NORTHERN TERRITORY GOLD MINES N.L.

ANNUAL REPORT YEAR 1
27.07.93 - 26.07.94

EL 8055

VOLUME 1: TEXT, APPENDICES

NORTHERN TERRITORY GOLD MINES N.L.

EXPLORATION LICENCE 8055

HORNERS CREEK SOUTH

FIRST ANNUAL REPORT - FOR YEAR ENDING 26/7/94

REPORT NUMBER: NTGM/8055/1

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AJ Hosking and Associates Pty Ltd
Darwin

October 1994

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FIGURES

SUMMARY

The licence was granted to Northern Territory Gold Mines N.L. on 27/7/93 for a period of six (6) years.

The licence area contains low-grade metasediments and possible metavolcanics of Palaeoproterozoic age which have been folded strongly and intruded in at least one locality by pro-orogenic dolerite.

Research and data compilation comprised the main exploration activities in the first year of tenure. All data were processed digitally per a Geographic Information System. Open-file records of Commonwealth and Territory government agencies were the main sources of data. A considerable amount of historical geological and exploration data was processed.

The activities in the first year have demonstrated that subsequent exploration should be focussed upon structural targets with particular emphasis given to soil-covered areas.

INTRODUCTION

Exploration Licence (EL) 8069 of nine one minute by one minute graticular blocks was granted to Northern Territory Gold Mines N.L. (NTGM) by the Northern Territory Department of Mines and Energy (NTDME) on 27/7/93 for a period of 6 years. The first licence year expired on 26/7/93.

The licence area is one of 11 comprising the McKinlay River project area of NTGM. The main administrative details of the licences are provided in Table 1 below.

Table 1

Details of McKinlay River ELs

EL no,	No. of blocks	Date of grant	Term (years)	Expenditure commitment	Title year
7155	4	05/12/90	6	$ 8000	4
7674	17	31/03/92	6	$ 5000	3
8055	9	27/07/93	6	$20000	1
8056	14	15/09/93	6	$30000	1
8069	36	27/04/93	6	$35000	1
8161	1	20/09/93	6	$ 5000	1
8170	42	16/07/93	6	$35000	1
8184	62	10/12/93	6	$30000	1
8228	24	31/12/93	6	$23000	1
8424	34	24/12/93	6	$20000	1
8425	3	24/12/93	3	$10000	1

Transfers of the title for ELs 7155 and 7674 from the original holder, Robert Biddlecombe were approved by NTDME on 29/10/93. Statutory areal reductions also have occurred as follows:

EL 7155 - 15 blocks originally ; first reduction 5/12/92 with 8 blocks retained ; second reduction 17/1/94 with 4 blocks retained

EL 7674 - 34 blocks originally ; first reduction 15/7/94 with 17 blocks retained

The total number of blocks in the project area is 246 of which EL 8055 comprises approximately 4 per cent.

The initial expectation of the company was that a very substantial field program in the project area would have been completed in the 1994 dry season, including a substantial component for EL 8055. However, unforseen problems with the public float of NTGM's parent company, Australian Gold Mines No Liability (AGM) on the Australian Stock Exchange caused major delays and difficulties in funding the proposed exploration program. Consequently, only research, administration and data management activities have occurred in Year 1. Considerable time, effort and expenditure has been devoted to digitising relevant technical data and establishing a Geographic Information System (GIS) for ongoing storage, processing, interpretation and presentation of such data per Ekos Research (NT) Pty Limited of Darwin. Details of the GIS are contained in the First Annual Report for EL 8069.

Part of one Mineral Claim (MCN 327), covering ground in the northern part of the Mount Wells Mining Centre, appears to lie within the licence area. However, corner pegs have not been checked to determine if this is the case.

The main exploration target of the company is large-tonnage, low-grade open-pittable gold mineralisation similar to that which occurs at major deposits at Union Reefs and Mount Todd. The potential for high grade gold deposits amenable to underground mining, and for base-metals deposits also will be assessed routinely during exploration.

This report contains details of the geology of the licence area, the results of previous exploration plus the research and data management activities which have occurred in Year 1 and part of Year 2 (to 30/9/94).

No sacred/significant sites are registered or recorded with the Aboriginal Areas Protection Authority.

LOCATION AND ACCESS

The location of EL 8055 is shown in Figure 1. The area occupied by the other ELs which with EL 8069 comprise the company's McKinlay River project area also is shown. The licence area occurs in the southwest part of the total area which is held.

The licence area is situated approximately 40 km northnorthwest of the township of Pine Creek. Vehicle access to the area is gained most conveniently from the south via the Stuart Highway, thence via the good, unsealed road adjacent to the old railway line and thence via the good, unsealed Burrundie Siding - Mount Wells - Mount Harris road. The old Mount Wells Mining Centre lies to the immediate south of the southern boundary of the area. Access can be gained also from the west via an approximately east-west track between Ban Ban Springs homestead and the McKinlay Gold Mine (within the contiguous EL 8069) and thence south to the licence area. However, access from the west is complicated by the fact that, for much of its route, this track passes over a black-soil plain which is difficult, if not impossible, to traverse by vehicle in the wet season (particularly over the central portion of the licence area between Compass Creek in the northwest and McKinlay River in the east).

A track leading to the Mavis Tin Mine and commencing near the southeast corner of the licence area offers convenient access to the western part.

SURFACE TENURE

The licence area lies wholly within Ban Ban Springs Perpetual Pastoral Lease 1111 (NT Portions 695 and 1344). This property supports beef raising.

PHYSIOGRAPHY

The principal physiographic and cultural features of the licence area are shown in Figure 2.

The area is dominated by Horners Creek, a major tributary of the McKinlay River. The creek drains from the south and west and rises at the north-south drainage divide between the McKinlay and Margaret river systems as shown by McGowan (1989). Numerous, permanent waterholes occur along Horners Creek.

A major physiographic study of the region bordered by the Alligator and East Alligator rivers was undertaken by CSIRO in the period 1965 - 1969 This study covered the licence area. Several authors, notably Williams (1969), Story (1969) and Williams and others (1969), contributed papers to a major publication which is the principal source of physiographic data in this report. Additional data have been obtained from the Vegetation Map of the NT published by the Conservation Commission of the NT ((Wilson and others, (1991)). The distributions of soil and vegetation types are shown in Figures 3 and 4.

Two major land units are recognised by Williams and others (1969). These are the dissected foothills and alluvial floodplains. The former unit is characterised by, low hills and rubble-covered rises formed by metasedimentary rocks with intervening alluvial flats. Remnants of strike ridges also are present. Woodland and/or stunted woodland (Box and Bloodwood) occur on the hills and rises with a grassland under-story with grassland on the flats. Soils vary from leached, skeletal types to yellow, loamy types on the elevated areas to alkaline types on the flats. The latter unit is marked by floodplains, deeply incised channels, levees and billabongs. Sands and silts occur on floodplains and in channels while areas of loamy to sandy alkaline and/or acid soils also are present. Paperbark (Melaleuca) woodland and open savannah grassland are distinctive features of this land unit.

The licence area has a monsoonal climate with an average annual rainfall in the order of 1500 mm, with most rain falling in the summer months. No waterbores are known to exist within the licence area.

REGIONAL GEOLOGY

The licence area lies within the Pine Creek Inlier (or Geosyncline). This major tectono-sedimentary unit contains pelitic and psammitic sediments with minor

volcanics of Palaeoproterozoic age which developed in a basinal setting on granitic basement of Late Archaean age. The sedimentary pile subsequently was deformed and metamorphosed (mostly to greenschist facies) by the Top End Orogeny which lasted for approximately 180 Ma (1870 - 1690 Ma). Pre-orogenic sills of mafic intrusives and syn- to post - orogenic granitoids intrude the metasedimentary and metavolvanic rocks. Most granitoids were emplaced in the waning stages of the tectonism.

A voluminous literature has developed for the Inlier over more than 50 years commencing with studies by the Aerial, Geological and Geophysical Survey of Northern Australia (AGGSNA) of mine areas and their surrounds. A considerable boost to the geological studies and to exploration followed the discovery of uranium at Rum Jungle in 1948. However, it is beyond the scope of this report to review this literature and only key publications have been referenced, notably those of Walpole (1968), Ferguson (1980), Stuart-Smith and others (1986), Needham and others (1988), Stuart-Smith and others (1993) and Nicholson and others (1994) which are particularly relevant to the licence area and its near surrounds. Geological maps at 1:63,360, 1:100 000 and 1:250 000 scales with accompanying reports produced by Commonwealth and NT government agencies are major components of this extensive database. A vast amount of data has accumulated from base-metal, gold and uranium exploration programs. Studies dealing with specific features of sedimentation, tectonism, magmatism and metallogenesis also have been features of the developing literature.

Key references dealing with the mineralisation of metallogenesis of the Inlier are those of Crohn (1968), Needham (1981), Nicholson and Eupene (1984), Nicholson & Eupene (1990), Needham and de Ross (1990), Ahmad and others (1994), Ormsby and others (1994) and Bajwah (1994).

In this report, the regional geology and stratigraphic framework proposed by Nicholson and others (1994) are adopted (see Figures 6 and 7). These authors have advocated a three-fold lithostratigraphic subdivision rather than the four-fold subdivision advocated by earlier BMR authors and applied widely in recent years. The significance of rim faults around major granitic bodies also is highlighted by Nicholson and others (1994). Such faults also were postulated by authors reporting on airborne geophysical surveys of the McKinlay River area in the 1960s eg. Goodeve (1966).

The licence area contains metasediments of the lower part of the Finniss River Group (Burrell Creek Formation) and possibly (?) metasediments and minor metavolcanics of the upper part of the Frances Creek Group (Mount Bonnie Formation, Gerowie Tuff and Koolpin Formation - comprising the South Alligator Group of earlier BMR authors). However, units of the older Frances Creek Group are believed to be present only in the extreme western part of the licence area. Large, granitic bodies to the near west and south of the licence area (components of the Cullen Bathylith) probably are temporally, spatially and genetically related to the gold mineralisation in the McKinlay River area. The mineralisation at the McKinlay Gold Mine to the north of EL 8055 appears to be within the contact metamorphic aureole of the Minglo Granite component of the Cullen Bathylith. The tin (-copper -tungsten) mineralisation in the Mount Wells Mining Centre to the near south of EL 8055 occurs in six quartz - sulphide lodes spatially above greisenised granite. Some lodes contain up to 0.5% Cu.

Pelitic and psammitic metasediments (originally mudstone, siltstone and greywacke) are predominant in the Burrell Creek Formation. The Koolpin Formation consists of pyritic and carbonaceous pelites plus iron-rich chert and iron formation. The Gerowie Tuff consists of felsic tuffs, tuffaceous chert, iron formation and siltstone. The Mount Bonnie Formation has a comparatively lower component of chemical sediments compared with the two underlying units and a comparatively higher psammitic component in the form of greywacke.

The metasediments and metavolcanics in the general region have undergone at least two phases of folding. The first phase produced tight to isoclinal, upright folds about NNW - SSW axes while a second, gentler phase produced broad, open folds about east-west axes.

LOCAL GEOLOGY

The geology of the licence area is shown in Figure 8.

The licence area contains mainly metapelites and metapsammites of the Burrell Creek Formation plus (?) very limited outcrop of the upper units of the older Frances Creek Group. Tight, complex folding is evident.

Zamu Dolerite, presumably a sill, crops out to a very limited extent near the eastern boundary of the licence area and trends NNW - SSE, as does outcrop of Gerowie Tuff in the near vicinity (close to the east bank of the McKinlay River).

White (buck) quartz veins and blows are common throughout the licence area, particularly in the western part.

Faults and shears similarly are common in the western and central parts, with dominant north - south and northwest - southeast orientations.

The effects of contact metamorphism (notably hornfelsing) due to the Prices Springs Granite, a component of the Cullen Bathylith, also are evident in the western part of the licence area. Geophysical evidence indicates that granite also underlies most of the complexly folded metasediments, metavolcanics and Zamu Dolerite to the east of the licence area.

KNOWN MINERALISATION

The former Mount Wells Policy Reserve occupied part of the licence area. This reserve, which was created in 1964 to encourage small-scale mining, was revoked in May, 1988. Old alluvial workings forming part of the Mount Wells Mining Centre lie just inside the southern boundary of the licence area.

The Mount Wells Tin Mine was discovered in 1879 and worked intermittently until 1929, with recorded production being approximately 100,000t grading 1% Sn. A few tonnes of hand-picked ore grading 37% Cu also were produced in 1917. The Mount Wells Battery was established in 1961 as an aid to prospecting and small-scale mining in the Pine creek district. Subsequently, the battery was upgraded and then sold eventually in 1981 to Jingellic Minerals N.L., a company which acquired title to the Mount Wells Tin Mine in 1970. Ownership of the mine and facilities then passed in 1983 to Territory Resources N.L. and a further upgrading of the plant occurred in 1985, followed by further production from three of the six lodes (approximately 5,000t of ore with grades in the range 0.3 - 0.8% Sn). Underground ore reserves in 1985 in probable and possible categories stood at some 360,000t and 375,000t of 1.5% Sn and 1.3% Sn respectively while an open-cut reserve of 400,000t of 0.4% Sn was indicated.

The NTDME Mine Data Sheet for the mine is provided in Appendix 1 (Item 1). Part of one current Mineral Claim (MCN) appears to lie within the licence area.

Small-scale production also has occurred at the Mavis Tin Mine to the near west of the northwest corner of the licence area (3.5t of concentrates).

PREVIOUS GEOLOGICAL STUDIES AND EXPLORATION ACTIVITIES

The central part of the Pine Creek Inlier has been the focus of many geological studies by Commonwealth and Territory government agencies and of substantial mineral exploration in recent years. The latter activities have occurred mainly in the late 1980s and early 1990s and have been concentrated upon geochemical sampling (stream sediment and soil principally), being directed towards the search for one or more of gold, base-metals and uranium. Gold exploration has been the most recent. Small-scale production of tin has occurred from small mines near the licence area in past years, notably from Mount Wells.

Significant aspects of the past government work are:

- work by the Aerial, Geological and Geophysical Survey of the Northern Australia (ASSSNA) at the McKinlay Gold Mine : Hossfeld (1940)
- core drilling by Mines Branch of the Department of the Northern Territory at the McKinlay Gold Mine: Newton (1974)
- 1:63 360 scale geological and geophysical mapping by the BMR in the 1950s and 1960s: eg Goodeve (1966)
- 1:00 000 scale geological mapping by the BMR in the 1980s: Stuart-Smith and others (1986)
- detailed geological and metallogenic studies by the BMR of the Cullen Mineral Field: Stuart Smith and others (1993)
- metallogenic mapping by the NTGS of the Pine Creek 1:250 000 mapsheet area: Ahmad and others (1994)

Geological and geophysical plans provided in this report are based on BMR publications as listed above eg Figures 8 and 9.

Detailed mineral exploration has been undertaken principally by;

- Billiton Australia: EL 6445 (Hardies South), Northern Gold NL for Knave Pty Ltd EL 6189.

Billiton Australia ((Mackay (1991, 1992) - see also Figures 10 and 11)) utilised both geochemistry (mainly stream-sediment sampling) and geophysics in its exploration program on EL 6443. Detailed high-quality aeromagnetic data were obtained and interpreted by the company as the product of a multi-client airborne survey flown by Aerodata in 1989. The company also reprocessed and interpreted earlier BMR aeromagnetic data. Ground magnetometry on one grid also was undertaken. Rock sampling was utilised for follow-up work on low-order stream-sediment anomalies. Results were discouraging with the principal conclusions being:

- anomalous stream-sediment values (to 26.9 ppb) have their sources outside EL 6443 (and outside EL 8055) within the northern part of the Mount Wells Mining Centre
- magnetic features are due to lithologic variation only (varying magnetite content) with no indications existing of sulphidic (pyrrhotitic) horizons
- most quartz veins are non-sulphidic, small and scattered, with no concentration in stockworks or shear zones; gold contents are insignificant

Northern Gold NL ((Partington (1989); Stokes (1991) - see also Figures 10 and 11) carried out a substantial exploration program, involving stream-sediment, soil and rock-chip sampling and interpretation of aeromagnetic data (from 1989 Aerodata multi-client survey). Results were discouraging with the principal conclusions being:

- stream-sediment sampling (279 samples) identified two anomalous zones associated with quartz stockwork and/or vein systems within shear zones
- follow-up soil sampling (183 and 108 samples respectively) produced only point-source anomalies associated with small quartz veins which are only spottily (randomly?) anomalous for gold; no width or strike continuity for gold anomalism exists in the veins (a peak value of 11.4 ppm was obtained in one isolated sample of gossanous quartz but virtually all others contained less than 1.0 ppm).

The main conclusions which can be drawn from the previous exploration are:

- the rock units of the licence area have produced very limited evidence to date of their potential economic significance
- linear magnetic features within the Burrell Creek Formation may represent magnetite-bearing intervals in the metasediments

- hornfelsing of metasedimentary rocks has occurred as a consequence of proximity to the Prices Springs Granite
- quartz veins are mainly of the white (buck) type with only limited evidence for pyritisation
- most anomalous gold values are either single-sample or not confirmed by later sampling and not significantly greater than background ranges

EXPLORATION CRITERIA

The criteria being observed by NTGM in its exploration of the area are:

- principal focus upon subareas of non-outcrop given that past exploration activities have had a strong geochemical focus (soil and/or rock sampling) upon outcropping subareas with negative results
- delineation of structurally complex subareas using available detailed aeromagnetic data, satellite imagery and colour aerial photography
- determination of the areal extents of the Zamu Dolerite and upper units of the Frances Creek Group in the eastern and western parts of the licence area respectively
- evaluation of the significance, so far as mineral prospectivity is concerned, of large granitic intrusives to the near west and south of the licence area (and particularly the contact aureoles of these bodies)
- sampling of pyritic and graphitic rock units in the Burrell Creek Formation and in units of Frances Creek Group
- sampling of tourmalinised rocks, if present

The principal aim of the exploration program in Year 2 will be to locate drilling targets in appropriate structural settings via a combination of detailed geological mapping, soil and/or rock sampling and ground magnetometry. Given the extensive cover of black soil within the licence area, the use of auger and/or RAB drilling to obtain representative samples is foreseen.

WORK COMPLETED IN YEAR 1 OF TENURE

The following activities were undertaken in Year 1:

- acquisition and digitising of colour aerial photography for the McKinlay River project area, which includes the licence area

- research of available geological and exploration-related data, mostly available in the open-file records of NTDME, in connection with compilation of the prospectus for Australian Gold Mines NL (AGM), the parent company of NTGM ; this work was carried out by Dr. G.R. Orridge of Geonorth Pty. Ltd., Darwin and submitted as the Independent Geologist's Report for the prospectus ((Orridge (1994)). The prospectus, which was issued in April 1994, subsequently was withdrawn in June 1994
- title management by principals and agents of NTGM based in Perth, Melbourne and Darwin
- establishment of a Geographic Information System (GIS) with subsidiary databases to manage all data generated by NTGM for its NT titles; this work was carried out by Mr. R. Fernandez of Ekos Research (NT) Pty. Limited
- assessment of options to obtain existing geophysical data (principally the aeromagnetic type) and satellite imagery in digital format to allow image processing

This work has extended into the early months of the second year of title and included an extension of the research activities with work by AJ Hosking of AJ Hosking and Associates Pty. Ltd.

As a consequence of the failure of the public float of AGM, alternative sources of funding for NTGM's exploration program in the NT have been sought.

EXPENDITURE STATEMENT FOR YEAR 1

	$
Darwin Office - Consultants	6117
Tenement Costs	437
Aerial Photography	480
Data Acquisition and Compilation	255
Geological Consultants	4872
GIS Management	1407
Travel and Accommodation	1396
Administration Overheads	1752
	$16,716

The expenditure incurred in Year 1 was less than the covenant. Accordingly an application for a Variation of Condition has been made.

Three geological consultants were utilised for varying periods in connection with preparation of the Prospectus for AGM, title administration and advice re programs and budgets for the title.

PROPOSED EXPLORATION PROGRAM AND BUDGET FOR YEAR 2

Given the generally disappointing nature of the results of past exploration activities within and/or immediately adjacent to the licence area, the exploration philosophy and program for Year 2 will be based upon the following key aspects:

- completion of a structural interpretation of the area using colour aerial photographs plus images prepared from digital Thematic Mapper and aeromagnetic data
- rock-chip, soil and ground magnetic traverses across prospects delineated by the structural interpretation with auger and/or RAB drilling as necessary to sample beneath black soil
- detailed geological mapping of the prospects (subject to outcrop limitations)

Most emphasis will be placed upon:

- assessment of the prospectivity of soil-covered areas
- delineation of faults, shear zones and folds (particularly the surface traces of anticlinal hingelines)
- determination of the areal extents and prospectivities of the units of the Frances Creek Group and the Zamu Dolerite in the western and eastern portions respectively of the licence area
- delineation of magnetic units within the Burrell creek Formation and of any major discontinuities or aberrations associated with them
- assessments of graphitic - pyritic and tourmalinised rocks as potential hosts to mineralisation

Expenditure is envisaged as follows:

		$
Geology - detailed mapping, supervision, data interpretation		3000
Geophysics - computer imaging of TM and aeromagnetic data, ground magnetic traversing		6000
Geochemistry - soft and rock-chip sampling (traverses), assaying		4000
Gridding		1000
Information Management (per GIS)		2000
Title Management		2000
		18000
Overheads (10%) - Darwin and Perth offices		1800
	Say	$20,000

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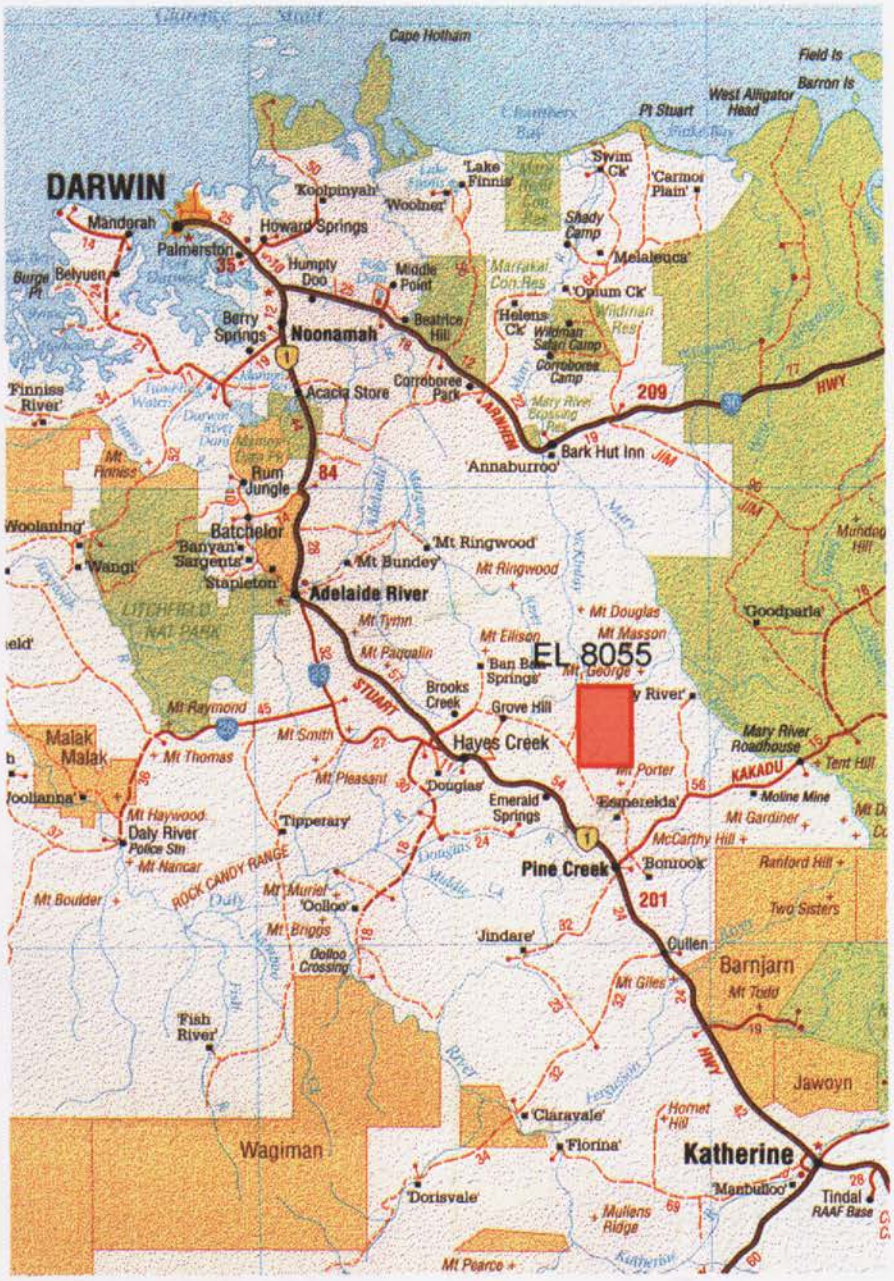
EL 8055



Prepared by:

er EKOS RESEARCH (NT) for:

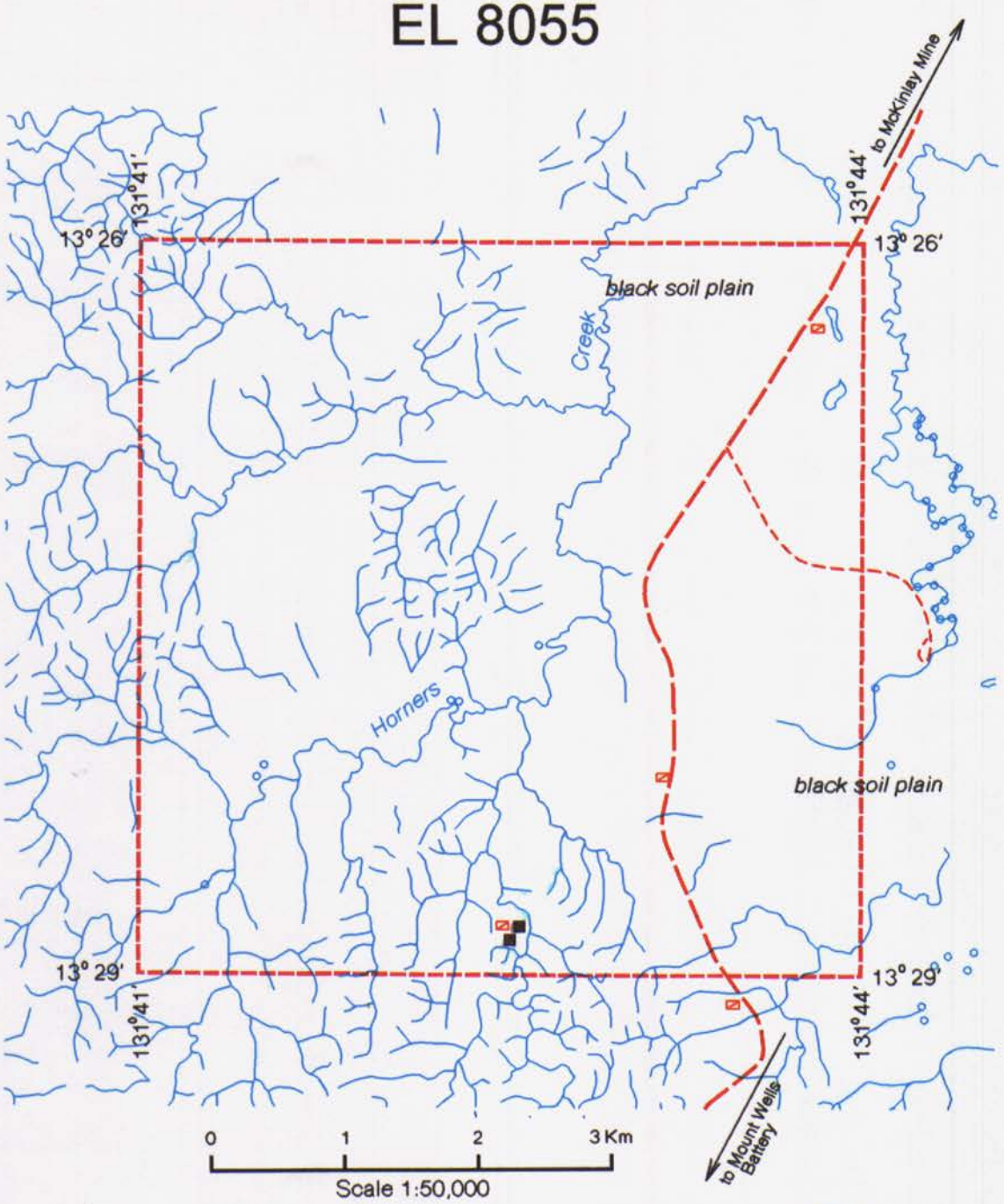
NORTHERN TERRITORY
GOLD MINES NL

ACN 057 123 930

FIGURE 1
LOCATION

PHYSIOGRAPHIC AND CULTURAL FEATURES

EL 8055



LEGEND

- Minor Road
- Vehicular Track
- River, Stream
- Mine
- Building

COMPILED FROM 100,000 MAPPING SERIES
PRODUCED BY THE ROYAL AUSTRALIAN SURVEY CORPS
MAP 5271 McKINLAY RIVER

Prepared by:

er EKOS RESEARCH (NT) for:

NORTHERN TERRITORY
GOLD MINES NL

ACN 057 123 930

FIGURE 2
PHYSIOGRAPIC AND CULTURAL FEATURES

AERIAL PHOTOGRAPHY

EL 8055

0 1 2 3 Km

Scale 1:50,000

LEGEND

- Minor Road
- Vehicular Track
- Mine
- Building

Date of photography 8 October 1993
Flying Height 4633 AMSL
Photo scale 1:50,000 Aprx.
Film AM558 Run 2 Frame 020

Geocorrected and geolocated by:

er EKOS RESEARCH (NT) for:

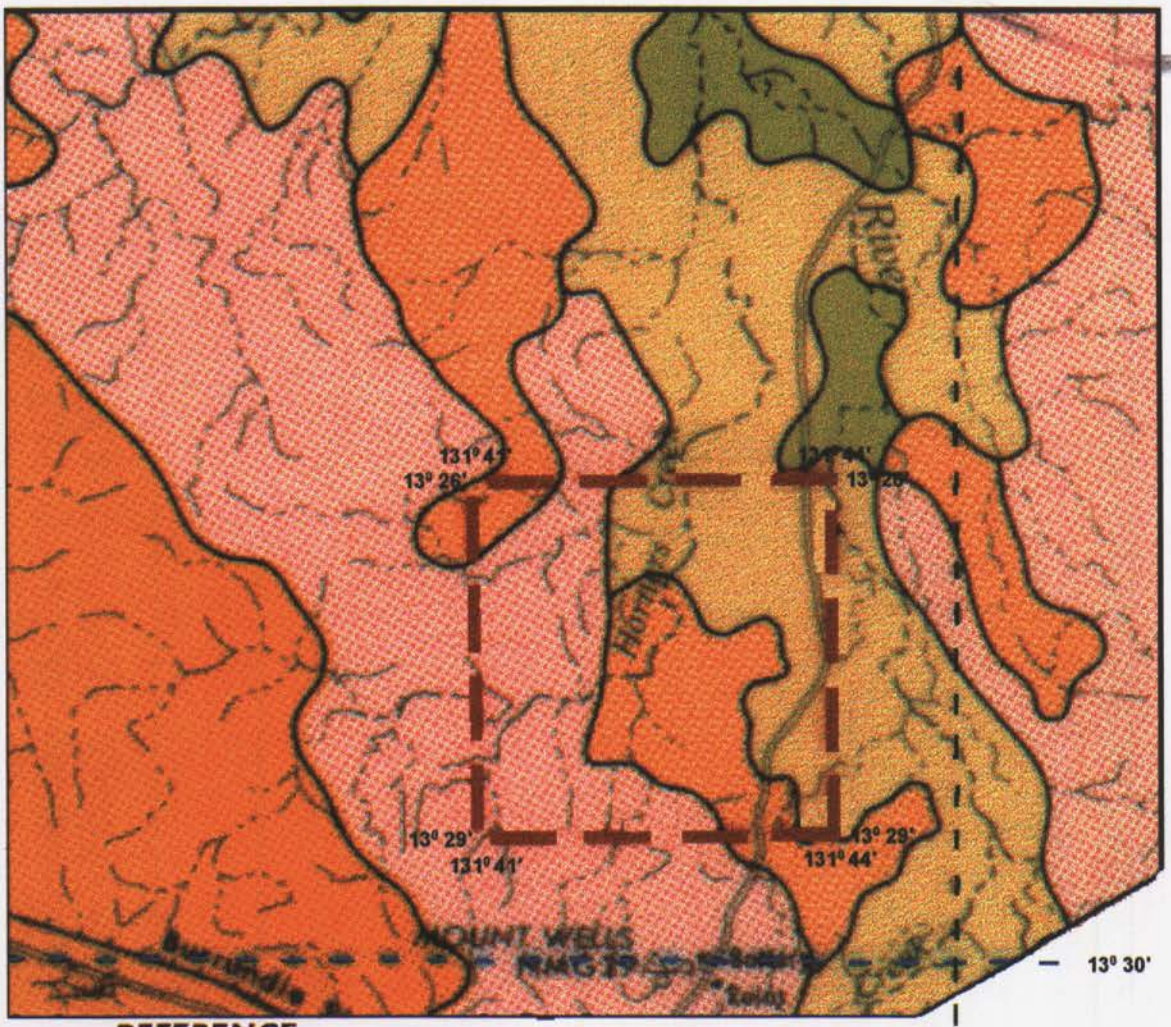
NORTHERN TERRITORY
GOLD MINES NL

ACN 057 123 930

FIGURE 3
AERIAL PHOTOGRAPHY

SOIL TYPES

EL 8055



REFERENCE

Soils of the dissected foothills, Buldiva plateau, and granite hills

Skeletal soils (Ucl, Uml) and outcrop

Skeletal soils, gradational (Gn2) and uniform (Uc5) red soils, and gradational yellow earths (Gn2), acid on colluvial slopes, alkaline in narrow flood-plains; minor texture-contrast (Dy3) soils

Soils of the flood-plains

Gradational (Gn2, Gn3) yellow soils over stratified alluvium; gradational (Gn4) silty soils on poorly drained sites

Uniform (Um5) deep silts on recent plains and levees, gradational (Gn2) red soils on levees; minor texture-contrast (Dy3) and gradational (Gn3) alkaline soils

COMPILED FROM C.S.I.R.O., Division of Land Research
SOILS MAP by A.D.L. Hooper
Land Research Series No. 25, 1969

Prepared by:

er EKOS RESEARCH (NT) **for:**

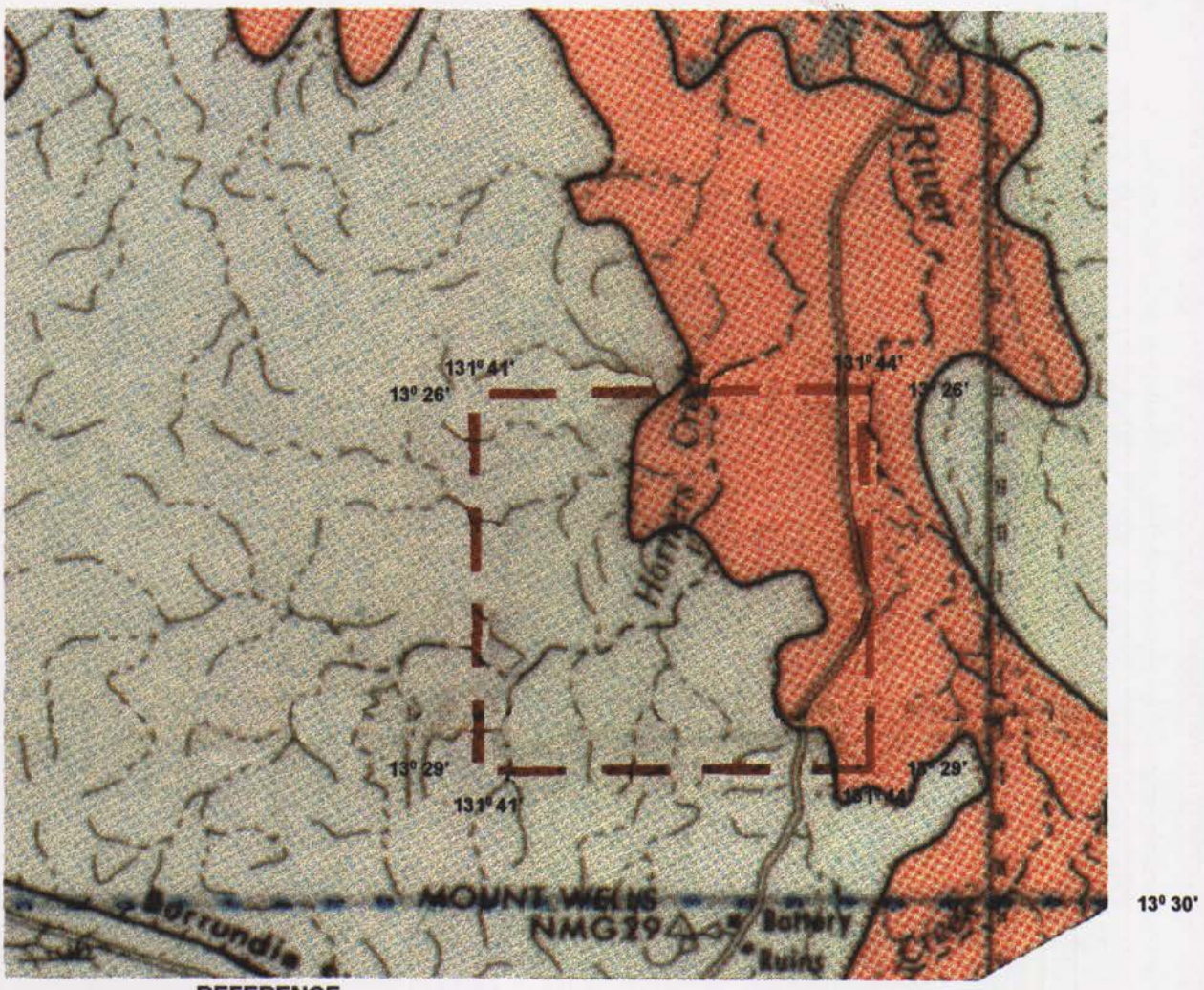
NORTHERN TERRITORY
GOLD MINES NL

ACN 057 123 930

FIGURE 4
SOIL TYPES

VEGETATION TYPES

EL 8055



REFERENCE

Woodland. Eucalypts usually dominant, some deciduous, no canopy, height under 40 ft, visibility 100-300 yd.

Grasland and savannah. Tall, mid-height, or short grasses, with scattered trees, visibility over 400 yd.

COMPILED FROM C.S.I.R.O., Division of Land Research
VEGETATION MAP by R. Story
Land Research Series No. 25, 1969

Prepared by:

er EKOS RESEARCH (NT) **for:**

NORTHERN TERRITORY
GOLD MINES NL

ACN 057 123 930

FIGURE 5
VEGETATION TYPES

Generalised geology of the central Pine Creek Geosyncline
by P.M. Nicholson and others.

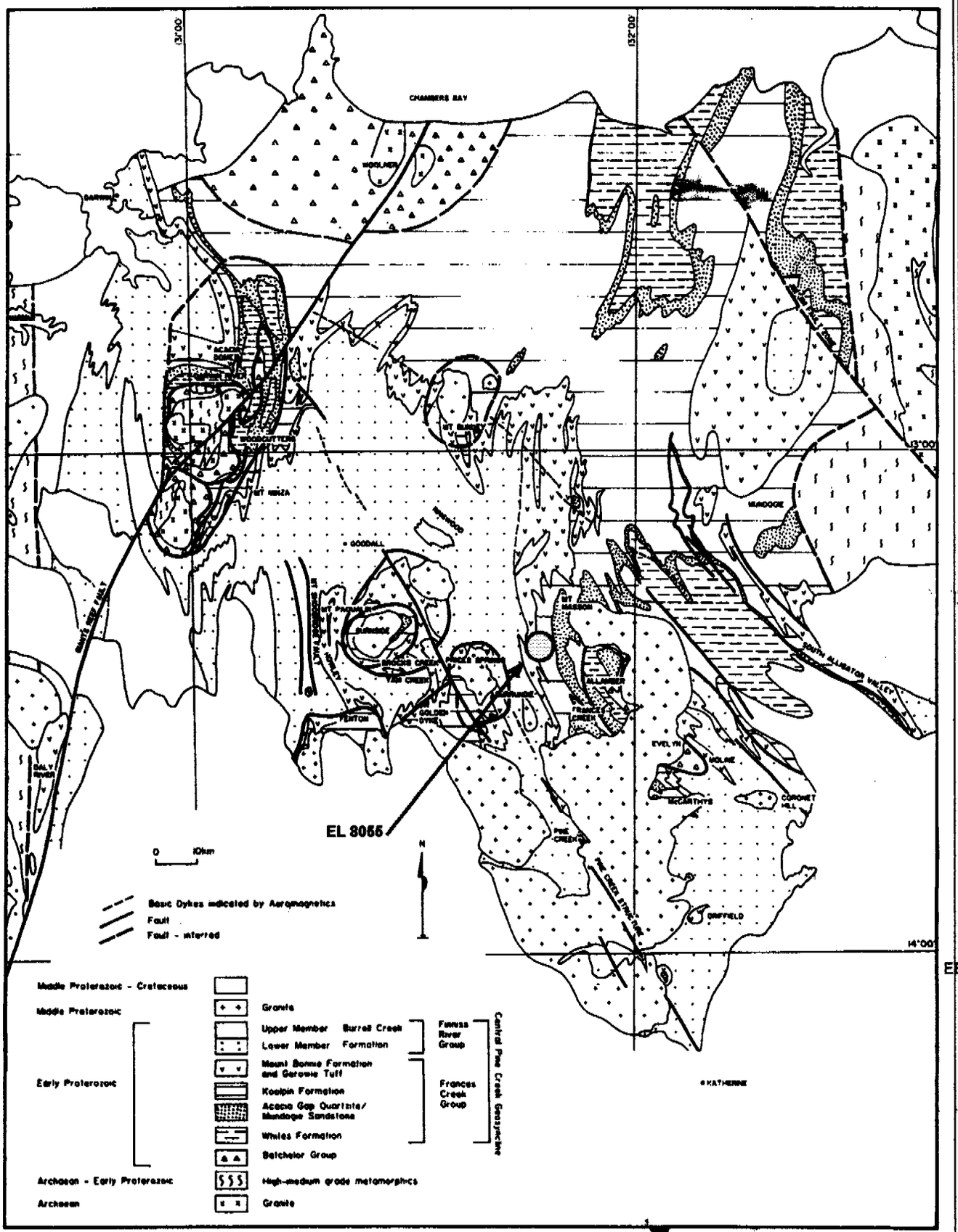


FIGURE 6
GENERAL GEOLOGY

Central Pine Creek Geosyncline stratigraphy.
by P.M. Nicholson and others

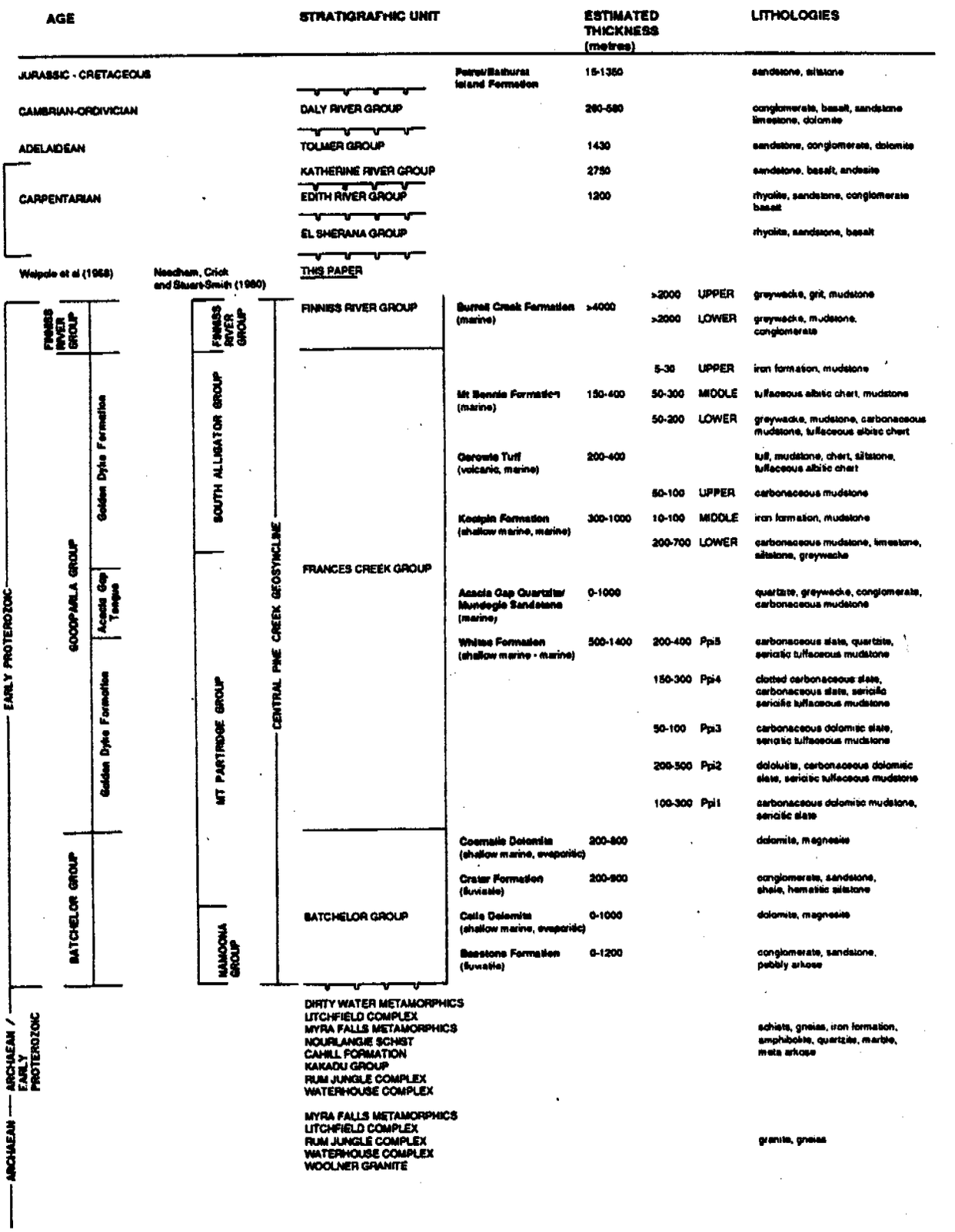
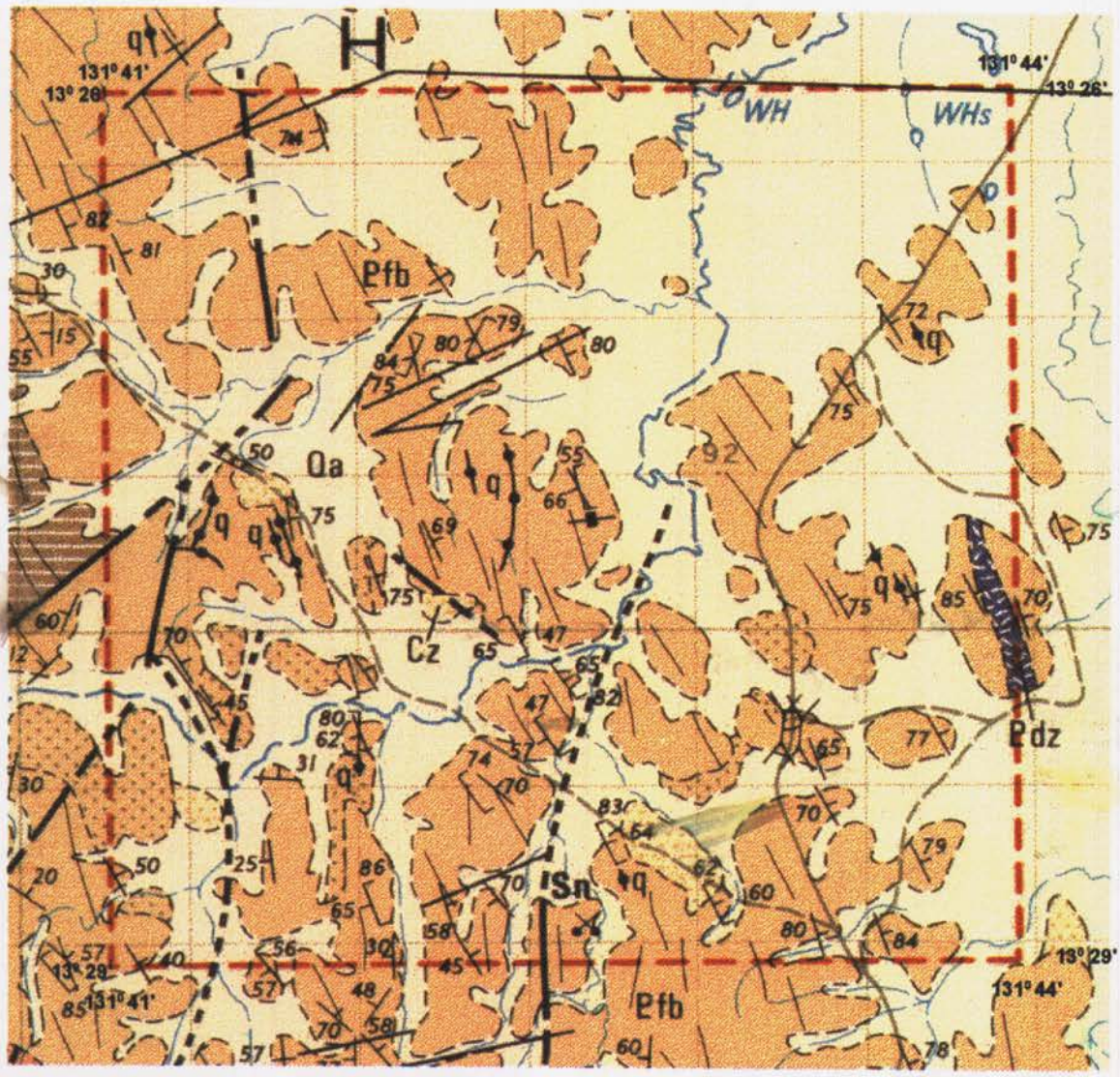


FIGURE 7
STRATIGRAPHY

REGIONAL GEOLOGY

EL 8055



COMPILED FROM B.M.R. 100,000 Series
by P.G. Stuar-Smith and others
Map 5271, McKinlay River

Prepared by:

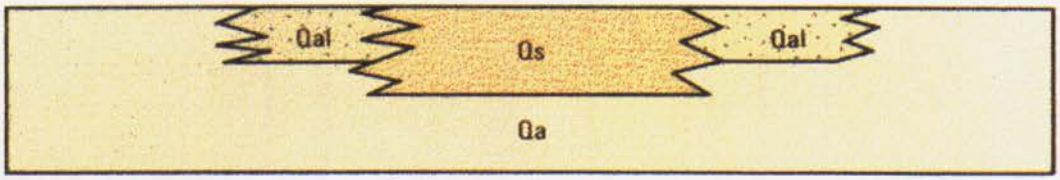
er EKOS RESEARCH (NT) for:

NORTHERN TERRITORY
GOLD MINES NL

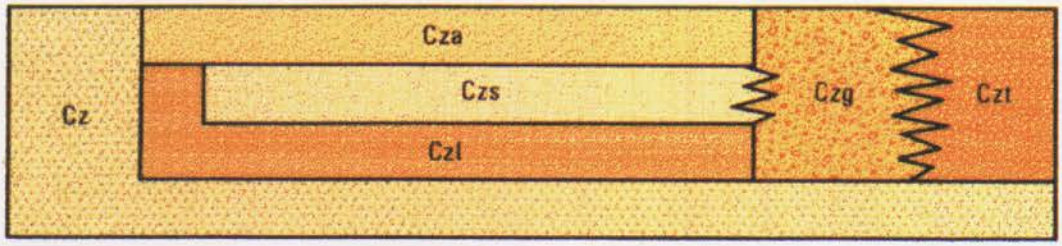
ACN 057 123 930

FIGURE 8
REGIONAL GEOLOGY

REFERENCE



Qa — *Silt, sand, clay and gravel: alluvium and flood plain deposits*
Qal — *Silt, clayey silt: levee deposits*
Qs — *Quartz sand: outwash and channel deposits*



Cz — *Lithosols, gradational red soils and yellow earth type soils shown ⁘ where these soils occur over known rock units*
Cza — *Winnowed sand, silt, clay, partially derived from Czs*
Czs — *Quartz sand, ferruginous and clayey sand: fan deposits*
Czl — *Detrital, pisolitic and concretionary ironstone*
Czg — *Higher level gravels and gravelly lithosols*
Czt — *Sandstone, and metasediment fragments, sand: talus and scree deposits*

Pdz — *Massive quartz dolerite, amphibolite*

Pfb — *Brown, grey and red sandy siltstone, siltstone, phyllite, slate and quartz–andalusite–muscovite–biotite–cordierite hornfels. Fine to coarse greywacke, minor volcanolithic pebble conglomerate. ᵛᵛᵛᵛ Denotes rare highly altered felsic volcanics*

Pso — *Siltstone and slate with minor laminated black chert bands, lenses and nodules, massive medium to coarse feldspathic greywacke; minor banded iron formation, argillite, crystal tuff and tuffaceous chert*

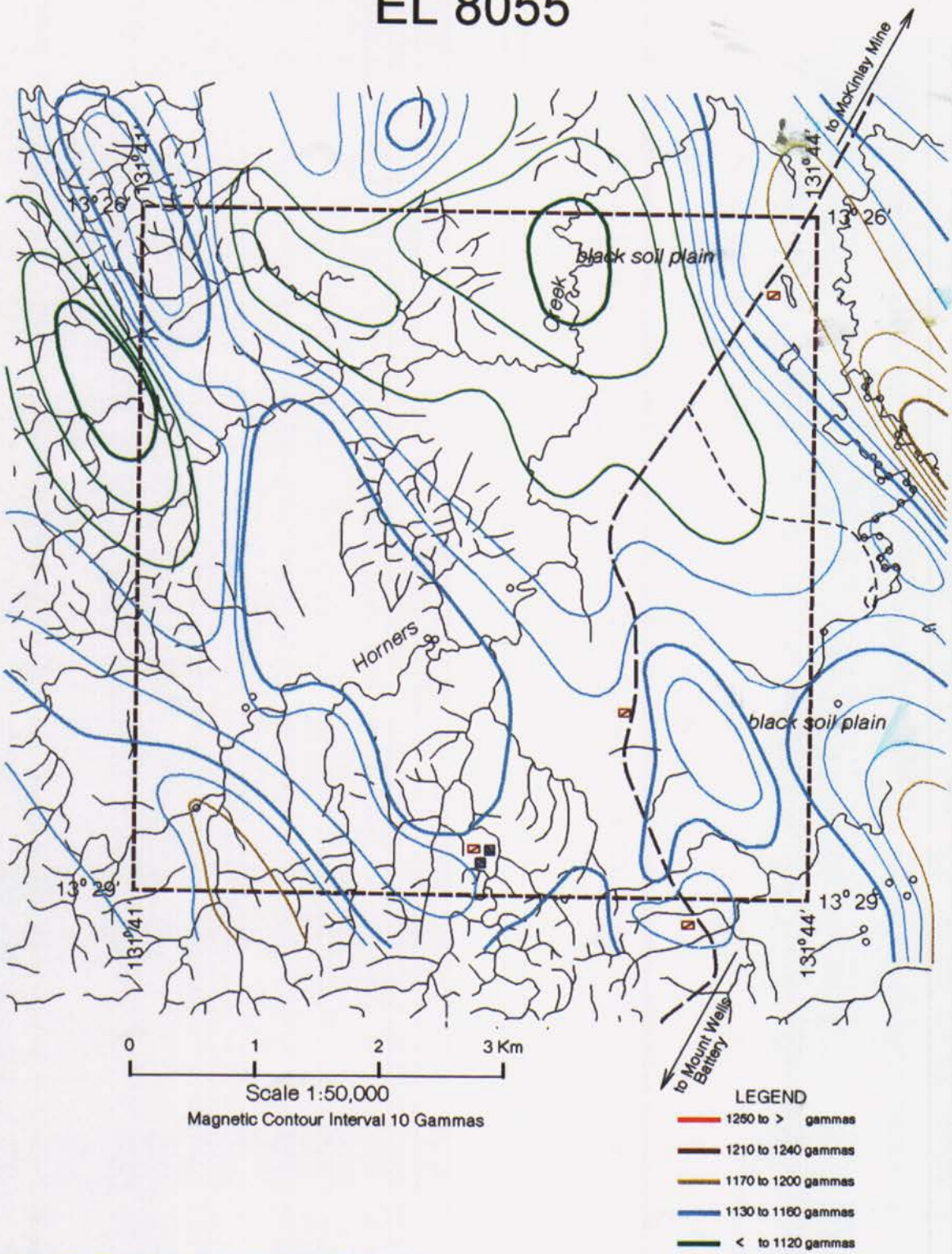
Psg — *Grey and brown siltstone and phyllite, andalusite–garnet–biotite–muscovite–quartz hornfels; pink, green, grey and brown argillite; glassy black spotted vitric tuff, crystal tuff and tuffaceous chert*

Psk — *Brown ferruginous siltstone, shale and phyllite commonly carbonaceous and containing chert bands, lenses and nodules, massive ironstone; carbonaceous claystone; grey graphitic chiastolite–muscovite–quartz hornfels; minor lenses of laminated, massive or brecciated silicified dolomite, impure dolomite, dolomitic marble and tremolite hornfels. Rare sandy siltstone and limonitic quartz sandstone at base*

FIGURE 8a
REFERENCE

AEROMAGNETIC CONTOURS

EL 8055



COMPILED FROM B.M.R. SURVEY OF 1963
From Goodeve
MAP AS:D 52/B1-18 (1964)

Prepared by:

er EKOS RESEARCH (NT) for:

NORTHERN TERRITORY
GOLD MINES NL

ACN 057 123 930

FIGURE 9
AEROMAGNETIC CONTOURS

AEROMAGNETIC CONTOURS

EL 8055

COMPILED FROM BILLITON 1992 AND NORTHERN GOLD 1991
From MacKay and Stokes

Prepared by:

er EKOS RESEARCH (NT) for:

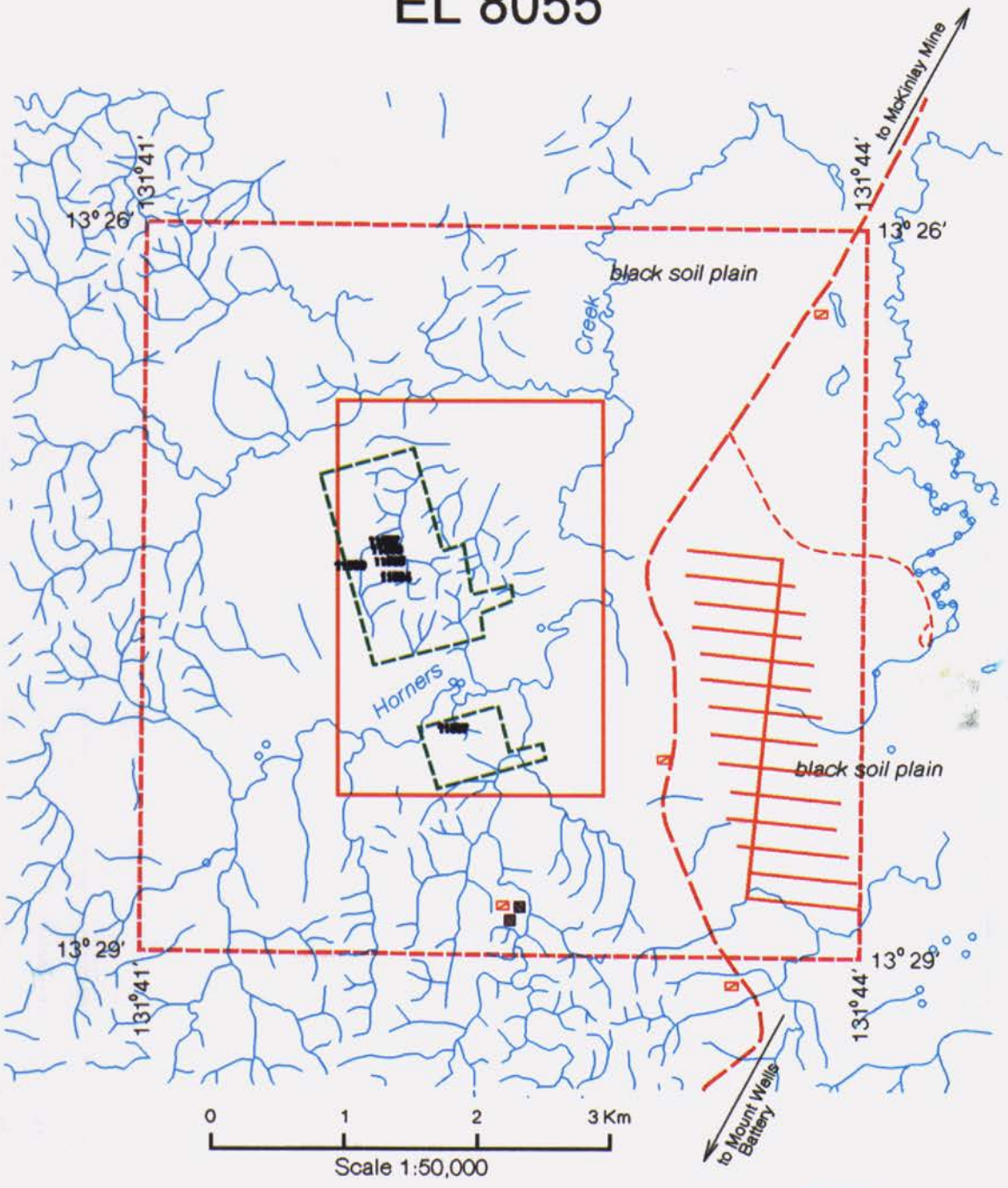
NORTHERN TERRITORY GOLD MINES NL

ACN 057 125 930

FIGURE 10
AEROMAGNETIC CONTOURS

PREVIOUS EXPLORATION

EL 8055



LEGEND

- GROUND MAGNETIC
- SOIL SAMPLE AREA
- ROCK CHIP
- Mine
- Building

COMPILED FROM BILLITON 1992 AND NORTHERN GOLD 1991
From MacKay and Stokes

Prepared by:

er EKOS RESEARCH (NT) for:

NORTHERN TERRITORY GOLD MINES NL

ACN 057 125 930

FIGURE 11
PREVIOUS EXPLORATION

APPENDIX 1

NTGS MINE DATA SHEETS

MINERAL DEPOSIT DATA SHEET

METALLOGENIC MAP DATA

Deposit/Prospect name: Mount Wells
Commodities - Major/Minor: Sn Cu
Locality - 1:250 000 sheet: PINE CREEK SD52-8
1:100 000 sheet: Pine Creek 5270
Universal Grid Reference GL 936 055
Latitude: Longitude:
Length (m): 200 Width(m): 1 Depth(m):
Strike bearing: 150 Dip: 70E Plunge:

Deposit number: 197
Compiled by: M.A
Date entered: 28/8/90

Status: Abandoned mine
Shape: Vein
Size: Medium
Mode of origin: Hydrothermal

GEOLOGICAL SETTING

Major tectonic unit(s): Pine Creek Geosyncline
Group: Finniss River Group
Formation: Burrell Creek Formation
Member:

Sub-unit:
Age: Palaeoproterozoic
Age: Palaeoproterozoic
Age:

LITHOLOGY AND METAMORPHISM

Host rock: Quartz Vein
Subsidary host rock: Quartz-tourmaline,Greisen and monzonite veins
Wall rock: Greywacke and Siltstone
Subsiduary wall rock: Hornfels
age of metamorphism: 1800 Ma Type: Regional/Contact Facies: Gnsch./Alb.Ep.

STRUCTURE

Type: Vein Strike: 150 Dip: 70E Plunge: Age relative to mineralisation: Syn
Type: Anticline Strike: Dip: Plunge: Age relative to mineralisation: Pre

MINERALISATION

Principal primary ore mineral: Cassiterite,Chalcopyrite Grain size:Coarse
Other primary ore mineral(s): Molybdenite,Wolframite,Arsenopyrite,Pyrite
Principal secondary ore mineral: Malachite
Other secondary ore mineral(s): Azurite
Principal gangue mineral: Quartz Age of Mineralisation:E. Prot.
Other gangue mineral(s):
Macroscopic ore textures: Vein fill
Weathering affect(s): Oxidation
Depth of weathering(m): 40

WALLROCK ALTERATION

Type	Location Relative to ore	Age relative to ore
: Sericitic	Proximal	Syn
:		
:		

EXPLORATION AND MINING

Exploration methods: Geol. mapping,Drilling,Costeaning,Exploratory mining
Mining methods: Underground
Open-cut workings - Depth(m): Length: Width:

PAST PRODUCTION

Period	Ore(t)	Grade(%)	Concentrate(t)	Contained metal (t)
: 1879-1929	100 000	1.0% Sn	1530t Sn	
: 1917	7	37% Cu		2.59 t Cu
: 1963			5tSn	
:				

ORE RESERVES

Status	Tonnes	Grade	Cut-off grade
: Inferred resource	360 000	1.46% Sn	
: Inferred resource	370 000	1.3% Sn	
: Inferred resource	971 000	1.5% Cu	
:			

REFERENCES

: Mookhey,1971(CR 71/102)
: Crohn,1968(BMR Bull. 82)
: Robinson(1986)
: Ellis, 1927 (GS 27/05)
: Smith,1958(CR 58/7)
: Richards,1975(CR 75/148)
: Newton, 1975a (GS 75/6)
: Newton, 1978b (GS 78/13)

REMARKS

Five quartz cassiterite lodes are present.The length and width quoted above is for the main lode.Drilling shows that these lodes terminate at a greisenised granite cupola.

MINERAL DEPOSIT DATA SHEET

METALLOGENIC MAP DATA

Deposit/Prospect name: Mount Wells Alluvials
Commodities - Major/Minor: Sn
Locality - 1:250 000 sheet: PINE CREEK SD52-8
1:100 000 sheet: Pine Creek 5270
Universal Grid Reference GL 936 053
Latitude: Longitude:
Length (m): Width(m): Depth(m):
Strike bearing: Dip: Plunge:

Deposit number: 198
Compiled by: M.A
Date entered: 28/8/90

Status: Abandoned mine
Shape: Placer
Size: Small
Mode of origin: Superficial enrichment

GEOLOGICAL SETTING

Major tectonic unit(s): Pine Creek Geosyncline
Group:
Formation: Czs
Member:

Sub-unit:
Age:
Age: Cainozoic
Age:

LITHOLOGY AND METAMORPHISM

Host rock: Sand and gravel
Subsidary host rock: Clay
Wall rock:
Subsiduary wall rock:
age of metamorphism: Type: Facies:

STRUCTURE

Type: Strike: Dip: Plunge: Age relative to mineralisation:
Type: Strike: Dip: Plunge: Age relative to mineralisation:

MINERALISATION

Principal primary ore mineral: Cassiterite Grain size:Medium
Other primary ore mineral(s):
Principal secondary ore mineral:
Other secondary ore mineral(s):
Principal gangue mineral: Quartz Age of Mineralisation:
Other gangue mineral(s): Clay,Tourmaline,Hematite
Macroscopic ore textures:
Weathering affect(s):
Depth of weathering(m):

WALLROCK ALTERATION

Type	Location Relative to ore	Age relative to ore
:		
:		
:		

EXPLORATION AND MINING

Exploration methods: Costeaning
Mining methods: Surface excavations
Open-cut workings - Depth(m): Length: Width:

PAST PRODUCTION

Period	Ore(t)	Grade(%)	Concentrate(t)	Contained metal (t)
:1980-82			240	
:				
:				
:				

ORE RESERVES

Status	Tonnes	Grade	Cut-off grade
:			
:			
:			
:			

REFERENCES

: J.Crago,Pers.Comm.

REMARKS

Source of alluvial tin is Mount Wells type Quartz-Cassiterite veins.Minor gold is present.The deposit is probably mined out.

MINERAL DEPOSIT DATA SHEET

METALLOGENIC MAP DATA

Deposit/Prospect name: Homers Creek Alluvials
Commodities - Major/Minor: Sn
Locality - 1:250 000 sheet: PINE CREEK SD52-8
1:100 000 sheet: McKinlay River 5271
Universal Grid Reference GL 934 067
Latitude: Longitude:
Length (m): Width(m): Depth(m):
Strike bearing: Dip: Plunge:

Deposit number: 196
Compiled by: M.A
Date entered: 28/8/90

Status: Abandoned mine
Shape: Placer
Size: Small
Mode of origin: Superficial enrichment

GEOLOGICAL SETTING

Major tectonic unit(s): Pine Creek Geosyncline
Group:
Formation: Czs
Member:

Sub-unit:
Age:
Age: Cainozoic
Age:

LITHOLOGY AND METAMORPHISM

Host rock: Sand and gravel
Subsidary host rock: Clay
Wall rock:
Subsiduary wall rock:
age of metamorphism: Type: Facies:

STRUCTURE

Type: Strike: Dip: Plunge: Age relative to mineralisation:
Type: Strike: Dip: Plunge: Age relative to mineralisation:

MINERALISATION

Principal primary ore mineral: Cassiterite Grain size:Medium
Other primary ore mineral(s):
Principal secondary ore mineral:
Other secondary ore mineral(s):
Principal gangue mineral: Quartz Age of Mineralisation:
Other gangue mineral(s):
Macroscopic ore textures:
Weathering affect(s):
Depth of weathering(m):

WALLROCK ALTERATION

Type	Location Relative to ore	Age relative to ore
:		
:		
:		

EXPLORATION AND MINING

Exploration methods: Excavations along creek bed
Mining methods: Surface
Open-cut workings - Depth(m): 4 Length: 500 Width: 100

PAST PRODUCTION

Period	Ore(t)	Grade(%)	Concentrate(t)	Contained metal (t)
: 1981-82?				33t Sn
:				175g Au
:				
:				

ORE RESERVES

Status	Tonnes	Grade	Cut-off grade
:			
:			
:			
:			

REFERENCES

:
:
:
:
:
:
:

:
:
:
:
:
:
:

REMARKS

Source of alluvial tin is Mount Wells type Quartz-Cassiterite veins.Minor gold is present.The deposit is probably mined out.

MINERAL DEPOSIT DATA SHEET

METALLOGENIC MAP DATA

Deposit/Prospect name: Homers Creek
Commodities - Major/Minor: Cu
Locality - 1:250 000 sheet: PINE CREEK SD52-8
1:100 000 sheet: McKinlay River 5271
Universal Grid Reference GL 933 066
Latitude: Longitude:
Length (m): 100 Width(m): 10 Depth(m): 15
Strike bearing: 015 Dip: 80E Plunge:

Deposit number: 195
Compiled by: P.F.
Date entered: 29/03/89

Status: Abandoned mine
Shape: Vein
Size: Occurrence only
Mode of origin: Hydrothermal

GEOLOGICAL SETTING

Major tectonic unit(s): Pine Creek Geosyncline
Group: Finniss River Group
Formation: Burrell Creek Formation
Member:

Sub-unit:
Age: Palaeoproterozoic
Age: Palaeoproterozoic
Age:

LITHOLOGY AND METAMORPHISM

Host rock: Vein Quartz
Subsidary host rock:
Wall rock: Litharenite
Subsiduary wall rock:
age of metamorphism: 1800 Ma Type: Regional Facies: Greenschist

STRUCTURE

Type: Shear zone	Strike: 015	Dip: 80 E	Plunge:	Age relative to mineralisation: Syn
Type: Bedding	Strike: 340	Dip: 75NE	Plunge:	Age relative to mineralisation: Pre

MINERALISATION

Principal primary ore mineral: Chalcopyrite
Other primary ore mineral(s): Pyrite
Principal secondary ore mineral: Malachite
Other secondary ore mineral(s): Chalcocite
Principal gangue mineral: Quartz
Other gangue mineral(s):
Macroscopic ore textures: Disseminated
Weathering affect(s): Supergene
Depth of weathering(m): 20

Grain size: Coarse
Age of Mineralisation: E. Prot.

WALLROCK ALTERATION

Type	Location Relative to ore	Age relative to ore
: Silicification	Footwall & Hangingwall	Syn
: Carbonatisation	Footwall & Hangingwall	Syn
:		

EXPLORATION AND MINING

Exploration methods:
Mining methods: One adit, several shafts and small pits.
Open-cut workings - Depth(m): 5 Length: 11 Width: 1

PAST PRODUCTION

Period	Ore(t)	Grade(%)	Concentrate(t)	Contained metal (t)
: 1967-68	93		5.2	0.8 t Cu
:				
:				
:				

ORE RESERVES

Status	Tonnes	Grade	Cut-off grade
:			
:			
:			
:			

REFERENCES

: DME Ann. Rpt 1967-68
:
:
:
:
:
:

:
: Richards, 1975 (CR75/148).
: Ferenczi, 1990b (GS90/15).
:
:
:
:

REMARKS

Worked by Jack Lewis in the late 1960's. At least three lodes are present, average width ~0.5m.

MINERAL DEPOSIT DATA SHEET

METALLOGENIC MAP DATA

Deposit/Prospect name: Unnamed
Commodities - Major/Minor: Sn
Locality - 1:250 000 sheet: PINE CREEK SD52-8
1:100 000 sheet: McKinlay River 5271
Universal Grid Reference GL 934 082
Latitude: Longitude:
Length (m): Width(m): Depth(m):
Strike bearing: ' Dip: Plunge:

Deposit number: 194
Compiled by: M.A
Date entered: 28/8/90

Status: Mineral occurrence
Shape: Placer
Size: Occurrence only
Mode of origin: Superficial enrichment

GEOLOGICAL SETTING

Major tectonic unit(s): Pine Creek Geosyncline
Group:
Formation: Czs
Member:

Sub-unit:
Age:
Age: Cainozoic
Age:

LITHOLOGY AND METAMORPHISM

Host rock: Sand and gravel
Subsidary host rock: Clay
Wall rock:
Subsidiary wall rock:
age of metamorphism: Type: Facies:

STRUCTURE

Type: Strike: Dip: Plunge: Age relative to mineralisation:
Type: Strike: Dip: Plunge: Age relative to mineralisation:

MINERALISATION

Principal primary ore mineral: Cassiterite Grain size:Medium
Other primary ore mineral(s):
Principal secondary ore mineral:
Other secondary ore mineral(s):
Principal gangue mineral: Quartz Age of Mineralisation:
Other gangue mineral(s):
Macroscopic ore textures:
Weathering affect(s):
Depth of weathering(m):

WALLROCK ALTERATION

Type	Location Relative to ore	Age relative to ore
:		
:		
:		

EXPLORATION AND MINING

Exploration methods: Excavations along creek bed
Mining methods: Surface
Open-cut workings - Depth(m): Length: Width:

PAST PRODUCTION

Period	Ore(t)	Grade(%)	Concentrate(t)	Contained metal (t)
:				
:				
:				
:				

ORE RESERVES

Status	Tonnes	Grade	Cut-off grade
:			
:			
:			
:			

REFERENCES

:
:
:
:
:
:
:

REMARKS

Source of alluvial tin is Mount Wells type Quartz-Cassiterite veins.Minor production probably included in Horners Creek.

MINERAL DEPOSIT DATA SHEET

METALLOGENIC MAP DATA

Deposit/Prospect name: Mavis
Commodities - Major/Minor: Sn
Locality - 1:250 000 sheet: PINE CREEK SD52-8
1:100 000 sheet: McKinlay River 5271
Universal Grid Reference GL 888 128
Latitude: Longitude:
Length (m): 200 Width(m): 0.1 Depth(m):
Strike bearing: 310 Dip: Plunge:

Deposit number: 104
Compiled by: M.A.
Date entered: 27/8/90

Status: Abandoned mine
Shape: Vein
Size: Occurrence only
Mode of origin: Hydrothermal

GEOLOGICAL SETTING

Major tectonic unit(s): Pine Creek Geosyncline
Group: South Alligator Group
Formation: Mount Bonnie Formation
Member:

Sub-unit:
Age: Palaeoproterozoic
Age: Palaeoproterozoic
Age:

LITHOLOGY AND METAMORPHISM

Host rock: Quartz vein
Subsidary host rock:
Wall rock: Greywacke
Subsiduary wall rock: Siltstone
age of metamorphism: 1800 Ma Type: Regional/Contact Facies: Gnsch./Alb.Ep.

STRUCTURE

Type: Vein Strike: 310 Dip: Plunge: Age relative to mineralisation: Syn
Type: Strike: Dip: Plunge: Age relative to mineralisation:

MINERALISATION

Principal primary ore mineral: Cassiterite Grain size:Coarse
Other primary ore mineral(s): Pyrite
Principal secondary ore mineral: Hematite
Other secondary ore mineral(s): Goethite,limonite
Principal gangue mineral: Quartz Age of Mineralisation:E. Prot.
Other gangue mineral(s): Hematite
Macroscopic ore textures: Vein fill
Weathering affect(s): Oxidation
Depth of weathering(m): 50

WALLROCK ALTERATION

Type	Location Relative to ore	Age relative to ore
: Sericitic	Proximal	Syn
:		
:		

EXPLORATION AND MINING

Exploration methods: Costeans,shallow pits
Mining methods: Adit and open cut
Open-cut workings - Depth(m): Length: Width:

PAST PRODUCTION

Period	Ore(t)	Grade(%)	Concentrate(t)	Contained metal (t)
: 1958-68			3.5	
:				
:				
:				

ORE RESERVES

Status	Tonnes	Grade	Cut-off grade
:			
:			
:			
:			

REFERENCES

: Crohn,1968(BMR Bull. 82)
: Dunn,1960(BMR Rec. 1960/134)

REMARKS