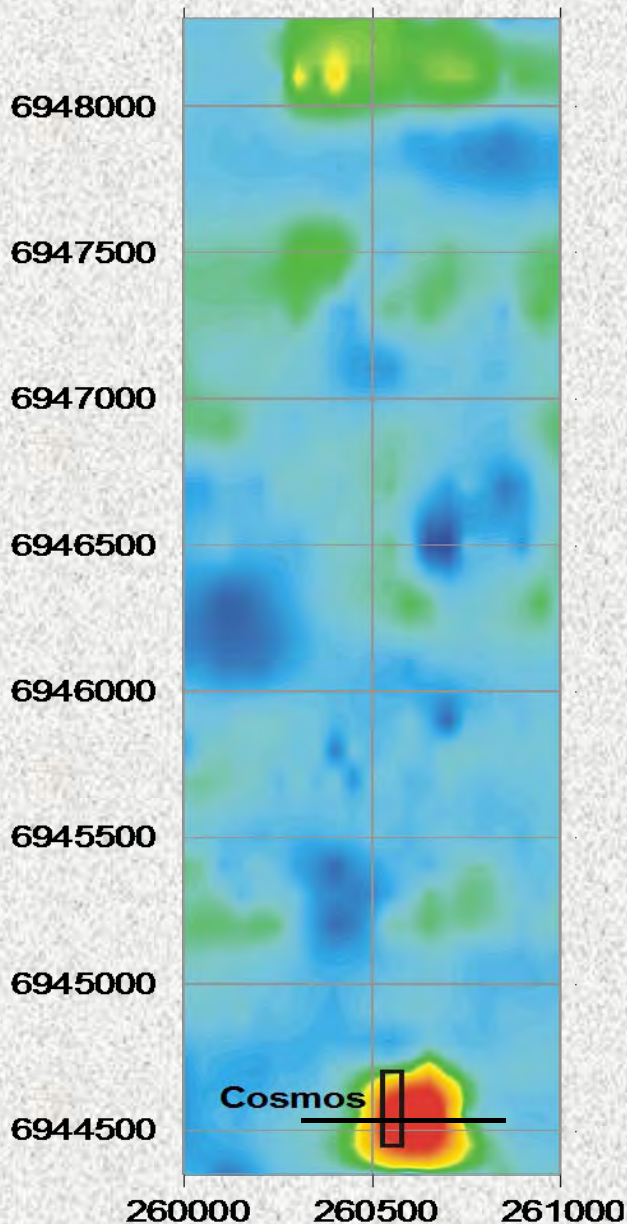


Cosmos - Ground TEM, Moving Loop



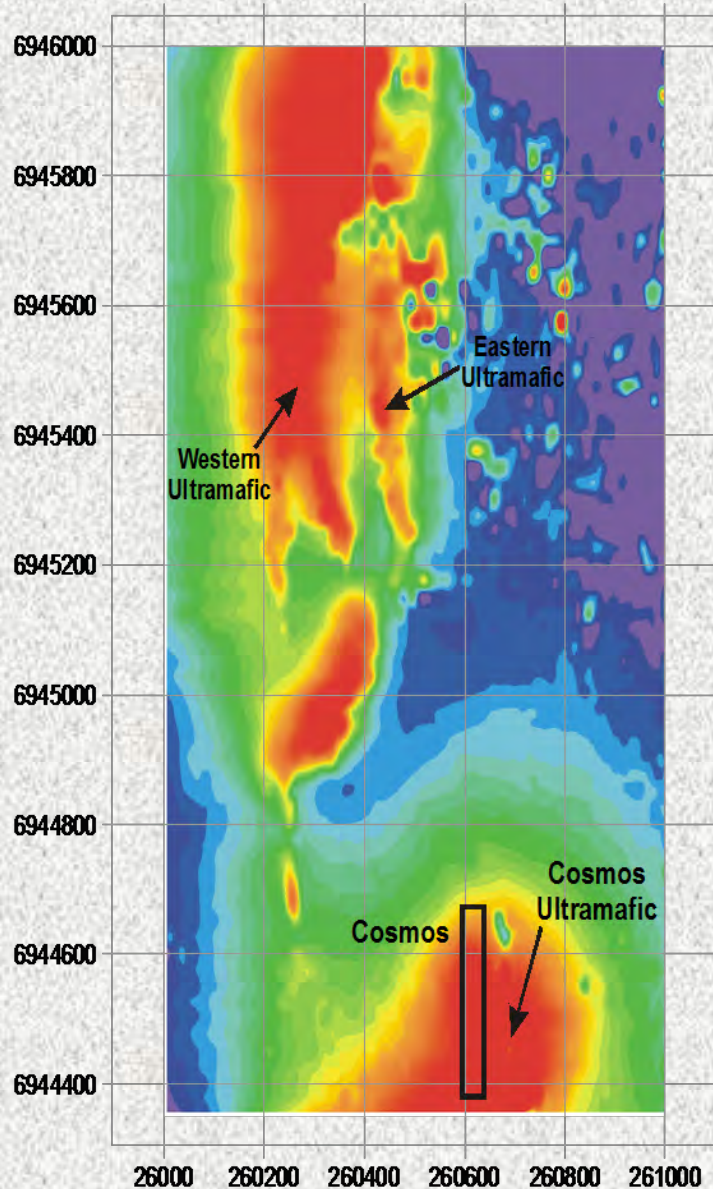
Moving loop (100m)

Z-component,
channel 23 (10.2
msecs).

Anomaly amplitude
is 8uV/A

Approximate position of
traverse

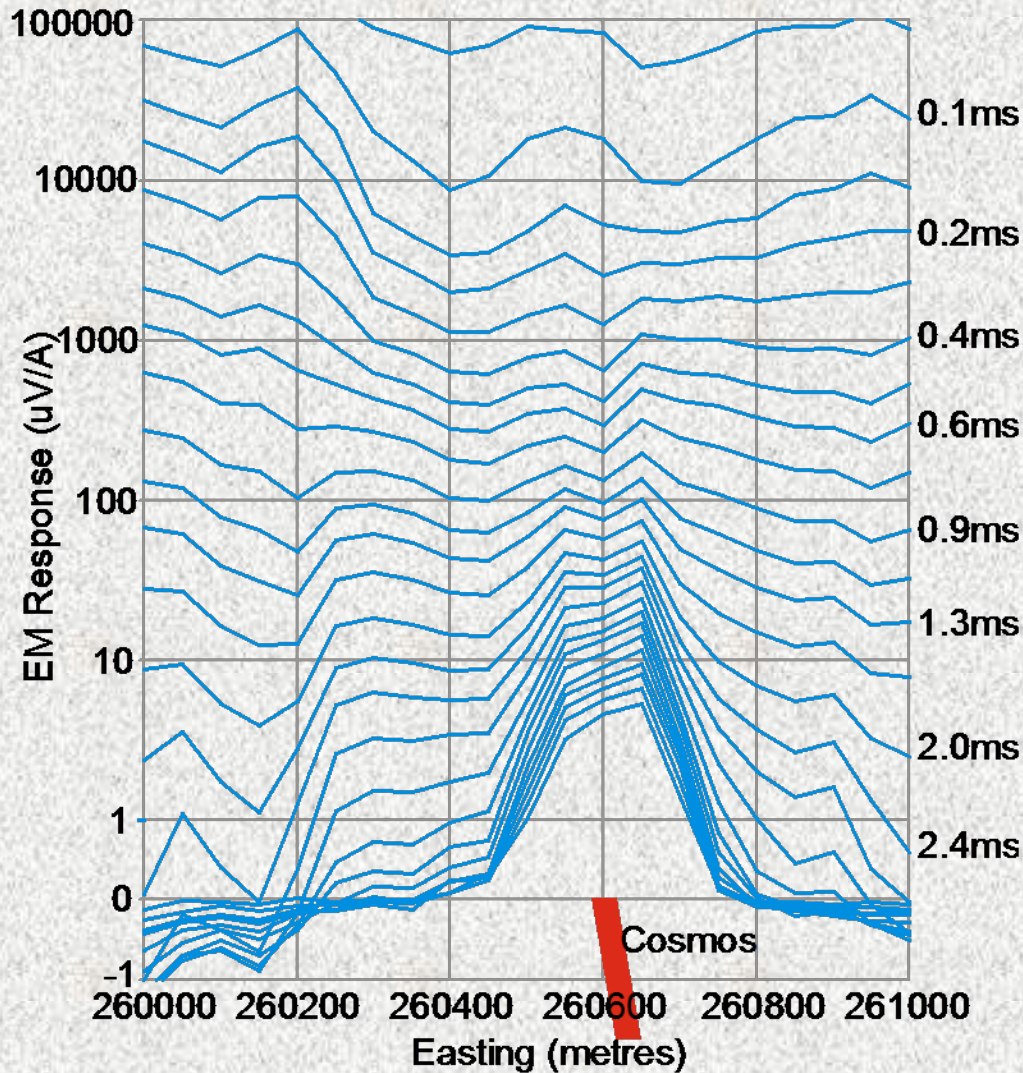
Cosmos- Ground Magnetics



Host High MgO Ultramafics Magnetic

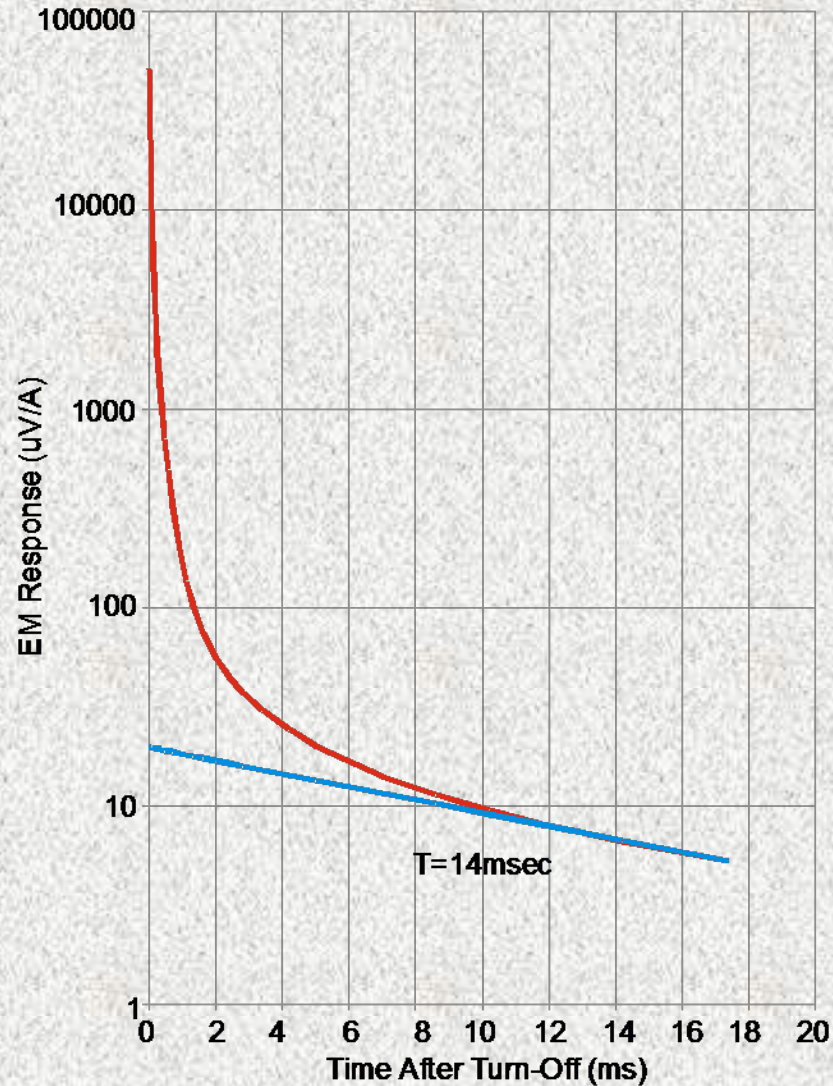
Important Channel Facies can see
Increase in thickness of
high MgO Ultramafics

Cosmos - Moving 100 m in-Loop

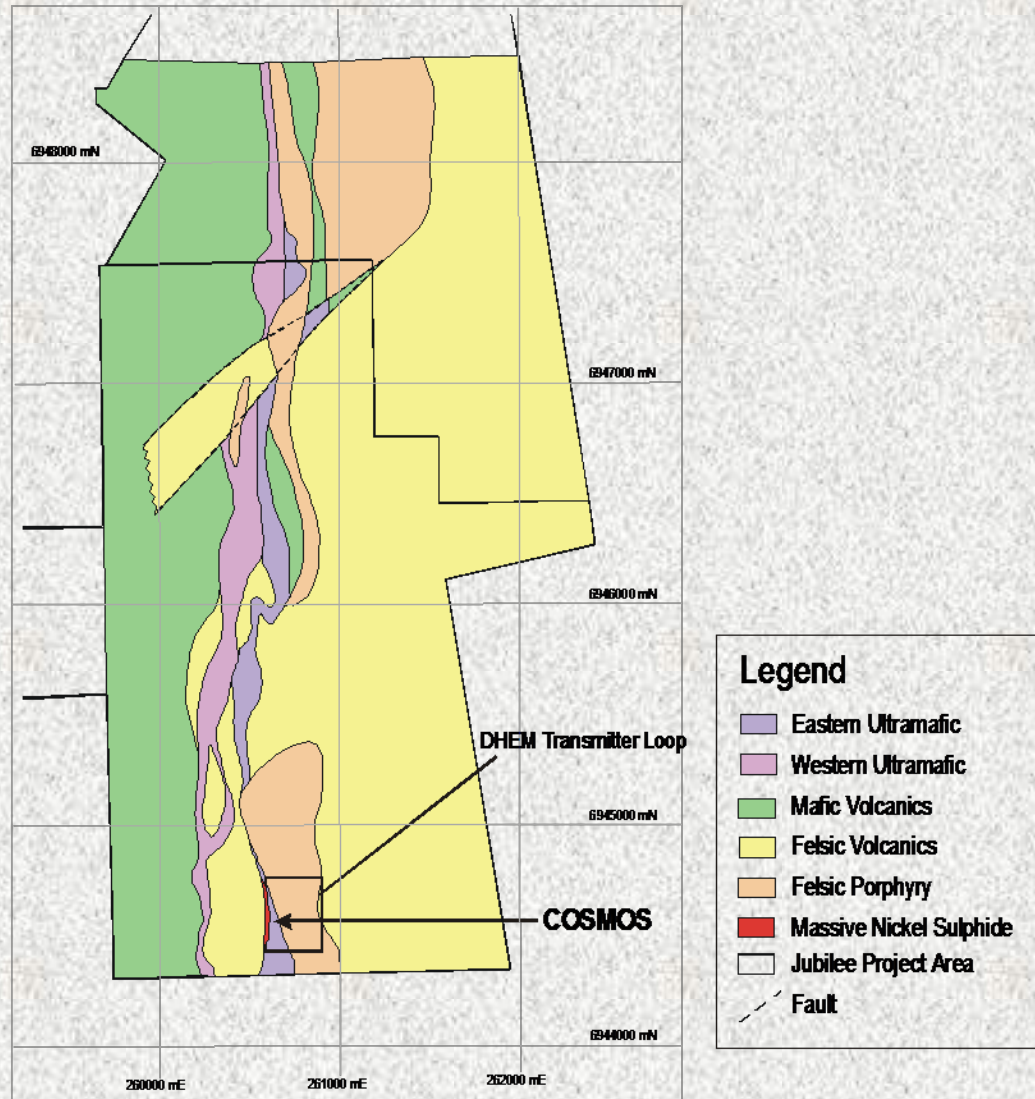


0.1ms Initial response at ~ 2msecs
0.2ms To differentiate from response at 260300, read to 5 msecs at least
0.4ms
0.6ms
0.9ms
1.3ms
2.0ms
2.4ms

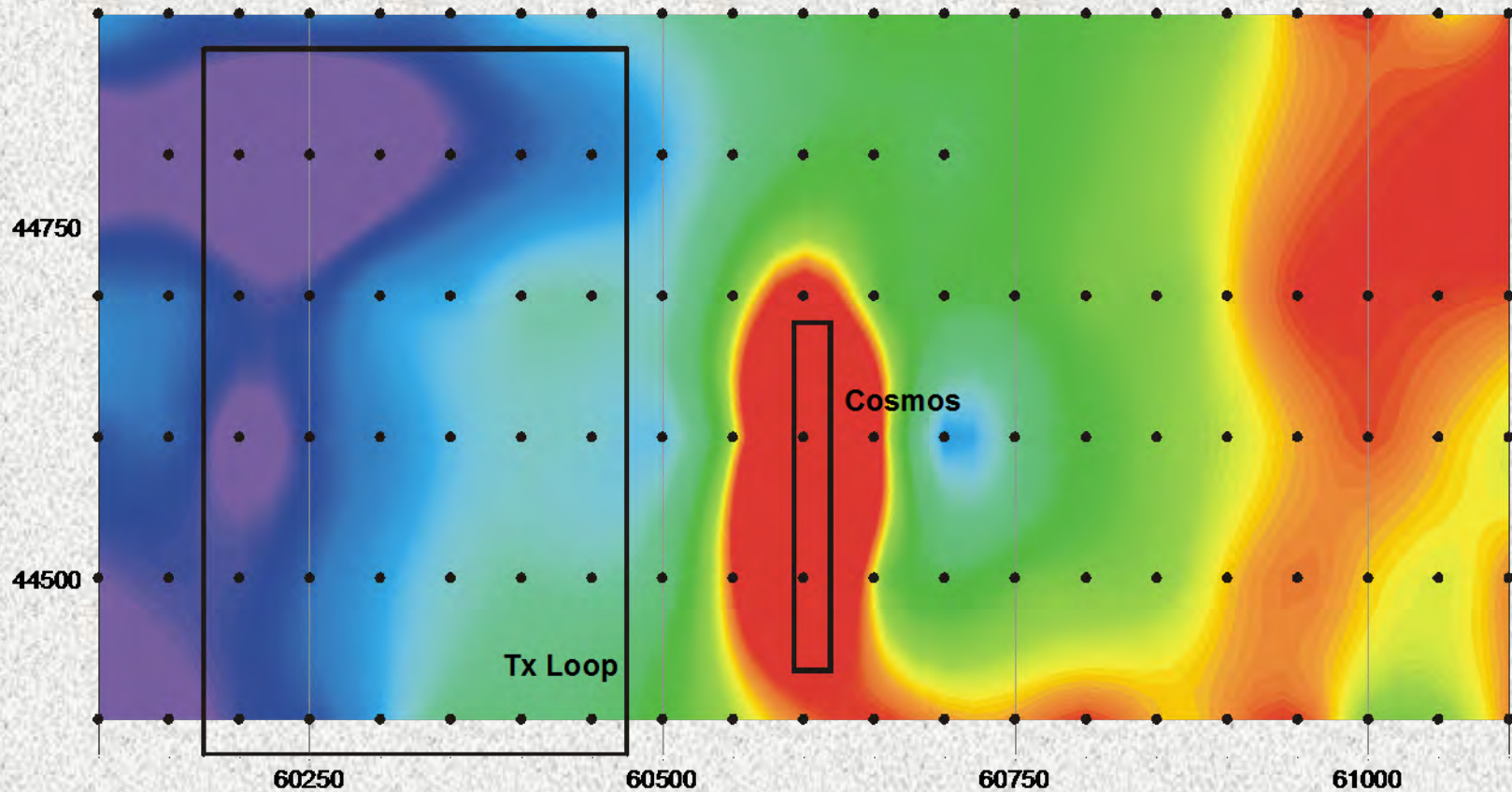
Cosmos-Tem Decay, moving 100m loop



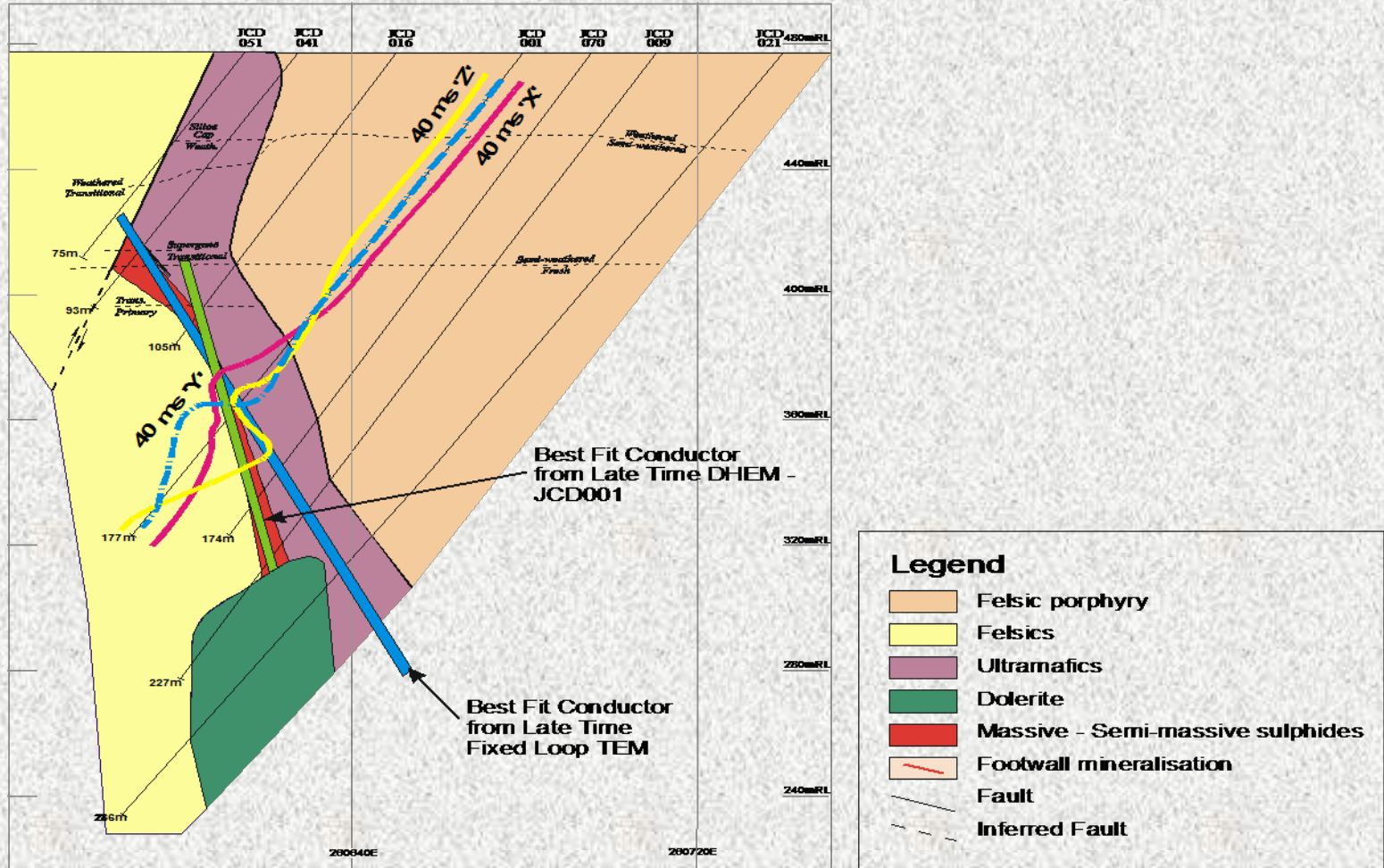
Cosmos-Fixed Loop TEM position



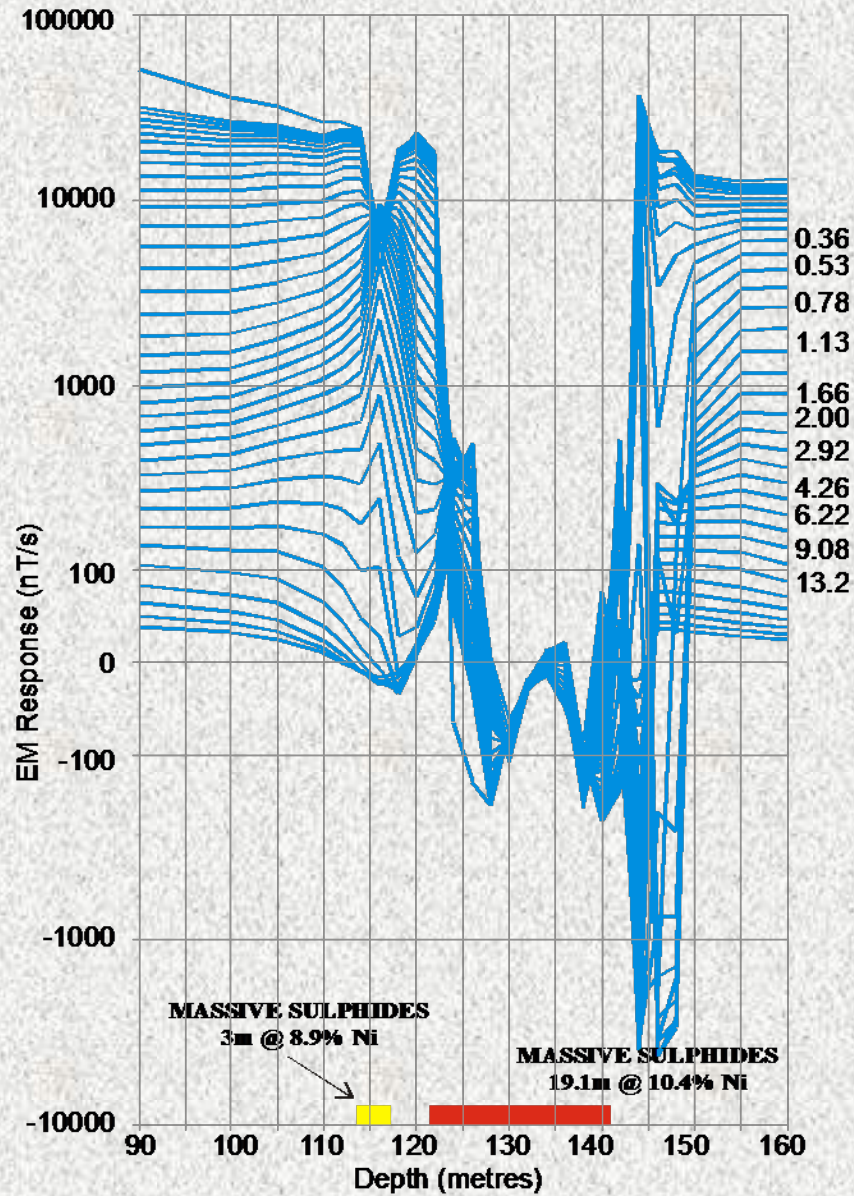
Cosmos-Fixed Loop response, X-component, channel 20 (5.8 msec)



Cosmos-Fixed Loop Interp and DHEM response sketch



Cosmos-DHTEM response



Cosmos-Conclusion (Craven, Rovira, Grammer and Styles, 2000)

“Major contribution of the geophysics has been to focus exploration quickly and accurately on the high value massive sulphide ore-body within the widespread halo of disseminated mineralisation”

Airborne EM- where were thou, where art thou?

- **Maggie Hayes North detected but not Emily Ann ?**
- **No discoveries under conductive overburden?**
 - **Too expensive, so under-utilized (?)**
 - **Inappropriate systems which do not allow adequate discrimination and signal to noise (?)**
 - *What is the next step to enable increase in TOTAL s/n ?*
- **Too hard, not economic (?)**
 - *New paradigm ?*

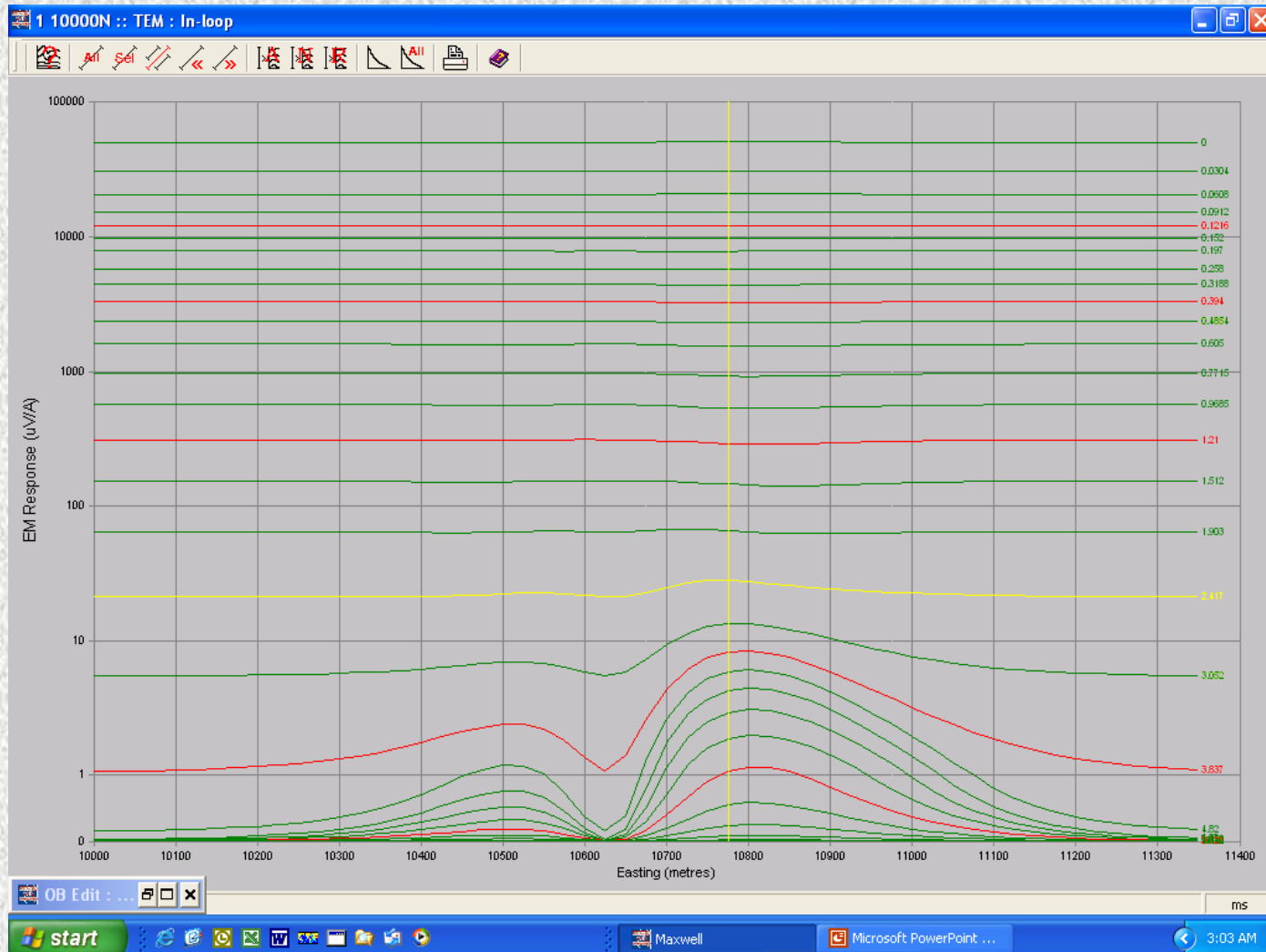
AEM Modeling, decays, Regolith Conductance ~ 10 S o/b

In Loop, simulation from 70m above ground,
10 S o/b, 100 S thin plate



AEM Modeling, profile response, Regolith Conductance ~ 10 Siemens

In Loop, simulation from 70m above ground,
10 S o/b, 100 S thin plate



Response at
~2msecs

AEM Modeling, profile response, Regolith Conductance ~ 30 Siemens o/b

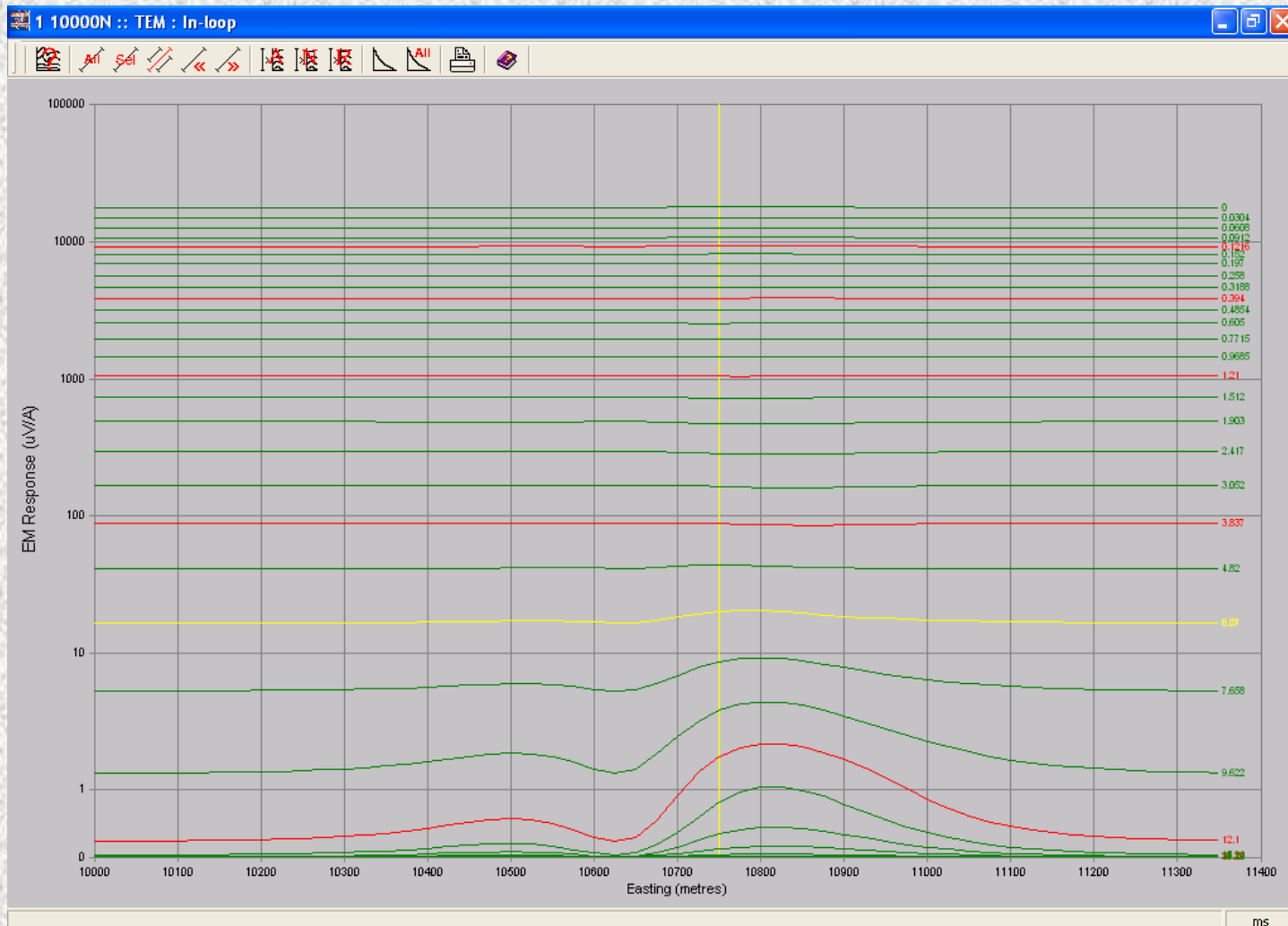
In Loop, simulation from 70m above ground,
30 S o/b, 100 S thin plate



Response at
~6msecs

AEM Modeling, profile response, Regolith Conductance ~ 30 S o/b

In Loop, simulation from 70m above ground,
30 S o/b, 100 S thin plate



Response at
~6msecs

Discovery using EM for Nickel Sulphides beneath an overburden.....the abbreviated story

- *Ground EM (TOTAL) system signal to noise has been increased by maximizing Tx moment (but not by increasing Tx loop area), increasing horizontal space and time dynamic range-resolution.*
- *Multiple turn, high current, 100 m moving Loops have been highly successful in reconnaissance ground TEM in Australia in the search for Nickel Sulphides.*
- *Multiple illuminations of possible ore positions preferred, as is enhanced horizontal resolution.*
- *In-Loop AND Slingram used together in reconnaissance are complimentary and successful.*
- *Fixed loop useful for helping resolve geometry of conductor and brownfields exploration, when lateral position of prospective horizon understood.*
- *The spate of commercial discoveries in Western Australia have been made with impulse systems.*
- *DHTEM AND surface measurements are making inroads into brownfields exploration.*
- *100% duty cycle, although being available not been used widely / not resulted in a documented discovery.*
- *Magnetic field measurements of TEM response are not in common use.*
- *Airborne EM needs careful consideration as to system design, operability and deployment.*

ACKNOWLEDGEMENTS

- Southern Geosciences-Bruce Craven, Bill Peters
- Forrestania Gold NL - Kim Robinson
- LionOre Australia Pty Ltd - Peter Buck
- QNI limited - Andrew Bailey, (now BHP Billiton)
- Billiton - Barry de Wet, (now BHP/Billiton)
- Zonge Geophysics
- Tesla-10 (now Fugro Ground Geophysics)
- Geoterrex (now Fugro Airborne Geophysics)
- World Geoscience (now Fugro Airborne Geophysics)
- Outer-Rim Exploration
- Systems Exploration-Don Emerson
- Electromagnetic Imaging Technology-Andrew Duncan
- WMC
- Geonics-Duncan McNeil