



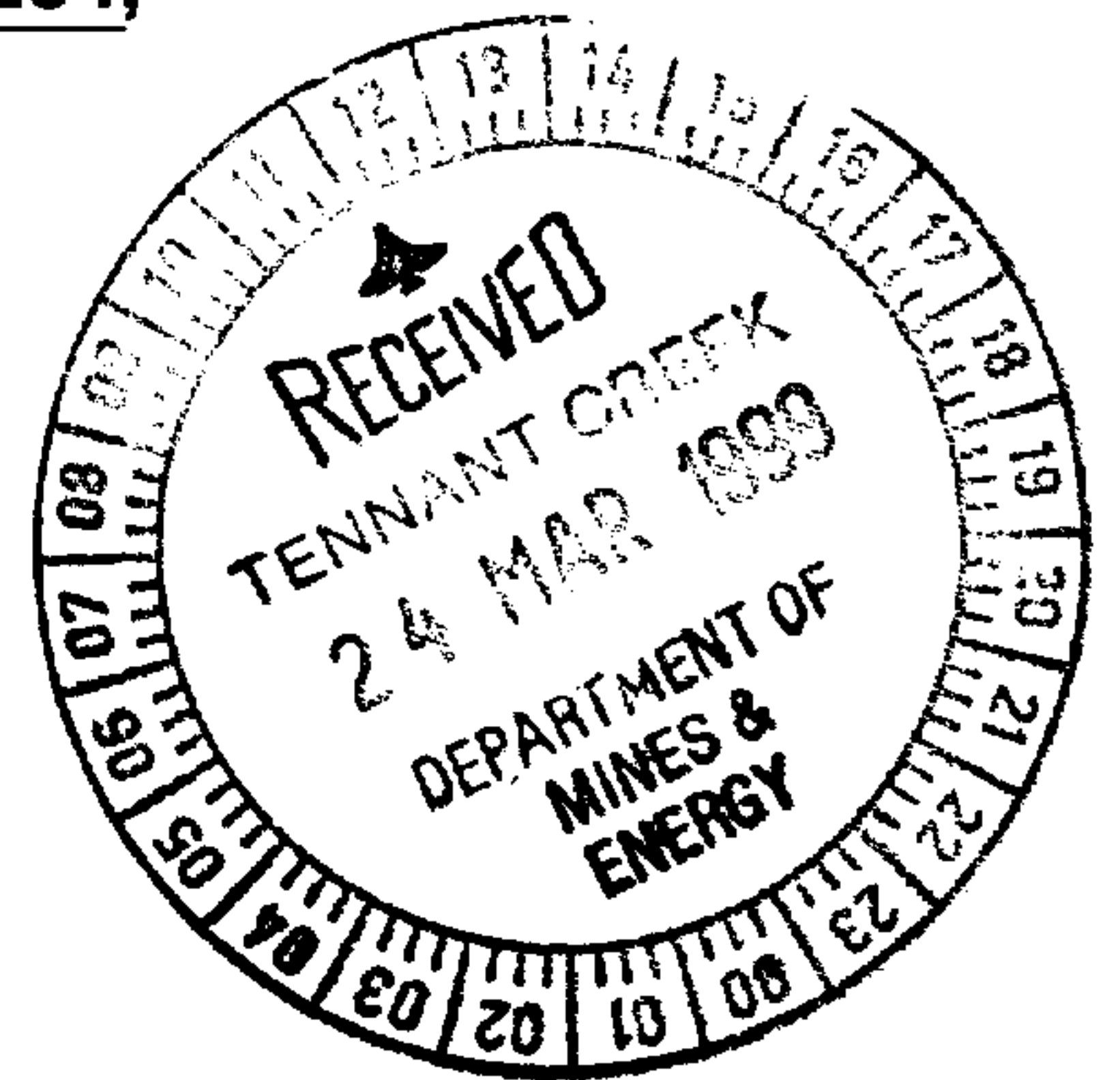
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**ANNUAL REPORT FOR**  
**MLCs 1, 2, 150-153, 156, 157, 197-209, 211-216, 281-284,**  
**431, 524, 623, 630, 631, 650, 651 & 653**  
**AND MCC's 21-23, 175-178 & 1426**  
**FOR THE YEAR ENDING 25 FEBRUARY 1999**  
**NOBLES NOB REPORTING GROUP**



**BURNT SHIRT LEASES**  
  
**TENNANT CREEK 1:250,000 MAP SHEET NO SE53-14**  
  
**VOLUME 1 OF 1**

**AUTHOR:** M HILL  
SENIOR EXPLORATION GEOLOGIST

**DATE:** MARCH 1999

**AUTHORISED BY:**

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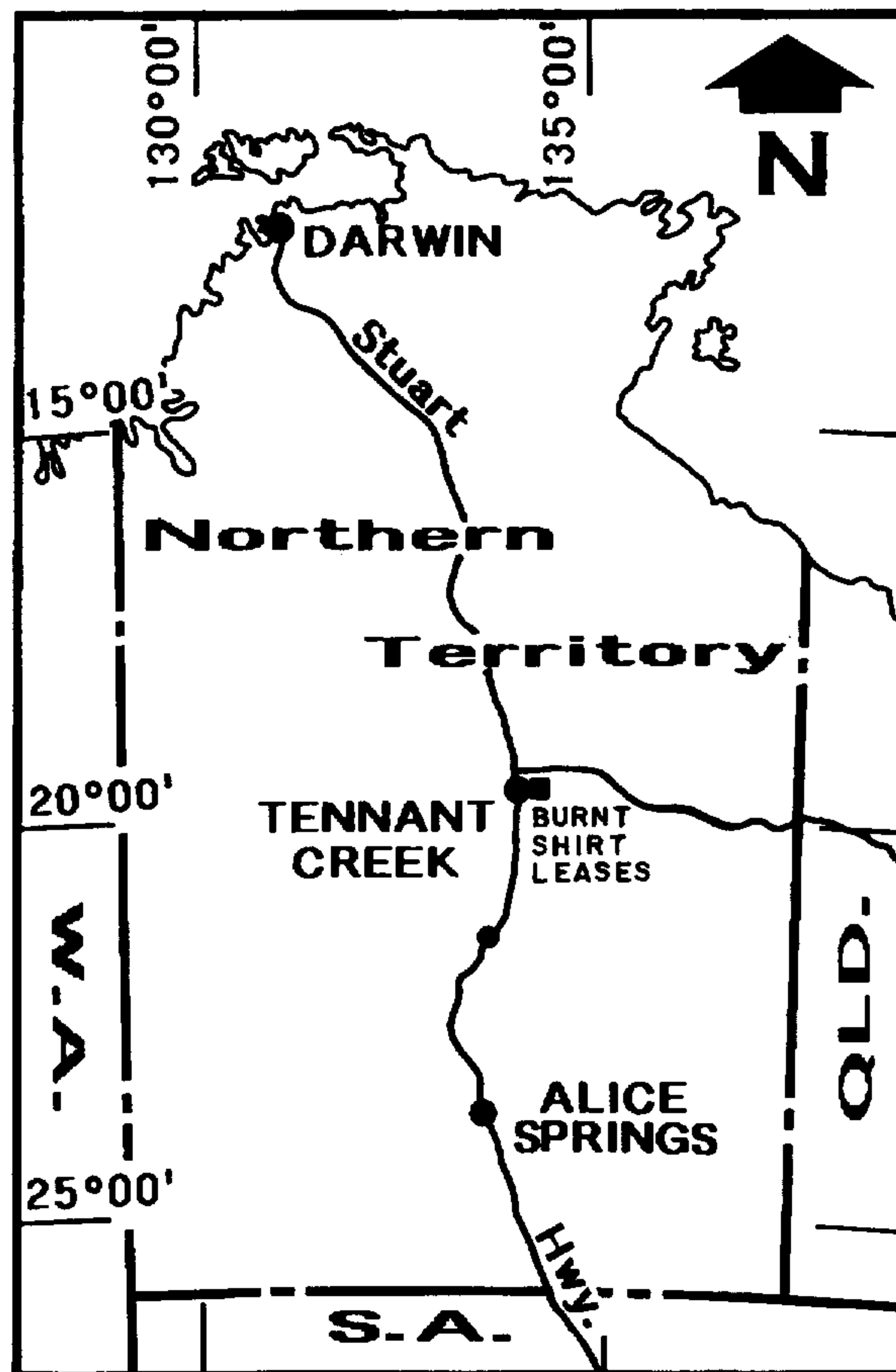
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## SUMMARY

**REPORT NO:** TENNANT CREEK: 99017 ADELAIDE: 23813  
**TITLE:** ANNUAL REPORT FOR MLCs 1, 2, 150-153, 156, 157, 197-209, 211-216, 281-284, 431, 524, 623, 630, 631, 650, 651 & 653 AND MCCs 21-23, 175-178 & 1426 FOR THE YEAR ENDING 25 FEBRUARY 1999, NOBLES NOB REPORTING GROUP, BURNT SHIRT LEASES, TENNANT CREEK 1:250,000 MAP SHEET NO SE53-14, VOLUME 1 OF 1  
**AUTHOR:** M HILL  
**DATE:** MARCH 1999



This report details exploration undertaken on MLCs 1, 2, 150-153, 156, 157, 197-209, 211-216, 281-284, 431, 524, 623, 630, 631, 650, 651 & 653 and MCCs 21-23, 175-178 & 1426 forming the Burnt Shirt Leases of the Nobles Nob Reporting Group for the year ending 25 February 1999.

The leases and claims are located immediately east of Tennant Creek township and cover 832 ha. Access is gained via the sealed road to Noble Nob Mine, and the graded tracks to the golf course and the Burnt Shirt and Argo mines

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## **1 CONCLUSIONS & RECOMMENDATIONS**

Exploration conducted over the tenements during the period 1 October 1997 to 25 February 1999 has included a high-resolution aeromagnetics survey, the signing of the agreement to access Warumungu Land Trust areas and ongoing rehabilitation activities.

Exploration planned for the period 26 February 1999 to 25 February 2000 will include target generation using existing geophysical and geochemical datasets. Detailed structural and alteration mapping will be used to assist in target generation modeling. The magnetic data for pre-existing prospects will re-modelled and compared with previous interpretations and drill data to establish its potential prospectivity. Drill testing will follow for any suitably prospective targets.

## **2 INTRODUCTION**

This report details exploration undertaken on MLCs 1, 2, 150-153, 156, 157, 197-209, 211-216, 281-284, 431, 524, 623, 630, 631, 650, 651 & 653 and MCCs 21-23, 175-178 & 1426 forming the Burnt Shirt Leases of the Nobles Nob Reporting Group for the year ending 25 February 1999.

## **3 LOCATION & ACCESS**

The leases and claims are located immediately east of Tennant Creek township access is gained via the sealed road to Noble Nob Mine and the graded tracks to the golf course and the Burnt Shirt and Argo mines (figure 1).

The climate of the Tennant Creek district is mild and dry through most of the autumn to spring months. The summer period is hot with seasonal heavy rainfall between January and March making access very difficult during these periods.

## **4 TENURE**

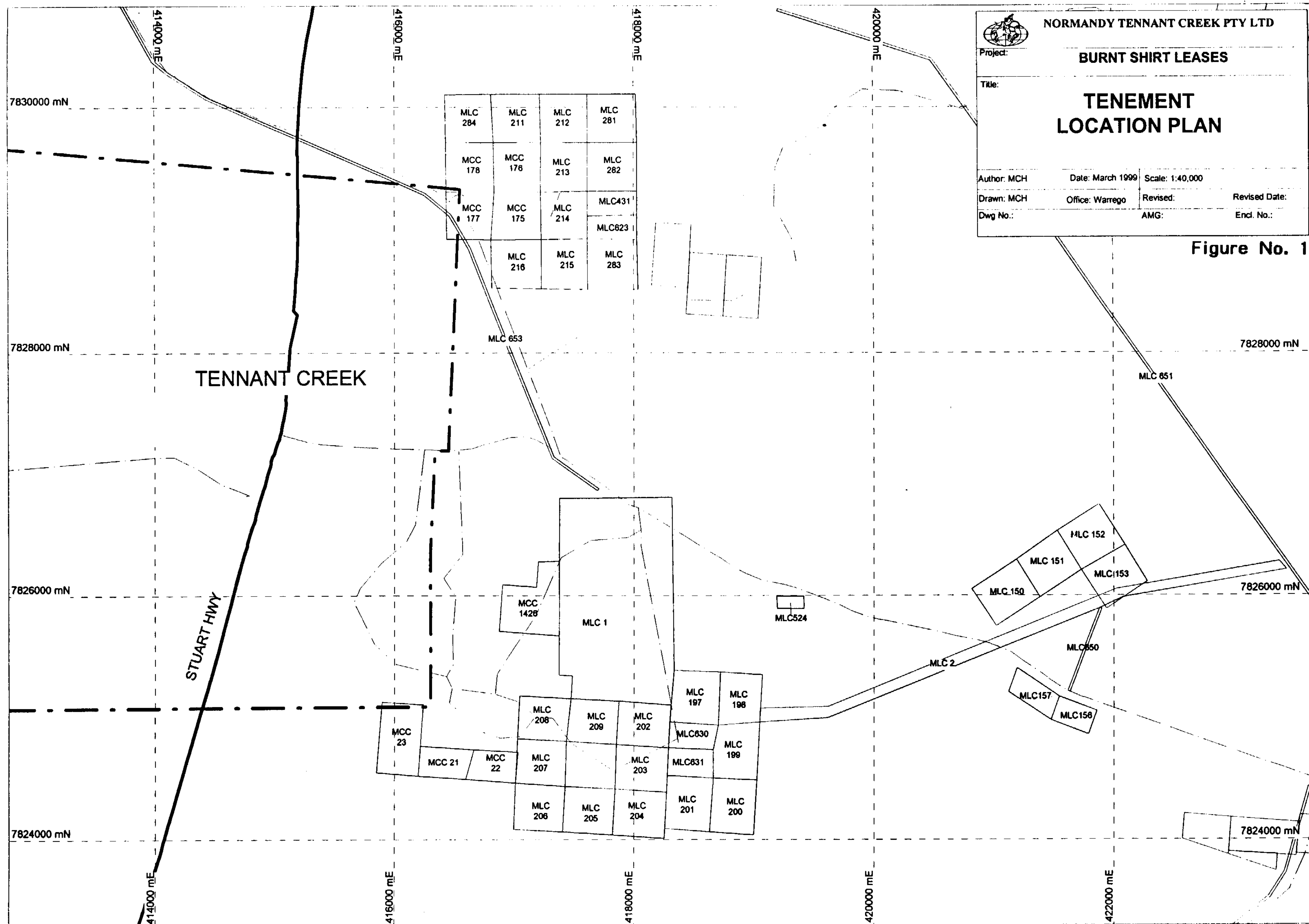
The Burnt Shirt Leases Reporting Group is formed by the following leases and claims MLCs 1, 2, 150-153, 156, 157, 197-209, 211-216, 281-284, 431, 524, 623, 630, 631, 650 651 & 653 and MCCs 21-23, 175-178 & 1426. The area covered is 586 ha.


MLCs 1, 2, 197-209, 630, 631, 650, 651, 653 are known as Argo leases (Explorer 46). MCCs 21-23 are known as Argo West, MLCs 150-153 as Explorer 99 and MLCs 156, 157 as Peko Gravel 1 and 2 respectively. MCCs 175-178 and MLCs 211-216, 281-284, 431 & 623 are known as Burnt Shirt and MLC 524 as Susan.

A tenure summary for these leases and claims is presented in Appendix 1.

## **5 REGIONAL GEOLOGY**

The geological understanding of the Tennant Creek Inlier has been recently advanced by detailed geological mapping over the Tennant Creek and Flynn 1:100,000 map sheets (Donnellan et. al. 1995), precision dating of stratigraphic components of the region (Compston, 1995) and regional geophysical interpretations.





**NORMANDY TENNANT CREEK PTY LTD**

Project:

**BURNT SHIRT LEASES**

Title:

**TENEMENT  
LOCATION PLAN**

Author: MCH

Date: March 1999

Scale: 1:40,000

Drawn: MCH

Office: Warrego

Revised:

Revised Date:

Dwg No.:

AMG:

Encl. No.:

Figure No. 1



The oldest exposed Proterozoic lithofacies in the Tennant Creek Inlier are the metasedimentary rocks of the Warramunga Formation, which are the hosts to the ironstone Au-Cu-Bi mineralisation of the Tennant Creek Goldfield. These Palaeoproterozoic metasediments were deposited approximately 1860 Ma. Deformation and intrusion of the Warramunga Formation by volumous porphyries and granitoids occurred during the Barramundi Orogeny (1858 Ma to 1845 Ma).

Following deformation and uplift the volcanics and volcanoclastics of the Flynn Sub-Group were erupted (1845 Ma to 1827 Ma), with intrusion of porphyries and minor granitoids into the Warramunga Formation. An additional deformation event preceded the deposition of the Hatches Creek Group/Tomkinson Creek Sub-Group (1820 Ma to 1785 Ma) and the intrusion of late-stage granitoids and porphyries into both the Warramunga Formation and Flynn Sub-Group at 1650-1712 Ma.

## **6 LOCAL GEOLOGY**

Outcrop is restricted to east-west trending sediment and quartz-haematite ironstone ridges. The dominant lithologies are Warramunga Group siltstones, shales and greywackes with minor quartz porphyry to the south of the area of interest. Numerous quartz and quartz-haematite ironstones are present in the ridges and their slopes. Lamprophyre has been mapped and was intersected in diamond drillholes at the Pinnacles Mine. Several east striking shears traverse the area. Mineralisation styles are varied and include auriferous quartz veins with quartz porphyry host (Dolomite and Pup Mines), shear hosted haematite-talc-chlorite ironstone (Pinnacles, Ajax, Fassifern and Southern Star Mines) and massive magnetite-chlorite ironstone (Argo Mine and Explorer 38).

## **7 PREVIOUS WORK**

GeoPeko Limited (GeoPeko) explored under EL 2535 the area immediately east of Tennant Creek township between 1980 and 1986. EL 2535 covered the majority of the leases and claims presented in this report. During that period, GeoPeko completed the following work: compilation of data from the Juno and Peko Mines; compilation of topographic, geological, geophysical information onto 1:50,000 scale plans; drilling at Juno North, Juno East, Juno Eastern Residual and Juno South; low level airborne magnetic and gravity surveys in 1984; ground magnetic surveys over four anomalies identified from the 1984 survey and compilation of a regional geological map (Love, 1987). All results are presented in Duke (1982, 1983), Duke & Hoschke (1983), Love & Balind (1985), Balind (1986), Love (1985, 1987).

The area of interest was explored by Asarco Australia Limited under EL 5304 in the late 1980s to early 1990s. Work completed by Asarco during that period included lag sampling, soil sampling ground magnetics surveying, vacuum and RAB drilling (Paterson, 1992; England, 1993).

### **7.1 MLCs 1, 2, 197-209, 630, 631, 651, 653 (Argo leases, R2, R3, Explorer 46) and MCCs 21-23 (Argo West)**

GeoPeko previously held Explorer 46 under Mineral Lease 388E (Williams, 1971 and Bamford, 1972). ML 388E became GML 824E & 825E and finally MLCs 630-631 in 1982. GeoPeko discovered the Explorer 46 magnetic anomaly in 1968. Diamond drilling of the target started in 1969. Significant gold intersections were obtained four diamond holes and nine wedges completed. A resource of 61,000t @ 11.3 g/t Au, 0.8% Cu was calculated. The lode was explored at depth in 1974



but no significant economic mineralisation was encountered. Diamond drilling of the Explorer 46 prospect continued in 1980. Further economic gold mineralisation was discovered and a probable resource of 184,000t @ 19 g/t Au, 0.82% Cu and 27 g/t Ag was calculated (O'Neill, 1980). Six more diamond holes were drilled to test the down dip extension of the mineralisation; results are presented in Duke (1981). The reserve was re-estimated in 1982 to be 253,000t @ 14.8 g/t Au (Duke et al. 1982). Shaft sinking at Argo Mine commenced in January 1984 and the first mill feed of ore was in May 1986 (Meade & Love, 1989). The mine closed in May 1988, after total production of 309,945t @ 8.3 g/t Au.

MLCs 197-209 (previously known as ML 700E-712E) were initially pegged around Explorer 46 and Explorer 38 (Muscadell, MLC 52) by Nobelex NL (Nobelex; exploration subsidiary of Australian Development Limited) to surround the R2-R3 anomalies (ADL, 1985; Haigh, 1977a & b). Nobelex conducted no work on the leases during the period 1974 to 1986. Peko Mines Limited (Peko) acquired MLCs 197, 198, 202, & 203 in 1986 for the purpose of improved access and mining ground around the Argo Mine. Poseidon Gold Limited (Poseidon; now Normandy Tennant Creek Pty Limited) acquired all Peko's assets in June 1991 and work on the leases since then included a vacuum drilling program (93 holes, 533 metres). Results are presented in the Report in Support of Renewal of the Leases (Evans, 1994a). The leases have still not been renewed by the DME.

MLC 650 corresponds to the road access from Peko Road to Waggaridge Dam, MLC 651 to the electrical power line route from Peko Mine to the Tennant Creek Pastoral Lease boundary and MLC 653 to the Tennant Creek by-pass road and Warrego road from Peko Road to Phillip Creek Pastoral Lease.

Poseidon had the Argo piles of mine mullock surveyed and assayed for gold (Hankinson, 1994). Average grades were above 2g/t Au and it was recommended to further sample the stockpiles should this material be used as mill feed for Warrego.

Some of the leases and claims are covered by Exploration Licence Application 8280 lodged by Poseidon in July 1993 (Hunter, 1994). The application covered land, which is subject to the Warumungu Aboriginal Land Trust. The licence is still under application.

MLCs 21-23 (Argo West) were granted to Peko for a period of ten years in 1983. An application for renewal of the claims was lodged by Poseidon in 1993 (Lindsay-Park, 1993). The claims have still not been renewed yet by the DME.

## **7.2 MCCs 175-178 and MLCs 211-216, 281-284, 431 & 623 (Burnt Shirt)**

These MCCs and MLCs cover the historical Burnt Shirt, Ace High, Kathleen and Leichardt mines and are also commonly referred to as the Ace High Leases in the literature.

Exploration goes back to the late 1930s in this area. In 1937 the Burnt Shirt to Kathleen area was subject to a ground magnetics survey. One anomaly was defined, located between Burnt Shirt and Ace High at a modeled depth of approximately 60 metres (Daly, 1957). The BMR tested the anomaly with one drill hole in 1964. The hole intersected barren quartz magnetite ironstone between 112 and 128 metres (in Evans, 1996).



In early 1967, the BMR drilled a diamond hole in an area known as the Burnt Shirt Anomaly 4. The hole failed to intersect any magnetic material. A second hole was drilled to investigate a small outcropping magnetic boss and intersected a thin band of ironstone at approximately 70 metre depth (230 feet). The BMR resurveyed the area in 1967 and on the basis of the new results another hole was drilled. This hole intersected massive ironstone at depth. A fourth hole was drilled to complete the geological knowledge. No significant gold values were encountered (Haigh, 1970).

In 1985, Australian Development Limited (ADL) conducted a ground magnetics survey over the Ace High leases which redefined the anomaly of Daly (1957) interpreted as the down plunge extension to the Burnt Shirt outcropping ironstone. The ironstone plunges ESE, strikes EW and dips steeply to the south. ADL followed the survey with a drilling program (12 holes, 587 metres) targeting extensions at depth to the Burnt Shirt, Kathleen, Leichardt and Ace High workings. No significant assay results were returned despite ironstone intersections in most holes (Evans, 1996).

Previous work on MCC 175-178 was carried out by Nobelex in the mid 1980s. Work has included percussion and RC drilling and ground magnetometer surveys. In 1985, nine percussion holes were drilled for 438 metres. No significant assay results were returned. In 1986 a ground magnetometer survey was completed over the Burnt Shirt grid. Deep drill hole targets were identified. In 1987, six RC holes (1457 metres) targeting the previously recognised targets were drilled followed in 1988 by a further RC/diamond hole (312 metres). The samples returned encouraging assay results (Worland, 1993).

During the late 1980s the Ace High leases were subject to RC drilling targeting the Burnt Shirt anomaly and Leichardt workings at depth. Seven holes for 1849 metres were drilled with a best result of 1m @ 1.25 g/t Au.

PosGold Limited (PosGold; formerly Poseidon) had the Leichardt piles of mine mullock surveyed and assayed for gold. These stockpiles totaled approximately 1,000t averaging 5g/t Au (Hankinson, 1994).

Exploration of the Ace high leases was dormant between the late 1980's to 1996.

PosGold conducted exploration on the leases and claims during 1996. During August 1996 the Ace High leases were subject to a vast surface rock chip-sampling program. A total of 249 samples were taken and submitted for assay on Au/Cu/Bi/Pb/Zn/Ag and Co. Results are presented in Evans (1996).

Exploration undertaken by PosGold on the Ace High leases between 1 October 1996 and 30 September 1997 has included three RAB holes at Kathleen and two RAB holes at Ace High. The results are discussed in Ward (1997).

### **7.3 MLCs 150-153 (Explorer 99)**

Peko originally pegged the mineral leases to cover a prospective aeromagnetic anomaly recognised from interpretation of the aeromagnetic survey flown by the BMR in 1956. Peko completed a ground magnetic survey to delineate the anomaly followed by one diamond drillhole. The hole intersected magnetite bearing sediments but no ironstone body (Lowe 1992a).

Poseidon explored the Explorer 99 area under EL 6343 between 1991 and 1994. Work completed included a review of historical data, vacuum drilling programs



(1,094 holes, 4,377 metres), a regional gravity survey, rock chipping (18 samples), soil sampling (22 samples), geomorphological mapping, photogeological mapping and a RAB drilling program (9 holes, 540 metres). All results are presented in Lowe (1992b, 1993) and Evans (1994a & b).

#### **7.4 MLCs 156-157 (Peko Gravel 1 & 2)**

GeoPeko previously held the leases under ML 620E and 621E for gravel extraction purposes. The material has been used in the past for road construction and maintenance. A report in support of the renewal of the leases was lodged by Poseidon in 1993 (Hunter, 1993).

Normandy Tennant Creek Pty Limited (Normandy) explored the area immediately surrounding MLCs 156-157 under EL 7924 between 1994 and 1996. Work completed by Normandy included data review, a ground magnetic survey and a vacuum drilling program (12 holes, 84 metres). All results are presented in Evans (1996, 1997).

#### **7.5 MLC 524 (Susan Prospect)**

MLC 524 (previously GML 367E) was originally pegged in October 1951 and granted to Ruger & Smith. During the period 1952-1954 small-scale underground mining was conducted, no production figures are available. GML 367E was forfeited in 1954.

GML 457E was then granted to Vallins & Morrison for a period of twenty-one years. Reported production figures for the period 1954-1959 are unknown, the production for 1959-1960 was however 120 tonnes @ 23.5 g/t Au. Ore was accessed using a 46m vertical shaft.

ADL, under its exploration subsidiary Nobelex, acquired an option to purchase the lease in 1972. McPhar Geophysics Pty Limited was mandated by ADL in 1972 to interpret the Susan magnetic anomaly. The magnetic data at the Susan area indicated the presence of a broad source of disseminated magnetite; the filtering of this data showed the presence of two anomalies that may be caused by deep ironstone bodies (Webster, 1972 & 1973). The lease was renewed for 21 years in 1975.

ADL explored a vast area including the Susan and Susan East Prospects under EL 96 in the early 1970s. Work completed by ADL included an aeromagnetic survey, sampling and geological mapping and diamond drilling. All results are presented in ADL (1972, 1973, 1974, 1975a & b, 1976). ADL also sampled the Susan Mine mullock dumps and defined a residual resource of 2,300 tonnes @ 1.5 g/t Au. In 1976 1,600 tonnes of mullock were processed at Nobles Nob with a recovery grade of 1.8 g/t Au.

#### **7.6 MCC 1426 (Ajax-Pinnacles Prospect)**

MCC 1426 covers the historical Pinnacles Mine described already by Ivanac in 1954. Production goes back to the mid 1930s. Between 1934 to 1950, the Pinnacles Mine produced 1,355 long tons @ 13.7 dwt Au (Ivanac, 1954).

PosGold explored the area surrounding MCC 1426 under EL 7931 between 1993 and 1995. Work completed by PosGold included a data review, geological mapping, rock-chip geochemistry (21 samples), vacuum drilling (51 holes, 153 metres) and RAB drilling (7 holes, 294 metres). All the results are detailed in

Evans (1994, 1996). Significant Au-Cu RAB intersections were returned from drilling in the Pinnacles Mine vicinity. MCC 1426 was pegged on 28 November 1995 to cover the RAB intercepts and areas along-strike to the east and west. The claim has still not been granted yet by the DME.

MCC 1426 was held previously by O'Brien and McFarlane under MCC 1056. The claim expired in October 1995 allowing PosGold to explore the old Pinnacles Mine workings vicinity late in the licence tenure of EL 7931.

## **8 WORK CARRIED OUT DURING THE REPORTING PERIOD**

Exploration conducted over the tenements during the period 1 October 1997 to 25 February 1999 has included a high-resolution aeromagnetics survey (figure 2), the signing of the agreement to access Warumungu Land Trust areas and ongoing rehabilitation activities.

### **8.1 Airborne Magnetics Survey**

Kevron flew the survey in October 1998. Survey specifications were 40m sensor height, 50m line spacing on a north – south line orientation with 7m in line sample spacing (Appendix 2). Elevation was recorded every seventh sample for digital terrain modelling (Appendix 2). Review of the radiometrics data (Appendix 2) indicates that total count anomalism is related to topographic highs.

Initial review of this data has indicated a greater level of structural detail can be delineated than from the earlier 1984 GeoPeko airborne magnetic survey.

### **8.2 Area of Interest Agreement**

The Area of Interest Agreement was signed on 9 December 1998. This agreement, between Central Land Council, Traditional Landowners and Normandy, establishes land access for mineral exploration upon Warrumungu Land Trust areas.

### **8.3 Environmental Audit**

An environmental audit is currently underway, covering all historical disturbances in the Tennant Creek mineral field. The audit is locating and detailing all occurrences of disturbance including mine workings, tracks, dumps, drillholes, excavations, buildings and rubbish.

## **9 EXPENDITURE STATEMENT FOR THE PERIOD 1/10/97 TO 25/2/99**

During the reporting period, the Burnt Shirt Leases Group incurred an expenditure of \$18,268. A breakdown of this expenditure follows (Table 1):



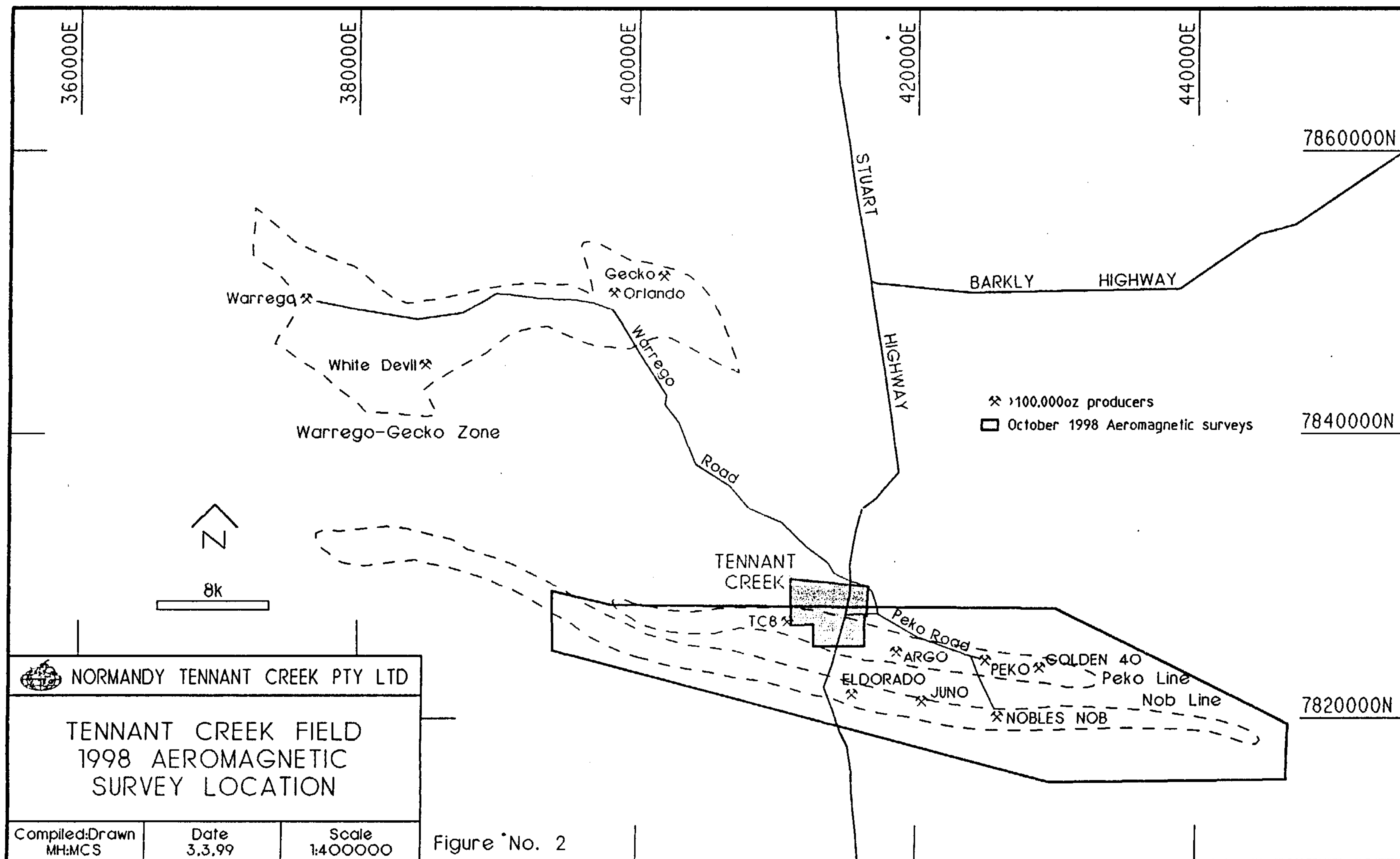


Table 1: Exploration Expenditure for the Burnt Shirt Leases

EXPENSE	COST
Employee Costs	\$ 3,897
Overheads	\$ 9
Drilling	\$ 0
Assays	\$ 0
Operating Costs	\$ 695
Specialist Services	\$ 4,760
Tenement Costs	\$ 8,390
Research	\$ 46
<b>TOTAL</b>	<b>\$ 18,268</b>

## 10 RECOMMENDED WORK PROGRAM & PROPOSED EXPENDITURE FOR THE PERIOD 26/2/1999 TO 25/2/2000

Proposed exploration activities for the period 26 February 1999 to 25 February 2000 will involve assessing the 1998 high resolution magnetics data for target generation, and detailed structural and alteration mapping.

Additional exploration is planned and the proposed exploration expenditure for the Burnt Shirt Leases Group for the next year of tenure is as follows (Table 2):

Table 2: Proposed Exploration Expenditure for the Burnt Shirt Leases

EXPENSE	COST
Employee Costs	\$ 1,400
Overheads	\$ 100
Drilling	\$ 0
Assays	\$ 0
Operating Costs	\$ 500
Specialist Services	\$ 100
Tenement Costs	\$ 8,090
<b>TOTAL</b>	<b>\$ 10,190</b>

## 11 ENVIRONMENTAL/REHABILITATION REPORT

Normandy has commenced an active rehabilitation program over much of the Tennant Creek field. This commitment has been reinforced within the Normandy Group with the appointment of a Group Environmental Engineer to oversee and implement the Group's guidelines and objectives. In addition to this an Environmental Superintendent has been engaged at Tennant Creek to design and implement the Group's objectives throughout the Tennant Creek area.

As an example of the Group's commitment to environmental issues several active rehabilitation programs are currently being undertaken in the Tennant Creek field. These include programs at Nobles Nob, Eldorado, White Devil and Warrego.

Environmental Management Plans for the Company's Tennant Creek Operations (Fowler, 1993; Fowler et al., 1998) have been submitted to the Department of Mines and Energy under separate cover. These plans detail the strategies to be implemented over various areas following completion of exploration programs and mining operations.



## 12 REFERENCES

- Balind, P (1986): *Relinquishment and Annual Report for Exploration Licence 2535, Volume 1 of 1*. GeoPeko Report to NTDME CR86/130 (86024).
- Compston, D M (1995): *Time constraints on the evaluation of the Tennant Creek Block, northern Australia*. Precambrian Research 71, 107-29.
- Donnellan, N, Hussey, K J & Morrison, R S (1995): *Flynn (5759) and Tennant Creek (5758) 1:100,000 Geological Map Series*. DME, NT Geol Surv.
- Duke, J (1982): *Annual Report for Exploration Licence 2535 for the Period 13/11/80 to 12/11/81, Volume 1 of 1*. GeoPeko Report to NTDME CR82/59 (82002).
- Duke, J (1983): *Annual Report for Exploration Licence 2535 for the Period 13/11/81 to 12/11/82, Volume 1 of 1*. GeoPeko Report to NTDME CR83/9 (83004).
- Duke, J & Hoschke, T (1983): *Annual Report for Exploration Licence 2535, Volume 1 of 1*. GeoPeko Report to NTDME CR83/339 (83008).
- England, C (1993): *Final Surrender Report to Department of Minerals and Energy (NT) Exploration Licence 5304, Volumes 1 and 2*. Asarco Australia Limited Report to NTDME CR93/532 (93248).
- Fowler, B (1993): *Environmental Management Plan 1993*. PosGold Limited, Report to the NTDME 93181.
- Fowler, B; Minns, A & Holmes, R (1998): *Environmental Management Plan 1998*. Normandy Gold Pty Limited Report to NTDME.
- Love, R (1985): *Annual Report for Exploration Licence 2535 for the Period 13/11/83 to 12/11/84, Volume 1 of 1*. GeoPeko Report to NTDME CR85/10 (85004).
- Love, R & Balind, P (1985): *Annual Report for Exploration Licence 2535 for the Period 13/11/84 to 12/11/85, Volume 1 of 1*. GeoPeko Report to NTDME 85028.
- Love, R (1987): *Final Report for Exploration Licence 2535 incorporating the Annual Report for 13th November 1985-12th November 1986*. GeoPeko Report to NTDME CR87/38A (87029).
- Paterson, C (1992): *Report for the sub-blocks relinquished from EL 5304, Juno prospect, May 1992, Volume 1 of 1*. Asarco Australia Limited Report to NTDME CR92/502 (92069).
- Ward, B (1997): *Annual Report on MCC's 65,96-99, 66-67, 78,95, 164-165,175-178, 927-944, 925-926, 167-169, 21-23, 1142-1144, 213, 239-240, 284, 1016, 1017, and MLC's 150-153, 57, 217-224, 398-401, 558, 512-517, 521, 525-526, 531-534, 537-545, 548-550,556, 589-590, 32, 36-37, 53-56, 65, 130-144,146-149, 186-196, 211-216, 225-228, 235-238, 281-284, 343-355, 388-396, 402-405, 431, 524, 576-577, 584-586,588,598,623,688-691, 35,38,253-261,362-375,376-387,432,530,606-616, 199-201,204-210,229-230,262-265,504-505, 1-3, 6-166, 18-19, 43-46, 49-51, 68, 125-126, 128, 154 - 157, 197-198, 202-203, 498-503,507, 509-510, 518-519, 523, 528-529, 535, 546, 578-579, 581-583, 630-631, 665-667, 683, 650, 561 for the Period 1/10/96 to 30/9/97, Sole Normandy Gold Pty Limited, Tenure of the Tennant Creek East Group, Tennant Creek District, Northern Territory*. Normandy Gold Pty Limited Report to NTDME 97085.



## **12.1 MLCs 1, 2, 197-209, 630, 631, 651, 653 (Argo Leases)**

ADL (1984): Australian Development Limited Operations at Tennant Creek. ADL Internal Report November 1984 (84014).

ADL (1985): Australian Development Limited Prospect Book. ADL Internal Report (85006).

Bamford, DH (1972): An interim report on the development of the Explorer 46 Prospect. GeoPeko Limited Internal Report 72051.

Duke, JH (1981): Geology and Exploration potential below 400 metres of the Explorer 46 Prospect, Tennant Creek. GeoPeko Internal Report 81031.

Duke, J H; Bridges, M & Willis, W B (1982): Explorer 46 Sensitivity of Resource Estimate, 29th December 1982. GeoPeko Internal Report 82019.

Evans, R (1994a): Report in Support of Renewal of Mineral Lease Number C197 to C209 inclusive, Tennant Creek District, Northern Territory, Explorer 46 (Argo) and Explorer 38 Area, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 94150.

Evans, R (1994b): Annual Report for Exploration Licence 7491 for the Period 15/10/93 to 14/10/94, Tennant Creek District, Northern Territory, Eldorado Prospect, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 94124.

Haigh, J E (1977a): Report on the Interpretation of Magnetic Anomalies R2 and R3 near Tennant Creek, NT for Australian Development Limited Project 77004. Georex Pty Limited 30th June 1977 (77028).

Haigh, J E (1977b): Report on the Re-Interpretation of Anomaly R3 near Tennant Creek, NT for Australian Development Limited Project 77004. Georex Pty Limited 21st July 1977 (77029).

Hankinson, J (1994): Initial Report-The Resource Potential of Mine Waste Stockpiles as Mill Feed for Warrego. PosGold Internal Report 94026.

Hunter, T J (1994): Exploration Proposal in Support of Grant of Exploration Licence Application 8280, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 94010/28/0178.

Lindsay-Park, K (1993): Application for Renewal of Mineral Claims C21, C22 and C23 Argo Mine Area, Tennant Creek District, Northern Territory, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 93009.

Meade, R (1986): The Geology and Genesis of the Argo Gold-Bismuth-Copper deposit, Tennant Creek, NT, Australia. Thesis Monash University 96003.

Meade, R & Love, R (1989): Review of Mining Operations at Argo Mine, Tennant Creek NT. GeoPeko Internal Report 89057.

O'Neill, W (1980): Interim geological and ore resource assessment of the Explorer 46 prospect, Tennant Creek, November 1980, Volumes 1 and 2. GeoPeko Internal Report 80027.

Williams, B T (1971): Confidential Report on the tenure situation in the Explorer 46 Area. GeoPeko Limited Internal Report 71052.

## **12.2 MCCs 175-178 and MLCs 211-216, 281-284, 431 & 623 (Burnt Shirt)**

Daly, J (1957): Magnetic Prospecting at Tennant, 1935 to 1937, Bulletin No. 44, Volume 1 of 1. Bureau of Mineral Resources, Geology & Geophysics Report BMR1957/44 (57003).

Evans, R (1996): Ace High Leases Exploration History and Status Report, Tennant Creek District, Northern Territory, Volume 1 of 1. PosGold Limited Internal Report 96111.

Haigh, J E (1970): Geophysical Investigation of the Burnt Shirt Anomaly 4 Area, Tennant Creek, 1967. Commonwealth of Australia Department of National Development, Bureau of Mineral Resources, Geology and Geophysics 1970/104 (70022).

Hankinson, J (1994): Initial Report-The Resource Potential of Mine Waste Stockpiles as Mill Feed for Warrego. PosGold Internal Report 94026.

Worland, R (1993): Report in Support of Renewal of Mineral Claims Central 175 to 178 inclusive, Burnt Shirt Area, Tennant Creek, Volume 1 of 1. Poseidon Gold Report to the NTDME 93004.

## **12.3 MLCs 150-153 (Explorer 99)**

Davenport, J W J (1991): Assessment of North Broken Hill Peko Limited's Tennant Creek Exploration and Mineral Assets. Poseidon Gold Limited Tennant Creek Operations Internal Report 91017.

Evans, R (1994a): Annual Report for EL 6343-Penguin for the Period 9/5/93 to 8/5/94, Tennant Creek District, Northern Territory, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 94057.

Evans, R (1994b): Final Report for EL 6343-Penguin for the Period 9/5/91 to 8/5/94, Tennant Creek District, Northern Territory, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 94065.

Lowe, G (1992a): Report in Support of Renewal Mineral Lease Central Numbers 150-153, Explorer 99 Area. Poseidon Gold Limited Report to NTDME 92047.

Lowe, G (1992b): Annual Report for EL 6343-Penguin for the Period 9/5/91 to 8/5/92, Tennant Creek District, Northern Territory, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 92025.

Lowe, G (1993): Annual Report for EL 6343-Penguin for the Period 9/5/92 to 8/5/93, Tennant Creek District, Northern Territory, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 93027.

## **12.4 MLCs 156-157 (Peko Gravel 1 & 2)**

Evans, R (1996): First Annual Report for Exploration Licence 7924 for the Period 28/12/94 to 27/12/95, Tennant Creek District, Northern Territory, Golf



Course Prospect, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 96002.

Evans, R (1997): Final Report for Exploration Licence 7924 for the Period 28/12/94 to 27/12/96, Tennant Creek District, Northern Territory, Golf Course Prospect, Volume 1 of 1. Normandy Gold Limited Report to NTDME 97005.

Hunter, T J (1993): Report in Support of Renewal of Mineral Leases Central 156 and 157, Golf Club Peko West Area, Tennant Creek District, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 93179.

## **12.5 MLC 524 (Susan Prospect)**

ADL (1973): Annual Exploration Report Exploration Licence 96-Mount Rugged, Tennant Creek, Northern Territory for the year ending 29th May 1973. Australian Development Limited Report to NTDME 73002.

ADL (1974): Annual Exploration Report Exploration Licence 96-Mount Rugged, Tennant Creek, Northern Territory for the four years ending 29th May 1974. Australian Development Limited Report to NTDME 74008.

ADL (1975a): Annual Exploration Report Exploration Licence 96-Mount Rugged, Tennant Creek, Northern Territory for the four years ending 29th May 1975. Australian Development Limited Report to NTDME 75006.

ADL (1975b): Report on Exploration for release to the public EL 96, Mount Rugged, May 1975. Australian Development Limited Report to NTDME 75009.

ADL (1976): Completion Exploration Report Exploration Licence 96-Mount Rugged, Tennant Creek, Northern Territory for the four years ending 29th May 1976. Australian Development Limited Report to NTDME CR76/64 (76001).

Webster, SS (1972): Interpretation of the Susan Magnetic Anomaly, Tennant Creek for Australian Development Limited. McPhar Geophysics Pty. Ltd. Report to ADL December 1972 (72088).

Webster, SS (1973): Additional Interpretation of the Susan Anomaly, Tennant Creek for Australian Development Limited. McPhar Geophysics Pty. Ltd. Report to ADL February 1973 (73058).

## **12.6 MCC 1426 (Ajax-Pinnacles Prospect)**

Evans, R (1994): Annual Report for EL 7931 the Period 1/12/93 to 30/11/94, Tennant Creek District, Northern Territory, Ajax Prospect, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 94057.

Evans, R (1996): Final Report for EL 7931 the Period 1/12/93 to 30/11/95, Tennant Creek District, Northern Territory, Ajax Prospect, Volume 1 of 1. Poseidon Gold Limited Report to NTDME 96013.

Ivanac J. F. (1954): The Geology and Mineral Deposits of the Tennant Creek Gold-Field, Northern Territory. BMR Bulletin No. 22, Volumes 1 and 2.



**APPENDIX ONE**

**TENURE SUMMARY**

### Tenure summary for the Burnt Shirt Leases Reporting Group

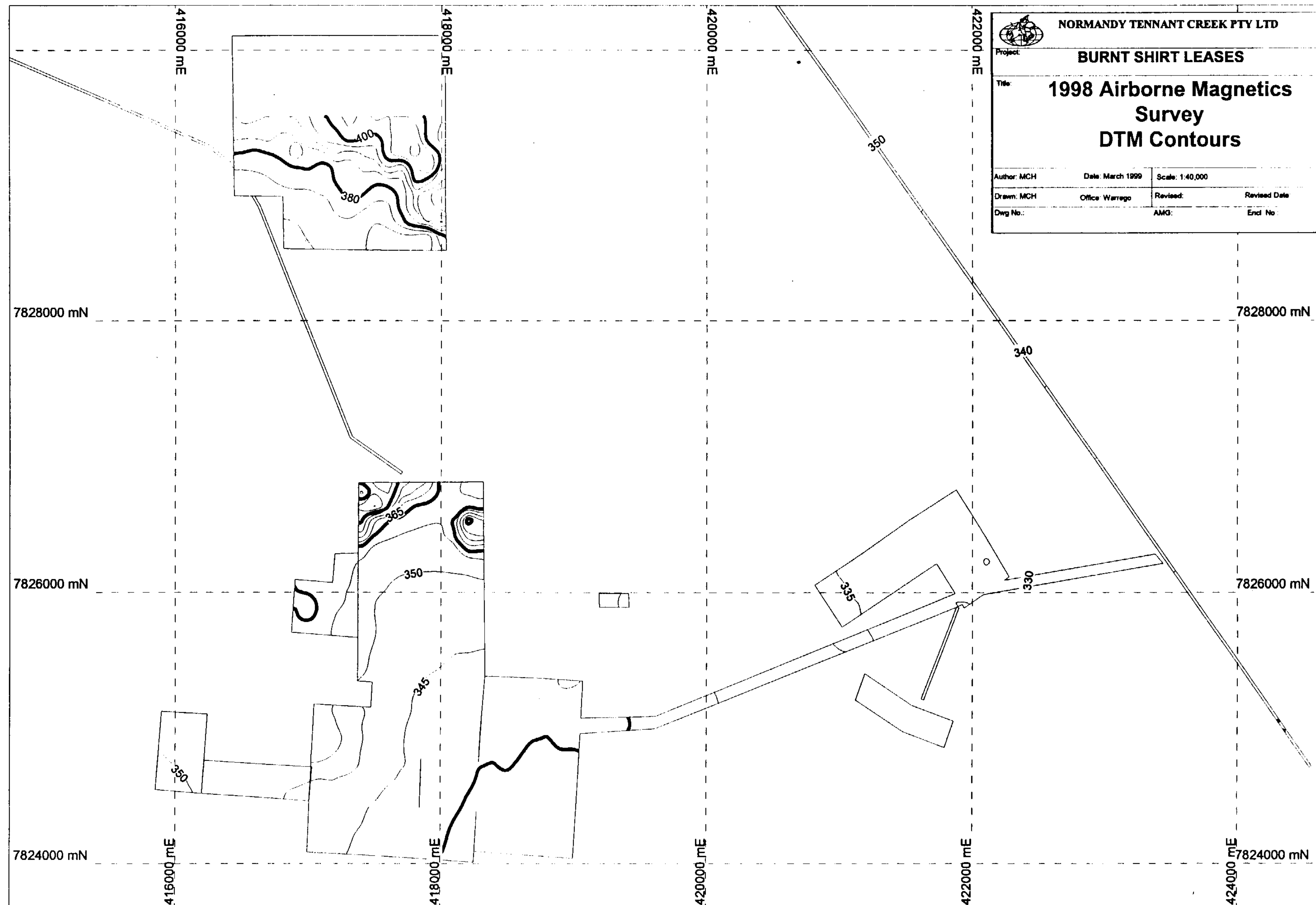
Title	Tenement Name, Location	Area (ha)	Date Granted	Date Expires	Comments
MCC 21	ARGO WEST	11.00	21/07/83	20/07/03	Report 15/03/94
MCC 22	ARGO WEST	11.00	21/07/83	20/07/03	Report 15/03/94
MCC 23	ARGO WEST	16.00	21/07/83	20/07/03	Report 15/03/94
MCC 175	BURNT SHIRT	16.00	29/05/85	29/05/03	Report 01/03/93
MCC 176	BURNT SHIRT	16.00	29/05/85	29/05/03	Report 01/03/93
MCC 177	BURNT SHIRT	13.00	29/05/85	29/05/03	Report 01/03/93
MCC 178	BURNT SHIRT	13.00	29/05/85	29/05/03	Report 01/03/93
MCC 1426	AJAX - Pinnacles	23.00	(Applied for 30/11/95)		
MLC 1	ARGO	157.00	14/11/83	13/11/07	
MLC 2	ARGO	47.00	14/11/83	13/11/07	
MLC 150	EXPLORER 99 No.1	16.00	27/10/72	31/12/92	Report 24/09/92
MLC 151	EXPLORER 99 No.2	15.00	27/10/72	31/12/92	Report 24/09/92
MLC 152	EXPLORER 99 No.3	16.00	27/10/72	31/12/92	Report 24/09/92
MLC 153	EXPLORER 99 No.4	16.00	27/10/72	31/12/92	Report 24/09/92
MLC 156	PEKO, Gravel 1	8.00	17/02/73	31/12/98	Renewed 98
MLC 157	PEKO, Gravel 2	10.00	17/02/73	31/12/98	Renewed 98
MLC 197	ARGO	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 198	ARGO	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 199	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 200	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 201	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 202	ARGO	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 203	ARGO	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 204	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 205	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 206	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 207	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 208	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 209	ARGO, R2, R3	16.00	12/12/74	31/12/94	Report 30/09/94
MLC 211	BURNT SHIRT	16.00	15/02/78	31/12/98	Renewed 98
MLC 212	BURNT SHIRT	16.00	15/02/78	31/12/98	Renewed 98
MLC 213	BURNT SHIRT	16.00	15/02/78	31/12/98	Renewed 98
MLC 214	BURNT SHIRT	16.00	15/02/78	31/12/98	Renewed 98
MLC 215	BURNT SHIRT	16.00	15/02/78	31/12/98	Renewed 98
MLC 216	BURNT SHIRT	16.00	15/02/78	31/12/98	Renewed 98
MLC 281	BURNT SHIRT	17.00	15/02/78	31/12/98	Renewed 98
MLC 282	BURNT SHIRT	17.00	15/02/78	31/12/98	Renewed 98
MLC 283	BURNT SHIRT	17.00	15/02/78	31/12/98	Renewed 98
MLC 284	BURNT SHIRT	13.00	15/02/78	31/12/98	Renewed 98
MLC 431	BURNT SHIRT	8.00	22/11/79	31/12/99	
MLC 524	SUSAN	3.00	27/10/54	31/12/05	Report 29/09/95
MLC 623	BURNT SHIRT	8.00	22/11/79	31/12/99	
MLC 630	ARGO	8.00	28/02/81	31/12/01	
MLC 631	ARGO	8.00	28/02/81	31/12/01	
MLC 650	ARGO	2.00	(Applied for 19/11/84)		(Authority 19/6/87)
MLC 653	ARGO	23.00	(Applied for 19/11/84)		(Authority 19/6/87)

**APPENDIX TWO**

**1998 AIRBORNE MAGNETICS TMI DIAGRAMS  
(including: TMI, DTM, TC Radiometrics)**











**APPENDIX THREE**

**BIBLIOGRAPHIC DATA SHEET**



## BIBLIOGRAPHIC DATA SHEET

**REPORT NUMBER:** TENNANT CREEK: 99017 ADELAIDE: 23813

**REPORT NAME:** ANNUAL REPORT FOR MLCs 1, 2, 150-153, 156-157, 197-209, 211-216, 281-284, 431, 524, 623, 630-631, 650-651 & 653 AND MCCs 21-23, 175-178 & 1426 FOR THE YEAR ENDING 25 FEBRUARY 1999, NOBLES NOB REPORTING GROUP, BURNT SHIRT LEASES, TENNANT CREEK 1:250,000 MAP SHEET NO SE53-14, VOLUME 1 OF 1.

**PROSPECT NAMES:** BURNT SHIRT  
ARGO  
ACE HIGH  
EXPLORER 38 (MUSCADEL)  
EXPLORER 46  
EXPLORER 99

**TENEMENT NUMBERS:** MLCs 1, 2, 150-153, 156, 157, 197-209, 211-216, 281-284, 431, 524, 623, 630, 631, 650, 651 & 653 AND MCC's 21-23, 175-178 & 1426

**OWNER/JV PARTNERS:** NORMANDY TENNANT CREEK PTY LIMITED

**AGREEMENT:** AREA OF INTEREST AGREEMENT

**COMMODITIES:** GOLD, COPPER

**TECTONIC UNITS:** TENNANT CREEK INLIER

**STRATIGRAPHIC UNITS:** WARRAMUNGA FORMATION

**1:250,000 MAP SHEET:** TENNANT CREEK SE53-14

**1:100,000 MAP SHEET:** TENNANT CREEK 5758

**KEYWORDS:** AERIAL MAGNETIC SURVEYS, GEOPHYSICAL  
INTERPRETATION, GEOPHYSICS, EXPLORATION  
PROPOSAL