

# EL7513 FRANCES CREEK FINAL REPORT TO 21<sup>ST</sup> JANUARY 1993

R93/29



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#### 1. SUMMARY

This report details exploration activities completed by Dominion Gold Operations Pty Ltd (Dominion) on EL7513 for year ending 21 January 1993. The licence, comprising five (5) graticular blocks was granted to Dominion Gold Operations Pty Ltd on 22 October 1991 for a period of five (5) years. Following consolidation of Dominion's Frances Creek tenements, EL7513 is now held under SEL8032, granted 21 January 1993, for a four (4) year period.

Exploration activities during 1992 consisted of:

- Literature Review
- Acquisition of airborne geophysical data
- Aerial photographic interpretation
- Regional 1:25,000 scale mapping
- Stream sediment sampling
- Rock chip sampling

Stream sediment and limited rock chip sampling failed to locate any anomalous Au or base metal targets worthy of further follow up. Evaluation is still required of recently acquired airborne geophysical data.

Exploration expenditure amounted to \$11,558 against a Year 1 covenant of \$7,500.

#### 2. INTRODUCTION

#### 2.1 Location and Tenure

EL7513 is located 180km southeast of Darwin and approximately 30km NE from the township of Pine Creek. The tenement can be found on the Pine Creek 1:250,000 scale (Sheet SD52-8), Pine Creek 1:100,000 scale (Sheet 5270) geology sheet and the Union Reef (Sheet 5270-1) topographical series sheet. (Figure 1).

Access is via the Stuart Highway to Pine Creek, thence via the Kakadu Highway to the Mary River Station turnoff and then via station tracks. Access can also be gained via unmaintained tracks either from Pine Creek or Mt. Wells. (Figure 2).

The licence, comprising five (5) graticular blocks, was granted to Dominion Gold Operations Pty Ltd on 22 October 1991 for five (5) years.

Consolidation of Dominion tenements in 1993 resulted in EL7513 forming part of SEL8032 on 21 January 1993. Cessation of EL7513 was effective 22 January 1993.

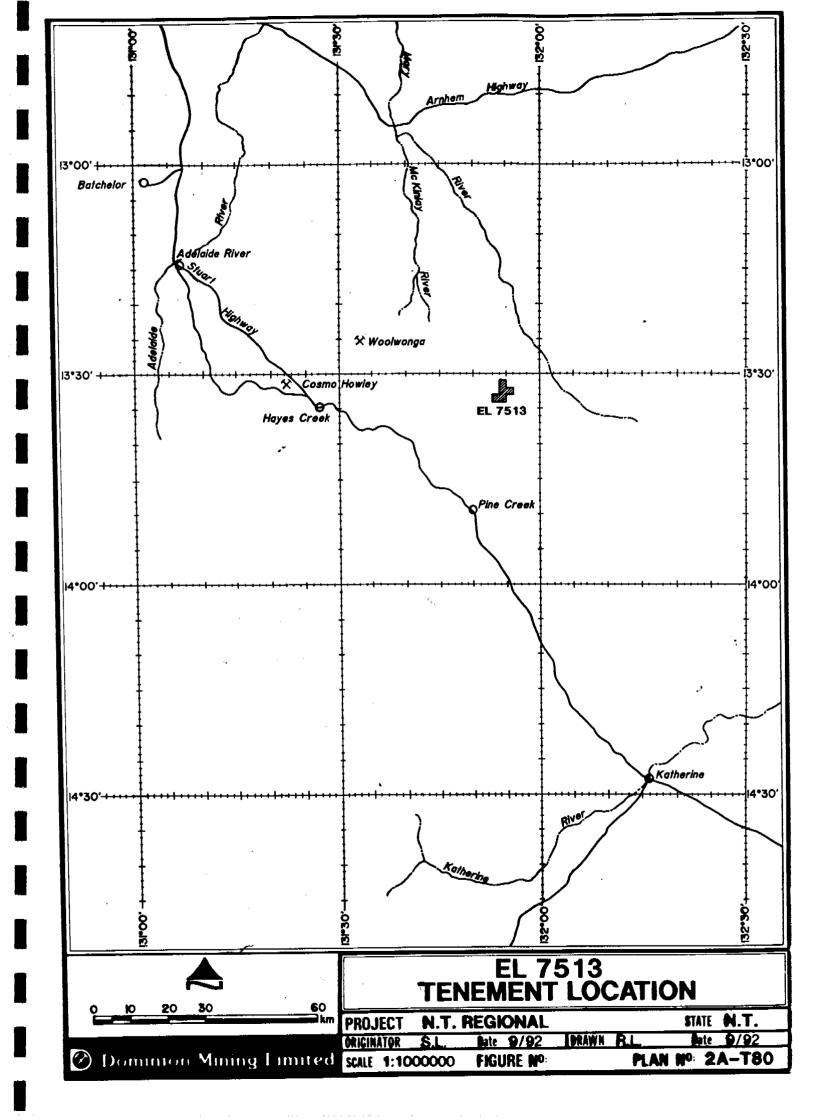
## 2.2 Climate and Physiography

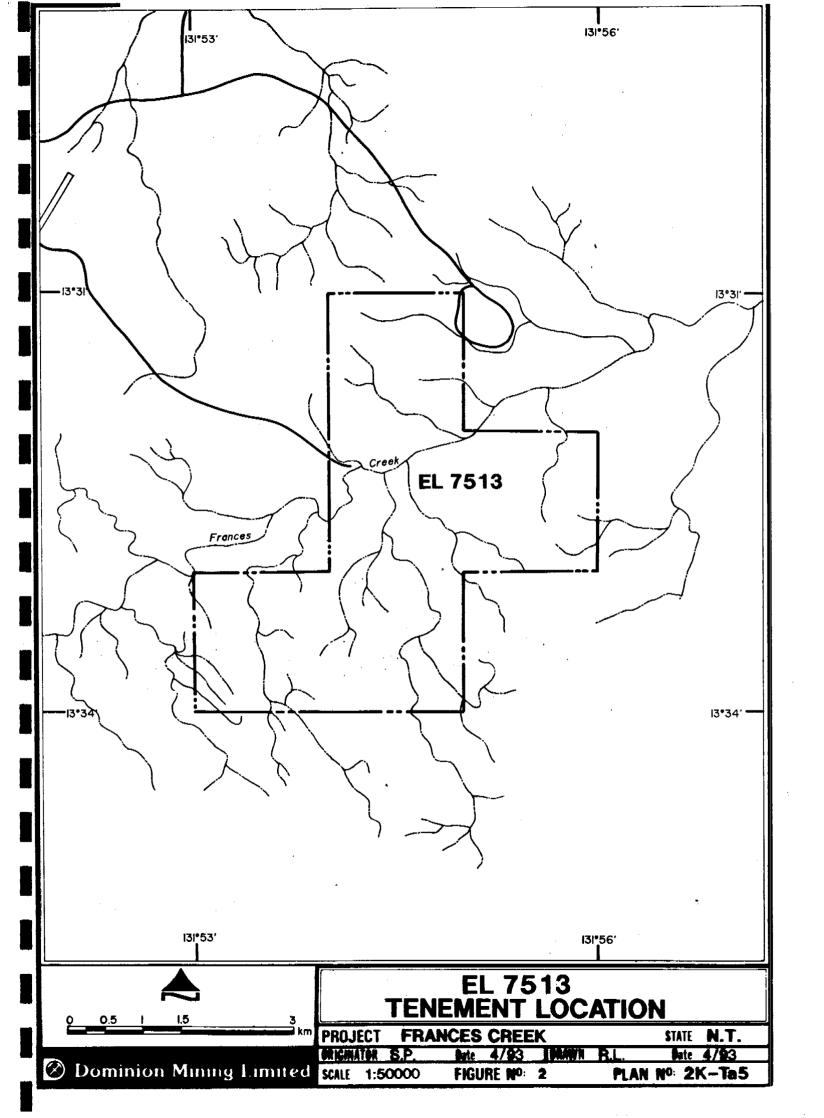
The Pine Creek Inlier lies within the monsoonal belt of northern Australia and exhibits an average annual rainfall of 1500mm, most of which falls during the wet season from November to April.

The physiography of the area is divided into a number of different units. The lowlands includes the alluvial floodplains of the Alligator, Margaret and Mckinlay Rivers in the north to the plains of the Daly River Basin in the southwest. The plains carry mixed scrubby to open eucalypt woodland and open savannah grasslands.

Granitoid terranes are overlain by undulating sandy rises which usually contain leached skeletal soils and lateritic podsols. Topographic gradients are low with amplitudes of usually 20m. Vegetation is mostly medium to tall semi-deciduous eucalypt woodland.

Rock ridges may rise up to 200m elevation above the surrounding plains. Gradients of these ridges are steep and surface boulders and low outcrops are widespread. Mid height woodlands dominate the slopes whilst tall eucalypt forests and dense perennial grasses occupy the dissected creek systems.





#### 3.0 GEOLOGY

## 3.1 Regional Geology

## 3.1.1 Regional History

The Pine Creek Inlier is a roughly triangular area of about 66,000km<sup>2</sup> south and east of Darwin, which contain Early Proterozoic metasedimentary rocks resting on a gneissic and granitic Archaean basement. The metasediments represent fluviatile, shallow water, intertidal basinal and flyschoid sequence up to 14km thick within an intracratonic basinal setting (Needham et al, 1980).

During the Top End Orogeny (1870–1780Ma) rocks within the Pine Creek Inlier were metamorphosed to mainly greenschist facies, however, amphibolite facies metamorphic mineral assemblages dominate in the Alligator Rivers region. Known Archaean rocks are restricted to granite–gneiss of the Rum Jungle, Waterhouse and Nanambu complexes which form mantled gneiss domes near the exposed eastern and western margins of the inlier. (Page, et al, 1980).

The sedimentary rocks are mainly shale, siltstone, sandstone, conglomerate, carbonate rocks and iron formations. Felsic to mafic volcanism and associated tuffaceous sediments are also present. The sedimentary sequence is intruded by transitional igneous rocks including pre-tectonic dolerite sills and syn to post tectonic granitoid plutons and dolerite lopoliths and dykes. Largely undeformed platform covers of Middle Proterozoic to Mesozoic strata rest on these with marked unconformity. (Figure 3).

Since the Cretaceous the area has generally remained above sea level. The dominant forces which moulded today's landscape were chemical weathering to produce laterite and "cut and fill" modification of the land surface by repeated erosional and aggradational cycles.

### 3.1.2 Structure

During the Top End Orogeny, the Early Proterozoic sediments, volcanics and dolerite were intensely deformed and regionally metamorphosed, resulting in tight to isoclinal folding and extensive faulting. Two phases of folding have been recognised. The older  $F_1$  folds are tight to isoclinal folds with northwest to northeast trending axial planes. A penetrative slately cleavage is present in pelitic rocks and a less prominent spaced fracture cleavage in sandstone. The younger  $F_2$  folds are widely spaced, open types with east to west trending axial planes. Both folding events pre date granitoid intrusions. (Figure 4).

# STRATIGRAPHIC COLUMN UNDIFFERENTIATED LATERITISED **CRETACEOUS SEDIMENTS** DALY RIVER GROUP - Oolloo Dolostone CAMBRIAN-ORDOVICIAN - Jinduckin Formation - Tindal Limestone - Jindare Formation TOLMER GROUP - Hinde Dolomite MIDDLE PROTEROZOIC - Stray Creek Sandstone - Depot Creek Sandstone **CULLEN GRANITOIDS** Composite I-type Batholith (1840-1780 Ma) Mc Minns Bluff Granite Fenton Granite Shoobridge Granite ZAMU DOLERITE (±? Maude) FINNISS RIVER GROUP - Burrell Creek Formation EARLY PROTEROZOIC SOUTH ALLIGATOR GROUP - Mt. Bonnie Formation - Gerowle Tuff - Koolpin Formation . PARTRIDGE GROUP - Wildman Siltstone - Mundogle Sandstone NAMOONA GROUP - Masson Formation **CULLEN MINERAL FIELD** STRATIGRAPHIC RELATIONS STATE N.T. **PROJECT** Me 5/9 ORIGINATOR F.F. tate 5/91 MANY R.L Dominion Mining Limited scale PLAN Nº: 2A - GIOC 3

# REGIONAL STRUCTURE - PINE CREEK INLIER

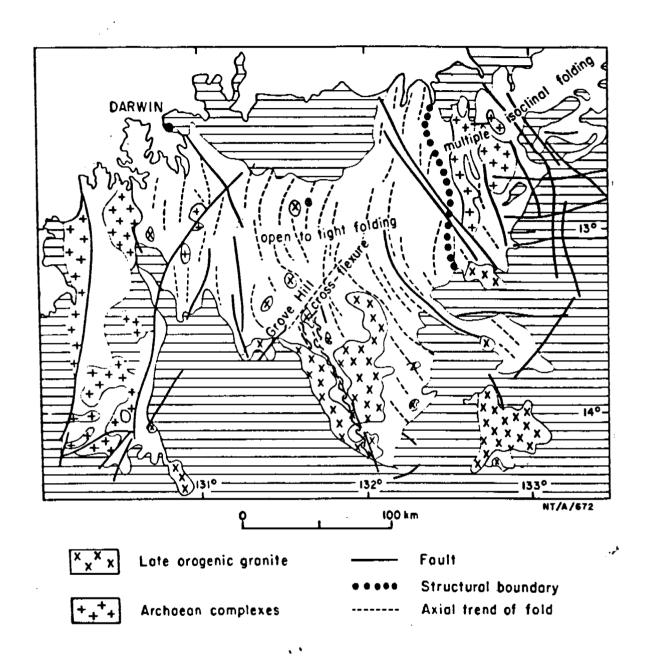


FIGURE 4

### 3.1.2 Structure (Cont'd)

Regional folding is locally modified by the major SE trending Noonamah – Katherine lineament zone, which consists of a 20 to 25km wide zone of shearing and folding with coincident gravity and magnetic anomalies. In the Pine Creek area the lineament is represented by the Pine Creek shear zone, which contains numerous aligned tight folds and shears and which hosts a concentration of gold occurrences. (Needham and Stuart-Smith, 1984a).

## 3.1.3 Metamorphism

All the Early Proterozoic rocks have been both regionally metamorphosed to greenschist facies and contact metamorphosed by the syn orogenic to post orogenic granitoids. The regional metamorphic grade ranges from predominantly lower greenschist to amphibolite facies in the NE of Pine Creek Inlier. Table 1 shows the characteristic metamorphic mineral assemblages for various rock types. Regional metamorphism is contemporaneous with regional deformation of the sedimentary pile during the Top End Orogeny. Throughout most of the area, regional metamorphism of pelitic rocks produced fine grained sericite and quartz. Sandstones usually exhibited fractured and/or strained quartz grains and minor sericite, chlorite and muscovite. (Figure 5).

Contact metamorphism largely overprints regional metamorphism indicating synpost deformation. The contact metamorphic aureole is primarily albite-epidote hornfels with a narrower inner continuous zone of hornblende hornfels. K-feldspar-cordierite hornfels is present immediately adjacent to the granitoids. The contact metamorphic aureole varies in width from a minimum distance of 500m to up to 15km - 20km. In general, granitoids with steeply dipping margins will produce a narrower contact aureole whilst relatively shallow, flat lying granitoids will produce a more extensive contact aureole, although the extent of a contact aureole can be significantly wider or narrower under different temperature – pressure regimes.

TABLE | CHARACTERISTIC METAMORPHIC MINERAL ASSEMBLAGES

Rock Type	Regional Metamorphism			Contact Metamorphis	m
	Lower Greenschist	Upper Greenschist	Albite-epidote Hornfels Facies	Homblende Homfels Facies	K-feldspar-cordierite Hornfels Facies
Pelitic rocks	Sericite + quartz	Biotite + muscovite + quartz	Muscovite  ± biotite  ± chiastolite  ± quartz	Muscovite + biotite ± cordierite ± albite ± quartz	Cordierite + andalusite + K-feldspar + biotite + quartz
Quartzose and feldspathic sandstone	Sericite/ muscovite + chlorite		Muscovite + quartz ± albite ± biotite	— ditto —	
Greywacke	Sericite + chlorite + epidote		Muscovite + biotite + quartz ± K-feldspar ± albite ± epidote ± actinolite	Muscovite + K-feldspar + quartz ± albite ± biotite	
Tuff	Chlorite + sericite + quartz	Biotite + muscovite + quartz	Muscovite + quartz ± biotite ± albite ± K-feldspar	— ditto —	
• ′	Dolomite + quartz	Tremolite + garnet + biotite	Calcite + tremo- lite + epidote	Grossular + calcite	
Carbonate rocks		+ quartz	Calcite + tremo- lite + zoisite + sphene + quartz Tremolite + biotite + quartz	Diopside + quartz	
Dolerite	Chlorite + sericite + epidote + zeolites	Actinolite + biotite	Actinolite + biotite + epidote + clinozoisite	Homblende + biotite + plagioclase + K-feldspar ± calcite ± sphene	

#### REPRODUCED FROM:

STUART-SMITH,P.G.,NEEDHAM,R.S.,BAGAS,L.,& WALLACE,D.A., 1987--PINE CREEK NORTHERN TERRITORY (SHEET 5270). BUREAU OI MINERAL RESOURCES, AUSTRALIA 1:100 000 GEOLOGICAL MAP AND COMMENTARY

## REGIONAL METAMORPHISM - PINE CREEK INLIER

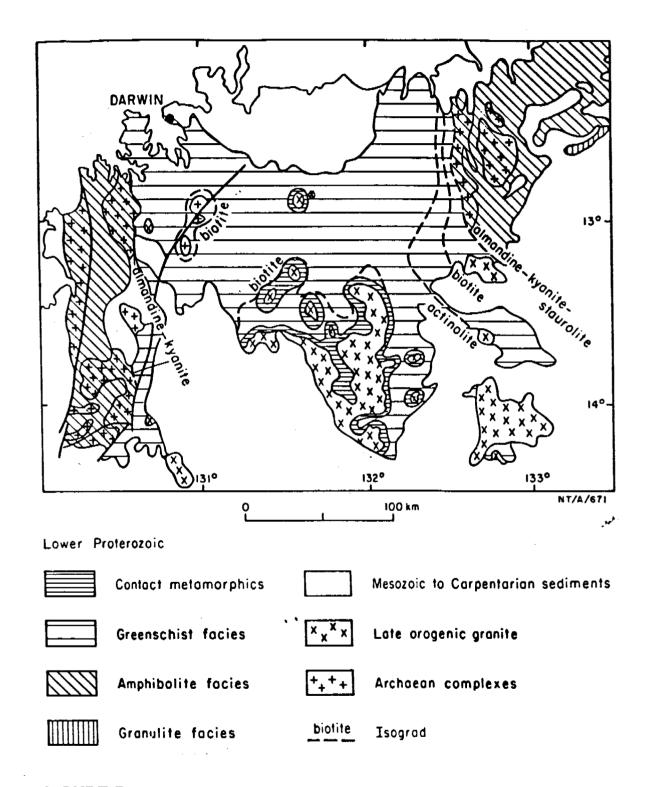


FIGURE 5

### 3.2 Local Geology

The stratigraphy of the Frances Creek area comprises Early Proterozoic metasediments including Mundogie Formation and Wildman Siltstone. Mapping by the BMR indicates significant outcrop of underlying Masson Formation mapped in structural highs and lows and always in valleys. Nowhere in the mapped area did distinct lithologies of Masson Formation outcrop. In broad terms, the Frances Creek stratigraphy consist of uppermost carbonaceous metasiltstones intruded by dolerite sills which corresponds to the Wildman Siltstone. Underlying this sequence are carbonaceous metasiltstones which contain quartzite beds of various thickness. Lower most are carbonaceous sand/siltstones containing coarse ferruginous conglomeratic quartzite units. These underlying units correspond to the Mundogie Formation. The occurrence of the first quartzite horizon in the upper part of the sequence marks the transition from Wildman Siltstone to Mundogie Formation. Frances Creek Geology is presented in Figure 6.

1:25,000 scale regional mapping has defined tightly folded Mundogie Formation sediments outcropping in the SW and NE. Wildman Siltstone is present within the Allamber Valley which trends NW-SE through the central portion of the licence.

Quartz veining is present but is not as common in comparison to the southern licence blocks which abut the Allamber Springs Granite.

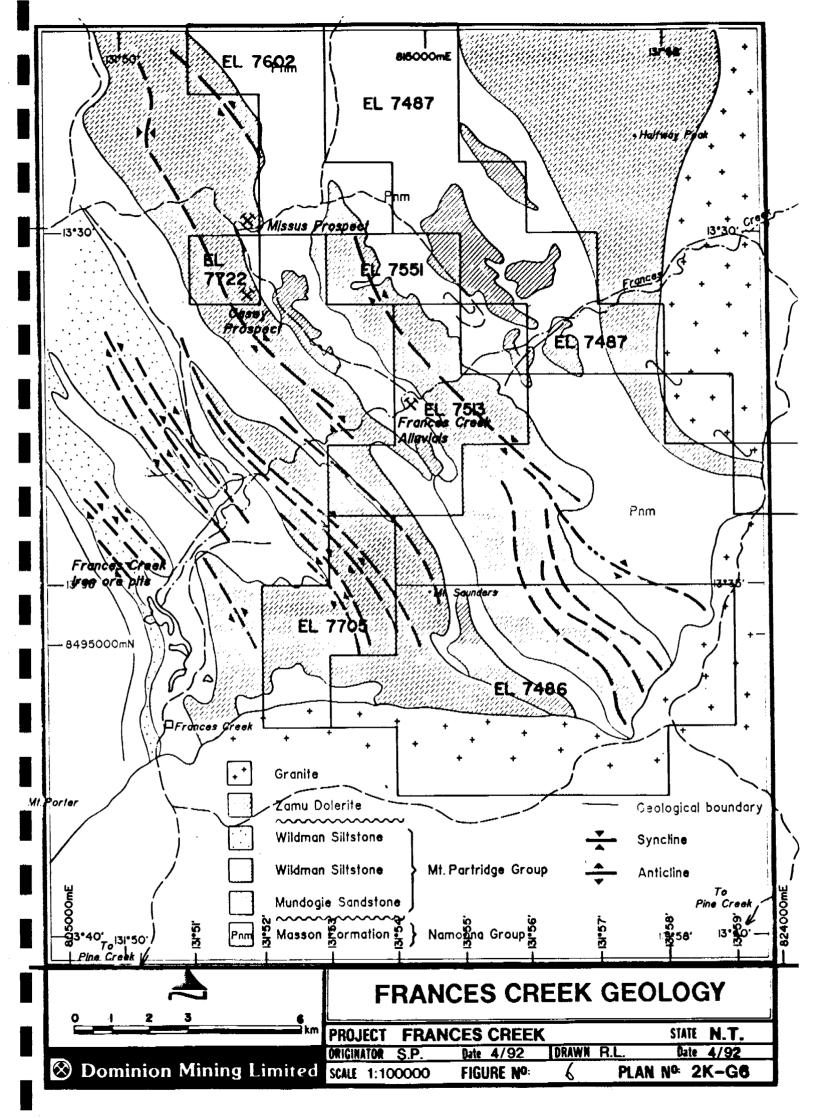
#### 4. 1992 EXPLORATION ACTIVITIES

#### 4.1 Aerial Photography

During April 1992, Dominion purchased colour air photos at 1:25,000 scale from Austlig in Canberra. The relevant air photo runs are:

	Film No.	Run No.	Frame No.
Pine Creek	CAG/C 419	Run 1 Run 2	006-015 109-117

See Plate 1 flight diagram.



## 4.2 Geophysics

During August 1992, Dominion commissioned Aerodata to fly airborne magnetics and radiometrics over the Frances Creek tenement areas. The area was now flown during October 1992.

Preliminary data was recently received and interpretation is underway.

### 4.3 Stream Sediment Sampling

Samples were dispatched to Analabs – Darwin where they were analysed by the following methods:

Au:

30 gram Aqua/Regia Digest, Carbon Rod Finish

Cu,Pb,Zn,As,Ni,Fe,Mn:

Aqua Regia Digest, AAS Finish

A total of 6 stream sediment samples were collected from active sediment laden drainages emanating from the licence. A best result of 85 ppb Au was recorded (Sample No. 960727) from pan concentrate with the resultant silt faction sample returning a value of 1 ppb Au.

Sample locations and assay results are shown on Figure 7.

### 4.4 Rock Chip Sampling

Rock chip sampling was conducted during the course of the field season. A total of seven (7) samples comprising 3-4kgs of material were collected and dispatched to Analabs - Darwin for Au analysis and Cu, Pb, Zn, Ni, As, Fe and Mn determinations. Methods used are as follows:

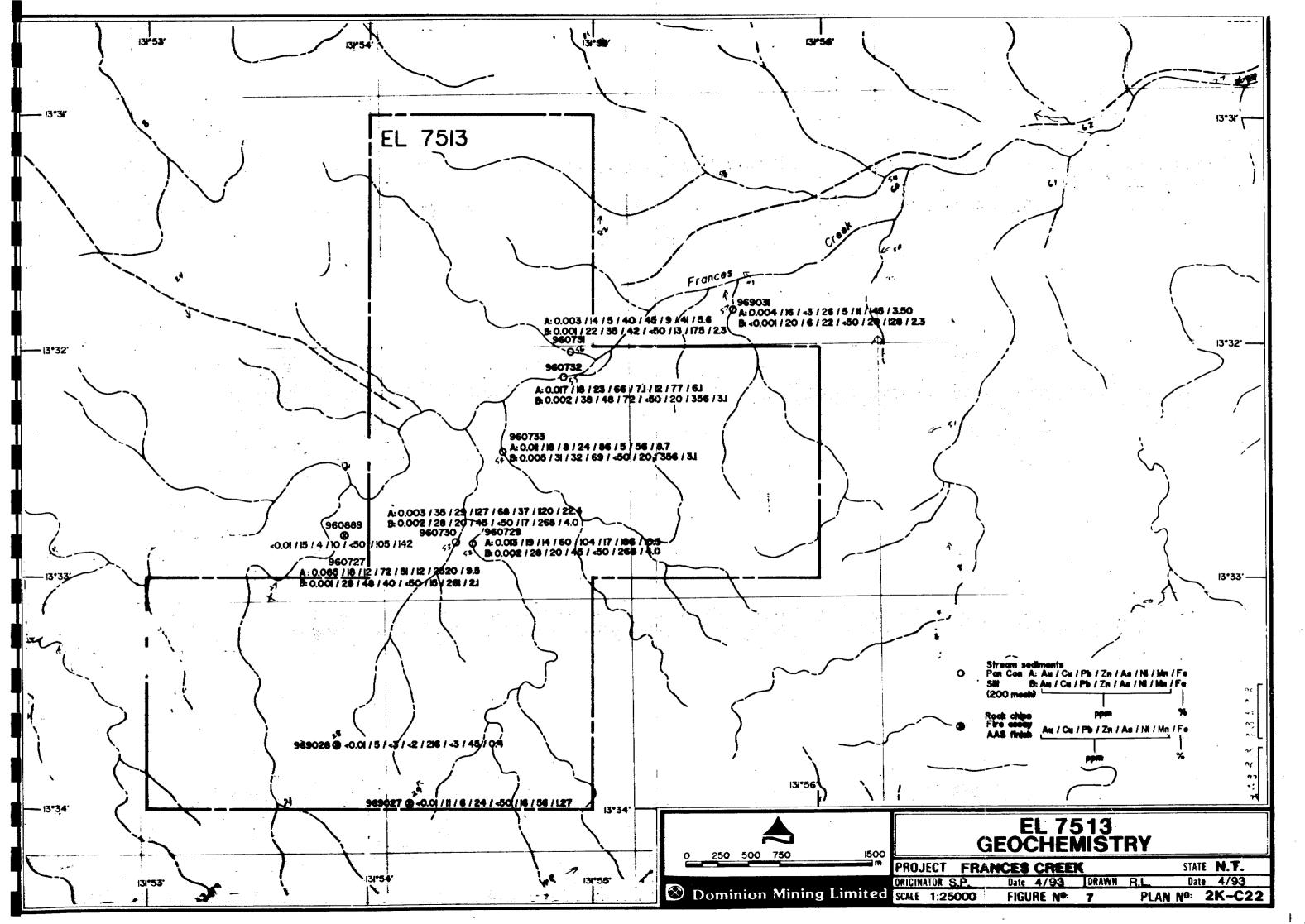
Au:

30 grams Fire Assay, AAS Finish (GG309)

Cu, Pb, Zn, Ni, As, Fe, Mn:

Aqua Regia Digest, AAS Finish (GA140)

All results were below detection limit (<0.01 ppm Au). (Figure 7).



## 5.0 CONCLUSIONS AND RECOMMENDATIONS

Exploration activities conducted during 1992 within EL7513 included aerial photographic interpretation and reconnaissance mapping at 1:25,000 scale, acquisition of airborne magnetics and radiometrics data, stream sediment sampling and rock chip sampling.

Regional stream sediment sampling did not return any significant Au or base metal values. Pan concentrates were <0.100 ppm Au and silt fraction results were ≤0.005 ppm Au.

Limited rock chip samplng failed to locate any Au anomalism.

## **Proposed Programme:**

Evaluation of new acquired airborne geophysical data.

## 6.0 EXPENDITURE

Exploration expenditure for EL7513 to 21 January 1993 amounted to \$11,558 against a covenant of \$10,000. The high expenditure reflects the relatively high cost in acquisition and interpretation of geophysical data.

**EL7513 EXPENDITURE** 

	EL7513 \$
Assays	1,100
Aerial Photography	90
Geophysics	1,700
Drilling: RAB	-
Data Acquisition	-
Equipment	214
Salaries & Wages	3,830
Travel & Accomm	1,169
Vehicles	594
Field Supplies/Equip	65
Camp Rental/Prov.	1,084
Draft & Computing	524
Darwin Office	638
	11,008
Administration (5%)	550
TOTALS	11,558

### 7.0 REFERENCES

- NEEDHAM, R.S., CRICK, I.H. and STUART-SMITH, P.G. 1980
  Regional geology of the Pine Creek Geosyncline. In Ferguson, J, and Goleby, A.B. (Editors) Uranium in the Pine Creek Geosyncline. International Atomic Energy Agency, Vienna, pp1-22.
- NEEDHAM, R.S. and STUART-SMITH, P.G. 1984a

  Geology of the Pine Creek Geosyncline, 1:500,000 Geological map. Bureau of Mineral Resources, Australia.
- PAGE, R.W., COMPSTON, W. and NEEDHAM, R.S. 1980

  Geochronology and evolution of the late Archaean basement and Proterozoic rocks in the Alligator Rivers Uranium Field, NT, Australia. In Ferguson, J. and Goleby, A.G., (Editors) Uranium in the Pine Creek Geosyncline. International Atomic Energy Agency, Vienna, pp39-68.

