BURNSIDE OPERATIONS P/L

FINAL REPORT

SEL 9591

(Area included in SELA24352)

Pine Creek SD 52.08 1:250,000; Margaret River (14/2-I) 1:50,000
Burnside (14/2-II) 1:50,000; Ban Ban (14/3-III) 1:50,000
Fenton (14/5-I) 1:50,000; Burrundie (14/6-IV) 1:50,000

Title Holder Northern Gold N.L.

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1. DBIRD DARWIN
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Compiled by:
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SUMMARY

SEL 9591 is centred 120km SE of Darwin, NT. It was granted to Territory Goldfields NL on 31st October 1996 and following reductions and several renewals, expired at the end of October 2004.

The tenement, initially of 251 blocks, comprised the substitution of numerous pre-existing exploration licences that had been pre-owned by several companies and individuals including Northern Gold NL, Dominion Gold Operations P/L and WMC.

This report is a compilation of all exploration work undertaken on the SEL since grant. As the area has been incorporated into a new application, SEL 24352, this report will for the time being, remain on closed file. Fourteen blocks were surrendered prior to the application for SEL24352 and work on these has been submitted as a separate report. (Shaw J. Final Report Surrendered Blocks SEL9591, Dec. 2004)

In April 2002 Territory Goldfields NL entered into a joint venture agreement with Buffalo Creek Mines P/L. (Harmony Gold Operations Ltd). The SEL and surrounding tenements were included in the dealing that placed management of the tenements under Burnside Operations P/L.

Since grant of SEL9591 on October 31st 1996, Territory Goldfields NL (Northern Gold NL) carried out several exploration programs comprising geophysical surveys, RC, diamond and RAB drilling, soil/rock chip sampling, trenching, resource modelling and estimates. These programs were mainly focused on prospects on the northern extension of the Howley Anticline and included Bons Rush, Ios, Ithaca, F16, Big Red Blob, Santorini, and Rhodes. To the south, prospects included Liberator, Chinese West, North Howley Siding, and to the east, Mt Bonnie North. Geochemical sampling was conducted at McCallum Creek in the north east of the tenement.

In the two and a half years of Burnside management, prior to surrender, the tenement was subjected to RC drilling, drill core analysis, surveying, and resource remodelling, followed by structural interpretation and domain ranking using remote sensing data.

Several of the above prospects, shown by exploration to contain gold resources, are either excised from the SEL under separate tenure or under application. The Ios deposit has largely been sterilised by the proximity of the new Darwin-Adelaide railway.

The bulk of technical data relating to the 1997-2004 period is available as a CD in digital format in the Appendices of this report. Other data is presented as hard copy.
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APPENDIX 1

CD-ROM of this report, figures, plates .pdf
Drilling and geochemical data Excel format
1.0 INTRODUCTION

SEL 9591 is a tenement, initially of 251 blocks, that surrounded and protected structural extensions to several important gold mining projects and settings that encircle the Burnside Granite intrusion, 120km SE of Darwin.

The SEL represented the amalgamation of numerous ELs owned by Northern Gold NL or purchased from Dominion Gold Operations P/L and other parties. It was granted on 31st October 1996.

The substitute licence expired at the end of October 2004 and a new application for SEL24352 was lodged. A total of 14 blocks were excluded from the new application and surrendered.

This report sets out exploration work carried out on the main body of the SEL since grant and covers the 8 year period to October 2004.

2.0 TENURE DETAILS SEL9591

The tenement was centred 120km SE of Darwin within the Cullen Mineral Field, on the Margaret River (14/2-I), Burnside (14/2-II), Ban Ban (14/3-III), Fenton (14/5-I) and the Burrundie (14/6-IV) 1:50,000 map sheets.

SEL 9591 of 251 blocks was granted to Northern Gold N.L. on the 31st of October 1996, for an initial period of four years. The SEL was comprised of an amalgamation of 53 exploration licences owned by Northern Gold N.L. (50%) and Camelot Northern Territory Limited (50%), Territory Goldfields N.L. and Star Money Lenders Pty. Ltd.

A waiver of reduction was granted on the 30th of September 1997, enabling 251 blocks to be retained until the 30th of September 1998. Due to compulsory partial relinquishment, the licence was reduced to 185 blocks in August, 1998.

The licence remained at 185 blocks during 1999, due to a waiver of reduction. A renewal was granted over the licence in November 2000 for a period expiring on the 30th October, 2002. A further application for renewal was granted expiring at the end of October 2004.

The Mining Act does not allow any further renewals so an application was made for a new SEL. Prior to the application for SEL24352 a total of 14 blocks were excised from the tenement and a separate report on these blocks was compiled and lodged with DBIRD. An application to substitute the whole of granted EL23543 was included in the new application.

SEL 9591 was situated within Perpetual Pastoral Lease No. 1111, Ban Ban Springs, held by Ban Ban Springs Station Pty. Ltd., Pastoral Lease No. 718, Mount Ringwood, held by W. E. and V. J. Moon, Pastoral Lease No. 903, Douglas, held by Tovehead Pty. Ltd., and
Crown Lease (Perpetual) Nos. 1546 and 900, held by the Northern Territory Land Corporation.

3.0 GEOLOGICAL SETTING

3.1 Regional Geology

SEL9591 situated within the Pine Creek Geosyncline, a tightly folded sequence of Lower Proterozoic rocks, 10km to 14km in thickness, laid down on a rifted granitic Archaean basement during the interval ~2.2-1.87Ga. The sequence is dominated by pelitic and psammitic (continental shelf shallow marine) sediments with locally significant inter-layered tuff units. Pre-orogenic mafic sills of the Zamu Dolerite event (~1.87Ga) intruded the lower formations of the South Alligator Group.

During the Top End Orogeny (Nimbuwah Event ~1.87-1.85Ga) the sequence was tightly folded, faulted and pervasively altered with metamorphic grade averaging greenschist facies with phyllite in sheared zones.

The Cullen intrusive event introduced a suite of fractionated calc-alkaline granitic batholiths into the sequence in the period ~1.84-1.80Ga. These high temperature I-type intrusives induced strong contact metamorphic aureoles ranging up to (garnet) amphibolite facies, and created regionally extensive biotite and andalusite hornfels facies.

Less deformed Middle and Late Proterozoic clastic rocks and volcanics have an unconformable relationship to the older sequences. Flat lying Palaeozoic and Mesozoic strata along with Cainozoic sediments and proto-laterite cementation overlie parts of the Pine Creek Geosyncline lithologies. Recent scree deposits occupy the lower hill slopes while fluviatile sands, gravels and black soil deposits mask the river/creek flats areas.

There is a tendency for gold mineralisation to be focused in the axial zone of anticlinal settings within strata of the South Alligator Group (1900-1880Ga) and lower parts of the Finniss River Group. This sequence evolved from initial low energy shallow basinal sedimentation to higher energy deeper water flysch facies. Dated at ~1720-1740Ga, (Sener 2004) gold in the Burnside region post-dated the Pine Creek Orogeny and Cullen intrusive events and has favoured suitable litho-structural trap sites in the biotite-hornfels facies of the thermal aureole.

3.2 Local Geology

The geology of SEL9591 comprises metasedimentary units of the Mt Partridge, South Alligator and Finniss River Groups of Lower Proterozoic age. This sequence was tightly folded along NNW trending axes by the Nimbuwah Event and dislocated by major north east and north striking fault sets. The fold axes were modified by later compression from
the south west and by the diapiric effects of the late orogenic Burnside Batholith. See Fig. 3.

Granitic intrusive centres of the syn-late orogenic Cullen event are represented by the Burnside, Margaret, Fenton and Shoobridge plutons that have penetrated the local layered sequences. The late orogenic elliptical Burnside intrusion in particular has had the effect of imparting a concentric outcrop pattern and an extensive biotite hornfels thermal aureole upon the South Alligator Group sequence. Rocks of the Wildman Siltstone, Koolpin Formation, Gerowie Tuff, Mt Bonnie Formation and Burrell Creek Formation are all exposed adjacent to the Burnside intrusion with the oldest formations in contact with the granite.

To the west of the Burnside Granite the Howley Anticline is an asymmetric (steep east limb) fold of regional and economic importance that can be traced for 30km from the Cosmo Howley mine to Mt Paqualin. At Cosmo Howley the axis strikes and plunges north west away from the Fenton Granite dome. Further north, from Bridge Creek on, it strikes north-south and undergoes a plunge reversal. Along the axis of the fold, rocks of the South Alligator Group are exposed, and where favourable juxtaposition of bedding sets and/or Zamu Dolerite units have been structurally prepared, accumulations of gold mineralisation are developed. In the Mt Paqualin area the axis is aligned NNE and has been affected by strong north east fracture sets. Gold mineralisation at Bons Rush, F16, Big Red Blob, Rhodes and Kazi have been developed in this setting.

To the east of the Burnside Granite, and passing between the latter and the Margaret Granite, the Pine Creek Shear Zone may be traced. This old and regionally important structural corridor strikes NW slightly discordant to the regional fold axes and may be traced from the region of Katherine in the south to near Batchelor in the north, a distance of ~200km. It is implicated in the localisation of the Union Reefs and Pine Creek gold mining centres and several other gold deposits along its length. In the vicinity of SEL9591 it passes through rocks of the Burrell Creek Formation and is marked by a belt of phyllite and disrupted fold limbs. A late stage dolerite dyke follows the axis of the corridor and can be seen on regional magnetic images.

The western limits of the SEL are marked by the Mt Shoobridge Fault system which trends north-south. It separates coarse facies lithic greywackes of the Burrell Creek Formation to the west from the Howley Anticline fold domain.

### 3.3 Economic Geology

The mining of gold, tin, lead, zinc and copper has occurred in the Burnside district since the early 1870's. Gold deposits occur preferentially in units of the South Alligator Group
and to a lesser extent in this area, in the Burrell Creek Formation. Furthermore, gold has an association with the axial zones of regional anticlinal folds.

The largest gold deposits in the area are located on the Howley Anticline. This major fold hosts the Cosmopolitan Howley, the Chinese Howley group and Big Howley mines as well as smaller deposits at Bridge Creek, Western Arm, Ios, Ithaca, Santorini, Bons Rush and Kazi. Many of the above were the focus of shallow historic gold workings. Significant deposits are also hosted by the Brocks Creek-Zapopan shear zone, the Hayes Creek Fault system and the Pine Creek Tectonic corridor or shear zone.

Gold is typically associated with vein quartz and sulphides. A chalcophile suite of metals, including sulphides of iron, copper, arsenic, bismuth, lead and zinc are accessories to the veins. Silicates such as tourmaline and accessories such as fluorite are also common vein associates.

Near Mt Shoobridge to the SW of the SEL there is a cluster of tin, lead and copper workings that appear spatially related to the Mt Shoobridge pluton and Fenton Granite in a structurally elevated horst block trending north-south, parallel to the Mt Shoobridge Fault.

Sener, in his 2004 PhD thesis, strongly supports a post orogenic and post granite timing for the Burnside region gold deposits. The timing at ~1740Ga coincides closely with the ages of gold in the Tanami region and in the Ashburton. The dating of this event correlates closely with the collision, cratonisation and subduction of tectonic plates in southern Australia. His work also supports a case for the biotite hornfels facies halo of the Cullen Granitoids as being more favourable for gold deposition.

**4.0 PREVIOUS EXPLORATION**

The area of SEL 9591 was extensively explored by Dominion Gold Operations Pty. Ltd and Northern Gold N.L under 53 separate exploration licence titles. Northern Gold NL purchased the Dominion assets and continued sole exploration in the substitute tenement until the formation of the Burnside Joint Venture in April 2002. Since then the SEL has been managed by the joint venture.

**4.1 Exploration Prior To Grant of SEL9591**

The more significant exploration events are listed below to illustrate the work carried out prior to the end of 1996 when the SEL was granted.
EL 7120 - Northern Gold N.L.

Northern Gold N.L. conducted a soil sampling, mapping and rock chip sampling program over the tenement. Results are given in Partington 1992 and 1993a.

In the 1994/95 field season, Northern Gold N.L. completed a reconnaissance aircore drilling program. A total of 48 aircore drill holes were completed for 392 metres, with three holes returning anomalous Au results over 40 ppb (Canaris, 1995a). These areas were targeted for RAB testing. A total of 63 RAB drill holes were completed for 1,086 metres, with an average depth of 17.2 metres. Twenty holes received anomalous results over 40 ppb Au (Canaris, 1995a).

Landsat Imagery, SPOT Imagery and AGSO mapping were obtained and used in conjunction with aerial mapping and site visits to determine the best method of exploration to be used on the licence (Socic, 1996a).

EL 7231 - Dominion Gold Operations Pty. Ltd & Northern Gold N.L.

Dominion Gold Operations Pty. Ltd. completed a literature review of previous exploration, aerial photographic interpretation, airborne magnetic interpretation, a ground magnetic survey, geological mapping, gridding, soil sampling and vacuum drilling. Results from this work identified several coincident gold-arsenic anomalies up to 25 ppb Au and 500 ppm As (Elliston, 1995a).

Landsat Imagery, SPOT Imagery and AGSO mapping were obtained and used in conjunction with aerial mapping to determine the best method of exploration to be used on the licence (Socic, 1996b).

EL 7364 - Dominion Gold Operations Pty. Ltd.

Dominion Gold Operations Pty. Ltd. completed an aerial photographic interpretation, airborne and ground geophysics, regional stream sediment sampling, geochemical soil sampling, vacuum drilling and RAB drilling, on an 1,000 metre by 50 metre sample array. Results were disappointing with peak stream sediment sample results of 5 ppb Au and 18 ppm As (Elliston, 1995b).

EL 7492 - Northern Gold N.L.

Northern Gold N.L. completed regional soil sampling during the 1994 field season. A total of 95 samples, including duplicates, were collected along 5 soil lines. Highly anomalous results were returned (Canaris, 1995b).

In 1995, Northern Gold N.L. completed a reconnaissance RAB drilling program. A total of 90 holes were completed for 794 metres. Ten holes received anomalous results, over 40 ppb Au (Canaris, 1995b).
Landsat Imagery, SPOT Imagery and AGSO mapping were obtained and used in conjunction with aerial mapping and site visits to determine the best method of exploration to be used on the licence (Socic, 1996c).

**EL 7561 - Dominion Gold Operations Pty. Ltd. and Northern Gold N.L.**

Work carried out by Dominion Gold Operations Pty. Ltd. from 1992 to 1994 included aeromagnetic interpretation, gridding, soil sampling and vacuum drilling.

The soil sampling program involved the collection of 86 samples. The peak gold response returned was 6.9 g/t (Palmer, 1993, 1994a).

The vacuum drilling programs resulted in a total of 215 holes drilled for 992.5 metres. The samples submitted for analysis from these programs returned no anomalous gold results (Palmer, 1993, 1994a).

Northern Gold N.L. completed a work program based on digital data acquisition and manipulation. Landsat Imagery, SPOT Imagery and AGSO mapping were obtained and used in conjunction with aerial mapping to determine the best method of gold exploration to be used on the licence (Socic, 1996d).

**EL 7601 - Dominion Gold Operations Pty. Ltd.**

Dominion Gold Operations Pty. Ltd. exploration consisted of stream sediment, rock chip and soil sampling. Stream sediment sampling produced peak responses of 250 ppb Au, 350 ppm As, 358 ppm Cu, 20 ppm Pb and 58 ppm Zn. Soil sampling returned peak values of 193 ppb Au, 87 ppm Cu, 170 ppm As, 28 ppm Mo and 2,110 ppm Mn (Elliston, 1995c).

**EL 7623 - Dominion Gold Operations Pty. Ltd.**

During 1994, Dominion Gold Operations Pty. Ltd. carried out a program of gridding, soil sampling, vacuum drilling and RAB drilling (Elliston, 1994).

Values to 180 ppb Au were returned from the soil sampling, and 50 ppb Au was returned from a vacuum hole. A high value of 390 ppb Au, from a RAB sample, was also recorded (Elliston, 1994).

**EL 7701 - Dominion Gold Operations Pty. Ltd.**

Exploration by Dominion Gold Operations Pty. Ltd. consisted of aerial photographic interpretation, airborne and ground geophysics, regional stream sediment sampling and one RC drill hole that targeted a magnetic (bullseye) high located within the tenement (Elliston, 1995d).
Results for this phase of exploration were disappointing, with a peak stream sediment sample result of 2 ppb Au. All intercepts from the single RC hole (WH002) were below detection limit for Au (Elliston, 1995d).

Exploration over the northern most graticular block, involved the collection of 111 geochemical soil samples and 12 vacuum drill holes for 41 metres. The results from both programs were generally disappointing and downgraded the northern section of the tenement (Elliston, 1995d).

**EL 7738 - Solomon Pacific Resources and Northern Gold N.L.**

In 1995, Solomon Pacific Resources provided a re-evaluation and presentation of soil and rock chip results from the previous years work over EL 7738 (Stokes, 1995a).

Exploration completed by Northern Gold N.L. included digital data manipulation and interpretation (Stokes, 1995a), a regional RAB drilling program and a reconnaissance soil sampling program (Socic, 1996e).

RAB drilling consisted of 369 holes for 1,802. Results returned coincident anomalous values up to 780 ppb Au and 1,300 ppm As (Socic, 1996e).

A total of 155 soil samples were collected and submitted to Assaycorp, for 50 gram, quartz flush low level fire assay Au and As analysis. The results from the soil sampling confirmed the Au and As anomaly identified by the RAB drilling, returning maximum values of 505 ppb Au and 190 ppm As (Socic, 1996e).

**EL 7786 - Northern Gold N.L.**

During the 1992/93 field season, Northern Gold N.L. completed a reconnaissance stream sediment sampling program with the aid of enhanced geophysical data and mapping. The stream sediment sampling results identified several anomalous soil values (Partington, 1993b).

In 1994, Northern Gold N.L. completed geological mapping, structural interpretations and soil sampling in the southern and eastern part of EL 7786. The soil sampling identified several areas of anomalous soil values, ranging from 5 ppb to 26 ppb Au (Partington, 1994).

In 1994/95, infill soil sampling was completed over two areas. A total of 402 samples were collected. The sampling reconfirmed the soil anomalies identified by the previous regional soil sampling program. Infill sampling in the southern area identified two Au and As anomalies with assays up to 490 ppb Au and 650 ppm As. Results from infill soil sampling the northern area returned spot highs up to 104 ppb Au (Hardy, 1995a).
During the 1995/96 field season, Northern Gold N.L. completed 347 RAB drill holes over the previously identified soil anomalies. The RAB drilling of the northern anomaly identified three north northeast trending gold and arsenic bedrock anomalies up to 500 metres in strike length and 80 metres width. Drilling on the southern anomaly identified a coincident north trending gold and arsenic mineralised zone with a strike length of 1,400 metres, and up to 100 metres in width. At least two other separate anomalous zones lie to the immediate west (Socic, 1996f).

**EL 7866 - Dominion Gold Operations Pty. Ltd.**

Dominion Gold Operations Pty. Ltd. completed 156 vacuum drilling for 631 metres. Results were disappointing, with a maximum result of 5 ppb Au (Bredhauer, 1994a).

**EL 7769 - Northern Gold N.L.**


Exploration programs were directed toward prospect areas originally identified by Western Mining Corporation (W.M.C.), prior to Northern Gold N.L.’s acquisition of the tenement area. These areas were renamed by Northern Gold N.L.

- Kazi Gold Prospect (W.M.C. Quest 150)
- Rhodes Gold Prospect (W.M.C. Quest 155)
- Santorini Gold Prospect (W.M.C. F17 Stockwork Prospect)
- Ithaca Gold Prospect (W.M.C. 9000 North Prospect)

**EL 7926 - Dominion Gold Operations Pty. Ltd.**

Dominion Gold Operations Pty. Ltd. completed geophysical interpretations, gridding, soil sampling and vacuum drilling.

The soil sampling program (39 samples), returned a peak response of 150 ppb Au. Vacuum drilling (29 holes for 101 metres) produced peak results of 57 ppb Au, 280 ppm As and 91 ppm Cu (Bredhauer, 1994b).

Further vacuum drilling was conducted in 1994. Peak responses for the program were 26 ppb Au, 200 ppm As, 69 ppm Cu, 160 ppm Pb and 3 ppm Bi (Bredhauer, 1994b).

**EL 8003 - Dominion Gold Operations Pty. Ltd.**

Gridding (9.2 line kilometres), soil sampling (318), rock chip sampling (33), stream sediment sampling (10 BLEG), aircore drilling (51 holes for 135.5 metres) and RC
percussion drilling (3 holes for 141 metres), were carried out during the 1994 field season. The results returned for Au, As and base metal geochemistry, were weak (Bredhauer, 1994c).

**EL 8049 - Dominion Gold Operations Pty. Ltd.**

Soil sampling was confined to areas of subcrop and outcrop within the tenement. A total of 155 samples were collected, returning a peak response 45 ppb Au (Motton, 1994).

A total of 96 vacuum drill holes were completed for 472 metres. The drilling yielded a maximum result of 11 ppb Au (Motton, 1994).

**EL 8053 - Dominion Gold Operations Pty. Ltd.**

Soil sampling was conducted in the western half of EL 8053, resulting in the collection of 158 samples. Gold results were generally less than detection (Fawcett, 1995a).

Two hundred and sixty nine metres of vacuum drilling returned gold results generally less than detection (Fawcett, 1995a).

**EL 8082 - Northern Gold N.L.**

In the 1994/95 field season, soil sampling was completed over EL 8082. A total of 340 regional soil samples were collected and analysed for Au, As and base metals. The program produced two highly anomalous zones, with values up to 520 ppb Au (Hardy et al., 1995).

An infill soil sampling program resulted in the collection of 414 samples. Samples were submitted for 50 gram, quartz flush low level fire assay Au and As analysis. The program reconfirmed the anomalies, returning gold values up to 1,650 ppb and arsenic values up to 860 ppm (Hardy et al., 1995).

**EL 8128 - Dominion Gold Operations Pty. Ltd. and Northern Gold N.L.**

Northern Gold N.L. completed a scout RC drill program to locate the source of the Au soil anomaly, highlighted by previous soil sampling, on ERL 95. A total of 11 scout RC drill holes were drilled. The best intersections returned were 3 metres @ 23.67 g/t Au from 20 metres in AC11 and 8 metres @ 3.41 g/t Au from 42 metres in AC06.

Northern Gold N.L. completed a comprehensive exploration program in 1994/95, which included costean excavation, geological mapping and sampling, and a pattern resource RC drilling program (Hardy, 1995b).

Two costeans were excavated and sampled over one metre intervals, with a total of 290 samples submitted for 50 gram fire assay, quartz flush analysis. Anomalous grades were returned from costean 1, close to the dolerite contact, with 2 metres @ 2.53 g/t Au from
139 metres, surrounded by a halo of 28 metres @ 0.54 g/t Au from 133 metres. Rock chip samples from costean 2 returned anomalous values, with 2 metres @ 0.75 g/t Au from 107 metres (Hardy, 1995b).

The RC drilling program consisted of a total of 35 infill resource holes drilled for a total of 2,048 metres. All samples were submitted for 50 gram fire assay, quartz flush Au analysis. The best intercepts were 3 metres @ 2.44 g/t Au from 70 metres in LB24, 15 metres @ 1.60 g/t Au from 51 metres in LB07 and 2 metres @ 8.60 g/t Au from 27 metres in drill hole LB20 and 2 metres @ 2.28 g/t Au from 6 metres in drill hole LB35 (Hardy, 1995b).

**EL 8129 - Northern Gold N.L.**

In the 1994/95 field season, Northern Gold N.L. completed a soil sampling program over EL 8129. A total of 176 soil samples were collected and submitted for analysis of Au, As, Cu, Pb, Zn, and Ag (Stokes, 1995b).

Northern Gold N.L. completed a regional RAB drilling program in the 1995/96 year of tenure. A total of 168 holes were completed for 977 metres. All RAB samples were submitted for low level fire assay analysis of Au and As. The program returned anomalous results from 28 holes, with results in excess of 100 ppb Au (Socic, 1996h). Anomalous Au ppb results were accompanied by a strong coincident As ppm response.

**EL 8139 - Dominion Gold Operations Pty. Ltd. and Northern Gold N.L.**

In 1994/95, Dominion Gold Operations Pty. Ltd. completed RAB drilling and LAG sampling programs over the tenement. The RAB drilling program involved drilling 23 holes for a total of 97 metres. Holes were drilled to depths of up to 12 metres. Samples were analysed for Au, Cu, Pb, Zn, Ag, As, Bi, Fe and Mn. The highest Au result returned for this drilling was 7ppb Au (Palmer, 1994b).

LAG sampling covered the southern two thirds of the tenement. A total of 140 samples were collected and submitted for analysis of Au, Cu, Pb, Zn, Ag, As, Fe, Mn, and Bi. Several zones of weakly anomalous gold geochemistry were identified (Palmer, 1994b).

Northern Gold N.L. completed a work program involving digital data acquisition and processing. Landsat Imagery, SPOT Imagery and AGSO mapping were obtained and used in conjunction with aerial mapping to determine the best method of exploration to be used on the licence (Socic, 1996i).

**EL 8444 - Dominion Gold Operations Pty. Ltd.**

Exploration completed by Dominion Gold Operations Pty. Ltd. comprised aeromagnetic interpretation, vacuum, aircore and vertical RAB drilling.
A vacuum drilling program was carried out during May 1994, however, due to problems with damp and wet sub-surface alluvial gravels and clays from the Margaret River system, some areas were unsuitable for vacuum drilling. Aircore drilling was then completed over these areas. This program was aborted after four holes, due to the inability of the rig to cope with the underground gravel systems. In all, only 3 samples were collected for analysis (Elliston, 1995e).

To infill the gaps in the grid that were present due to difficult drilling conditions, RAB drilling was completed. Only one sample was collected from a total of five holes (Elliston, 1995e).

Results were generally poor with a majority being below detection limits (Elliston, 1995e).

**EL 8521 - Northern Gold N.L.**

A regional soil sampling program was completed by Northern Gold N.L. A total of 33 samples, including duplicates, were submitted for Au, As and base metal analysis. The soil sampling program returned low (Socic, 1996j).

Northern Gold N.L. also completed 60 RAB drill holes for 623 metres. Ten samples received anomalous results, over 40 ppb Au (Socic, 1996j).

**EL 8529 - Northern Gold N.L.**

Northern Gold N.L. conducted a regional soil sampling program, covering all five graticular blocks of the tenement, in 1995. A total of 473 samples, including duplicates, were collected (Socic, 1996k).

The regional soil sampling produced a northerly, trending Au and As anomaly with assay values to 63 ppb Au and 83 ppm As. A series of coincident As and base metal anomalies, with maximum assay values to 220 ppm As, 458 ppm Pb, 444 ppm Zn and 86 ppm Cu were also identified (Socic, 1996k).

**EL 8550 - Northern Gold N.L.**

The work completed over EL 8550 by Northern Gold N.L. included soil sampling, aircore drilling, assaying and remote sensing (Canaris, *et al.*, 1995).

The soil sampling program consisted of the collection of 75 samples, which were analysed for Au and As. The results returned were generally low (Canaris, *et al.*, 1995).

An aircore drill program consisted of 11 holes drilled for 39 metres. The results were generally anomalous. Of the 11 samples collected, 4 were anomalous for Au (>20 ppb),
and As was generally elevated for the whole area tested, with 6 of the samples exceeding 100 ppm (Canaris, et al., 1995).

During the 1995/96 year of tenure, Northern Gold N.L. completed geological mapping, regional soil sampling, RAB drilling, an infill RAB drilling program and a scout RC drilling program.

A first pass RAB program consisted of 158 holes drilled for 1,912 metres. All samples were analysed for Au and As. Results outlined a northerly trending zone of highly anomalous coincident Au and As bedrock mineralisation, over a strike distance of 1,200 metres and width 400 metres, that is open to the north and south (Socic, 1996L).

Regional soil sampling produced a 2km by 1km northerly trending Au and As anomaly, with assay values up to 80 ppb Au and 1,190 ppm As (Socic, 1996L).

A total of 298 infill RAB holes were drilled for 2,810 metres. Samples were submitted to Assaycorp for 50 gram, quartz flush low level fire assay Au and As analysis. The drilling identified a series of high coincident Au and As anomalies along the length of the area drilled, with best results including 14 metres @ 1.17 g/t Au from 5 metres, and 2 metres @ 1.38 g/t Au from 3 metres (Socic, 1996L).

Twenty six RC drill holes were completed for 1,443 metres. All samples were submitted to Assaycorp for 50 gram fire assay, quartz flush Au analysis. Best results were returned from RC drill holes PQ17 and PQ18, recording 4 metres @ 3.41 g/t Au from 2 metres, 4 metres @ 3.72 g/t Au from 29 metres, and 4 metres @ 3.87 g/t Au from 43 metres (Socic, 1996L).

**EL 8579 - Dominion Gold Operations Pty. Ltd.**

A total of 120 soil samples were collected by Dominion Gold Operations, returning Au results ranging up to 250 ppb with a corresponding As value of 480 ppm (Fawcett, 1995b).

Twenty seven RAB drill holes were also completed for 171 metres, over the northeast corner of EL 8579. The results obtained gave a peak response of 12 ppb Au and 330 ppm As (Fawcett, 1995b).

**EL 8683 - Dominion Gold Operations Pty. Ltd.**

Exploration conducted by Dominion Gold Operations consisted of soil sampling, vacuum and aircore drilling.

The soil sampling program resulted in the collection of 174 samples, which were analysed for Au, As, Bi, Pb and Cu. Results of up to 58 ppb Au were returned in the southeastern area of the tenement (Fawcett, 1995c).
A total of 50 vacuum drill holes were completed for 202 metres. The results returned were generally weak (Fawcett, 1995c).

Aircore drilling was carried out in the eastern section of EL 8683, resulting in 50 holes being drilled for a total of 248 metres. Results were more encouraging than the vacuum drilling, with gold assays of up to 8 ppb (Fawcett, 1995c).

EL 8835 - Metana Minerals N.L. and Northern Gold N.L.

Metana Minerals extracted a total of 277,000 LCM’s from EL 4737, in the Bridge Creek area. A grade of 0.4 g/LCM was obtained from the gold bearing gravels. Metana Minerals N.L. also carried out mapping based on aerial photographs. (Russell, 1989a, 1989b).

Northern Gold N.L. completed geochemical soil sampling over parts of EL 4737, which was later held as EL 8835. A total of 117 samples were collected at 50 metre intervals, along 3 traverse lines. The samples were analysed by Analabs, in Perth, using BLEG analysis, with a detection limit of 0.01 ppb Au (McKenzie, 1988, and Stokes, 1989).

EL 8886 - Northern Gold N.L.

In the 1995 field season, Northern Gold N.L. completed a RAB drilling program to infill and test previous anomalous RAB and percussion drill results (Hardy, 1995c).

A total of 103 RAB holes were completed for 333 metres, with samples submitted for low level fire assay Au and As analysis. Anomalous Au and As values over a 2,000 metre, northwest trending zone were returned (Hardy, 1995c).

EL 8898 - Northern Gold N.L.

Northern Gold N.L. completed a regional soil sampling program over EL 8898. A total of 264 samples, including duplicates, were submitted for analysis of Au, As, Cu, Pb, Zn, Mo and Bi (Hardy, 1995d).

Two northwest trending, low order, gold soil anomalies were identified by the soil sampling program, returning Au values up to 41 ppb (Hardy, 1995d). Weakly anomalous values for As, Cu, Zn and Pb were also returned, with maximum values of 101 ppm As, 85 ppm Cu, 115 ppm Zn and 143 ppm Pb (Hardy, 1995d).

EL 8927 - Northern Gold N.L.

During the 1995 field season, a regional soil sampling program was completed over EL 8927. A total of 319 were collected and analysed for Au and As (Slade, 1995). Results for both Au and As identified the area around the Howley Ridge as highly anomalous, with values up to 315 ppb Au and 240 ppm As. However, values to the east and west of
the Howley Ridge were low, except in areas of known alluvial resources where Au values reach 850 ppb (Slade, 1995).

**EL 9349 - Dominion Gold Operations Pty. Ltd.**

Exploration conducted within the licence area was completed by Dominion Gold Operations Pty. Ltd. over EL 6995.

The work completed consisted of airborne geophysical interpretations, aerial photographic interpretations, geological mapping at 1:10,000 scale, stream sediment sampling, composite soil sampling, rock chip sampling and 66 metres of RC drilling.

The rock chip, stream sediment and soil sampling programs failed to return any results of significance (Fuccenecco, 1991).

The RC drilling program intersected zones of anomalous Cu and Zn, with values ranging from 200 to 2000 ppm. The Au results returned were generally below the 0.01 ppm Au detection limit (Fuccenecco, 1991).

**EL 9484 - Northern Gold N.L.**

Northern Gold N.L. completed a work program based on digital data acquisition and manipulation and RAB drilling.

The RAB drilling program was completed over EL 7786. A total of 13 holes extended into EL 9484, and were drilled for 68 metres. Forty one samples were analysed for Au and As. The highest result returned was 1 metre @ 2.24 g/t Au from drill hole number BB45 (Socic, 1997a).

**4.2 PREVIOUS EXPLORATION SEL 9591**

**4.2-1 Year Ending 30th October 1997**

During the 1996/97 year of tenure, Northern Gold N.L. completed MMI geochemical soil sampling, two phases of RC drilling, ore resource estimates, mining feasibility studies and an environmental study over SEL 9591. The prospects covered by these work programs were Kazi, Ios, and Sikonos, in the Mount Paqualin area, the Western Arm Extension and McCallums Creek.

**MMI geochemical soil sampling 1997**

At the McCallum Creek Prospect a reconnaissance MMI program was carried out over 5 lines, 1,500 metres in length, to test two anomalies at the. A total of 315 samples, including duplicates, were submitted to Amdel for MMI Au, Ag, Pd, Co and Ni analysis (Socic, 1997b).
The results were encouraging, and defined two sub-parallel, northwest trending zones, with high response ratios over an area greater than 500 metres strike length, and up to 200 metres in width (Socic, 1997b). A peak value of 48 ppb Au, with a response ratio of 384, was returned (Sample No. 150780, 8527913N, 769461E).

At the Kazi Prospect, Northern Gold N.L. completed an MMI geochemical sampling program comprising 142 samples collected from two traverses at 5 metre intervals. The samples were submitted to Analabs, in Perth, for analysis of Cu, Pb, Zn, Cd, Au, Ag, Ni, Co and Pd by the analytical methods MS800 and MS801 (Socic, 1997b).

The program identified an anomalous Au zone along the southern traverse. Over the northern traverse, the geochemical patterns were more subdued with individual elements more erratic. Three low order trends were identified at 752532E to 752577E, 752662E to 752702E and 752747E to 752802E. The peak results returned were 20.12 ppb Au (Sample No. 108333, 8523436.83N : 752648.45E) and 29.47 ppb Au (Sample No. 108340, 8523434.48N : 752683.39E). This work was reported in Socic, 1997b.

At the Western Arm Gold Prospect Northern Gold N.L. also completed an MMI geochemical sampling program. A total of 24 samples were collected at 5m intervals from within the SEL along the eastern extensions of four traverses. The program returned a peak result of 6.29 ppb Au (Sample No. 132658, 8515808.77N : 749085.25E). This work is reported in Socic, 1997b.

**Reverse Circulation Drilling 1997**

At the Ios Prospect a two-phase resource RC drilling program was completed over the. A total of 19 holes were completed for 2,399m (Socic, 1997b).

Best intersections at 0.7 g/t cut off with minimum width of two metres and maximum internal dilution of two metres, were

**IOS007**, 2m @ 1.09 g/t Au from 87 m (8516888N, 750828E).
**IOS009**, 7 m @ 1.71 g/t Au from 27m (8516989N : 750792E).
**IOS011**, 4m @ 2.06 g/t Au from 84m (8516987N, 750832E).
**IOS014**, 15m @ 4.0 g/t Au from 59m (8517063N :750844E).
**IOS018**, 10m @ 4.84 g/t Au from 95m (8517128N, 750798E),
**IOS022**, 7m @ 3.11 g/t Au from 76m (8517167N : 750819.8E).

The drilling confirmed the high grade, but discontinuous, nature of the mineralisation.
Resource Estimates 1997

Resource estimates were calculated by Northern Gold N.L. for the Kazi, Ios and Sikonos Prospects.

The Kazi Prospect was estimated to contain the following resources at a 0.7 g/t cut off grade down to -85 metres RL. (Glassock, 1997a, Socic, 1997b).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Tonnes</th>
<th>g/t Au Cut (15) g/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>993,520</td>
<td>2.12</td>
</tr>
<tr>
<td>Indicated</td>
<td>118,830</td>
<td>1.81</td>
</tr>
<tr>
<td>Inferred</td>
<td>44,630</td>
<td>1.47</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,156,670</strong></td>
<td><strong>2.06</strong></td>
</tr>
</tbody>
</table>

The Ios Prospect was estimated to contain the following resources at a 0.7 g/t cut off grade (Glassock, 1997b, Socic, 1997b).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Tonnes</th>
<th>g/t Au Cut (15) g/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
<td>396,520</td>
<td>1.55</td>
</tr>
<tr>
<td>Indicated</td>
<td>223,340</td>
<td>1.62</td>
</tr>
<tr>
<td>Inferred</td>
<td>192,450</td>
<td>1.63</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>812,310</strong></td>
<td><strong>1.59</strong></td>
</tr>
</tbody>
</table>

(The new Darwin to Adelaide Railway has sterilised most of this resource.)

The Sikonos Prospect is estimated to contain the following resources at a 0.7 g/t cut off grade (Glassock, 1997c, Socic, 1997b).

<table>
<thead>
<tr>
<th>Classification</th>
<th>Tonnes</th>
<th>g/t Au Cut (15) g/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured</td>
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</tr>
<tr>
<td>Indicated</td>
<td>85,270</td>
<td>2.07</td>
</tr>
<tr>
<td>Inferred</td>
<td>33,520</td>
<td>2.28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>401,680</strong></td>
<td><strong>1.97</strong></td>
</tr>
</tbody>
</table>

A Public Environmental Report (PER) was prepared by AGC Woodward - Clyde Pty. Ltd. for Northern Gold N.L., in March 1997. The report was written to cover mining operations at Kazi, Western Arm and Bridge Creek, in response to guidelines provided by the Northern Territory Department of Mines and Energy (Socic, 1997b).

Expenditure for the year ending 30th October 1997 was $496,949.
4.2-2 Year Ending 30th October 1998

Geophysical Surveys 1998

An airborne magnetic and radiometric survey was conducted over the Howley Anticline by World Geoscience Corporation Ltd. The survey comprised an 80m line spacing and 50m terrain clearance and was carried out using a Cessna 206. The magnetometer specifications were Scintrex VIW2321-CS2 split beam caesium, resolution 0.001nT, cycle rate 0.1sec. Sample interval was 6m. A spectrometer was also used concurrently. It was a 256 channel Picodas PGAM-1000, self volume 33.56litres. Cycle rate 1 sec. Sample interval 60m. Navigation control was with Differential GPS satellite system.

Traverse lines were 90 degrees az. and tie lines 000 degrees.

The data was interpreted geologically to determine the structural fabric of the region covered.

A gravity survey was conducted in a cross configuration with a total of 36.5km. of surveyed baselines and 146 stations at 250m intervals. The survey was implemented to assist in the investigation of the presence of a blind granitoid body NE of Big Howley. A large gravity low was encountered and this was interpreted as a 12km by 4km body at less than 1km depth. The data was interpreted in conjunction with the new airborne magnetic survey.

Soil Sampling and Rock chip Programs 1998

An infill soil sampling program at Big Howley West comprised 41 samples of B horizon –5# material.

Analysis was for gold using FALL to 1ppb, and Ag (0.05ppm), As (0.5ppm), Cu (0.2ppm), Pb (0.2ppm) and Zn (0.5ppm) by G400M method at Assaycorp Pine Creek. A peak gold value of 260ppb Au was reported.

A program with identical methodology was carried out at Big Red Blob prospect. A total of 291 samples were collected. It confirmed the regional gold in soil anomaly and outlined two separate zones. A NNE trending mineralised structure with moderate to high values and a peak value of 1540ppb Au, and a southern zone peaking at 330ppb was reported.

At Bons Rush, using identical methodology, an infill program comprising 150 soil samples was completed. An anomaly trending NNE and 1km long by 200m wide was outlined. Peak values were 1,710ppb Au.
At Bons Rush 5 rock chip samples were collected, each aggregating 2kg. Only one sample exceeded the limit of detection at 0.01g/t Au.

At Chinese East Prospect geological mapping and rock chip sampling was carried out. A total of 23 samples were collected and assayed at Assaycorp Pine Creek for Au, using FALL, and for Ag (1ppm) As (5ppm) Cu (1ppm) Pb (5ppm) Zn (2ppm). A maximum value of 14ppb suggested the area lacks potential.

At Chinese West Fault Block a B horizon soil sample program was completed totalling 50 samples. The objective was to locate extensions to the Chinese Howley mineralisation. Maxima of 30 and 21ppb Au were returned which downgraded the zone.

The F16 prospect lies NE of Bons Rush. Three rock chip samples were collected and assayed. The best result was 1.16g/t Au. Costeaning, followed by mapping and sampling is discussed below.

At Kazi Prospect a total of 16 rock chips were collected during geological mapping and assayed. The best sample was 0.43g/t Au but most were anomalous to some degree. The geological study of the area show an upper greenschist facies of metamorphism in metasediments, overprinted by hydrothermal alteration in mineralised zones. The zone is tightly folded by parasitic structures on the western limb of a N-S F3 anticline. The mineralisation is bounded at depth by a west dipping thrust plane along which monoclinic pyrrhotite is developed. Gold is in a stockwork of quartz veins that are both concordant and discordant to bedding and the S3 regional fabric.

The 8550 East Prospect was subjected to infill B horizon soil sampling. A total of 96 samples were collected. A north-south trending anomaly was outlined in an area of significant black soil cover. The peak results were 430ppb Au and 270ppb Au.

The Western Arm East prospect was made the subject of a regolith study to determine the dispersion of gold and other metals in a black soil setting. Dispersion up to 60m from source can be detected in geothitic accumulations within the ferruginous gravel horizon of the black soil profile, also in the carbonate (calcrete) rich zone at the basal smectite rich layer of the black soil. The implication is that drilling of the profile is required to gain access to the optimum sample media. A regolith plan was created for the prospect.

Santorini South Prospect was subjected to infill B horizon soil sampling. A total of 47 samples were collected using above-described method and analysis. Two south east trending anomalies were outlined within the hinge zone of the Santorini Anticline. The western anomaly is 400m in length and 50m wide and peak values at 280ppb Au. The eastern anomaly, in a zone of ridges, is 400m long and 150m wide with maximum values of 150ppb Au.
The Santorini East Prospect was also subjected to an infill B horizon soil sampling program using standard procedures. A total of 106 samples were collected. The survey was successful in outlining north trending anomalous zones east of the main Santorini Ridge. The southern zone, 400m long, peaked at 1,140 ppb Au. The north western zone, also 400m long, peaked at 2,960 ppb Au.

At North Mt Bonnie Prospect, 800m east of the Iron Blow base metal deposit, a mapping and rock chip study was carried out. A total of 82 rock chips were taken. Most were low order in gold results however one silicified quartz-tuff breccia vein assayed at 15.8 g/t Au. The area is characterised by massive black Gerowie Tuff Formation with patchy banded silicified tuff zones anomalous in base metals and gold.

**Geological Mapping Projects**

**North Howley Siding** was subjected to a geological mapping exercise. Previously part of EL7738, the area lies to the west of the Burnside Granite, carries a high metamorphic grade and extensive shearing, and minor copper prospect workings. Anomalous RAB holes up to 780 ppb Au are reported as well as soil values to 505 ppb Au.

Rocks of the Upper Koolpin Fm., Gerowie Tuff, Mt Bonnie Fm., and Zamu Dolerite were identified. A large sill of Zamu Dolerite dominates the area, in the hinge of an easterly overturned south plunging antiform. The anomalous zones coincided with the sheared contacts of the sill in areas of competency contrast.

**Reverse Circulation Drilling 1998**

The Liberator Prospect near Cosmo Howley was subjected to a short RC drilling program comprising 5 holes for 304m. The target was the southern extension of the Chinese Howley No.3 pit setting, where the Howley Anticline appears to have two anticlinal hinge zones. One hinge appeared to be untested. The results were disappointing with the best values being 1m @ 0.63g/t Au from 13m in LB039.

**Costeaneing and Channel Sampling 1998**

In addition to soil sampling, the F16 Prospect was trenched, with the costeans being channel sampled and mapped. The objective was to locate the source of gold anomalousism identified earlier by WMC.

A total of 7 trenches were dug for a total length of 681m. The average depth was 1m.

Sampling was by channel in 3m composites. A total of 227 samples were collected and assayed at Pine Creek for gold (FA) and arsenic (hydride). The best intervals met with in the work were 3m @ 1,850 ppb Au, 6m @ 1,405 ppb Au, 3m @ 1,480 ppb Au, and 3m @ 1,985 ppb Au in trenches 4, 5, 6 and 7 respectively. The mapping showed inherent
complexity in the F16 area. An axial zone of multiple folding, containing numerous banded chert horizons in the north was identified. Gold is related to bedding concordant quartz veins and chert- (“BIF”) horizons.

The trenched areas at F16, and drilling in the Mt Paqualin and Liberator areas were all rehabilitated.

Expenditure for the 1997-1998 year was $307,458.

4.2-3 Year Ending 30th October 1999

Surveying Activity

The old WMC baselines (10400E and 10600E) that were local grids were re established. Star pickets were installed at 50m intervals. The new 10600E baseline was established on 358 degrees magnetic and a tie line was installed on 16000N.

Soil Sampling Programs 1999

At Big Red Blob prospect a B horizon infill soil sampling program was undertaken. The work comprised 108 samples and were analysed for the suite Au (FALL 1ppb) Ag, As, Cu, Pb, Zn G400M (ICP-MS) at Assaycorp Pine Creek. A further split of the samples was made to determine Au and Ag using BLEG (0.1ppb) method on 1kg of sample.

The work confirmed the soil anomaly outlined in 1997-1998. A low order north trending zone, open to the north and closed to the south was reported. The peak FALL results were 70ppb and 90ppb Au. The peak BLEG value was 42.3ppb Au against a 53ppb FALL value at the same site.

RAB and Aircore Drilling Programs 1999

The Big Red Blob prospect was subjected to RAB drilling on soil anomaly targets. The work comprised 181 holes for an advance of 2,716m (blade and hammer) angled 086 az on a 200m by 25m grid.

Gold and arsenic analysis on 3m composites was carried out using fire assay and ICP-OES. The best result was 9m @ 2.51g/t Au in BRR132.

At Bons Rush prospect RAB drilling comprised 131 holes for an advance of 1,913m.

Gold anomalies outlined by WMC and Northern Gold NL were targeted on a 50m by 100m and 200m pattern. As at Big Red Blob, all were drilled on 086 az. at 60 degrees.

Analysis used identical methods. The better results included 9m @ 2.13g/t Au and 3m @ 33.5g/t Au.
Aircore drilling was employed on soil anomalism at the southern end of Bons Rush where alluvial cover was present. Five holes were drilled for 93.5m. The assays were disappointing peaking at 3m @ 0.041g/t Au.

Geological Mapping Programs

Geological mapping was carried out at Bons Rush and Big Red Blob to determine structural controls on the gold mineralisation. At Big Red Blob anomalism was coincident with a north south shear system, offset by 255 degree faults/shears containing an en echelon array of conjugate 330 degree faults/shears. The better gold values were found to lie close to Koolpin Formation, Gerowie Tuff and Zamu Dolerite contacts.

The Bons Rush prospect coincides with shallow historical gold workings on a NNE alignment. Mineralisation appears to be associated with NNE trending folds constrained by north-south shears and cross cutting 255 degree faults/shears with trends the same as at Big Red Blob.

Rehabilitation was carried out of the RAB drilling activity. Expenditure for the 1998-1999 year totalled $215,521.

4.2-4 Year Ending 30th October 2000

Data Review at Department of Mines and Energy

A comprehensive review of historic data was undertaken in Darwin at the Mines Department offices. There was focus on the East Burnside and Howley Anticline areas. Various company reports were obtained both in hard copy and digital format for integration with the Northern Gold NL exploration database. All was compiled into Micromine or Mapinfo software packages to aid in work program development.

RAB Drilling Programs 2000

At Big Red Blob a RAB drilling program to test soil anomalies and extensions was completed for 36 holes and 589m. Several holes were resampled as further 3m composites to compare laboratories. Azimuths were 086 and 088 degrees. All samples were assayed for gold (FALL 1ppb) and As (ICP-OES 1ppm). The best result was 3m @ 1.317g/t Au.

At Bons Rush a total of 198 holes were drilled for an advance of 3,514m. The best result was 25m @ 1.95g/t Au including 7m @ 4.16g/t Au from 7m depth. Assays were by FALL to 1ppb and As by ICP-OES to 1ppm. Mineralisation was in the sheared contact zone of Zamu Dolerite sills and graphitic shales of the Koolpin Fm. Some 30 composites were collected from the 1999 year and repeat assayed for comparative purposes. Only slight differences were reported but coarse gold is implicated.
**RC Drilling Programs 2000**

At Bons Rush a two stage RC drilling program was undertaken totalling 32 holes for 2,449m. The holes were on eight east west sections with azimuths of 086 and 088. The program showed that gold was concentrated in the NNE sheared contact zones between a major Zamu Dolerite sill sandwiched between the upper Koolpin and lower Gerowie Tuff Formations. This setting lies on the west limb of the Howley Anticline. In the weathered zone, gold is associated with quartz, haematite and limonite alteration. In fresh material it is associated with quartz-/carbonate veining, chlorite alteration and pyrite, arsenopyrite and pyrrhotite. Minor chalcopyrite is present.

Assays were carried out at Assaycorp Pine Creek using FA50 method for gold and ICP-OES for arsenic. Check analyses were carried out at Amdel Darwin, and Kalgoorlie, W.A. for screen fire testing at –75microns. The presence of coarse gold was confirmed.

**Diamond Core Drilling Program 2000**

A diamond drilling program was commissioned at Bons Rush prospect to examine structural and geological features within the main zone of mineralisation.

Two holes were pre collared and cored HQ to completion. Both were declined 60 degrees to the east.

BRDDH001 was precollared to 8.6m and completed at 63.1m on az.88 degrees. BRDDH002 was precollared to 32.7m and completed at 87.2m on the same azimuth and section, 19m west of hole 1.

The pre-collar RC samples were submitted to Assaycorp for routine Au and As analysis. The core was not split and assayed at this time. Logs were provided in the report.

Structural information from the core showed that gold was contained in quartz-carbonate veins that dip shallowly (25-30 degrees) to the NE. These veins lie within a within a structural domain bounded by 1-3m wide west dipping shear zones defined by strong chloritic foliation and boudinaged quartz. The shear zones dip dominantly 75 degrees to the west with a reverse sense of movement. Most of the alteration and movement was in a granophyric phase of the Zamu Dolerite that also suffered crackle breccia type veining.

**Soil Sampling and Rock Chips 2000**

At Bons Rush 46 rock chip samples were collected and assayed for gold and multi-elements. The maximum value was 3.78g/t Au.

A total of 4 samples were collected at Ios prospect, (1.27g/t Au max) and three at Ithaca (0.14g/t Au max.)
At **Kazi Prospect** an infill soil sampling program comprising 78 B-horizon samples @ 4kg each was completed. Analysis was by standard FALL and ICP-MS. The program failed to reproduce the original BLEG anomaly in the south. In the northwest a 500m by 80m north trending extension to the Kazi NW soil anomaly was established with peaks at 11ppb Au and 555ppm arsenic, over a black soil profile.

One rock chip sample was taken which was strongly arsenical at 3,254ppm As, without detectable gold.

The **North Burnside Prospect** (located south of the Goodall mine, at the northern extremity of SEL9591) was soil sampled using B-horizon –5mm material. A total of 114 samples were taken and analysed for Au and multi elements as above. Duplicate BLEG analysis was also undertaken for gold and silver (0.1ppb). Both NE and NW trending anomalies were detected in the area sampled, some coincident with interpreted photo lineaments and magnetic features. The peak results were 180ppb Au, 94ppb Au, and 29ppb Au.

The **Quest Far South** prospect (south of Kazi) was also covered by infill soil sampling. The program comprised 214 samples sieved from B-horizon at 4kg each, analysed for gold FALL, and multi-elements ICP-MS at Assaycorp. The program was successful in tracing extensions to the existing NE trend and locating other anomalies with a northerly trend. The peak values were 360ppb, 240ppb and 190ppb Au.

Rehabilitation was undertaken in the drilled areas. Expenditure for the year ending 30th October 2000 was $504,372.

### 4.2-5 Year Ending October 30th 2001

**Soil Sampling Program 2001**

A short infill soil sampling program was carried out at **Rhodes Prospect**.

A total of 30 samples were collected to locate extensions to an area of moderate to high tenor gold in soil values open to the north and east of the Rhodes resource.

The B horizon program failed to delineate gold anomalism in the area sampled. The peak value was 5ppb Au.

**RC Drilling Program 2001**

At Bons Rush further infill RC drilling was carried out. A total of 13 holes were completed for an advance of 922m on 6 sections. The azimuths selected were 087 and 267 degrees. Gold analysis was on riffle split samples of 3kg determined for fire assay gold and ICP arsenic. The best result was 16m @ 3.0g/t Au.
RAB Drilling Program 2001

At Quest Far South a RAB drilling program was completed designed to test NE and N trending soil anomalism on magnetic lineaments. A total of 146 holes were completed for an advance of 2,726m. Holes were both vertical and angled and 2m and 3m composites were taken for analysis for Au (FALL) and arsenic (ICP-OES).

The drilling was successful in delineating a north trending bedrock gold-arsenic anomaly over an area 1,400m by 500m coincident with a magnetic trend.

The peak gold intercepts were 6m @ 102.5ppb from surface, 6m @ 347.5ppb from surface and 3m @ 584.5ppb from 12m.

The areas drilled were rehabilitated. The total expenditure for the year ended 30th October 2001 was $197,806.

4.2-6 Year Ending 30th October 2002

Under the Burnside Joint Venture the following exploration was carried out.

Reverse Circulation Drilling Program 2002

The joint venture undertook reverse circulation drilling at Bons Rush to firm up the resource for possible open pit mining. The program comprised 11 holes for an advance of 508m. (BRRC-44 to BRRC-56) The results of the drilling were satisfactory, however internal continuity of the resource was brought into doubt. The following table shows significant gold intercepts.

<table>
<thead>
<tr>
<th>Hole ID</th>
<th>Local E</th>
<th>Local N</th>
<th>Az</th>
<th>Dip</th>
<th>From</th>
<th>To</th>
<th>Metres</th>
<th>Ave. grade</th>
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</tr>
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<td>42</td>
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</tbody>
</table>

The higher grades are associated with a zone of quartz veining, chloritisation, pyrite, arsenopyrite and minor pyrrhotite, hosted within a shear zone in the hanging wall of the Upper Zamu Dolerite Sill. The vein sets dip shallowly to the north east. In this area Zamu Dolerite has intruded Mt Bonnie Formation.
The results of this and previous drilling were assessed. It was concluded that the drilling downgraded the scope for a higher grade near surface body of gold mineralisation. In addition the new drilling information increased the apparent structural complexity of the resource.

The trucking distance to the (then owned) Brocks Creek mill (22km) was taken into account and it was decided to defer development at Bons Rush in favour of resources closer to the mill for the time being.

**Diamond Core Drilling 2002**

The diamond core extracted from Bons Rush in 2001 was re-logged, split and sampled. (BRDDH-001 and BRDDH-002).

A total of 109 samples were (fire) assayed at NAL.

The following table shows the significant assay intervals obtained.

<table>
<thead>
<tr>
<th>Hole ID</th>
<th>AMG N</th>
<th>AMG E</th>
<th>RL</th>
<th>DIP/AZ MAG.</th>
<th>FROM (m)</th>
<th>Interval (m)</th>
<th>Au g/t</th>
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</thead>
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<td>BRDDH-001</td>
<td>8525578</td>
<td>751605.5</td>
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<td>16.0</td>
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<td>BRDDH002</td>
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<td>751586.3</td>
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<td>60/92</td>
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<td>55.0</td>
<td>13.0</td>
<td>3.01</td>
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</table>

The thickness and grade of the two intercepts were remarkably similar at between 13m and 16m @ 3.0g/t Au.

**Reviews of Regional Data**

Other resources and targets within the SEL and others that are adjacent to high priority targets within Joint Venture tenure were subjected to technical data reviews and prioritised.

The drill collars were rehabilitated. Expenditures reported for the year ended 30th October 2002 were $45,220.00.
4.2-7 Year Ending 30th October 2003

Target Definition/Structural Interpretation

a) Target Definition

A combination of detailed airborne magnetics and GIS topographic data was used to create a plan showing interpreted structures that control the distribution of mineralisation in the area around Brocks Creek, extending as far as Yam Creek in the east and the Woolwonga deposit in the north east. These structures were interpreted as nested arcuate entities and it was noted that several known deposits and prospects fell on them. It was suggested that the traces of these entities could be used as a guide to focus field activities at the first phase of exploration. A work proposal was put forward on the basis of this interpretation. (Gillman 2003).

b) Acquisition of Historic Remote Sensing Data

The joint venture acquired photographic copies of early remote sensing images covering the Burnside region. These had a variety of sources and ages, some from Dominion Mining NL. Images considered of value were scanned and saved as tiff images in ArcMap 8; rectified coordinates ensured an accurate spatial correlation with other GIS layers.

The images comprised airborne magnetic enhancements of regional data or thematic mapper images of terrain using different spectral combinations to enhance surface features and using appropriate sun-angle shading. Other images were of radiometric data.

Several interpretations were created that combined known deposits, airborne magnetic image, SPOT image, AGSO Geology and tenements. Priority one lineaments were recorded onto the magnetic image. These could then be screened for local geology, terrain, and proximity to known mineralisation. It is considered that this data will comprise a useful means of screening more or less valuable portions of the Burnside Region and highlighting areas that warrant attention, perhaps under transported cover.

c) Interpretation of Images

Images produced to date from the acquired remote sensing data show the location of open pit mines in the region, the AGSO Geology layer for the Pine Creek, Batchelor and McKinlay River map sheets, terrain image data (Landsat-SPOT), airborne magnetic layer, plus lineament interpretation from a combination of airborne magnetics, terrain and AGSO.

Plans were created to show the interpreted linears along with open pits and AGSO geology. They can be grouped into sets according to their strike direction. The first set
strikes **north westerly** to west north westerly. These are believed to represent axial planar fold failures produced from directed stress (crustal shortening) from the SW. They are part of the structural geometry that has resulted in steep to overturned NE fold limbs, cut by SE dipping reverse faults. These structures are represented at the Howley Anticline and at Brocks Creek in the BKZ (Brocks Creek-Zapopan shear zone). Several others have been identified on the plan and as such represent targets for exploration. The presence of the Burnside Batholith has had the effect of refracting some strain lines.

The second set strikes **north-north easterly** and is most likely a conjugate geometric response to the first set, responding dextrally to directed stress from the SW.

The third set strikes **north easterly**. There are elements that are bedding parallel on the south east side of the Burnside Batholith, while other elements cross cut the axial planes of folds and the first two fracture sets. They would probably span the realm of brittle-ductile style deformation. Along with the NNE sets these are probably the most important individual fracture set forming a focus for mineralisation where they have interacted with axial planar structures.

One other fracture system has a **north westerly** strike and is restricted to a line connecting the west end of the Burnside Batholith and the Fenton Granite. This fault set is thought to represent a linear accommodation feature that has relieved stress with dextral strain. The SPOT image supports the magnetic linear interpretations in most cases showing that faulting is the underlying cause of the linears.

**Expenditure** specific to the tenement for the report period totalled $4,617.

**4.2-8 Year Ending 30th October 2004**

**Surveying Activity 2004**

The Bons Rush, Big Red Blob and F16 resources and prospects were the subject of a mineral lease application in readiness for mining the Bons Rush deposit when economic conditions allow. As a condition to precede grant, the application ML23617, was required by DBIRD to be surveyed and marked along the boundaries by a government-approved entity. Several quotes were sought for the job and all were very high. The work was carried out in 2004 by GHD Surveys Pty Ltd of Darwin following selection of the least expensive and negotiating the line of sight requirements. At the time of writing the ML had not been granted.

**Structural Interpretation 2004**

The interpretive work commenced in the previous year and was further advanced in 2004.
A lineament plan was created using all available magnetic, geological and remote sensing images. The pattern of images was interpreted in light of the distribution of known gold occurrences and domains of SEL9591 were ranked in terms of prospectivity.

The enhanced interpretation was partly driven by the requirement to surrender blocks from SEL9591 as part of the process of outlining a new SEL application. A new application was required because further extensions of term were not allowed under the Mining Act. New SELA24352 was lodged in mid 2004.

In addition, further understanding of geological controls on gold mineralisation is necessary for targeting of exploration and ranking of prospects both within the SEL and in the recently granted exploration licences held by the Burnside Joint Venture.

The interpretation led to several conclusions and reinforced observations made in the previous year.

a) Within the Burnside Region the largest and historically most productive gold mines discovered to date lie on either the BKZ structure (Brock Creek-Zapopan) or on the Howley Anticline trend. What these two groups of deposits have in common is alignment along a plunging anticlinal axial zone with a steep to overturned NE limb. The strike of the axial zones is 290 degrees in the case of the BKZ and 315-320 degrees in the case of the Howley Anticline.

b) The productive anticlines have been formed within sediments of the South Alligator Group, (Koolpin Fm, Gerowie Tuff and Mt Bonnie Fm) and include contact zones with pre orogenic Zamu Dolerite sills.

c) Cross cutting structures appear to have interacted with the primary anticlines at a high angle. These structures include linear fracture swarms striking 230-235 magnetic and these fractures could be related to late stage cross folding or doming that have induced slight plunge reversals at intervals along the primary anticlines. This combination of fracture swarms and plunge reversals appear important in localising gold along the favoured anticlinal axes.

d) Both the BKZ and the Howley Anticline have been influenced by strike-parallel reverse faulting dipping SW. At least five major reverse faults are interpreted to be present between the Howley Anticline and the BKZ. The net effect of this faulting, which is a result of directed stress from SW to NE, has been to imbricate the South Alligator sequence, sub parallel to bedding, along south west dipping slip planes. From observations in the field most of these faults have dips around 60 degrees to 80 degrees. The bedding traces from 1st Derivative magnetics support this interpretation.
e) The late-syn to post orogenic Burnside Batholith has had the effect of distorting the pre-existing fold/fault patterns as well as acting as a buttress and refracting late stage movements. The net effect has been to cause a swing in strike of the main reverse faults from 315 at the Howley Anticline to 290 at the BKZ and to 270 degrees at the Rising Tide deposit near the granite contact.

f) Directed stress has contributed to other linear features. A diagonal set of (dextral?) accommodation faults striking 340 magnetic have developed half way between the Howley Anticline and the BKZ. In addition, a fault striking 50 degrees magnetic separates linear, contact suite rocks adjacent to the SE side of the Burnside Batholith, from folded South Alligator rocks. A similar fault of lesser displacement lies on the north western side of the batholith. Several other linears have been interpreted with this trend between the Hayes Creek Fault in the south east and the Burnside Batholith. The refolding of fold axes plus possible accommodation structures in this zone could imply crustal shortening and compression in a NW-SE direction, buttressing against the Burnside Batholith. Such compression could have caused the domal cross folding on the BKZ and Howley Anticline.

g) In the north east of SEL9591 a north west striking corridor of sheared and folded sediments occurs. This is known as the Pine Creek (Shear) Tectonic Zone, and is a strike-extensive entity (~200km) that has its origins in the fundamental structure of the Pine Creek Geosyncline. In the area studied it has an average width of 3km and passes between the Burnside Granite and the Margaret Granite. A late stage dolerite dyke described as the “Great Dyke” by Dominion meanders along its course for some tens of kilometres.

The corridor is important in an economic sense due to the higher intensity of structural preparation that has occurred there and the potential for deep plumbing of fluids. There does appear to be a greater frequency of gold occurrences within and adjacent to it. Both the Pine Creek Gold field and the Union Reefs Goldfield lie within the corridor and the Woolwonga and Goodall pits, Great Northern and Great Western, lie just outside it. Also within the corridor are several recorded soil and rock anomalies, including the McCallums Creek prospect. It is interpreted that northerly or easterly trending conjugate structures cutting the corridor would be the most prospective settings for gold deposition.

h) In the north-western sector of the SEL the local structure is dominated by late orogenic north east striking (30-40 degree magnetic) fault sets. These cut the northern extension of the Howley Anticline axis that strikes between N and NNE
in this area and are the sites of several gold prospects along the axial zone. These include Howley Ridge, Bridge Creek, Ios, Sikinos-Ithaca, and Santorini.

In addition the axes of folds east of the Howley Anticline have been caught up and partly realigned with dextral faults of a NE event. This setting has generated several gold prospects in the sector, including Kazi, Rhodes, Bons Rush, F16, Quest Far South and several other geochemical anomalies.

Within SEL9591 the above analysis suggests several structural settings that would appear to have superior opportunities for the development of gold deposits. These settings vary according to the stress patterns around the Burnside Batholith and the relationship of anticlinal fold axes, plunge reversals and litho-facies to important cross cutting linear features such as faults and fracture swarms. With the post orogenic and post granite timing of the gold mineralising event postulated by Sener 2004, structural preparation and thermal aureole facies considerations need to be considered in the analysis of lineaments.

a) South Western Sector of SEL9591

This area appears to have inferior potential for gold deposits. The Howley Anticline and strong reverse faulting lies immediately to the north east along with some of the better gold deposits in the field. The magnetic signature suggests that fold axes and faults of sufficient magnitude to generate significant settings for gold mineralisation are only weakly developed. The stratigraphy also appears to be dominated by Burrell Creek Formation coarse clastics, a less prospective host rock in this vicinity. Despite reasonable outcrop few anomalies have been reported despite proximity to the Howley Anticline. The area of the Midway Anomaly (rock chip anomaly) needs further investigation.

b) Eastern Sector of SEL9591

Geographically this area extends northwards from the vicinity of Mt Bonnie to just beyond Woolwonga pit. It surrounds the Glencoe deposits and takes in a broad swath of country to the south east of the Burnside Batholith.

The sector is bounded to the east by the tenement boundary and the Pine Creek (Shear) Tectonic Zone.

The zone is attractive because it lies within the NE striking conceptual corridor that hosts the Howley deposits, the BKZ deposits, Glencoe and Woolwonga. This alignment, bracketed by NE fracture patterns, highlights an area of SEL9591 measuring 5km in width and extending NE for 10km.
Prime areas for search would be between Glencoe and Woolwonga and north east of Fountain Head to the tenement boundary. Secondary search areas lie along the trend of the NE extensions of the Hayes Creek Fault to the tenement boundary and to the north west of Woolwonga pit, along the southern margin of the Tectonic Zone.

These areas are extensively masked by Recent alluvium of the Margaret River and its tributaries.

c) **North Eastern Sector of SEL9591**

This area is dominated by the Pine Creek (Shear) Tectonic Zone that passes north westwards between the Burnside and Margaret Granites. Several anomalous locations have been documented in terms of soil and rock chip and the McCallums Creek prospect lies within this sector. This corridor comprises a structurally prepared metasedimentary suite that is most likely to be mineralised at settings where either northerly or easterly trending fracture systems intersect it. Areas marginal to the Tectonic Zone, on its south west side, are also prospective.

d) **North Western Sector of SEL9591**

North striking stratigraphy and fold axes are the dominant feature of the western margins of the licence. Elements of the Burrell Creek Formation in the far west pass eastwards into slices and axially positioned segments of South Alligator Group rocks exposed in the Howley Anticline and parasitic structures.

Further east again, less folded arenite-turbidite suites of the Burrell Creek Formation dominate the stratigraphy. Late stage north east striking dextral faults have transected the axial zone of the Howley Anticline contributing to sites favourable for gold deposition. These include Howley Ridge, Bridge Creek, Ios, Sikinos, Western Arm and Santorini.

To the north east the axis of the Howley Anticline has been aligned in a NNE direction. NNE and ENE fault sets accompany tight folding events and complex settings illustrated by mapping exercises in the Bons Rush and F16 area. This setting has generated further sites for gold mineralisation, in particular at Bons Rush, Big Red Blob, F16, Kazi and Rhodes. The latter group appear to have superior structural settings and better gold grade characteristics.
5.0 REFERENCES


VAN NOORT, E., (1996). Gold and Trace Element Dispersion in Black Soil Profiles, Western Arm, Northern Territory. Unpublished report to the University of Western Australia, Department of Geology and Geophysics.
APPENDIX TWO

Drilling, soil and costean lithocodes

Chinese West rock chip results

North Mt Bonnie rock chip results