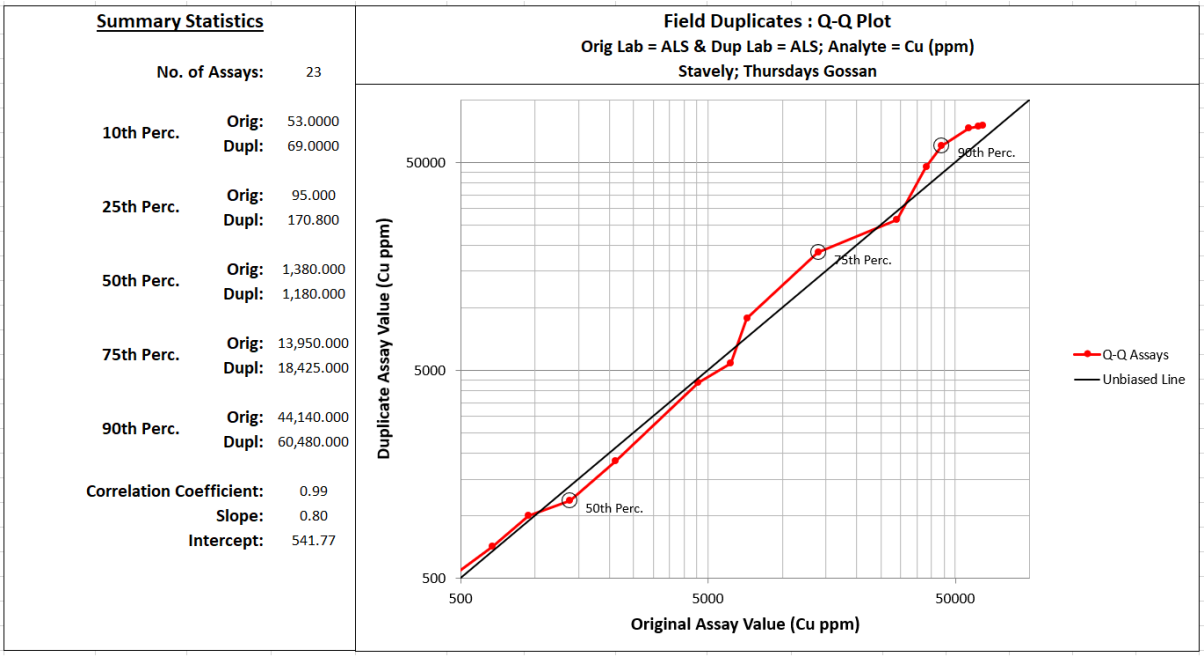



**Figure 4-2: Q-Q plot for Cu on half core DDH duplicates**

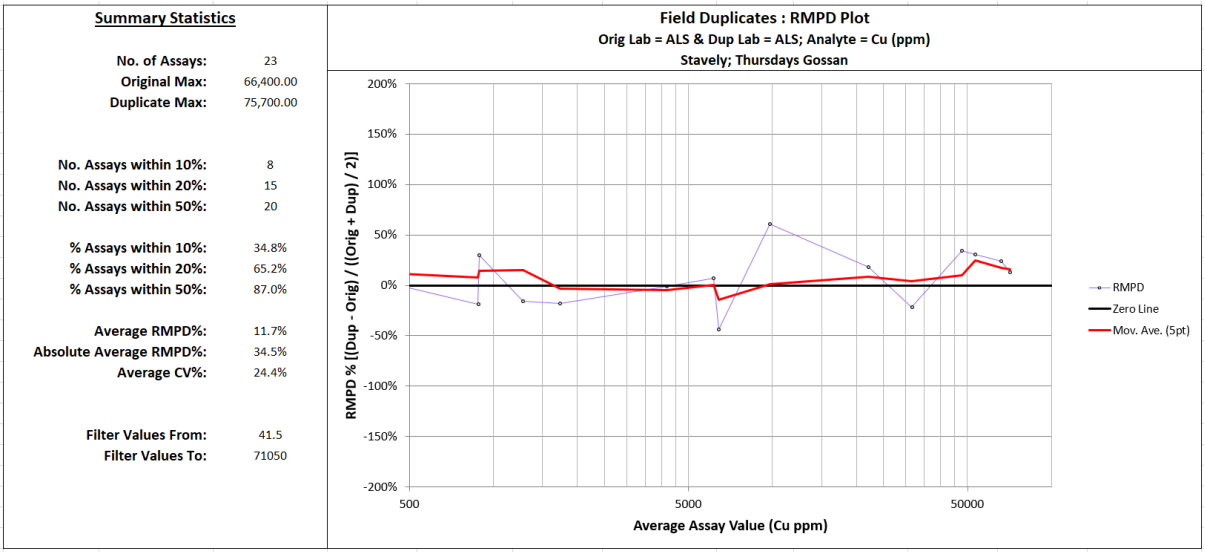



**Figure 4-3: RMPD plot for Cu on half core DDH duplicates**

#### 4.1.1.2. Au

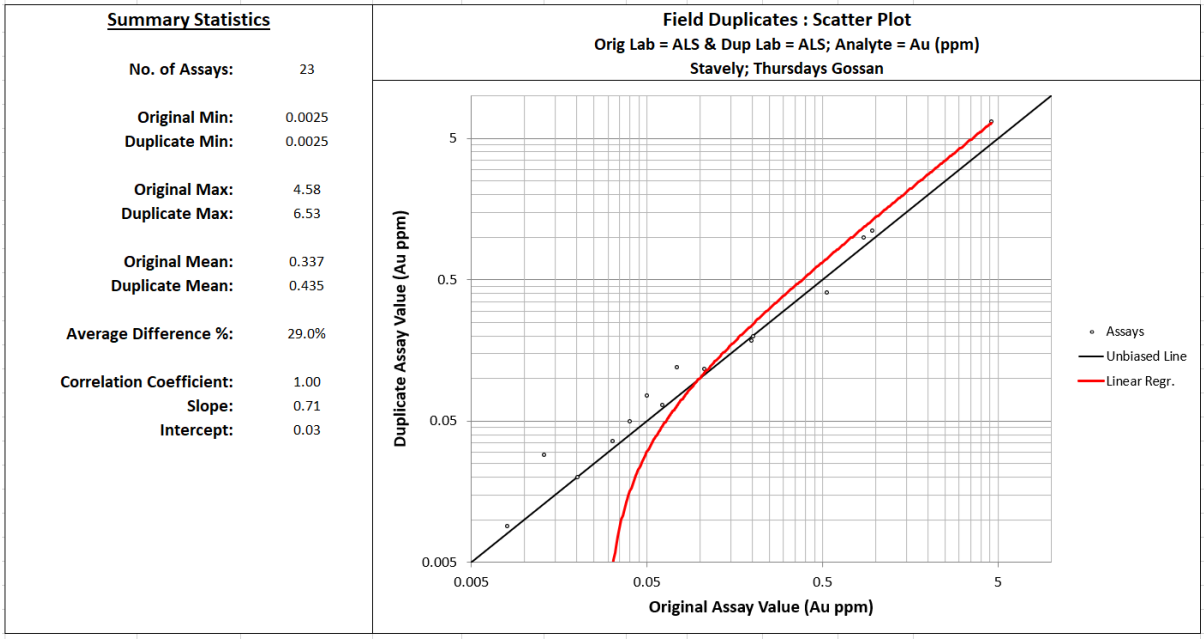



**Figure 4-4: Scatter plot for Au on half core DDH duplicates**

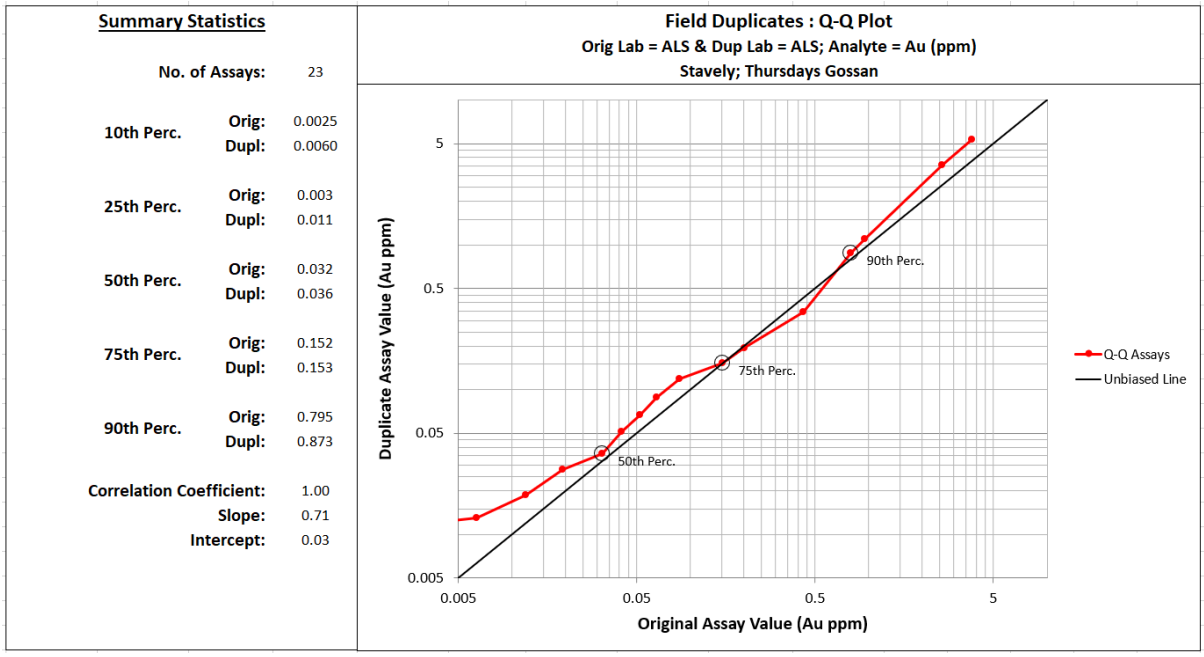



**Figure 4-5: Q-Q plot for Au on half core DDH duplicates**

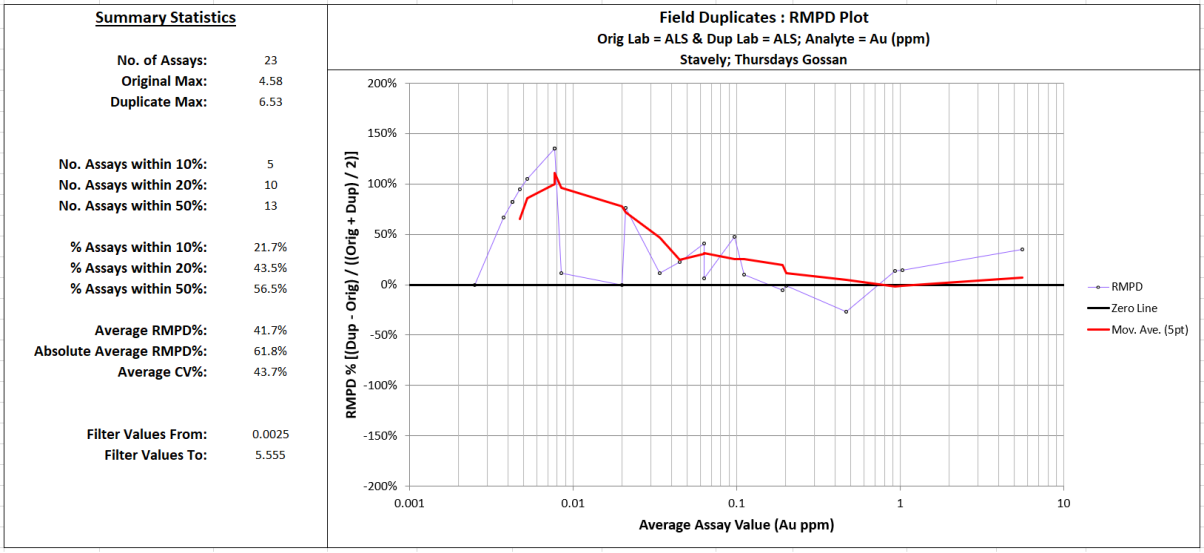



**Figure 4-6: RMPD plot for Au on half core DDH duplicates**

#### 4.1.1.3. Ag

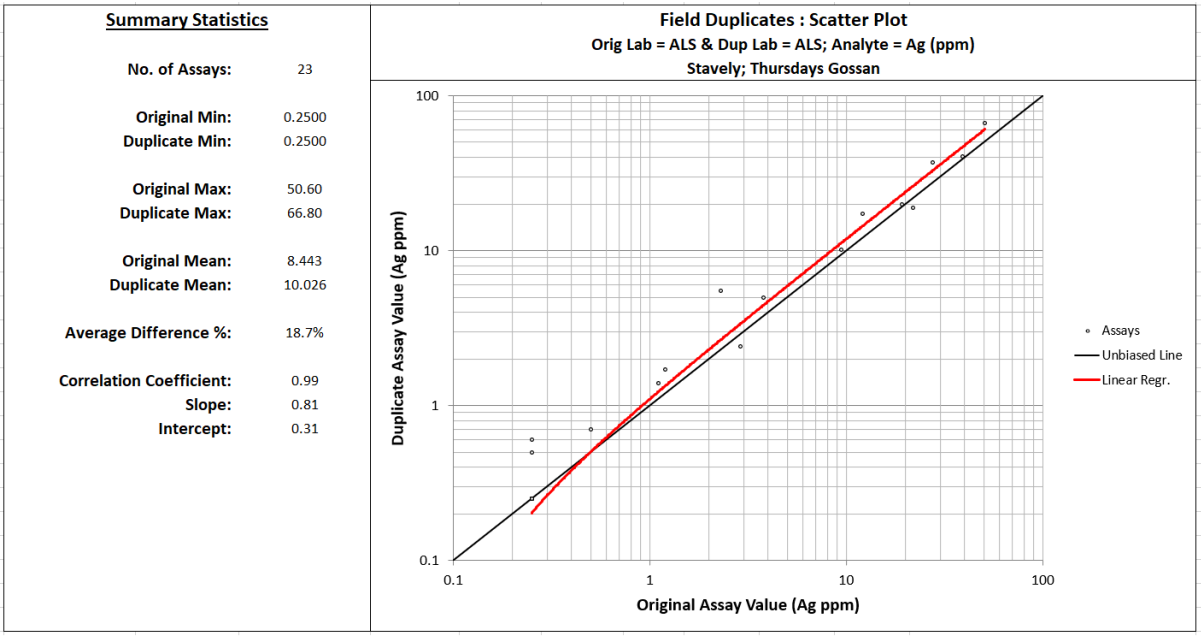



**Figure 4-7: Scatter plot for Ag on half core DDH duplicates**

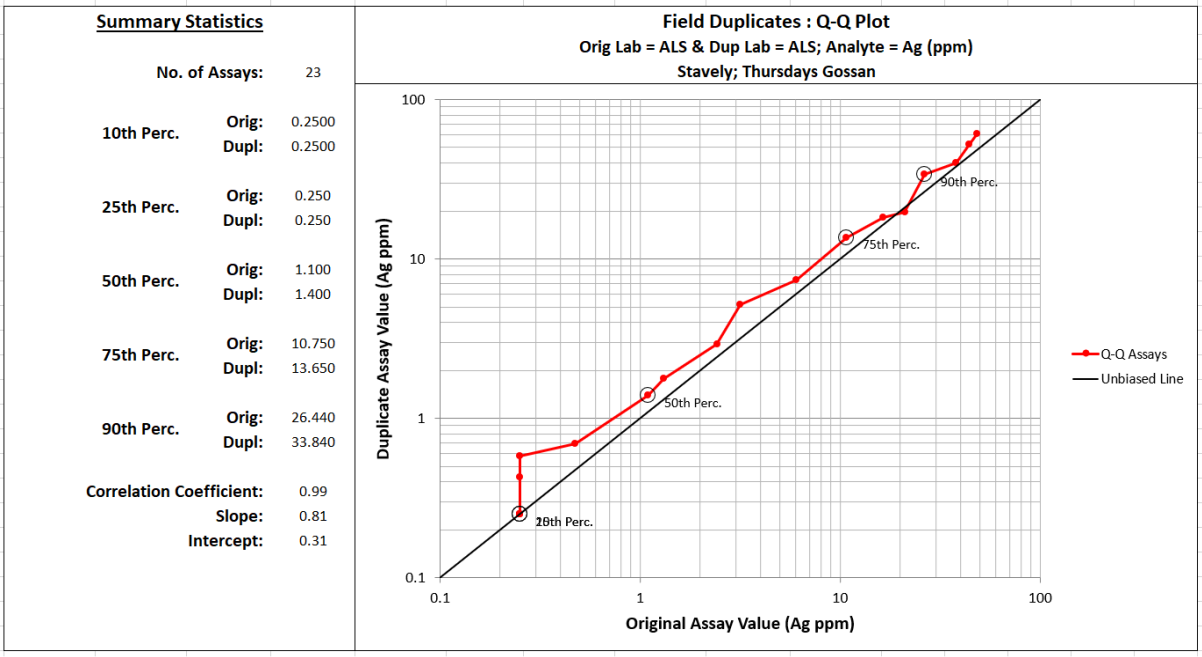



**Figure 4-8: Q-Q plot for Ag on half core DDH duplicates**

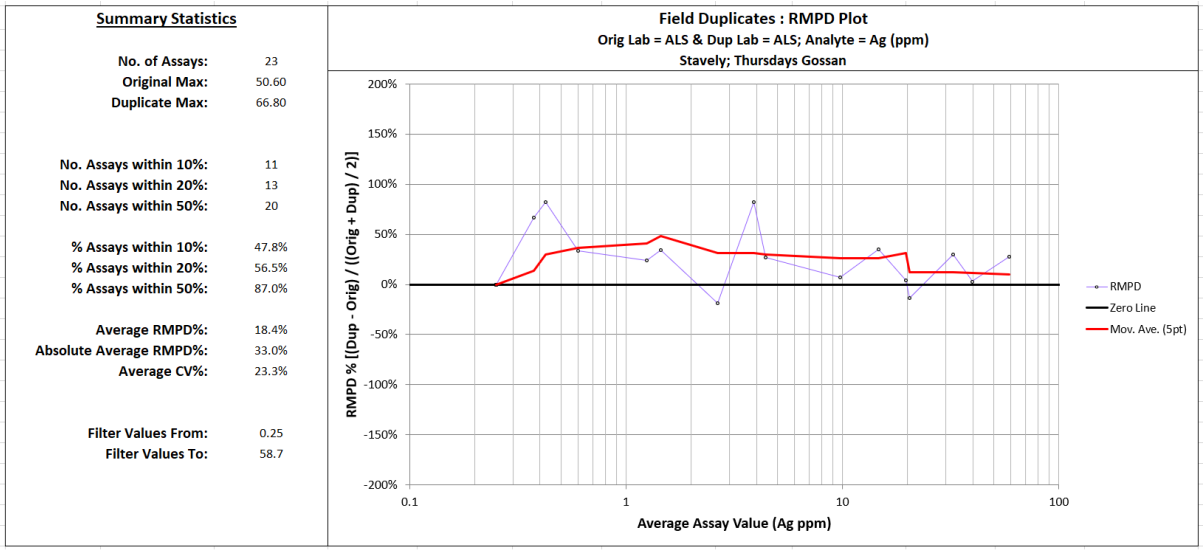



**Figure 4-9: RMPD plot for Ag on half core DDH duplicates**

### 4.1.2. Sonic

No half core duplicates were taken with sonic core.

## 4.2. Quarter Core Duplicates

### 4.2.1. DDH

A dataset of over 1,900 samples enables a relevant comparison of performance. The scatter (Figure 4-10) and Q-Q plots Figure 4-11 for all elements show no perceptible bias.

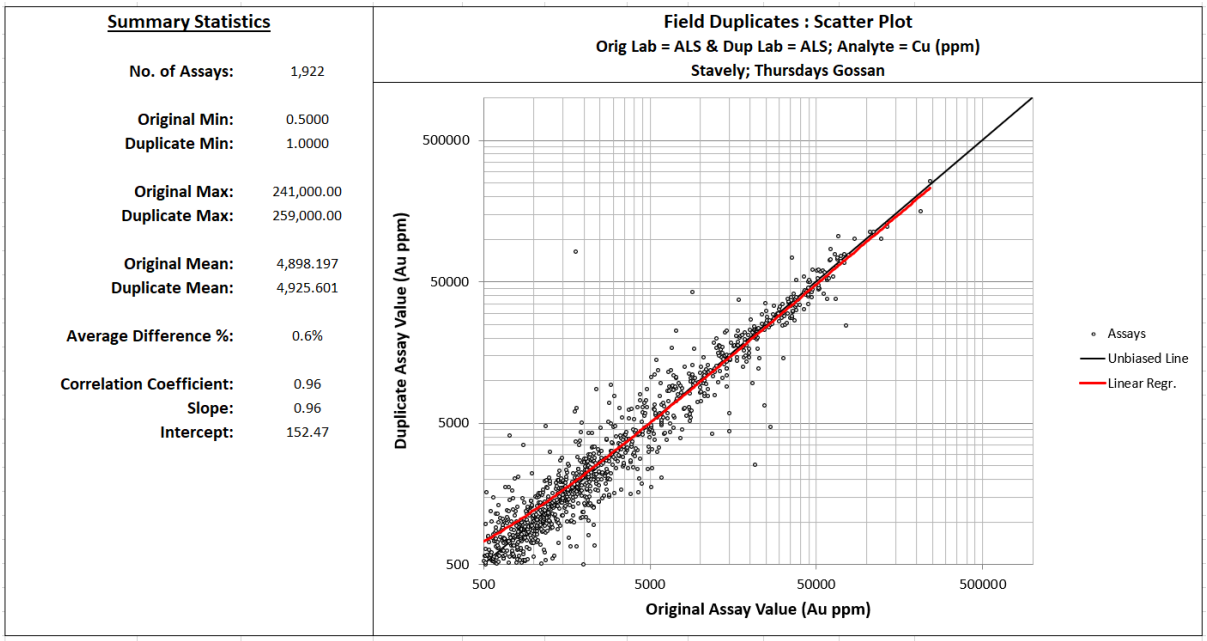



**Figure 4-10: Scatter plot for Cu on quarter core DDH duplicates**

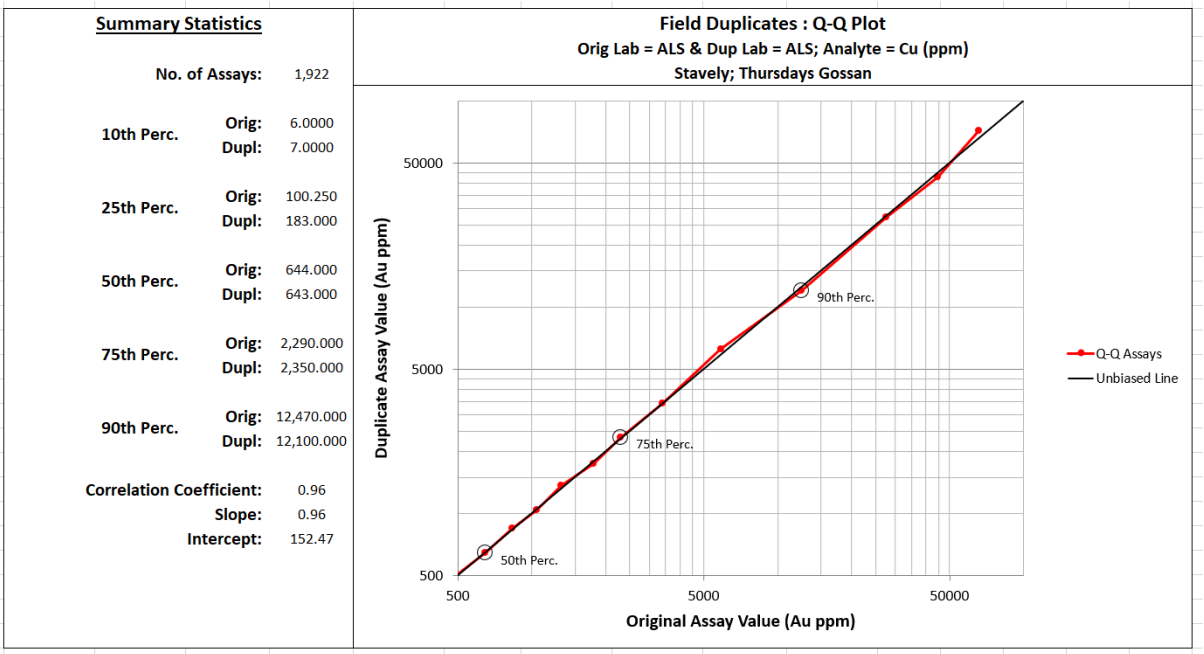



**Figure 4-11: Q-Q plot for Cu on quarter core DDH duplicates**

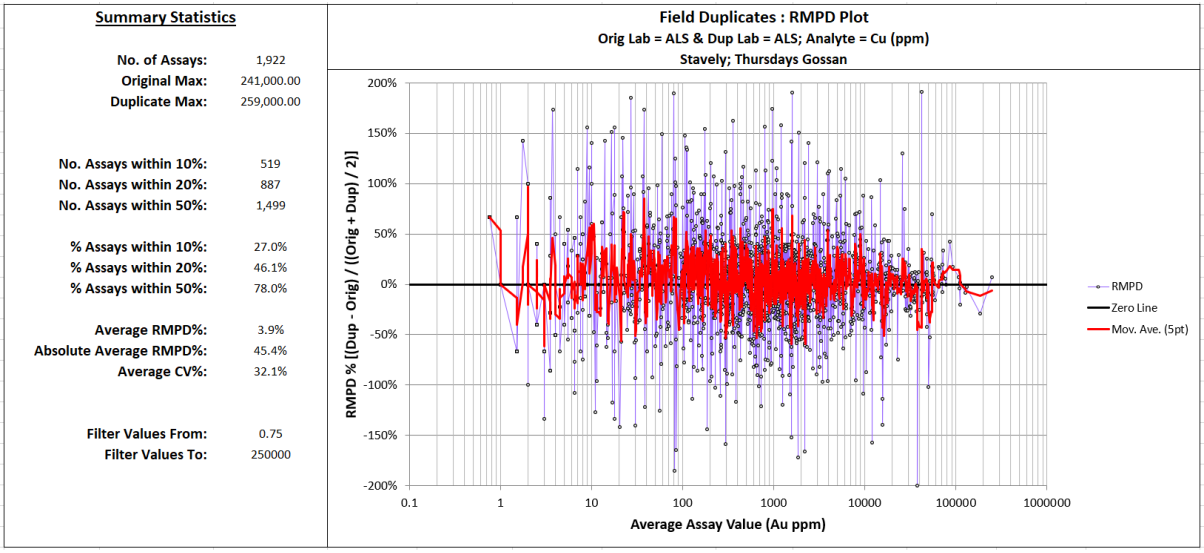



**Figure 4-12: RMPD plot for Cu on quarter core DDH duplicates**

#### 4.2.1.1. Au

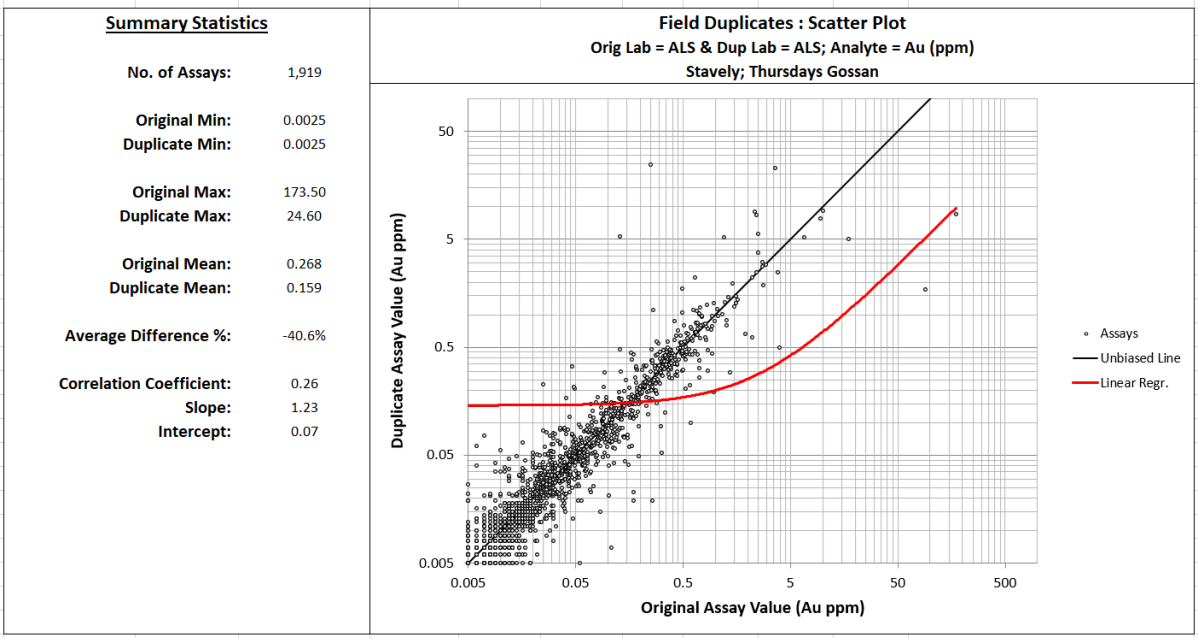



**Figure 4-13: Scatter plot for Au on quarter core DDH duplicates**

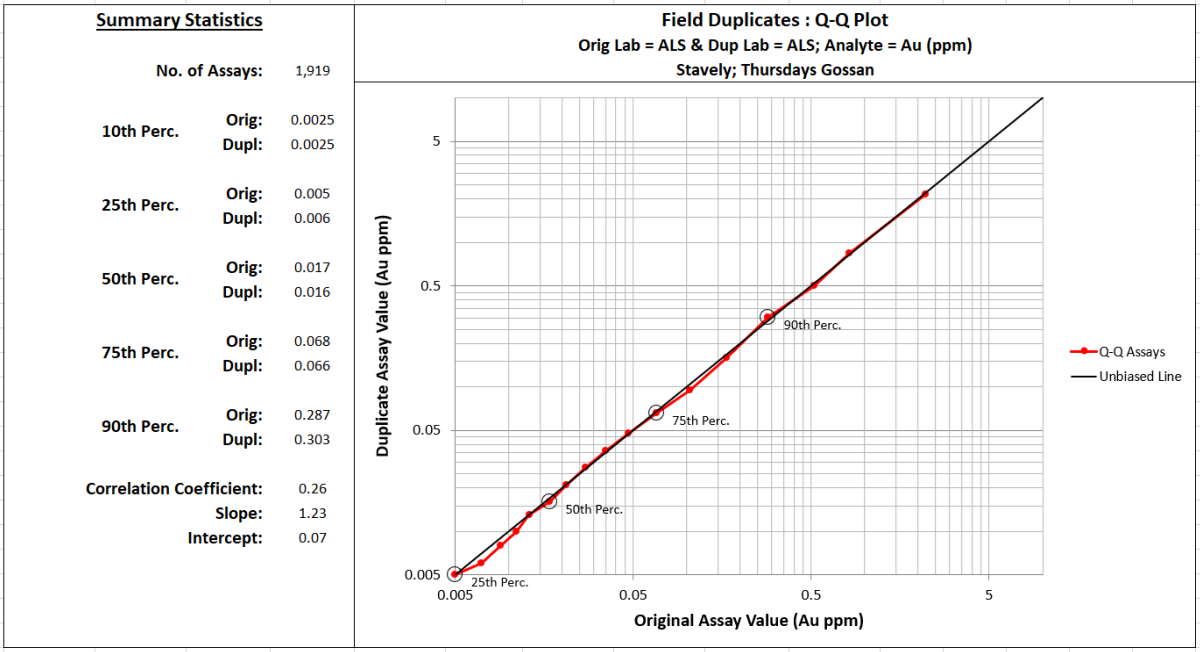



**Figure 4-14: Q-Q plot for Au on quarter core DDH duplicates**

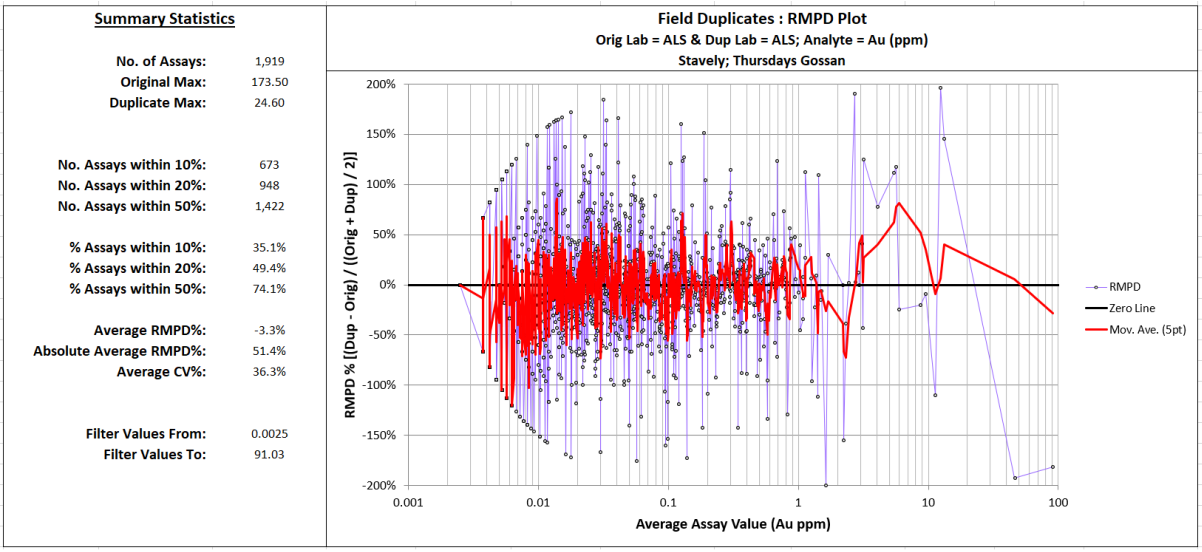



**Figure 4-15: RMPD plot for Au on quarter core DDH duplicates**

#### 4.2.1.2. Ag

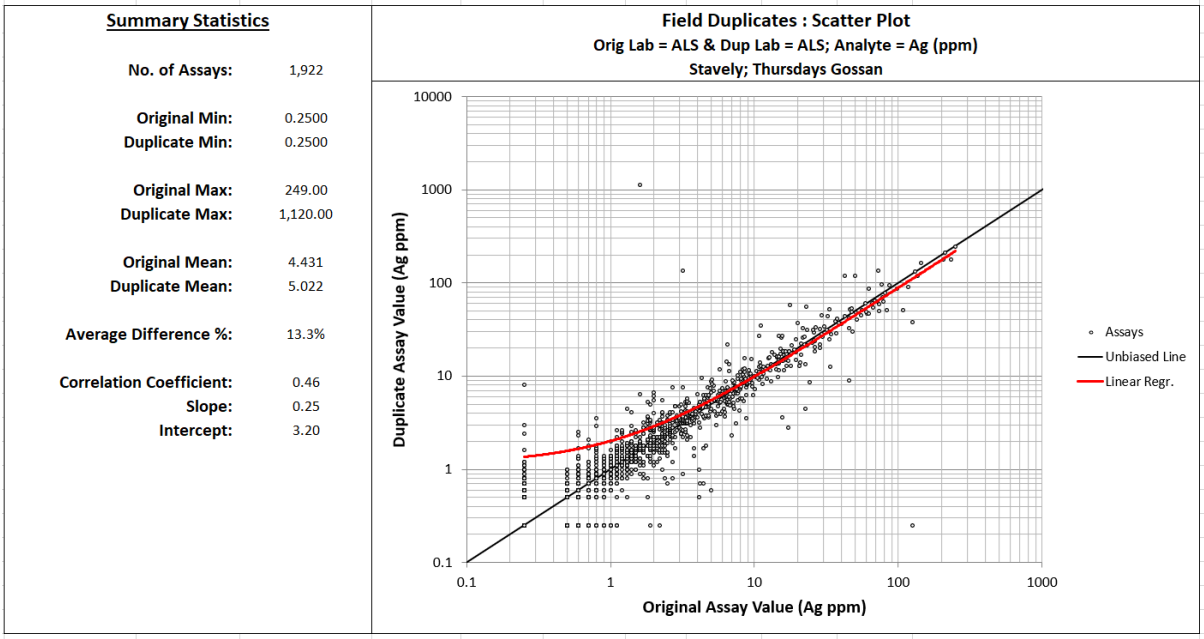



**Figure 4-16: Scatter plot for Ag on quarter core DDH duplicates**

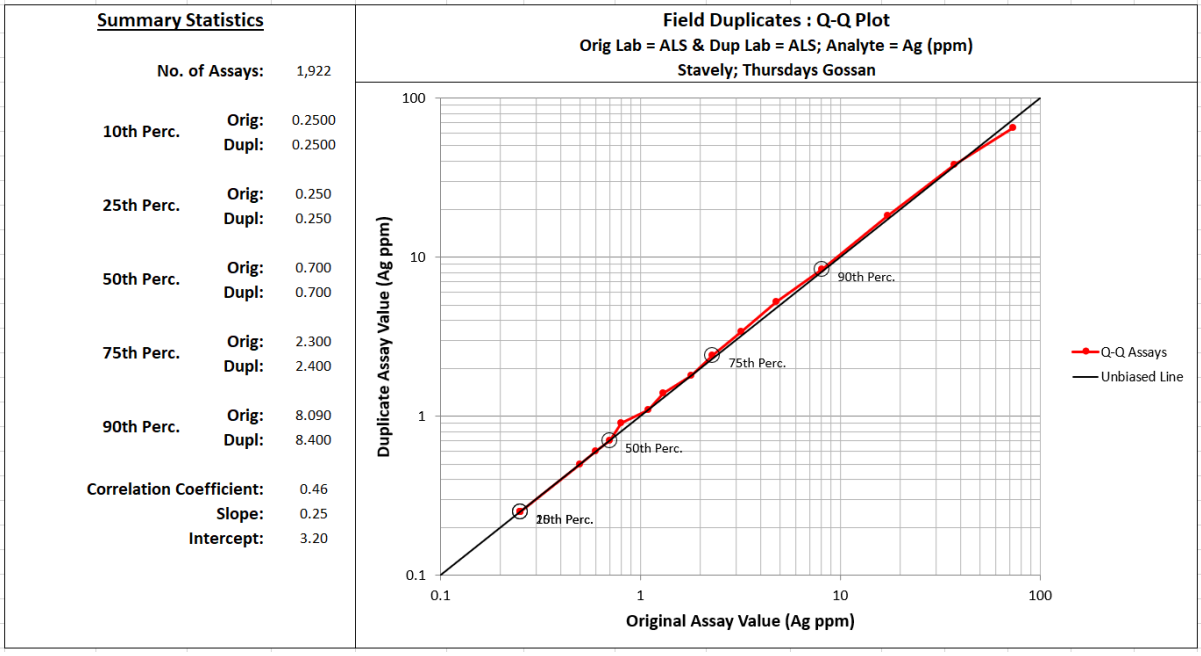



**Figure 4-17: Q-Q plot for Ag on quarter core DDH duplicates**

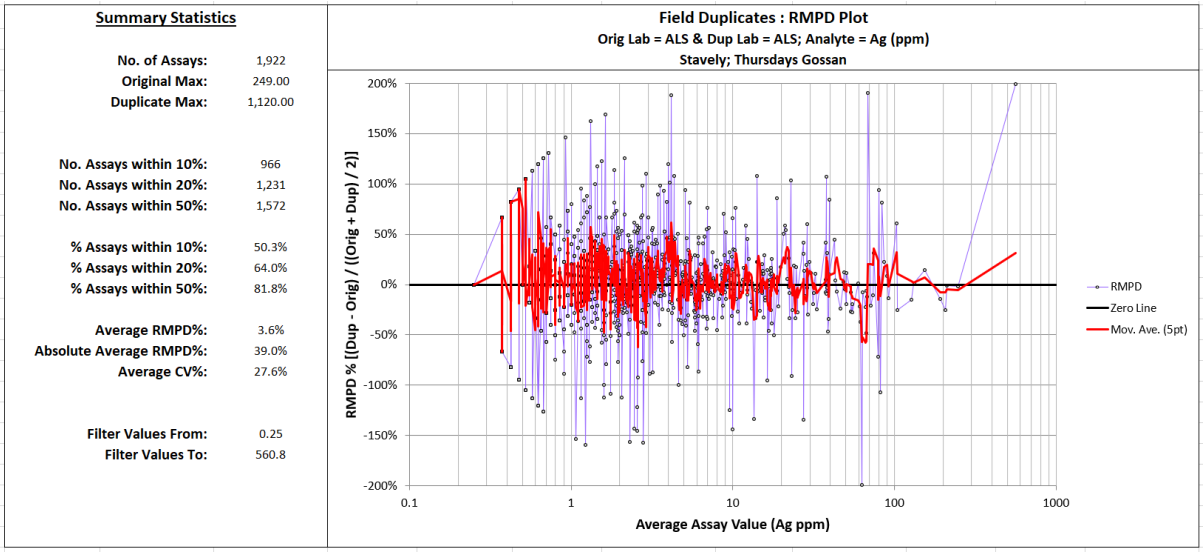



**Figure 4-18: RMPD plot for Ag on quarter core DDH duplicates**

### 4.2.2. Sonic

The sonic results show good performance, with no biases. Cu shows the best performance as the sonic drilling was generally restricted to the upper portions of the deposit where Cu is more mobile and pervasive in nature.

#### 4.2.2.1. Cu

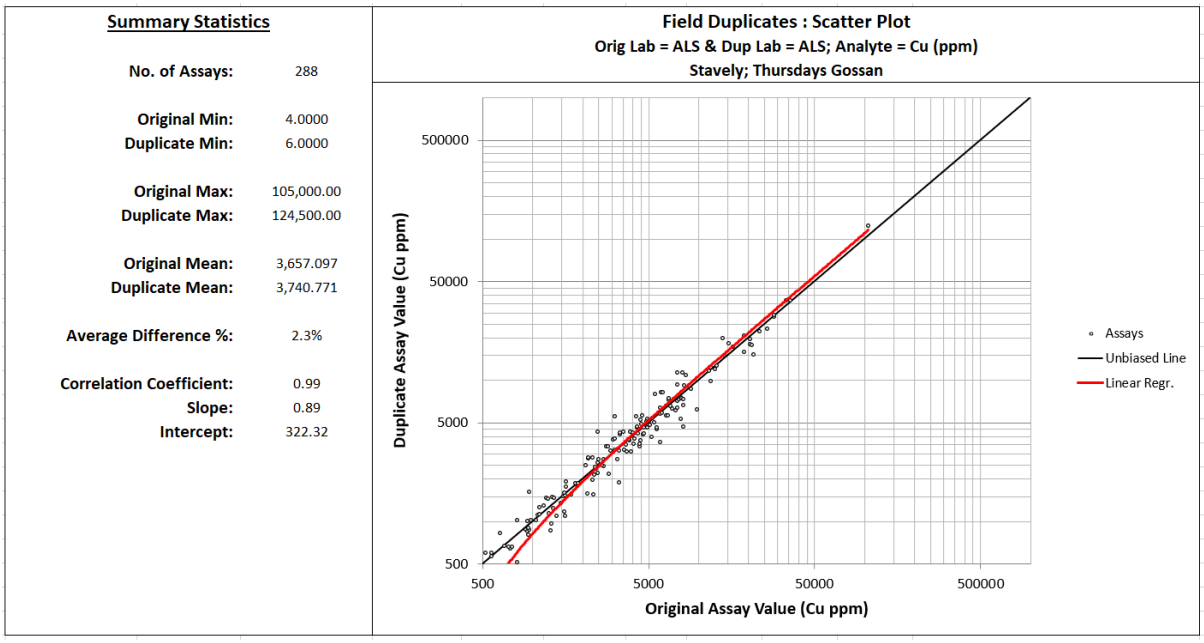



**Figure 4-19: Scatter plot for Cu on quarter core sonic duplicates**

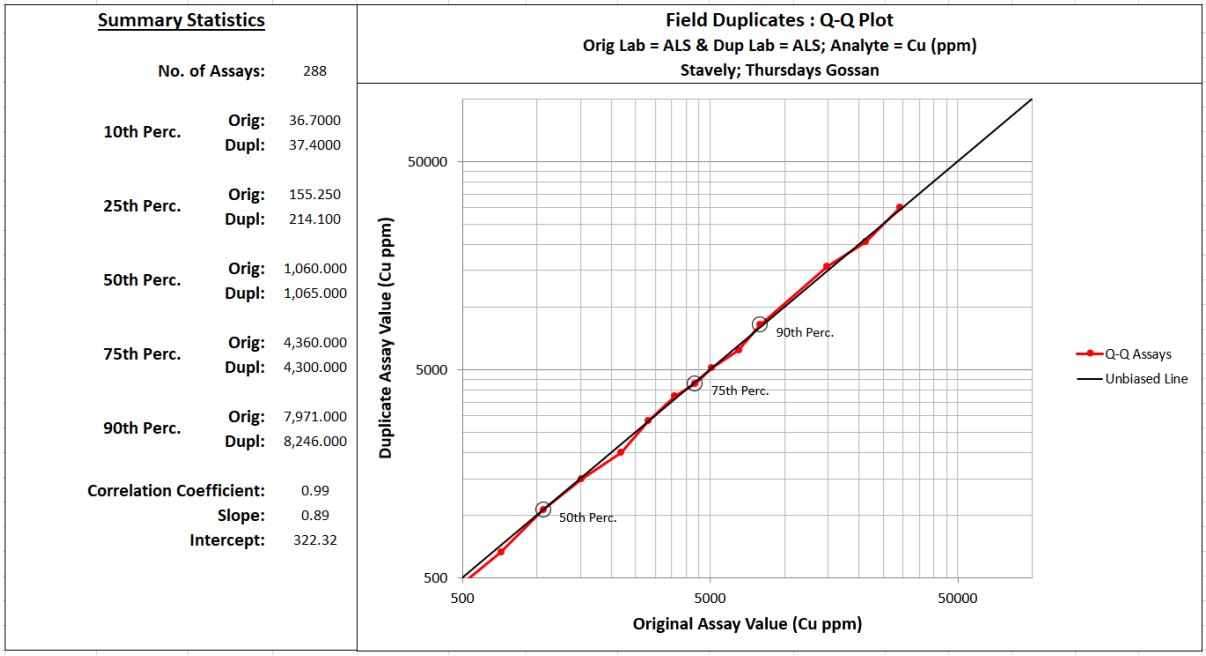



**Figure 4-20: Q-Q plot for Cu on quarter core sonic duplicates**

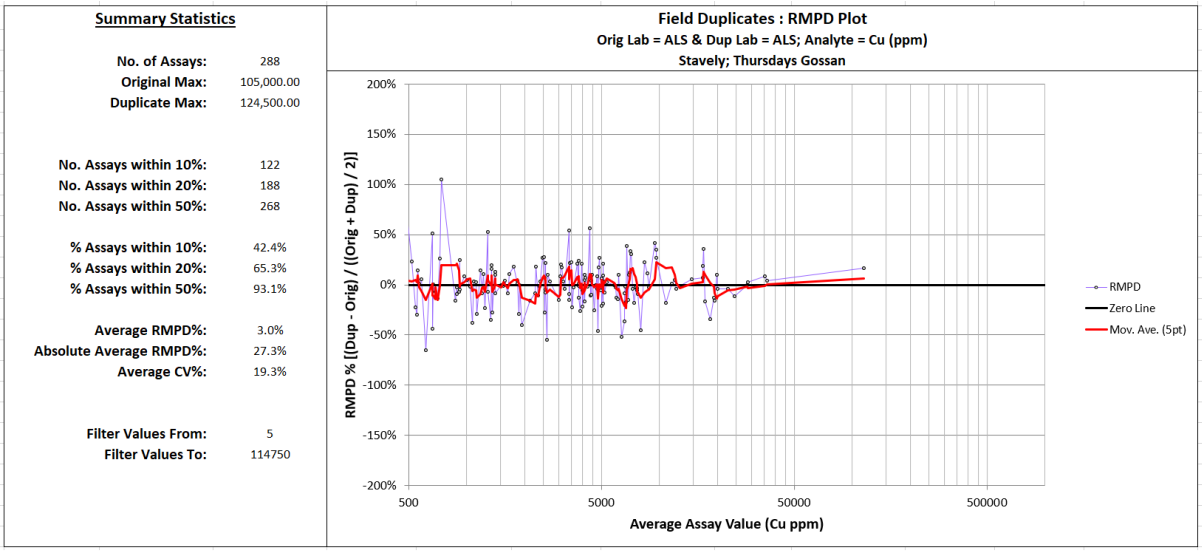



**Figure 4-21: RMPD plot for Cu on quarter core sonic duplicates**

#### 4.2.2.2. Au

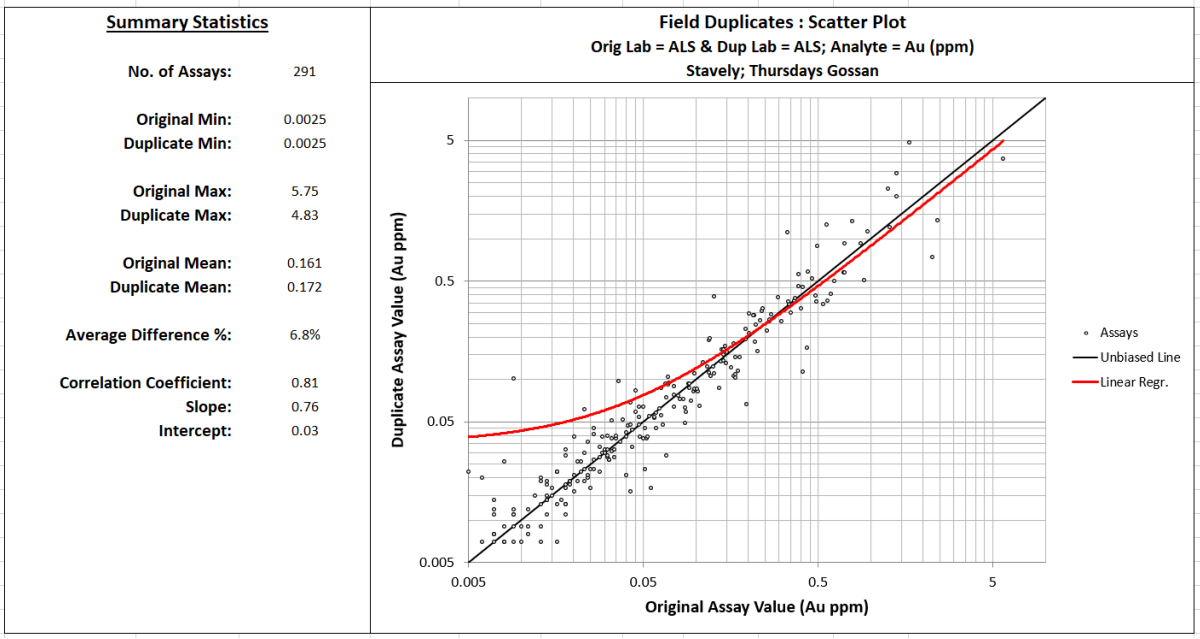



**Figure 4-22: Scatter plot for Au on quarter core sonic duplicates**

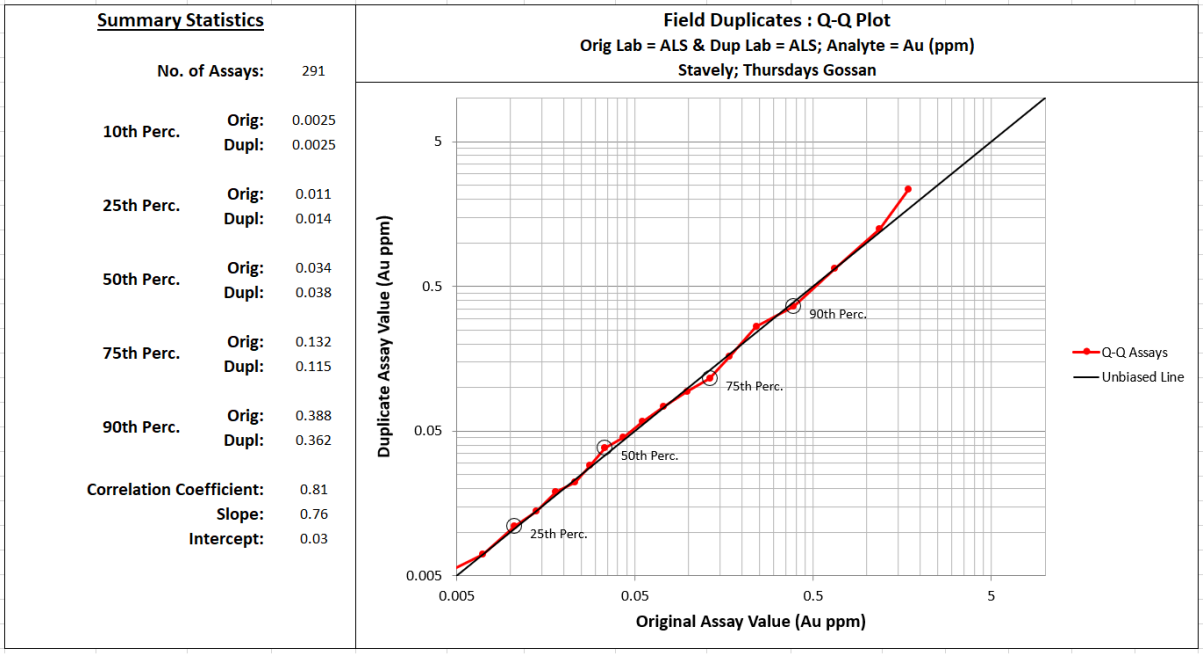



**Figure 4-23: Q-Q plot for Au on quarter core sonic duplicates**

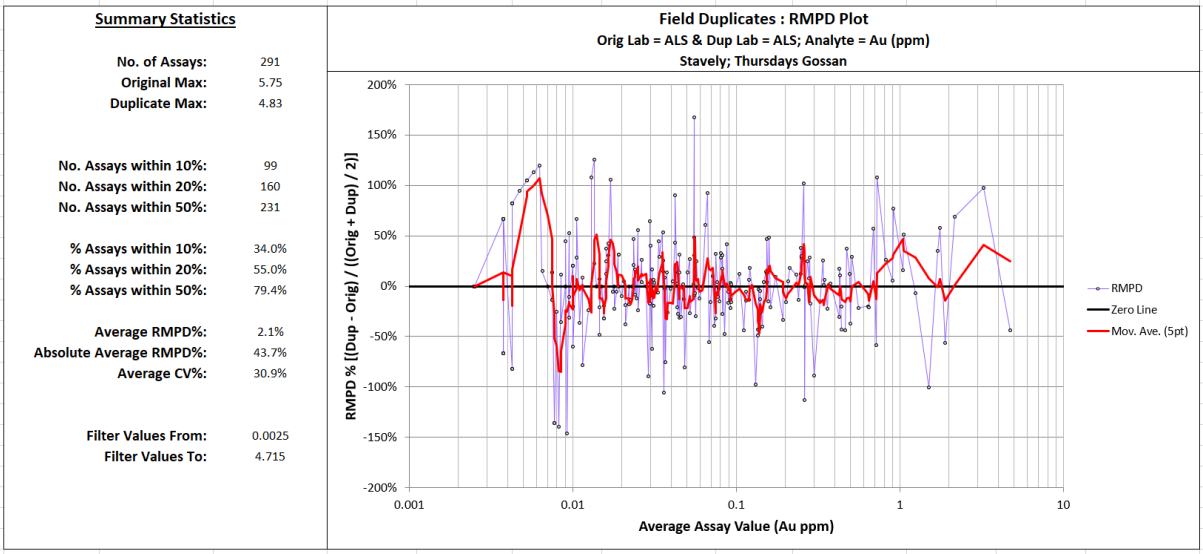



**Figure 4-24: RMPD plot for Au on quarter core sonic duplicates**

#### 4.2.2.3. Ag

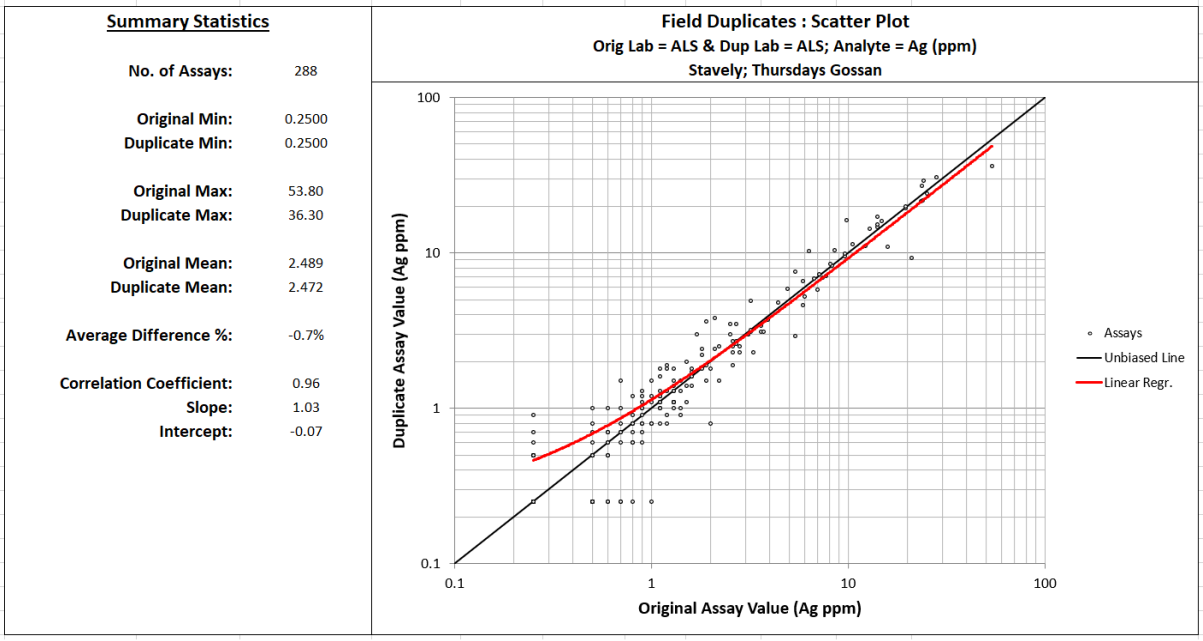



**Figure 4-25: Scatter plot for Ag on quarter core sonic duplicates**

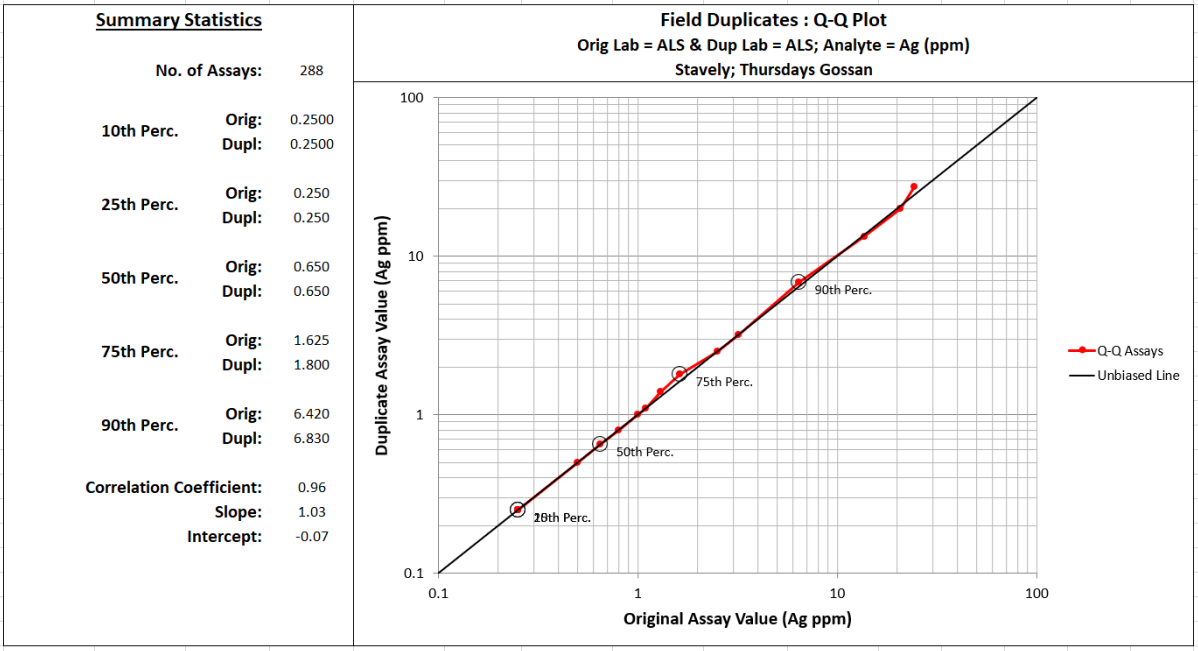



**Figure 4-26: Q-Q plot for Ag on quarter core sonic duplicates**

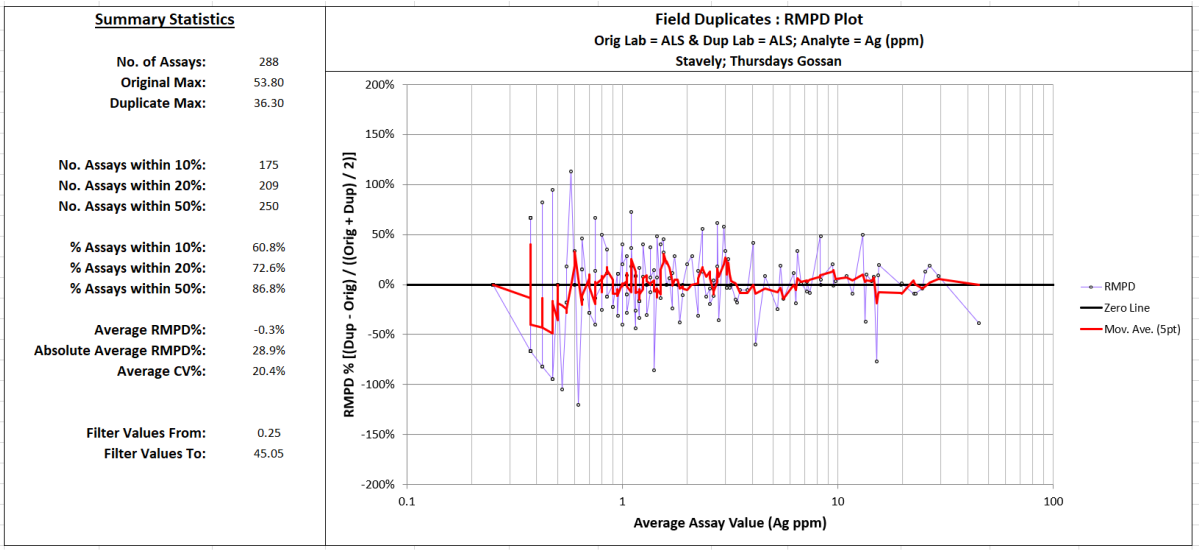



**Figure 4-27: RMPD plot for Ag on quarter core sonic duplicates**

## 4.3. Spatial Analysis of QAQC samples

It is good practice that there is a spatial relationship to any QAQC data, to ensure that QAQC data is evenly spread throughout the deposit, so that it covers all present lithologies, weathering and mineralisation domains. The duplicate data does have spatial information, but this data is of limited use. The CRM data supplied did not contain any spatial reference, hence an analysis could not be conducted.

## 4.4. Laboratory Duplicates

There were no laboratory duplicates conducted i.e., the analysis of course rejects. Depending upon the mineralisation style, this step in a QAQC can be important, especially for nuggety gold deposits. As the Cu mineralisation is fairly homogenous, has a high value (% vs ppm levels) and has a low nugget, this step is not considered overly important.

## 4.5. Blind Pulp Repeats

The re-submission of pulps back to the same laboratory is considered a necessary step in a high quality QAQC analysis. This was not conducted by Stavely.

## 4.6. Umpire pulps

No umpire pulps were submitted.

## 4.7. Blanks

There were over 900 blanks submitted. The source of the blanks was road base collected from a roadside stockpile. The use of this material for a blank is not recommended as it is not certified and may contain mineralisation. For any on-going work, Stavely is advised to source certified blanks.

As a result of the use of this type of blank, the effectiveness of analysing the results is compromised. This is especially seen with the Cu results (Figure 4-29) where over 63% of the samples were over 3SD from the mean. There were also five blanks showing results > 1000 ppm. The conclusion of this is that the blanks contain Cu mineralisation and hence the level of contamination that has occurred in the laboratory (if any) cannot be determined. The control charts for Au and Ag are show in Figure 4-28 and Figure 4-30.

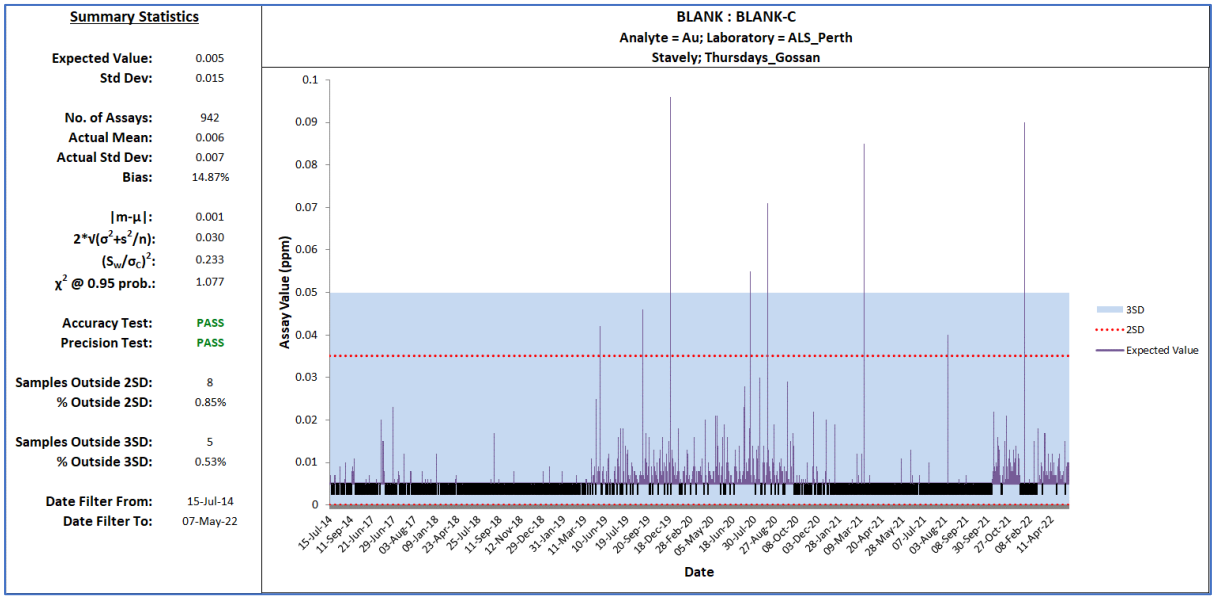



**Figure 4-28: Control chart of Au blanks**

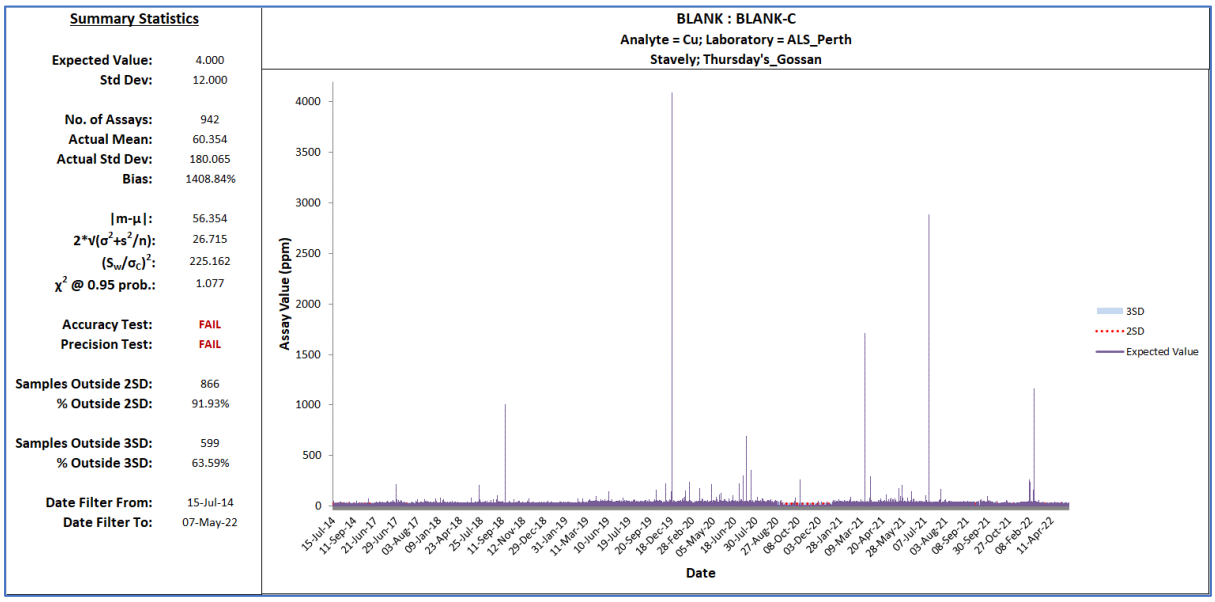



**Figure 4-29: Control chart for Cu blanks**

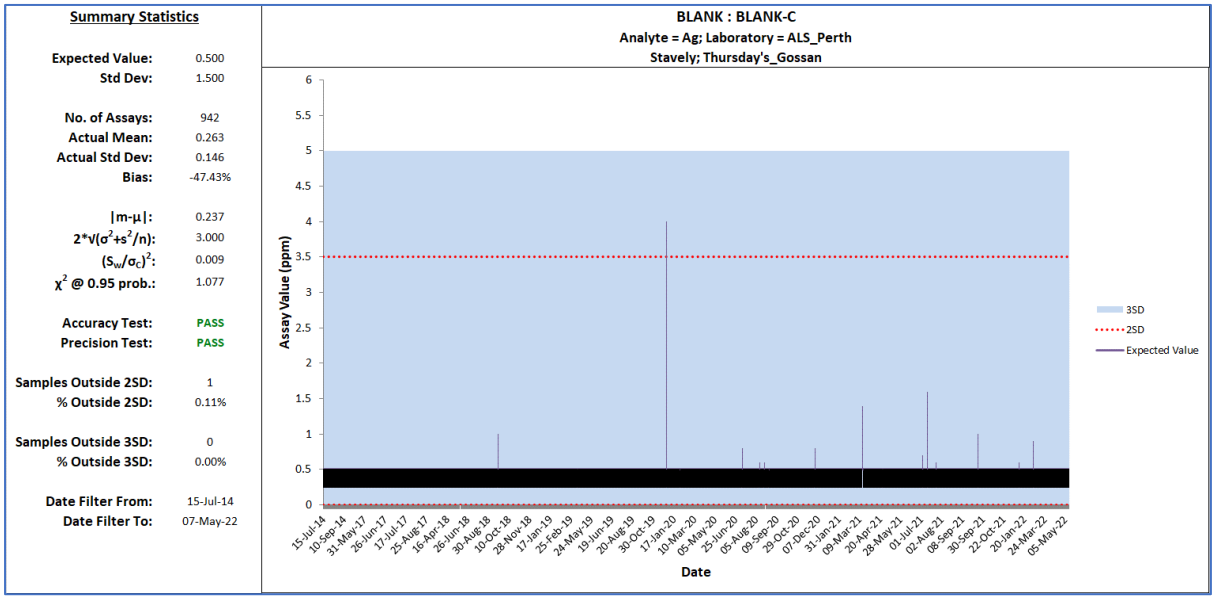



**Figure 4-30: Control chart for Ag blanks**

# 5. Conclusions and Recommendations

- A substantial number of different CRMs were used and most contained a sufficient number of samples to conduct a meaningful analysis. A large number of different CRMs utilised is considered a positive.
- The performance of Au in the CRMs is considered moderate to good. There were four CRMs that were considered to fail the precision test, but there were no accuracy test failures. Two CRMs in the 0.3 – 0.55 g/t Au range, one showed a strong positive bias and one showed a strong negative bias.
- The performance of Cu in the CRMs is considered to be moderate to good. There were several precision test failures, but no accuracy test failures. Two showed a negative bias, however other CRMs with similar grades did not show a bias, hence the certified value for the CRMs showing a negative bias may be comprised.
- The pure statistical performance of Ag is considered moderate to poor, with the majority failing a precision test. However, as the vast majority of CRMs used contained very low levels of Ag (< 4 g/t), this would be considered fairly normal, and is not considered to be an issue of concern. OREAS-604B which has a relatively high level of Ag (493 g/t), showed a strong positive bias, but as the number of Ag values within the drilling database at these levels are extremely limited (there are only seven values > 400 g/t Ag), this again is not considered an item of concern.
- The use of ½ or ¼ core as field duplicates has limited value as a QAQC tool, however an analysis was conducted for the sake of completeness. The vast majority of the field duplicates were ¼ core from DDH (~1,900), with a further 288 from sonic. The average RMPD% for all elements are very low, and all show no perceptible grade based biases.
- No coarse reject samples were analysed. In most situations this type of check can provide an insight into QAQC performance, however due to the nature of the Thursdays Gossan mineralisation the impact of not doing this QAQC check is limited.
- The fact that no blind re-submition of pulps and the use of an umpire laboratory was not undertaken does leave gaps in a complete QAQC analysis.
- The of uncertified blanks is not recommended. It is suspected that the blanks contain Cu mineralisation, hence potential contamination occurring in the laboratory cannot be determined.