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DISPERSION INTO THE SOUTHERN CROSS FORMATION AROUND THE SCOTT AND CINDY LODES, PAJINGO - N.E. QUEENSLAND

I.D.M. Robertson

CRC LEME OPEN FILE REPORT 121

February 2002

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(CSIRO Exploration and Mining Report 449R/CRC LEME Report 65R, 1997.
Second impression 2002)

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CRC LEME is an unincorporated joint venture between CSIRO-Exploration & Mining, and Land & Water, The Australian National University, Curtin University of Technology, University of Adelaide, University of Canberra, Geoscience Australia, Bureau of Rural Sciences, Primary Industries and Resources SA, NSW Department of Mineral Resources-Geological Survey and Minerals Council of Australia.
Headquarters: CRC LEME c/o CSIRO Exploration and Mining, PO Box 1130, Bentley WA 6102, Australia

CSIRO/CRC LEME/AMIRA PROJECT P417
GEOCHEMICAL EXPLORATION IN REGOLITH-DOMINATED TERRAIN, NORTH QUEENSLAND 1994-1997

In 1994, CSIRO commenced a multi-client research project in regolith geology and geochemistry in North Queensland, supported by 11 mining companies, through the Australian Mineral Industries Research Association Limited (AMIRA). This research project, "Geochemical Exploration in Regolith-Dominated Terrain, North Queensland" had the aim of substantially improving geochemical methods of exploring for base metals and gold deposits under cover or obscured by deep weathering in selected areas within (a) the Mt Isa region and (b) the Charters Towers - North Drummond Basin region.

In July 1995, this project was incorporated into the research programs of CRC LEME, which provided an expanded staffing, not only from CSIRO but also from the Australian Geological Survey Organisation, University of Queensland and the Queensland Department of Minerals and Energy. The project, operated from nodes in Perth, Brisbane, Canberra and Sydney, was led by Dr R.R. Anand. It was commenced on 1st April 1994 and concluded in December 1997. The project involved regional mapping (three areas), district scale mapping (seven areas), local scale mapping (six areas), geochemical dispersion studies (fifteen sites) and geochronological studies (eleven sites). It carried the experience gained from the Yilgarn (see CRC LEME Open File Reports 1-75 and 86-112) across the continent and expanded upon it.

Although the confidentiality period of Project P417 expired in mid 2000, the reports have not been released previously. CRC LEME acknowledges the Australian Mineral Industries Research Association and CSIRO Division of Exploration and Mining for authority to publish these reports. It is intended that publication of the reports will be a substantial additional factor in transferring technology to aid the Australian mineral industry.

This report (CRC LEME Open File Report 121) is a second impression (second printing) of CSIRO, Division of Exploration and Mining Restricted Report 449R, first issued in 1997, which formed part of the CSIRO/AMIRA Project P417.

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FRONTISPIECE

Sampling at Cindy Pit

PREFACE AND EXECUTIVE SUMMARY

The CRC LEME-AMIRA Project 'Geochemical exploration in regolith-dominated terrain of North Queensland' (P417) has, as its overall aim, to substantially improve geochemical methods of exploring for base metals and gold deposits under cover or obscured by deep weathering. The research includes geochemical dispersion studies, regolith characterisation, dating of profiles and investigation of regolith evolution. This report contributes to the first two of these.

Two reports in this project investigated the regolith of the Pajingo district, an area renowned for auriferous epithermal quartz veins. The first (Campbell, 1996), dealt with district-scale regolith mapping and regolith development around Pajingo and demonstrated a complex regolith of relatively fresh Devonian volcanics and sediments on high ground, surrounded by a lower pediment of lateritised Devonian volcanics and Tertiary sediments (Southern Cross and Campaspe formations) and various more recent colluvia and alluvia.

This report covers a detailed investigation around mineralisation at the Scott and Cindy lodes. Mineralisation at Cindy was completely covered by a thick blanket of mottled grits and conglomerates of the Southern Cross Formation. At Scott, a palaeochannel, filled with grits and clays of the Southern Cross Formation, is exposed in the southern wall of the pit. Materials and data from mining and extensive drilling in the area have provided an excellent opportunity for detailed characterisation of the Southern Cross Formation, investigation of dispersion into these weathered sediments and development of a dispersion model.

Results indicate a complex pattern of palaeochannels beneath the covered areas. The clay-rich detritus, which now forms the Southern Cross Formation, was derived from several regolith horizons (lateritic residuum, saprolite and probably also fresh rock) of a deeply weathered terrain and has undergone additional weathering since deposition. High Au backgrounds occur in the Southern Cross Formation on a local scale and the background is particularly high in sediments that were formed from detritus derived from the mineralisation and its immediate environs. Gold is dispersed into these sediments at several levels, not only from economic mineralisation but also from areas of numerous, small, auriferous veins. Analysis of Southern Cross Formation sediments could be used to locate likely areas of mineralisation, where high local backgrounds and dispersions occur. Detailed drilling and accurate logging would be necessary to model dispersion patterns within the Southern Cross Formation and trace them back to mineralisation in the basement.

R. R. Anand
Project Leader

I.D.M. Robertson
Deputy Project Leader

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ABSTRACT

Epithermal quartz veins occur at Pajingo within relatively flat-lying andesites, tuffs, volcaniclastic sediments and sandstones. The host rocks are relatively fresh on the Mt Janet Range but are weathered and mottled on the surrounding pediment, where they are partly covered by Tertiary sediments (mottled Southern Cross and less weathered Campaspe formations) and by various more recent colluvia and alluvia.

The Tertiary sediments, exposed by mining of the Scott and Cindy lodes, were mapped and sampled. They consist of immature, clay-rich conglomerates and grits which have drawn their detritus from a range of levels in the regolith (fresh rock, saprolite and pisolitic material). These sediments were then further weathered (weathering of fresh rock fragments and mottling).

Geochemical backgrounds, over 1 km from known mineralisation, are slightly elevated (>30 ppb) compared to 5-10 ppb more distant. The Southern Cross Formation sediments exposed by mining at Scott Lode are all rich in Au (>100 ppb) as their detritus was largely derived from the Scott mineralisation and its environs. Local Au anomalies of >500 ppb occur near the base and well above the base of the profile. In contrast, at Cindy, the background in the Southern Cross Formation sediments is much lower, as their detritus was derived up-slope from Cindy. A localised Au anomaly (150-500 ppb) occurs near the base of a palaeochannel which drained the eastern side of the Cindy mineralisation. All this suggests mechanical Au dispersion together with dispersions in W and Mo. However, partial extraction, using water, potassium iodide and potassium cyanide, indicates that a proportion (about 18%) of the Au is now relatively soluble and has been relocated slightly by weathering.

Data from the exploration drilling were sifted and maximum and arithmetic mean Au contents in each drill intersection in the Southern Cross Formation sediments were determined and plotted for each study area. Gold is dispersed into these sediments at several levels and anomalies of 100-300 m occur not only at Scott and Cindy but also related to zones of numerous auriferous quartz veins, unrelated to economic mineralisation. It is necessary to understand the palaeotopography of the basement to interpret these anomalies.

1. INTRODUCTION

1.1 The Pajingo mineralisation

Epithermal Au mineralisation at Pajingo occurs in Devonian volcanic and volcaniclastic rocks (Bobis *et al.,* 1995; Cornwell and Teddinik, 1995). This includes the productive Scott and Cindy lodes and a number of other auriferous veins within a northwest trending zone in the Janet Range (20°32'S, 146°27'E), 53 km south-southeast of Charters Towers (Figure 1). It is part of a volcanic-hosted epithermal quartz vein system in an envelope of propylitic alteration (chlorite, illite, illite-smectite, dickite, ankerite, dolomite and siderite; Porter, 1990).

The Boomerang-shaped Scott Lode has an east to northeast strike of 560 m, a maximum width of 23 m, tapers to 4 m at each end and dips south at 70-85° (Porter, 1990). It consists of clear to milky chalcedonic and microcrystalline quartz with goethite and hematite bands. The veins have massive, crustiform, colloform, cockade, vesicular and fibrous internal fabrics which indicate multiple brecciation (hydraulic fracturing) of pre-existing material with deposition of compositionally similar silica (silica self sealing). Gold occurs as electrum (70:30 Au:Ag) with only minor supergene enrichment. The Au-Ag mineralisation is associated with Hg, As, Sb, Cu, Pb, Zn, Te, Tl, Bi, W, Ba, and F. The mineralisation is hosted by relatively flat-lying andesites, tuffs, volcaniclastics and sandstones with chloritic subvolcanic intrusives.

1.2 Local regolith setting

Campbell (1996) mapped and described in detail the areas around Pajingo (1:10 000) and Wahines Prospect (1:20 000). In summary, the basement consists of outcropping Devonian volcanics and volcaniclastic rocks which are relatively fresh or weathered to saprock in the Mt Janet Range, some 180 m above the surrounding plain. Lower down, a poorly-developed lateritic profile has formed on the volcanics with an Fe-rich, pisolitic duricrust of hematite, goethite and kaolinite with some gibbsite cementing the pisoliths.

The elevated areas of exposed basement are surrounded by a complex pediment of weathered basement, mottled, locally-derived Tertiary sediments (Southern Cross Formation) and various colluvia, scree and alluvia. Some quite large areas are masked from surface exploration by extensive depositional areas (see Figure 2 and Porter, 1990).

1.3 Climate

The climate is tropical, semi-arid with almost all rainfall (average 660 mm) falling in summer when 65% humidity is common. The maximum summer temperatures average 34°C and the average minimum winter temperature is 10°C with 35% humidity. Average annual evaporation (2200 mm) exceeds rainfall (see Parkinson, 1986; Bureau of Meteorology, 1988). The country consists of open savanna woodland and cattle grazing is the major land use.

1.4 Previous geochemical and geochronological studies at Scott Lode

An exploratory program (Elliott, 1989; Sinclair, 1989) assessed the alluvial Au potential in an area to the south and southeast of the Scott mineralisation, including the Southern Cross Formation. Several Au-rich alluvial units dip south, away from the Janet A vein roughly parallel with the palaeotopographic surface. It was concluded that Au-bearing material had been introduced into the alluvium from the Scott mineralisation for virtually the whole of the mid-Tertiary sedimentation period and Au concentrations tended to be greatest near the base of the pile. Gold seemed correlated with quartz and silicified rock.

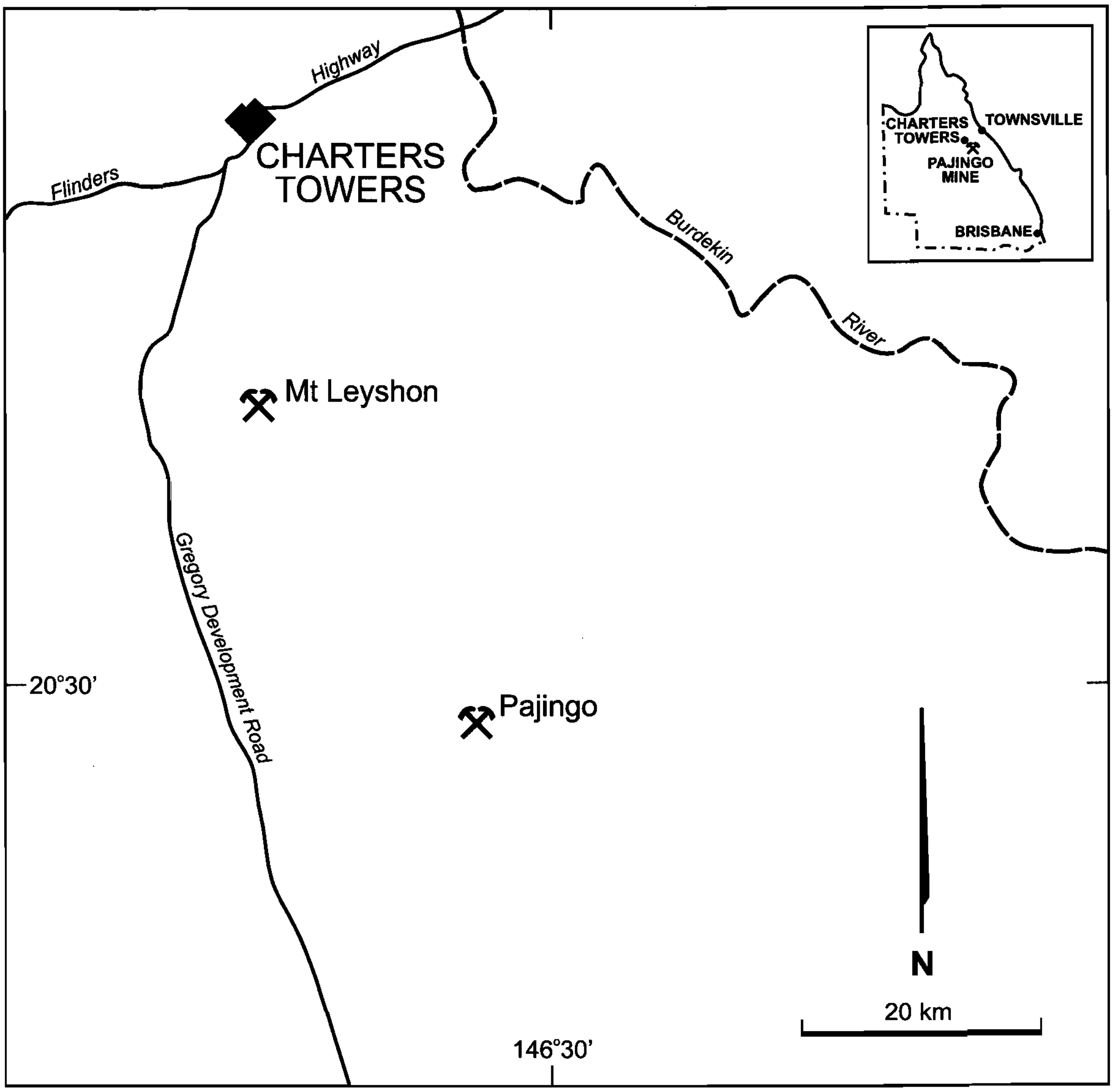

Figure 1. Location map of the Pajingo area in relation to Charters Towers and the Mt Leyshon Mine.

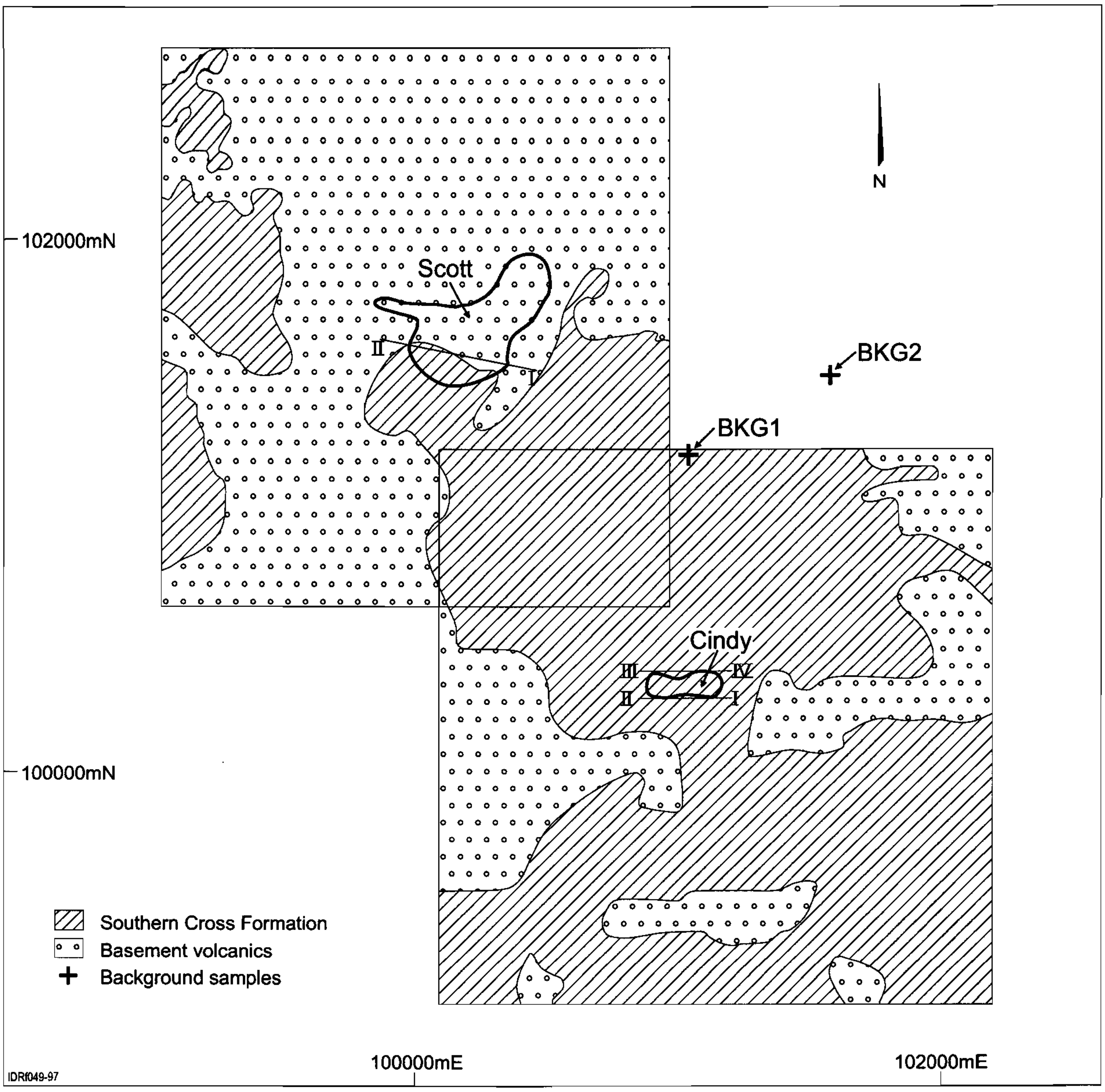

Figure 2. The slightly overlapping Scott and Cindy study areas, showing the extent of Tertiary cover, the locations of the background sampling and the pit sections of Figure 3.

A vertical profile from saprolites of the basement volcanics into the Southern Cross Formation had been sampled by Campbell (1996) at the Scott Pit. Two size fractions, a coarse fraction (>2000 μm) and a fine fraction (<100 μm) were analysed and compared. The coarse fraction was richer in Fe and Si (quartz and ferruginous fragments) and the fine fraction richer in Al and K (clay and white mica).

Discounting samples from the weathered basement, some high Au concentrations were found in the Southern Cross Formation (27-349 ppb); the fine fraction contained consistently more Au but less Sb and As. Although the Au concentrations seemed significantly anomalous, there was little reliable background abundances with which they could be compared. Preferential concentration of Au in the fine fraction was considered to indicate hydromorphic Au dispersion but sporadic peaks in W in the coarse fraction was considered to reflect detrital transport.

No minerals suitable for $^{40}Ar/^{39}Ar$ dating were found in the Southern Cross Formation at Scott Pit. However, ages from the weathered volcanics, ranging from 3.9 Ma at the bottom of the pit to 16.2 Ma at the top were obtained by Vasconcelos (1998). This suggests downward progression of the weathering front from the early Miocene to the mid Pliocene.

1.5 Work program

In view of the above investigations and the outcomes of the Sponsors' field visit to the Pajingo area (Scott *et al.*, 1996) it was clear that a detailed geochemical investigation of the Southern Cross Formation, overlying or partly overlying the Scott and Cindy mineralisations, was required.

- Several vertical profiles were to be sampled at the Scott and Cindy lodes to include as much of the Southern Cross Formation as could be reached safely.
- A palaeotopographic model of the top of the basement was to be constructed from exploration drilling and pit logging.
- A dispersion model for Au (and any other elements) from the mineralisation into the Southern Cross Formation was to be constructed using assays of exploration drill cuttings and from analytical data (CRC LEME and company exploration), to determine the nature and extents of the dispersions.
- Partial Au extraction, using a range of extractants, was to be used on at least one profile to determine the solubility of the Au.

To accomplish this:-

1. Two sites of natural exposure, distant from known mineralisation (Figure 2), were sampled to establish geochemical background.
2. Five profiles through the Southern Cross Formation were sampled at Scott Lode and eight at Cindy (Figure 3).
3. Databases of previous exploration and near-mine drilling were obtained relevant for within 1 km of each mine site. This was examined to provide:-

    (i) Drill collar information from which a topographic contour map was produced. This was used to show dispersion directions from the exposed Palaeozoic basement into the sedimentary depositories.

(ii) Drilling information from within the sedimentary basins was selected and the RL (relative level) of the unconformity between basement and Tertiary sediments was obtained where clearly logged. Contours of this unconformity, combined with the topography of the exposed basement, were used to provide additional information as to probable surface and subsurface mechanical dispersion directions.

(iii) The maximum and mean Au content of the Tertiary sediments in each drill intersection were used to illustrate Au dispersion into the sediments from known mineralisation.

4. Partial extractions with water, potassium iodide and potassium cyanide were compared with the instrumental neutron activation analyses (INAA) of profiles V3-V4 at Scott Pit to determine the Au solubility.

Details of the study methods are given in Appendix 1, data in Appendix 2, analytical standards in Appendix 3 and digital data in Appendix 4.

2. GEOLOGY OF THE TERTIARY SEDIMENTS AT SCOTT AND CINDY PITS

The pit faces were photographed and photo-mosaics were constructed. After pit sampling and logging of the profiles, the intervening pit faces were sketched and the geology was interpolated between profiles from the photographs. The resultant 'photogeological map' is given in Figure 3.

2.1 Scott

A synoptic view of the geology of the relevant part of the pit faces and the locations of the sampled profiles is given in Figure 3A. Logs and geochemical profiles are shown in Figure 4. Details of parts of the face are shown in Figures 5A-H. The edge of an arcuate channel, situated to the south of the pit, cuts into its south face. The western edge of the channel has a footwall of mottled saprolite. Here, the base of the channel consists of dark, red-brown, imbricate mottles which are embedded in a small amount of white, kaolinitic clay and were probably winnowed from detritus generated from material similar to that of the mottled zone below (Figure 5H). Some large boulders occur at the base of the channel (Figure 5G). This coarse facies is restricted to the steep slope at the channel edge. The remainder of the base of the channel consists of mottled gritty clays overlain by a thin layer (2-3 m) of gravels, set in a clay matrix. This is overlain successively by a wedge-shaped mass of red-brown clays, rich in white, branching, 'root'-like[1] kaolinitic megamottles (Figures 5C and D), and by a thicker mass (>10 m) of mottled, gravelly sediments (Figures 5A, B and F).

2.2 Cindy

The northern and southern faces of the Cindy Pit are shown in Figures 3C and B respectively together with the locations of the sampled profiles. Profiles S2, S3, S5 and S6 have been logged and sampled in detail (Figure 6). The southern, or up-slope pit face (Figure 3B) consists of a thick but continuous overlay of Tertiary sediments, resting on saprolite and mottled saprolite of the basement volcanics, with a thin conglomerate (1 m) at the base, alternating with slightly thicker gritty layers (2-3 m) (Figures 7A and C). The top part consists of mottled materials which were not accessible.

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[1]The likeness of the overall morphology of these mottles to root structures is particularly compelling (Figure 5E). It seems that bleaching of the red, ferruginous clays has occurred around roots, possibly related to excretion of CO_2. Some of these white mottles had a central void (Figure 5C, D) and some were complete with a root (Figure 5D). Although it is possible that roots followed existing weak structures, it is also likely that pre-existing rhizomorphs have been used repeatedly due to the soft clays they contain, progressively enhancing the extent of bleaching and the size of the mottle.

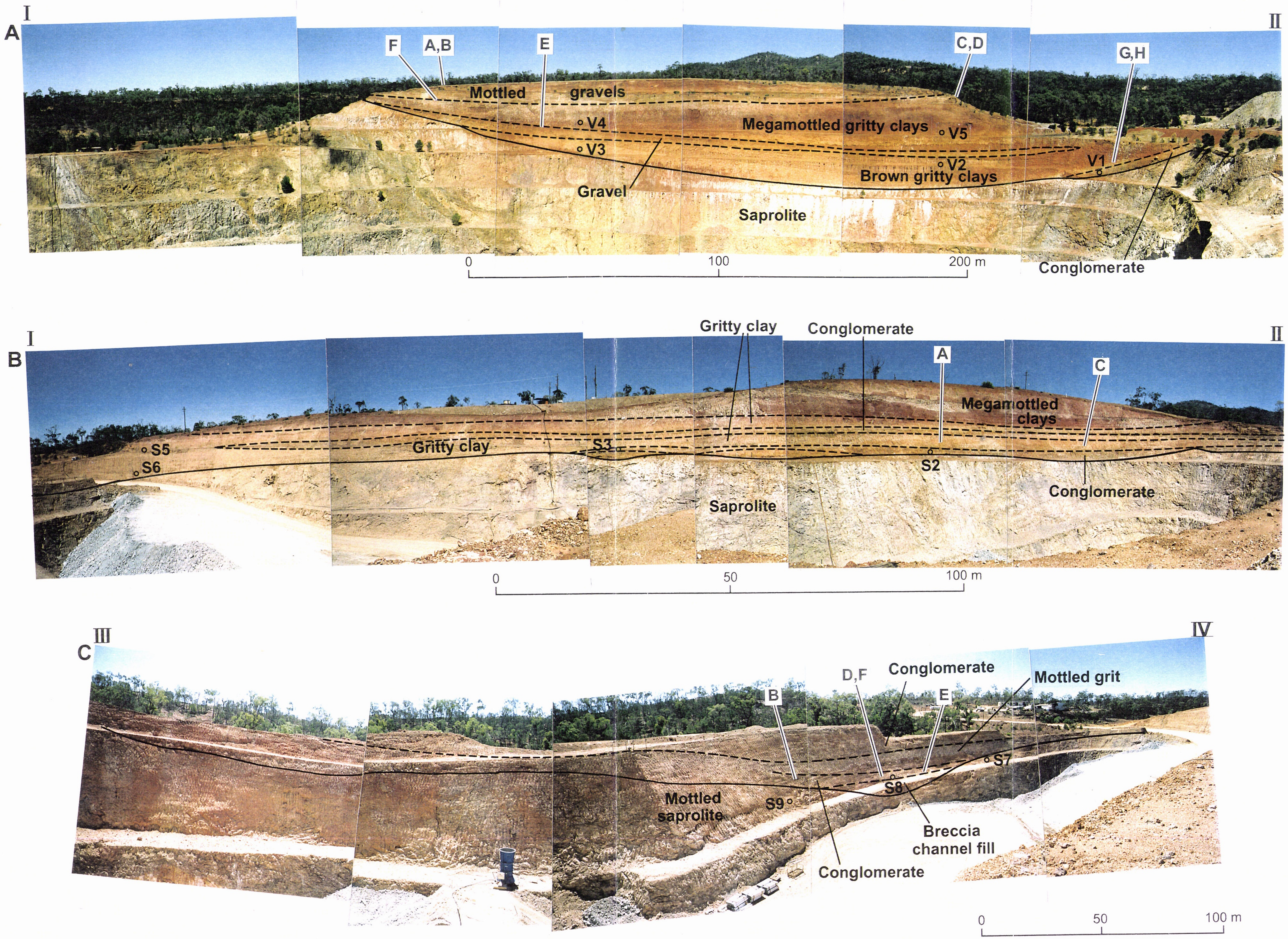


Figure 3. Photomozaics of exposure of the Tertiary sediments at the Scott Pit (A) and the Cindy Pit (B - scuth face and C - north face). The locations of the bases of the sampled profiles are shown (V1-5 at Scott and S2-9 at Cindy). Locations of detailed photographs in Figures 5A-H for Scott and Figures 7A-H for Cindy are also shown. See Figure 2 for the locations of these photomozaics.

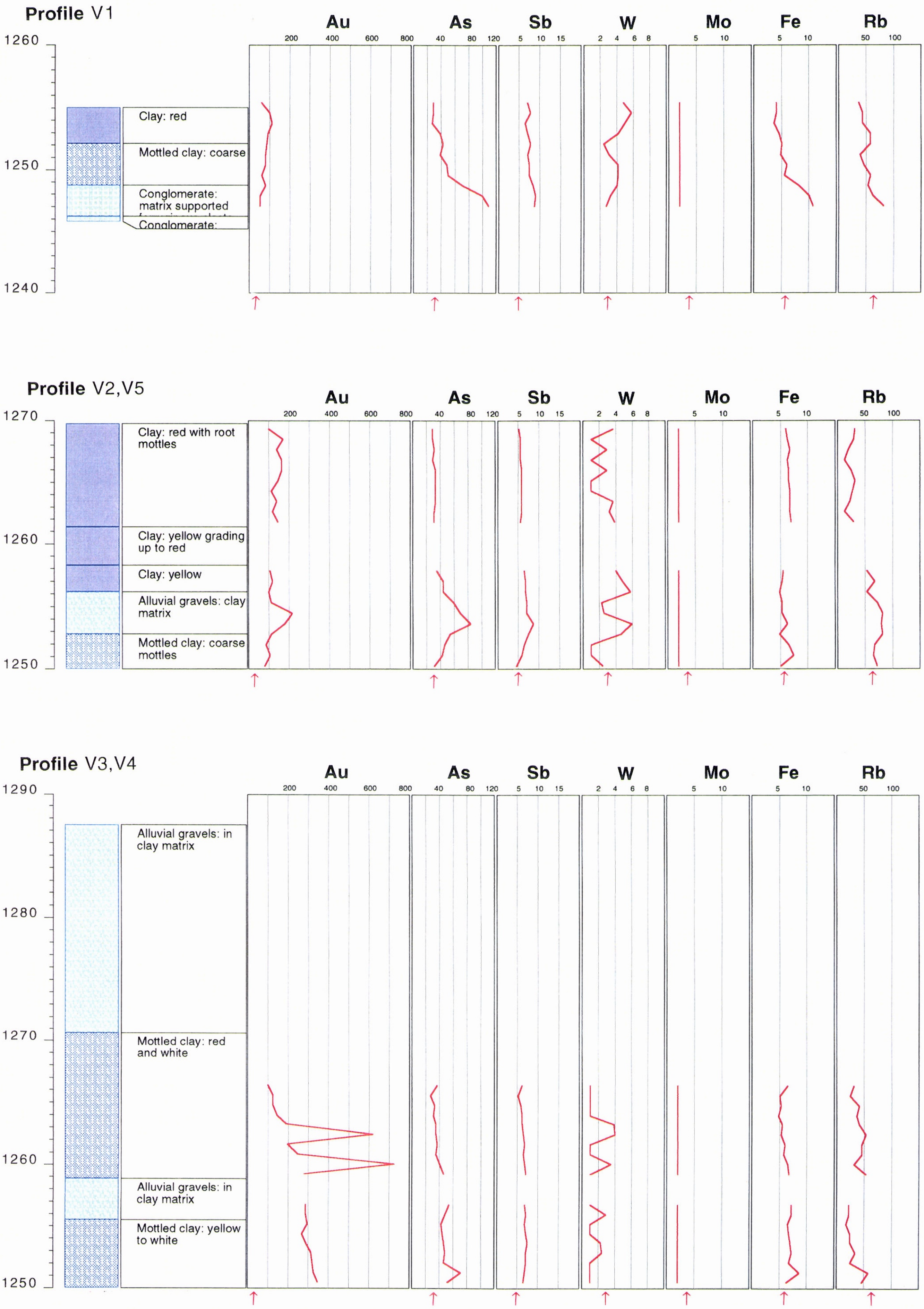


Figure 4. Profile logs and geochemistry at Scott Pit. For locations of the profiles, see Figure 3A. Red arrows indicate typical local background concentrations.

FIGURE 5

Details of exposures in Scott Pit
See Figure 3A for locations

A Fragments of saprolite (SP) and ferruginous saprolite (FS) of volcanic rocks and quartz in a mottled gritty matrix (MX). Upper, eastern part of exposure.

B Strongly mottled grits from the upper, eastern part of the exposure. The mottling (MT) is due both to red-brown hematite (HM) and khaki-yellow goethite (GT).

C Details of rhizomorphic bleaching (RB) of a hematite (HM) and goethite-stained (GT) grit from the upper, western part of the exposure.

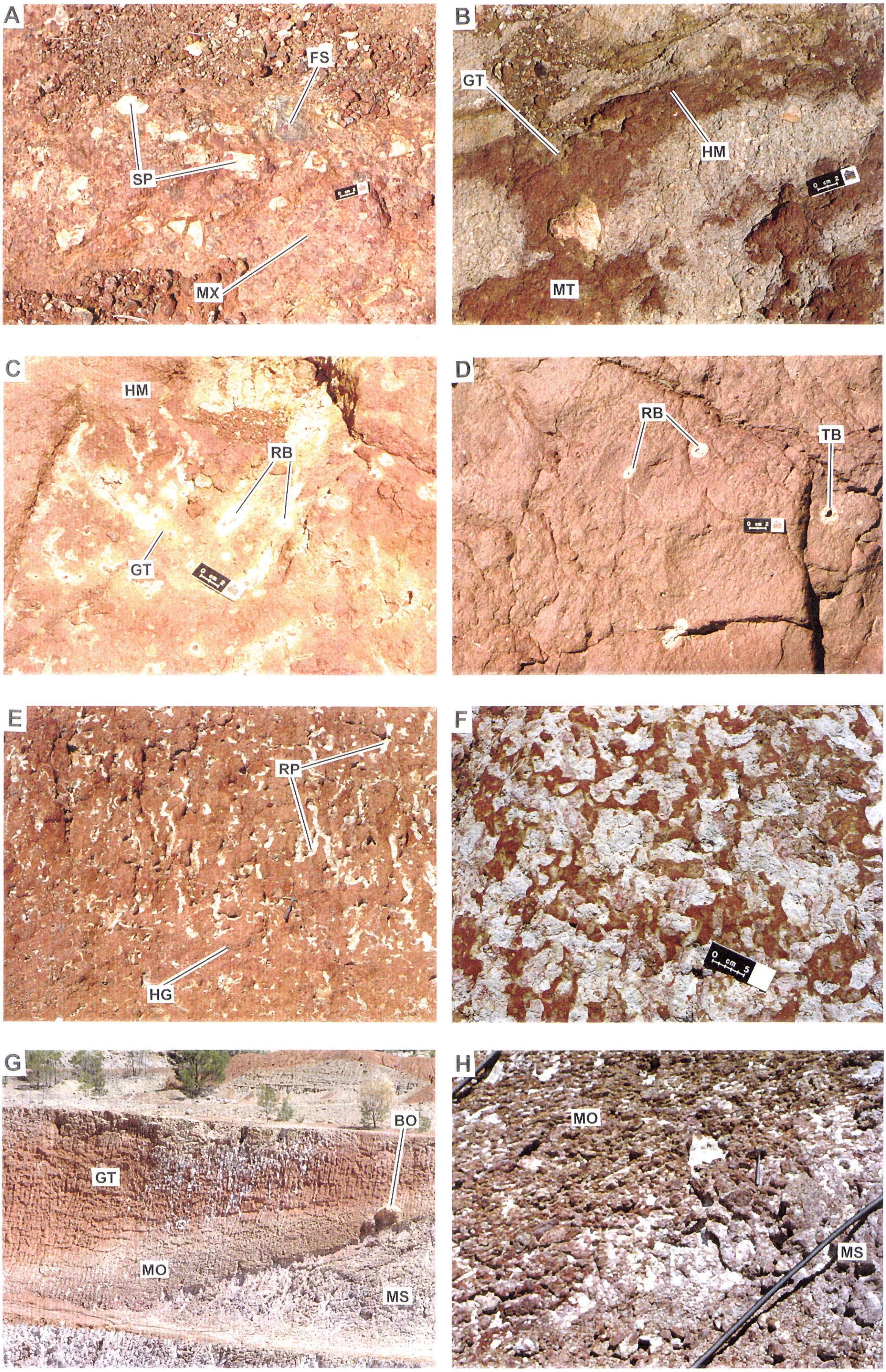
D Localised bleaching (RB) around root tubules in a red, hematite-stained grit. The central tubule (TB), once occupied by a root, is clearly visible. Upper, western part of the exposure.

E Large rhizomorphic bleached patches (RP) in brown, hematite-stained fine-grained grits (HG) from deep in the profile near profile RVS 4. Middle eastern part of the exposure. Hammer as scale.

F Coarse mottles near upper, eastern part of the exposure developed in a coarse-grained immature sediment mottled with hematite and goethite. Compare to Figure 5B

G Base of the Tertiary at the western end of the exposure. The Tertiary rests on mottled saprolite (MS) and the contact slopes steeply to the east. The basal part consists largely of mottles (MO) separated from the underlying saprolite and passes upwards into mottled grits (GT). Some large boulders (BO) lie on the basal contact. See Figure 5H for detail of the contact.

H Detail of the contact in Figure 5G. The base of the Tertiary consists of an imbricate structure of hardened mottles (MO), presumably derived from the basement, which lies on a mottled saprolite (MS) of deeply weathered volcanic material. The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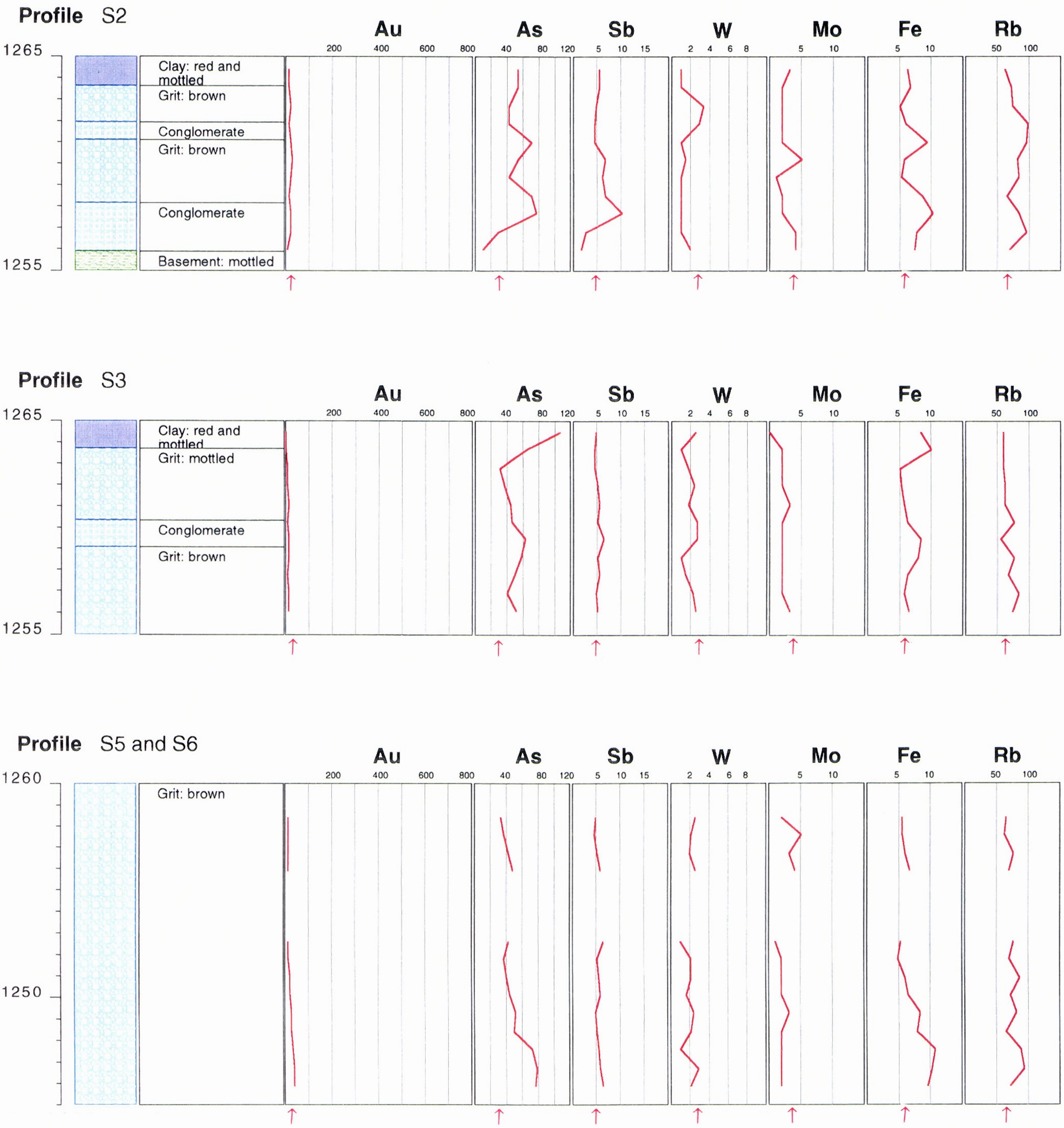


Figure 6. Profile logs and geochemistry at Cindy Pit. For locations of the profiles, see Figures 3B and C. Red arrows indicate typical local background concentrations.

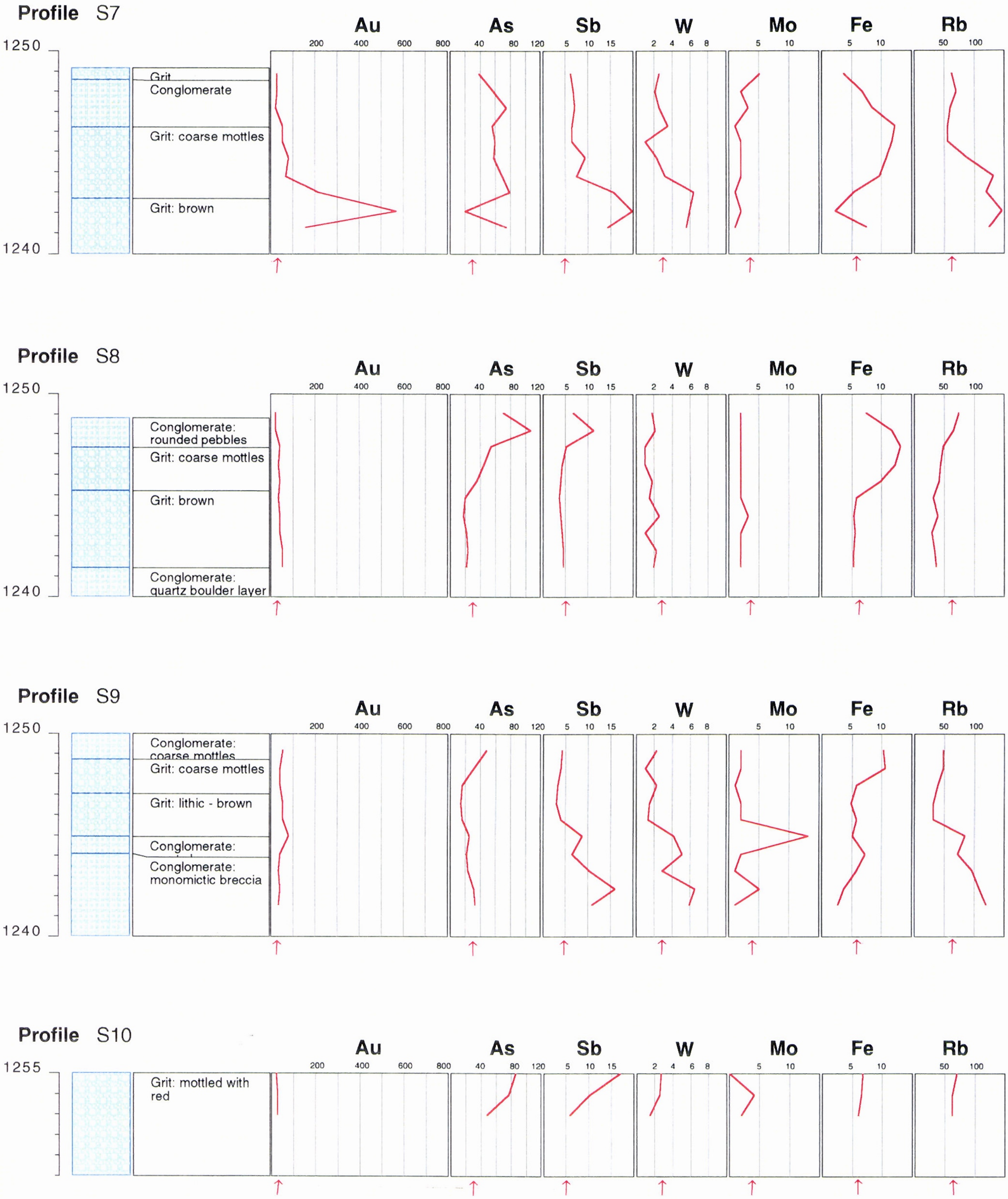


Figure 6 (cont'd). Profile logs and geochemistry at Cindy Pit. For locations of the profiles, see Figures 3B and C. Red arrows indicate typical local background concentrations.

FIGURE 7

Details of exposures at Cindy Pit

See Figures 3 B and C for locations

A Sampled profile S2 passing upwards from mottled saprolite of basement rocks (MS), through a basal gravel (BG), into grit (GT) and mottled grit (MG). An upper layer of coarse sediments (CG) is succeeded by red, mottled clay-rich grits (MG).

B Sampled profile S9. Mottled saprolites of the basement (MS) have an irregular contact with the Tertiary sediments. The base of the sediments consist of a monomictic breccia (MB) of volcanic fragments. This passes upwards into a conglomerate containing fragments of weathered quartz vein (QC) and into grits (GT) and mottled grits (MG).

C Basal gravelly grits of the south-western end of the pit. Rude layering in the grits is clearly apparent.

D Detail of monomictic breccia (MB) at base of Tertiary at base of channel on the north side of the pit. Cracks in the fragments and the complete matrix (MX) is stained with hematite.

E Detail of matrix-supported quartz vein conglomerate (QC) near base of Tertiary overlain by gritty sediments (GT).

F Detail of matrix-supported quartz vein conglomerate (QC) with fragments of ferruginous saprolite (FS) from near the base of the Tertiary.

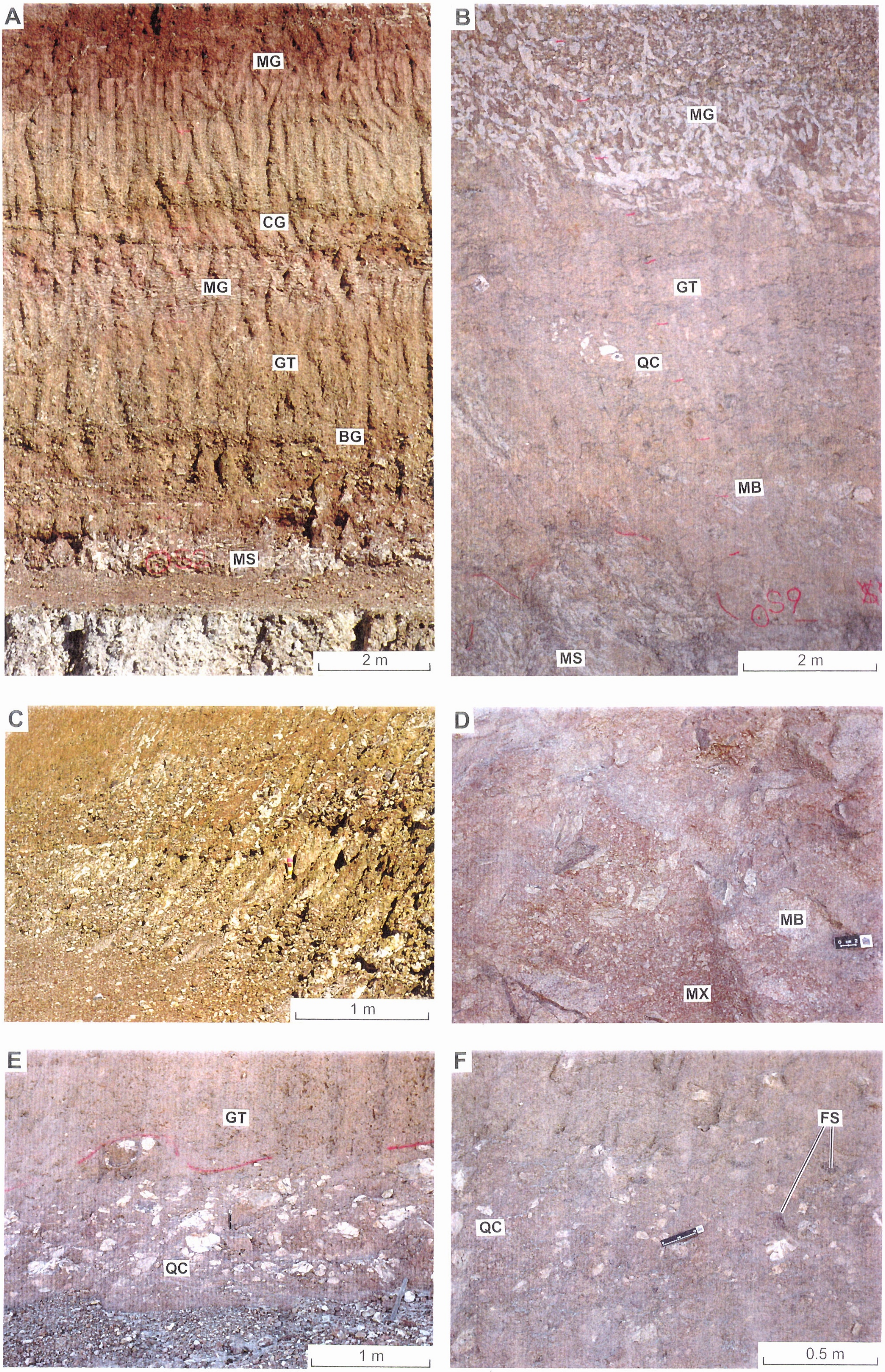

A
MG
CG
MG
GT
BG
MS
2 m
B
MG
GT
QC
MB
MS
2 m
C
1 m
D
MB
MX
E
GT
QC
1 m
F
FS
QC
0.5 m

FIGURE 8

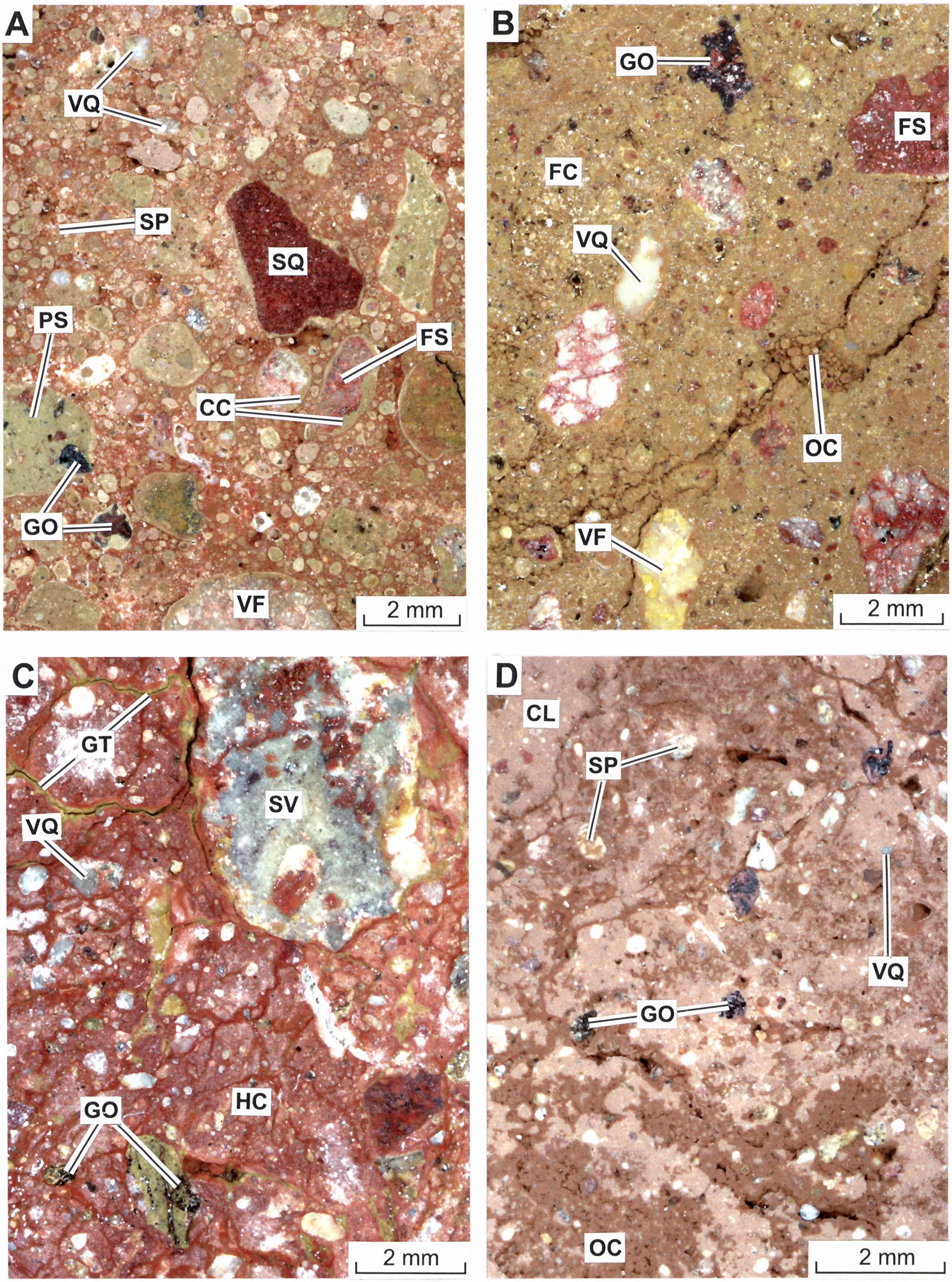
Details of Tertiary sediments from Cindy and Scott Pits

A. This clast supported grit consists of (i) saprolites of volcanic fragments (now kaolinised feldspar and quartz, VF), weathered, yellow-brown ferruginous saprolite (FS), vein quartz (VQ), sugary quartz cemented by goethite (SQ) and black, massive goethite (GO) all enclosed by a thin, khaki-yellow ferruginised clay cutan (CC) and, (ii) pisoliths (PS) consisting of many of the above fragments matrix-supported in the same khaki-yellow ferruginised clay. All these form a clast-supported grit of smaller pisoliths (SP) and ooliths cemented by a very small amount of hematitic cement (mottled). Close-up photograph of specimen RCS 9007 in oblique reflected light, Cindy Pit north side.

B. A matrix supported grit of uncoated or only very thinly coated subangular clasts of saprolites (VF) and ferruginous saprolites (FS) of volcanics and vein quartz (VQ) with minor goethite fragments (GO). This is matrix-supported in a khaki-yellow ferruginous clay (FC) and fine quartz. Voids and cracks in the silty grit are filled with ooliths of ferruginous clay (OC). Close-up photograph of specimen 9006 in oblique reflected light, Cindy pit north side.

C. A coarse polymictic grit consisting of subrounded to subangular saprolitic fragments of volcanic materials (SV), vein quartz (VQ) and minor goethite fragments (GO), set an a dominant matrix of pinkish hematitic clay (HC). The clay has cracked and the hematite on the edges of the cracks has hydrated to khaki-yellow goethite (GT). Close-up photograph of specimen RVS 2002 in oblique reflected light, Scott Pit.

D. A relatively fine-grained, silty material with a matrix of brown, slightly cracked kaolinitic clay (CL). This is set with a few small fragments of vein quartz (VQ), saprolite (SP), ferruginous saprolite and goethite granules (GO). Where the matrix is cracked, the edges are deeper brown and is composed of clay ooliths (OC). Close-up photograph of specimen RVS 5010 in oblique reflected light, Scott Pit.


A
VQ
SP
SQ
PS
FS
CC
GO
VF
2 mm
B
GO
FS
FC
VQ
OC
VF
2 mm
C
GT
VQ
SV
GO
HC
2 mm
D
CL
SP
VQ
GO
OC
2 mm

The unconformity in the northern face (Figure 3C) is generally lower than that of the southern face and is inclined towards the east-central part of the pit, where a marked low point occurs, probably representing a channel or point of drainage from the pit area, prior to Tertiary sedimentation. The base of this channel consists of a coarse breccia of volcanic fragments (Figure 7D) resting on mottled saprolite. Above this, fragments of vein quartz are common in a deeply weathered conglomerate (Figures 7E and F) and higher still are slightly to mega-mottled grits and megamottled conglomerates (Figure 7B) near the base of which lies a Mo-anomalous conglomerate of angular, weathered quartz vein fragments. Profiles S7, S8, S9 and S10 have been logged and sampled in detail (Figure 6).

3. PETROLOGY OF TERTIARY SEDIMENTS AT SCOTT AND CINDY PITS

A suite of reference samples, taken from the geochemical study, were examined microscopically (see Appendix 1). Equivalent pulps were examined by XRD. All the sediments, including the 'clays', have a gritty matrix (Figures 8A-D) consisting of subrounded to subangular fragments of vein quartz and deeply weathered saprolites of volcanic and volcanosedimentary rocks, ferruginous saprolites and goethite nodules. Some clasts are coated with a thin cutan of khaki-yellow, goethite-stained kaolinitic clay (Figure 8A). Other fragments are pisolitic (Figure 8A) and are composed of goethite-stained kaolinite and small quartz fragments, representing either reworked sediments or deeply-weathered, fine-grained volcanic materials. The matrix of these complex sediments is fine-grained quartz and clay. The sediments, particularly those from Scott Pit, are slightly mottled with hematite (Figures 8C, D), in places, and the matrix is cracked; the clays along these cracks have broken down into very small oolitic structures (Figures 8B and D) and some show hydration of hematite to goethite (Figure 8C). The coarser versions of these sediments contain larger, mottled, saprolitic volcanic clasts (Figure 8C) with perfectly preserved feldspar fabrics, now kaolinite. The ratio of clasts to matrix varies, so that some are matrix supported (Figures 8B and D) and some tend to be clast supported (Figure 8A).

Their poorly-sorted nature and the variety of regolith materials they contain indicate very immature sediments which have been derived from a variety of regolith horizons (fresh rock to lateritic residuum). Preservation of volcanic feldspar fabrics in some clasts suggest that a few were essentially fresh at sedimentation as it is unlikely that kaolinitic pseudomorphs after feldspar would have survived transport. Complete conversion of volcanic feldspar fabrics to kaolinite suggests intense, continued weathering of these materials after sedimentation.

4. TOPOLOGY OF AREAS AROUND THE SCOTT AND CINDY LODES

Databases of exploration and near mine drilling, from within 1 km of each mine site, provided (i) drill collar coordinates for a topographic map to show likely dispersion directions from the exposed Palaeozoic basement into the depositional areas and (ii) RLs of the unconformity between basement and Tertiary sediments which, when combined with the topography of the exposed basement, provided likely subsurface mechanical dispersion directions.

4.1 Topography

The extensive surveyed drilling in the area provided an opportunity to construct a local topographic map from drill collar elevations. To this was added the pit outlines and areas of known Tertiary cover. At Scott Pit there is a topographic high to the southwest and a modern valley draining the deposit to the northeast. The main areas of Tertiary cover are in the southeast and along the western edge (Figure 9A).

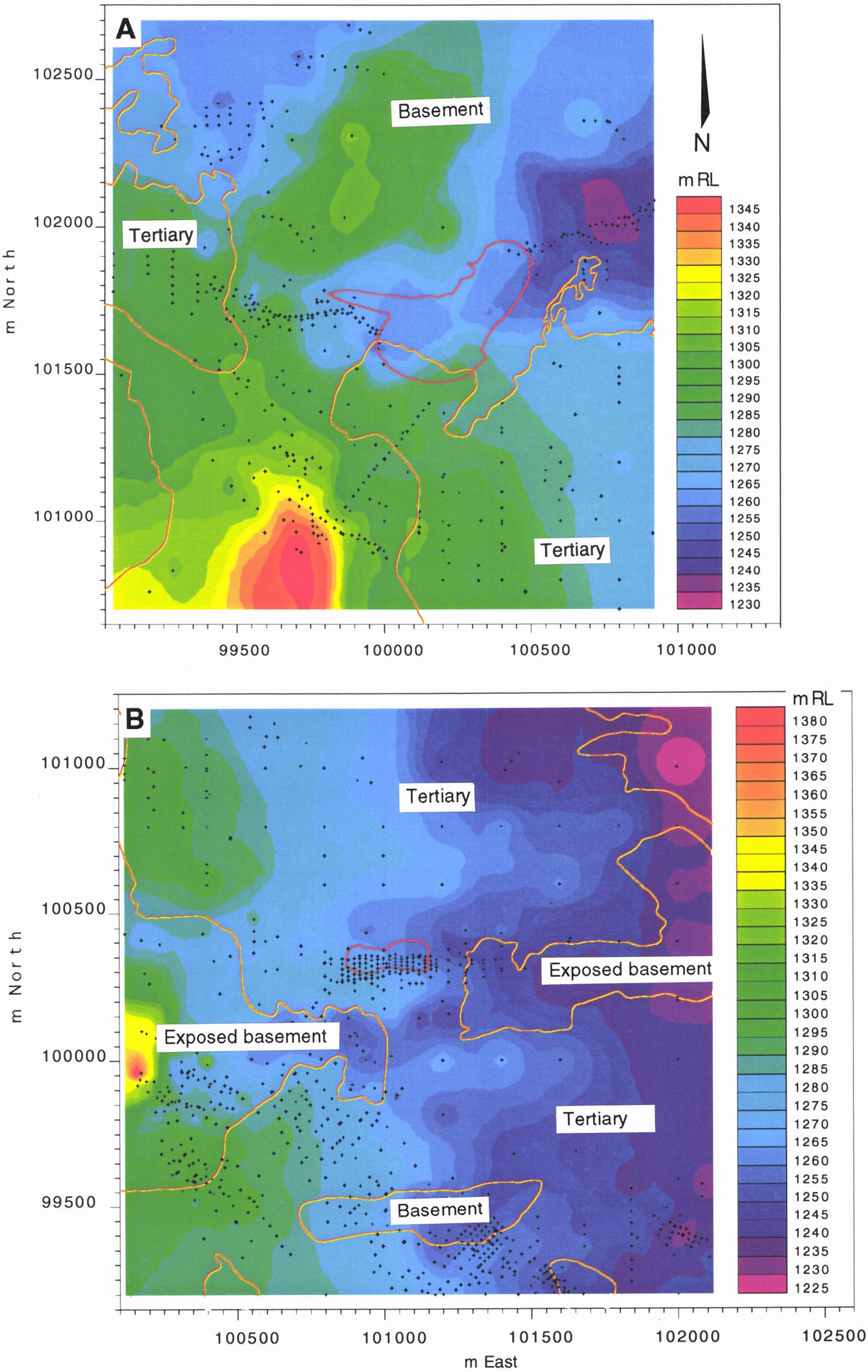


Figure 9. Topography natural surface of Scott (A) and Cindy (B) study areas from contouring of drill collar heights. Pits shown in red and surveyed drill holes as +.

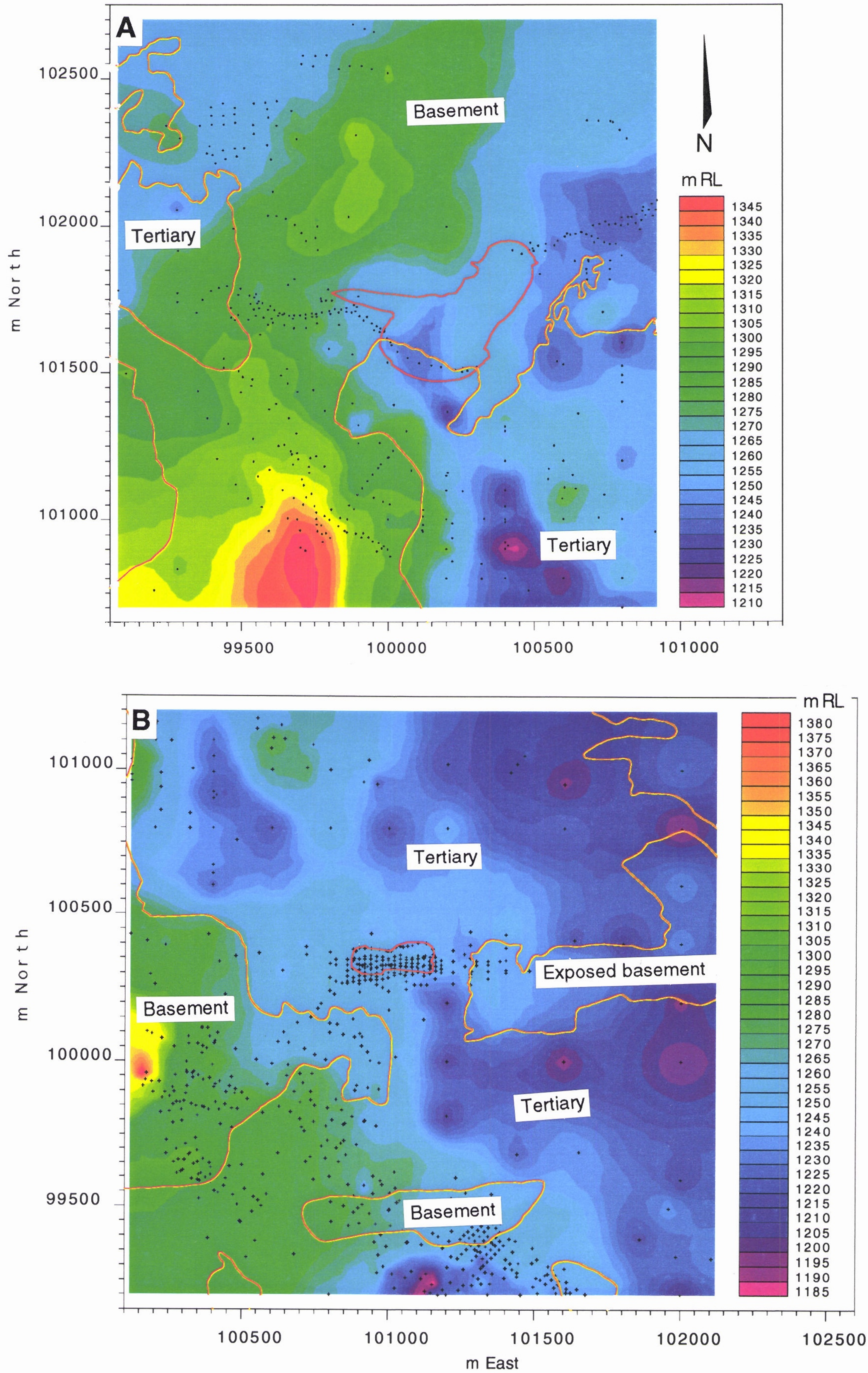


Figure 10. Contouring of basement-Tertiary unconformity under covered areas and natural surface in exposed areas at Scott (A) and Cindy (B) study areas. Pits shown in red and surveyed drill holes as +.

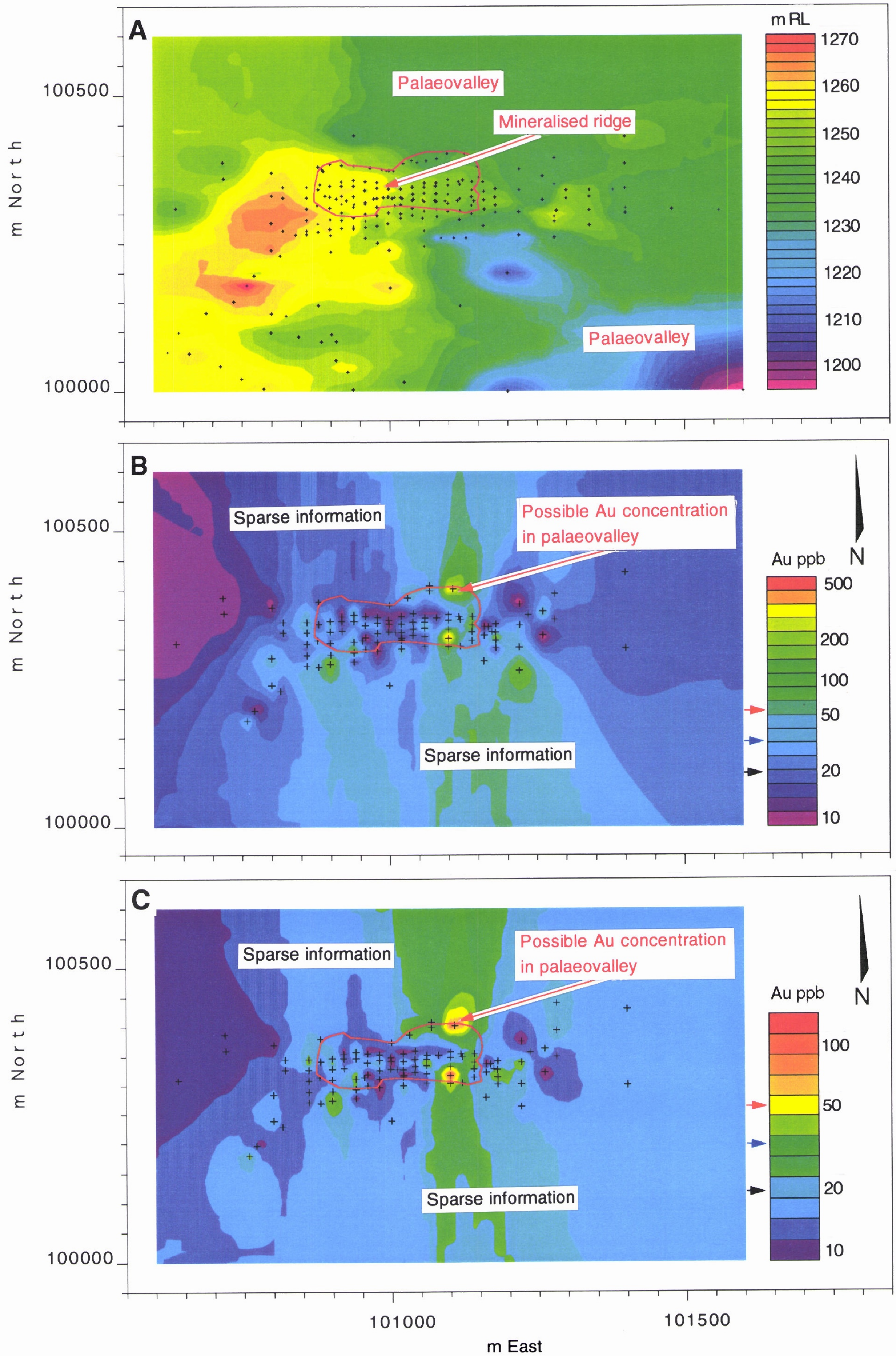


Figure 11. Detailed information in the immediate vicinity of the Cindy pit (in red). Basement-Tertiary unconformity (A), maximum Au in Tertiary (B) and average Au in Tertiary (C). Regional and local thresholds as black and blue arrows respectively. 90th percentile in red.

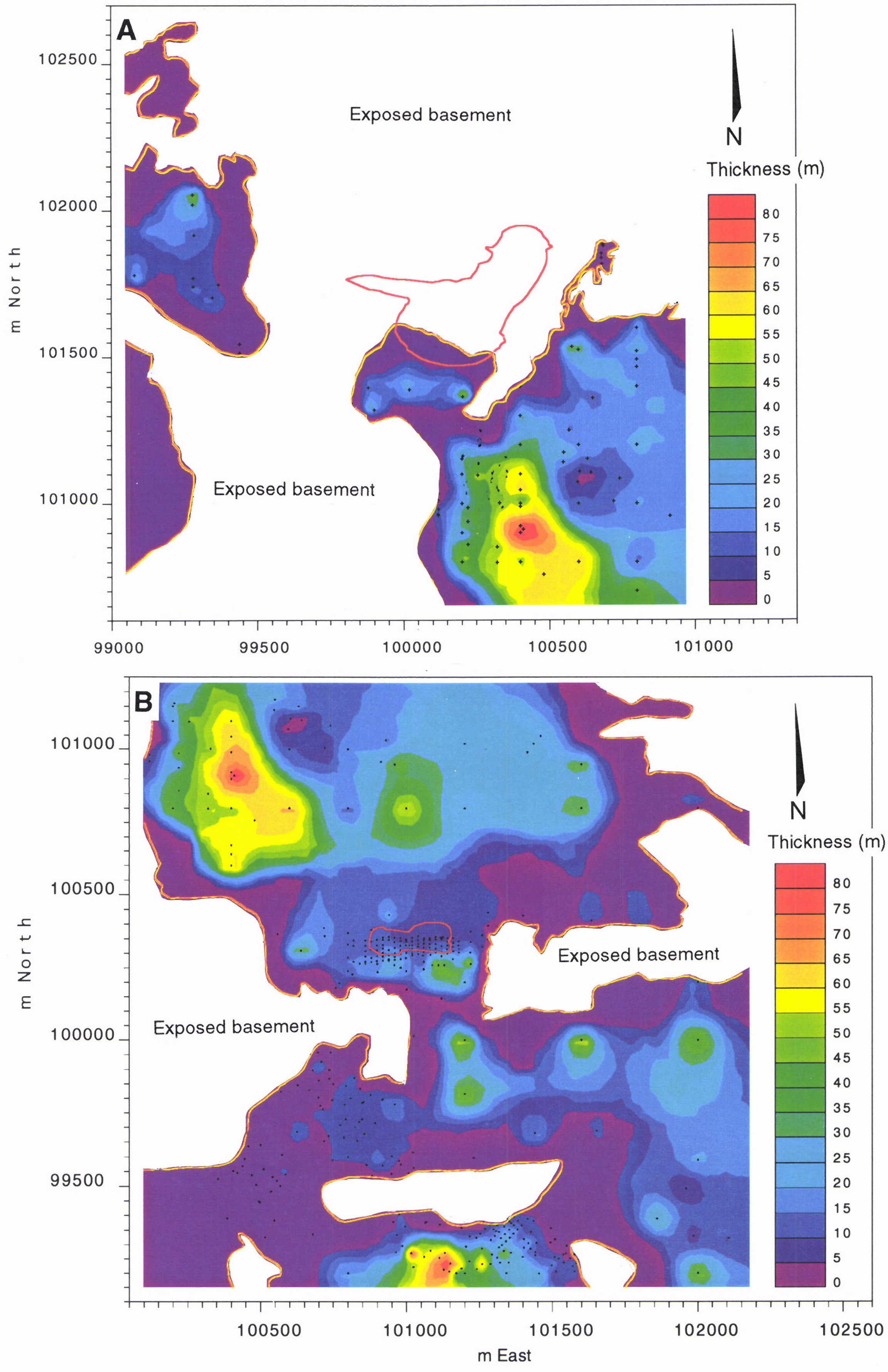


Figure 12. Isopachs of Tertiary cover at Scott (A) and Cindy (B). Pits outlined in red, and drilling data points shown as +.

At Cindy, the high ground is to the west, which is being eroded by at least four east-flowing drainages. In detail, the Cindy Pit has high ground to the south and west and a drainage on its northeast side. The area around the Cindy Pit has a distribution of control points most favourable for contouring. Tertiary cover blankets the Cindy Pit completely, the main areas of exposure of the basement being in the high ground to the west and in deeply eroded areas to the east (Figure 9B).

4.2 Pre-Tertiary unconformity

A map was constructed from the RLs of the unconformity, where cover occurs, and the present height of the basement[2], where there were no cover rocks (see Appendix 1). The topology of this unconformity (Figures 10A and B) would be expected to indicate directions of mechanical dispersion from mineralisation in the basement. This unconformity has been precisely located by surveying of the pit face. A few 'spot lows' in the drilled area may represent logging errors or misinterpretations of the logs. Compared to the present topography, the base of the Southern Cross Formation indicates additional older drainages from the vicinity of the Scott Pit to the south-southeast and to the northeast.

The topology of the basement-Tertiary unconformity at Cindy Pit, which is well-controlled by the large amount of drilling within the pit and survey points on the pit sides, shows a marked ridge through the centre of the pit, probably corresponding to a palaeotopographic high related to the Cindy lode. Detailed contouring of the unconformity in the immediate vicinity of the Cindy pit shows palaeodrainages from the east-central end of the pit, both to the south and to the north (Figure 11A). The palaeodrainage to the south turns east within 300 m of leaving the confines of the pit (Figure 10B).

4.3 Isopachs of Tertiary cover

Isopachs (thickness contours) of the Southern Cross Formation were constructed from the drilling information (see Appendix 1) where the unconformity could be reliably located. A few 'spot maxima' may represent logging errors or misinterpretations of the logs. At the Scott Pit (Figure 12A) the thickest parts of the Southern Cross Formation (40-65 m, perhaps as much as 80 m) are concentrated in the southeast, in the palaeovalley which drained the pit area. The Tertiary cover is relatively thin in the west (5-20 m; perhaps reaching a maximum of 35 m).

At Cindy (Figure 12B), the Tertiary cover is thickest (25-35 m) to the immediate south of the pit and thins to the north (10 m), representing filling of existing palaeovalleys (to the south) less the modern erosion (to the north). Substantial thicknesses (20-35 m) of Southern Cross Formation sediments fill the palaeovalley which drains the pit to the south and swings east.

5. BACKGROUND GEOCHEMISTRY AND ANOMALOUS ELEMENTS

Ten samples from two sites of natural exposure, distant from known mineralisation, were collected to establish geochemical background. Their locations are shown in Figure 2 and sampling methods are covered in Appendix 1. The results are given in Appendix 2. Arithmetic means, maxima and minima have been calculated (see Figure 13A). The mean background content for Au (31 ppb) is quite high, reflecting a high local Au background for this auriferous area. How far this high Au background extends could not be determined but data from the Southern Cross Formation at the Wahines Prospect (Campbell, 1996) indicates <5-10 ppb may represent the regional background.

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[2]For such a map to approximate the topology of the pre-Tertiary unconformity, this construction assumes minimal stripping of the basement in areas where it is now exposed.

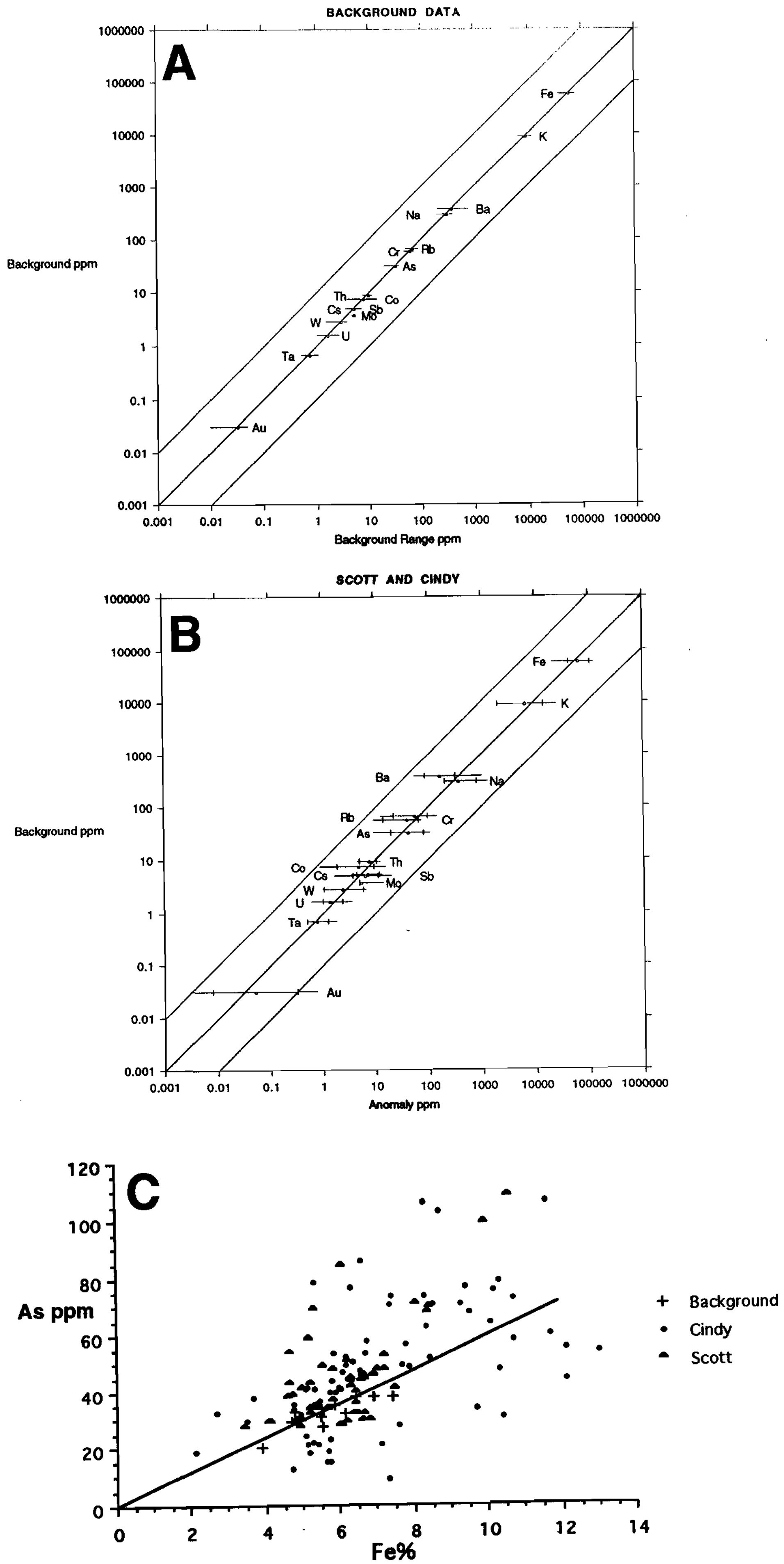

Figure 13. Log-log plot of background ranges and geometric means of background data (A) and data from Scott and Cindy (B). Relationship between As and Fe (C) for background, Scott and Cindy data.

These local background data may be compared to ranges of data from the Scott and Cindy pits to determine which elements are anomalous (Figure 13B). Of the pooled data, only Au is clearly anomalous (>1 order of magnitude). Although it is strongly anomalous at Scott, only profile S7 is anomalous in Au at Cindy. However, a number of other elements are weakly anomalous (Figure 13B); those which extend beyond the range of the background data (As, Sb, Mo, W, Rb, K) tend to come from profiles on the north side of the Cindy Pit particularly (S7, S8, S9).

There is a strong positive correlation between As and Fe in the background data (Figure 13C). This implies adsorption of As by neoformed Fe oxides, probably associated with mottling, and makes interpretation of raw As data difficult where the Fe content is variable. This effect may be reduced by calculating anomalous or residual As (As_a) from the raw As data (As_r):-

$$As_a = As_r - 6Fe$$

Where As is expressed in ppm, Fe in % and the factor 6 reflects the slope of the background data of Figure 13C.

6. GEOCHEMISTRY OF THE TERTIARY SEDIMENTS AT SCOTT AND CINDY PITS

Five profiles through the Southern Cross Formation were sampled at Scott Lode and eight at Cindy. Numerical data are tabulated in Appendix 2 and are plotted in Figures 4 and 6.

6.1 Scott

Overall, the Au content of the Southern Cross Formation is well above background, generally >100 ppb (Figure 4). Profile V1, at the west end of the pit, consists of a basal clast-supported conglomerate of hardened mottles and passes upwards into a matrix-supported conglomerate and into mottled and red clays. The Au content is low (minimum 50 ppb) but As, Fe and Rb are concentrated in the clastic material at the base (reaching 108 ppm, 10.6% and 80 ppm respectively). Large boulders, presumably containing mineralised material, occur at the unconformity nearby (Figure 5G), which may indicate a very nuggetty nature for the Au distribution. Arsenic would be related to mineralisation and Rb might be related to white mica alteration.

Profile V2-V5 is from the deepest part of the channel edge. It was not possible to access the base of the channel safely, so sampling began about 6 m above the base in mottled clays and alluvial gravels set in a clay matrix. Overall, Au is more abundant here (100-200 ppb) than from the side of the channel (Profile V1). Gold, As, Rb and W seem to be concentrated in the coarser materials. Tungsten and As occur at twice background concentrations. There is a 50 ppm anomaly in As_a associated with 6 ppm W and 200 ppb Au in profile V2.

Profile V3-V4 is from the eastern part of the exposed channel and extends upward from near the base. It was not possible to sample the upper part of the profile, however some quite high Au concentrations (locally >500 ppb), with no anomalies in other elements, occur in the upper, mottled clay horizon.

Comparing the profiles, it seems that, although all the profiles are Au anomalous, the highest concentrations of combined Au, As, W and Rb are associated with coarser sediments in the west part of the exposure. This contrasts with highly anomalous Au with no supporting pathfinders in the east.

6.2 Cindy

The Au content of the Tertiary sediments on the south side of the Cindy Pit (Figure 6; Profiles S2-S6) are very close to background (3-40 ppb, average 16 ppb). Minor peaks in As are directly related to the Fe content. There is an anomaly of 50 ppm As_a associated with 200 ppb Au and 6 ppm W in the lower part of S7. Profiles on the down-slope or north side of the pit show more Au. Profiles S8 and S9 contain 21-76, average 41 ppb Au. Profile S7, from the eastern side of the channel, contains similar Au concentrations in its upper part (20-76, average 47 ppb) but there is strongly anomalous Au near the base (158-566 ppb) with associated anomalous Sb, W and Rb but no As. Again As is closely related to the Fe content. The peak in Mo on Profile S9 is related to a conglomerate rich in fragments of hydrothermal quartz; elsewhere Mo is low. Tungsten is also low except at the base of profile S7.

The other profiles (S8-S10) on the north side of Cindy Pit contain little Au but As is enhanced with Fe. Rb seems related to conglomeratic layers.

7. DISPERSION AROUND THE SCOTT AND CINDY LODES

Databases of exploration and near-mine drilling from within 1 km of each mine site, were used to provide maximum and mean Au contents for intersections of the Southern Cross Formation sediments. This was used to illustrate actual dispersion into the sediments from mineralisation and other sources.

Company Au data from the pooled Cindy and Scott study areas have a near perfect log-normal distribution with no clear population breaks, making estimation of threshold parameters difficult. Accordingly, it was necessary to resort to the use of percentiles (see Grunsky, 1991). The 95th percentile (90 ppb) was considered too high for a threshold; much of the data lie close to mineralisation and the proportion of background samples would be expected to be less than in most exploration programs. The 90th percentile (50 ppb) was better and it also formed the lower threshold of a gradient on the contoured Au plots.

There was insufficient As data, and data of other indicator elements apart from Au, in the exploration database to assess their dispersions in the Southern Cross Formation. Thus it was not possible to assess the efficacy of the residual treatment discussed in Section 5.

7.1 Scott

Plots of average and maximum Au in intersections of the Tertiary cover produce very similar results, though the maxima are the clearest (Figures 14A and 15A). At Scott, the greatest Au concentrations lie in the pit face (sampling for this report) although similar Au concentrations lie to the east, filling a small channel which drained the confines of the pit and eastern subeconomic extensions of the Scott Lode. There are also several anomalous concentrations of Au to the south of Scott (750 m), following a deep channel draining to the south. Although this may represent a down-slope dispersion from Scott, a more likely and nearer source is a concentration of subeconomic auriferous veins exposed in the basement 600 m south of the Scott lode and west of the Au anomalies in the cover sequence.

7.2 Cindy

The distribution of useful Au data in the cover sequence in the Cindy study is very patchy (Figures 14B and 15B), being concentrated in the immediate pit area and to the south-southwest, where some Au concentrations may reflect auriferous quartz veining in the basement. There is a single point anomaly to the southeast of Cindy which is unexplained. A detailed investigation of the Au

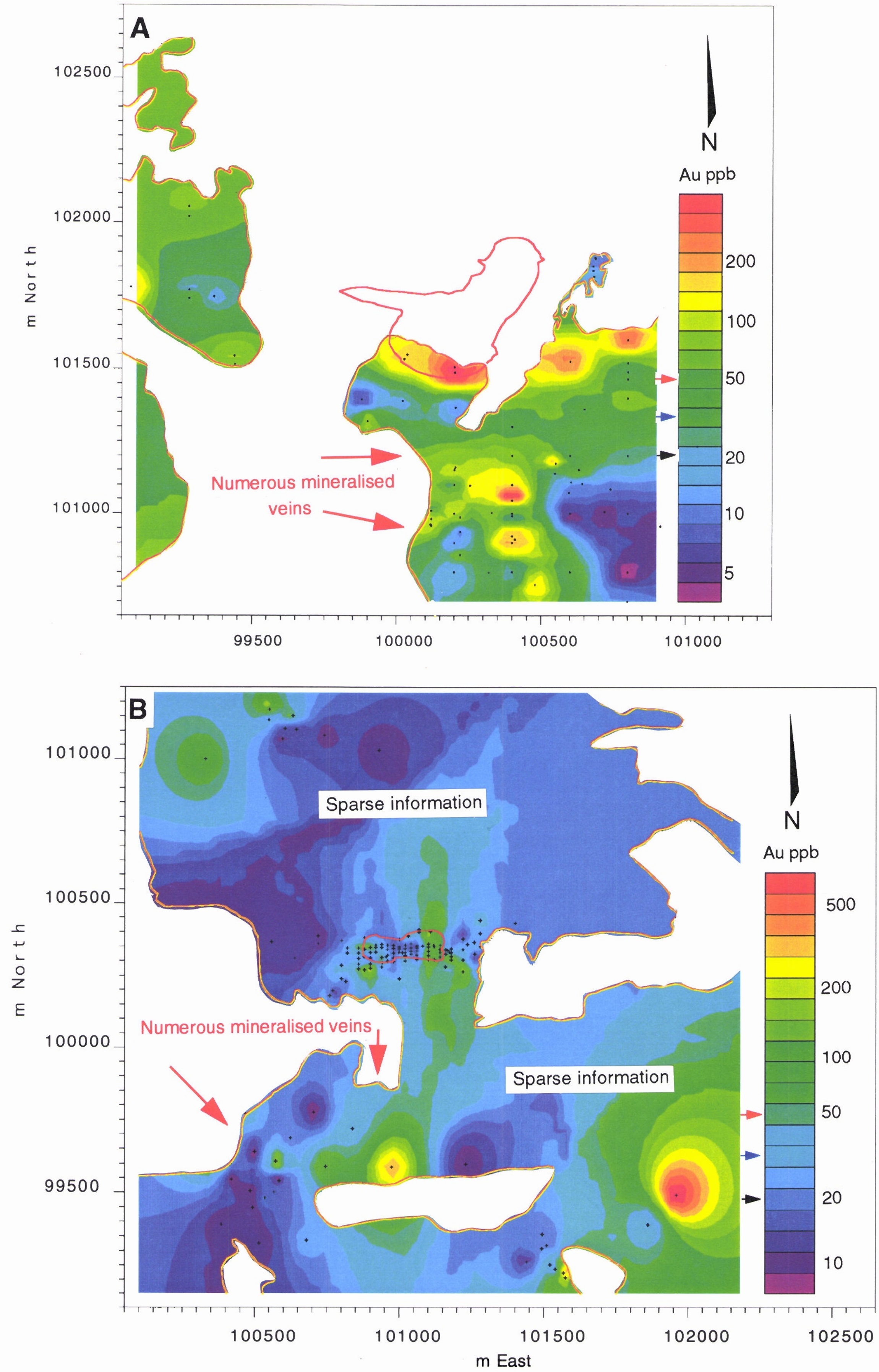

Figure 14. Isopleths of maximum Au in Tertiary in Scott (A) and Cindy (B) study areas. Pits outlined in red and drilling data points as +. Regional and local thresholds indicated by black and blue arrows respectively; red arrow indicates 90th percentile.

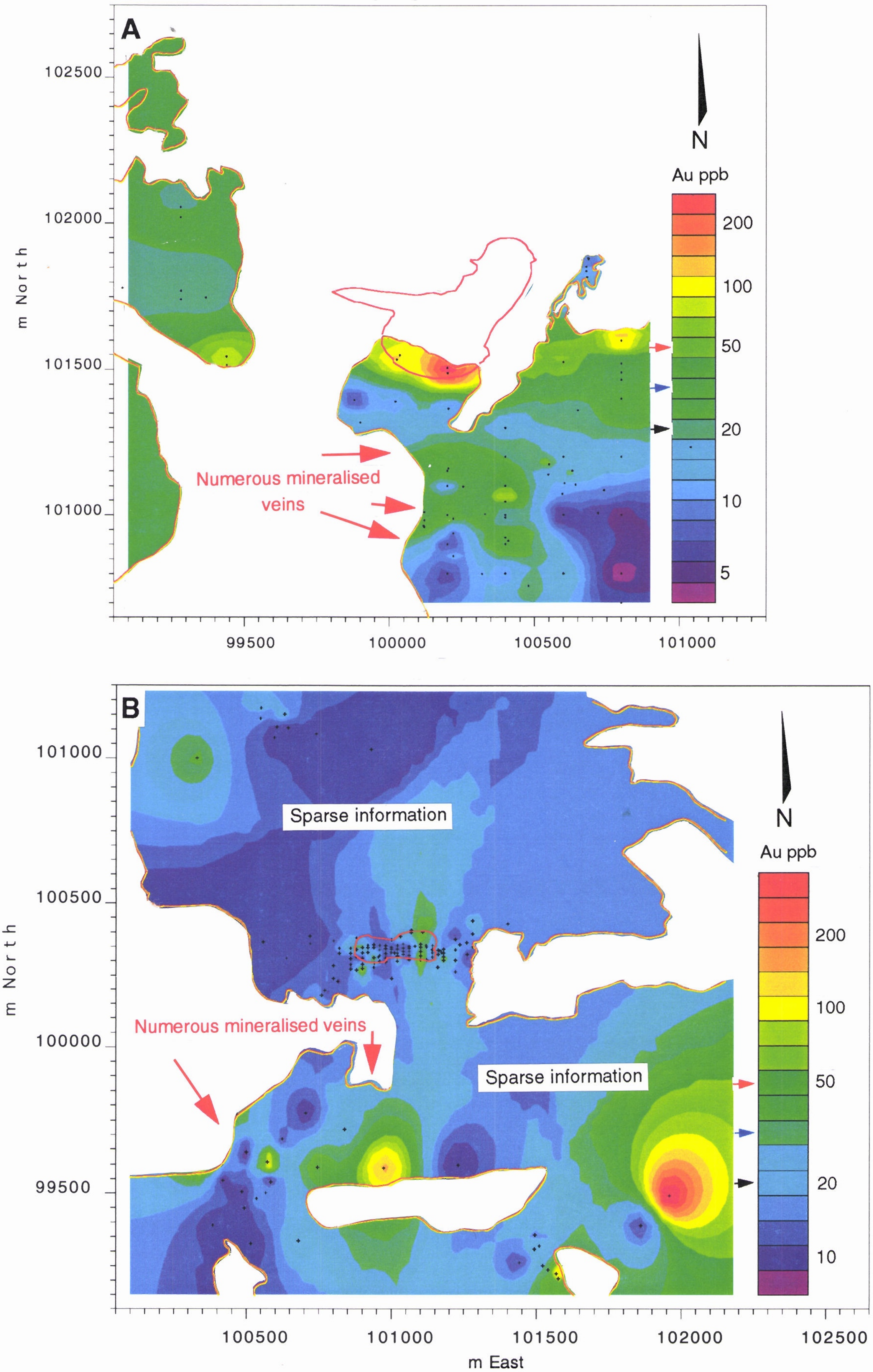

Figure 15. Isopleths of arithmetic mean Au in Tertiary in Scott (A) and Cindy (B) study areas. Pits outlined in red and drilling data points as +. Regional and local thresholds indicated by black and blue arrows respectively; red arrow indicates 90th percentile.

distribution in the immediate vicinity of the Cindy Pit reveals Au anomalies concentrated very close to the two outflow directions (north and south) from the east-central part of the pit (low points on the unconformity). The Tertiary cover in the remainder of the pit is barely anomalous; this confirms the conclusions reached by the pit face sampling.

8. PARTIAL EXTRACTIONS OF SAMPLES FROM SCOTT PIT

Partial extractions with water, potassium iodide (KI) and potassium cyanide (KCN) were compared with the INAA analyses of profiles V3-V4 at Scott Pit to provide more information on the form of the Au by investigating its extractibility. Details of the methods are given in Appendix 1 and the numeric data are given in Appendices 2 and 4.

Although some of the Au extraction was performed sequentially, to remove the effect of variations within the sample pulp (nugget effect), the data have been recalculated and plotted as though three separate determinations were made:-

(i) Extraction with water,

(ii) Extraction with iodide (which would include water extractable Au), and

(iii) Extraction with cyanide (including water and iodide).

This is compared with INAA data which is a total analysis; the difference between INAA and cyanide extractable Au is Au occluded from cyanide attack.

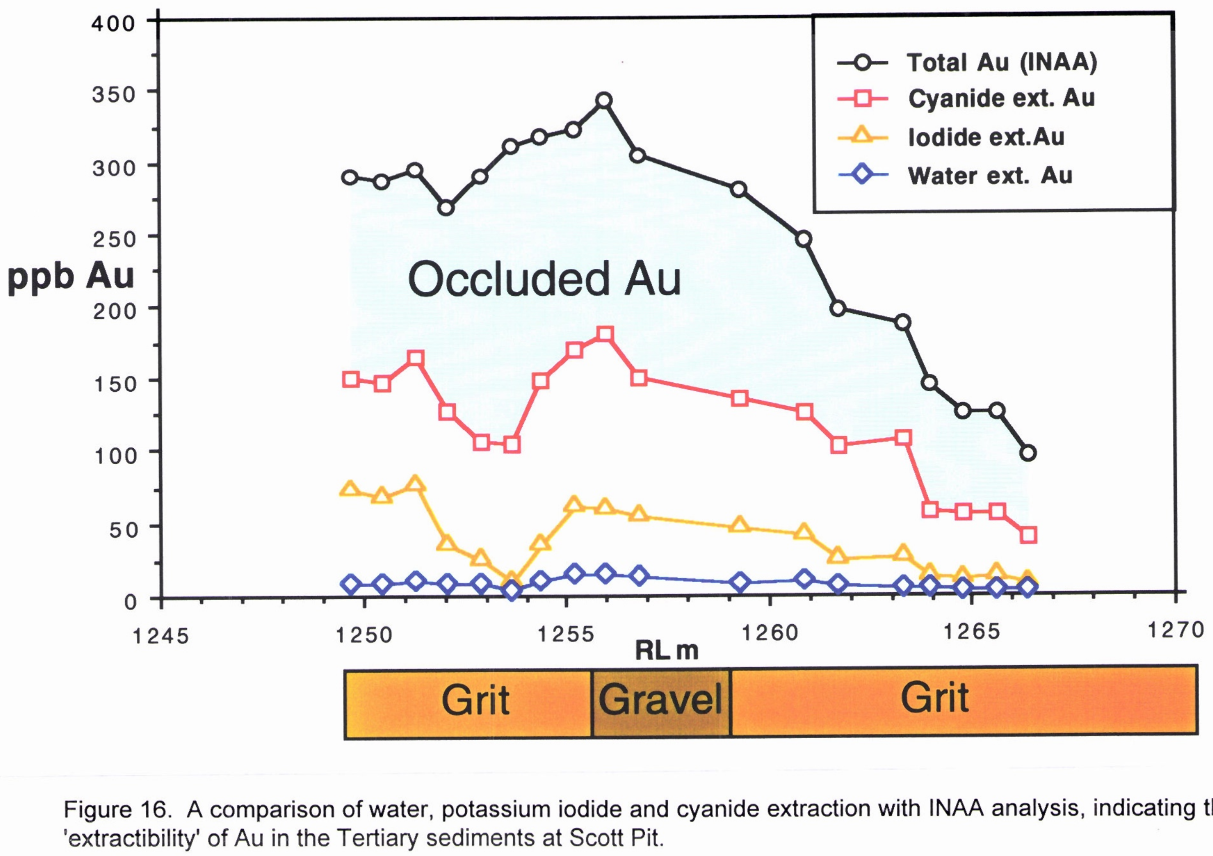

Figure 16. A comparison of water, potassium iodide and cyanide extraction with INAA analysis, indicating the 'extractibility' of Au in the Tertiary sediments at Scott Pit.

Cyanide extraction shows two very Au-rich samples, confirming the INAA results. The *proportion* of the total Au that is removed by each extractant (Appendix 2) is remarkably consistent (averages for cyanide 51%, iodide 15%, water 3%). The only anomalies in the cyanide extraction are for the very Au-rich samples (723 ppb, 77%; 621 ppb, 91%), probably related to easily accessible nuggetty Au. If these are ignored as atypical, the significance of the remainder is that about half of the Au is occluded from cyanide attack, placing some doubt as to the value of Au analysis using cyanide in the Southern Cross Formation. However, this very small data set implies that a proportional relationship holds and high Au values could be enhanced. The two high Au values were removed and the data plotted (Figure 16) to illustrate the relationship between extractants.

Iodide extracts between 8 and 26% of the total Au and water extracts up to 4%, indicating that a significant proportion of the Au has been dissolved and relocated by weathering. These proportions are typical for lateritic terrain but not as high as for carbonate soils (D.J. Gray, personal communication, December 1997).

The proportions of iodide- and cyanide-extractable Au reach a local minimum at 1254 m RL in the upper part of a gritty layer near the base of the profile, with little loss of total Au. This implies a permeable zone where water may have flowed (aquifer), leaching out most of the readily extractable Au.

The exploration Au data were obtained mostly by aqua regia digest with minor fire assay.

9. SUMMARY AND CONCLUSIONS

9.1 Regolith

The Devonian volcanics vary from relatively fresh to saprolitic on the high ground but on the lower ground they have a lateritic profile with an Fe-rich duricrust of hematite, goethite and kaolinite with some gibbsite cementing the pisoliths. Here they form a complex pediment with an extensive cover of mottled and lateritised Tertiary sediments (Southern Cross Formation) and various colluvia, scree and alluvium.

Pisolitic duricrust is developed in the top half metre of the Southern Cross Formation on the high parts of the pediment and, in places, this duricrust has broken down to a surficial pisolitic gravel. Most of the Southern Cross Formation, on the remainder of the pediment, consists of mottled clays covered with either a very thin lithosol or a veneer of proximal colluvium.

The Southern Cross Formation completely blankets the Cindy Lode with a thin conglomerate at its base on a mottled saprolite of the basement volcanics. Higher in the Southern Cross Formation, alternating conglomeratic and gritty layers occur with a thick mottled horizon at the top. The detritus has been derived from a variety of regolith horizons; there are pisolitic fragments, fragments coated with a thin cutan of yellow-brown clay and some contain preserved volcanic fabrics, although the feldspars are now completely kaolinised. At Scott Lode, the basement and the lode were exposed. The edge of a palaeochannel cuts into the southwest side of the pit, exposing an imbricate rudite of red-brown mottles, resting on a mottled clay basement. This is overlain by alternating mottled grits and gravelly clays with a thick wedge of red-brown clays with branching, rhizoform megamottles and further mottled gravelly sediments. The clasts of these sediments consist largely of deeply weathered volcanic rocks with minor epithermal quartz clasts which are set in a clay matrix. It seems unlikely that many of these volcanic clasts would have survived transport in a deeply weathered state so at least the latter part of their weathering, including their mottling, was accomplished *in situ* within the Southern Cross Formation.

Alluvium is extensive in low-lying areas; this ranges from boulders, through gravels to massive clay deposits which are up to 4 m thick and upward fining. These materials are immature and contain ferruginous pisoliths from pre-existing lateritic profiles, vein quartz and weathered volcanics, much of which may have been inherited from the Southern Cross Formation.

9.2 Geochemical dispersion

Dispersions within the Devonian basement were not investigated. Dispersion studies were focused on the Southern Cross Formation.

9.2.1 Regional and local background

Distant from known mineralisation, regional Au backgrounds are low (e.g., <5-10 ppb at the Wahines Prospect) but, within 1 km of the Scott and Cindy mineralisations, the local background reaches 31 ppb. The background in the Southern Cross Formation at Scott Pit is very high (>100 ppb) because the Scott Lode was at least partly exposed throughout sedimentation and mineralised detritus from the lode has been shed into the palaeodrainage; it is less (16 ppb) at Cindy, where the bulk of the detritus was from up slope, beyond the mineralisation. Within the cover sequence, a Au background of >20 ppb may indicate a distal Au source; >35 ppb may indicate a proximal Au source. However, the source may not necessarily be economic. Significant dispersion may result from a large number of small, auriferous veins.

9.2.2 Localised dispersions

Mechanical dispersion has produced localised anomalies in Au, W and Mo in the Southern Cross Formation. At Scott, the highest Au concentration (700 ppb) is not at the base of the channel but within gritty sediments just above a gravelly layer; concentrations of Au (200 ppb), As (80 ppm) and W (6 ppm) lie within gravelly sediments near but not at the base of the channel. Gold is locally concentrated (>500 ppb) down slope of the mineralisation at Cindy, where it was cut by a small outflowing palaeodrainage. Again, it occurs near but not at the base of the sediments. Thus, dispersions do not necessarily occur at the base of the cover but at other levels, requiring analysis of the whole sequence. Similar mechanical Au dispersions into Tertiary cover at the Wirralie Prospect has resulted in ore grades (Fellows and Hammond, 1990).

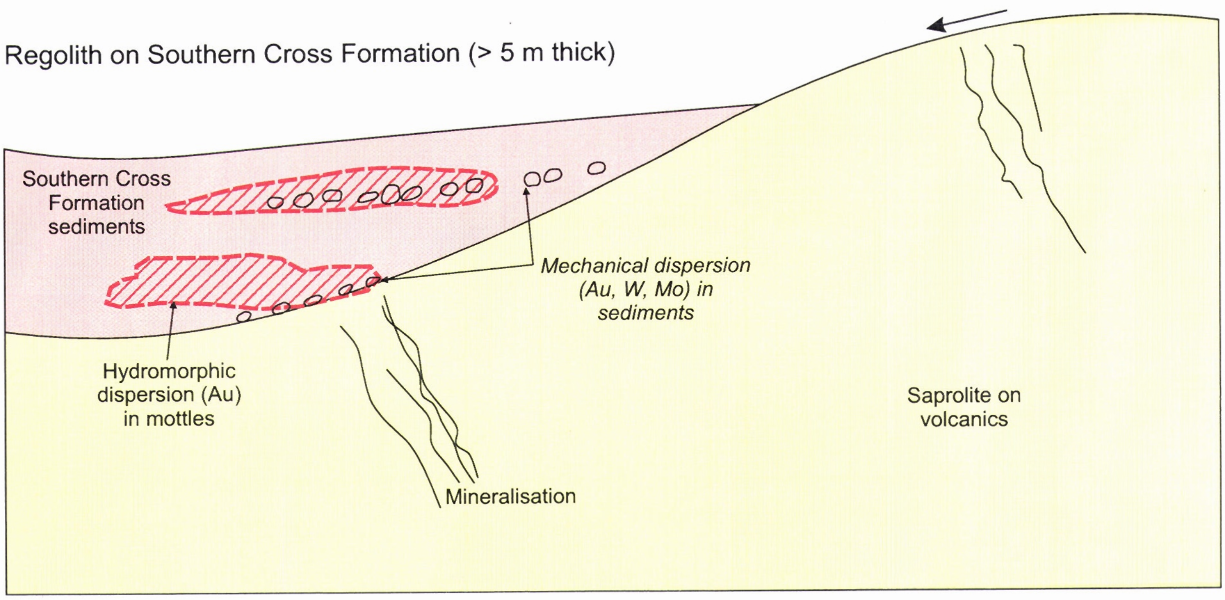

Figure 17. Cross section showing dispersion of Au and pathfinder elements at and above unconformity between Southern Cross Formation and basement.

Exploration drilling, within 1 km of the mines, confirmed Au dispersions (>70 ppb) of 100-300 m both from the Scott and Cindy mineralisations or from areas of numerous auriferous quartz veins nearby. Gold dispersions occur at the base of the cover and higher, indicating that auriferous sources remained exposed during sedimentation (Figure 17). All this supports a largely mechanical dispersion mechanism. Partial extraction experiments, however, indicated that a proportion (18%) of the Au is loosely attached (soluble in weak extractants; K-iodide and water) so some relocation of the Au by weathering is likely. A slightly greater proportion of the Au is held in the fine fraction (<100 μm) of the Southern Cross Formation at Scott (Campbell, 1996). About half of the contained Au is occluded from cyanide attack.

10. IMPLICATIONS FOR EXPLORATION

- Dispersion from buried mineralisation into the Southern Cross Formation was initially by mechanical means and did not necessarily occur all at the base of the sediments. However, there is evidence for some hydromorphic relocation of Au during subsequent weathering.

- Dispersion trains down slope from mineralisation may be traceable for 100-300 m but may also occur from areas of numerous auriferous quartz veins without economic mineralisation.

- Useful, large dispersions are most likely where the mineralisation has remained exposed for a long period during sedimentation (Scott); they are less likely where the mineralisation was completely covered by early sediments and further blanketed by material from up slope (Cindy).

- Interpretation of dispersion within the Southern Cross Formation requires an understanding of the palaeotopography.

- Elevated local backgrounds of >20 ppb Au may indicate distal mineralisation. Backgrounds of >35 ppb and, more specifically anomalies of >50 ppb Au may indicate proximal mineralisation.

11. ACKNOWLEDGMENTS

A. Goode gave permission for access to the Scott and Cindy pits and I. Jaques provided safety inductions. B. Jones, L. Stringer and J. Parks provided advice, accommodation at Battle Mountain Exploration Camp and logistical support. Cindy Washburn efficiently provided digital drilling data from the exploration database. S.M. Ford assisted with the pit sampling - a potentially hazardous task which was accomplished in a competent manner, without a single rush of adrenalin. Geochemical analyses were by Becquerel Laboratories (INAA) at Lucas Heights. Partial extractions were by J.E. Wildman and G.D. Longman. Sample preparation was by K. Lim. X-ray diffraction analysis was by M.K.W. Hart and interpretation was by E.R. Nickel. Artwork was prepared by A.D. Vartesi. R.R. Anand, K.M. Scott and D.J. Gray provided critical review of the manuscript. All this assistance is acknowledged with appreciation.

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APPENDIX 1

Study methods

STUDY METHODS

Pit sampling

A 10 m ladder was used to gain access to the pit face. The foot of the ladder was firmly secured in a shallow groove; the ladder was found to be very stable once it rested against the pit face. One metre sample intervals were marked up the inclined face (corrections were later made for this inclination). A number of grab samples (5-10) were then taken within each interval, totalling 1 kg and bagged in calico. Dropping them from the ladder contributed slightly to the milling process.

Sampling natural exposure

Grab samples of up to 1 kg were hammered from estimated 1-2 m intervals of natural exposure and bagged in calico. Accurate intervals were unnecessary as these were required for background geochemical abundances.

Pit surveying

The positions of the foot of each sampled section were painted on the pit walls. These were later located by the contract surveyor. The unconformity was drawn on photographs of the pit face. Points along the unconformity were also located by survey and digital data provided for each pit.

Sifting of database

The database information was supplied in tab-delimited format. It was necessary to prepare a list of all drillholes occurring within areas underlain by sediments (from exploration mapping) and write a small software utility to locate their data and copy them to a new file.

The log of each drillhole (symbol and narrative) was inspected to determine the position of the Palaeozoic-Tertiary unconformity and to excise all irrelevant data. In some drillholes the unconformity could not be determined satisfactorily due to:- (i) confusion related to similarity between the clastic fabrics of the Tertiary sediments and those of basement pyroclastics, (ii) masking by substantial weathering of all rocks and (iii) inconsistencies in use of lithology symbols by different staff (particularly confusion as to the meaning of 'laterite') and (iv) some understandable uncertainty in the narrative logs due to all of the above. Those drillholes, where the unconformity could not be determined with confidence, were ignored.

The RL of the unconformity and the thickness of the Tertiary sediments were determined from the down hole depth of the unconformity, the drillhole inclination and the drill collar coordinates. The arithmetic mean Au for each intersection in the Tertiary sediments and the maximum Au assay for each were determined from the new database, using another small, customised software utility.

Petrography

Small reference samples were selected from each sample before splitting and milling, and some of these were set in resin and polished for petrographic study. XRD mineralogy was used to assist the petrographic descriptions

Splitting and milling

Each sample for geochemical analysis was split on a PVC riffle. Aliquots of 100 g were pulped to a nominal <75 µm in a case-hardened K1045 steel mill (Robertson *et al.*, 1996) using a double sand clean and ethanol wipe of the mill components between samples.

XRD mineralogy

Pulped samples were examined by CuKα radiation, using a Philips PW1050 diffractometer, fitted with a graphite crystal diffracted beam monochromator. Each sample was scanned over a range 3-65° 2θ at a speed of 1° 2θ/min and data were collected at 0.02° 2θ intervals. Charts, plotted at 0.5° 2θ/cm were used for interpretation.

Chemical analysis

All samples were analysed by INAA (Becquerel Laboratories). No XRF analyses were performed; resources were focused on total Au, As, Sb, W and Mo and on determining the mode of dispersion by partial extractions of some samples.

INAA

Aliquots of 10 or 30 g (depending on availability) were encapsulated and sent to Becquerel Laboratories for INAA analysis. Detection limits were as follows (in ppm):- K (2000); Fe (500); Zn, Ba, Na (100); Rb (20); Ag, Se, Cr, Mo (5); W, Ce, Br, U (2); As, Co, Cs, Ta (1); La, Eu, Yb, Hf, Th (0.5); Sb, Sm, Lu (0.2); Sc (0.1); Ir (0.02); Au (0.005).

Partial Extraction

An aliquot of 10 g of sample, milled to <75 µm, was agitated on a bottle roller with a KI reagent[3] and with a 1 g sachet of activated C, using a soil:solution ratio of 1:2. After 7 days, the sachet was removed, rinsed in water, dried and analysed by INAA.

After that, 10 ml of KCN solution[4] was added to the same soil:solution mix, to give a final KCN concentration of 0.2%, and a sachet of activated C was added. Agitation continued for seven days, the sachet was removed, rinsed, dried and analysed by INAA.

Using a separate 10 g sample of the soil, a soil:water slurry (1:2) was prepared and agitated with an activated C sachet for 7 days. The sachet was then removed, dried and analysed by INAA. After that, 10 ml of KCN solution[5] was added to the same soil:solution mix, to give a final KCN concentration of 0.2%, and a sachet of activated C was added. Agitation continued for seven days, the sachet was removed, rinsed, dried and analysed by INAA. This separate CN^- extraction was used to detect any nugget effect.

All the data (INAA and partial extraction) are presented in Appendix 2. A data disc is appended (Appendix 4). Analyses of standards included with each batch are also presented in Appendix 3.

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[3]A solution of 0.1 M KI and 1 M $NaHCO_3$ taken to pH 7.5 with HCl, with concurrent CO_2 bubbling.

[4]A solution 2%KCN in saturated limewater.

[5]A solution 2%KCN in saturated limewater.

APPENDIX 2

Tabulated analytical data

GEOCHEMISTRY OF CINDY PIT PROFILES

Field No	Lab No	Lib No	East	North	RL	Profile	As	Au	Ba	Br	Ce	Co	Cr	Cs	Eu	Fe	Hf	K	La	Lu	Mo	Na	Rb	Sb	Sc	Sm	Ta	Th	U	W	Yb
		Unit	m	m	m		ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Detn Lt	-	-	-		2	5	100	2	10	1.0	5	1.0	1.0	0.10	1.0	0.4	0.5	0.2	10.0	0.02	20	0.5	0.1	0.2	1.0	0.5	1.0	2.0	0.5
RCS-2001	L08-2147	08-2085	100954.2	100317.4	1256.0	S2	9	6	191	2	30	8.7	9	3.4	1.1	7.29	3.0	1.1	16.0	0.4	3.7	0.13	70	1.6	28.9	3.4	0.8	6.1	1.0	1.9	2.6
RCS-2002	L08-2104	08-2086	100954.2	100316.9	1256.8	S2	28	20	238	4	45	7.9	35	7.3	1.1	7.58	3.2	1.4	21.9	0.4	4.1	0.12	95	2.6	32.7	4.4	0.8	6.7	1.0	0.9	2.6
RCS-2003	L08-2085	08-2087	100954.2	100316.3	1257.7	S2	76	17	205	3	22	12.0	55	4.1	0.8	10.20	2.8	1.4	13.5	0.3	3.3	0.07	83	10.0	23.4	2.5	0.5	4.9	1.2	0.8	1.8
RCS-2004	L08-2092	08-2088	100954.2	100315.8	1258.5	S2	71	12	249	3	43	12.4	60	4.8	1.0	8.53	3.2	1.0	21.6	0.3	1.8	0.05	64	6.6	26.8	3.6	0.7	6.2	1.0	1.0	2.1
RCS-2005	L08-2109	08-2089	100954.2	100315.3	1259.4	S2	42	19	113	3	50	9.8	47	6.1	1.0	5.12	4.1	1.1	24.4	0.4	0.7	0.05	84	5.9	26.0	4.3	0.7	6.1	1.4	1.1	2.2
RCS-2006	L08-2112	08-2090	100954.2	100314.7	1260.2	S2	54	26	110	4	49	9.3	48	4.2	0.8	5.83	3.8	1.1	23.6	0.3	4.5	0.04	80	6.6	25.7	4.3	0.7	6.1	1.0	1.5	2.2
RCS-2007	L08-2157	08-2091	100954.2	100314.2	1261.0	S2	71	22	234	7	42	4.3	54	8.3	0.8	9.28	2.9	1.2	21.7	0.3	3.1	0.06	96	4.3	25.5	3.4	0.5	6.4	1.1	1.1	1.9
RCS-2008	L08-2143	08-2092	100954.2	100313.6	1261.9	S2	42	14	255	5	56	3.9	54	7.2	1.0	5.97	4.2	0.9	30.1	0.3	2.2	0.05	98	4.5	25.4	3.9	0.8	8.8	1.2	2.8	2.2
RCS-2009	L08-2117	08-2093	100954.2	100313.1	1262.7	S2	41	17	223	4	49	3.3	45	5.9	0.9	5.10	4.4	0.9	25.3	0.3	5.7	0.05	73	4.9	23.0	3.5	1.2	8.6	1.0	3.4	2.0
RCS-2010	L08-2103	08-2094	100954.2	100312.6	1263.6	S2	54	11	158	3	43	5.2	59	5.4	0.9	6.70	4.3	0.9	24.1	0.3	4.3	0.04	72	5.5	22.8	3.2	1.2	7.8	1.0	1.0	2.0
RCS-2011	L08-2159	08-2095	100954.2	100312.0	1264.4	S2	53	10	324	3	43	5.2	64	5.4	0.7	6.16	3.7	0.8	23.5	0.2	2.9	0.06	63	5.5	24.6	3.1	1.0	7.5	1.0	1.4	1.8
RCS-3001	L08-2094	08-2096	101020.7	100321.3	1256.1	S3	51	12	265	2	48	7.6	49	5.3	0.9	6.38	3.6	1.1	23.4	0.3	3.3	0.06	73	5.2	26.0	3.8	0.6	6.5	1.2	2.5	2.0
RCS-3002	L08-2108	08-2097	101020.7	100320.7	1256.9	S3	40	12	187	2	49	5.8	59	5.5	0.9	5.73	4.0	1.0	24.2	0.3	3.8	0.05	83	4.8	25.0	3.9	0.7	6.2	1.5	2.3	2.1
RCS-3003	L08-2087	08-2098	101020.7	100320.2	1257.8	S3	50	8	208	3	58	3.3	54	5.9	1.0	6.18	4.4	0.9	27.8	0.3	1.5	0.05	67	5.4	22.5	4.2	0.6	7.9	1.4	1.5	1.9
RCS-3004	L08-2136	08-2099	101020.7	100319.6	1258.6	S3	57	10	206	2	51	3.9	63	6.8	1.0	7.76	4.0	1.0	27.0	0.3	4.0	0.05	77	5.2	23.2	4.0	1.0	7.7	1.5	1.2	1.9
RCS-3005	L08-2122	08-2100	101020.7	100319.1	1259.5	S3	63	12	141	3	50	4.4	55	5.8	0.7	8.35	4.9	0.7	27.1	0.3	3.5	0.03	55	6.4	23.7	3.9	0.7	8.7	1.3	2.7	2.0
RCS-3006	L08-2142	08-2101	101020.7	100318.6	1260.3	S3	45	8	144	2	51	5.0	61	6.0	0.8	6.20	4.4	0.9	27.2	0.3	4.4	0.04	76	5.2	21.9	3.6	0.4	7.8	1.0	2.7	1.9
RCS-3007	L08-2107	08-2102	101020.7	100318.0	1261.1	S3	44	13	92	3	48	6.1	60	5.6	0.7	5.79	4.5	0.7	25.8	0.3	3.3	0.04	61	5.4	21.9	3.3	0.6	7.8	1.0	1.7	1.9
RCS-3008	L08-2139	08-2103	101020.7	100317.5	1262.0	S3	36	8	175	5	43	4.3	56	5.4	0.6	5.35	4.3	0.7	24.5	0.3	3.7	0.05	62	5.2	22.4	3.1	0.7	8.4	1.0	2.4	1.9
RCS-3009	L08-2145	08-2104	101020.7	100316.9	1262.8	S3	31	9	69	3	43	4.2	53	6.2	0.5	4.91	4.4	0.8	24.0	0.3	3.6	0.05	59	4.4	20.1	2.8	1.0	8.4	0.9	1.7	1.9
RCS-3010	L08-2086	08-2105	101020.7	100316.4	1263.7	S3	64	3	190	3	32	3.7	72	5.0	0.6	10.10	4.1	0.6	20.3	0.2	2.0	0.03	59	4.6	17.2	2.1	0.9	10.0	1.0	0.8	1.8
RCS-3011	L08-2101	08-2106	101020.7	100315.9	1264.5	S3	106	3	173	3	29	2.5	74	5.9	0.2	8.28	4.3	0.6	19.3	0.3	0.1	0.03	59	4.9	15.7	1.9	1.1	10.2	1.0	2.6	1.7
RCS-4001	L08-2095	08-2107	101235.0	100358.0	1249.0	S4	34	20	127	3	43	4.5	54	5.6	0.6	4.76	4.8	0.8	27.1	0.3	2.6	0.03	63	5.1	21.2	2.9	1.2	9.2	1.0	3.0	2.1
RCS-4002	L08-2149	08-2108	101235.0	100358.0	1247.5	S4	50	11	204	2	46	6.5	64	5.3	0.6	7.66	4.8	0.9	26.8	0.3	3.5	0.03	79	5.6	21.7	3.5	0.8	9.2	1.3	2.0	2.1
RCS-4003	L08-2132	08-2109	101235.0	100358.0	1246.0	S4	32	5	207	1	55	6.8	57	6.4	1.2	4.94	4.7	1.0	28.9	0.4	5.0	0.03	82	5.3	22.5	4.8	1.0	8.3	2.2	1.9	2.4
RCS-5001	L08-2151	08-2110	101172.8	100330.1	1255.9	S5	48	15	202	2	52	6.7	72	5.6	0.8	6.55	4.7	0.9	27.2	0.3	4.4	0.03	70	5.7	22.1	4.2	0.5	8.4	1.8	2.5	2.4
RCS-5002	L08-2131	08-2111	101173.1	100329.7	1256.7	S5	41	12	165	2	51	6.1	63	5.7	0.8	6.03	4.8	0.9	27.5	0.3	3.3	0.03	76	5.1	22.2	3.8	0.8	9.1	1.4	1.9	2.2
RCS-5003	L08-2100	08-2112	101173.5	100329.3	1257.6	S5	37	13	211	2	51	6.6	62	6.0	0.9	5.46	4.5	0.8	28.4	0.3	4.6	0.03	63	4.6	22.0	3.6	0.5	8.7	1.6	2.0	2.1
RCS-5004	L08-2148	08-2113	101173.9	100329.0	1258.4	S5	32	15	192	2	50	6.8	59	6.4	0.7	5.50	5.0	0.6	28.6	0.3	4.1	0.04	65	4.7	22.4	3.5	0.4	9.0	1.6	2.5	2.1
RCS-6001	L08-2121	08-2114	101165.8	100339.5	1245.9	S6	77	40	189	2	53	8.5	44	5.6	0.9	9.44	2.5	1.0	31.9	0.3	0.5	0.05	72	6.3	21.4	4.2	0.5	5.2	1.0	2.0	1.8
RCS-6002	L08-2138	08-2115	101166.1	100339.1	1246.7	S6	79	40	230	2	37	4.3	47	6.1	0.7	10.30	2.8	1.0	19.7	0.3	4.1	0.05	93	5.7	20.9	3.5	0.6	6.1	1.2	2.9	2.0
RCS-6003	L08-2137	08-2116	101166.5	100338.7	1247.6	S6	73	33	149	3	45	3.7	61	6.5	0.9	10.70	3.5	1.1	23.6	0.3	4.1	0.04	89	5.3	24.6	4.0	1.0	7.1	1.6	1.3	2.2
RCS-6004	L08-2120	08-2117	101166.9	100338.3	1248.4	S6	49	24	213	2	53	4.1	64	5.7	0.8	7.89	4.1	0.9	26.3	0.3	4.6	0.04	64	5.0	23.9	4.3	0.5	7.9	2.0	2.1	2.2
RCS-6005	L08-2118	08-2118	101167.3	100337.9	1249.3	S6	52	27	219	2	52	4.8	66	6.5	0.9	8.43	4.2	1.0	25.5	0.3	2.5	0.04	80	4.9	24.5	4.4	1.7	8.0	1.9	2.4	2.2
RCS-6006	L08-2124	08-2119	101167.6	100337.6	1250.1	S6	44	18	219	2	55	3.4	60	4.6	1.1	6.32	5.0	0.7	25.4	0.3	3.5	0.03	71	5.6	23.1	4.9	1.1	8.4	1.3	1.6	2.4
RCS-6007	L08-2155	08-2120	101168.0	100337.2	1250.9	S6	40	19	229	3	69	3.7	70	6.7	1.3	5.89	5.6	0.8	31.0	0.4	1.8	0.04	86	5.4	26.2	5.7	1.5	10.3	1.0	2.1	2.6
RCS-6008	L08-2141	08-2121	101168.4	100336.8	1251.8	S6	36	14	186	1	68	6.2	65	6.3	1.1	4.74	5.4	0.8	30.5	0.4	2.2	0.03	70	5.1	25.0	5.7	0.8	8.9	1.5	2.0	2.4
RCS-6009	L08-2160	08-2122	101168.8	100336.4	1252.6	S6	41	12	318	1	64	3.6	62	5.9	1.2	5.34	4.7	1.0	28.9	0.3	1.1	0.03	77	6.3	23.2	5.6	1.6	8.4	1.2	1.3	2.4

Field No	Lab No	Lib No	East	North	RL	Profile	As	Au	Ba	Br	Ce	Co	Cr	Cs	Eu	Fe	Hf	K	La	Lu	Mo	Na	Rb	Sb	Sc	Sm	Ta	Th	U	W	Yb
		Unit	m	m	m		ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Detn Lt	-	-	-		2	5	100	2	10	1.0	5	1.0	1.0	0.10	1.0	0.4	0.5	0.2	10.0	0.02	20	0.5	0.1	0.2	1.0	0.5	1.0	2.0	0.5
RCS-7001	L08-2133	08-2123	101107.6	100400.1	1241.3	S7	74	158	160	3	45	1.8	13	9.2	1.0	7.40	3.6	2.2	24.5	0.4	0.7	0.04	123	14.4	17.2	4.0	1.0	7.9	1.5	5.5	2.5
RCS-7002	L08-2110	08-2124	101107.6	100400.7	1242.1	S7	19	566	272	2	59	1.5	12	7.1	0.9	2.13	3.7	2.6	29.8	0.4	2.2	0.04	146	19.6	17.1	4.7	0.9	8.6	1.6	5.8	2.5
RCS-7003	L08-2134	08-2125	101107.6	100401.2	1243.0	S7	79	216	419	4	70	2.2	14	8.9	1.8	5.34	3.4	2.4	38.3	0.4	0.9	0.05	120	15.7	18.7	6.6	1.0	8.5	2.0	6.3	2.3
RCS-7004	L08-2154	08-2126	101107.6	100401.8	1243.8	S7	68	68	352	4	93	1.5	15	7.6	1.5	9.50	3.5	2.5	55.8	0.3	3.0	0.04	132	7.2	17.9	6.9	0.6	8.5	1.0	3.1	2.4
RCS-7005	L08-2152	08-2127	101107.6	100402.3	1244.7	S7	58	76	191	3	39	1.3	24	6.5	0.8	10.70	3.8	1.4	22.2	0.3	3.7	0.03	85	9.2	18.6	3.9	0.4	8.0	1.4	2.2	1.8
RCS-7006	L08-2161	08-2128	101107.6	100402.8	1245.5	S7	60	53	197	3	33	3.7	35	7.9	0.8	11.70	4.1	0.7	19.5	0.3	3.6	0.03	54	6.3	18.7	3.3	0.6	8.4	1.0	1.3	2.3
RCS-7007	L08-2114	08-2129	101107.6	100403.4	1246.3	S7	55	54	90	2	32	5.3	35	7.4	0.8	12.10	4.0	0.5	18.1	0.3	0.9	0.03	55	6.3	20.0	3.0	1.8	8.2	1.0	3.5	2.2
RCS-7008	L08-2153	08-2130	101107.6	100403.9	1247.2	S7	74	20	119	3	36	15.2	53	4.3	0.9	8.28	2.7	0.8	17.5	0.4	2.7	0.04	59	7.1	25.9	3.8	1.0	5.3	1.0	2.6	2.8
RCS-7009	L08-2111	08-2131	101107.6	100404.5	1248.0	S7	58	27	221	3	46	9.7	44	6.5	1.0	6.75	3.3	1.1	23.0	0.4	3.4	0.04	68	6.6	25.6	4.4	1.0	6.2	1.2	2.1	2.5
RCS-7010	L08-2106	08-2132	101107.6	100405.0	1248.9	S7	38	29	263	3	41	5.2	40	5.1	0.9	3.69	3.0	1.0	19.4	0.3	4.6	0.04	63	5.9	20.7	3.7	0.4	4.6	0.8	2.5	2.2
RCS-8001	L08-2150	08-2133	101068.2	100397.2	1241.5	S8	21	52	107	3	30	4.8	19	7.3	0.8	5.13	3.2	0.4	14.9	0.3	3.2	0.04	36	4.6	13.7	2.9	0.4	5.8	1.0	1.9	1.8
RCS-8002	L08-2128	08-2134	101068.2	100397.7	1242.3	S8	22	49	161	2	28	4.9	19	6.5	0.6	5.27	3.4	0.5	15.1	0.3	2.3	0.03	33	4.6	14.2	2.8	0.8	5.8	1.4	2.2	1.8
RCS-8003	L08-2129	08-2135	101068.2	100398.2	1243.2	S8	21	38	187	2	26	4.8	20	7.1	0.6	5.44	3.4	0.5	13.9	0.3	1.9	0.03	29	4.2	14.7	2.7	0.4	6.0	1.0	0.9	1.9
RCS-8004	L08-2162	08-2136	101068.2	100398.8	1244.0	S8	18	36	121	2	26	4.3	24	7.0	0.7	5.17	3.5	0.3	14.3	0.3	3.4	0.04	38	3.7	15.0	2.8	0.5	6.0	1.1	2.5	1.9
RCS-8005	L08-2115	08-2137	101068.2	100399.3	1244.9	S8	19	35	120	2	25	3.7	22	7.1	0.8	5.70	3.7	0.4	13.5	0.3	3.9	0.04	31	3.6	15.5	2.8	0.4	6.1	1.5	1.4	1.8
RCS-8006	L08-2113	08-2138	101068.2	100399.9	1245.7	S8	34	39	210	2	28	3.0	27	8.3	0.9	9.69	3.8	0.4	15.6	0.3	0.5	0.04	40	3.8	19.4	3.3	1.1	7.1	1.0	1.7	2.2
RCS-8007	L08-2146	08-2139	101068.2	100400.4	1246.5	S8	44	33	92	2	29	3.6	31	9.2	0.8	12.10	3.9	0.5	16.5	0.3	3.6	0.03	43	4.0	22.0	3.5	1.1	8.2	1.0	1.3	2.5
RCS-8008	L08-2140	08-2140	101068.2	100400.9	1247.4	S8	54	38	136	2	33	5.9	38	9.0	0.7	13.00	4.0	0.5	19.7	0.3	3.7	0.03	48	5.2	25.8	3.7	0.6	8.8	1.0	1.3	2.4
RCS-8009	L08-2123	08-2141	101068.2	100401.5	1248.2	S8	106	22	294	2	25	9.4	48	5.3	0.9	11.60	2.4	1.1	13.0	0.3	1.9	0.04	64	11.1	26.5	3.4	0.5	4.9	0.6	2.1	2.2
RCS-8010	L08-2125	08-2142	101068.2	100402.0	1249.1	S8	71	21	177	2	38	9.4	44	5.9	0.9	7.37	2.7	1.1	18.8	0.3	0.0	0.04	75	6.6	26.3	4.0	0.9	5.3	1.3	1.7	2.4
RCS-9001	L08-2135	08-2143	101032.4	100385.5	1241.6	S9	33	34	350	2	62	2.1	18	9.8	1.1	2.69	3.5	2.1	31.2	0.3	1.3	0.03	120	10.7	17.1	5.1	0.8	7.7	1.2	5.9	2.3
RCS-9002	L08-2096	08-2144	101032.0	100385.9	1242.4	S9	30	39	84	2	58	2.0	9	6.8	0.9	3.49	3.3	1.7	29.7	0.3	4.5	0.02	106	15.8	15.7	4.3	0.5	7.8	1.2	6.5	2.1
RCS-9003	L08-2156	08-2145	101031.6	100386.2	1243.3	S9	23	35	129	2	57	1.8	12	6.3	1.0	5.75	3.3	1.4	27.8	0.3	0.8	0.02	95	10.3	16.6	4.8	0.9	8.0	1.4	2.9	2.1
RCS-9004	L08-2119	08-2146	101031.2	100386.6	1244.1	S9	21	39	158	2	90	2.8	14	6.5	1.2	7.11	4.0	1.1	57.3	0.3	4.2	0.02	72	6.2	16.5	5.4	1.0	8.3	1.6	5.0	2.1
RCS-9005	L08-2098	08-2147	101030.9	100387.0	1245.0	S9	24	76	56	2	39	5.5	16	7.0	0.6	5.08	3.2	1.3	20.2	0.3	13.4	0.03	83	8.5	15.2	3.1	0.6	6.2	1.1	4.1	1.7
RCS-9006	L08-2099	08-2148	101030.5	100387.4	1245.8	S9	15	53	102	2	25	5.7	19	7.2	0.6	5.76	3.6	0.4	13.6	0.3	4.3	0.04	31	3.7	16.2	2.5	1.1	5.4	1.2	1.3	1.9
RCS-9007	L08-2126	08-2149	101030.1	100387.7	1246.6	S9	13	50	138	3	27	5.0	19	7.4	0.6	4.72	3.2	0.4	13.2	0.2	2.1	0.05	31	2.9	14.5	2.5	0.3	4.8	1.8	1.5	1.7
RCS-9008	L08-2091	08-2150	101029.7	100388.1	1247.5	S9	15	37	245	2	30	4.4	26	9.0	0.7	5.67	3.4	0.5	15.8	0.3	1.1	0.05	38	3.3	15.7	3.0	0.6	5.7	1.5	2.3	2.0
RCS-9009	L08-2127	08-2151	101029.4	100388.5	1248.3	S9	31	40	139	2	29	5.3	29	8.1	0.7	10.40	3.6	0.4	16.3	0.3	3.4	0.04	47	3.8	18.6	3.1	0.9	7.0	1.0	1.0	2.1
RCS-9010	L08-2089	08-2152	101029.0	100388.9	1249.2	S9	48	51	112	2	32	5.2	32	8.7	0.9	10.30	3.9	0.5	18.1	0.3	3.4	0.04	48	4.0	22.1	3.3	0.5	7.3	1.1	2.2	2.2
RCS-10001	L08-2105	08-2153	101068.0	100408.0	1253.0	S10	47	23	152	2	45	7.9	50	4.6	0.7	6.06	3.6	1.0	22.8	0.4	3.4	0.04	63	5.8	24.8	4.1	0.5	6.1	1.2	1.5	2.3
RCS-10002	L08-2097	08-2154	101068.0	100408.0	1254.0	S10	77	29	141	3	45	4.8	55	4.4	0.8	6.31	2.4	0.8	20.5	0.2	4.4	0.03	61	10.1	19.7	3.6	0.8	4.8	1.0	2.6	1.6
RCS-10003	L08-2090	08-2155	101068.0	100408.0	1255.0	S10	86	19	264	2	41	4.4	60	3.5	1.1	6.61	2.3	0.9	19.7	0.3	0.1	0.03	68	16.8	20.1	3.7	0.8	4.3	1.1	2.7	1.9
RCS-10004	L08-2093	08-2156	101068.0	100408.0	1256.0	S10	103	14	247	3	46	6.0	59	3.5	0.8	8.74	2.9	0.8	21.8	0.2	0.6	0.03	46	9.8	20.4	3.8	0.5	6.2	1.0	2.6	1.8

GEOCHEMISTRY OF SCOTT PIT PROFILES

Field No	Lab No	Lib No	East	North	RL	Profile	As	Au	Ba	Br	Ce	Co	Cr	Cs	Eu	Fe	Hf	K	La	Lu	Mo	Na	Rb	Sb	Sc	Sm	Ta	Th	U	W	Yb
		Unit	m	m	m		ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Detn Lt	-	-	-		2	5	100	2	10	1.0	5	1.0	1.0	0.10	1.0	0.4	0.5	0.2	10.0	0.02	20	0.5	0.1	0.2	1.0	0.5	1.0	2.0	0.5
RVS-1000	L08-2213	08-2163	99998.8	101611.8	1247.1	V1	108	50	120	1	32	0.9	38	9.8	0.8	10.60	2.8	1.0	14.6	0.2	3.9	0.08	80	8.6	23.5	3.9	0.5	4.3	2.3	2.7	2.0
RVS-1001	L08-2189	08-2164	99998.0	101611.8	1247.9	V1	99	55	161	1	33	1.9	53	10.6	1.0	9.94	2.6	0.5	17.1	0.3	4.3	0.09	62	9.0	23.6	4.4	0.6	4.9	1.0	3.1	1.9
RVS-1002	L08-2194	08-2165	99997.3	101611.8	1248.7	V1	71	75	84	2	36	3.0	56	10.8	1.0	8.05	3.2	0.5	18.8	0.3	4.1	0.06	53	8.2	19.7	4.5	1.2	5.4	1.8	3.9	1.8
RVS-1003	L08-2197	08-2166	99996.5	101611.8	1249.5	V1	49	58	172	2	44	1.4	44	11.5	1.1	5.55	3.6	0.4	20.1	0.3	3.5	0.08	57	7.4	18.2	4.4	1.4	5.5	1.0	4.1	1.8
RVS-1004	L08-2173	08-2167	99995.7	101611.8	1250.3	V1	48	76	133	1	39	2.7	44	11.4	1.0	5.86	3.5	0.4	19.9	0.3	3.8	0.05	46	7.2	18.5	4.3	0.6	5.4	1.0	4.2	1.8
RVS-1005	L08-2170	08-2168	99995.0	101611.8	1251.1	V1	39	77	87	1	38	3.0	41	12.3	1.0	4.75	3.7	0.4	20.4	0.3	3.8	0.06	38	6.9	18.1	4.3	0.8	6.4	1.0	3.0	1.7
RVS-1006	L08-2172	08-2169	99994.2	101611.8	1251.8	V1	41	84	85	1	42	2.2	45	11.1	1.0	4.98	3.8	0.4	21.8	0.3	3.9	0.05	58	7.5	18.6	4.6	0.8	6.3	2.4	2.4	2.0
RVS-1007	L08-2210	08-2170	99993.5	101611.8	1252.6	V1	38	94	148	1	45	3.7	38	12.3	1.1	4.60	3.8	0.4	21.6	0.3	3.7	0.09	57	6.9	19.9	4.5	0.6	6.2	1.4	4.1	2.1
RVS-1008	L08-2192	08-2171	99992.7	101611.8	1253.4	V1	27	112	246	2	42	3.1	35	11.2	0.9	3.46	3.7	0.3	23.0	0.3	3.8	0.09	42	6.2	17.9	3.8	1.2	5.7	1.0	4.9	1.8
RVS-1009	L08-2163	08-2172	99991.9	101611.8	1254.2	V1	29	95	62	1	51	3.0	39	11.5	0.8	4.11	4.3	0.3	24.5	0.3	3.2	0.06	42	7.6	19.0	4.1	0.6	7.1	1.5	5.7	2.1
RVS-1010	L08-2165	08-2173	99991.2	101611.8	1255.0	V1	29	60	88	2	36	2.5	34	10.7	1.0	4.13	4.0	0.4	21.9	0.3	3.7	0.08	35	7.0	17.3	3.4	0.6	6.5	1.8	4.8	1.7
RVS-2001	L08-2209	08-2174	100039.1	101551.2	1250.4	V2	30	75	164	2	43	4.8	35	7.4	0.8	4.99	3.3	1.1	21.8	0.3	3.8	0.03	72	4.3	27.6	3.7	0.6	5.6	1.0	2.4	2.3
RVS-2002	L08-2171	08-2175	100038.5	101550.7	1251.1	V2	41	105	153	1	35	6.2	35	7.7	1.0	7.49	2.6	0.9	21.1	0.3	4.1	0.03	64	5.6	28.1	3.4	0.8	5.6	1.6	1.5	2.0
RVS-2003	L08-2201	08-2176	100038.0	101550.2	1251.9	V2	45	86	258	2	51	5.6	36	8.7	1.0	6.31	4.1	0.7	26.2	0.3	3.9	0.03	66	6.3	27.6	4.0	0.6	7.9	2.5	1.7	2.3
RVS-2004	L08-2204	08-2177	100037.5	101549.7	1252.7	V2	54	110	116	2	49	2.3	39	12.7	0.9	4.69	3.7	0.8	21.8	0.3	3.7	0.02	81	7.4	21.5	4.1	0.5	8.2	1.6	4.6	2.3
RVS-2005	L08-2217	08-2178	100036.9	101549.1	1253.5	V2	84	173	137	2	44	3.8	41	9.5	1.0	6.09	4.0	1.2	20.0	0.3	3.8	0.04	79	8.5	22.7	3.7	0.5	7.6	1.7	5.8	2.3
RVS-2006	L08-2175	08-2179	100036.4	101548.6	1254.3	V2	69	216	324	4	42	2.2	41	10.9	1.0	5.34	4.1	1.0	21.9	0.3	4.1	0.05	80	7.0	24.0	3.9	0.6	7.7	2.3	2.6	2.2
RVS-2007	L08-2202	08-2180	100035.9	101548.1	1255.1	V2	59	110	213	2	51	3.0	39	13.2	1.0	5.19	4.3	0.9	23.8	0.4	3.8	0.03	72	7.0	24.5	4.2	1.1	7.9	1.0	2.3	2.5
RVS-2008	L08-2167	08-2181	100035.3	101547.5	1255.9	V2	43	96	94	1	41	3.2	38	9.9	0.8	4.65	4.0	0.7	24.9	0.3	4.1	0.02	53	6.7	23.2	3.9	0.6	8.1	1.8	5.7	2.1
RVS-2009	L08-2187	08-2182	100034.8	101547.0	1256.7	V2	43	116	135	2	42	4.0	41	11.5	1.0	5.22	4.1	0.6	24.1	0.3	4.1	0.02	66	6.6	23.9	3.9	0.8	7.5	1.0	4.8	1.9
RVS-2010	L08-2182	08-2183	100034.3	101546.5	1257.5	V2	35	102	132	2	34	5.2	41	8.4	0.8	5.40	4.2	0.4	21.7	0.3	4.0	0.02	52	6.5	22.7	3.5	0.6	7.7	1.0	4.0	2.2
RVS-3001	L08-2193	08-2184	100200.6	101509.3	1249.7	V3	53	289	129	1	21	4.5	39	4.6	0.4	7.21	3.5	0.3	12.4	0.3	3.8	0.02	21	6.6	20.5	2.4	0.8	6.6	2.0	1.7	2.1
RVS-3002	L08-2191	08-2185	100200.6	101508.5	1250.5	V3	48	286	127	2	24	3.9	38	3.4	0.6	7.20	3.9	0.2	13.8	0.3	3.8	0.02	21	7.1	19.1	2.6	0.5	6.6	1.3	2.9	2.0
RVS-3003	L08-2166	08-2186	100200.6	101507.8	1251.3	V3	42	295	123	2	21	3.6	41	4.7	0.8	6.32	3.9	0.2	12.8	0.3	3.7	0.02	17	6.6	18.2	2.5	1.0	6.9	1.4	1.4	2.0
RVS-3004	L08-2207	08-2187	100200.6	101507.0	1252.1	V3	44	268	138	2	25	4.0	41	4.6	0.7	6.61	4.5	0.2	12.5	0.3	5.8	0.02	23	7.1	18.7	2.7	1.0	7.5	1.0	2.1	2.3
RVS-3005	L08-2208	08-2188	100200.6	101506.2	1252.9	V3	46	289	187	2	25	4.2	43	6.1	0.7	6.94	4.3	0.3	13.0	0.4	3.6	0.02	25	7.2	19.2	2.9	0.7	7.9	2.4	2.3	2.4
RVS-3006	L08-2199	08-2189	100200.6	101505.5	1253.7	V3	48	311	83	2	28	4.3	38	7.4	0.5	7.04	4.4	0.3	13.7	0.4	3.1	0.02	34	7.0	19.3	3.0	0.9	6.9	1.5	2.4	2.4
RVS-3007	L08-2190	08-2190	100200.6	101504.7	1254.4	V3	45	318	88	2	23	4.1	37	6.2	0.6	6.69	4.2	0.3	13.3	0.3	3.8	0.02	25	6.9	17.9	2.7	0.7	6.1	2.5	1.6	2.1
RVS-3008	L08-2174	08-2191	100200.6	101504.0	1255.2	V3	70	323	1040	3	28	6.6	39	5.5	0.7	8.46	3.2	0.7	15.3	0.3	4.0	0.03	58	6.8	21.7	3.2	0.5	6.1	2.6	2.3	2.1
RVS-3009	L08-2176	08-2192	100200.6	101503.2	1256.0	V3	51	342	648	2	30	5.8	42	8.1	0.8	6.21	3.4	0.8	18.4	0.3	3.9	0.03	46	6.4	21.0	3.1	1.0	6.0	1.0	1.6	1.9
RVS-3010	L08-2203	08-2193	100200.6	101502.4	1256.8	V3	68	305	149	2	33	9.4	40	5.6	0.8	8.39	3.5	0.9	16.4	0.4	3.9	0.03	63	7.3	25.9	3.4	1.1	6.5	3.4	1.3	2.3
RVS-4001	L08-2216	08-2194	100201.7	101491.5	1259.3	V4	46	280	160	1	33	7.1	37	9.1	1.2	6.64	3.9	0.5	23.6	0.3	4.1	0.03	53	7.1	31.4	3.4	1.0	7.3	1.0	1.9	2.2
RVS-4002	L08-2188	08-2195	100201.7	101490.8	1260.1	V4	40	723	198	1	29	7.2	41	8.4	0.7	6.44	4.2	0.4	24.0	0.3	4.5	0.03	31	6.6	32.7	3.3	0.6	8.8	1.7	3.5	2.1
RVS-4003	L08-2179	08-2196	100201.7	101490.0	1260.9	V4	34	245	117	2	29	5.9	36	8.1	0.6	5.70	4.4	0.3	22.6	0.3	4.3	0.02	45	6.4	33.8	3.1	1.0	8.4	1.0	2.0	2.0
RVS-4004	L08-2214	08-2197	100201.7	101489.2	1261.7	V4	37	197	110	1	37	5.9	41	8.4	0.7	5.84	4.4	0.4	21.8	0.3	4.2	0.03	46	6.7	38.7	3.3	0.6	10.1	2.0	2.0	2.2
RVS-4005	L08-2169	08-2198	100201.7	101488.5	1262.5	V4	34	621	120	1	31	6.0	42	10.0	0.8	5.25	4.3	0.4	22.4	0.3	4.5	0.02	53	6.2	39.0	3.2	0.8	8.7	2.3	3.9	2.3
RVS-4006	L08-2195	08-2199	100201.7	101487.7	1263.3	V4	34	188	110	1	33	5.3	39	10.0	0.7	5.48	4.8	0.3	21.6	0.4	4.2	0.03	40	6.1	42.5	3.4	0.6	10.3	1.2	3.8	2.4
RVS-4007	L08-2200	08-2200	100201.7	101487.0	1264.0	V4	30	145	110	2	34	4.4	40	10.4	0.7	4.86	4.9	0.3	21.2	0.3	4.1	0.03	35	6.1	42.5	3.3	0.8	10.2	1.0	1.9	2.3
RVS-4008	L08-2185	08-2201	100201.7	101486.2	1264.8	V4	32	125	210	1	28	4.5	41	11.4	0.7	5.21	4.7	0.4	20.7	0.3	4.5	0.03	41	5.7	41.5	3.1	0.6	10.6	1.0	2.2	2.0
RVS-4009	L08-2180	08-2202	100201.7	101485.4	1265.6	V4	27	125	160	2	27	3.5	40	11.5	0.7	4.95	4.7	0.4	20.5	0.3	4.3	0.03	24	5.1	37.2	3.0	1.1	10.6	1.0	2.0	2.1
RVS-4010	L08-2206	08-2203	100201.7	101484.7	1266.4	V4	36	95	174	1	31	4.4	45	11.3	0.7	6.47	5.0	0.4	20.8	0.3	4.1	0.03	31	5.9	37.6	3.3	1.3	12.1	1.9	1.6	2.2

Field No	Lab No	Lib No	East	North	RL	Profile	As	Au	Ba	Br	Ce	Co	Cr	Cs	Eu	Fe	Hf	K	La	Lu	Mo	Na	Rb	Sb	Sc	Sm	Ta	Th	U	W	Yb
		Unit	m	m	m		ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Detn Lt	-	-	-		2	5	100	2	10	1.0	5	1.0	1.0	0.10	1.0	0.4	0.5	0.2	10.0	0.02	20	0.5	0.1	0.2	1.0	0.5	1.0	2.0	0.5
RVS-5001	L08-2196	08-2204	100028.6	101536.2	1261.8	V5	30	141	83	3	33	6.9	57	4.4	0.9	6.84	3.6	0.3	14.6	0.3	3.6	0.02	29	5.4	26.6	3.4	0.8	5.9	1.9	3.8	2.0
RVS-5002	L08-2184	08-2205	100028.1	101535.7	1262.6	V5	30	118	122	3	30	6.6	42	4.7	0.9	6.64	3.3	0.2	15.9	0.3	3.9	0.02	12	5.6	25.1	3.2	0.8	5.8	1.5	3.1	1.8
RVS-5003	L08-2177	08-2206	100027.5	101535.2	1263.4	V5	32	135	97	2	32	7.4	47	6.1	0.8	6.71	3.8	0.2	17.8	0.3	4.0	0.02	22	5.8	26.9	3.3	0.8	6.7	1.5	3.6	2.0
RVS-5004	L08-2186	08-2207	100027.0	101534.7	1264.2	V5	32	109	114	1	33	7.0	46	7.3	0.8	6.70	4.1	0.2	18.8	0.3	4.1	0.02	27	5.7	27.3	3.5	0.9	6.3	1.0	1.5	1.9
RVS-5005	L08-2183	08-2208	100026.5	101534.1	1265.0	V5	32	141	116	1	33	7.9	45	5.9	0.8	6.42	4.0	0.2	20.3	0.3	4.1	0.02	32	5.7	28.2	3.5	0.7	7.5	1.0	1.5	2.2
RVS-5006	L08-2205	08-2209	100025.9	101533.6	1265.8	V5	32	162	100	2	37	7.8	52	8.1	0.7	6.50	4.4	0.2	19.2	0.3	4.0	0.02	23	5.8	31.9	3.6	1.0	7.9	1.0	2.8	2.4
RVS-5007	L08-2178	08-2210	100025.4	101533.1	1266.5	V5	28	163	136	2	30	7.8	46	7.7	0.7	6.10	4.1	0.2	17.7	0.3	4.1	0.02	12	5.5	31.7	3.3	0.7	7.4	1.0	1.9	1.8
RVS-5008	L08-2212	08-2211	100024.9	101532.5	1267.3	V5	30	135	141	2	32	8.9	42	6.8	1.0	6.64	4.1	0.3	16.6	0.3	4.0	0.02	20	5.4	35.8	3.6	0.9	7.6	1.0	2.8	2.2
RVS-5009	L08-2211	08-2212	100024.3	101532.0	1268.1	V5	29	172	100	2	34	8.6	48	8.0	0.8	6.22	4.4	0.1	17.1	0.3	4.1	0.03	29	5.3	38.8	3.4	0.5	8.4	1.0	1.6	2.2
RVS-5010	L08-2168	08-2213	100023.8	101531.5	1268.9	V5	28	99	110	2	28	7.9	46	8.5	0.6	6.02	4.2	0.3	17.8	0.3	4.3	0.03	30	5.2	38.5	3.1	0.8	8.3	1.0	3.6	1.8

GEOCHEMISTRY OF BACKGROUND PROFILES

Field No	Lab No	Lib No	East	North	RL	Profile	As	Au	Ba	Br	Ce	Co	Cr	Cs	Eu	Fe	Hf	K	La	Lu	Mo	Na	Rb	Sb	Sc	Sm	Ta	Th	U	W	Yb
		Unit	m	m	m		ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		Detn Lt	-	-	-		2	5	100	2	10	1.0	5	1.0	1.0	0.10	1.0	0.4	0.5	0.2	10.0	0.02	20	0.5	0.1	0.2	1.0	0.5	1.0	2.0	0.5
RJS-0001	L08-2224	08-2224	101598.0	101515.0	4.5	Bkg2	33	27	249	2	54	5.5	51	5.0	0.7	4.80	5.7	1.1	32.0	0.3	3.7	0.02	78	4.1	15.2	3.9	0.6	10.2	2.1	3.7	2.1
RJS-0002	L08-2225	08-2225	101598.0	101515.0	3.0	Bkg2	35	26	683	2	52	8.9	60	6.2	0.9	5.90	4.7	1.2	28.9	0.3	3.8	0.03	67	5.4	19.5	4.3	0.6	9.1	1.0	3.5	2.3
RJS-0003	L08-2226	08-2226	101598.0	101515.0	1.5	Bkg2	31	33	349	2	54	8.2	66	5.1	1.0	5.50	5.5	0.9	28.3	0.4	3.7	0.03	67	4.5	17.8	4.3	0.7	10.4	1.0	2.4	2.5
RJS-0004	L08-2227	08-2227	101598.0	101515.0	0.0	Bkg2	38	50	260	2	46	14.3	50	3.6	0.8	6.48	4.5	0.7	23.3	0.3	3.6	0.03	50	4.4	13.7	4.0	0.5	8.7	2.1	1.5	2.2
RSS-1001	L08-2219	08-2218	101039.0	101233.0	7.5	Bkg1	20	10	233	3	39	4.1	52	6.8	0.6	3.89	4.5	0.7	24.1	0.3	3.5	0.03	73	4.0	17.6	2.9	0.6	8.3	1.0	2.2	1.8
RSS-1002	L08-2223	08-2219	101039.0	101233.0	6.0	Bkg1	32	23	397	3	46	5.9	65	4.8	0.8	6.17	5.2	0.8	26.3	0.3	3.8	0.03	67	5.1	17.4	3.9	0.6	9.2	1.6	3.9	2.1
RSS-1003	L08-2222	08-2220	101039.0	101233.0	4.5	Bkg1	29	28	218	3	50	3.9	48	4.1	0.9	4.71	5.4	1.0	26.6	0.3	3.7	0.03	53	5.7	16.4	4.2	1.1	9.3	1.8	2.8	2.2
RSS-1004	L08-2221	08-2221	101039.0	101233.0	3.0	Bkg1	27	29	214	3	57	6.6	61	5.0	1.1	5.54	5.5	0.9	30.2	0.3	3.9	0.04	89	3.9	20.0	5.0	1.1	11.2	1.7	1.7	2.3
RSS-1005	L08-2220	08-2222	101039.0	101233.0	1.5	Bkg1	38	40	340	2	48	8.4	66	5.8	1.0	6.91	4.8	0.9	24.6	0.4	3.8	0.03	60	5.7	19.2	4.7	0.8	8.3	2.7	2.3	2.4
RSS-1006	L08-2218	08-2223	101039.0	101233.0	0.0	Bkg1	38	47	800	1	39	8.7	71	5.2	0.9	7.46	4.3	1.0	21.4	0.3	3.8	0.03	65	7.2	19.4	3.9	0.5	7.7	1.1	3.9	2.1
Average							32	31	374	2	49	7.4	59	5.2	0.9	5.74	5.0	0.9	26.6	0.3	3.7	0.03	67	5.0	17.6	4.1	0.7	9.2	1.6	2.8	2.2
Minimum							20	10	214	1	39	3.9	48	3.6	0.6	3.89	4.3	0.7	21.4	0.3	3.5	0.02	50	3.9	13.7	2.9	0.5	7.7	1.0	1.5	1.8
Maximum							38	50	800	3	57	14.3	71	6.8	1.1	7.46	5.7	1.2	32.0	0.4	3.9	0.04	89	7.2	20.0	5.0	1.1	11.2	2.7	3.9	2.5

PARTIAL EXTRACTIONS OF GOLD

Lib No	RL	Au	Au	Au	Au	CN/INAA	I/INAA	H2O/INAA
		INAA	Cyanide	Iodide	Water			
	m	ppb	ppb	ppb	ppb	%	%	%
08-2184	1249.7	289	150.2	71.8	7.77	51.97	24.84	2.69
08-2185	1250.5	286	146.0	67.0	8.74	51.05	23.43	3.06
08-2186	1251.3	295	164.6	76.2	9.87	55.80	25.83	3.35
08-2187	1252.1	268	126.7	34.4	8.40	47.28	12.84	3.13
08-2188	1252.9	289	105.9	24.2	8.98	36.64	8.37	3.11
08-2189	1253.7	311	103.0	10.5	3.90	33.12	3.38	1.25
08-2190	1254.4	318	148.1	35.1	9.38	46.57	11.04	2.95
08-2191	1255.2	323	169.0	61.0	14.00	52.32	18.89	4.33
08-2192	1256.0	342	180.7	58.7	14.60	52.84	17.16	4.27
08-2193	1256.8	305	149.7	54.7	12.90	49.08	17.93	4.23
08-2194	1259.3	280	134.3	46.0	8.35	47.96	16.43	2.98
08-2195	1260.1	723	556.0	148.0	8.71	76.90	20.47	1.20
08-2196	1260.9	245	125.4	41.4	9.50	51.18	16.90	3.88
08-2197	1261.7	197	102.4	25.5	6.45	51.98	12.94	3.27
08-2198	1262.5	621	563.0	102.0	5.34	90.66	16.43	0.86
08-2199	1263.3	188	106.4	27.0	4.19	56.60	14.36	2.23
08-2200	1264.0	145	57.9	12.8	5.27	39.93	8.83	3.63
08-2201	1264.8	125	55.7	11.3	3.52	44.56	9.04	2.82
08-2202	1265.6	125	56.1	13.2	3.74	44.88	10.56	2.99
08-2203	1266.4	95	38.8	7.6	3.18	40.81	7.97	3.35

APPENDIX 3

Analytical standards

STANDARDS

Sample	LabNo	LibNo	As	Au	Ba	Br	Ce	Co	Cr	Cs	Eu	Fe	Hf	Ir	K	La	Lu	Mo	Na	Rb	Sb	Sc	Se	Sm	Ta	Th	U	W	Yb
		Unit	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppb	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
		DetnLt	2.0	5	100	2.0	10.0	1	5	1.0	1.00	0.1	1.00	20	0.40	0.5	0.20	10.0	0.02	20	0.5	0.1	10.0	0.20	1.0	0.50	0:00	2.0	0.50
STD 006	L08-2102	08-2158	2.2	106	297	4.8	41.9	<0.6	129	7.5	0.42	0.3	2.92	<6.9	3.05	21.2	0.12	<3.2	0.32	95	13.2	14.3	<2.3	2.39	0.6	5.17	<0.84	6.6	1.00
STD 006	L08-2130	08-2160	1.7	98	311	4.6	40.5	0	130	7.8	0.53	0.3	2.95	<6.7	3.16	20.9	0.16	4.1	0.31	98	13.0	14.1	<2.2	2.33	-0.5	4.96	0.7	6.1	0.98
STD 006	L08-2158	08-2162	2.1	86	376	4.7	40.6	0	127	7.7	0.65	0.3	2.70	<6.5	2.94	20.7	0.13	4.5	0.31	103	12.9	14.0	<2.1	2.27	0.9	4.64	1.07	5.9	1.02
STD 006	L08-2164	08-2214	1.7	90	375	4.6	42.4	0	132	7.8	0.47	0.3	2.82	<6.7	3.17	21.6	0.16	<3.6	0.32	106	13.4	14.4	<2.2	2.40	0.7	4.99	<0.75	6.3	1.07
STD 006	L08-2198	08-2216	2.1	81	392	4.8	36.7	<0.5	122	7.8	0.67	0.3	3.03	14.5	2.89	20.3	0.14	<3.4	0.30	108	12.9	14.0	<3.2	2.35	0.7	5.08	<1	7.2	1.06
		Mean	1.9	92	350	4.7	40.4	-	128	7.7	0.55	0.3	2.88	-	3.04	20.9	0.14	4.3	0.31	102	13.1	14.2	-	2.35	0.5	4.97	0.89	6.4	1.03
		AccVal	2.0	86	330	5.0	31.0	1	120	7.6	0.50	0.3	2.70	7	3.94	21.6	0.10	3.0	0.30	109	12.8	13.8	2.0	2.30	0.4	4.50	0:00	6.0	0.80

STD 007	L08-2088	08-2157	79.2	360	<110	6.0	8.3	11	503	<1.1	0.27	23.3	7.00	<14	<0.12	5.8	<0.03	<5	0.06	18	1.5	74.8	<4.2	1.55	1.0	32.30	5.6	15.1	1.11
STD 007	L08-2116	08-2159	79.8	331	<120	5.3	8.8	10	515	<1.1	0.40	23.9	7.26	<14	0.20	6.0	0.08	<8.6	0.06	20	1.5	76.8	<4.2	1.58	1.6	34.00	4.78	16.2	1.03
STD 007	L08-2144	08-2161	76.5	348	<110	5.8	8.5	10	503	2.3	0.42	23.1	6.78	<13	<0.2	5.7	0.08	<8.9	0.06	<15	1.3	74.4	<4	1.56	1.4	32.90	5.15	12.8	1.08
STD 007	L08-2181	08-2215	69.4	472	<150	5.3	8.2	10	393	1.9	0.35	20.2	5.83	<18	0.25	5.2	0.06	4.3	0.05	<15	1.0	62.9	<5.8	1.43	2.1	27.40	3.36	8.8	0.82
STD 007	L08-2215	08-2217	75.8	380	<150	7.2	10.5	12	462	3.3	0.62	21.6	6.67	<18	<0.12	5.4	0.07	<8.5	0.06	22	1.3	72.1	<6	1.62	1.6	32.30	5.5	16.5	1.08
		Mean	76.1	378	-	5.9	8.9	11	475	2.5	0.41	22.4	6.71	-	-	5.6	0.07	4.3	0.06	20	1.3	72.2	-	1.55	1.6	31.78	4.88	13.9	1.02
		AccVal	66.0	576	49	6.0	9.0	10	407	1.7	0.30	19.6	5.60	10	0.12	5.3	0.20	6.0	0.02	12	1.1	64.4	3.0	1.40	1.3	26.50	4	11.0	0.80

APPENDIX 4

Data disc - type README.DOC for contents and format