EXTENDED CONFERENCE ABSTRACTS

NEW DEVELOPMENTS IN GEOLOGY AND METALLOGENY: NORTHERN TASMAN OROGENIC ZONE

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Recent developments in the management of exploration data from North Queensland

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Since the late 1960's, mineral exploration programs have to a large extent covered the exposed portions of the basement geology of North Queensland's mineral provinces with surface sampling. In more recent times, extensive drilling programs have also investigated the covered areas adjacent to the basement blocks.

All these exploration data eventually come into the public domain, because Australia (unlike many other countries) is blessed with a mining law where this is a requirement of title. The Open File system, which releases the results of previous exploration activities, is no doubt one of the contributory factors to the enviable mineral deposit discovery rate in Australia. However, as the volume of material held in Open File records rapidly expands, the ability to interrogate efficiently by manual methods this valuable, but grossly fragmented, data source, is fast becoming impossible: Almost all of these data are still trapped as hard copy reports, on uncontrolled maps or on outdated technology such as microfiche. The open file data resource in its current form is totally inadequate for analysis by state of the art geoscientific information systems (GIS).

Although some major companies are compiling proprietary data sets, historical information is accumulating at a much greater rate than previously. Government agencies are custodians of geoscientific data, but they do not have the hands-on exploration experience, nor have they allocated serious funding to compile the historical open file data into a digital data base. Since the early 1980's, all geochemical data has left assay laboratories in digital form, but virtually no digital geochemical data has reached the open file system. Before this situation can be rectified, a structured data management system has to be in place to accept multifaceted, new and historical, exploration data.

Terra Search has researched and developed the EXPLORER II Data Management System, which utilises the power of a structured relational database, to capture, record, interrogate and visualise exploration data gleaned from historical reports. The first step in the process is the painstaking transfer of samples from uncontrolled hard copy maps to controlled drainage bases and subsequent digitising with AMG coordinates. After conversion to digital form, each sample sits in an interconnected framework accompanied by its essential attributes such as location information, sample collection methods, analytical techniques, assay data, with cross links into existing geoscientific and geographic data bases: eg. drainage bases, tenement information, regional geophysics. Examples of the relational cross links are given in Figs 1 and 3.

A comprehensive geochemical data set is being built up for the Ravenswood Block and Drummond Basin regions. To date it consists of 36,000 stream sediment, 20,000 rock chip, 80,000 soil, and 66,000 drill hole samples. As an example, Fig 2. illustrates the sample coverage in terms of bulk cyanide leach extractable gold in stream sediments (BCL's). Each one of these 14,000 plus points is able to be queried and visualised on the basis of a host of attributes; eg. element content, sampling method, tenement (EPM) number, Company Report (CR) number, date and technique of analysis, geological unit.

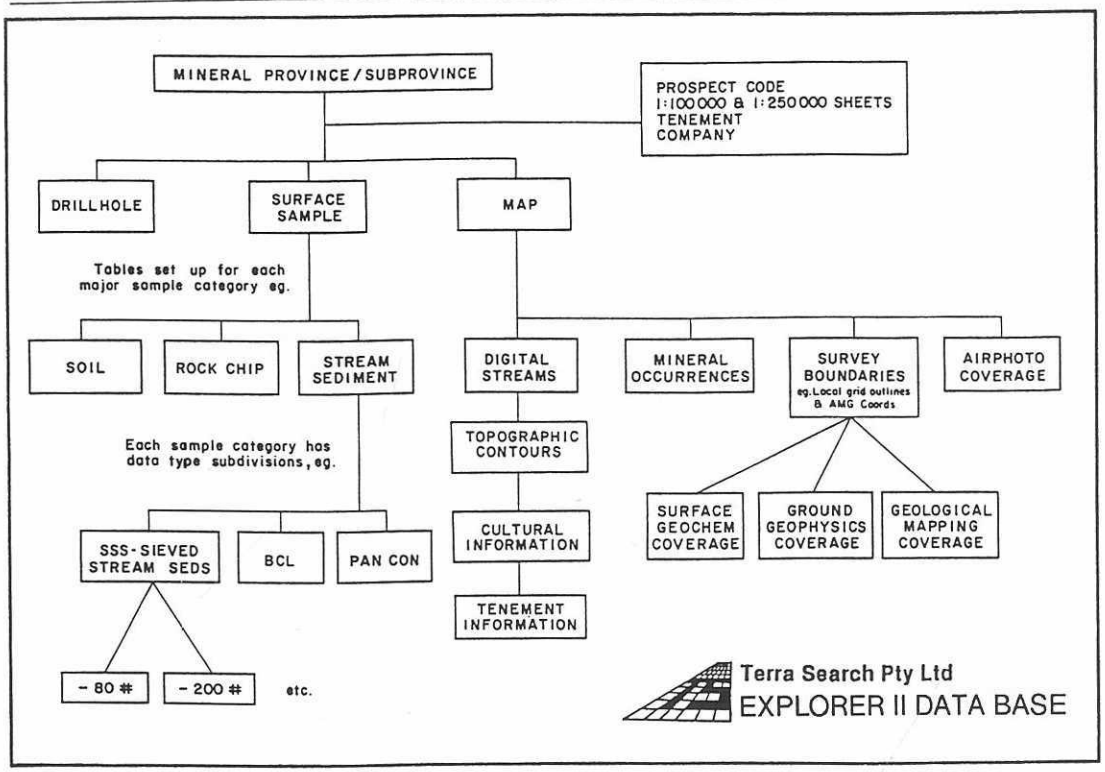

Figure 1. EXPLORER II Data Management System: Organisation Scheme for major information categories.

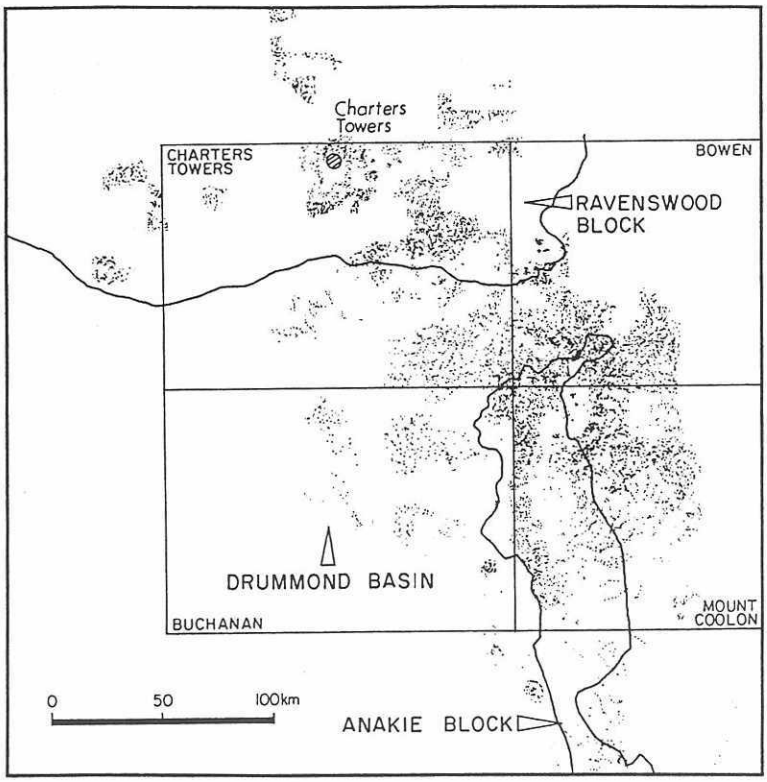

Figure 2. Distribution of BCL Stream Sediment sample data Drummond Basin and Ravenswood Block. 1:250,000 sheet boundaries shown. 14000 points plotted.

As an example, it is easy to subset the data to show all samples in relation to a particular unit eg. the Campaspe Beds, then either carry out basic statistical analysis, print out, or plot this sub-population. Alternatively, comparisons can be made between BCL samples collected with particular mesh sizes (eg. -20# compared to -9#) or those analysed by particular assay methods (eg static compared to active leach).

With drill holes, information such as bedrock lithology, depth of transported cover, pyrite content etc. are all stored and available for interpretation - see Fig 3.

Future discoveries of economic mineralisation in the out-cropping areas of North Queensland will, in most cases, result from follow-up of previously known, but incompletely evaluated, first order anomalies, or alternatively the reprocessing and reinterpretation of subtle second order anomalies. For non-outcropping areas, most future discoveries are likely to be concealed deposits, delineated by extensive bedrock drilling under cover, or blind deposits where vectors to ore are obtained by an understanding of the geochemistry of the hydrothermal system, alteration envelopes and host rocks, together with an appreciation of the nature of geochemical dispersion in the regolith.

It is therefore imperative that historical and future exploration data is properly recorded and fully utilised in order to facilitate discoveries. This requirement is accentuated by the increasing application of sampling procedures emanating from the Yilgarn Block, where CSIRO and AMIRA sponsored research has led to a greater understanding of the regolith and utilisation of innovative sampling media in mineral exploration (Anand and Smith, 1993).

Innovative developments such as partial extraction analysis (eg. BCL) or selective sampling media (eg. lateritic pisolites) have meant that raw assay numbers may no longer be directly comparable. Incorrect interpretations based on spurious comparisons are likely if vital attributes on assay techniques and sampling methods are not recorded with assay data and accessible in a structured data management environment.

Thus, as mineral exploration in North Queensland moves into the next phase of the digital age, it is important to recognise that careful documentation of sample collection methods, analytical procedures and accurate sample location will be as essential in the future as it should have been in the past.

References:

Anand, R.R. and Smith, R.E., 1993. Regolith distribution, stratigraphy and evolution in the Yilgarn Craton - implications for exploration. In: Williams P.R., and Haldane J.A., ed. *An International Conference on Crustal evolution, metallogeny and exploration of the Eastern Goldfields*. Extended Abstracts. AGSO Record 1993/54

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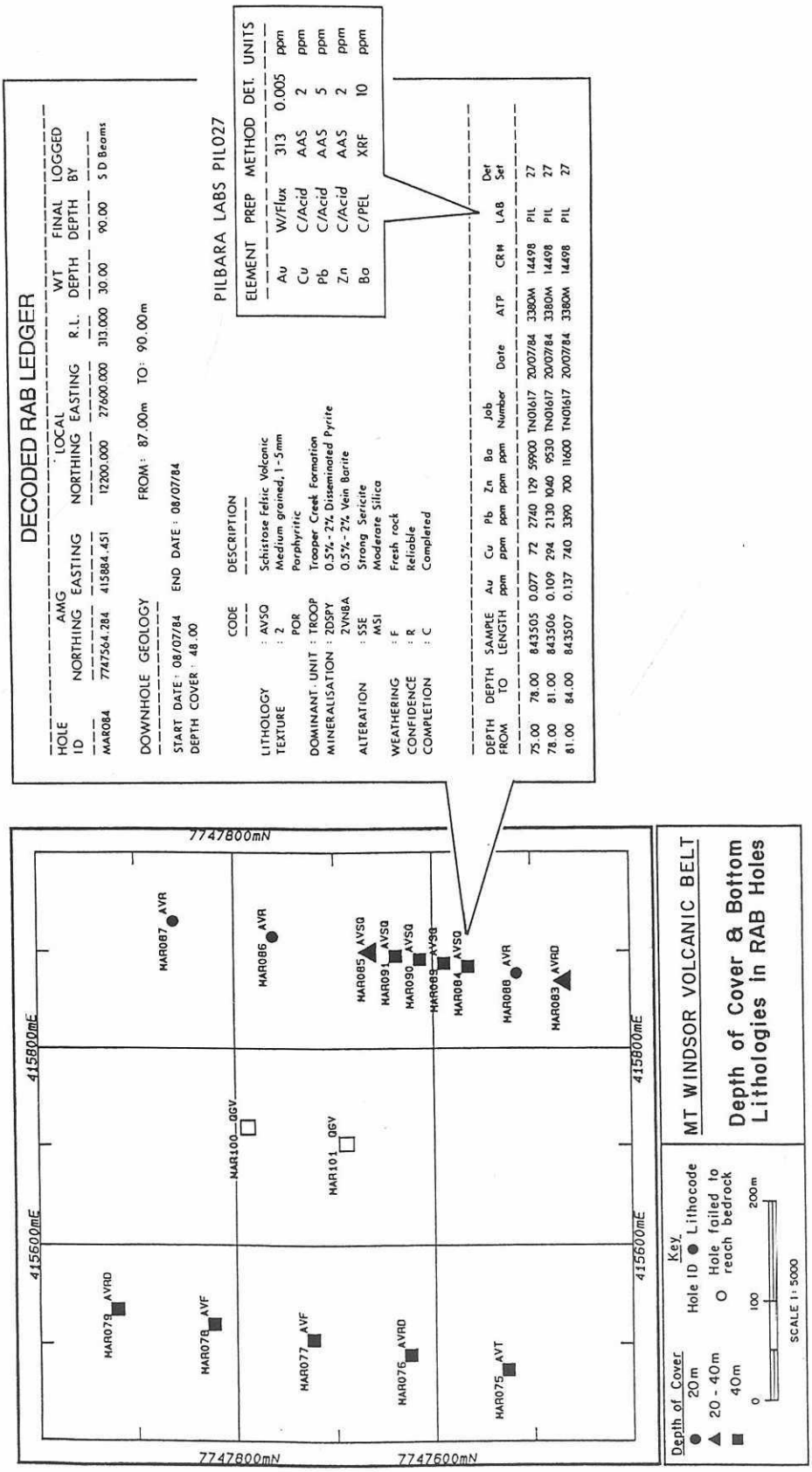

Figure 3. Illustration of various geological and geochemical attributes stored with RAB drill hole data. Decoded RAB ledger reports lithology, texture, assay, location and drill information. Plot shows depth of transported cover and lithocodes.