# TECHNICAL BULLETION – IMPROVING ANOMALY RESOLUTION

## AUGUST 1997

**Worksheet**

To investigate the advantages of MMI partial extractions, when compared with total digestions, case study data from a Cu prospect in Central Queensland, Australia, is shown in Table 1. The data came from an area where both styles of geochemistry "work" and provide real analytical responses over Cumineralization.

**Table 1 - Partial Extraction versus Total Digestion Analytical Data**

| Sample | Response Ratios (m) | Total Cu (ppb) | MMI Cu (ppb) | Cu Results in Descending Order | | Response Ratios | |
|---|---|---|---|---|---|---|---|
| | | | | Total Cu | MMI Cu | Total Cu | MMI Cu |
| CQ1 | 0 | 4,200 | 100 | | | | |
| CQ2 | 25 | 3,800 | 120 | | | | |
| CQ3 | 50 | 7,000 | 100 | | | | |
| CQ4 | 75 | 17,000 | 2,500 | | | | |
| CQ5 | 100 | 9,000 | 200 | | | | |
| CQ6 | 125 | 6,000 | 150 | | | | |
| CQ7 | 150 | 5,100 | 100 | | | | |
| CQ8 | 175 | 5,000 | 150 | | | | |
| | | | | Total Cu Background | MMI Cu Background | | |

**Note:** The MMI digestion has extracted less than 2% of the total metal from most samples. There is a higher percentage, 15% from the anomalous sample.

**Complete the above table as follows:**

1. Sort the analytical data sets into descending order (highest to lowest).
2. **Calculate a background for each data set.**
Average the values for the lowest quartile (25%) of data (in this case, the lowest 2 values).
3. **Calculate the Response Ratio (RR) for each sample.**
Divide each value by the background for both data sets. Round the result to a whole number.
4. Plot on the graph below the Response Ratio, for each sample for each technique.

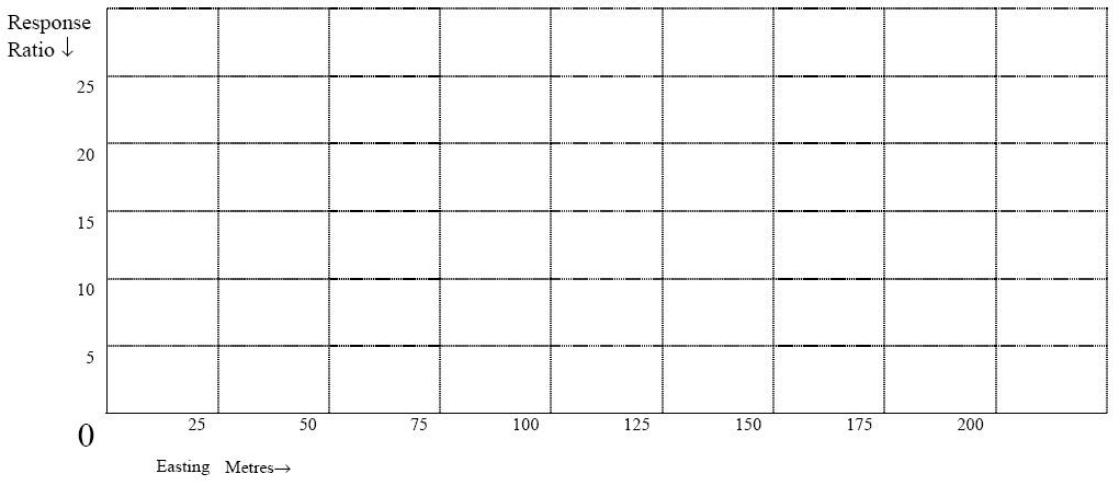


**Figure 1 – Response Ratios for Total and MMI Analysis**

Although MMI has extracted less metal from the sample, in so doing we have increased the **signal to noise ratio or anomaly to background response** considerably.

**We have preferentially accessed "unbound" metal to achieve this.**

There are a number of possible situations where the increased signal to noise ratio of the partial geochemical anomaly may be of advantage:

1. Where the amount of transported material in the (colluvial) soil would swamp a conventional geochemical signal, but not one from partial digestion;
2. Where the depth of the mineralization is so great that the "bleed" signal of metal is very weak; and
3. Where the amount of weathering in the profile has led to a very low metal signal in the surface soil.

**Improved Drill Targeting**

At the initial stage of exploration drilling, the increased width resolution, "the sharpness", of the partial geochemistry signal can be of great value. It allows more precise drill targeting from a geochemical anomaly. The example below gives a simple illustration of this. The conventional geochemical signal has "shoulders" which give the anomaly a width of approximately 100m (4 samples at $\geq$ 1.5 RR). By comparison the partial geochemistry signal is 50m wide (2 samples at $\geq$ 1.5 times RR).

We can approximately compare costs for Total Exploration to the end of the first round drilling of this target by these two scenarios.

Use your own estimates of costs to complete the following table:-

Assuming first round drilling would be at 25m spacings to 50m.

| Item | MMI Geochemistry | Daily Rate $ | Total Cost $ |
|---|---|---|---|
| Geochemical Sampling | 1 day | | |
| Analysis (assume Total Samples = 80) | 80 samples | | |
| Geochemical Interpretation | 1 day | | |
| Gridding Costs | 0.2 day | | |
| Drilling | 100 metres | | |
| Drill Supervision Geologist | 1 day | | |
| Downhole Samples | 100 samples | | |
| Other | | | |
| **TOTAL:** | | | |

| Conventional Geochemistry | Daily Rate $ | Total Cost $ |
|---|---|---|
| 1 day | | |
| 80 samples | | |
| 0.5 day | | |
| 0.2 day | | |
| 200 metres | | |
| 2 day | | |
| 200 samples | | |
| | | |
| | | |

**GOLDEN WEB DEPOSIT - COST COMPARISON**

A cost comparison between Conventional and MMI Surveys

Case Study: Golden Web Deposit, Western Australia
Phase I – Grassroots to Pre-definition drilling
(Note: Reserves subsequently defined)

| Item | MMI Survey | Cost | Conventional | Cost |
|---|---|---|---|---|
| Geochemical Survey | 5 days | $ 2,000 | 5 days | $ 2,000 |
| Analysis | 200 x 5 elements | $ 4,000 | 200 x 2 elements | $ 2,000 |
| Interpretation | | $ 600 | | $ 600 |
| Reconnaissance Drilling | 2,000m @ $15 | $ 30,000 | 4,000m @ $15 | $ 60,000 |
| Supervision | 20 days | $ 7,000 | 40 days | $ 14,000 |
| Assays (Fire Assay) | | $ 14,000 | | $ 28,000 |
| | **Total:** | **$ 57,600** | **Total:** | **$106,600** |

Data supplied by St Francis Mining N, all costs are shown in Australian Dollars.

Subsequent to the definition of the MMI geochemical anomaly, a reconnaissance RAB drilling program was implemented.

The results of Phase I exploration drilling are shown below.

**Summary of Phase I Exploration Drilling Program**

Initial drilling was 8 holes to 40 metre depth within the > 30 times background for MMI Au

| Hole No. | Intersection (metres) | Grade of Au (g/t) |
|---|---|---|
| GWB1 | 12 | 4.9 |
| GWB2 | 4 | 12.5 |
| GWB5 | 2 | 2.7 |
| GWB7 | 12 | 3.9 |
| GWB8 | 8 | 12.0 |

This phase of drilling showed 62% of holes returned intercepts greater than 1.0 g/t Au over intervals exceeding 2 metres.

A subsequent drilling program outside the > 30 times background MMI anomaly tested the adjacent area with 28 holes to 40 m depth. Only one hole returned an intercept of 8m @ 4.4 g/t Au immediately adjacent to the initial anomaly. This represented only a 4% intercept rate.