



# 2009 AIG Portable XRF Workshop

## QAQC and Data Management of PXRF Data

# What You Need to Remember



- By using a Portable XRF Device to collect assay data,

**YOU ARE NOW THE LABORATORY!!!**

- So, you need to act like an analytical laboratory:
  - Chemistry results are only from what the X Rays see. Sampling statistics need to be taken into account e.g. homogeneity, particle size, surface effects and XRF window size!
  - Use blanks
  - Deal with matrix effects - Use LAB data to verify chemistry and correct via calibration
  - use Matrix Matched certified standards to correct factors if the matrix is consistent.
  - Watch your detection limits: Longer Tests = better precision within limits

# Also... Adding Value to Your XRF Data



## How can I add value to my XRF Data?

- XRF Sampling is NO Different to any other sampling regime you adopt!... Remember the Data is very valuable (& costly)!
- So, Use good QA/QC Protocols & Data Validation
- Incorporate Standards, Blanks, Field Duplicates and Check Samples to increase your understanding & confidence
- Rank & Store the Data in a well ordered & structured DB
- Remember that for ASX/TSX Reporting you must abide by JORC Code / TSX 43-101 – All about Transparency & Disclosure – so ensure your data is reported correctly!

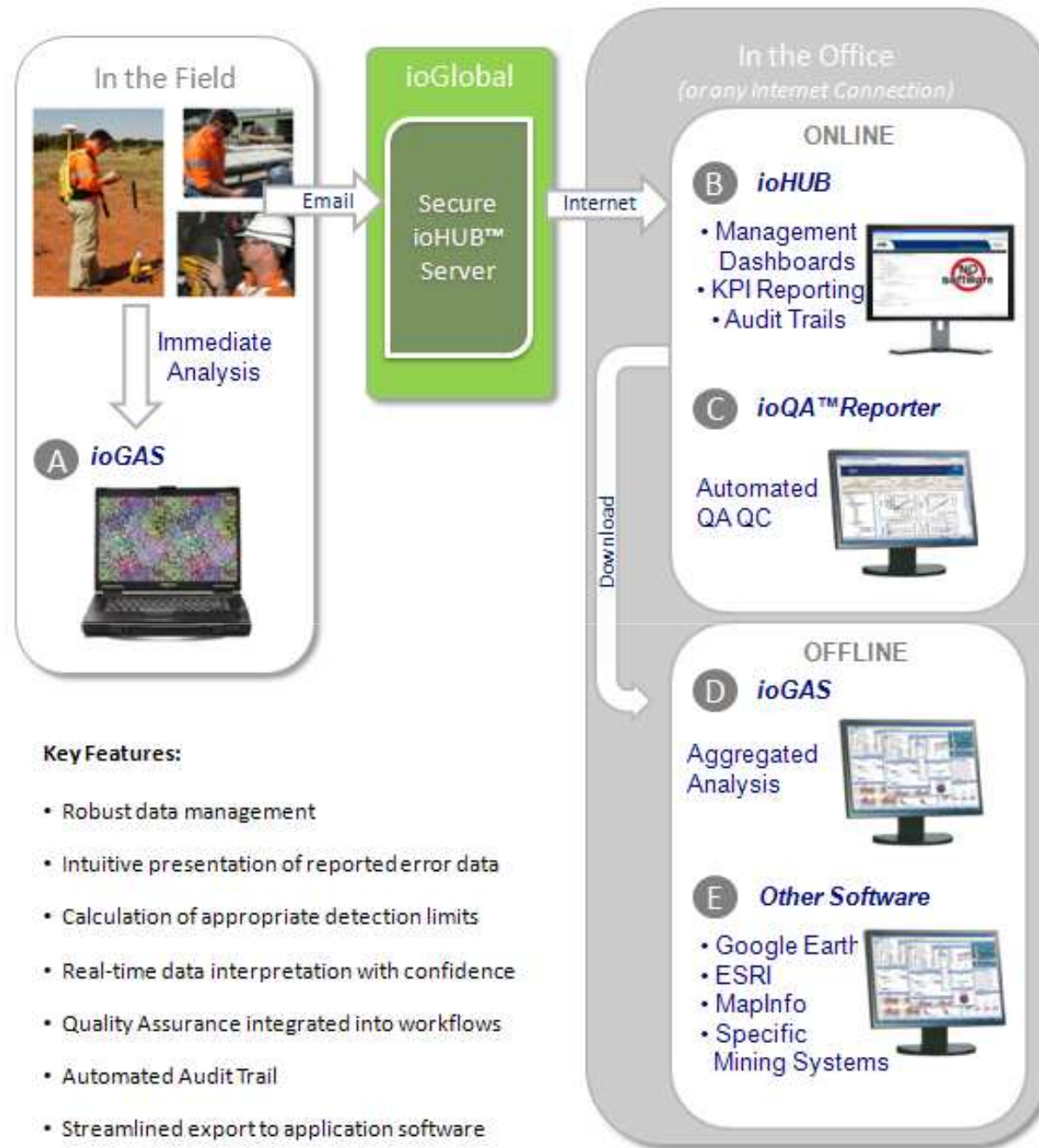


2009 AIG Portable XRF Workshop

# REPORTING, DATA SYSTEMS INTEGRATION

# Integrated Collection, Data Management and QAQC – Innov-X Example

- ioGAS
- ioHUB
- ioQA™ Reporter

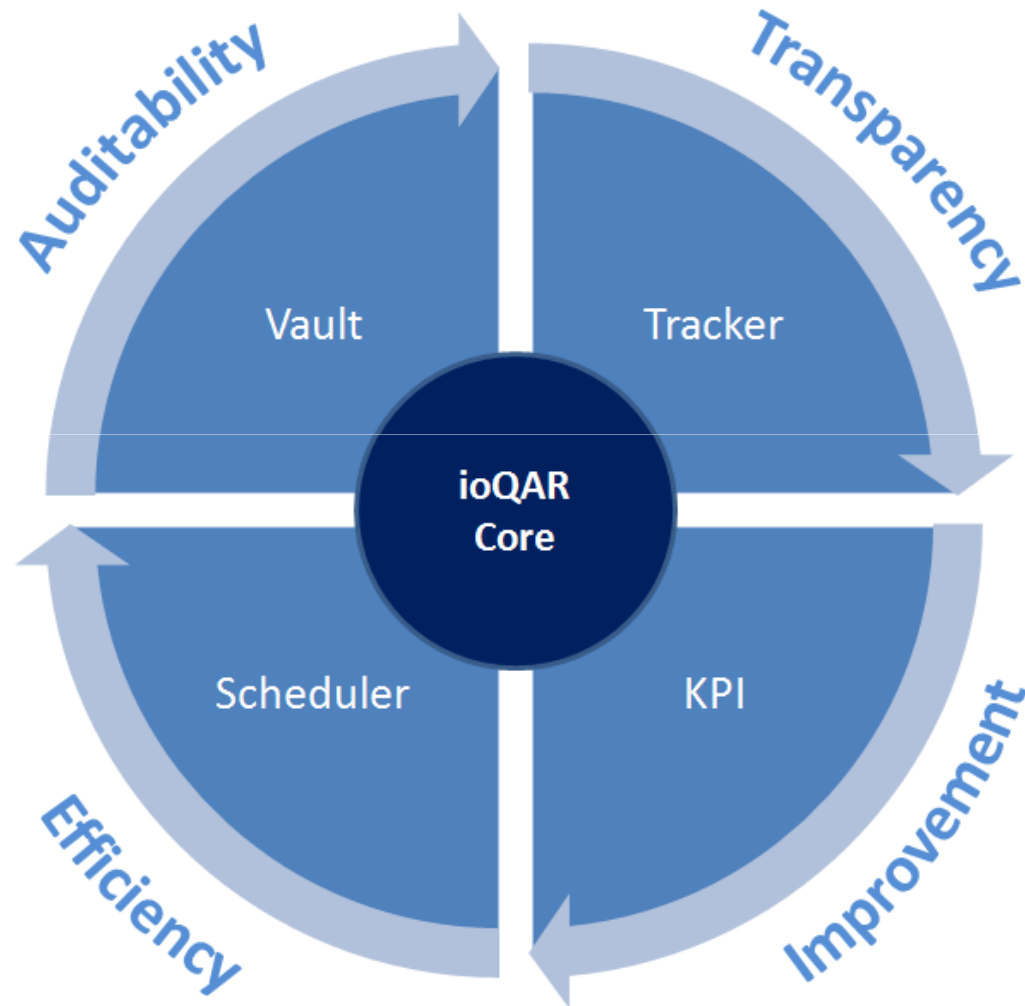


### Key Features:

- Robust data management
- Intuitive presentation of reported error data
- Calculation of appropriate detection limits
- Real-time data interpretation with confidence
- Quality Assurance integrated into workflows
- Automated Audit Trail
- Streamlined export to application software

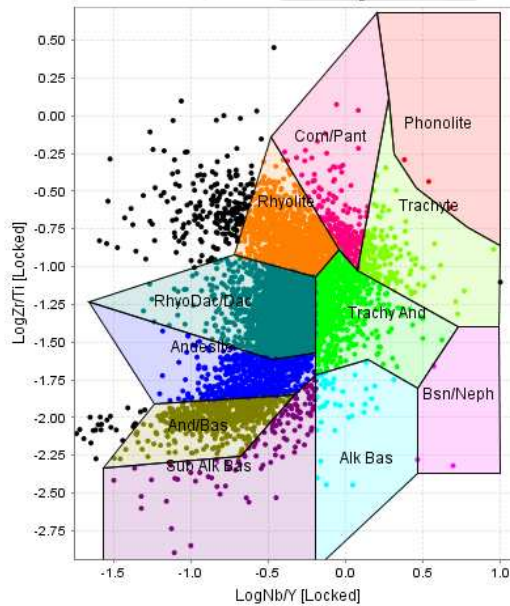


# QA - Holistic Approach





Winchester and Floyd



### Error Model DL Estimation

DL Values

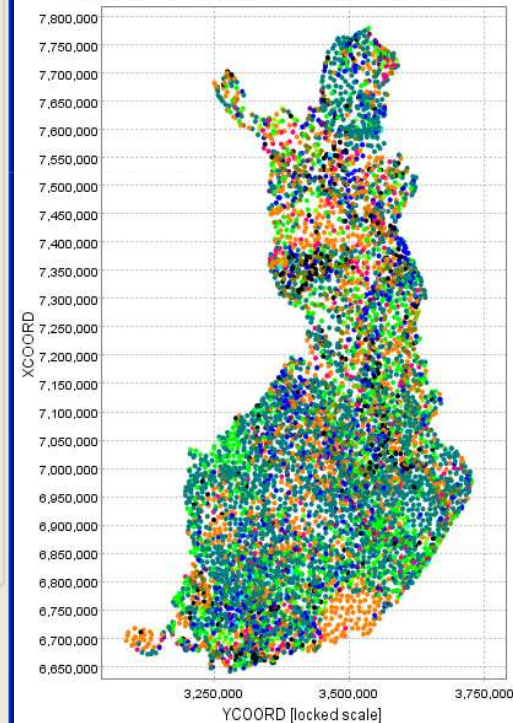
Import Threshold (% > DL)

Element	DL Value	% > DL	Data Count	Error Count	Import
P_ppm	9451.0	3.448	145	145	<input type="checkbox"/>
S_ppm	2528.0	14.48	145	145	<input type="checkbox"/>
Cl_ppm	778.3	15.86	145	145	<input type="checkbox"/>
K_ppm	342.6	100.0	145	145	<input checked="" type="checkbox"/>
Ca_ppm	258.8	60.0	145	145	<input type="checkbox"/>
Ti_ppm	79.25	100.0	145	145	<input checked="" type="checkbox"/>
V_ppm	15.24	100.0	145	145	<input checked="" type="checkbox"/>
Cr_ppm	26.99	98.62	145	145	<input checked="" type="checkbox"/>
Mn_ppm	24.94	100.0	145	145	<input checked="" type="checkbox"/>
Fe_ppm	386.0	100.0	145	145	<input checked="" type="checkbox"/>
Co_ppm	2.65	100.0	145	145	<input checked="" type="checkbox"/>
Ni_ppm	37.52	7.586	145	145	<input type="checkbox"/>
Cu_ppm	19.66	95.86	145	145	<input checked="" type="checkbox"/>
Zn_ppm	9.383	100.0	145	145	<input checked="" type="checkbox"/>
As_ppm	5.929	46.89	145	145	<input type="checkbox"/>
Se_ppm	Bad Fit	Bad Fit	145	145	<input type="checkbox"/>
Rb_ppm	Bad Fit	Bad Fit	145	145	<input type="checkbox"/>
Sr_ppm	3.325	100.0	145	145	<input checked="" type="checkbox"/>
Zr_ppm	4.854	100.0	145	145	<input checked="" type="checkbox"/>
Mo_ppm	6.313	11.72	145	145	<input type="checkbox"/>
Ag_ppm	Bad Fit	Bad Fit	145	145	<input type="checkbox"/>
Cd_ppm	33.67	8.275	145	145	<input type="checkbox"/>
Sn_ppm	58.91	20.0	145	145	<input type="checkbox"/>
Sb_ppm	65.21	2.758	145	145	<input type="checkbox"/>
W_ppm	26.3	20.0	145	145	<input type="checkbox"/>


Retain Raw Data Columns     Import All  
 Retain Error Columns     Convert < DL to Half DL


Attribute Map (Colour, Shape and Size)



In the Field




ioGlobal



In the Office  
*(or any internet Connection)*

ONLINE



Import XRF - Message (HTML)
[-] [x]

Message Insert Options Format Text

Paste

Clipboard

Calibri (Body) 11

**B** *I* U

Basic Text

Address Book

Check Names

Names

Include

Options

Follow Up

Options

ABC

Spelling

Proofing

**Send**

Account

To...

Cc...

Subject:

Attached:

Stephen Winter  
 Director, ioGlobal Pty Ltd  
 Resource **Analytics** and Data Systems **Automation**

www.ioglobal.net  
 Tel: +61 8 6311 3255  
 ISO 9001 Quality Certified


Quality Assurance integrated into workflows

Automated Audit Trail

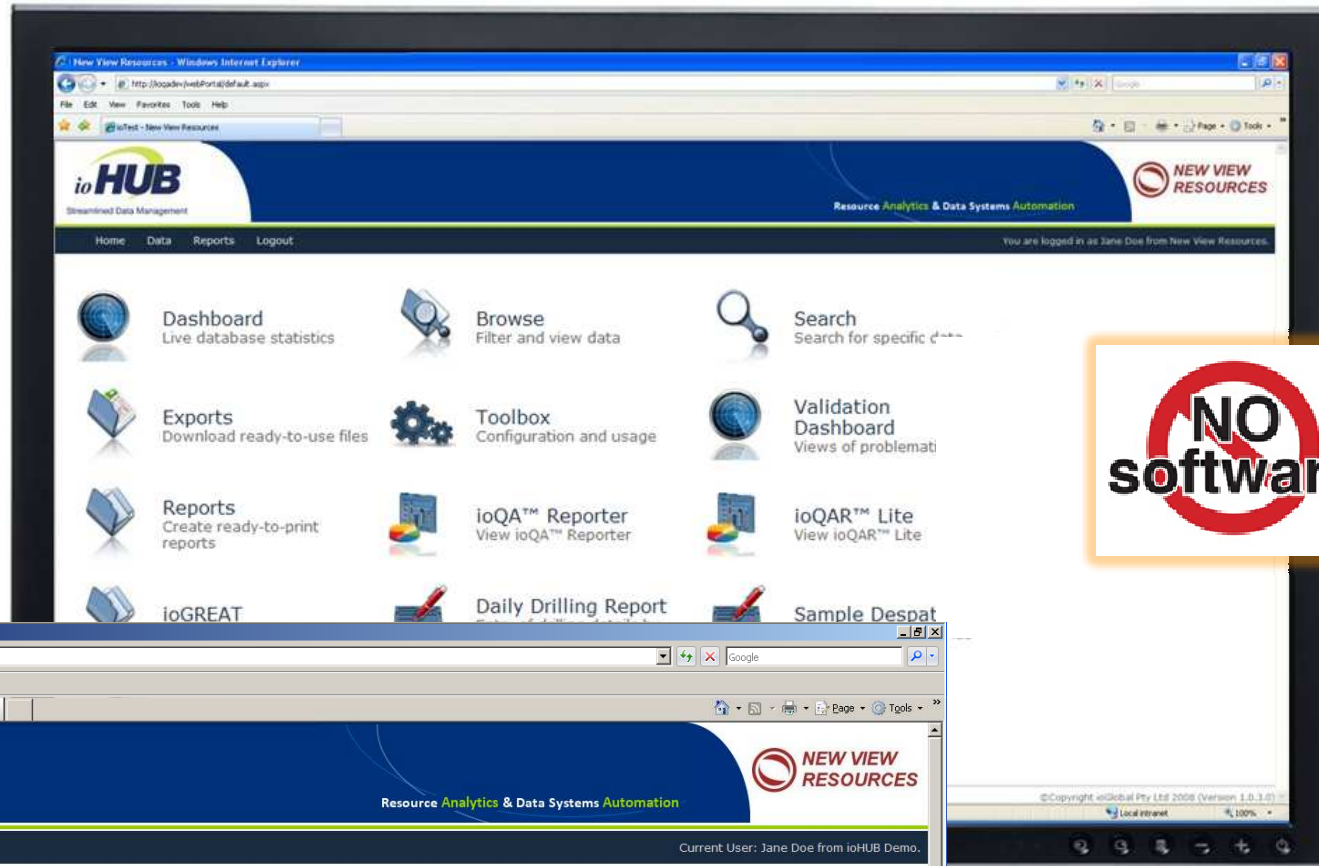
Streamlined export to application software

• MapInfo

• Specific Mining Systems







ioHub DEMO - Windows Internet Explorer

http://localhost:ioHub/Data.aspx

ioHUB Streamlined Data Management Resource Analytics & Data Systems Automation NEW VIEW RESOURCES

Home Data Reports Logout Current User: Jane Doe from ioHUB Demo.

Browse

Export Data

Projects> Innov-X HandHeld XRF Samples

Collars Standard Compare Duplicate Compare Exports Lab Batch QC HandHeld XRF Samples

HandHeld XRF QC Samples

Project	BatchNo	TEST_DATE	READING_NO	MODE	LIVETIME	ELAPTIME	FIELD_1	FIELD_2	FIELD_3	FIELD_4	FIELD_5	FIELD_6	FIELD_7	FIELD_8	WGS84_LAT	WGS84_LONG	WGS84_ELEV	US
Innov-X	Demo	15/01/2009	15/01/2009 #201	S			GRA302			D9	Pt	SPL			121.428618	-25.276408		AC
Innov-X	Demo	15/01/2009	15/01/2009 #202	S			GRA303			DC	Pt	STRM			121.404416	-25.289583		AC
Innov-X	Demo	15/01/2009	15/01/2009 #203	S			GRA304			DC	Pt	SHTW			121.356936	-25.275627		AC
Innov-X	Demo	15/01/2009	15/01/2009 #204	S			GRA305			E	Pt	SHTW			121.306373	-25.274333		AC
Innov-X	Demo	15/01/2009	15/01/2009 #205	S			GRA306			E	Pt	SHTW			121.238529	-25.270794		AC
Innov-X	Demo	15/01/2009	15/01/2009 #206	S			GRA307			D9	Pt	SHTW			121.202009	-25.279743		AC
Innov-X	Demo	15/01/2009	15/01/2009 #207	S			GRA308			D9	PM	SPL			121.041702	-25.111163		AC
Innov-X	Demo	15/01/2009	15/01/2009 #208	S			GRA309			D9	PM	SPL			121.0814	-25.097382		AC

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- Real-time data interpretation with confidence
- Quality Assurance integrated into workflows
- Automated Audit Trail
- Streamlined export to application software

In the Office  
(by Internet Connection)

ONLINE

ioHUB

Management Dashboards  
API Reporting  
Audit Trails



Commercial in confidence

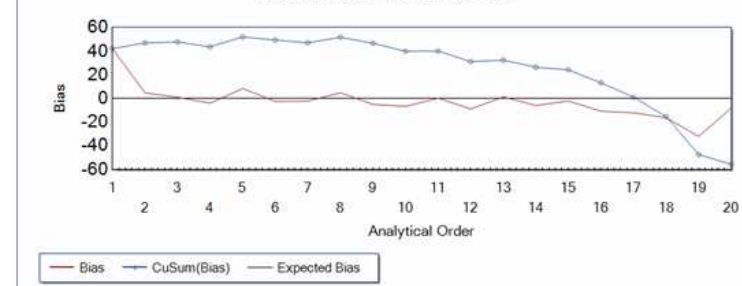
Produced 27-Feb-2009

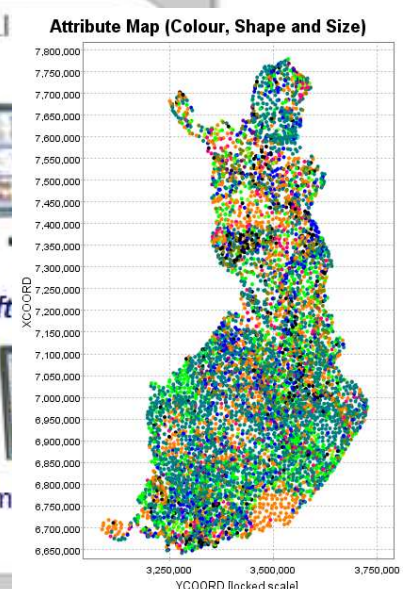
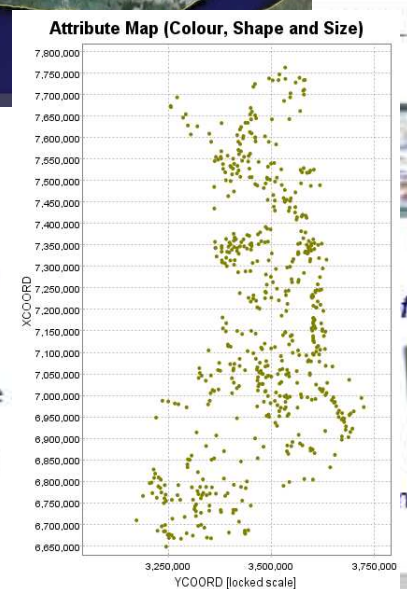
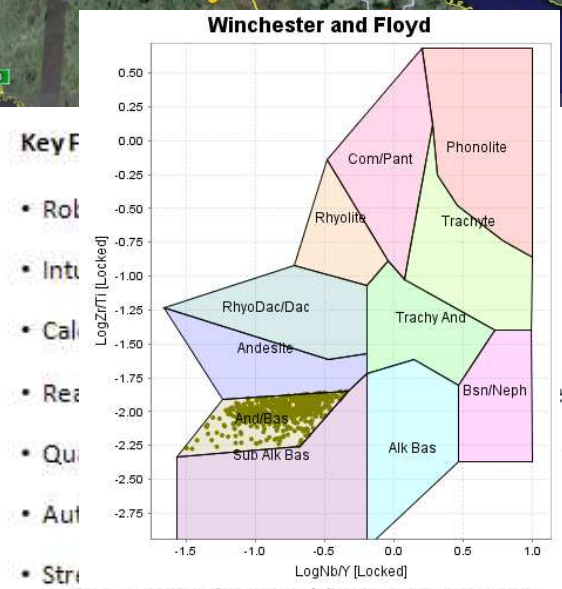
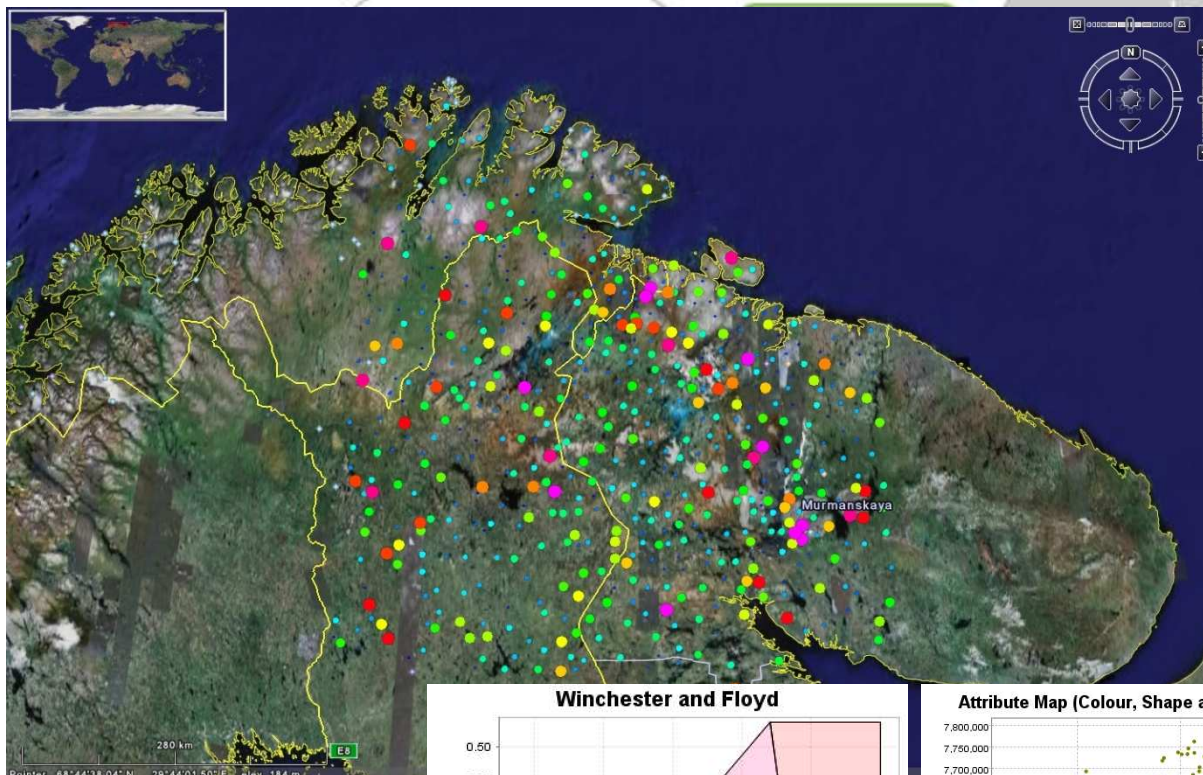
Standard: OREAS42P Lab: Innov-X Systems Method: NI\_DATA Element: NI

Over Time Standard Control Chart N=20

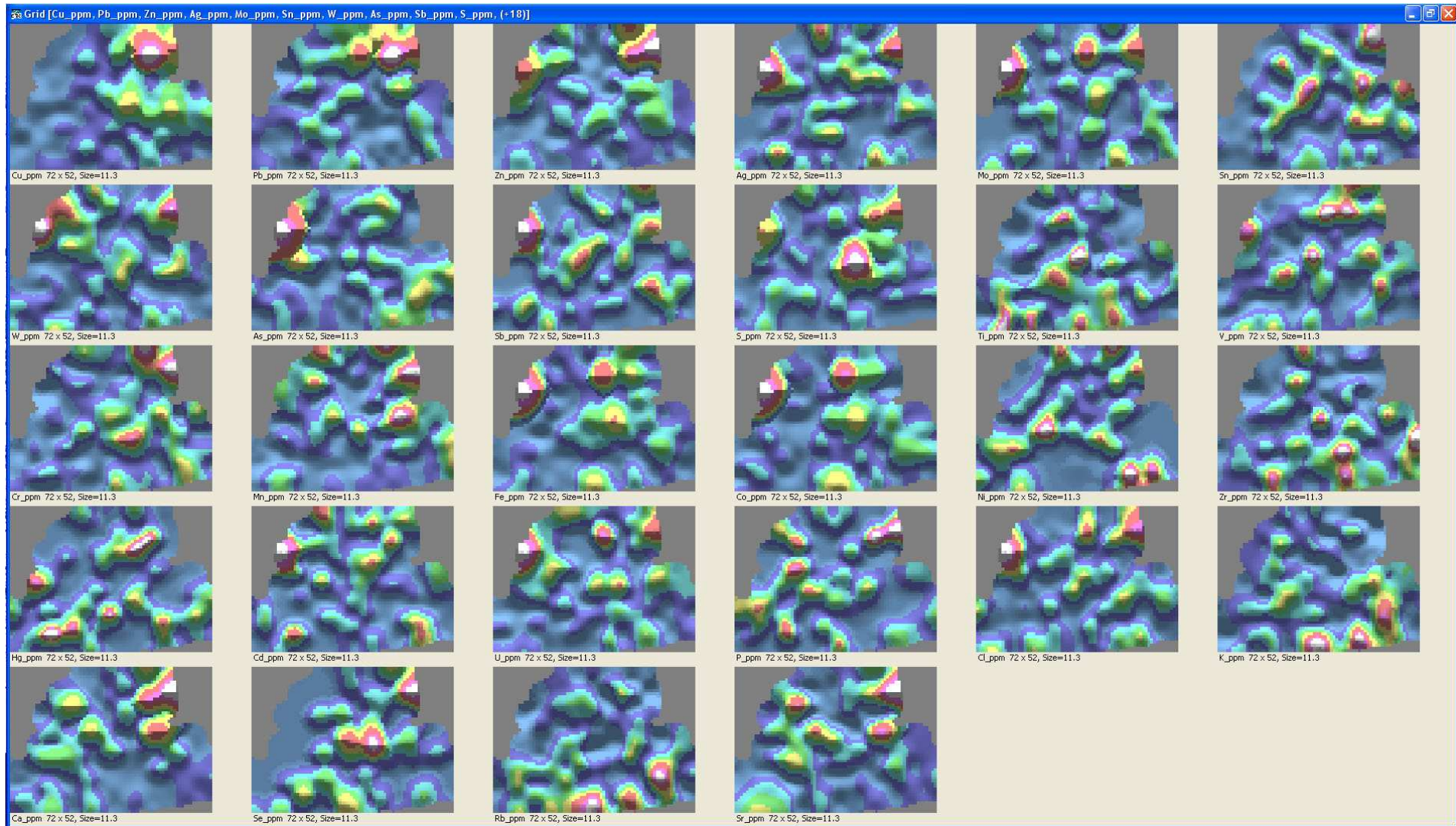


Over Time CuSum Bias N=20





# In Field Example – Data Imaging





2009 AIG Portable XRF Workshop

**QAQC**

# Why do we Care?

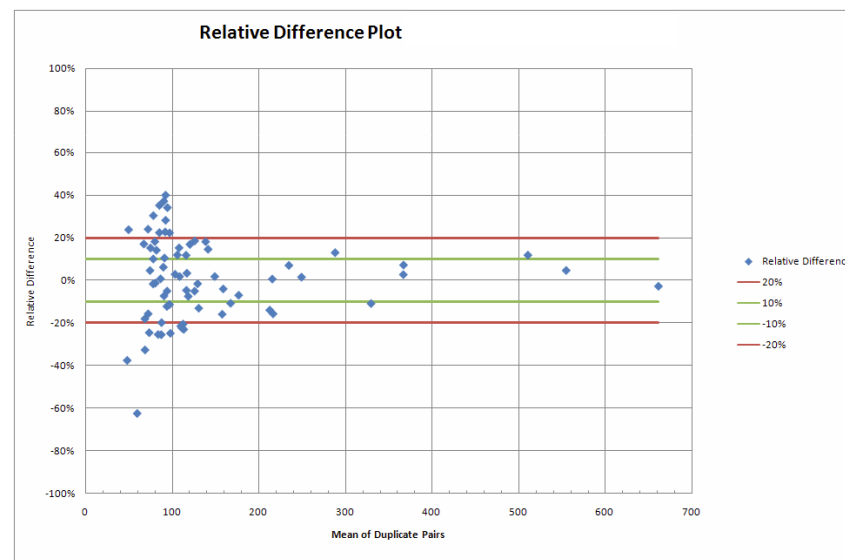
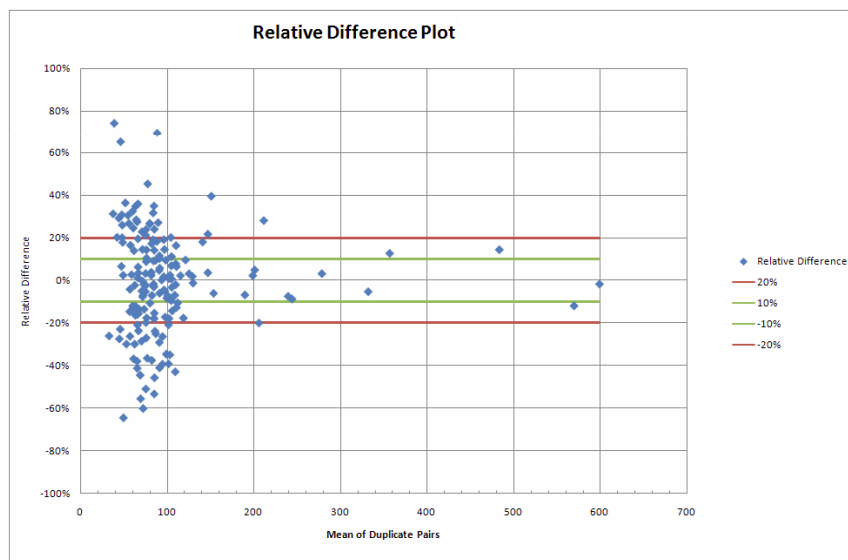


Exploration	Don't miss a target, asses targets properly.
Resources	Data suitable for publicly reported estimates. Geomet implications. Reduce risk
Grade Control	Minimal misclassification. Geomet – scheduling optimisation.
Plant/Tails/Product	Reconciliation

# Effect of Fraction Size on Precision

30 second data - Bulk

30 second data -75um

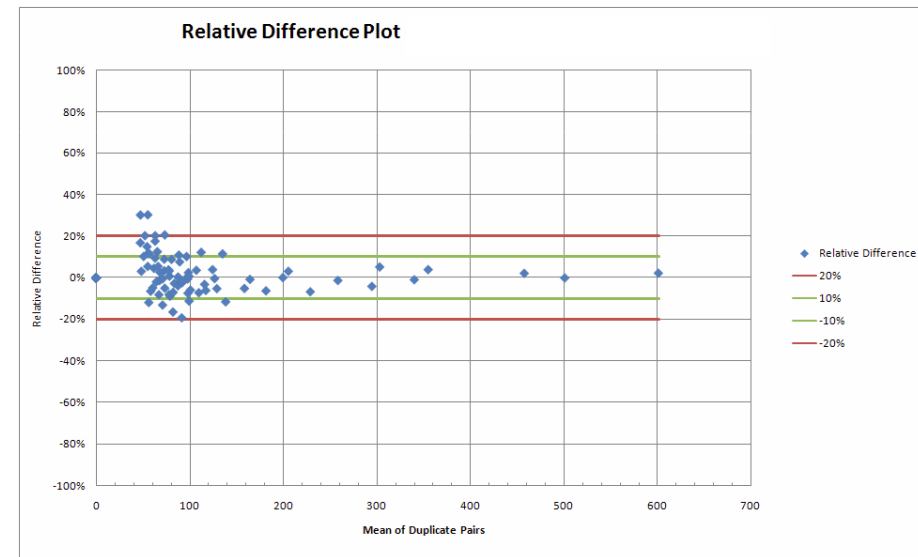
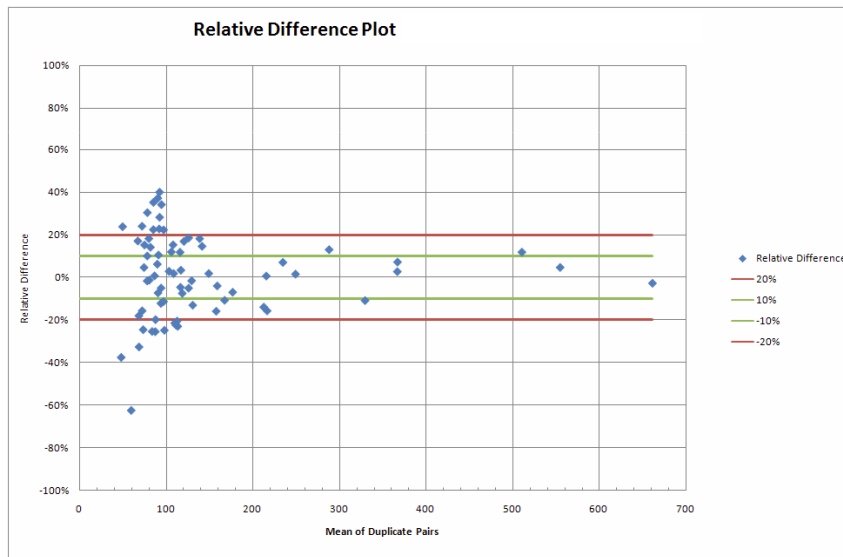


**Tighter precision envelope and lower effective detection limit for -75um data**

# Effect of Reading Time on Precision

30 second data -75um

180 second data -75um



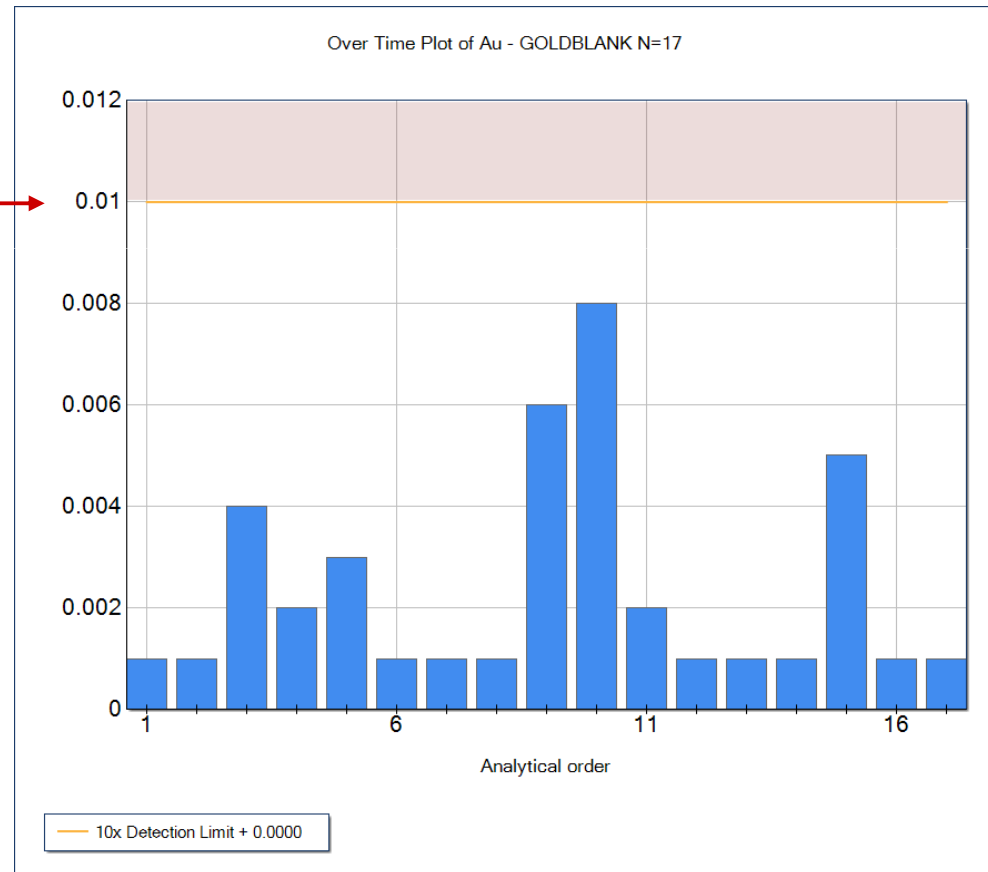
**Tighter precision envelope and lower effective detection limit for 180 second data**



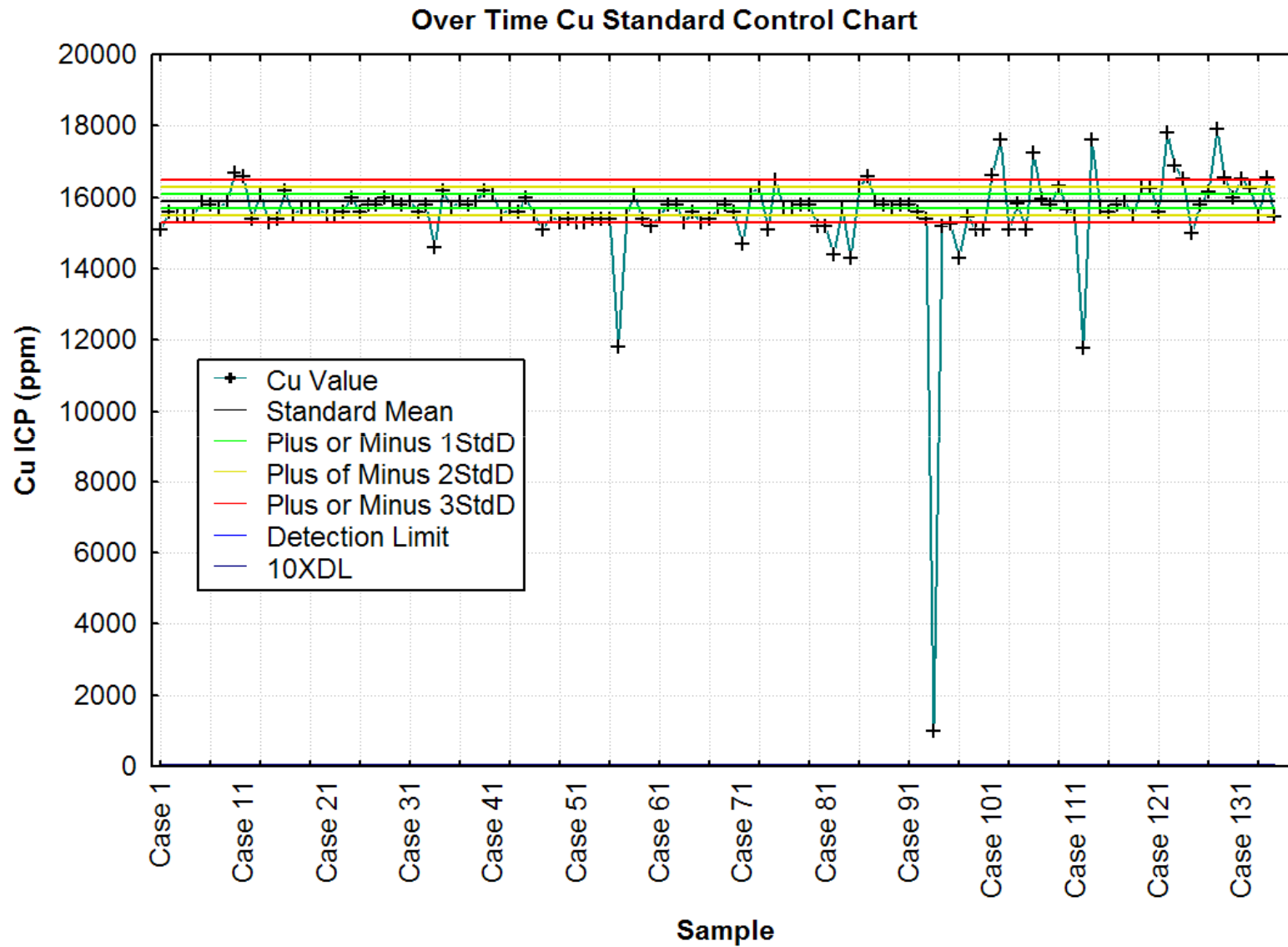
# Blanks Tests – “Zero” Blank



Limit, eg set at multiple of DL or absolute value



# Example of Analytical Problems 'Over Time' – Cu Analyses



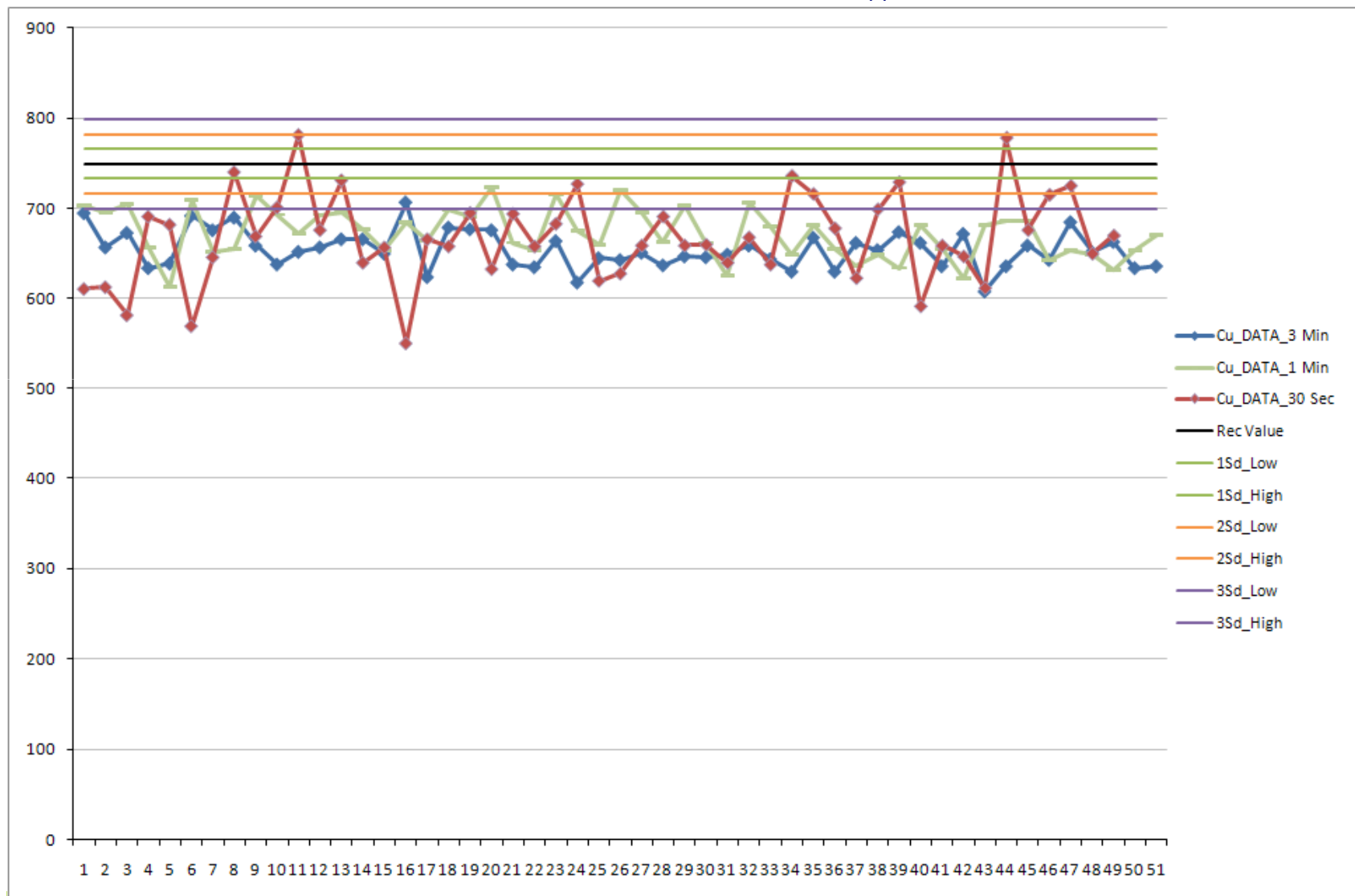
# Ores45p Cu-ppm

Detection Limits (2sd) and CV

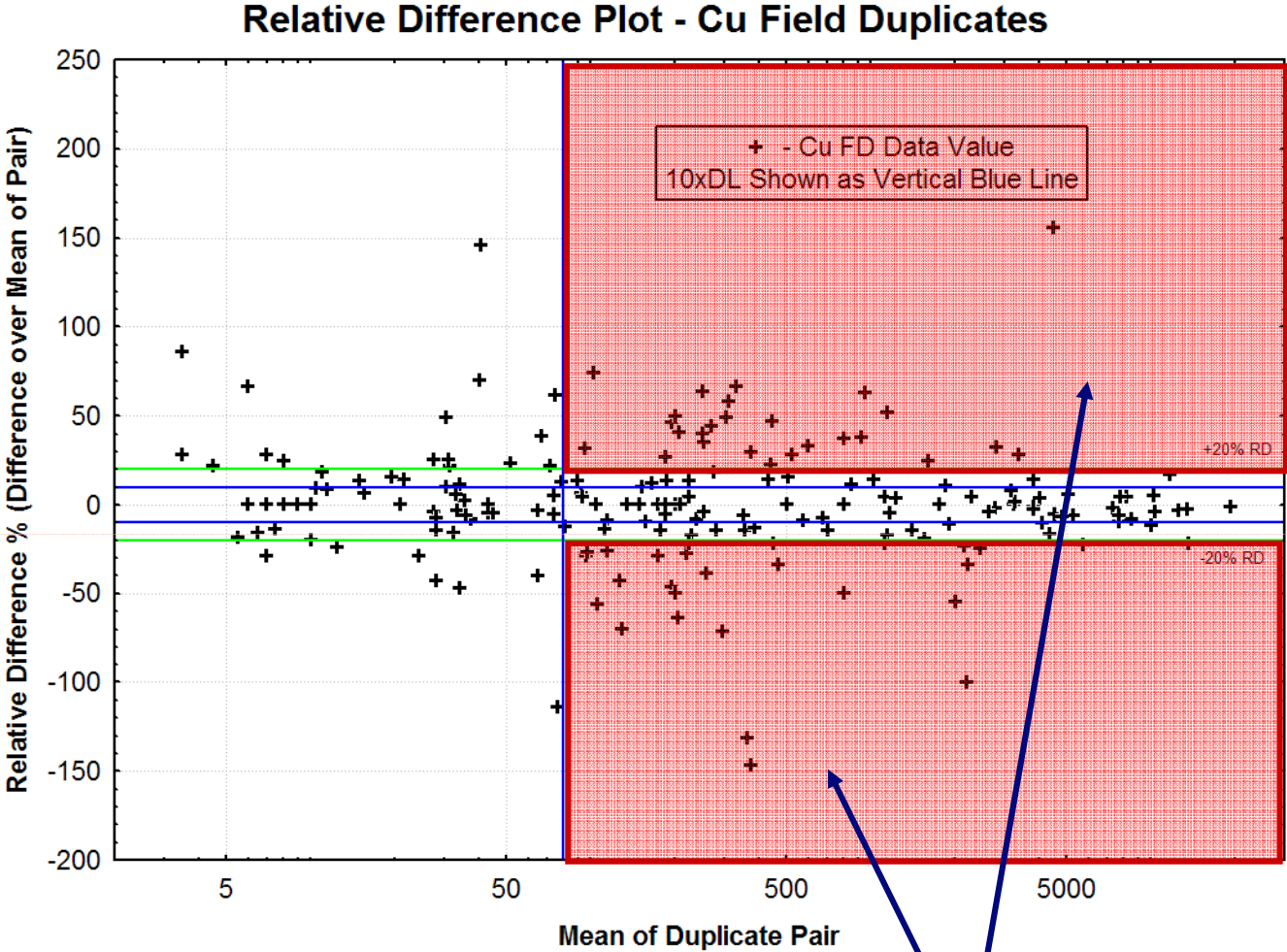
3min – 34ppm, 0.026

1 min – 60ppm, 0.045

30 sec – 85ppm, 0.064



# Percent Relative Difference Plots



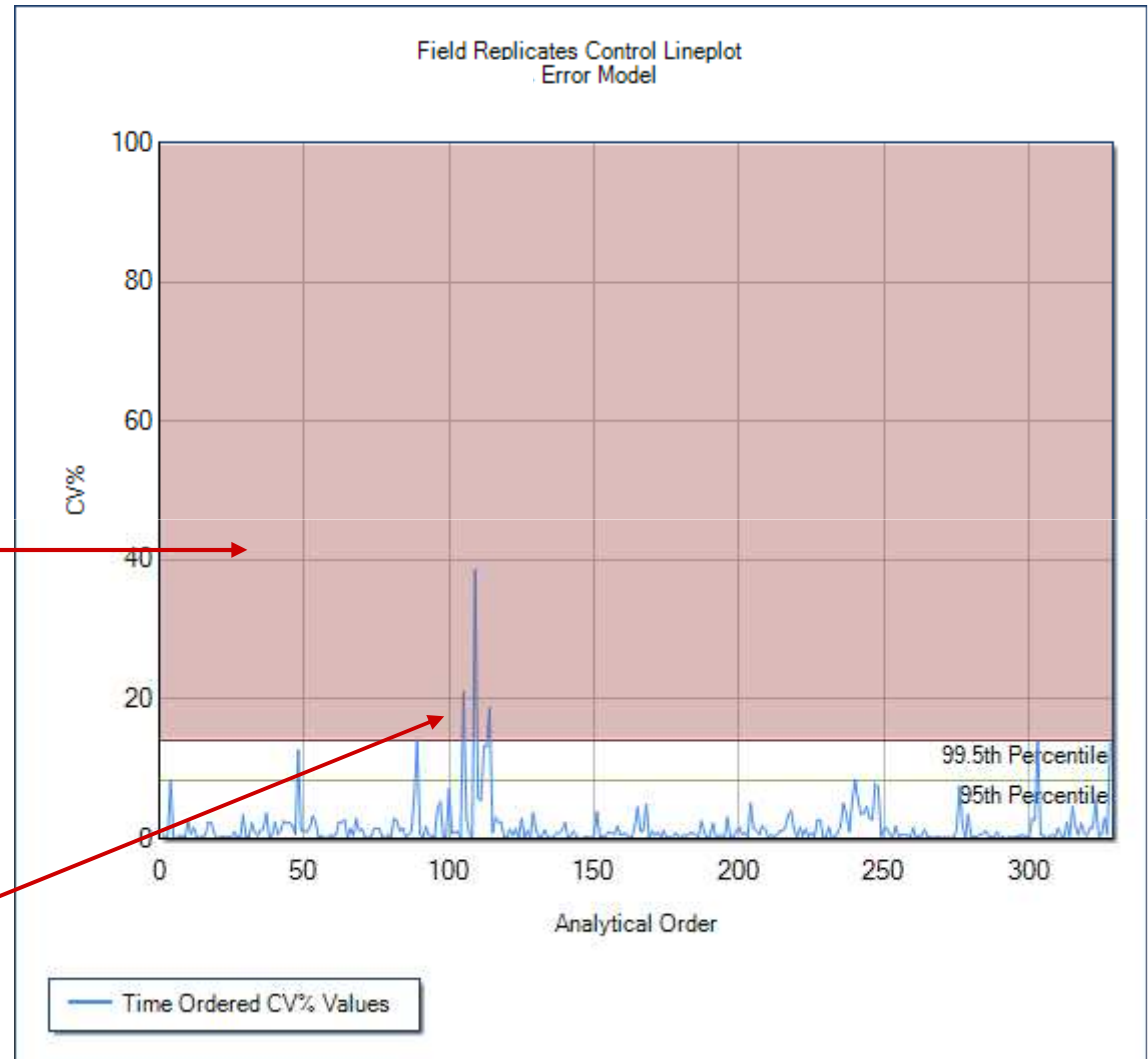
**Reported Out of Range Data Come From Here**

# Error Model - Test against set Relative Error



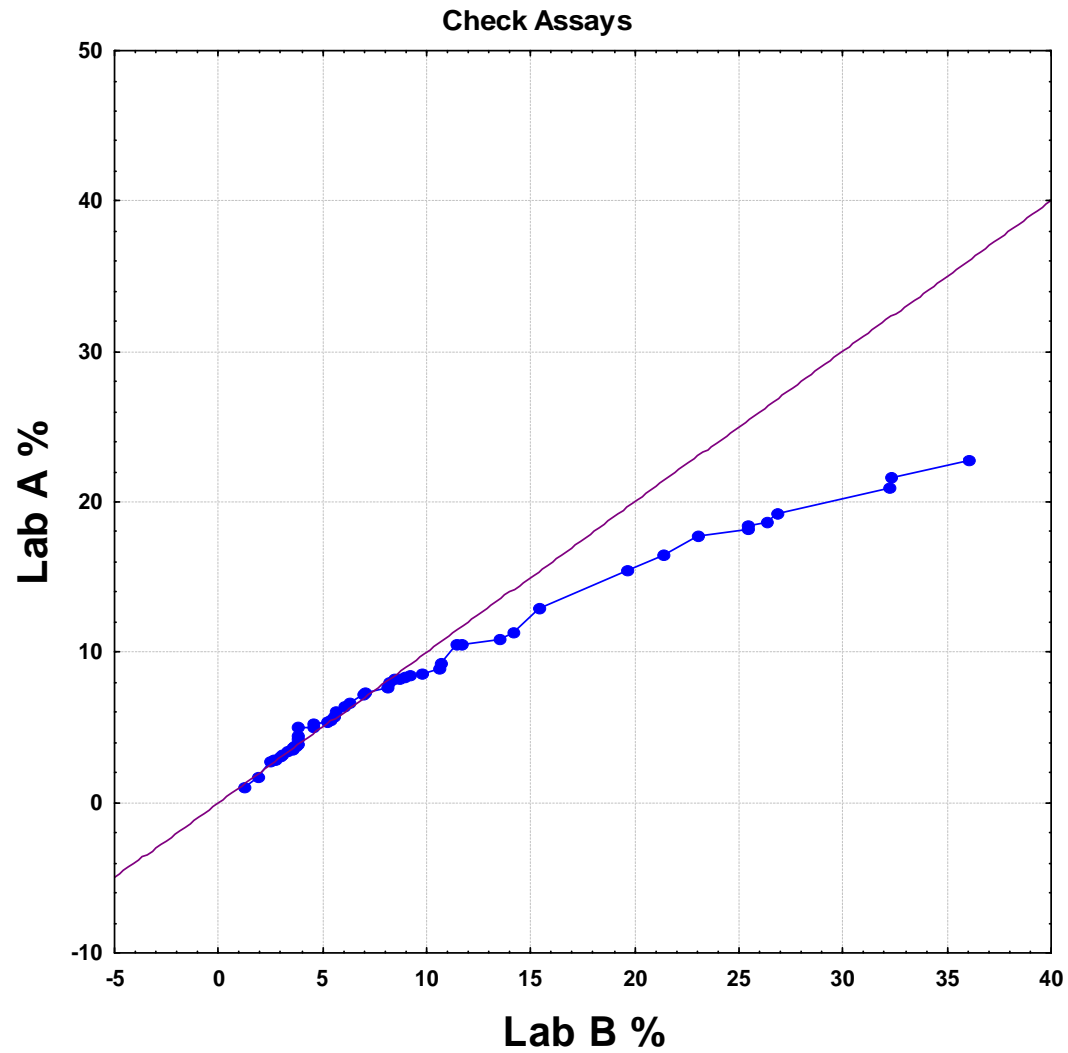
This region coloured in to indicate that this plot has been used in the exception reporting

Time context

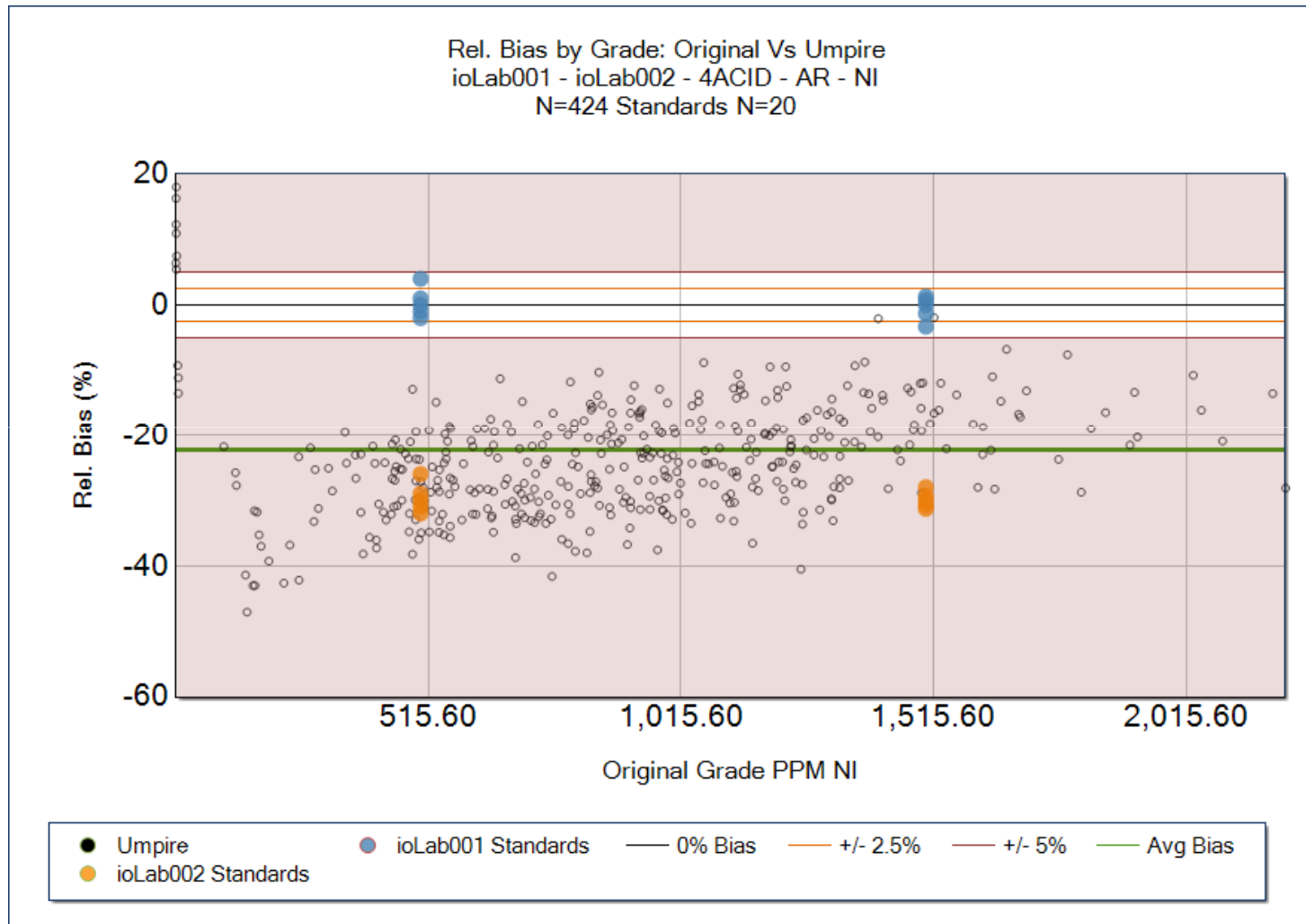


**\*Also allows for temporal based variations in precision to be assessed**

# Check Assay Example – QQ Plot



# Relative Bias



# Summary



- Jorc/43-101 → Transparency and Disclosure
- Collection of Portable XRF requires the same QAQC as other analytical data
- Contamination, Accuracy, Precision, Bias all need to be monitored
- Sample matrix and sampling statistic effects are crucial
- In field use no longer precludes data systems integration and analysis. 'Real time' analysis is a reality
- QC reporting can now be automated