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SANTOS LTD.  
AND  
HELLYER MINING AND EXPLORATION PTY. LTD.  
MINERAL PROJECTS  
NORTH EAST TASMANIA

RL 2715

<b>MINES</b>	
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17 AUG 1987	
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Refers to	
Letter dated	
14.8.87.	
Resubmit to	Date

AMG REFERENCE POINTS ADDED

40°45'

147°00'

148°00'

896002

40°45'

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Is.

**E.L.42/80 (HELLYER CONTINGENT INTEREST)**

house Pt.

Tomahawk Pt.  
ANG  
563010E  
5476050N

Tomahawk Pt.  
Tomahawk Is.

**E.L.A.17/82 (SANTOS)**

**E.L.19/77 (HELLYER)**

**C.M.L.42M/76 (HELLYER)**

**FLY-BY-NIGHT M.L.'s (HELLYER)**

**GLADSTONE M.L.'s (SANTOS)**

41°00'

41°00'

Tomahawk  
Mt. Horror  
ster

Laurentinna  
BRISBIS  
DERBY  
FRANKHOLM  
BRAYS HILL

BRAYS DAM  
Mt. Paris Dam

Winningshan  
Moonigan  
Front Street  
Wedgeborough

Wedgeborough  
Latta

Herrick  
Pioneer Dam  
PIONEER

Wedgeborough  
Latta

ENDURANCE  
Mt. Cameron  
550

Wedgeborough  
Latta

GLADSTONE  
Mt. Cameron  
550

Wedgeborough  
Latta

**E.L.9/76 (HELLYER)**

147°00'

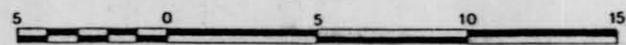
148°00'

AMG REFERENCE POINTS ADDED

**SANTOS LTD. & HELLYER  
NORTH EAST TASMANIA  
MINERAL PROJECTS**



SCALE



KILOMETRES

5 cm

002

1. GREAT NORTHERN PLAIN ALLUVIAL TIN PROJECT (ONSHORE)

TENEMENTS: Great Northern Plain E.L. 19/77 - *no longer in existence. now part of 17/82*  
 Ringarooma River E.L. 17/82  
 MacGregors C.M.L. 42M/76

TENURE AND INTEREST:

	<u>Area</u>	<u>Licence Holder</u>	<u>Tenure</u>	<u>Interest</u>
E.L. 19/77	115sq. km	Hellyer	Renewed to 11.4.83	90% of metallic minerals
E.L.A. 17/82	20.8sq. km	SANTOS	Grant of title imminent	100%
C.M.L. 42M/76	153ha.	Hellyer	Lease expires 1997	90% of metallic minerals

GEOLOGICAL SUMMARY AND  
EXPLORATION TO DATE:

Hellyer's interests in E.L. 19/77 and C.M.L. 42M/76 were acquired in 1981 to search for Tertiary and Quaternary alluvial tin mineralization in the Ringarooma River valley, downstream from areas previously worked by the Dorset Dredge between 1964 and 1971.

In 1981 a total of 58 widely-spaced churn drill holes were completed on E.L. 19/77, outlining a potential resource of 33 million cubic metres of wash grading 200g/cu. metre (tin metal) and minor gold. Assessment of previous drilling and back-hoe sampling (by Hellyer) on C.M.L. 42M/76 indicated that a probable dredging reserve of 1.5 million cubic metres grading 109g/cu. metre (tin metal) is contained within proven in-situ reserves of 5.0 million cubic metres grading 83g/cu. metre (tin metal). Department of Mines drilling has outlined probable reserves of 6.16 million cu. metres grading 136g/cu. metre (tin metal) at the Braithwaites area on E.L.A. 17/82.

During 1982, churn drilling (97 holes) has continued, together with bulk sample drilling (8 holes), preliminary metallurgical and environmental studies and a preliminary economic assessment of the project. SANTOS tendered for and won the right to apply for an exploration licence over the Ringarooma River area late in 1981 and work was conducted in this area in the early part of the year under an Authority to Prospect, which is no longer valid.

Amount of gold in  
dredge to be won

$$\begin{aligned} & \text{Gold content of dredged reserves} \\ & = 40 \times 10^6 \times 2 \times 10^{-3} \text{ grams} \\ & = 80 \times 10^3 = \underline{80,000 \text{ grams Au}} \\ & = \$1.6 \times 10^6 \text{ at } \underline{\text{A\$20/gram}} \end{aligned}$$

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Current estimates of in-situ and dredgeable reserves are listed in the following table:

<u>IN-SITU</u>	<u>PROVEN</u>	<u>PROBABLE</u>	<u>POSSIBLE</u>	<u>TOTAL (OF (PREVIOUS CATEGORIES))</u>
Bowlers	-	21.28mm <sup>3</sup> @ 76.4g/m <sup>3</sup>	32.5mm <sup>3</sup> @ 79g/m <sup>3</sup>	53.8mm <sup>3</sup> @ 78g/m <sup>3</sup>
Braithwaites	-	6.16mm <sup>3</sup> @ 136g/m <sup>3</sup>	15.0mm <sup>3</sup> @ 88g/m <sup>3</sup>	21.2mm <sup>3</sup> @ 102g/m <sup>3</sup>
MacGregors	5.0mm <sup>3</sup> @ 83g/m <sup>3</sup>	-	-	5.0mm <sup>3</sup> @ 83g/m <sup>3</sup>
<b>TOTAL IN-SITU</b>	<b>5.0mm<sup>3</sup> @ 83g/m<sup>3</sup></b>	<b>27.44mm<sup>3</sup> @ 90g/m<sup>3</sup></b>	<b>47.5mm<sup>3</sup> @ 80g/m<sup>3</sup></b>	<b>80mm<sup>3</sup> @ 85g/m<sup>3</sup></b>

<u>DREDGEABLE</u>	<u>PROVEN</u>	<u>PROBABLE</u>	<u>POSSIBLE</u>	<u>POTENTIAL (INCLUDING PREVIOUS CATEGORIES)</u>
Bowlers	-	-	19.39mm <sup>3</sup> @ 99.1g/m <sup>3</sup>	40mm <sup>3</sup> @ 100g/m <sup>3</sup>
Braithwaites	-	-	-	15mm <sup>3</sup> @ 100g/m <sup>3</sup>
MacGregors	-	1.5mm <sup>3</sup> @ 109g/m <sup>3</sup>	-	1.5mm <sup>3</sup> @ 109g/m <sup>3</sup>
<b>TOTAL DREDGEABLE</b>	<b>-</b>	<b>1.5mm<sup>3</sup> @ 109g/m<sup>3</sup></b>	<b>19.39mm<sup>3</sup> @ 99g/m<sup>3</sup></b>	<b>56.5mm<sup>3</sup> @ 100g/m<sup>3</sup></b>

All volumes quoted in millions of cubic metres and grades in grams tin metal per cubic metre.

The dredgeable reserve figures are subject to greater uncertainty than the in-situ figures as they are more critically dependent upon the results of closely-spaced drilling, on the final choice of dredging plant and on suitable dredging paths being located between the main areas of mineralization (see plan in pocket).

Until possible dredging paths have been more accurately delineated, the potential dredgeable reserve figure used in cash flow studies has been limited to 40 million cu. metres grading 100g/m<sup>3</sup> tin metal.

Gold analyses indicate that a grade of approximately 2 mg per cubic metre is present throughout the mineralized area. Recovery of the gold is simple and would be economic to retrieve at gold prices above approximately \$50/ounce, as it is mined with and initially concentrated with the tin.

Traces of tantalum also occur but appear to be uneconomic to recover unless there is a significant price rise for tantalum oxide.

PRELIMINARY FEASIBILITY  
STUDIES:

Several dredging equipment options have been examined, including rehabilitation of the Dorset Dredge, the use of Newmann's or Elliott bucketwheel dredges, purchase/lease of several dredges currently based in S.E. Asia and rehabilitation of the H.C. Meyer bucket-ladder dredge (located at Port Adelaide).

At present, the most attractive option appears to involve lease of the Asia Stannum, which is a large suction-cutter dredge, either working alone or in conjunction with two Newmann's dredges working as overburden dredges.

Cash flow analyses on these two development options, assuming a minimum dredgeable resource of 40 million cu. metres of material grading 100 g per cu. metre (tin metal) have been run for various discount factor/commodity price/capital cost/inflation rate combinations. Results indicate that the use of overburden dredges is warranted and the results are summarised as follows:

- (i) A tin price of approximately \$13,000/tonne is required for the project to be viable. Using a discount factor of 15%, the project gives a R.O.R. of 32.9% (N.V.P. = \$2.255 million). The tin price has fluctuated between \$11,200/tonne and \$14,400/tonne in the past year.
- (ii) Write-off of previous exploration expenditure increases the R.O.R. to 35.0% while a 50% increase in capital costs reduces the R.O.R. to 21.0%.
- (iii) If operating costs were to inflate at 11% greater than increases in the tin price, the project becomes uneconomic (R.O.R. = 6.9%). However, historically, increases in the tin price appear to have kept pace with long term inflation in operating costs.

The viability of the project is clearly dependent upon the start-up date and hence the anticipated tin price (for example a tin price averaging \$15,000/tonne is conceivable in the medium term) and also the choice of dredging equipment, as other options will become available in the future.

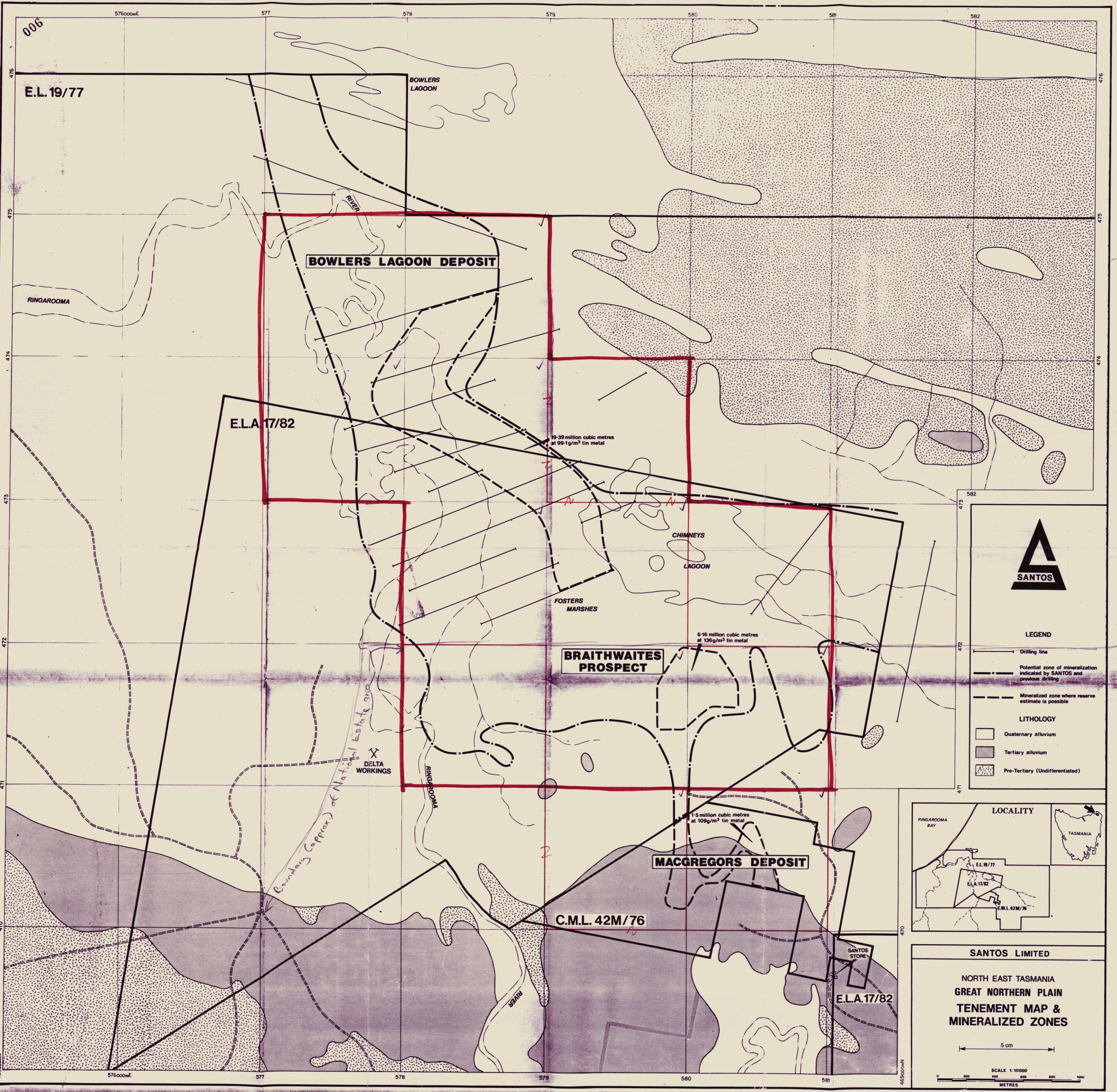
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1983 EXPLORATION:  
PROGRAMME:

Subject to tenement status and access availability, drilling will be resumed in the last quarter of 1982 in order to determine future drilling priorities. Depending on the results of the 1982 work and the general economic outlook for tin, further drilling designed to establish the limits and grade of the zones of higher grade mineralization, together with more detailed environmental, hydrological and economic studies will be conducted in the first half of 1983. The target grade required for viability at current tin prices is of the order of 100 g/cu. metre (tin metal).

EXPENDITURE:

Total expenditure to date on all three areas has been approximately \$438,000. The total budget allocation for 1983 has been set at \$100,000, which is expected to be apportioned approximately \$60,000 to E.L.A. 17/82, \$30,000 to E.L. 19/77 and \$10,000 to C.M.L. 42M/76.



006

E.L. 19/77

BOWLERS LAGOON

**BOWLERS LAGOON DEPOSIT**

RINGAROOMA

E.L.A. 17/82

19.39 million cubic metres at 99.1g/m<sup>3</sup> tin metal

CHIMNEYS LAGOON

FOSTERS MARSHES

**BRAITHWAITES PROSPECT**

6.16 million cubic metres at 136g/m<sup>3</sup> tin metal

DELTA WORKINGS

*Boundary (approx) of National Estate area*

RINGAROOMA

C.M.L. 42M/76

**MACGREGORS DEPOSIT**

1.5 million cubic metres at 109g/m<sup>3</sup> tin metal

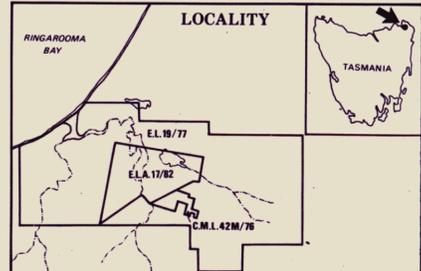
SANTOS STORE

E.L.A. 17/82



**LEGEND**

- Drilling line
  - - - Potential zone of mineralization indicated by SANTOS and previous drilling
  - - - Mineralized zone where reserve estimate is possible
- LITHOLOGY**
- Quaternary alluvium
  - ▨ Tertiary alluvium
  - ▩ Pre-Tertiary (Undifferentiated)



**SANTOS LIMITED**

**NORTH EAST TASMANIA  
GREAT NORTHERN PLAIN  
TENEMENT MAP &  
MINERALIZED ZONES**

5 cm



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