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Part B.

CSR LIMITED

MINERALS EXPLORATION AND DEVELOPMENT GROUP

EXPLORATION LICENCE 4695
LEWIN CREEK, NORTHERN TERRITORY
FERGUSSON RIVER 1:250,000 SHEET SD 52-12
FINAL REPORT

EMR 30/85

OPEN FILE

DARWIN
FEBRUARY 1985

K.W. HAMILTON

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KEYWORDS

EL4695	GOLD
FERGUSSON 1:250,000	SD52-12
PINE CREEK	BULK STREAM SEDIMENT
NORTHERN TERRITORY	ROCK-CHIP
LEWIN CREEK	

1. SUMMARY

Exploration Licence 4695 (Lewin Creek) was granted to CSR Limited by the N.T. Department of Mines and Energy on the 22/11/84.

The exploration target was gold mineralisation. Five kilogram stream sediment samples were collected from the streams draining the licence area and analysed for Au, Cu and Ag.

Three low-order gold anomalies were delineated. However, the results were not sufficiently encouraging to warrant further exploration. It was recommended that the Exploration Licence should be surrendered.

2. INTRODUCTION

Exploration licence 4695 was granted to CSR Limited on 22nd November, 1984, for a period of six years.

A bulk sample stream sediment geochemical survey was undertaken throughout the licence area to test for the presence of gold mineralisation. This report details the results of that survey.

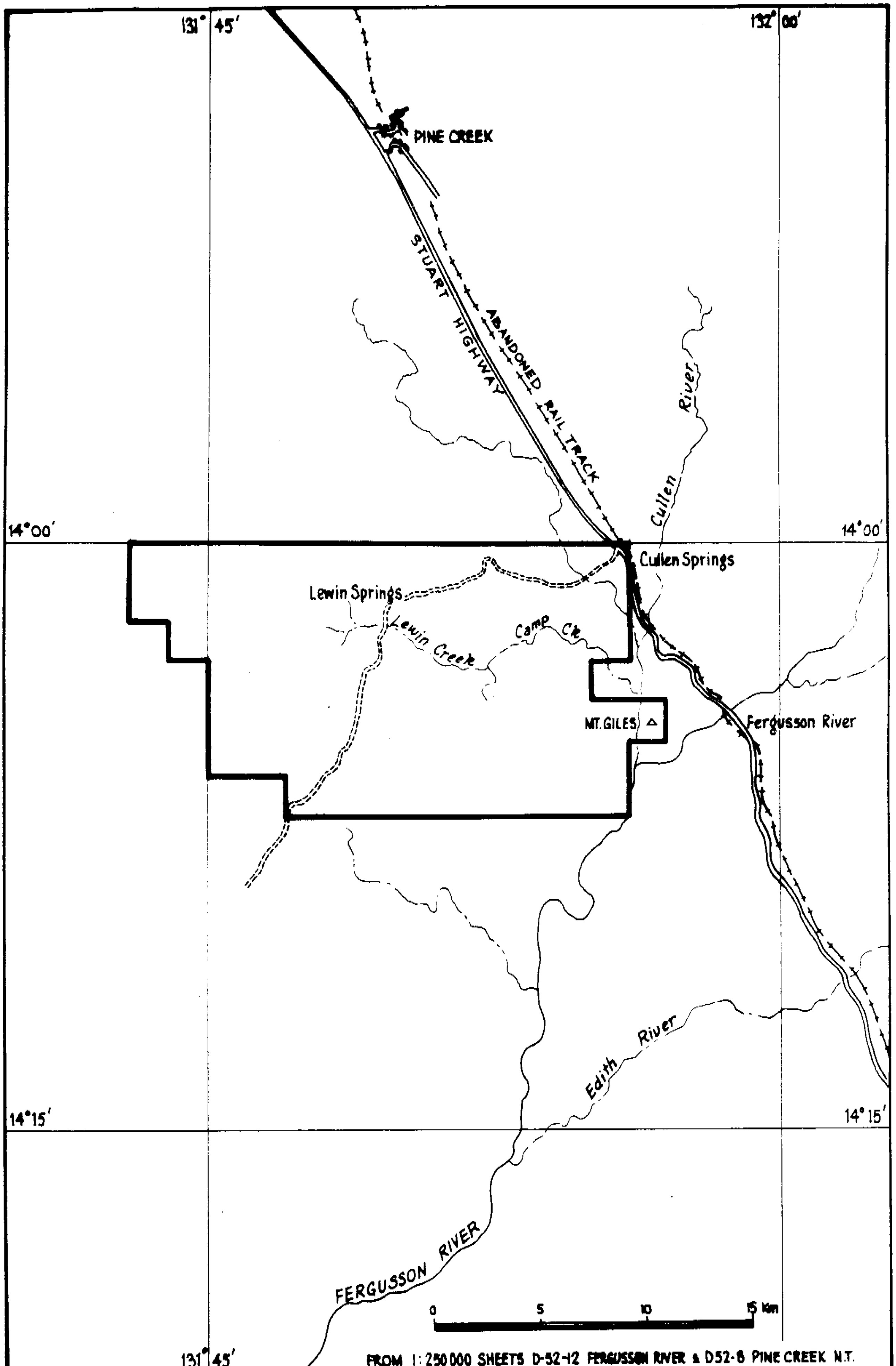

FIG. 1 LOCALITY MAP E.L. 4695 LEWIN CREEK N.T.

3. LOCATION AND ACCESS

EL 4695 is located 25 kilometres south of Pine Creek in the Northern Territory (Figure 1), and covered an area of 80 one minute blocks (258 sq km).

Access to the area is good during the dry season from May to December. During the wet season the flooding of the Cullen and Fergusson Rivers and numerous large creeks makes access difficult, if not impossible.

The Stuart Highway runs along the eastern edge of the licence. Several bush tracks leading west from the highway provide access to that part of the licence east of the Cullen and Fergusson Rivers. Access to the western section of EL 4695 is provided by the formed gravel road to the Claravale and Dorisvale Homesteads. No other roads traverse the licence, but access to the more remote sample locations is possible by four-wheel drive vehicle.

4. TOPOGRAPHY AND CLIMATE

Most of the land surface of EL 4695 consists of low, gently undulating plains covered by low open forest. The south east corner contains an area of rugged landscape formed over the folded units of the Burrell Creek Formation. The relief is up to 150m with steep-sided ridges and narrow valleys. Along the western edge of the exploration licence steep-sided mesas of Cretaceous sandstone are conspicuous. The highest point in the licence area is a mesa known as Mt. Foelsche with an elevation of 267 metres above sea level.

The climate is monsoonal with a wet season that extends from January to late April. The average rainfall is approximately 1000 mm per year, most of which falls in the short wet season.

5. PREVIOUS INVESTIGATIONS

The area has been mapped during numerous geological surveys by government geologists (Brown, 1905, 1906; Jensen, 1915, 1919; Noakes, 1949; Rattigan and Clarke, 1955; Walpole et al, 1968; Pontifex and Mendum, 1972). More recently the BMR has published the Edith River 100,000 scale geological map (Needham et al, 1984) which covers the licence area.

The Woolngi gold field east of EL 4695 was discovered prior to 1897. This field was worked until 1908 and is reported to have produced 4600 oz of gold (Walpole et al, 1968). During this period prospectors also discovered the Expectation copper mine which lies within the boundaries of the licence. Other small occurrences of wolfram and copper are reported to occur within the licence.

Since these early discoveries there has been only minor prospecting activity by private individuals in the vicinity of EL 4695. No open file reports covering the licence area are present in the library of the Department of Mines and Energy.

TABLE 1

STATISTICAL SUMMARY OF GROUPED DATA

ELEMENT : Au

MINIMUM	0.03	MAXIMUM	4.90	RANGE	4.83
MEAN	0.14	VARIANCE	0.23	STAN. DEV.	0.47
SKEWNESS	0.05	KURTOSIS	68.25		

Mid Point	Frequency	Frequency Percentage	Cumulative Frequency	Cum-freq. Percentage
0.03	91	84.26	91	84.26
0.35	12	11.11	103	95.37
0.67	2	1.85	105	97.22
1.00	1	0.93	106	98.15
1.32	1	0.93	107	99.07
1.65	0	0.00	107	99.07
1.97	0	0.00	107	99.07
2.30	0	0.00	107	99.07
2.63	0	0.00	107	99.07
2.95	0	0.00	107	99.07
3.28	0	0.00	107	99.07
3.60	0	0.00	107	99.07
3.93	0	0.00	107	99.07
4.25	0	0.00	107	99.07
4.57	1	0.93	108	100.00

6. EXPLORATION RESULTS

The main exploration technique used within EL 4695 was bulk stream sediment geochemistry. The geological data shown on the accompanying map (DRG No. 8583-1) have been taken directly from the 1:25,000 scale photo compilation sheets used by the Bureau of Mineral Resources (Needham et al, 1984).

6.1 Stream Sediment Survey

One hundred and nine (109) stream sediment samples were collected (5 kg dry weight). The samples were despatched to a laboratory where the gold was extracted and deposited onto three grams of zinc. The zinc was then assayed for gold, copper and silver. The assay results are presented in Appendix I and are plotted on the accompanying map (DRG No. 8583-2).

Assays recorded as ppm gold on zinc are concentrated values and are considerably enhanced compared to the in-situ values.

Only the gold values were subjected to a thorough examination. The copper and silver results were not evaluated for the following reasons:-

- none of the values obtained were considered geochemically significant.

- the extractive technique is designed to optimize the extraction of gold and the effect on copper and silver extraction is not clearly understood.

Initially all the gold values were statistically analysed by computer. The results are summarized in Table 1 and shown on Figure 2. It is evident from the

FIGURE 2

FREQUENCY GRAPH FOR AU
FREQUENCY PERCENTAGE

```
MID POINT    10...20...30...40...50...60...70...80
       I....I....I....I....I....I....I....I.....
         I
    0.03 ********************************************  (91)
         I
    0.35 ******          ( 12)
         I
    0.67 *    (  2)
         I
    1.00 *    (  1)
         I
    1.32 *    (  1)
         I
    1.65 *    (  0)
         I
    1.97 *    (  0)
         I
    2.30 *    (  0)
         I
    2.63 *    (  0)
         I
    2.95 *    (  0)
         I
    3.28 *    (  0)
         I
    3.60 *    (  0)
         I
    3.93 *    (  0)
         I
    4.25 *    (  0)
         I
    4.57 *    (  1)
```

histogram in Figure 2 that there is one distinct population present comprising the bulk of the samples plus Sample 194663 (4.9 ppm).

The highly anomalous value exhibited by Sample 194663 was then removed from the file and normal statistics were run on the remaining samples. The statistical summary is presented in Table 2. The mean was 0.1 ppm Au and the standard deviation was 0.2. Samples with values greater than the mean plus two standard deviations (i.e. >0.5 ppm Au) were considered anomalous. Four samples had values which exceeded this threshold and when combined with sample 194663 gave five anomalous samples for the whole survey, i.e.

194556	-	1.40 ppm
194623	-	0.75 ppm
194662	-	0.65 ppm
194663	-	4.90 ppm
194668	-	0.85 ppm

TABLE 2

STATISTICAL SUMMARY

ELEMENTS	Au	Cu	Ag
NUMBER	107	108	108
MEAN	0.1	53.6	1.7
MAXIMUM	1.4	805.0	9.0
MINIMUM	0.0	14.0	0.5
STAN. DEV.	0.2	86.3	1.2
SKEWNESS	0.3	0.5	5.2
KURTOSIS	21.5	5L.5	17.4
GEO-MEAN	0.0	36.5	1.4

Correlation coefficients were also run for Cu, Au and Ag (Table 3). As was expected the correlation between all three elements was very low.

TABLE 3

SAMPLE CORRELATION COEFFICIENT (r)

	Au	Cu	Ag
Au	1.00	0.42	0.25
Cu	0.42	1.00	0.40
Ag	0.25	0.40	1.00

POPULATION CORRELATION COEFFICIENTS p(Ho)

	Au	Cu	Ag
Au	1.000	4.782	2.671
Cu	4.782	1.000	4.550
Ag	2.671	4.550	1.000

LEVELS OF SIGNIFICANCE

	Au	Cu	Ag
Au	0.160	0.000	0.004
Cu	0.000	0.160	0.000
Ag	0.004	0.000	0.160

DEGREES OF FREEDOM

	Au	Cu	Ag
Au	105.0	105.0	105.0
Cu	105.0	106.0	106.0
Ag	105.0	106.0	106.0

All of the anomalous drainages are from areas of Burrell Creek Formation and Edith River Volcanics. When compared with results from other exploration areas within the Pine Creek region and when the area of drainage covered by each sample is taken into consideration, it was felt that the values of samples 194556, 194623, 194662 and 194668 are too low to represent significant mineralisation.

Sample 194663 drains an area adjacent to the old Woolngi goldfield and is probably caused by a similar style of mineralisation.

As the mineralisation in the Woolngi Goldfield consists of modest grades associated with thin quartz veins of limited extent, it is not an attractive target to CSR Limited. No further exploration was recommended in this area.

6.2 Rock-chip Samples

Twenty two rock-chip and stream float samples were collected within EL 4695. The assay results are listed in Appendix II and the sample locations are plotted on DRG No. 8583-2. None of the assay results were considered to be of economic significance. Samples 194672 and 194673 which contained anomalous gold (up to 0.13 ppm Au) were collected from the small quartz veins in the old Woolngi gold field.

Rock samples (194657 and 194671) were submitted for petrological description (Appendix III).

7. CONCLUSIONS AND RECOMMENDATIONS

A bulk stream sediment survey of EL 4695 did not reveal any significant anomalies. The highest value of 4.90 ppm Au was obtained from an area outside the exploration licence and is probably related to gold shedding from narrow gold-bearing quartz veins. As such a style of mineralisation was not considered an attractive exploration target, it was recommended that title to EL 4695 be relinquished.

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KWH/SGL
February 1985

APPENDIX I

STREAM SEDIMENT ASSAY RESULTS

FROM BULK GOLD CONCENTRATES

N.B. Assays recorded as ppm gold on zinc are concentrated values and are considerably enhanced compared to the in-situ values.

E.L. 4695 - LEWIN CREEK

BULK GOLD CONCENTRATE ASSAY RESULTS (ppm)

Sample	Wt. (g)	Au	Cu	Ag
194351	3.00	0.20	24	1
194352	3.20	0.40	28	1
194355	3.10	0.15	16	1
194356	3.20	0.20	22	1
194357	3.20	0.30	24	1
194358	3.00	0.20	28	1
194359	3.20	0.05	56	2
194360	3.00	0.05	34	2
194552	3.09	<0.05	56	2
194553	3.18	0.05	34	1
194554	3.46	<0.05	40	2
194555	3.11	<0.05	30	1
194556	3.25	1.40	42	2
194558	3.33	0.10	32	1
194560	3.35	<0.05	26	1
194563	3.38	<0.05	24	1
194564	3.32	<0.05	18	1
194566	3.12	<0.05	20	1
194568	3.23	<0.05	22	1
194569	3.23	<0.05	20	1
194572	2.99	0.30	335	3
194575	3.30	<0.05	26	1
194577	3.40	<0.05	26	1
194580	2.97	<0.05	24	1
194581	3.18	<0.05	24	1
194583	3.29	<0.05	38	1
194584	3.41	<0.05	22	1
194585	3.23	<0.05	22	1
194587	3.00	<0.05	24	1
194589	3.39	<0.05	22	1
194590	3.48	<0.05	30	1
194591	3.36	<0.05	26	1
194593	3.16	<0.05	20	1
194595	3.15	<0.05	26	1
194596	3.02	<0.05	24	1
194598	3.09	<0.05	28	1
194599	3.43	<0.05	28	1
194600	3.11	<0.05	28	1
194602	3.37	0.05	32	2
194603	3.20	<0.05	38	2
194604	3.33	<0.05	28	1
194605	3.04	<0.05	145	3
194606	3.24	<0.05	70	2
194607	3.04	<0.05	80	2
194610	2.99	<0.05	46	2
194611	3.19	<0.05	28	1
194612	3.21	<0.05	94	2
194614	3.34	<0.05	50	1

Sample	Wt. (g)	Au	Cu	Ag
194615	3.05	0.10	165	2
194616	2.96	0.20	185	3
194617	3.34	0.10	92	3
194619	3.05	0.15	105	3
194620	3.25	0.05	58	2
194621	3.36	<0.05	46	2
194622	3.16	0.35	115	2
194623	2.93	0.75	805	3
194624	3.12	0.05	60	2
194626	2.93	<0.05	82	2
194628	3.28	0.10	24	1
194629	3.18	0.15	125	2
194631	3.23	0.25	96	2
194633	3.16	<0.05	44	2
194634	3.02	0.10	110	4
194637	3.00	0.05	20	1
194639	2.80	0.05	18	1
194641	2.90	0.05	20	1
194642	2.90	<0.05	18	1
194643	3.30	<0.05	16	1
194644	3.50	0.05	26	1
194645	3.20	0.10	18	1
194647	2.90	<0.05	22	2
194648	2.90	<0.05	22	1
194650	3.10	0.05	16	1
194651	3.15	<0.05	22	2
194652	3.07	0.05	18	1
194653	2.65	0.15	26	3
194654	2.79	0.05	22	2
194655	2.93	0.10	22	2
194656	3.33	<0.05	22	1
194660	3.13	<0.05	26	2
194661	2.89	0.35	185	9
194662	3.05	0.65	78	2
194663	2.92	4.90	125	3
194666	3.03	0.20	125	4
194667	2.95	0.20	98	2
194668	3.05	0.85	72	3
194669	3.57	0.40	100	2
194670	3.02	0.15	70	2
194674	3.03	<0.05	28	1
194675	3.18	<0.05	34	3
194677	3.07	<0.05	20	1
194679	3.06	<0.05	28	1
194680	3.16	<0.05	24	1
194681	3.11	<0.05	30	1
194683	2.90	<0.05	80	8
194684	2.97	<0.05	30	2
194686	3.23	<0.05	24	1
194687	3.16	<0.05	30	1
194689	3.13	<0.05	20	1
194690	3.11	<0.05	40	1

Sample	Wt. (g)	Au	Cu	Ag
194691	3.29	<0.05	22	1
194693	3.27	<0.05	18	1
194694	3.07	<0.05	14	1
194695	3.29	<0.05	36	3
194696	3.19	<0.05	24	1
194697	2.99	<0.05	26	1
194698	2.70	<0.05	18	1
194699	3.05	<0.05	22	1
194700	3.20	<0.05	46	1

APPENDIX II

ROCK-CHIP ASSAY RESULTS

E.L. 4695 - LEWIN CREEK

ROCK-CHIP ASSAY RESULTS

Element	Cu	Pb	Zn	Au	Ag	As	S	Mo
194354	40	nr	20	0.17	nr	14	nr	nr
194361	1.41%	10	65	0.008	nr	25	nr	nr
194362	345	20	115	<0.01	nr	19	nr	nr
194363	1900	35	60	0.008	<0.05	8	nr	nr
194562	70	105	65	<0.01	nr	11	nr	nr
194565	550	10	20	<0.01	nr	11	nr	nr
194576	20	15	20	0.008	nr	13	nr	nr
194578	665	380	190	0.017	nr	210	nr	nr
194579	55	40	110	<0.01	nr	19	nr	nr
194592	160	785	130	0.01	nr	6	nr	nr
194608	3450	40	105	0.01	nr	29	nr	nr
194618	405	645	70	0.025	nr	160	nr	nr
194627	5	15	5	<0.01	nr	19	nr	nr
194635	15	5	55	<0.01	nr	7	nr	nr
194657	240	nr	nr	<0.01	nr	30	nr	3
194658	105	nr	nr	<0.01	nr	21	nr	<3
194659	20	nr	nr	<0.01	nr	14	nr	9
194664	25	nr	nr	<0.01	nr	28	nr	25
194665	120	nr	nr	0.05	nr	73	nr	9
194671	75	nr	nr	<0.01	nr	110	nr	9
194672	45	nr	nr	0.06	nr	37	nr	10
194673	35	nr	nr	0.13	nr	61	nr	20

All results in ppm unless indicated

APPENDIX III

PETROLOGICAL DESCRIPTIONS

REPORT CMS 84/9/11

PETROLOGICAL DESCRIPTIONS

194657 (T.S. 51440)

This rock is a thoroughly altered "biotite granite" with the finer compositional detail obscured.

Major mineralogy comprises relics of granitic quartz and variously chlorite-K-feldspar- or chlorite-quartz-pseudomorphed feldspar. Conspicuous primary biotite is represented by pseudomorphous chlorite, supplemented by rare relict biotite flakes. Disseminated cloudy sphene represents altered accessory titanopaques, and traces of apatite complete the altered "granitic" assemblage.

The associated vein consists of quartz and alkali feldspar (adularia, minor albite), with the feldspar concentrated in 3.5-4 mm marginal zones. Accessory fine cloudy epidote appears as single grains and small-scale clusters. The feldspathic selvedge includes a little vermiform chlorite, thinly disseminated grains of partly metamict monazite and occasional anhedral grains (to 500 μ x 1.6 mm) of scheelite.

The vein assemblage duplicates the host rock alteration assemblage. Thus, similarly altered zones conceivably carry disseminated scheelite, supplementing the vein-controlled mineralisation.

194671 (T.S. 51441)

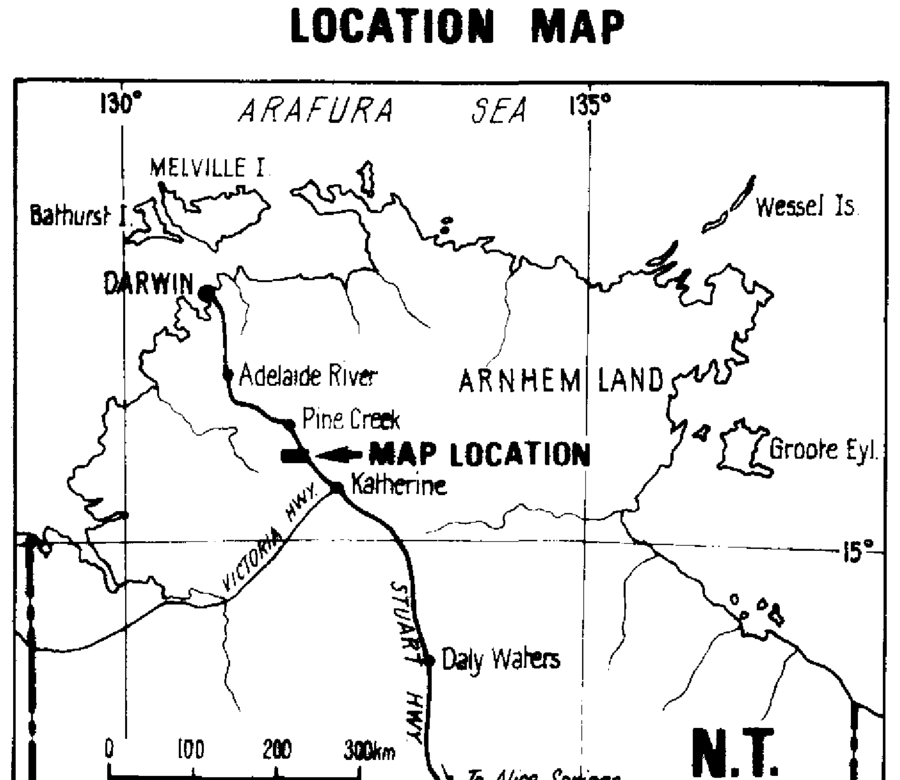
This rock may be classified as a breccia and comprises essentially angular, submillimetric to centimetric clasts, with a ferruginised, largely indeterminate matrix.

Clasts are homogeneous, with the single lithology represented being a tuffaceous pelite. This rock is strongly sericitic and ranges from massive pelitic, (shaly) to silty pelitic, wlth a clastic component of devitrified and silicified-sericitised shards, accessory quartz grains, and minor silt-sized mica flakes. A few clasts exhibit limonite pseudomorphs of fine, weakly quartz pressure-shadowed pyrite and arsenopyrite euhedra.

The matrix component comprises mainly limonite with a little vein-type quartz. Limonite, in part at least, represents degraded fine-grained mica aggregates and elsewhere degraded fine "scaly" hematite. There are no tangible sulphide-derived features. The hematite was conceivably secondary (e.g. carbonate-replacive).

D. Cowan, B.Sc.

LOCATION MAP



REFERENCE

	Watercourse
	Road, track
	E.L.A. boundary
	Trig point
	Mine abandoned
	Abandoned prospect
× 194635 RC	Rock chip sample location and number
194578 SF	Stream float sample location and number
194357 (0.30, 24, 1)	Bulk gold sample location, number and Au, Cu, Ag results in ppm

0 1 2 3 4 5km

CSR LIMITED-AMCD

E.L. 4695 LEWIN CREEK N.T.

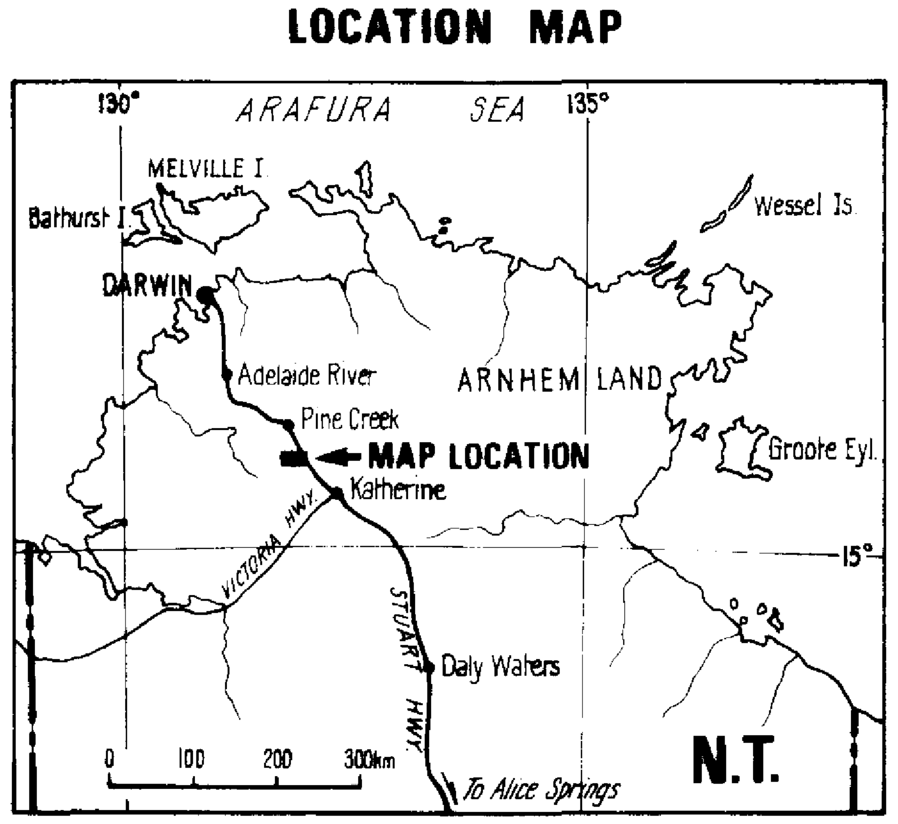
GEOCHEMISTRY

SAMPLE LOCATION MAP

(Bulk Gold in P.P.M.)

SCALE	1: 50,000	DRG. No
DRAWN	PR./K.W.H.	**8583-2**
DATE	April '85	
REVISED		

LOCATION MAP



REFERENCE

- Watercourse
- Road, track
- E.L.A. boundary
- Trig. point
- Mine, abandoned
- Abandoned prospect
- Geological boundary
- Geol. boundary, approx., inferred
- Fault (q, quartz fill)
- Shear

QUATERNARY	Qa	Soil, sand, silt, clay
TERTIARY	Cz	Soil, rubble, sand
CRETACEOUS	Kp	Fine, white sandstone, yellow-brown medium sandstone
LOWER to MID. CAMBRIAN	Єlw	JINDARE SANDSTONE Pink to purple sandstone, arkose, limonitic laminated chert
LATE PROTEROZOIC	Ꝑtd	TOLMER GROUP: DEPOT CREEK SANDSTONE Laminated pink quartzite, minor interbedded haematitic quartzite
EARLY PROTEROZOIC		EDITH RIVER GROUP
	Ꝑef	FERGUSSON RIVER TOSCANITE Red-pink rhyolite, ignimbrite, minor grey rhyolite
	Ꝑew	LEWIN SPRINGS SYENITE Red-grey, porphyritic, microsyenite
	Ꝑel	PHILLIPS CREEK SANDSTONE Purple tuffaceous sandstone, arkose, conglomerate, minor siltstone and phyllite
EARLY PROTEROZOIC		CULLEN GRANITE COMPLEX
	Ꝑgc$_1$	Porphyritic granite
	Ꝑgc$_2$	Altered granite, fine to coarse leucogranite, porphyritic leucogranite
	Ꝑgc$_3$	Granodiorite, fine to medium grained and porphyritic granodiorite
	Ꝑgl	LUCY'S CAMP GRANITE Coarse pink equigranular leucogranite, commonly altered and greisenised
	Ꝑfb	FINNISS RIVER GROUP: BURRELL CREEK FORMATION Grey, grey-green, purple greywacke; grey-brown phyllite, slate and siltstone
		Greisen

NOTE: GEOLOGY COMPILED FROM B.M.R. FERGUSSON RIVER 1:25,000 PHOTO COMPILATION SHEETS N.T.

0 1 2 3 4 5km

CSR LIMITED-AMCD

E.L.4695 LEWIN CREEK N.T.

GEOLOGICAL MAP

SCALE : 1:50,000	DRG.No.	8583-1
DRAWN : P.R./K.W.H.		
DATE : April '85		
REVISED :		

/ 164 A