

ANNUAL REPORT  
TO  
DEPARTMENT OF MINES AND ENERGY  
NORTHERN TERRITORY

Licencee and Operator:	Agip Australia Pty. Ltd.
Exploration Licence No:	E.L. 3059
Standard Map Areas:	Mary River / Point Stuart
Period:	12.09.84-11.09.85
Date of Submission:	October, 1985

TABLE OF CONTENTS

	<u>Page</u>
1. SUMMARY	1
2. INTRODUCTION	2
2.1 Tenement Status	2
2.2 Location and Access	2
2.3 Climate and Topography	2
3. PREVIOUS WORK	4
4. EXPLORATION ACTIVITIES	7
4.1 Sampling and Analysis	7
4.2 Evaluation of Shellgrit Resources	8
5. EXPENDITURE	9

LIST OF MAPS

<u>Drawing No.</u>	<u>Description</u>	<u>Scale</u>
3059/4	Geological Map - E.L. 3059 (Point Stuart)	1:25,000

LIST OF FIGURES

Fig. 1	Location Map - E.L. 3059 (Point Stuart)
Fig. 2	Tenement Status - E.L. 3059

LIST OF TABLES

Table 1	Analytical Results
Table 2	Insitu Resources - Shellgrit Deposits

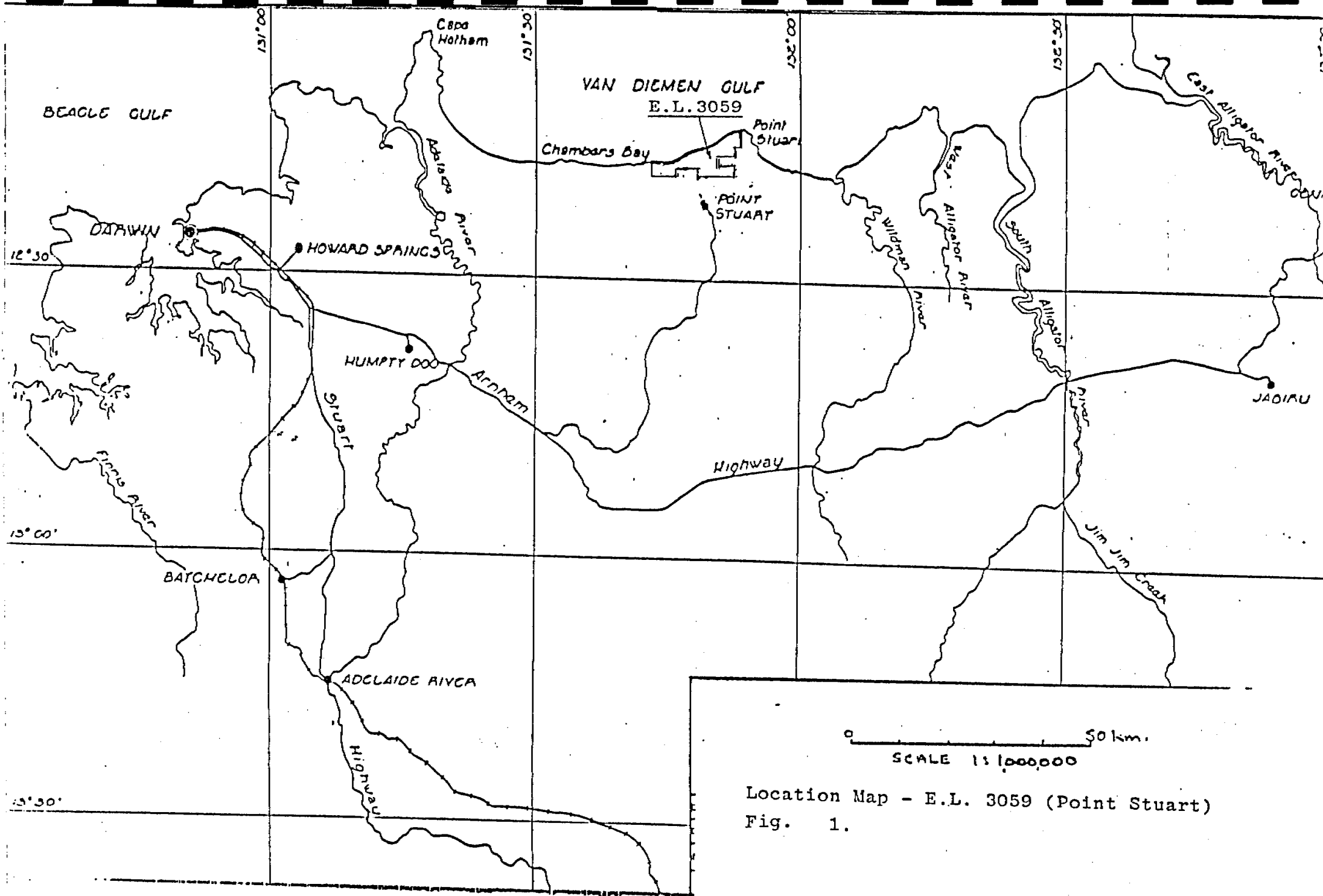
1. SUMMARY

E.L. 3059 (Point Stuart), was granted to Agip Australia Pty. Ltd., on 12th September, 1981. Following exploration activities within the original area the Exploration Licence has been reduced to approximately 61 square kilometres (25 blocks).

The area which straddles between the Batchelor Shelf and the South Alligator trough of Pine Creek Geosyncline, was originally considered to have favourable geological setting to host either Rum Jungle or East Alligator type uranium mineralization.

Exploration activities were considerably restricted, as much of the area comprises grassy black soil plains and saline tidal flats and access is difficult and limited to five months only during the dry season. In addition part of the licence area is occupied by thick Cretaceous and Cainozoic sediments overlying Proterozoic rocks.

Recent interest and demand for lime and its projected future requirements for local industries led to a review and assessment of shellgrit deposits located within the licence area.



Location Map - E.L. 3059 (Point Stuart)  
 Fig. 1.

## 2. INTRODUCTION

### 2.1 Tenement Status

E.L. 3059, originally covering an area of approximately 220 sq.kms. was granted to Agip Australia Pty. Ltd. on 12th September, 1981 for a period of twelve months. The licence was subsequently renewed on 12th September, 1982 for a period of six years. Currently the area covers approximately 61 sq.kms. (25 blocks) and carries a minimum expenditure commitment of \$15,000/annum. (Fig. 2).

### 2.2 Location and Access

E.L. 3059 is located 105km east of Darwin on coastal flats near the mouth of the Mary River, approximately midway between the Rum Rungle to the west and the East Alligator uranium fields to the east. (See Figure 1).

Access is via the sealed Arnhem Highway, 100km from the Stuart Highway junction, thence along the Point Stuart Station road to the junction of tracks leading to Point Stuart and Sampan Creek.

Access within the E.L. is restricted to two tracks which lead to Point Stuart and Sampan Creek areas. The track is impassable throughout most of the year except for the period between May and October. Off the track travel is restricted due to black soil plains and swampy tidal flats.

### 2.3 Climate and Topography

The climate is monsoonal, with a short summer wet season of 3 to 5 months, and a winter dry season of 7 to 9 months. The mean annual rainfall is 150 cm, with most of the rain falling between January and March. Most of the area within E.L. 3059 is under water and consequently inaccessible by road for several months of the year particularly north of Old Point Stuart Homestead. The mean minimum and maximum temperatures are 26<sup>o</sup>-34<sup>o</sup>C respectively, with mean relative humidity over 60%-70%.

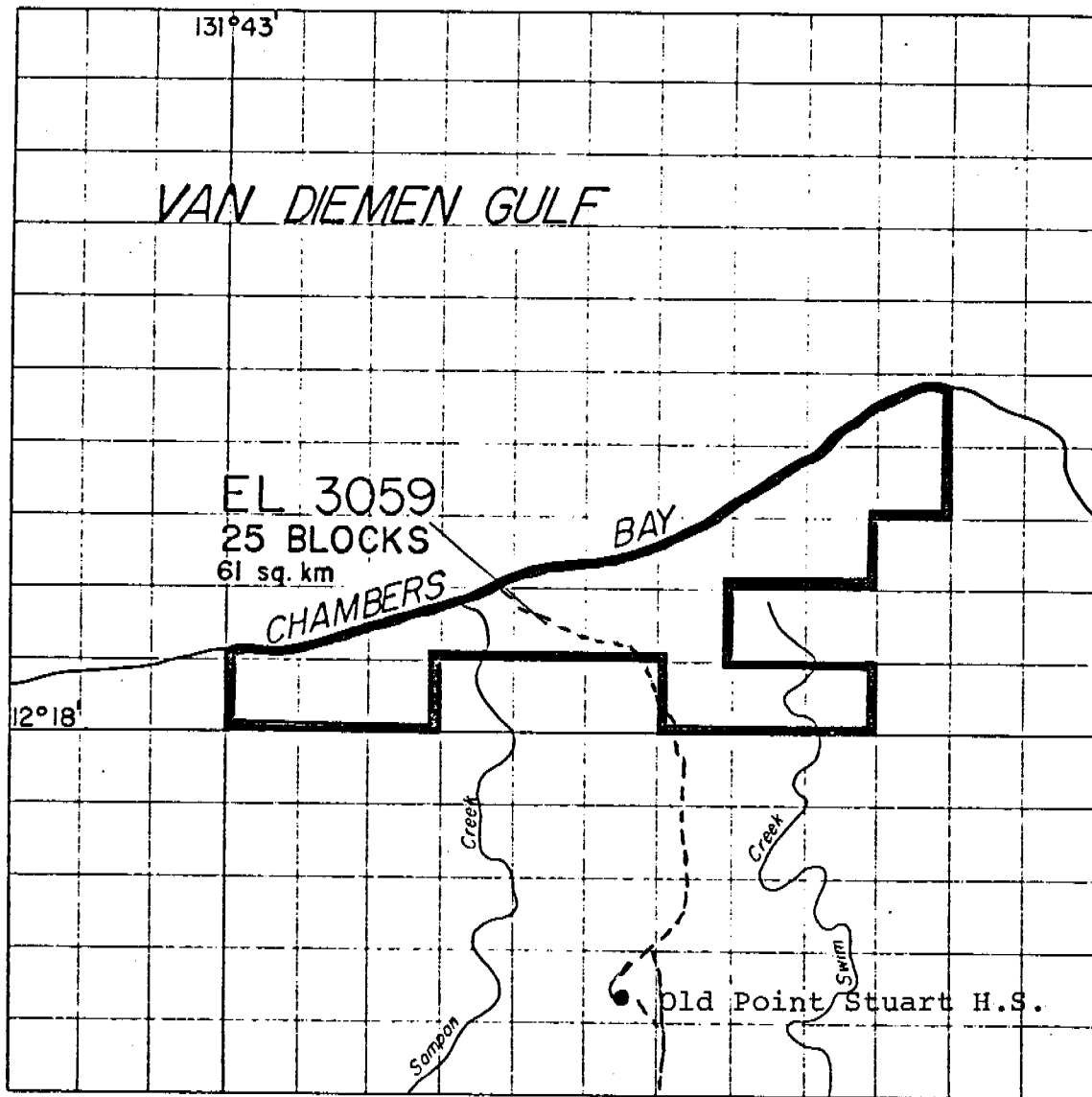


Fig. 2.

Tenement Status E.L. 3059

Scale: 1:250,000

The physiographic unit in E.L. 3059 is represented by plains. Two major creeks, Sampan and Thrings Creek drain through the area.

Most of the area is flat and gently undulating, and nearly 70% is subject to inundation. Perennial swamps are located in the western part with intermittent swamps covering most of the area to the west and east of Sampan Creek. Medium to dense scrub occupies the portion immediately west of Swim Creek and the track leading to Sampan Creek. Saline coastal flats and mangrove swamps occupy the northern part of the area.

### 3. PREVIOUS WORK

The area is within the Mary River - Point Stuart geological map sheet at 1:100,000 scale jointly mapped by B.M.R. and N.T.G.S. during 1978.

Australus Mining Co. Pty. Ltd. carried out some exploration in 1968 for beach sand heavy minerals. No significant deposits were found.

C.R.A. undertook exploration in the Lower Mary River region, including the southern part of E.L. 3059 (Point Stuart), during 1971-73 within E.L.'s 763 and 764. Exploration activities included:-

- a) a combined airborne radiometric and magnetic survey
- b) geological mapping, stream sediment sampling, ground geophysics and auger drilling.

B.P. Mining Development Aust. Pty. Ltd. during 1978-79 carried out an exploration programme in an area (E.L. 1039) immediately south of E.L. 3059 and their activities consisted of:

- a) geological reconnaissance and mapping, bedrock drilling
- b) a combined airborne INPUT, radiometric and magnetic survey.
- c) ground follow-up geophysical survey and percussion/rotary drilling.

Geopeko Ltd. who previously held the present E.L. 3059 area under E.L. 2221 (Chambers Bay) completed an exploration programme which consisted of:

- a) gravity survey with stations located on a grid spacing 1.5km. The gravity survey delineated a gravity low south of Point Stuart (Old Homestead) and two gravity highs.
- b) drilling of one hole in the N.E. part of the area. The drill hole intersected Cainozoic and Cretaceous sediments before reaching dolomites of Lower Proterozoic age.



Northern Cement Pty. Ltd. held E.L. 931 over the Chambers Bay area for a period between 1972 and 1974. Exploration activities within the present E.L. 3059 included:

- a) Photogeological mapping of sand dune areas
- b) air and ground reconnaissance
- c) auger drilling of 23 holes for a maximum depth of 2.6m
- d) analysis of samples for CaO and MgO contents.

Agip Australia Pty. Ltd. commenced investigations in 1981-1982. A geological base map was compiled and a review of BMR aeromagnetics together with re-interpretation of gravity data and drilling from Geopeko Ltd. were carried out. Airborne radiometric and magnetic data collected by CRA Exploration Pty. Ltd. were also examined. Due to the lack of obvious significant geological and geochemical features in the E.L. area it appeared that presence at shallow depth of uranium and/or base metals mineralization was rather unlikely.

Subsequent exploration activities consisted mainly of an evaluation of the shellgrit deposits located in the northern portion of the area. The deposits consist of shell and sand ridges parallel to the coastline and extending discontinuously ENE-WSW for about 40km and as far as 10km inland. They are generally 1m to 2.5m thick and varying in width.

Several bulk samples were collected from the deposits, both in the vicinity of the coast and inland for chemical analysis and beneficiation studies. The objectives of the test programme were:

- a) Analysis of samples for  $\text{CaCO}_3$ ,  $\text{MgCO}_3$ ,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$  and  $\text{Fe}_2\text{O}_3$  content on each sample.
- b) Dry screening tests to determine the distribution of shell and sand to agglomerates in the samples.
- c) Wet screen sizing tests and chemical analysis of fractions to determine the distribution of shell to sand in washed samples to determine the cut off size for optimum  $\text{CaCO}_3$  recovery.
- d) Washing tests to determine the degree of dispersion of agglomerates in the samples.

The above investigations suggest that:

- 1) The average grade of  $\text{CaCO}_3$  of the samples varies between 62% to 78% with negligible content of  $\text{MgCO}_3$  (0.6-2.7%),  $\text{Fe}_2\text{O}_3$  (0.5-3.0%) and  $\text{Al}_2\text{O}_3$  (1.1-6.1%). The  $\text{SiO}_2$  content varies between 21.2 to 24.8%.
- 2) The samples, representing landward dune material, contain substantial amount of fine silt, sand and shellgrit. Washing of the material would be required to remove silt and sand.
- 3) The split at 500 microns recover 64% of the total  $\text{CaCO}_3$  at an average grade of 91.77%  $\text{CaCO}_3$  and 5.68%  $\text{SiO}_2$ , and this possibly suggests the cut off point for screening and recovery of  $\text{CaCO}_3$ .
- 4) Additional washing tests are required to determine the breakdown of fine silt and shellgrit concretions.

A preliminary interpretation of Landsat Imagery was carried out for the Southern portion of E.L. 3059. The study included digital image processing of Landsat data using linear/stretching and ratioing of different bands. While present day or recent dunes are not distinguishable from Quaternary sediments, dunes located on lateritic Tertiary sediments are clearly observable due to the variation in reflectance. (Fig. 3).

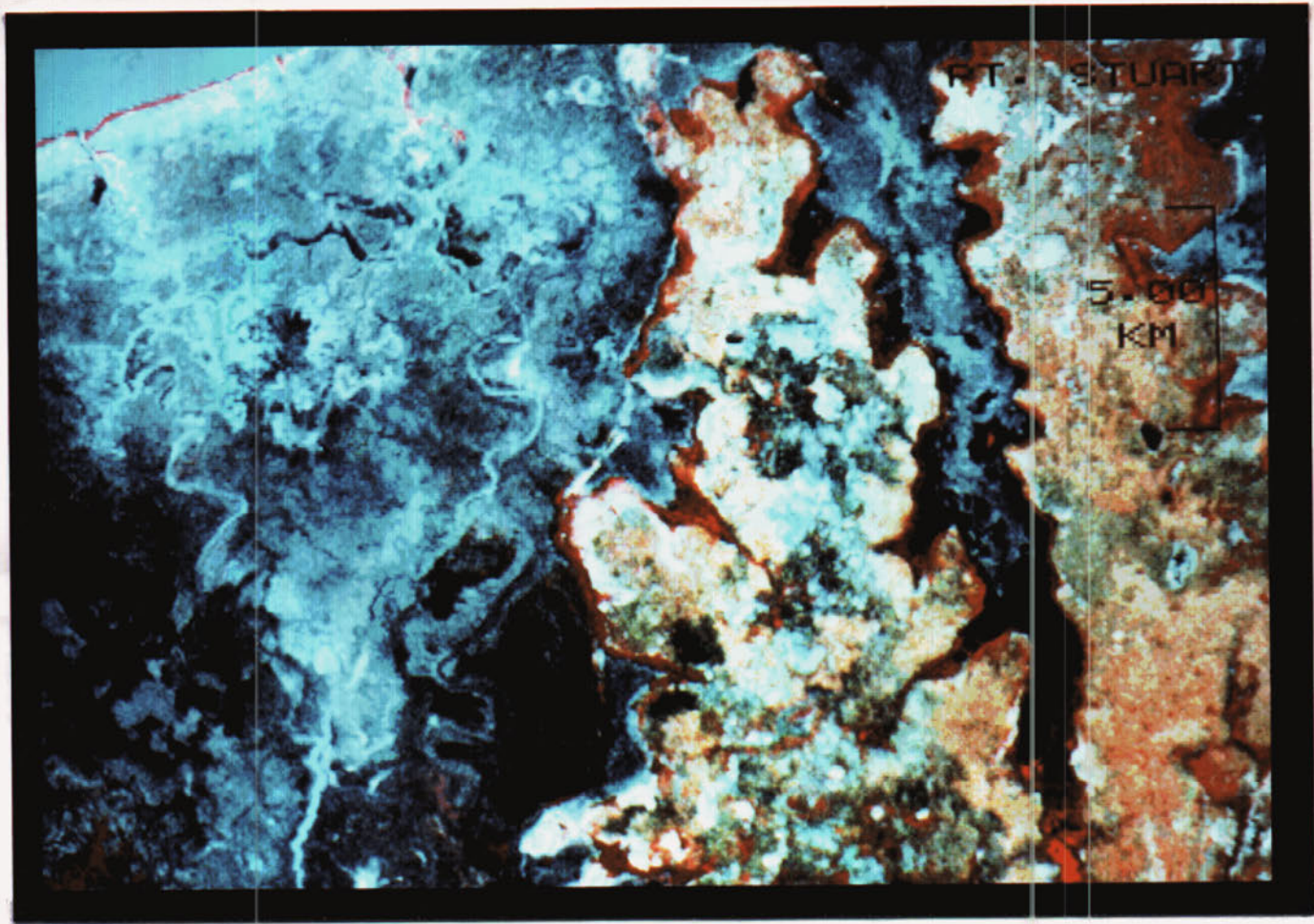


Fig. 3

#### 4. EXPLORATION ACTIVITIES

Exploration activities during the current tenure of E.L. 3059 included, the detailed examination of shellgrit deposits located in the eastern part of E.L. 3059, in the Point Stuart area, a programme of shallow trenching and collection of samples for analysis of CaO, MgO and other deleterious elements, and an evaluation of insitu shellgrit resources based on available data.

##### 4.1 Sampling and Analysis

A total of 16 samples were collected from the shell ridges located in the Point Stuart area representing five sub-parallel systems of dunes/shell ridges.

These samples were combined and riffled to produce five composite samples for analysis. Results of these analysis are given in Table 1.

The results suggest that the calcium oxide content varies from 28.71% to 41.03% and the  $Al_2O_3$ ,  $Fe_2O_3$ , MgO,  $Na_2O$ ,  $TiO_2$ ,  $Cl^-$  content increase with the dunes away from the coast, a feature related to silt content of the samples and associated shell deposits. The high content  $Cl^-$  related to the salt content of the sediments in the sample is considered one of the harmful elements associated with the shellgrit. Unless the  $Cl^-$  is removed in the beneficiation process the use of shellgrit for manufacture of lime will result in the formation of scales and corrosion in the kilns. Further beneficiation tests need to be carried out to remove the  $Cl^-$  from the shellgrit. Previous washing tests on similar type of material suggest that  $Al_2O_3$ ,  $Fe_2O_3$ ,  $SiO_2$  content of the samples are related to finer portions of the sample representing the silt and sand.

TABLE 1 ANALYTICAL RESULTS

	SA6	SA7	SA8	SA9	SA10
SiO <sub>2</sub>	22.59	26.89	23.30	26.81	25.59
Al <sub>2</sub> O <sub>3</sub>	0.23	2.14	2.28	5.89	6.80
Fe <sub>2</sub> O <sub>3</sub>	0.43	1.17	1.38	2.84	3.17
CaO	41.03	33.45	35.93	28.71	28.89
MgO	0.19	0.52	0.42	0.97	1.40
Na <sub>2</sub> O	0.03	0.65	0.84	1.15	0.90
K <sub>2</sub> O	0.01	0.81	0.19	0.51	0.65
SO <sub>3</sub>	0.18	0.20	0.26	0.21	0.25
TiO <sub>2</sub>	0.04	0.15	0.16	0.35	0.39
P <sub>2</sub> O <sub>5</sub>	0.09	0.19	0.18	0.19	0.09
Cl <sup>-</sup>	0.04	0.50	0.53	1.14	0.75
Loss	34.62	34.32	34.98	31.85	31.63

#### 4.2 Evaluation of Shellgrit Resources

Preliminary evaluation of insitu resources of shellgrit deposits of Sampan Creek and Point Stuart areas was undertaken based on the results of sampling programme and preliminary screen tests undertaken by Agip and the previous drilling investigations completed by Northern Cement Ltd.

The shellgrit deposits as referred earlier vary in their lime content, thickness and associated silt content considerably from one another. Preliminary screening and washing tests suggest that the landward dunes in the Sampan Creek area contain more silts and finer lime sand of nearly 70% of the total material, only 30% of the deposits contain coarser fragments of shell. The coastal dunes (seaward dunes) however contain nearly 40-45% coarser fragments. These data suggest that the economically recoverable deposits represent only 30% and 40% of the landward and coastal shellgrit dunes.

The resource estimates were calculated for the coastal dune in Sampan Creek and the coastal and landward dunes in Point Stuart area. The strike length of dunes examined vary from 0.9km to 6.25km and the width vary up to 195m. The deposits vary in thickness from 0.6m to 2.44m, averaging 0.91m.

The following table gives the detail of insitu resources and possible extractable resources of shellgrit and CaO. A tonnage factor of 2.65 was used in the calculation. (Ref. Table 2).

Table 2.

INSITU RESOURCES - SHELLGRIT DEPOSITS

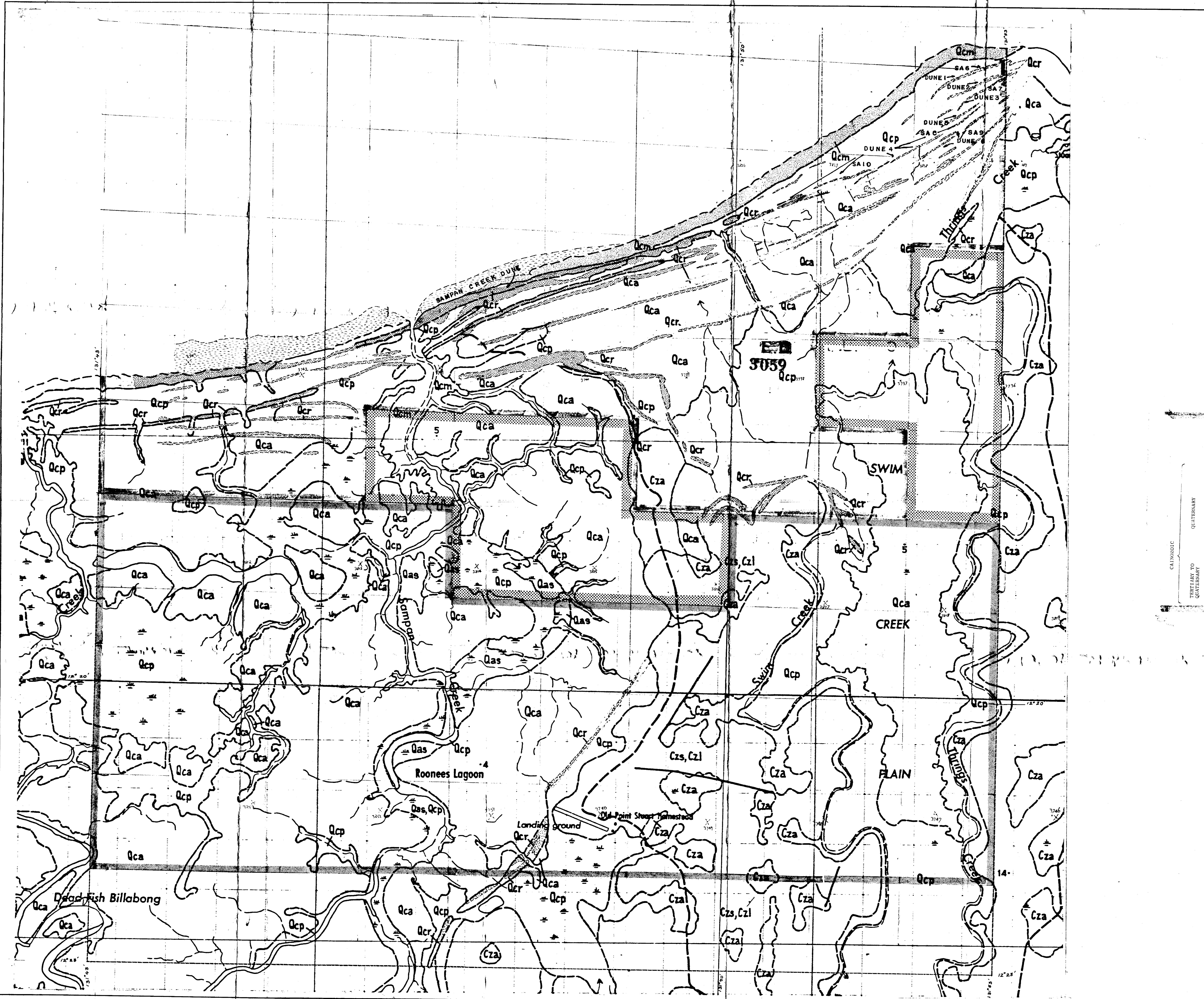
<u>AREA</u>	<u>TOTAL SHELLGRIT RESOURCES</u>		<u>EXTRACTABLE RESOURCES</u>		<u>AVERAGE % CaO</u>
	SHELLGRIT (tonnes)	CaO (tonnes)	SHELLGRIT (tonnes)	CaO (tonnes)	
SAMPAN CREEK	3,139,513	1,291,909	941,854	387,573	41.15%
<u>POINT STUART</u>					
DUNE 1	454,342	175,376	136,303	52,613	38.6%
DUNE 2	184,009	82,804	55,203	24,841	45%
DUNE 3	141,351	48,483	42,405	14,545	34.3%
DUNE 4	396,619	138,816	118,986	41,645	35%
DUNE 5	133,274	60,639	39,982	18,192	45.5%
DUNE 6	35,338	7,068	10,601	2,120	20%
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TOTAL	4,484,446	1,805,095	1,345,334	541,529	40.25%
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5. EXPENDITURE

Expenditure for the period 12th September, 1984 to 12th September, 1985 within E.L. 3059 amounts to \$23,311.91.

Labour	\$16,313.06
Purchases	422.41
Services	2,755.46
Other	<u>3,820.98</u>
	<u>\$23,311.91</u>





- LEGEND**
- Qcm Mud silt; intertidal mangrove swamp.
  - Qca Silt, mud; coastal alluvium
  - Qcp Clay, silt, mud; coastal mud pans.
  - Qcr Sand, shelly sand coquina; coastal sand ridges
  - Shellgrit associated with tidal flats and mangroves.
  - Shellgrit associated with present day coast line.
  - Shelly ridges/sand dunes - related to recent and old strand lines.
  - Qas Silt, clay; abandoned channel deposits.
  - Cza Winnowed sand, silt, clay; partially stripped Czs
  - Czs Unconsolidated sand, ferruginous and clayey sand
  - Czl Nodular and concretionary laterite

- Area relinquished
- 1983
  - 1984

NORTHERN TERRITORY  
GEOLOGICAL SURVEY  
**CR 85 / 250 A**

**Agip Australia Pty. Ltd.**  
GEOLOGICAL MAP  
E.L. 3059 (Point Stuart)

SCALE: 1:25000  
DATE: OCTOBER, 1983/85  
DRAWN BY: [unintelligible]  
REVISION NO. 3059-4