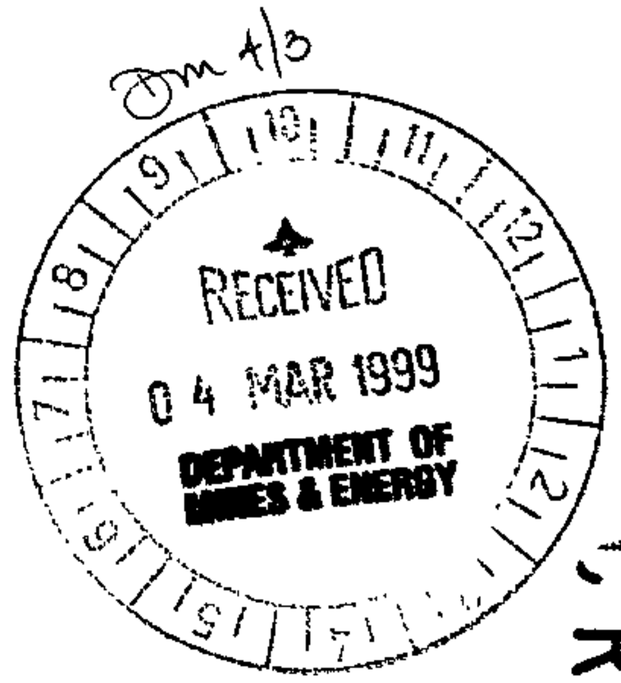
FINAL REPORT

EL 7160

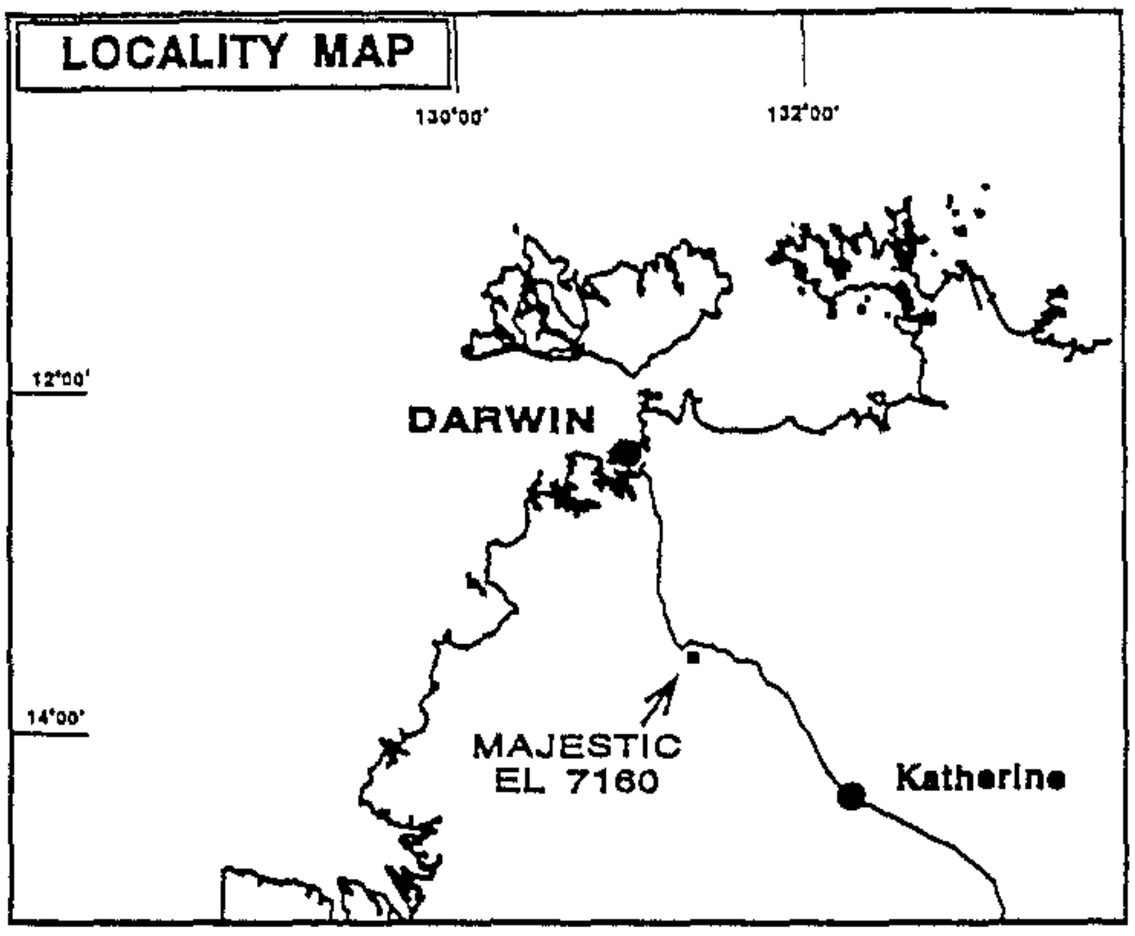
1 January 1999

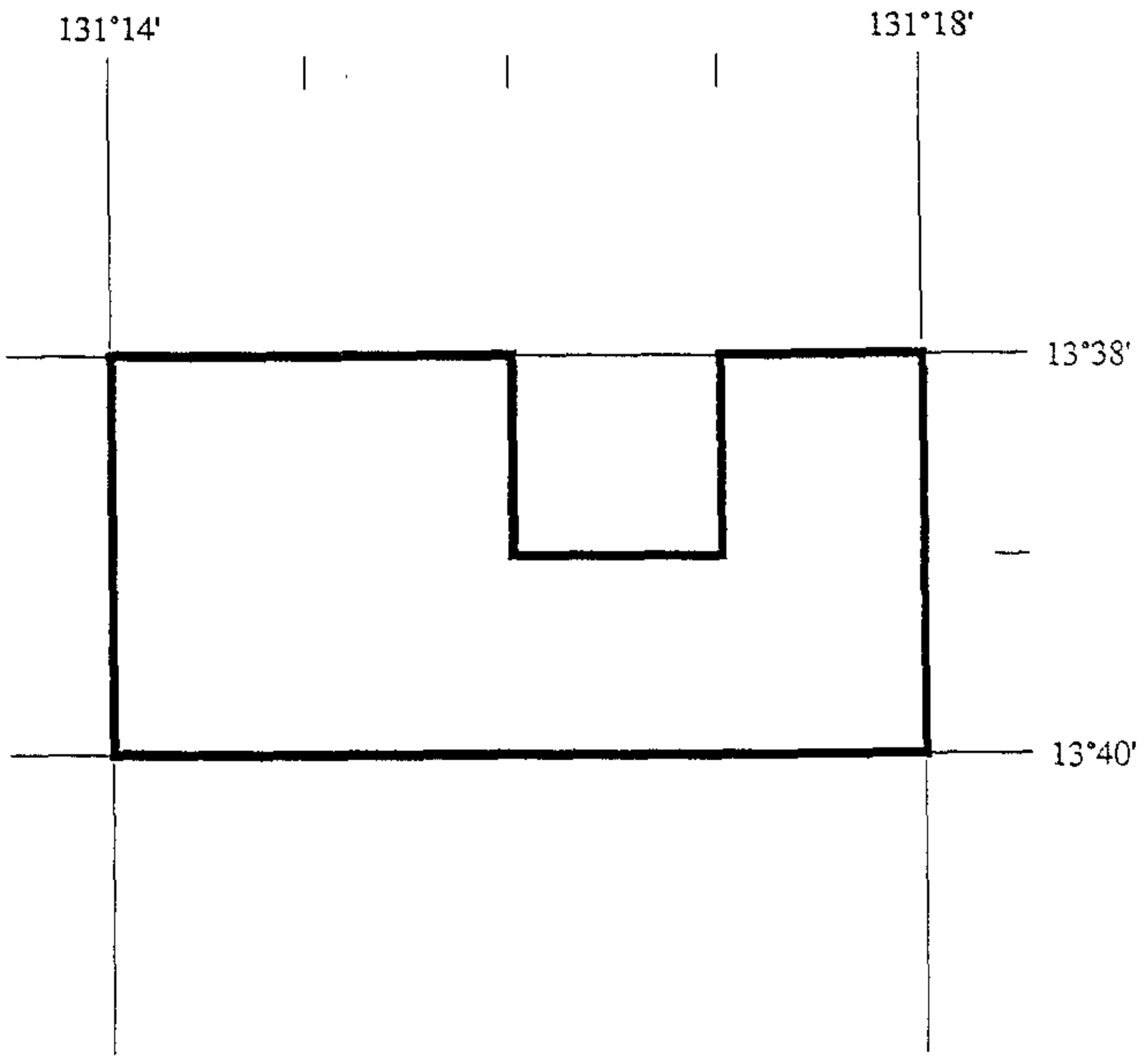


CR99/104

R M BIDDLECOMBE

LOCALITY MAP

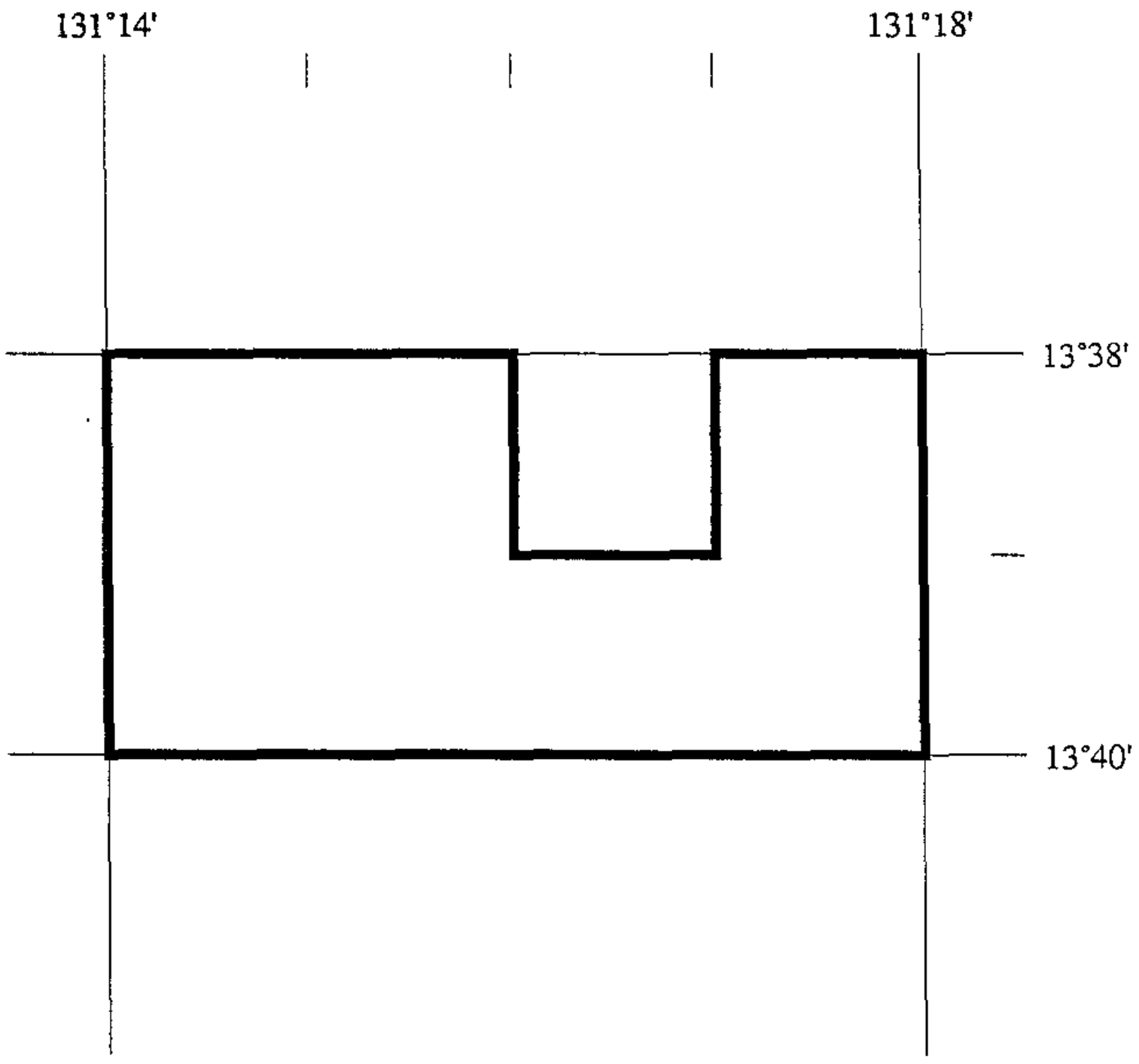




EL7160

7 BLOCKS

22 sq kms



EL7160
7 BLOCKS
22 sq kms

Location and Access

EL7160 (Majestic) is located approximately 185km south-south-east of Darwin and nearly 50km west-north-west of Pine Creek. Access to EL7160 from Darwin is south via the Stuart Highway for approximately 170km to the old Stuart Highway (Dorat Road) or Fountain Head Road (Figure 1). Approximately 5km westward along the old Stuart Highway is the Douglas-Daly Road which heads south towards the Douglas-Daly Park Roadhouse. Located 8km south of the old Stuart Highway/Douglas-Daly Road intersection is the abandoned Fenton airstrip. Following the road that circles the airstrip leads to a track heading west. The track is followed for approximately 10km before turning onto a north trending track that proceeds to the Majestic tenement within a few kilometres.

There are two currently operating gold mines within reasonably close proximity to the Majestic licence. The Brocks Creek gold mine is situated approximately 30km north-east and the Union Reefs gold mine is approximately 55km east. Both operating mines can be accessed via sealed roads from the Stuart Highway.

Climate

The northern half of the Northern Territory is subject to heavy seasonal monsoonal rains and thunderstorms. These occur normally between November and April. During this time access to the licence would only be possible along the sealed Stuart Highway, old Stuart Highway, Douglas River road as far as the Fenton airstrip. The tracks from the Fenton airstrip to the licence are impassable during the wet period. After the wet season movement within the licence can be severely restricted for several months. Commonly long grass 1m to 2m high obscures the ground and severely hinders the exploration activities. During the remainder of the year access to and about the lease is easy by either foot or vehicle.

Topography

The topography in EL7160 consists of gently sloping hills with a maximum elevation of 30m and well defined creeks. The creeks, which are dry for most of the year, flow into a major creek which is approximately 30m wide and bisects the licence area. The major creek drains to the south-east into Hayes Creek and then the Douglas River.

5. CR1996-0042
1996
EL7160

Annual Report Fenton Area
Biddlecombe, RM SD5208 Pine Creek

Appraisal of previous exploration results, field visits, new program preparation.

6. CR1997-0058
1997
EL7160

EL 7160 (R1), Northern Territory, First Renewal
Annual report for year ending 13/12/96
Hinde, JS SD5208 Pine Creek

MIM Exploration Pty Ltd. Rock chip sampling, geological mapping, check soil sample program from other explorers.

7. CR1998-0032
EL7160

EL 7160 annual report on exploration activity by Golden Valley Mines NL between 8/12/96 and 7/12/97.
Lindsay-Park, K SD5208 Pine Creek
Tipperary 5170

Golden Valley Mines. Costeans across anomalous gold area to ascertain geology and relationship with gold in soil.

8. 1997/98

Rehabilitation of costeans, roads, drill pads and all distrubances by previous explorers. EL 7160 was then relinquished on due date.

1. CR1992-0216
1992
EL76170

EL 7160 near Plateau Point, Fenton Area, NT Annual Report period ending 4/12/91.
Orridge, GR. SD5208 Pine Creek.

Review of past work, chip sampling of known anomalies.

2. CR1992-0657
1992
EL7160

Annual and Relinquished Area Report EL 7160 Fenton area 4 December 1991 TO 3 December 1992.
Biddlecombe, RM SD5208 Pine Creek
Biddlecombe, RM Daly River 5070

Sampling, loam sampling extension of pendant Au, Pt, mineralization into El 7160.

3. CR1994-0007
1994
EL 7160

EL 7160 Majestic NT, Annual Report year three of tenure from 5/12/92 to 4/12/93.
Biddlecombe, RM SD 5208 Pine Creek
Burn, NR

JV between RM Biddlecombe and Dominion Mining. Vacuum drilling, limited RC drilling. Soil sampling. Best RC results

9m @ .84 gpt Au
6m @ .9 gpt Au
3m @ 1.93 gpt Au

GEOLOGICAL SETTING

Regional Geology

EL7160, Majestic, lies within the western portion of the Palaeo-Proterozoic, Pine Creek Geosyncline. This major depositional basin covers approximately 40,000 square kilometres and extends from Katherine in the south to north of Darwin in the north-west and beyond Jabiru in the north-east. The regional geology of the area was mapped at 1:250,000 and described in detail by Walpole *et al.* (1968) and redescribed by Needham *et al.*(1980). In Table 1, the overall stratigraphy of the Katherine-Darwin region is outlined while Table 2 displays the early Proterozoic Stratigraphy of the western Pine Creek Geosyncline.

Nicholson and Eupene (1984) provide the following summary of the geological history of the Pine Creek Geosyncline (p.378).

"At about 2400 to 2100 m.y., arkoses, pelites, carbonates and iron formation of the Kakadu Group and Cahill Formation, outer Nanambu Complex, Fish Creek schists, parts of the Litchfield Complex and perhaps the outer Rum Jungle and Waterhouse Complexes were deposited on crystalline Archaean basement. Amphibolite facies regional metamorphism and deformation followed at

Table 1: Stratigraphy of the Katherine-Darwin Area

Age	Stratigraphic Unit	Lithologies	Approx. Thickness (m)
Mesozoic	Bathurst Is Group	Sandstone, siltstone	1,300
Cambrian/Ord	Daly River Group	Limestone, sandstone	300
Adelaidean	Tolmer Group	Sandstone, dolomite, siltstone	1,000
Carpentarian	Katherine River Group	Sandstone, minor volcanics	2,000
Early Proterozoic	El Sherana, Edith River Groups	Acid volcanics, volcanoclastics, sandstone	700
	Finniss River Group	Greywacke, sandstone mudstone, minor volcanics	>3,000
	South Alligator Group	Mudstone, carbonaceous-mudstone mudstone, iron formation, greywacke, siltstone, tuff	1,000
	Mt Partridge Group	Sandstone, arkose, conglomerate, mudstone	2,000
	Namoona Group	Carbonaceous mudstone, limestone minor volcanics	2,000
	Bachelor Group	Dolomite, conglomerate, arkose, sandstone	1,000
	Kakadu Group, Cahill Formation Litchfield Complex Fish Ck schists , ?outer Rum Jungle and Waterhouse Complexes	Meta-arkose, quartzite, feldspar quartz gneiss, mica quartz schist, graphitic in places, para-amphibolite, magnesite	3,000
Archaean	Rum Jungle complex Waterhouse complex Nanambu Complex Woolner Granite Litchfield Complex	Granite, foliated granite	unknown

approximately 2100 to 2000 m.y. Following erosion of these rocks, early Proterozoic sedimentation continued with, in order of decreasing age:-

1. arkose, conglomerate and dolomite (Batchelor Group);
2. carbonaceous mudstone with lesser interbedded limestone, greywacke and basalt (Namoona Group);
3. various clastic, mainly fluviatile, sediments (Mount Partridge Group);
4. a heterogeneous sequence of mudstone, turbidites, iron formation, limestone and volcanics (South Alligator Group); and
5. a flyschoid sequence in which greywacke and shale predominate (Finniss River Group).

The Zamu Dolerite was intruded into this sequence prior to greenschist facies metamorphism and the major phase of deformation. The metamorphism is dated at about 1800 m.y.. Widespread granite intrusion with associated broad refolding occurred around 1760 m.y.. This concluded the development of the Pine Creek Geosyncline. Possibly in the dying stages of granite intrusion, felsic volcanics, volcaniclastics and sediments of the El Sherana and Edith River Groups were deposited in fault controlled depressions in the metamorphic terrain (Stuart-Smith *et al.*, 1984).

Sandstones of the Katherine River and Tolmer Groups were unconformably deposited on the Early Proterozoic rocks and have remained essentially undisturbed (along with younger rocks) to the present."

Prospect Geology. (after Hinde, 1997)

The tenement lies in the northern region of the Pine Creek Geosyncline on the Tipperary (5170) 1:100,000 geological sheet. The south-west block of the licence is mostly Mt Bonnie Formation with lesser Burrell Creek Formation in the north, minor Gerowie Tuff and Koolpin Formation in the north-east corner. The northern block of the licence contains metamorphosed Wildman Siltstone(?) as a roof pendant in the Fenton Granite. Fenton Granite crops out in the south-east of the

Table 2 Early Proterozoic Stratigraphy-Pine Creek

Group	Formation	Member	Lithologies	Thickness (m)
Finniss River	Burrell Creek		Greywacke, siltstone, mudstone, rare chert, iron formation and conglomerate.	>3000
South Alligator	Mt Bonnie	Upper	Mudstone, siltstone, chert, iron formation	100-250
		Lower	Greywacke, mudstone, siltstone, chert, carbonaceous mudstone, rare conglomerate	50-150
	Gerowie Tuff		Chert, mudstone, siltstone	200-400
	Koolpin	Upper	Carbonaceous mudstone, mudstone siltstone	50-150
		Middle	Iron formation, mudstone, carbonaceous mudstone, siltstone	30-100
		Lower	Carbonaceous mudstone, mudstone, siltstone, limestone	0-250
Mt Partridge	Wildman Siltstone		Mudstone, phillite, siltstone, carbonaceous mudstone, sandstone	200-400
	Mundogie Sandstone		Quartzite, arkose, pebble conglomerate, mudstone, siltstone	>500

northern block of the licence and passes outside the eastern boundary of the southern block. A sill of Zamu Dolerite occupies the position between the Wildman Siltstone and the Koolpin Formation in the northern block.

The Fenton Granite in and adjacent to EL7160 is a mildly foliated leucogranite. The Koolpin Formation consists of metamorphosed siltstones, pyritic in part, and cherty nodular ironstone. Both lithotypes weather to a brown haematite stained pseudo-gossan which commonly forms ridges. The Gerowie Tuff consists of tuffs and tuffaceous sediments. Possibly due to contact metamorphism no obviously tuffaceous material has been recognised in field mapping. The Mount Bonnie Formation is dominated by interbedded greywacke, phyllite and iron-rich siltstone. Commonly narrow (1 to 10 cm) beds of chert are interdigitated with the Mount Bonnie Formation sediments in the southern block.

In the southern block, the formations have been subject to folding, producing north-north-east trending tight folds and minor faulting. Fault zones are highlighted by the presence of quartz-veining, brecciation, slickensides, sericitisation and chloritisation.

Metallogenic Models. (after Goulevitch, 1997)

The Pine Creek Geosyncline has a long history of gold production that spans 127 years. Initially high grade quartz vein-associated gold mineralisation was exploited by Australian, European and Asian miners. More recently exploration and mining has focused on gold mineralisation associated with and without quartz veining. Over the past 127 years, 2.88 million ounces (90 tonnes) of gold have been produced from the region. At the end of 1996, in excess of 9.3 million ounces of gold (291 tonnes) were contained in Identified Mineral Reserves and Resources and sub-economic resources.

Gold mineralisation in the Pine Creek Geosyncline falls essentially into two categories, those being vein-deficient sediment-hosted gold mineralisation and vein-dominated gold mineralisation. Both styles have produced significant ore bodies, however, the vein-deficient style, while less common, is economically more significant. Good examples of the vein-deficient style are Cosmo Howley, Golden Dyke and Mount Porter.

The vein-deficient sediment-hosted mineralisation occurs in several settings. The most significant deposits are hosted by chloritic, sulphidic, cherty iron formations of the middle Koolpin Formation near the base of the South Alligator Group.

The salient aspects of this style of gold mineralisation are:

- they are restricted to the middle Koolpin Formation,
- the host rocks are cherty, sulphidic, silicate iron formations,
- the chert is typically nodular or lensoidal,
- the mineralisation is associated with a strong presence of arsenopyrite and tourmaline,
- the host sequence is overlain by thick accumulations of sulphidic, especially pyrrhotitic, carbonaceous mudstone and siltstone,
- the sequence is intruded by sills of Zamu Dolerite, and
- bedded tourmalinite sometimes occurs in a stratigraphic position laterally equivalent to the mineralised formation.

The vein-dominated deposits in the Pine Creek Geosyncline are the most common, though they are typically low grade at 1 to 2 g/t gold. The Enterprise deposit at Pine Creek was the most successfully exploited deposit of this style. Deposits of this type are not restricted to one stratigraphic unit but occur from the Mundogie Sandstone at the base of the Mount Partridge Group through to the lower Burrell Creek Formation in the Finniss River Group. The more significant deposits occur within the Mount Bonnie Formation at the top of the South Alligator Group and in the immediately overlying lower Burrell Creek Formation.

Typically the veins which host the gold mineralisation in this type of deposit are pyritic quartz veins sometimes with a minor base metal sulphide component. In the larger deposits pyrrhotite sometimes becomes the dominant iron sulphide species at depth. Arsenopyrite is always associated with this style of mineralisation either in the quartz-pyrite veins or as part of the wall-rock alteration assemblage.

For the most part gold is concentrated within the veins through in some deposits gold also occurs along with disseminated pyrite and arsenopyrite in the host sediments and tuffs.

Interbedded greywacke-mudstone sequences host the bulk of the vein-dominated deposits. However, there are important exceptions to this. In particular, a large part of the Cosmo Howley deposit in the cherty iron formation of the Middle Koolpin Formation consisted of vein-dominated mineralisation in the iron formation; and the bulk of the low grade deposits at Chinese Howley and Big Howley are hosted by the tuffaceous sediments and tuffaceous cherts of the Gerowie Tuff.

The major deposits consist of multiple-vein systems whereas the smaller deposits, especially those towards the lower and upper extremes of the stratigraphic distribution, generally consist of a single vein often laminated in appearance.

Perhaps the most significant control on the localisation of deposits of this style are the regional D2 anticline axes. All the major deposits of this type occur on or adjacent to the crests of anticlines with the exception of the Batman deposit at Mount Todd. The anticline in cross-sections can be either symmetrical or asymmetric and commonly overturned, generally to the east.

PREVIOUS EXPLORATION

In previous years the area now encompassed by EL7160 has been held under licences EL4738 (W J and E Fisher) and EL6225 (Burmine). Newmont Australia Ltd joint ventured both of these titles during 1988-90. It was Newmont geologists who identified the Majestic, K9 and Miser prospects. Only the former two are in EL7160.

In 1986-87, W J and E Fisher conducted a soil sampling program over a magnetic anomaly located north of the current licence. Their exploration target was gold mineralisation hosted by dolerite.

In 1988, Burmine conducted a stream sediment sampling program with samples collected at a density of approximately 1 sample per square kilometre. The samples were assayed for gold via the cyanide leach technique and arsenic by an unspecified method. Their work produced several strongly anomalous drainages. Billiton were invited to examine the results and showed their interest by re-sampling several of the most anomalous sites. Billiton's samples showed a poor correlation with the Burmine samples. Burmine resubmitted some of their samples to another laboratory and in general obtained results similar to those in their first episode with the exception of a few higher results were much lower in the second phase of assaying.

Newmont Australia entered into joint venture agreements with the Fishers and Burmine in 1988 and immediately embarked upon a new program of stream sediment sampling and cyanide leach analyses. The results obtained by Newmont show a strong (18ppb) gold anomaly in the Majestic area. The Newmont sampling failed to reproduce the anomalous results obtained by Burmine in the Miser area, however, Newmont did identify the K9 prospect which was not detected by Burmine.

Burmine also conducted a program of rock chip sampling which concentrated on quartz-veins and silicified areas. Their results indicated the presence of several highly anomalous gold-mineralised veins in the vicinity of Majestic and Miser.

Newmont's rock-chip sampling, mapping and soil sampling concentrated on the areas identified as the sources of the stream sediment anomalism. Burmine's rock chip sampling was more widespread and not targeted on the areas identified as anomalous by the stream sediment sampling.

At the Majestic prospect Newmont completed soil sampling on a 25x50m grid, rock chip sampling and geological mapping at 1:5000 scale. The minus 80# fractions of the soil samples were analysed for Cu, Zn, As, Ag, Pb, Sn, W, and Au by AAS methods. Newmont also drilled three traverses of RAB holes across the peak of the gold-in-soil anomaly. The holes were inclined to the east, drilled to 20m depth, at 10m spacing and with 100m between lines. Samples were routinely collected as 4m composites with selected intervals sampled by the metre. The drilling encountered broad zones of gold anomalism with a best result of 4m at 2.74 g/t gold in hole PPB17. Due to heavy rainfall the drilling was terminated prior to completion.

At the K9 prospect Newmont undertook soil sampling, rock-chip sampling and geological mapping over an area of 400x800m using the same procedures as at Majestic. One highly anomalous gold result of 480 ppb was collected from the western edge of the grid. Elsewhere a poorly defined zone with results between 20 to 60 ppb gold was identified. In 1989 Newmont withdrew from the joint ventures.

In 1993 Dominion Mining Ltd entered into a joint venture with Mainline Gold Mines Ltd who then held title over the area. Dominion carried out data compilation, soil sampling, rock-chip sampling, vacuum drilling and RC drilling. The stream sediment sampling failed to define any significantly anomalous drainages (peak 6ppb). Soil sampling defined an anomalous area within the current licence area at the Majestic prospect. The anomalous area has a peak of 380 ppb gold and a well defined contour at 200 ppb can be drawn. Vacuum drilling

was used to extend the area of soil sampling and this succeeded in defining an anomaly over 1500m long at better than 50ppb gold.

Dominion Mining drilled 7 RC holes for a total of 318m over a strike length of 500m. The drilling was completed on the Majestic geochemical anomaly. The drilling was undertaken by Gomex Drilling using a truck mounted RCD-2 rig with a 137mm face-sampling hammer. Samples were collected as 3m composites and assayed at Amdel Laboratories in Darwin for gold by fire assay and arsenic by conventional AAS. The RC drilling intersected some gold anomalism but realised no significant results.

The gold mineralisation which was intersected was interpreted to occur within quartz-vein stockwork zones in the Mount Bonnie Formation. The lack of encouraging results led to Dominion relinquishing the ground in December 1993.

In 1996 Mount Isa Mines explored the two blocks that are the current licence area. They undertook rock chip sampling, geological mapping and soil sampling. A total of 115 rock-chip samples were collected with an even spread over both blocks. The samples were assayed for Cu, Pb, Zn, Ag, Fe, Mn, As and Au with a few samples assayed for Pt, Pd and Bi. The rock-chip sampling identified several anomalous gold zones associated with haematite and scorodite-bearing quartz veins.

Geological mapping at 1:5000 scale was completed over the Majestic prospect in the south-western block. The mapping identified two marker units. The first is described as "a medium to coarse-grained psammite which is gritty in places" while the second is described as "a distinct grey to dark-grey, blocky and siliceous sericitic-schistose-greywacke". Mapping of the marker beds allowed the recognition of an east-north-east trending shear zone which bisects the area. The shear has a dextral sense of movement.

To validate the previously collected soil samples, MIM completed two lines of soil sampling and had the samples assayed by the cyanide leach technique. Their results supported the results obtained by Dominion Mining. MIM concluded that much of the width of the soil anomaly is due to the mechanical dispersion of mineralised vein quartz. In November, 1996 MIM withdrew from the joint venture.

WORK CARRIED OUT FOR FINAL YEAR

The recommendation of the previous year were adhered to. These suggested that no further work be carried out on the remaining block of EL 7160 without a broader exploration target which would include surrounding graticular blocks. Efforts were made to create a parcel of worthwhile proportions by the join venturer Golden Valley Mines of Perth. This was not accomplished and the joint venture between myself and Golden Valley Mines expired in July 1998.

A rush program put together by myself was not able to be started before access to the area became risky from weather problems.

However all rehabilitation of costeans, roads etc was carried out prior to the wet of 1998/99 and EL 7160 has been left in pristine condition after several years of exploration including costeans, drilling etc.

2 SUMMARY

In 1997 Golden Valley Mines NL engaged the services of Exploremin Pty. Ltd to conduct it's exploration activities in the Majestic area. Golden Valley Mines NL, in joint venture with R M Biddlecombe, are managing the licence.

The exploration activities undertaken in EL7160, Majestic, were designed to ascertain the nature of the mineralised system identified by previous workers and determine if potential exists for locating an economic orebody. Initial activities involved a detailed review of the previously collected data.

In 1997, two costeans were dug to expose the rocks in two areas (Majestic and K9) where previous soil sampling and shallow drilling had indicated the presence of gold mineralisation. Detailed geological mapping and rock chip channel sampling were conducted in both costeans.

The work conducted in 1997 has demonstrated the restricted distribution and low-grade nature of the gold mineralisation previously identified at Majestic and K9.

3 CONCLUSIONS

- At the K9 prospect the gold mineralisation is related to a narrow ferruginous zone that lies on the contact between a sill of the Zamu Dolerite and weakly schistose siltstones.
- At Majestic the gold mineralisation is associated with quartz-veins and ferruginous chert beds hosted by mica schists and greywacke.
- Anomalous levels of gold mineralisation are also found in the host sediments at Majestic.
- At both prospects the gold assay results from costean rock chip sampling are considered to be sufficient to explain the gold geochemical response obtained by soil sampling.
- At neither prospect do the costean results suggest the presence of significant, near-surface, economic gold mineralisation.

4 RECOMMENDATIONS

- It is recommended that no further work is conducted at either the K9 or Majestic prospect at this time.
- Additional work in EL7160 maybe carried out as part of a larger exploration effort in tenements surrounding EL7160.

EXPENDITURE

Expenditure for EL 7160 December 1997 to December 1998.

Office & Administration Expenditure	$1500.00
Plant hire, camping, transport to and from site, plant & personnel	$6000.00
	$7500.00