

# AIG Handheld XRF Instruments Users Workshop and Forum

## Case Study

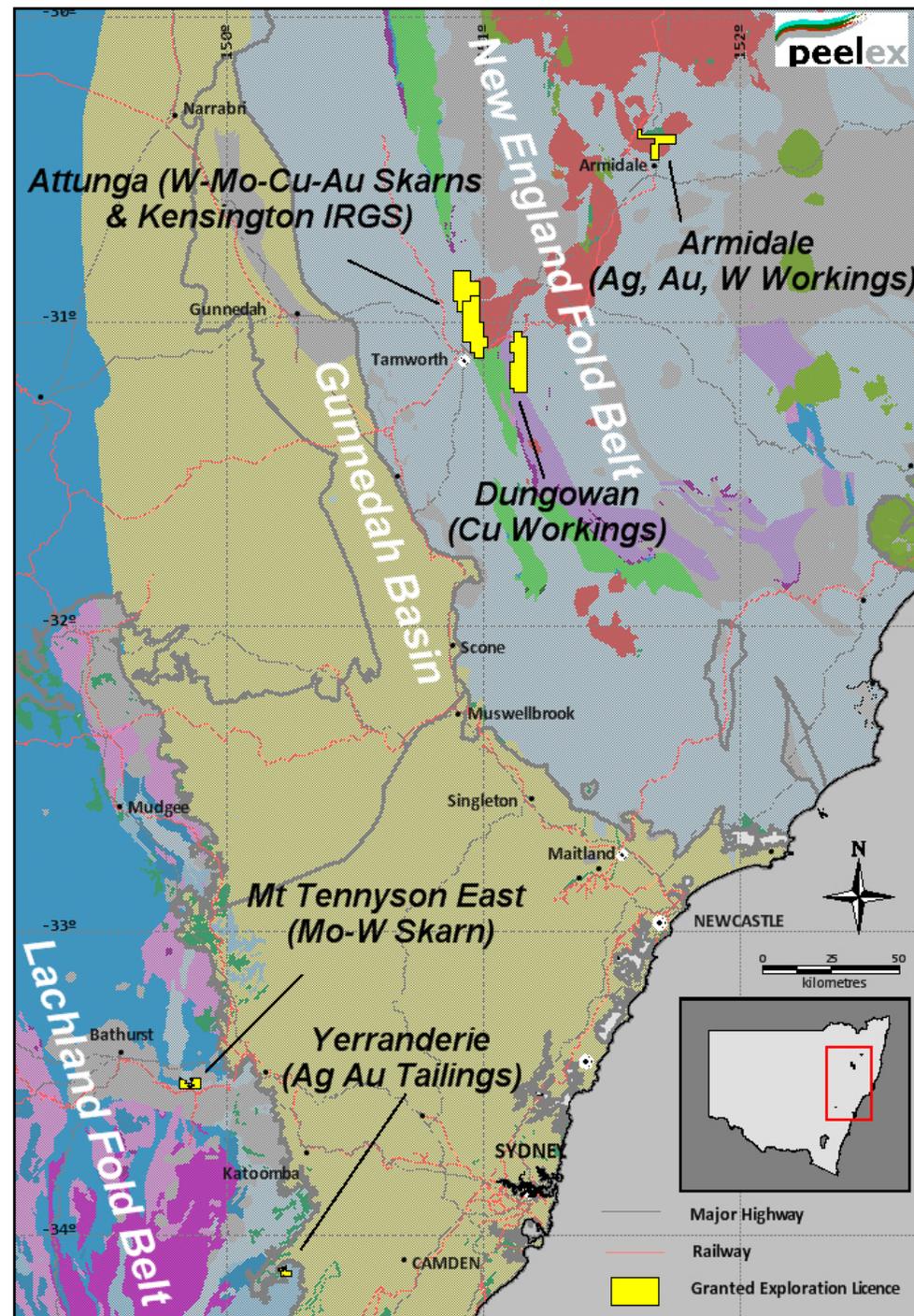
# Tungsten and Molybdenum in drill chips Attunga Prospect, NSW

Michael Oates

6<sup>th</sup> November 2009 Sydney

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# Exploration & Development Projects



# What do we use the XRF for?

- **Define ore zones for lab analysis**
- **Allow composite samples outside ore**
- **Manage sample costs**
- **Quick and reliable quantitative analysis**
- **Does not replace laboratory**
- **Provides greater sample coverage**

# Cost Saving example

- Recent 1700m RC drilling program
- 4m composites for “barren” zones
- Multi-element suite ICP & XRF
- Reduction of 808 samples required
- @\$50 sample = saving \$40,400
- **50% XRF capex in one small program**



Attunga Tungsten Skarn Outcrop



RC Drilling at Attunga Tungsten



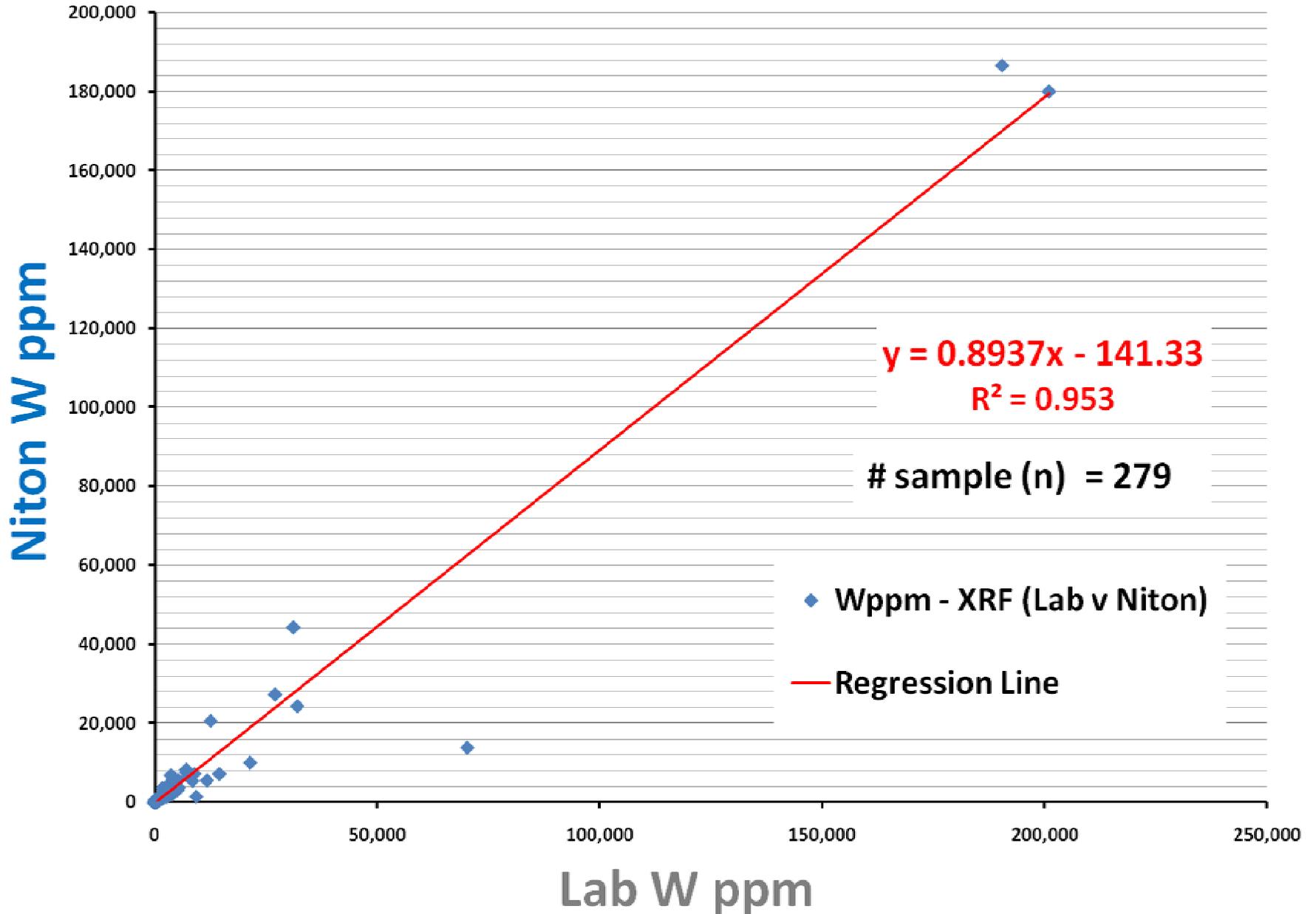
Yerranderie Mine Tailings



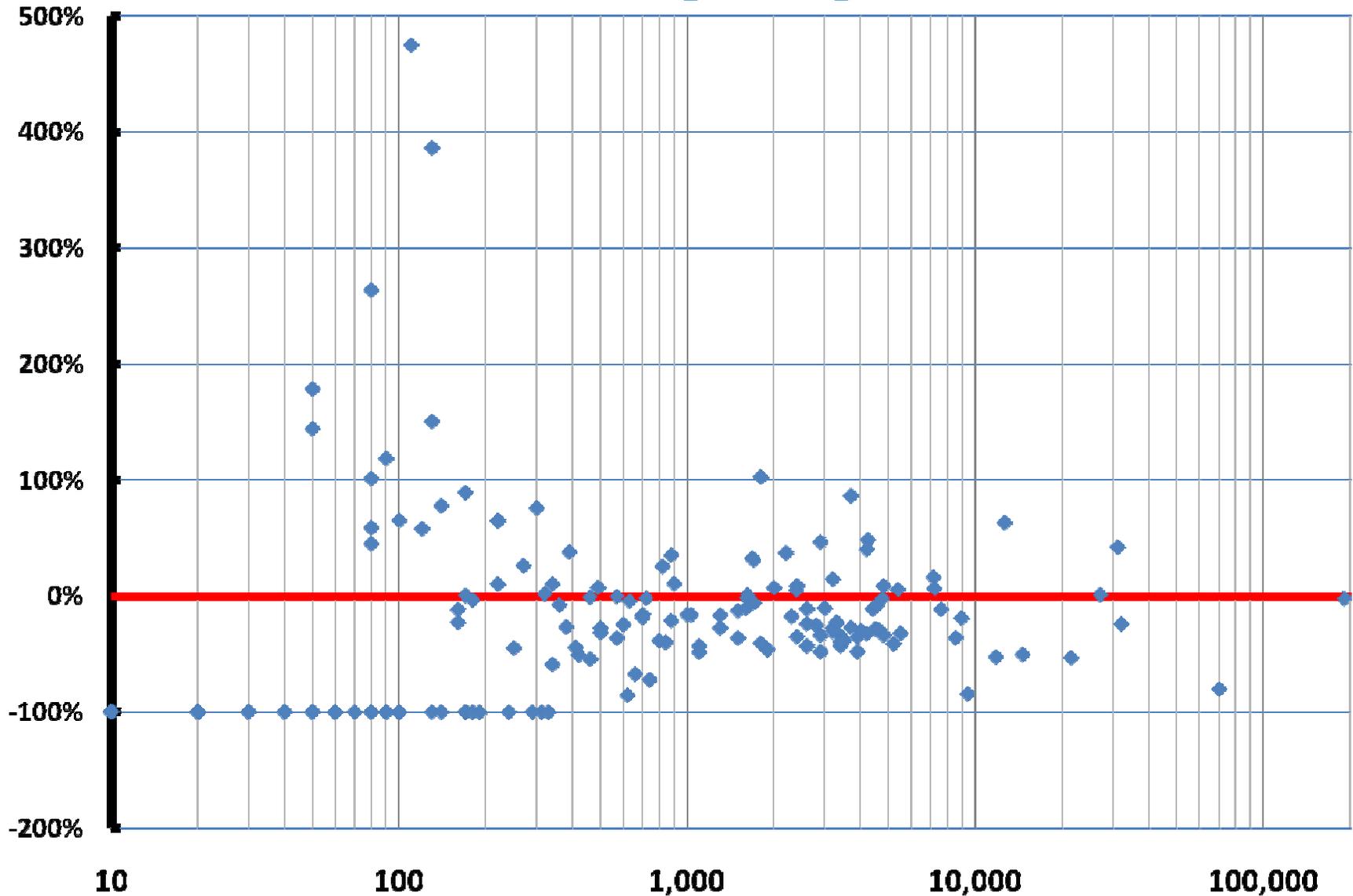
# Percussion Analysis Procedures

- **Calibrate each morning**
- **Analyse through sample bag**
- **20 - 30s per filter**
- **Wet or Dry sample**
- **Use standards**
- **Cross reference with Lab results**

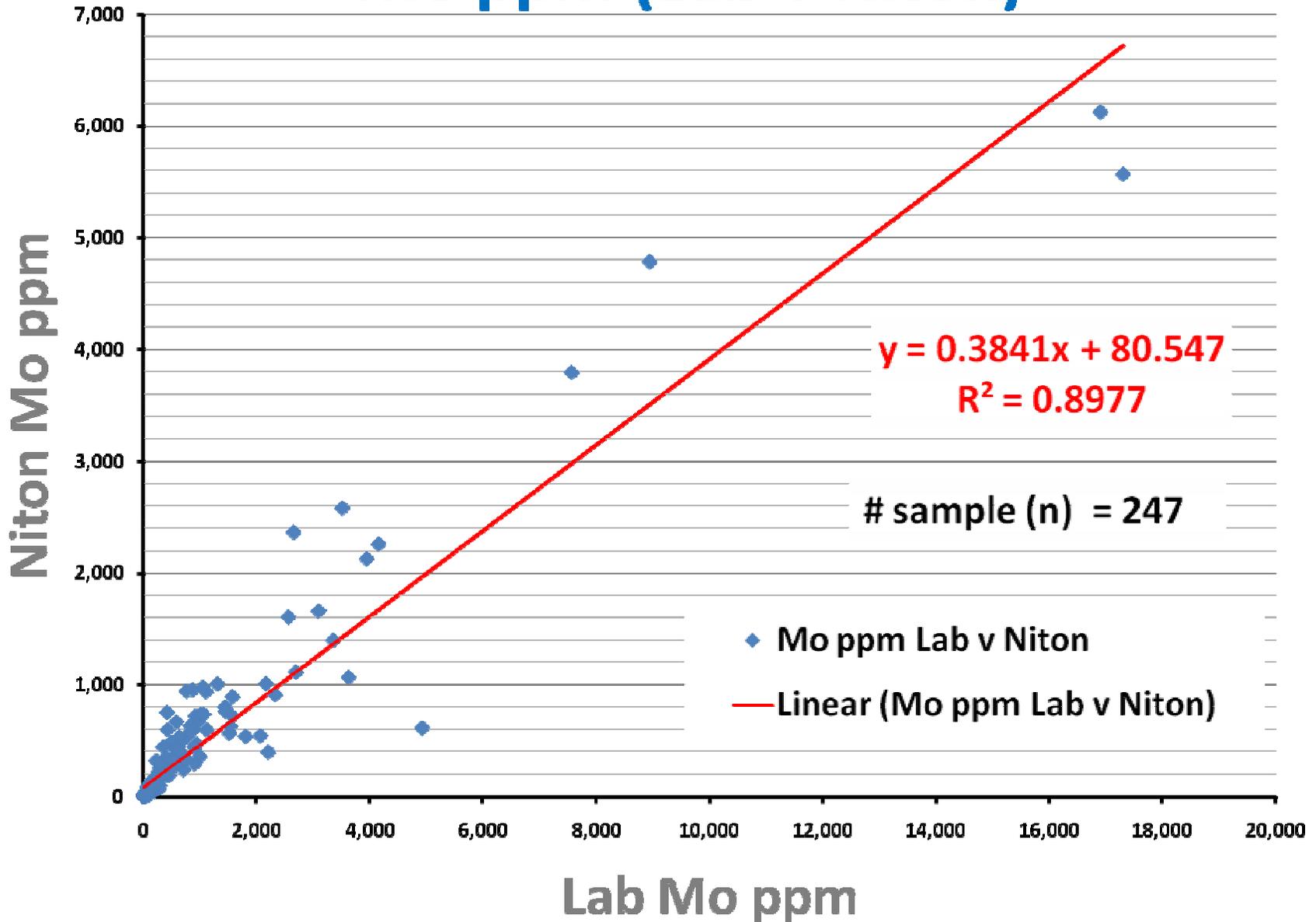
# W ppm - (Lab v Niton)



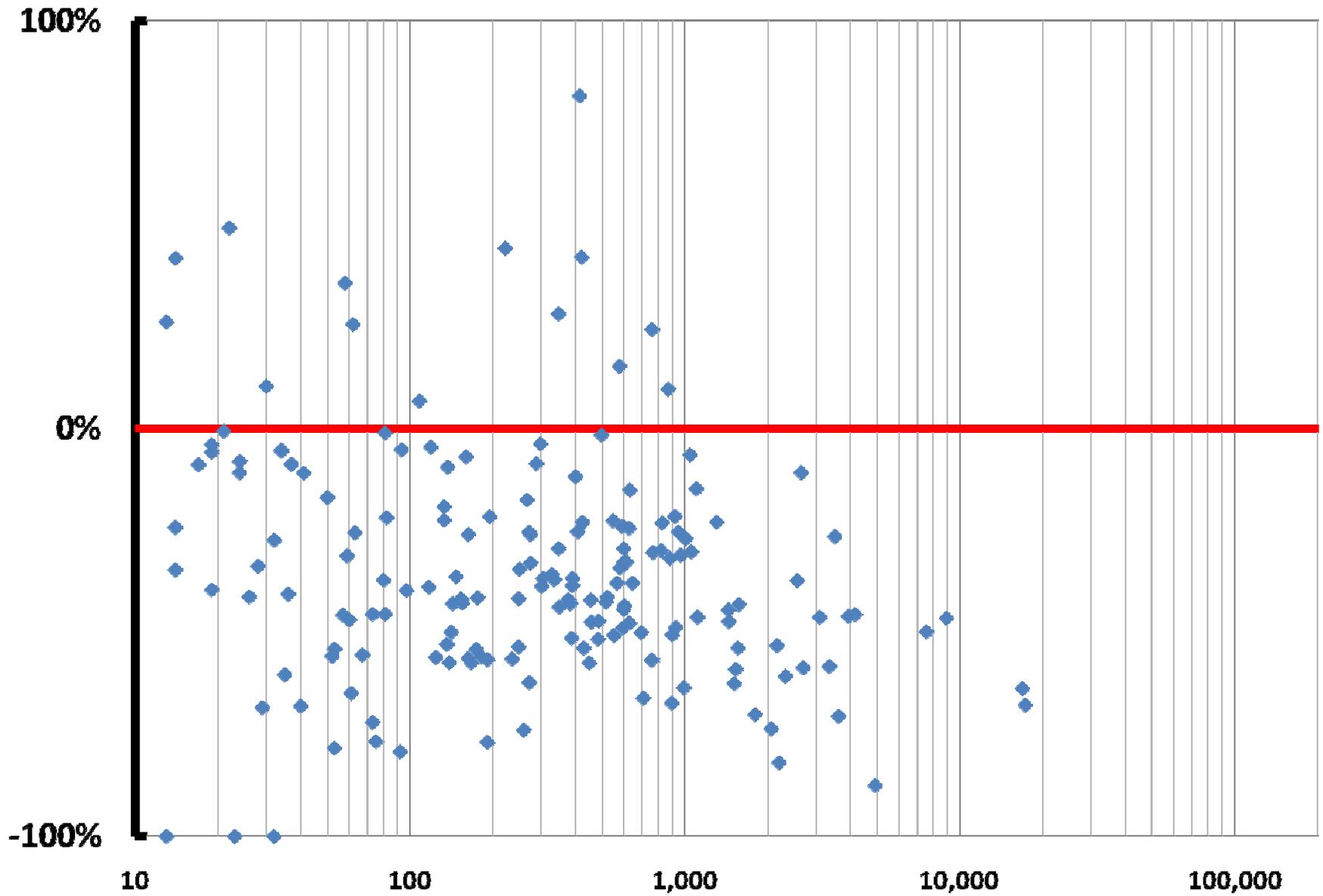
# ◆ W % change V grade



# Mo ppm (Lab v Niton)



# ◆ Mo % Change V Grade



Mo ppm Laboratory XRF > 100ppm

# Precision of W & Mo

- **W Avg error 65 ppm from 2889 readings**
- **W ICP-AES plus XRF finish W > 500ppm**
- **Mo Avg error 5.5 ppm from 2889 readings**
- **Mo ICP-AES plus XRF finish Mo > 1%**

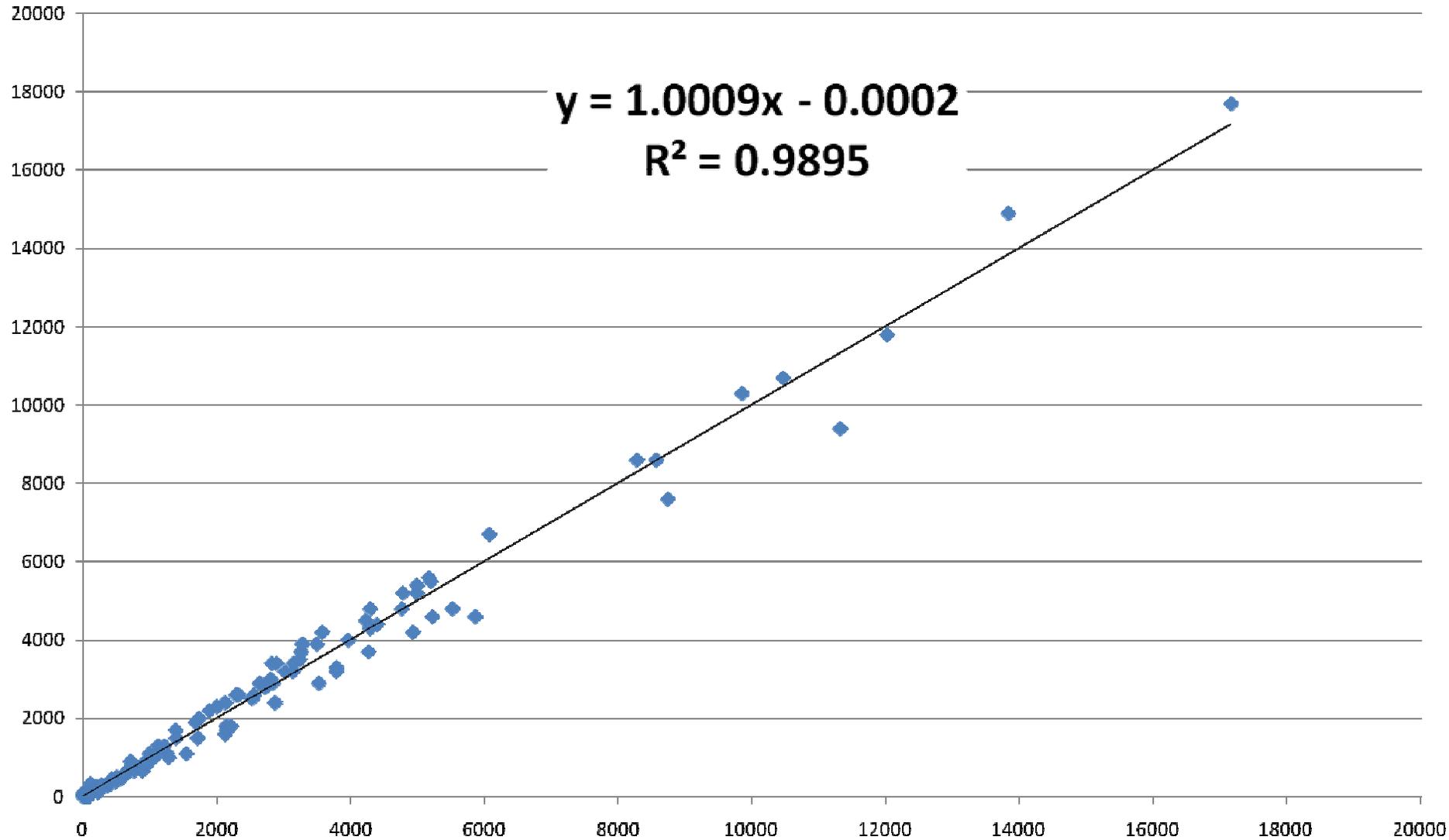
# Tweaking the Machine

- **Analyse Lab Pulps**
- **Collect population of data (1minute per filter)**
- **XY regression Plot Lab v Niton**
- **Determine slope and intercept**
- **Calibrate XRF for specific elements**
- **Project specific standards**

# Low Tech Stand Solution



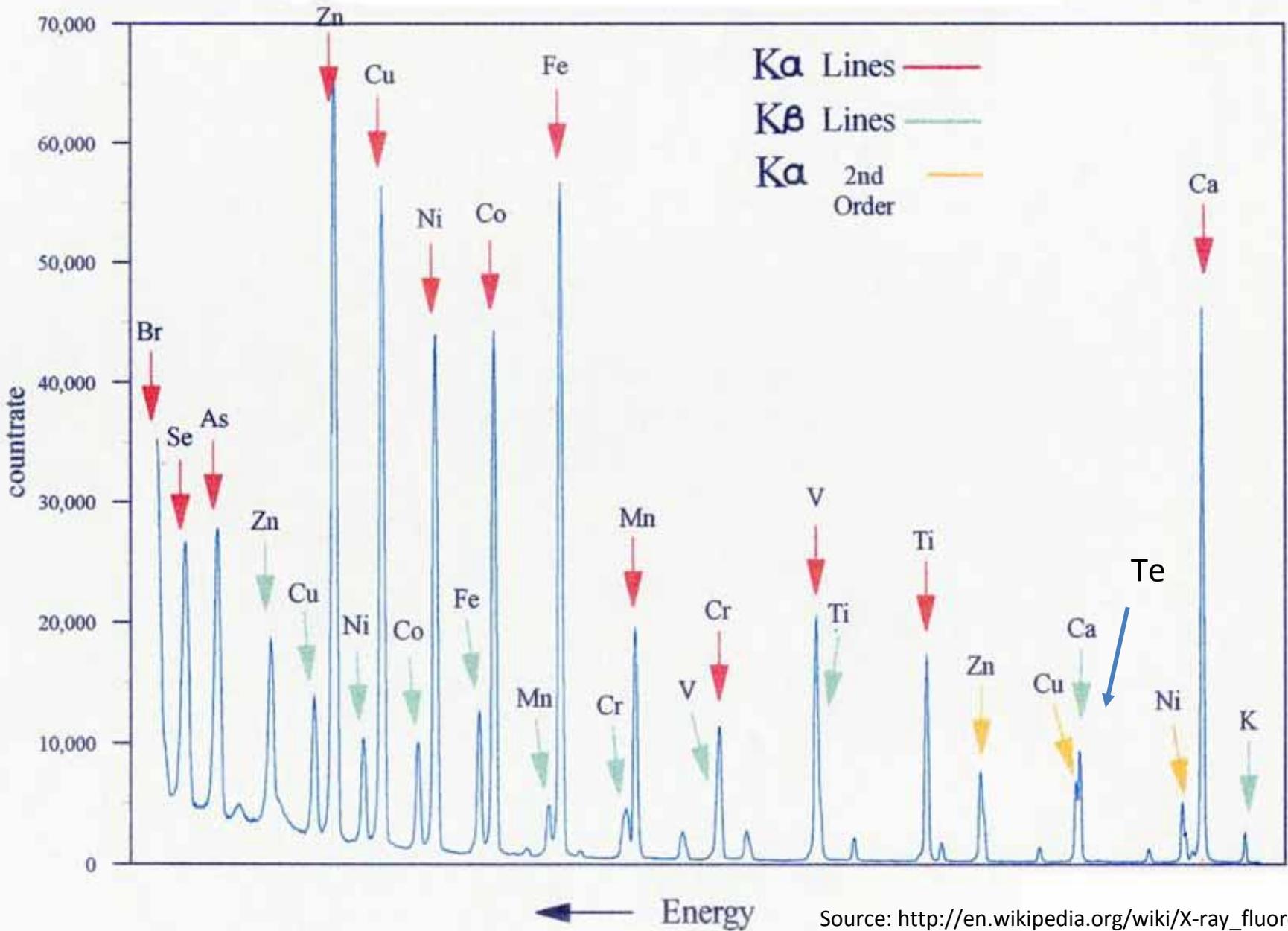
# Lab v XRF W ppm corrected



# False Peaks

- **Tellurium crustal abundance <0.01 ppm**
- **Indicative of Hydrothermal Fluids eg IRGS**
- **Averaging 100ppm with Avg error 45ppm**
- **Te  $L\alpha_1$  0.3289 & Ca  $K\alpha_{1,2}$  0.3359**
- **Overlapping spectral peaks Ca and Te**

# Typical XRF Spectrum



# Question.....What is it?

- **141% Zn**
- **1.2% W**
- **143 ppm Mo**
- **170 ppm U**

# Answer....Drillers Lubricant !

- **Keep track of rod changes in logs**

# Conclusions

- **Handheld XRF works well for ore grades**
- **Handheld XRF effective W (>100ppm)**
- **Handheld XRF effective Mo (>10ppm)**
- **Reduce lab costs for drilling**
- **Fine tune your tool**
- **Beware contaminants eg drill grease**