EXPLORATION LICENCE

T-2-MEL

RINGAROOMA BAY, TASMANIA

(Volume 1)

ANNUAL REPORT ON EXPLORATION MAY 1999 TO JUNE 2000

for
Mineral Holdings Australia Pty Ltd
2nd Floor,
135, Collins St .,
Melbourne Vic 3000

Compiled by

D. McP Duncan **&** **L. Rhodes**
McPherson Duncan & Associates **Consulting Metallurgist**
18, Old Summerleas Rd **PO Box 154**
Kingston Tas 7050 **St Marys Tas 7215**

TABLE OF CONTENTS

T2- MEL- Ringarooma Bay- Annual Report 2000- Volume 1

ABSTRACT

This report describes the work carried out on the evaluation of tin-bearing placers in this offshore licence (T2-MEL) which is an integral part of the Ringarooma Alluvial Project of Mineral Holdings Australia Pty Ltd. Previous exploration offshore in the 1960s has revealed an Inferred Resource of 130 Million cubic metres of potential tin wash most of which falls within the area of T2-MEL.

The bulk sampling program to further investigate the alluvials has not yet been carried out. Negotiations have taken place with various dredging companies- namely Van Oord, Westham and Marcon- to access suitable dredging technologies but for a variety of technical, weather-related, or equipment-availability reasons the program has not yet proceeded. The most promising technology-the Pneuma pump, a gravel pump which will lift sediment from water depths of up to 50m, is currently under disputed ownership by elements of the Marcon Company and not at present available to the project. It is hoped that this problem will soon be resolved.

Limited work has been carried out on the seabed sediment sampling program which includes samples from T2-MEL. Zircon re-analyses on 64 samples have been completed during the year and a composite sample of 57.6kg was made from the individual seabed sediment samples. Analysis of the heavy minerals showed the presence of rutile, cassiterite, spessartine, magnetite, ilmenite, picotite, pyrite, phosphate and two blue sapphire grains (+ 0.3mm). This is the first proof that the offshore alluvials are sapphire-bearing.

Mineral Holdings hopes to pursue the evaluation of the offshore placers in T2-MEL as an integral part of its tenement holding in NE Tasmania by bulk sampling the placers using suitable technology, including the Pneuma pump when available, with or without possible joint venture partners. In the past year, twenty six Australian and overseas companies have been approached as potential joint venturers and some of these have been sent information for evaluation. Success in sapphire exploration in the special licence 22/99 onshore by partners GTN Resources could increase the potential of the offshore tenements and attract more exploration funds to the area.

T2-MEL - Ringarooma Bay- Annual Report 2000- Volume 1

1.0 Introduction

An account of the offshore licence T2-MEL and its significance as an integral part of the Ringarooma Alluvial Project is given below.

This report (Volume 1) describes the limited work carried out on the actual area of T2-MEL and an accompanying report (Volume 2) recounts the exploration performed on the off-licence, up-palaeoslope catchments of the Ringarooma and Boobyalla Rivers particularly on the sapphire content of the alluvials which has a direct bearing on the potential composition of the offshore placers.

For various reasons as outlined below, the bulk sampling program on which the licence T2-MEL was granted has not yet taken place.

EL 19/93 was granted to Mineral Holdings Australia Pty Ltd on 28th April 1997 for a maximum of 5 years to 4th April 2002 over an area of 18sq km at Ringarooma Bay to cover the extension into State Waters of the tin-bearing palaeochannel of the Ringarooma River.

Subsequently, two adjacent ELs were applied for to secure additional areas-landwards and seawards- of potential for alluvial tin. T2-MEL was applied for on 19th May 1997 covering some 48 sq km in Commonwealth Waters under the Offshore Minerals Act 1994 and was granted for four years from 30th March1998.

EL 20/97 was applied for on 20th May 1997 to secure the extentions of the palaeochannel both offshore around EL 19/93 and T2-MEL and onshore to connect up with the Retention Licences 8715 and 8723 at Fosters Marshes and to cover the Bowlers Lagoon area suspected of concealing a former branch of the Ringarooma River. On granting on 20th January 1998, EL 20/97 was amalgamated into EL 19/93 to give a combined area of 52 sq km expiring on 4th April 2002 (Plan 1).

Subsequently, EL 38/97 was granted on 6th March 1998 to the south of the RLs at Aberfoyle Hill to cover 4 sq km containing old alluvial tin workings to prospect for bentonite, tin and gemstones.

These licences held by Mineral Holdings Australia Pty Ltd consolidate the potential alluvial tin resources in the Ringarooma Bay region both onshore and offshore and allow exploration to proceed in a coherent manner with subsequent economies of scale.

2.0 Previous Exploration

The Ringarooma Tin Project of Mineral Holdings Australia Pty Ltd consists of the tin-bearing palaeochannel of the Ringarooma River in NE Tasmania. Previous exploration in the 1960s by Ocean Mining A.G. (Lampietti et al.,1968) as summarised by MacArthur (1995) has shown that the onshore and offshore components of the channel contain indicated resources of 109M cu m at 64g tin/ cu m and 16M cu m at 227g tin/

cu m respectively. In total offshore, there is an inferred resource of 130M cu m of potential tin wash (Plan 2).

Additional values of minerals in the wash offshore include rutile and zircon averaging 55 g/cu m and 110 g/cu m respectively. Ilmenite is expected to be at similar concentrations as zircon. Gold has been recovered in the past from the wash onshore by the Dorset Dredge at 3 mg/cu m while a composite sample from one onshore drill hole assayed 6 mg/ cu m. Monazite(rare earths), topaz and sapphire are present but remain unquantified.

Historically since the 1870s, the Ringarooma catchment has produced over 40,000 tonnes of tin from onshore alluvial mines at Aberfoyle, Pioneer, Endurance and Briseis and a number of smaller deposits.

The onshore resource is currently held by MHA under Retention Licences 8715 (6 sq km) and 8723 (7 sq km) and the offshore resource by the same company under Exploration Licences EL19/93 and T2-MEL. The extension of the palaeochannel and associated structures into Commonwealth Waters contains the bulk of the known tin resources.

While awaiting the availability of a suitable dredge to carry out a bulk sampling program since 1998, Mineral Holdings has investigated the seabed with abalone divers using 15 foot boats equipped with GPS for navigation. The results are fully described in the previous two annual reports (Duncan and Rhodes, 1998 and 1999) and will only be summarised here.

Grab sampling by abalone divers of active seabed sediments has outlined a 4sq km area of greater than 100g/t Sn (and up to 694g/t) centred on 147deg 52mins E and 40deg 50mins S and called the **"Palaeochannel Prospect".** The area outlined sits on the interpreted palaeochannel and also extends to the west into a region not previously considered prospective.

No additional figures can be added to the resource inventory until a drilling program has confirmed appropriate grades to basement. Because of the small grab sample size, these tin contents are indications only rather than contributing to resource figures.

The zone defined by the > 0.3 and < 1.2% Ti02 contour is now referred to as the **"Old Shoreline Prospect,"** lies inshore at about 15m water depth and has been extended by the recent sampling to 4km in strike length and 500m in width. The zone may be subject to reworking and concentrating in a bar parallel to shore with heavy minerals being added in the present sediment build up. The prospect has been drilled by 15 BHP-Utah holes in 1968 but only tin analyses were carried out with poor results (Volker, 1968).

The seabed sampling program has provided additional information on the sediments, structures, bedrock, vegetation and depth of the seabed.

3.0 Current Exploration

The overall distribution of sediment sample sites throughout the offshore areas is shown in Plan 3 where 8% (about 25) of the samples fall within T2-MEL and the remainder in EL 19/93. The bias against T2-MEL is because the tenement lies in deeper water (plus 30m) where the divers are working at the limit of their capability.

In detail, the sea bed sampling sites and their tin values in classes up to 200g/t Sn and their position with respect to the potential bulk sampling sites is represented on Plan 4 and their significance has been commented on in the last annual report. The work has given seabed information in the vicinity of the possible bulk sampling sites.

Re-analysis of the zircon values on the seabed sediments has been completed with samples 135-285 now presented correctly in Tables 25-29 in the Appendix. The interpretation is presented in last year's annual report (Duncan & Rhodes, 1999) along with the remainder of the modified zircon contents.

No sampling has taken place in the last twelve months. However a composite sample (no 1) of 57.6kg was made from the individual samples in the palaeochannel prospect and the results on the heavy minerals after analyses by IDL (see appendix) included rutile, cassiterite, spessartine (garnet), magnetite, ilmenite, picotite (spinel), pyrite and phosphate and significantly two blue sapphire grains (+0.3mm). This is the first positive proof that the offshore alluvials are sapphire-bearing which is to be expected from their derivation from the Ringarooma River catchment.

4.0 Delayed Bulk Sampling Program

While waiting for joint venture participation on the substantial drilling program necessary to raise the resources to the measured category before a decision can be taken on the feasibility of a development project, Mineral Holdings has planned a bulk sampling program in Ringarooma Bay within licences T2-MEL and EL 19/93.

The details and rational behind this program are given in the accompanying report and the main targets are listed in Table 1.

Since these licences were issued and even before, Mineral Holdings has been working on hiring dredgers with the appropriate technology and at optimum cost by monitoring their movements in Australian waters and responding to opportunities in their timetables. To date Mineral Holdings has not been successful in attracting vessels with suitable equipment, in a competitive marine industry, given the relatively small size of the program, the water depth and the exposed conditions in Ringarooma Bay.

Details of the companies approached and vessels considered are given below in historical sequence.

Van Oord ACZ

The licence was applied for on 19th May 1997 on the basis of the availability of the **Volvox Delta** operated by Van Oord ACZ, an experienced Dutch marine dredging

	Hole No	Tin Content(g/cu m)	Inters Depth (m)	Total Depth (m)	Water Depth (m)	Sediment Type	Location
			from sed surface	to bedrock			
CHANNEL	2	114	0.9	9.2	25.5	medium sand	147deg 53.21min E
AREA						with gravel	40deg 49.74min S
	42	129	2.12	4.8	28.8	med-coarse sand	147deg 51.86min E
						with pebbles	40deg 48.57min S
	48	197	1.06	3.8	34	no log	147deg 51.92min E
							40deg 47.20min S
	103	235	5.75	7.9	34	medium sand	147deg 51.89min E
						with silt	40deg 46.86min S
PLATEAU	36	137	2.7	7.3	34	fine sand	147deg 51.25min E
AREA						with pebbles	40deg 47.11min S
	71	111	1.21	6.7	35	coarse sand	147deg 50.00min E
							40deg 47.20min S
	79	186	3.32	7	33	coarse sand	147deg 52.19 min E
						with pebbles	40deg 47.57 min S
	89	321	4.27	10.3	35	fine-med sand	147deg 48.68 min E
						with gravel	40deg 46.61 min S

Table 1 --- BULK SAMPLING SITES---RINGAROOMA BAY

contractor with a base in Melbourne. This large capacity, Singapore-based suction hopper dredger of 12,000 tonnes (see specifications in Appendix) was then working in Geelong harbour, Victoria. Proposed bulk samples from Ringarooma Bay were envisaged to be in the 1-20 tonne range with provision for a few to be as large as 1000 tonnes and the heavy mineral fraction was to be extracted on the dredge with the residue being returned to the seabed. As it happened, the dredge sustained damage during the Geelong operation and had to depart for essential repairs.

The **Jan Steen** was the replacement vessel on the above project and about February 1998 was offered to Mineral Holdings after the completion of the Geelong contract. She was a shallow-drafted multi purpose construction vessel of 3,000 tonnes then fitted out for investigations in the Timor sea (specifications in Appendix). Although configured for grab dredging, the vessel was to have an air lift device based on a 0.3m diameter pipe for the Ringarooma Bay sampling. Each bulk sample was proposed in the range 10-50 cubic metres. This vessel was not used as interest swung to a rival company which had a dredge already operating in Tasmanian waters.

WestHam Dredging Company

This company based in Sydney is also an experienced Dutch dredging company and was found to have equipment operating in Devonport harbour. The available vessels (see Appendix) were a self elevating drilling platform **(Sirius)**, a self propelled split hopper barge **(Adventure)**, a heavy duty grab dredger **(Goomai)** and a light support tug. After inspection and considering the operational modes and capabilities of the various vessels, it appeared that the self propelled hopper barge fitted with an airlift device or a light grab with a crane would most closely approach our bulk sampling requirements. These were eventually discounted due to various technical difficulties, the crane because of anticipated structural weakness in the maximum swell conditions liable to be encountered in Bass Strait. A submerged gravel pump operating on the sea bed from the hopper barge was then considered but none with sufficient depth capacity could be sourced in Australia.

In June 1999, the above company offered the **Pelican**, which had arrived in Port Melbourne on a Government project, to Mineral Holdings following that contract. The vessel is a trailer hopper suction dredger with a hopper capacity of 1000 cu m and a maximum dredging depth of 20m (see specifications in Appendix). The proposal was to extend the dredging arm to reach the maximum 35-40m required by the target depth and/or provide for an air lift device. After design studies and modification estimates by WestHam, the proposed budget reached $250,000 and there was still no guarantee that the coarser sands and gravels would be raised. In considering this cost with the high risk of not acquiring suitable samples, it was decided not to proceed.

Marcon Dredging Company

They were next on the scene about December 1999 with the Italian-designed **Pneuma** pump dredging system -the first gravel pump in Australia that will work in water depths of greater than 20m (details in Appendix). Mineral Holdings signed a contract with the company about mid February 2000 to undertake the bulk sampling project. The proposal was to mobilise from Bell Bay with the pump mounted on an 80 foot

barge towed by a seagoing tug **(Carrington)**. Provision was made to sample up to eight sites taking 5cu m (8tonnes) at each site with the samples being accumulated and dewatered in a hopper and then deposited into 1tonne bulker bags for transport and storage.

However, about the beginning of March the project was deferred due to the decision of a major company not to take up equity in the venture. This decision meant considerable financial pain to Mineral Holdings as the penalty and demobilisation costs reached $11,500.

By May 2000, the project was then back on track with Mineral Holdings committing to the venture from its own resources and paying another round of mobilising funds to Marcon. Work was carried out on alterations to the barge which was inspected along with the pump on the 25th of that month at Bell Bay with John Pemberton of Mineral Resources Tasmania. Divers and ship to shore transfers were arranged ex Bridport and extra geologists were on standby for two days notice of sailing and deployment.

For the next five months and despite Mineral Holdings remaining on two days notice to proceed, frustrating delays were experienced with no suitable breaks in the winter weather patterns, the periodic non availability of the Port of Launceston tug and barge due to other duties and servicing and, we now understand, serious financial and structural problems within the Marcon Company.

Mineral Holdings has now been forced to suspend plans for bulk sampling with Marcon pending the resolution of the problems and is now considering alternative methods of sampling. A study is currently underway into sampling seabed sediments using a fishing trawler based out of Bridport to collect samples up to 1 cu m in volume. Alternative sampling devices are under evaluation at present to decide the best method of proceeding relative to the kind of information required to assess the offshore alluvials particularly their tin and sapphire contents.

The economic parameters of the MacArthur report (1995) on the feasibility of the Ringarooma Bay and Great Northern Plains alluvials are currently being upgraded in the light of the more recent metal prices and of possible sapphire grades arrived at from the recent exploration of the Ringarooma catchment.

5.0 Joint Venture Negotiations

Attempts are continuing to attract a joint venture partner for the further evaluation of the placers both offshore in Ringarooma Bay in T2-MEL and EL 19/93 and onshore on the Great Northern Plains in RLs 8715 and 8723 and EL 38/97 and also the smaller licences covering Pioneer, Endurance and Monarch.

The marine tenements with their greater risks and potentially greater rewards will favour large companies often with their own survey and mining vessels and are a great challenge to promote. The land-based licences are obviously suited to smaller, more innovative, companies who are prepared to consider small operations which, when they demonstrate viability, can be expanded as required within market constraints.

Within the last twelve months, the following companies have been given on site visits- Rio Tinto, Murchison Minerals, Cobra Resource and GTN Resources. This resulted in a joint venture with GTN Resources covering sapphires in a special exploration licence 22/99 covering 3600 sq km in NE Tasmania.

Contact has been made with the following companies some of whom have been sent information to evaluate on the various tenements- Billiton, Ashton, Lyons Selection Group, Iluka (Westralian Sands), Bemax, Van Oord, Monto Minerals, Marlborough, Centrex, Trans-Hex International (Canada), Ind Minerals, Kenmare, De Beers, Anglo Australian Resources, Auridium, Nimbus, Australian Bulk Minerals, Du Pont (USA), Kerr-McGee (USA), Nautilus Minerals Corporation, Kronos(Norway) and Namco (South Africa).

6.0 Future Program

Mineral Holdings intends to pursue the evaluation of the offshore placers in T2-MEL as an integral part of the larger tenement holding in NE Tasmania by the following options-

- seabed sampling by fishing trawler with composite samples up to 1cu m in volume,
- seabed sampling with the Pneuma pump from a barge or other suitable vessel generating bulk samples of up to 5cu m, and
- attracting large companies with the resources and technology to embark on the full scale testing of the alluvials with an ocean drilling and geophysical survey program.

The main targets in the placers are cassiterite and sapphires with minor credits of ilmenite, rutile, zircon, topaz and gold. Recent trends in the sapphire industry mean that the smaller stones in the 2-3mm size are becoming fashionable in jewellery and are now being pursued. Success in sapphire exploration in the special licence 22/99 onshore in the next twelve months will increase the potential of the other Mineral Holdings' tenements both onshore and offshore and attract more exploration funds to the region.

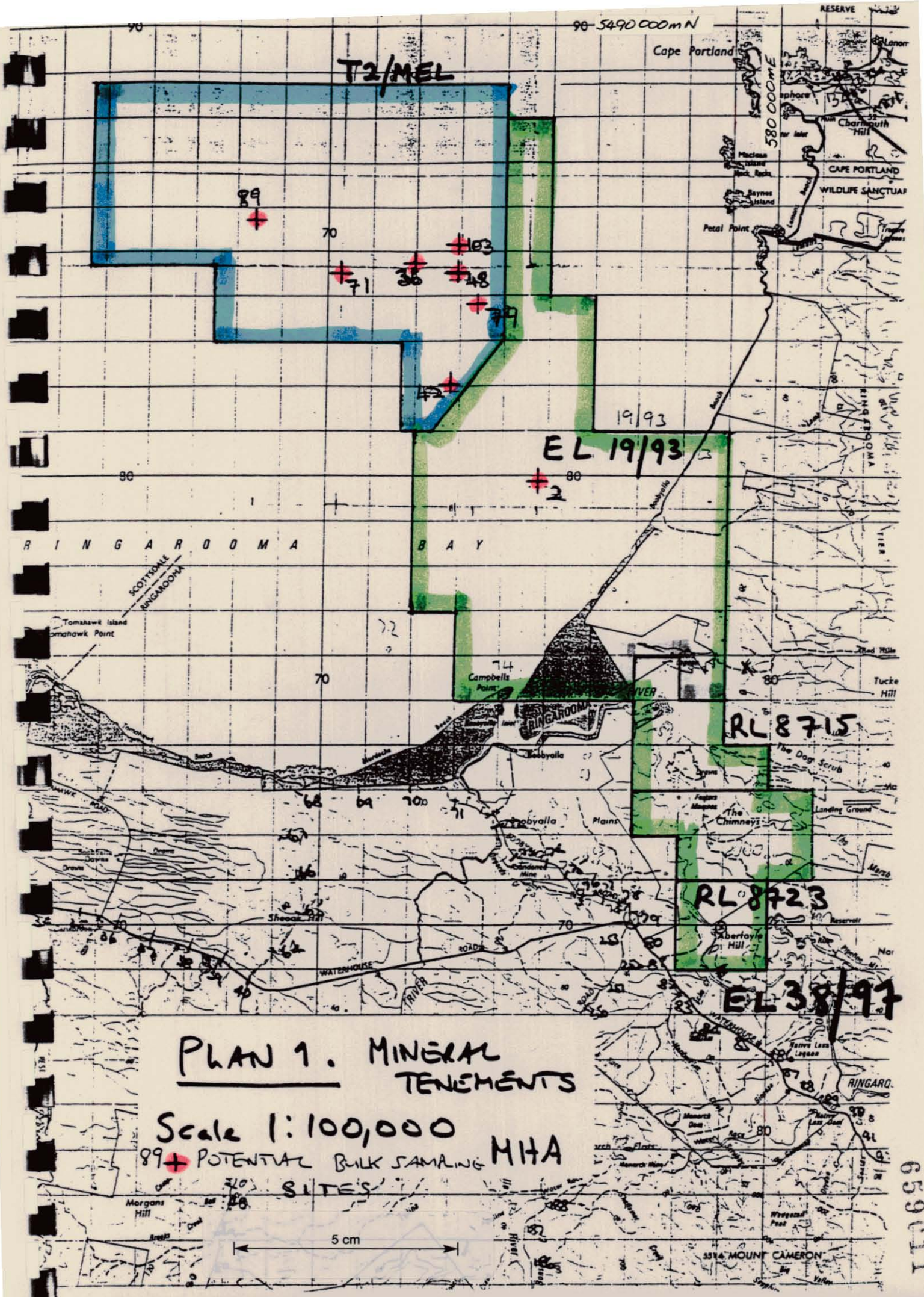
REFERENCES

Duncan, D. McP. and Rhodes, L.1998. EL 19/93- Ringarooma Bay;1999. EL 19/93 and T2-MEL- Ringarooma Bay. Annual Reports for Mineral Holdings Australia Ltd.

Lampietti, F.J., Davies, W. and Young, D.J. 1968. Prospecting for Tin off Tasmania. Mining Magazine- September 1968, Vol. 119, No. 3.

MacArthur, N.A. 1995. Pre-feasibility Review, Ringarooma Alluvial Tin Project. Report to Mineral Holdings Australia Pty Ltd.

Volker, J. 1968. report on Off-Shore Drilling- Tasmania, EL 2/65. Utah Development Co. & Broken Hill Pty Co Ltd. TCR 68-514.

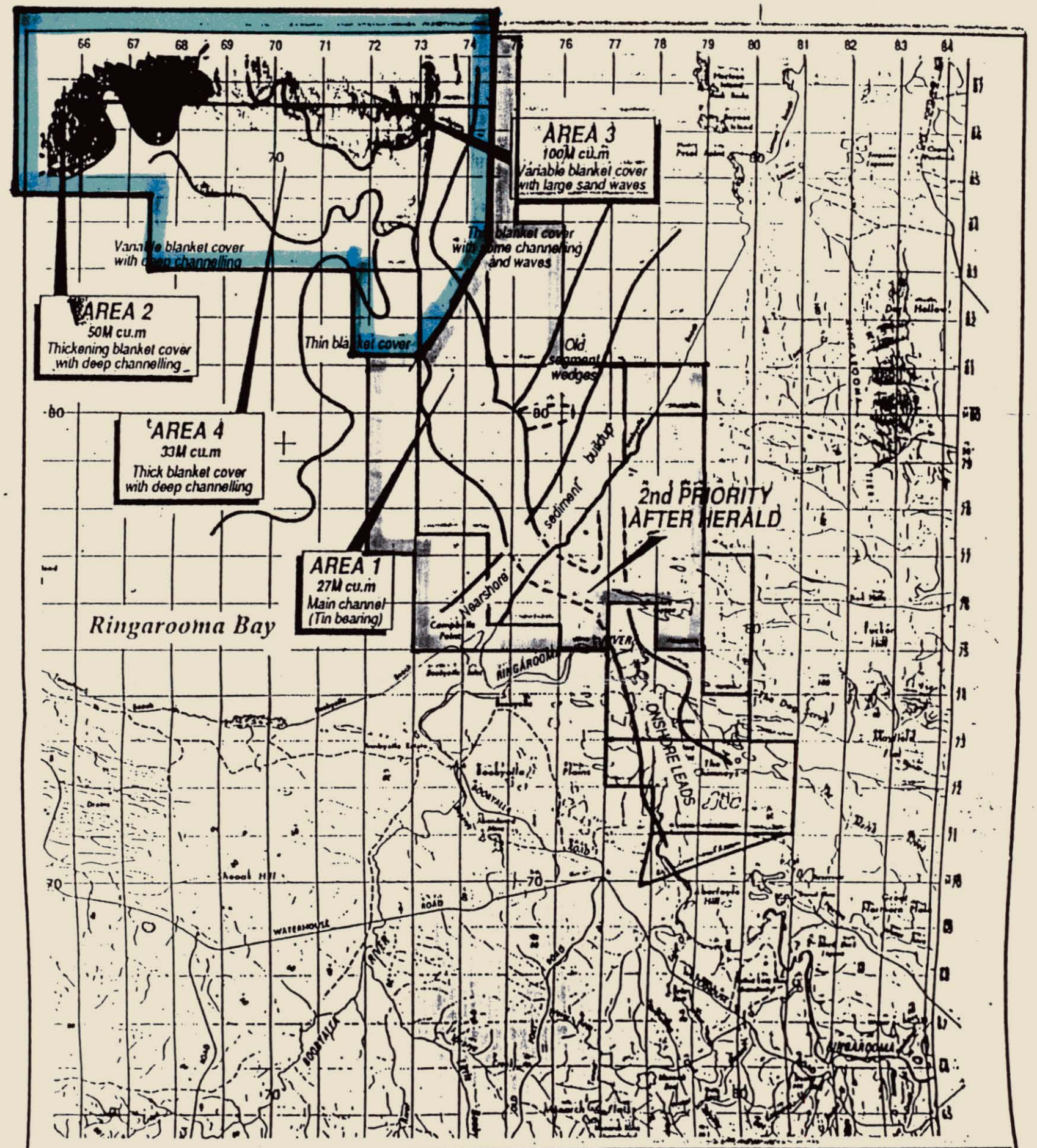


PLAN 1. MINERAL TENEMENTS

Scale 1:100,000

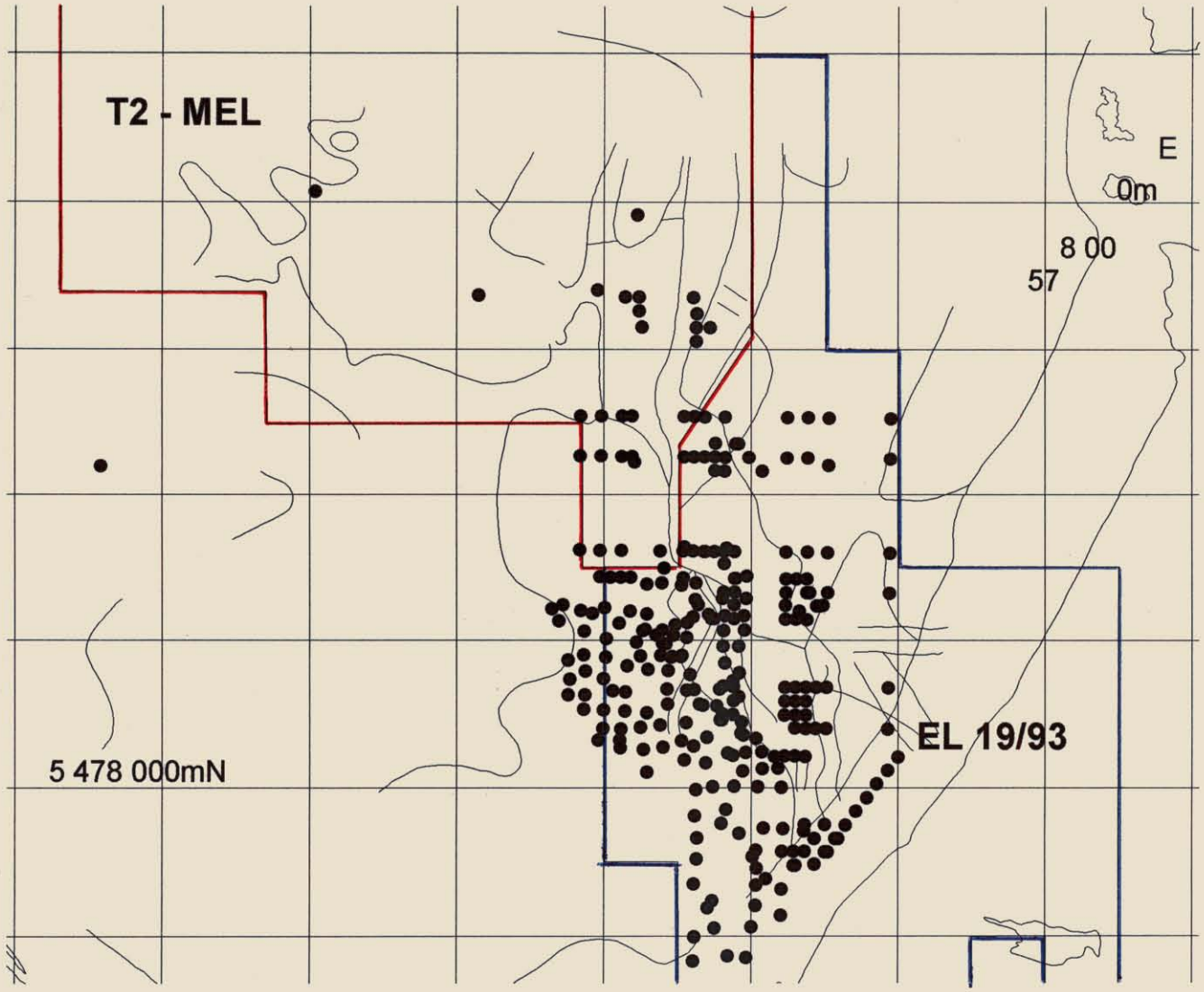
89 + POTENTIAL BULK SAMPLING MHA SITES

659611


AREA 3
100M cu.m
Variable blanket cover
with large sand waves
Variable blanket cover
with deep channelling
Thin blanket cover
with some channelling
and waves
AREA 2
50M cu.m
Thickening blanket cover
with deep channelling
Thin blanket cover
Old
segment
wedges
AREA 4
33M cu.m
Thick blanket cover
with deep channelling
2nd PRIORITY
AFTER HERALD
sediment
buildup
AREA 1
27M cu.m
Main channel
(Tin bearing)
Nearshore
Ringarooma Bay
RINGAROOMA
ONSHORE LEADS
WATERHOUSE
ROAD
Scale 1:100,000
EL 19/93
PLAN 2
T2-MEL
0 1 2 3 4 5
KILOMETRES
TASMANIA
THE RINGAROOMA ALLUVIAL TIN PROPERTY
OFFSHORE TARGET ZONES
Figure 2
Compiled by: N.MacArthur
Drawn by: Roz Davies
Date: July, 1994
5 cm

659013

RINGAROOMA BAY TIN PROJECT



MINERAL HOLDINGS AUSTRALIA PTY LTD

4 0 4 8 Kilometers

5 cm

Seabed Sediment Sample Localities

- Newdata.shp
- Bound.shp
- Amg.shp

N

PLAN 3

Seabed Sediments
Sample localities &
Coded Tin Values
PLAN 4

PLATEAU

5 cm

TIN LEGEND

- < 50 g/t Sn
- ≥ 50 < 100 g/t Sn
- ≥ 100 < 200 g/t Sn
- Bulk Sample Site (Proposed)

PLAN 4

Scale 1:25,000

147°49' 147°50' 147°51' 147°52' 147°53' 147°54'

40°47' 40°48' 40°49'

#89 #71 #36 #48 #103 #79 #42

361 325 326 357 355 360 324 333

T2 MEL

EL 19/93

LEGEND AS FOR PLAN 3

OUTLINE OF PALAEOCHANNEL

SMAHAWK

659014

APPENDIX

Zircon Re-analyses, Tables 25-29 (and original assay sheets from TEMCO)

Composite Samples 1 and 2 from Ringarooma Bay - heavy mineral counts and analyses by Independent Diamond Laboratories Pty Ltd

Dredging Companies and Vessels

Van Oord ACZ

WestHam Dredging Company Pty Ltd

Marcon Dredging Pty Ltd- Pneuma System

Table 25

Location of samples

Sample No.	Latitude	Longitude	Depth (m)
135	40.49.180S	147.52.620E	31.9
136	40.49.348S	147.52.614E	27.8
137	40.49.348S	147.52.384E	28.6
138	40.49.200S	147.52.387E	28.7
139	40.49.093S	147.52.395E	28.6
140	40.48.980S	147.52.421E	29.0
141	40.49.000S	147.52.214E	28.4
143	40.48.970S	147.52.011E	27.5
144	40.49.004S	147.51.778E	28.4

To read latitude and longitude the reading 40.51.045S means 40 degrees 51 minutes and .045 of a minute.

Table 26

Samples screened on 5mm screen and -5mm fraction assayed

Sample No.	Total mass of sample g	% -5mm	Core depth m	Core Recovery %	Assays of -5mm fraction Sn g/t	TiO2%	ZrO2%
135	743.4	67.3			60	0.05	0.16 *
135-1	721.3	96.1	0.27	38.7	70	0.08	0.015
136	620.2	94.6			30	0.15	0.16 *
136-1	804.1	99.1	0.30	43.1	80	0.11	0.029
137	406.0	99.7			30	0.07	0.16 *
137-1	989.5	91.2	0.37	53.0	90	0.08	0.011
138	615.7	99.9			80	0.04	0.17 *
138-1	909.7	87.2	0.34	48.8	40	0.07	0.015
139	615.7	99.9			< 30	0.10	0.18 *
139-1	1052.5	98.9	0.39	56.4	< 30	0.09	0.015
140	481.3	97.9			< 30	0.07	0.17 *
140-1	932.8	96.9	0.35	50.0	50	0.07	0.010
141	410.5	99.5			< 30	0.04	0.14 *
141-1	1440.0	98.0	0.54	77.2	< 30	0.07	0.011
143	456.6	99.3			< 30	0.07	0.17 *
143-1	1076.0	98.6	0.40	57.7	< 30	0.07	0.011
144	457.2	97.8			< 30	0.04	0.14 *
144-1	992.9	97.6	0.37	53.2	< 30	0.05	0.015

Samples were taken with a 375g peanut butter glass jar. A full jar of sample gave a mass of sample over 400g. Where sample masses are down around 250g or so, there were a lot of coarse pebbles present about the size of the opening of the jar and it was difficult to get a larger sample.

The sample numbers with a subscript -1 were taken with the bait pump.

* Indicates original inaccurate ZrO2 assays.

Table 27
Calculated head assays

Sample No.	Calculated Head Assays Sn g/t	TiO2%	ZrO2%
135	40	0.03	0.11 *
135-1	67	0.08	0.014
136	28	0.14	0.15 *
136-1	79	0.11	0.029
137	30	0.07	0.16 *
137-1	82	0.07	0.010
138	61	0.03	0.13 *
138-1	35	0.06	0.013
139	< 30	0.10	0.18 *
139-1	< 30	0.09	0.015
140	< 29	0.07	0.17 *
140-1	48	0.07	0.010
141	< 30	0.04	0.14 *
141-1	< 29	0.07	0.011
143	< 30	0.07	0.17 *
143-1	< 30	0.07	0.011
144	< 29	0.04	0.14 *
144-1	< 29	0.05	0.015

* Indicates calculated ZrO2 assays based on original inaccurate ZrO2 assays on -5mm fractions.

Sample numbers with the subscript -1 were taken with the bait pump.

Table 28

Location of samples

Sample No.	Latitude	Longitude	Depth (m)	Bottom
228	40.48.00S	147.51.00E	30.0	Rippled sand
229	40.48.00S	147.51.20E	30.0	"
230	40.48.00S	147.51.40E	29.0	"
231	40.48.00S	147.51.50E	29.0	"
232	40.48.00S	147.52.00E	28.0	"
233	40.48.00S	147.52.10E	28.0	"
234	40.48.00S	147.52.20E	27.0	"
235	40.48.00S	147.53.00E	27.0	"
236	40.48.00S	147.53.20E	25.0	"
237	40.48.00S	147.53.40E	25.0	"
238	40.48.00S	147.54.00E	24.0	"
239	40.48.30S	147.51.00E	26.0	"
240	40.48.30S	147.51.20E	28.0	"
241	40.48.30S	147.51.40E	28.0	"
242	40.48.30S	147.51.50E	27.0	"
243	40.48.30S	147.52.00E	27.0	"
244	40.48.30S	147.52.10E	27.0	"
245	40.48.30S	147.52.20E	28.0	"
246	40.48.30S	147.52.30E	28.0	"
247	40.48.30S	147.52.40E	30.0	"
248	40.48.30S	147.53.00E	31.0	Clay
249	40.48.30S	147.53.20E	31.0	"
250	40.48.30S	147.53.40E	30.0	"
251	40.48.30S	147.54.00E	29.0	"
252	40.49.00S	147.51.00E	26.0	Weed,small
253	40.49.00S	147.51.20E	28.0	rocks
254	40.49.00S	147.51.40E	27.0	Rippled sand
255	40.49.00S	147.52.00E	27.0	"
256	40.49.00S	147.52.10E	27.0	"
257	40.49.00S	147.52.20E	29.0	"
258	40.49.00S	147.52.30E	30.0	"
259	40.49.00S	147.52.40E	28.0	"
260	40.49.00S	147.52.50E	28.0	"
261	40.49.00S	147.53.00E	27.0	"
262	40.49.00S	147.53.20E	28.0	"
263	40.49.00S	147.53.40E	29.0	"
264	40.49.00S	147.54.00E	22.0	Rocky
265	40.49.30S	147.52.40E	27.0	Sand then rocky
266	40.49.30S	147.52.50E	27.0	"
267	40.49.30S	147.53.00E	26.0	"
268	40.49.30S	147.53.20E	26.0	Pebbles
269	40.49.30S	147.53.40E	23.0	"
270	40.49.30S	147.54.00E	16.0	Sand with grass
271	40.50.00S	147.52.40E	21.0	"
272	40.50.00S	147.52.50E	23.0	"
273	40.50.00S	147.53.00E	21.0	"
274	40.50.00S	147.53.10E	23.0	"
275	40.50.00S	147.53.20E	23.0	"

659020

Sample No.	Latitude	Longitude	Depth (m)	Bottom
276	40.50.00S	147.53.30E	20.0	Sand with grass
277	40.50.00S	147.53.40E	19.0	"
278	40.50.00S	147.54.00E	14.0	"
280	40.50.30S	147.53.10E	?	"
281	40.50.30S	147.53.20E	22.0	"
282	40.50.30S	147.53.30E	18.0	"
283	40.50.30S	147.53.40E	16.0	"
284	40.50.30S	147.54.00E	12.0	"
285	40.48.00S	147.52.40E	28.0	Rippled sand

To read latitude and longitude the reading 40.50.30S means 40 degrees 50 minutes and .30 of a minute.

Table 29
Head assays

Sample No.	Assays Sn g/t	TiO2%	ZrO2%	
228	< 30	0.05	0.008	
229	30	0.14	0.010	
230	< 30	0.07	0.016	
231	< 30	0.08	0.012	
232	< 30	0.05	0.011	
233	< 30	0.07	0.015	
234	< 30	0.07	0.018	
235	< 30	0.05	0.006	
236	< 30	0.07	0.025	
237	< 30	0.05	0.021	
238	< 30	0.04	0.009	
239	< 30	0.09	0.017	
240	< 30	0.05	0.006	
241	< 30	0.05	0.005	
242	< 30	0.04	0.002	
243	< 30	0.05	0.008	
244	< 30	0.04	0.004	
245	< 30	0.06	0.008	
246	< 30	0.12	0.027	
247	150	0.10	0.18	*
248	< 30	0.04	0.004	
249	< 30	0.05	0.007	
250	< 30	0.05	0.011	
251	< 30	0.03	0.007	
252	< 30	0.06	0.13	*
253	< 30	0.07	0.015	
254	< 30	0.06	0.007	
255	30	0.10	0.009	
256	< 30	0.09	0.015	
257	50	0.07	0.014	
258	30	0.08	0.013	
259	< 30	0.07	0.015	
260	< 30	0.07	0.020	
261	30	0.23	0.012	
262	30	0.13	0.013	
263	90	0.10	0.017	
264	< 30	0.12	0.042	
265	100	0.05	0.007	
266	190	0.06	0.026	
267	120	0.07	0.010	
268	30	0.11	0.015	
269	< 30	0.02	0.003	
270	< 30	0.12	0.011	
271	120	0.12	0.016	
272	200	0.14	0.013	
273	< 30	0.08	0.009	
274	< 30	0.07	0.012	
275	< 30	0.11	0.012	

Sample No.	Sn g/t	TiO2%	ZrO2%
276	< 30	0.14	0.025
277	< 30	0.13	0.018
278	< 30	0.28	0.041
280	< 30	0.16	0.014
281	< 30	0.15	0.030
282	< 30	0.12	0.011
283	< 30	0.13	0.030
284	< 30	0.17	0.012
285	< 30	0.07	0.007

* Indicates original inaccurate ZrO2 assays.

659023

CHEMICAL LABORATORY : INPLANT ANALYSIS REPORT

DATE: 15.12.97

REFERENCE: Mineral Sands samples

TO: L. Rhodes

Q 252 = 0.009.

SAMPLE IDENT.	Sn(ppm)	TiO_2(%)	ZrO_2(%)	ZrO_2 %
135 (Q620)	60	0.05	0.16	—
135- (Q621)	70	0.08	0.17	0.015
136 (Q622)	30	0.15	0.16	—
136- (Q623)	80	0.11	0.17	0.029
137 (Q624)	30	0.07	0.16	—
137- (Q625)	90	0.08	0.14	0.011
138 (Q626)	80	0.04	0.17	—
138- (Q627)	40	0.07	0.17	0.015
139 (Q628)	<30	0.10	0.18	—
139- (Q629)	<30	0.09	0.17	0.015
140 (Q630)	<30	0.07	0.17	—
140- (Q631)	50	0.07	0.17	0.010
141 (Q632)	<30	0.04	0.14	—
141- (Q633)	<30	0.07	0.16	0.011
143 (Q634)	<30	0.07	0.17	—
143- (Q635)	<30	0.07	0.15	0.011
144 (Q636)	<30	0.04	0.14	—
144- (Q637)	<30	0.05	0.11	0.015

COMMENTS:

ANALYST: AH,KD,CF CHEMIST: R. Gelston

QA:DOC:12 REV.02 DATE:22.03.95 AUTHORISED BY: R.GELSTON

659024

CHEMICAL LABORATORY : INPLANT ANALYSIS REPORT

DATE: 23.02.98

REFERENCE: Mineral Sands samples

TO: L. Rhodes

SAMPLE IDENT.	Sn(ppm)	TiO_2(%)	ZrO_2(%)				ZrO_2	%		
228 Q 768 (28)	<30	0.05	0.17		G		0·008			
Q 769 (29)	30	0.14	0.17		G		0·010			
Q 770 (30)	<30	0.07	0.17		G		0·016			
Q 771 (31)	<30	0.08	0.15		G		0·012			
Q 772 (32)	<30	0.05	0.18		G		0·011			
Q 773 (33)	<30	0.07	0.19		G		0·015			
Q 774 (34)	<30	0.07	0.11		G		0·018			
Q 775 (35)	<30	0.05	0.11		G		0·006			
Q 776 (36)	<30	0.07	0.15		G		0·025			
Q 777 (37)	<30	0.05	0.10		G		0·021			
Q 778 (38)	<30	0.04	0.13		G		0·009			
Q 779 (39)	<30	0.09	0.17		G		0·017			
Q 780 (40)	<30	0.05	0.12		G		0·006			
Q 781 (41)	<30	0.05	0.12		G		0·005			
Q 782 (42)	<30	0.04	0.17		G		0·002			
Q 783 (43)	<30	0.05	0.15		G		0·008			
Q 784 (44)	<30	0.04	0.15		G		0·004			
Q 785 (45)	<30	0.06	0.15		G		0·008			
Q 786 (46)	<30	0.12	0.16		S		0·027			
Q 787 (47)	150	0.10	0.18							

247

COMMENTS:

ANALYST: AB,AH,KD,DG **CHEMIST:** R. Gelston.

QA:DOC:12 REV.02 DATE:22.03.95 AUTHORISED BY: R.GELSTON

659025

CHEMICAL LABORATORY : INPLANT ANALYSIS REPORT

DATE: 23.02.98

REFERENCE: Mineral Sands samples

TO: L. Rhodes

SAMPLE IDENT.	Sn(ppm)	TiO_2(%)	ZrO_2(%)					ZrO_2	%	
Q 788 (48) 248	<30	0.04	0.12		G			0·004		
Q 789 (49)	<30	0.05	0.15		G			0·007		
Q 790 (50)	<30	0.05	0.13		G			0·011		
Q 791 (51)	<30	0.03	0.13		G			0·007		
Q 792 (52)	<30	0.06	0.13		G					
Q 793 (53)	<30	0.07	0.16		G			0·015		
Q 794 (54)	<30	0.06	0.17		G			0·007		
Q 795 (55)	30	0.10	0.18		G			0·009		
Q 796 (56)	<30	0.09	0.18		G			0·015		
Q 797 (57)	50	0.07	0.16		G			0·014		
Q 798 (58)	30	0.08	0.16		G			0·013		
Q 799 (59)	<30	0.07	0.16		G			0·015		
Q 800 (60)	<30	0.07	0.15		G			0·020		
Q 801 (61)	30	0.23	0.16		G			0·012		
Q 802 (62)	30	0.13	0.16		G			0·013		
Q 803 (63)	90	0.10	0.17		G			0·017		
Q 804 (64)	<30	0.12	0.15		S			0·042		
Q 805 (65)	100	0.05	0.16		G			0·007		
Q 806 (66)	190	0.06	0.18		G			0·026		
Q 807 (67) 267	120	0.07	0.17		S			0·010		

COMMENTS:

ANALYST: AB,AH,KD,DG **CHEMIST:** R. Gelston

QA:DOC:12 REV.02 DATE:22.03.95 AUTHORISED BY: R.GELSTON

659026

CHEMICAL LABORATORY : INPLANT ANALYSIS REPORT

DATE: 21.02.98

REFERENCE: Mineral Sands samples Kilgas Room A 12H

TO: L. Rhodes

SAMPLE IDENT.	Sn(ppm)	TiO_2(%)	ZrO_2(%)					ZrO_2	%	
Q 808 (68) 268	30	0.11	0.15		—	C		0·015		
Q 809 (69)	<30	0.02	0.13		—	G		0·003		
Q 810 (70)	<30	0.12	0.13		- -	S		0·011		
Q 811 (71)	120	0.12	0.16		—	G		0·016		
Q 812 (72)	200	0.14	0.16	0·30	—	G		0·013		
Q 813 (73)	<30	0.08	0.16		—	G		0·009		
Q 814 (74)	<30	0.07	0.16		- -	G		0·012		
Q 815 (75)	<30	0.11	0.13		—	G		0·012		
Q 816 (76)	<30	0.14	0.16	0·30	—	S		0·025		
Q 817 (77)	<30	0.13	0.14		—	S		0·018		
Q 818 (78)	<30	0.28	0.14	0·42	—	S		0·041		
Q 819 (79)	No Sample									
Q 820 (80)	<30	0.16	0.14	0·30	—	S		0·014		
Q 821 (81)	<30	0.15	0.13		- -	S		0·030		
Q 822 (82)	<30	0.12	0.14		- -	S		0·011		
Q 823 (83)	<30	0.13	0.12		—	S		0·030		
Q 824 (84)	<30	0.17	0.14	0·31	- -	S		0·012		
Q 825 (85) 285	<30	0.07	0.17		—	G		0·007		

COMMENTS:

ANALYST: AB,AH,KD,DG CHEMIST: AC Gelston

659027

DIAMOND INDICATOR DATA

Sample No: Composite 1

Job No: 287

Date Started: 29/4/99

Processing Weights

Initial:	57.6 kg
+2mm:	6.036 kg
After Tabling:	11.99 kg
After TBE:	61 g
+2mm:	13 g

Positive X

Negative

Positive (Other)

Ø/mm	>2	>1	>0.8	>0.5	>0.4	>0.3	<0.3
Crush							
Table		x	x	x	x	x	x
HL	x	x	x	x	x	x	
Mag		x	x	x	x	x	

Fractions Analysed(x),Observed only(o),Scanned only(s)

Ø/mm	>1	>0.8	>0.5	>0.4	>0.3	>0.2	>0.1
NM	x	x	x	x	x		
M4	x	x	x	x	x		
M3	x	x	x	x	x		

Kimberlite, Lamproite Indicators

Sieve Size/mm	>2	>1	>0.8	>0.5	>0.4	>0.3	>0.2	>0.1	Wear/km	Kimberlitic?
Diamond										
Chrome Diopside										
Chromite						1			<5	Poss.
Phlogopite										
Picroilmenite					1	4			3-8	See Below
Pyrope										
Diopside				1	1	5			0-5	Prob. Not

Detailed Descriptions

Mineral	Size/mm	Description
Chromite	1+0.3	Subhedral fragment, One slightly concave X'tal face, frosted to submetallic, Cokey fracture.
Picroilmenite A-Poss. Kimb.	1+0.4	Anhedral, Rounded, Pitted, Curved fracture, Brittle.
Picroilmenite B-Prob. Not Kimb.	4+0.3	Anhedral, Rounded, Pitted, Slight cleavage, Probably Mn ilmenite.
Diopside	1+0.4	Anhedral, Rounded to angular with saw tooth terminations, Ribbed , Pale green, Translucent, Cr bearing.
Topaz	1+2	White
Sapphire	2+0.3	Blue
Garnet	≈8+0.5	RI>1.77

Other Minerals (Volume% after Heavy Liquid-HL)

Almandine	O	Orthopyroxene		Spinel		Apatite	
Andradite		Clinopyroxene	A	Magnetite	T	Monazite	
Grossular		Amphibole	A	Leucoxene		Phosphate	T
Spessartine	O	Biotite	S	Pleonaste	S	Picotite	T
		Prehnite		Limonite		Rock Fragments	O
Andalusite		Corundum		Pyrite(psuedo)			
Kyanite		Hematite		Pyrite	T	Zircon	F
Sillimanite		Ilmenite	T	Barite		Titanite	
Staurolite		Rutile	F	Anhydrite		Topaz	P
Epidote		Anatase					
Tourmaline	O	Brookite		Magnesite		Cassiterite	O

P >50% A 20-50% C 10-20% S 1-10% O 20grains-1% F 5-20grains T 1-5grains

6590 28

DIAMOND INDICATOR DATA

Sample No: Composite 2

Job No: 287

Date Started: 29/4/99

Processing Weights

Initial: 26 kg

+2mm: 0.059 kg

After Tabling: 1.568 kg

After TBE: 4 g +2mm 0 g

Positive X

Negative

Positive (Other)

Ø/mm	>2	>1	>0.8	>0.5	>0.4	>0.3	<0.3
Crush							
Table		x	x	x	x	x	x
HL	x	x	x	x	x	x	
Mag		x	x	x	x	x	

Fractions Analysed(x),Observed only(o),Scanned only(s)

Ø/mm	>1	>0.8	>0.5	>0.4	>0.3	>0.2	>0.1
NM	x	x	x	x	x		
M4	x	x	x	x	x		
M3	x	x	x	x	x		

Kimberlite, Lamproite Indicators

Sieve Size/mm	>2	>1	>0.8	>0.5	>0.4	>0.3	>0.2	>0.1	Wear/km	Kimberlitic?
Diamond										
Chrome Diopside										
Chromite										
Phlogopite										
Picroilmenite										
Pyrope										
Diopside					1				1-2	Prob. Not

Detailed Descriptions

Mineral	Size/mm	Description
Diopside	1+0.4	Anhedral, Irregular, Subrounded, Ribbed, Green, Subtranslucent Little or no chrome

Other Minerals (Volume% after Heavy Liquid-HL)

Almandine	T	Orthopyroxene		Spinel		Apatite	
Andradite		Clinopyroxene	A	Magnetite		Monazite	
Grossular		Amphibole	A	Leucoxene	T	Phosphate	
Spessartine		Biotite	S	Pleonaste	F		
		Prehnite		Limonite		Rock Fragments	F
Andalusite		Corundum		Pyrite(psuedo)			
Kyanite		Hematite		Pyrite		Zircon	
Sillimanite		Ilmenite		Barite		Titanite	
Staurolite		Rutile	T	Anhydrite		Topaz	A
Epidote	T	Anatase	T				
Tourmaline	S	Brookite		Magnesite			

P >50% A 20-50% C 10-20% S 1-10% O 20grains-1% F 5-20grains T 1-5grains

Mineralogist/Observer: J.G/JT Date Completed: 30/4/99

Composite 1 Sample
Ringarooma Bay.

Sample Description	Comp. 1 cmt
Mineral	SP
Ox no	4
TiO2	0.00
Al2O3	20.52
Cr2O3	51.28
V2O3	0.00
FeO	14.47
MnO	0.00
MgO	12.73
ZnO	0.00
NiO	0.00
Oxide total	99.00
Fe2O3*	0.00
FeO*	14.47
Total*	99.00
Ti	0.000
Al	0.755
Cr	1.265
Fe3+	0.000
V	0.000
Fe2+	0.378
Mn	0.000
Mg	0.592
Zn	0.000
Ni	0.000
Cation total	2.990
Mg No	61.05
Ulvospinel	0.00
Spinel	37.37
Chromite	62.63
Magnetite	0.00
100Cr/(Cr+Al)	62.6
100Fe/(Fe+Mg	38.9

Sample Description	Comp. 1 picro Gp.A
Mineral	IL
Ox no	3
TiO2	54.60
Al2O3	0.00
Cr2O3	0.00
V2O3	0.00
Nb2O5	0.00
FeO	39.14
MnO	0.50
MgO	6.64
CaO	0.00
ZnO	0.00
NiO	0.00
Oxide total	100.88
Fe2O3*	1.06
FeO*	38.19
Total*	100.99
Ti	0.981
Al	0.000
Cr	0.000
Fe3+	0.019
V	0.000
Nb	0.000
Fe2+	0.763
Mn	0.010
Mg	0.236
Ca	0.000
Zn	0.000
Ni	0.000
Cation total	2.010
Mg No	23.65
XTiO3	98.10
Hematite	1.90
Ilmenite	74.14
Pyrophanite	0.98
Geikielite	22.97

659030.

Van Oord ACZ

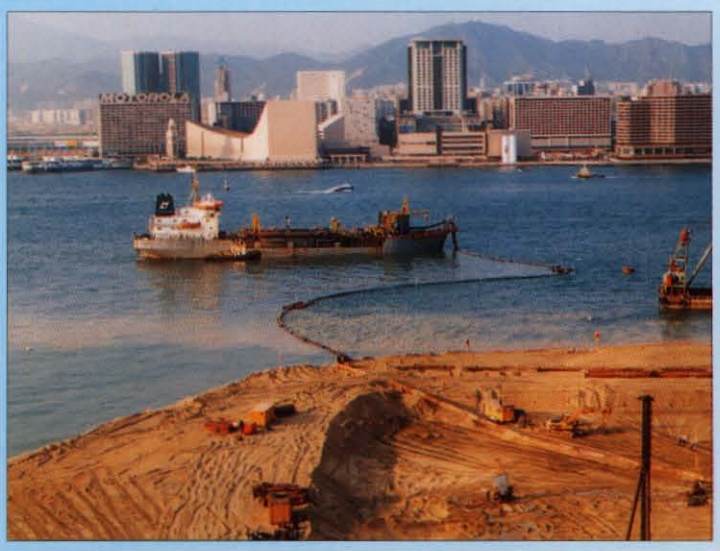
VOLVOX DELTA

D.P. Trailing Suction Hopper Dredger

Schlepphoppersauger

Drague suceuse porteuse

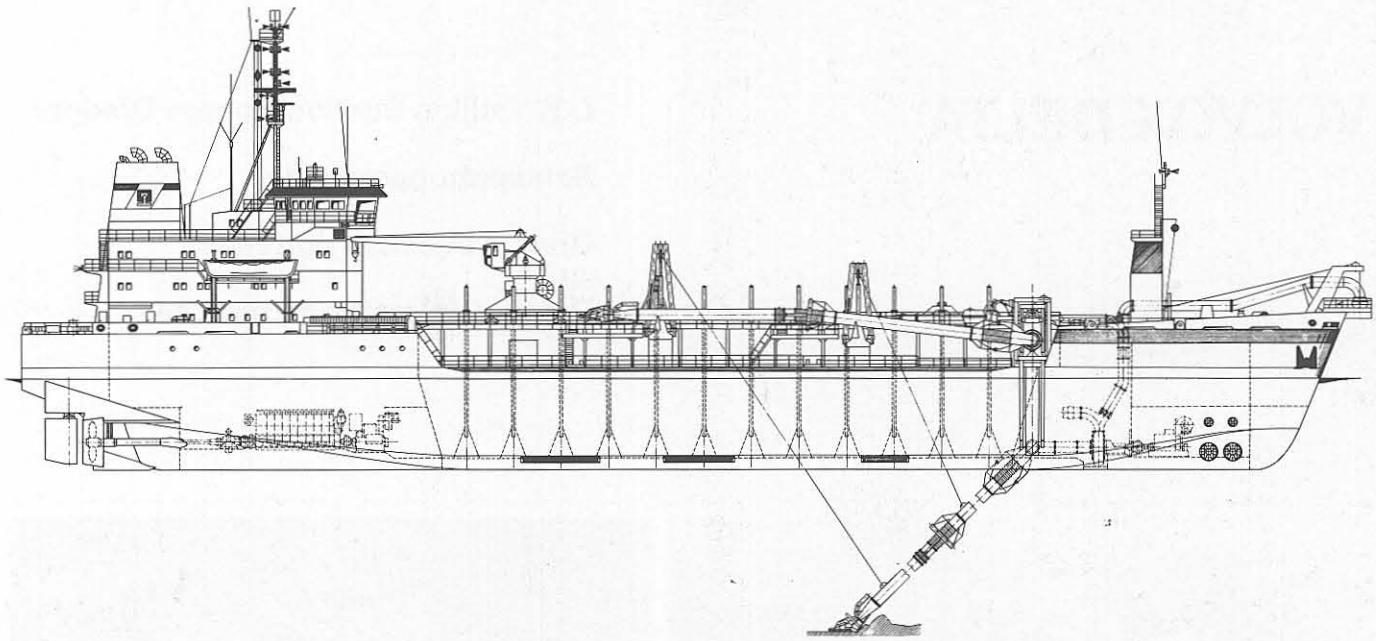
Draga de succión en marcha



40.1416.07

VOLVOX DELTA

659031



D.P. Trailing Suction Hopper Dredger

Dimensions:

Length overall	117.00 m
Hull length	110.20 m
Beam	21.70 m
Moulded depth	9.10 m
Draught (max.)	8.13 m
Capacity	8,142 m³

Suction pipes: 2 x Ø 1.00 m
Discharge pipe: Ø 0.80 m

Dredging depth: 37.50 m

Pump drive:
Diesel engines 2 x 1,840 kW

Propulsion:
Diesel engines
2 x Bow thrusters
Maximum speed 15.2 knots

Power during transport:
2 x 5,075 kW

Power during dredging:
2 x 3,235 kW

D.P./Mooring
Kongsbergs Albatros ADP 701
8 point mooring

Classification:
Bureau Veritas, I 3/3 ✠
Hopper Dredger/Deep Sea

Dutch Shipping Inspection,
Working area: 15 miles offshore
Transport, unrestricted

Schlepphoppersauger

Abmessungen:

Länge über alles	117,00 m
Kaskolänge	110,20 m
Breite	21,70 m
Seitenhöhe	9,10 m
Tiefgang (max.)	8,13 m
Laderauminhalt	8.142 m³

Nennweite Saugrohrleitung: 2 x Ø 1,00 m
Nennweite Druckrohrleitung: Ø 0,80 m

Maximale Baggertiefe: 37,50 m

Pumpantrieb:
Dieselmotoren 2 x 1.840 kW

Antrieb:
Dieselmotoren
2 x Bugstrahl
Geschwindichkeit 15,2 Knoten

Leistung während des Transportes: 2 x 5.075 kW

Leistung während des Saugens: 2 x 3.235 kW

Dynamische Angleichung:
Kongsberg Albatros ADP 701
8 Punkte Verankerung

Klasse:
Bureau Veritas, I 3/3 ✠
Hopper Dredger/Hochsee

Dutch Shipping Inspection,
Arbeitsbereich:
15 Meilen vor der Küste
Transport, uneingeschränkt

Drague suceuse porteuse

Dimensions:

Longueur hors-tout	117,00 m
Coque longueur	110,20 m
Largeur	21,70 m
Creux au livet	9,10 m
Tirant d'eau (max.)	8,13 m
Capacité	8.142 m³

Conduite d'aspiration: 2 x Ø 1,00 m
Conduite de refoulement: Ø 0,80 m

Profondeur de dragage max.: 37,50 m

Puissance des pompes:
Moteurs Diesel 2 x 1.840 kW

Propulsion:
Moteurs Diesel
2 x Hélice de proue
Vitesse maximum 15,2 noeuds

Puissance pendant le transport: 2 x 5.075 kW

Puissance de production:
2 x 3.235 kW

Positionnement dynamique:
Kongsberg Albatros ADP 701
8 points d'amarrage

Classe:
Bureau Veritas, I 3/3 ✠
Drague/Haute Mer

Dutch Shipping Inspection,
Zone d'opération:
15 miles au large
Transport, illimitée

Draga de succión en marcha

Dimensiones:

Eslora total	117,00 m
Casco longitud	110,20 m
Manga	21,70 m
Puntal de construcción	9,10 m
Calado (máx.)	8,13 m
Capacidad	8.142 m³

Tubo de succión: 2 x Ø 1,00 m
Tuberia de descarga: Ø 0,80 m

Profundidad de dragado máx.: 37,50 m

Accionamiento de las bombas:
Motores Diesel 2 x 1.840 kW

Accionamiento de las hélices:
Motores Diesel
2 x Hélice de proa
Velocidad máxima 15,2 nudos

Potencia duranta el transportes: 2 x 5.075 kW

Potencia duranta el dragado:
2 x 3.235 kW

Posiciónamiento Dinámico:
Kongsberg Albatros ADP 701
8 puntos de amarre

Clase:
Bureau Veritas, I 3/3 ✠
Draga de alta mar

Dutch Shipping Inspection,
Area de trabajo:
15 millas de la costa
Transporte, sin restricciones

Van Oord ACZ B.V.
P.O.Box 458
4200 AL Gorinchem
The Netherlands

Phone : +31 183 642200
Fax : +31 183 624394
Telex : 25716 voacz nl

Van Oord ACZ
Marine and Dredging Contractors

659032

Van Oord ACZ

JAN STEEN

D.P. Construction Vessel

Dynamische Angleichung Bauschiff

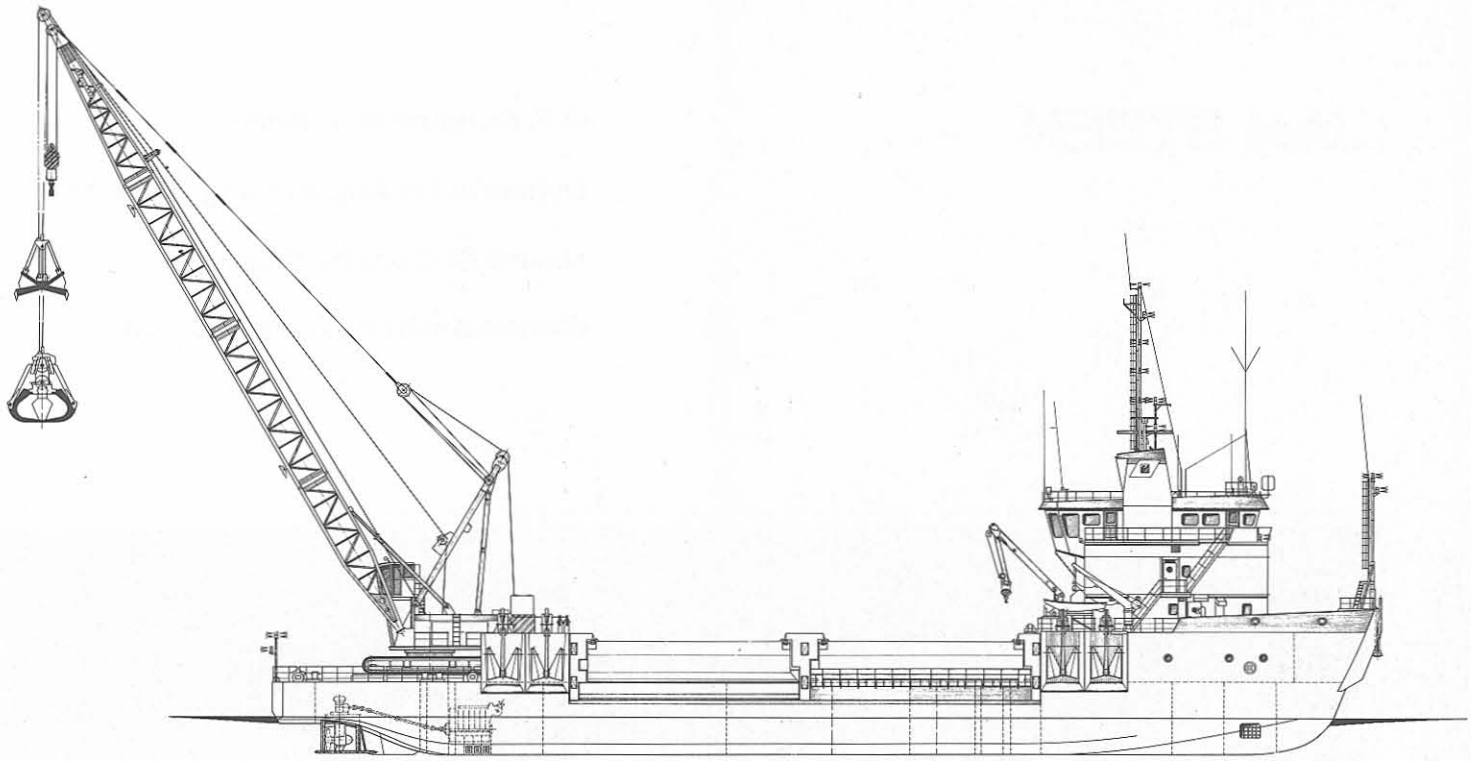
Navire de Construction

Embarcación de Construcción

40.1401.07

JAN STEEN

659033



D.P. Construction Vessel

Accommodation: 25 persons

Dimensions:

Length overall	76.00 m
Beam	19.14 m
Moulded depth	5.00 m
Draught laden	4.04 m
Carrying capacity	2,000 t

D.P./Mooring:
Kongsberg Albatros ADP 100
8 point mooring, 800 m wire

Propulsion:
2 Aquamaster propellers
2 x 855 kW (2,324 hp)
1 Bow thruster 550 kW (750 hp)
Speed 10 Knots

Moonpool:
7.2 x 4.8 m / 1.2 x 1.0 m

Crane:
Manitowoc 4600 S5
Boom 60 m
Capacity 90 t at 15 m
65 t at 20 m
25 t at 40 m

Classification:
Bureau Veritas, I 3/3 (E) ✠
Special Service, Deep Sea,
Ice class III, AUT-MS

Dutch Shipping Inspection,
Working area: unrestricted

Dynamische Angleichung Bauschiff

Unterkünfte: 25 Personen

Abmessungen:

Länge über alles	76,00 m
Breite	19,14 m
Seitenhöhe	5,00 m
Tiefgang beladen	4,04 m
Ladefähigkeit	2000 t

Dynamische Angleichung:
Kongsberg Albatros ADP 100
8 Punkte Verankerung, 800 m
Kabel

Antrieb:
2 Aquamaster Schrauben
2 x 855 kW (2.324 PS)
1 Bugstrahl 550 kW (750 PS)
Geschwindigkeit 10 Knoten

Arbeitsschacht:
7,2 x 4,8 m / 1,2 x 1,0 m

Kranaufbau:
Manitowoc 4600 S5
Ausleger 60 m
Kapazität 90 t at 15 m
65 t at 20 m
25 t at 40 m

Klasse:
Bureau Veritas, I 3/3 (E) ✠
Sondereinsatz, Hochsee,
Eisklasse III, AUT-MS

Dutch Shipping Inspection,
Arbeitsbereich: uneingeschränkt

Navire de Construction

Accommodation: 25 personnes

Dimensions:

Longueur hors-tout	76,00 m
Largeur	19,14 m
Creux au livet	5,00 m
Tirant d'eau en charge	4,04 m
Tonnage	2000 t

Positionnement dynamique:
Kongsberg Albatros ADP 100
8 points d'amarrage, 800 m câble

Propulsion:
2 Aquamaster Poussées
2 x 855 kW (2.324 cv)
1 Hélice de proue 550 kW (750 cv)
Vitesse 10 noeuds

Puits:
7,2 x 4,8 m / 1,2 x 1,0 m

Grue:
Manitowoc 4600 S5
Grue bras 60 m
Capacité 90 t at 15 m
65 t at 20 m
25 t at 40 m

Classe:
Bureau Veritas, I 3/3 (E) ✠
Service spécial, Haute Mer,
Glace classe III, AUT-MS

Dutch Shipping Inspection,
Zone d'opération: illimitée

Embarcación de Construcción

Alojamiento: 25 personas

Dimensiones:

Eslora total	76,00 m
Manga	19,14 m
Puntal de construcción	5,00 m
Calado máx.	4,04 m
Capacidad de carga	2000 t

Posicionamiento Dinámico:
Kongsberg Albatros ADP 100
8 puntos de amarre, 800 m
de cable

Accionamiento de las hélices:
2 Aquamaster hélices
2 x 855 kW (2.324 cv)
1 Hélice de proa 550 kW (750 cv)
Velocidad 5 nudos

Moon pool:
7,2 x 4,8 m / 1,2 x 1,0 m

Grúa:
Manitowoc 4600 S5
Brazo de grúa 60 m
Capacidad 90 t at 15 m
65 t at 20 m
25 t at 40 m

Clase:
Bureau Veritas, I 3/3 (E) ✠
Servicio especial, de alta mar,
Clase de helio III, AUT-MS

Dutch Shipping Inspection,
Área de trabajo sin: restricciones

Van Oord ACZ B.V.
P.O.Box 458
4200 AL Gorinchem
The Netherlands

Phone : +31 1830 42200
Fax : +31 1830 24394
Telex : 25716 voacz nl

Van Oord ACZ
Marine and Dredging Contractors

659034

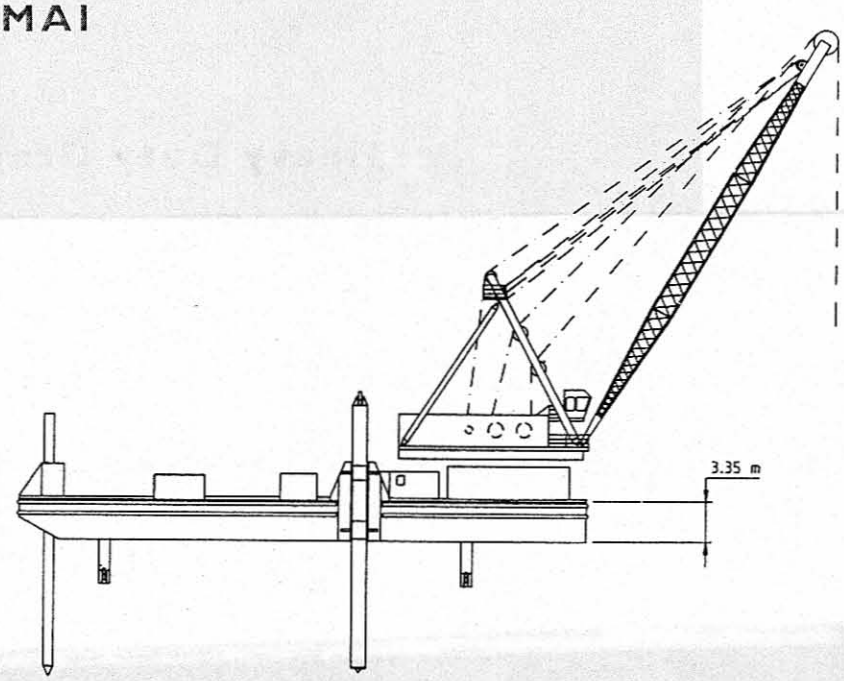
W.H. Goomai

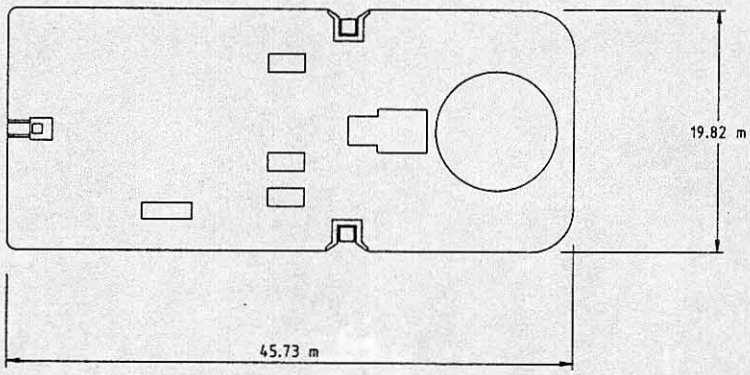
Heavy Duty Grab Dredger

WESTHAM DREDGING COMPANY PTY LIMITED
Level 8,122 Arthur Street North Sydney NSW 2060
PO Box 1891 North Sydney NSW 2059 AUSTRALIA
[redacted]
Telephone 02 9959 5715 Facsimile 02 9959 5721

W.H. GOOMAI

659035





Year of construction		1969
Yard		Fowell Mort Yard, Sydney, NSW
Classification		Lloyd's Floating crane 100 A - Australia and NZ Coastal Service with occasional voyages between Australia and NZ
Barge dimensions	length	45.7m
	breadth	19.8m
	depth	3.4m
	draught	1.8m
Hull construction		All welded steel, hull has "swim" end for sea towage. Crane mounted well clear of deck on substantial turret structure
Winches	3-2 drum	diesel hydraulic mooring winches rated at 25 tonnes line pull
	1-3 drum	diesel hydraulic winch rated at 7.5 tonnes @ 15 m.p.m.for barge fleeting
Machinery		1-40KW, alternator to be used in conjunction with crane alternator for essential services
Tank capacities	Fuel oil	123 tonnes
	Fresh water	83 tonnes
	Water ballast	315 tonnes
Buckets (grabs)		Heavy Duty Esco Clamshell capacity to 11.5m3 max. heaped load
Bucket positioning		On board computer displays bucket position in X,Y,Z axes, relative to pontoon,upgraded in 1994
Crane		Diesel powered barge mounted Clyde Whirley crane Model 32-DE-120
Positioning Spuds		2 fixed and 1 walking spud
Positioning Anchors and Wires		6 point anchoring system with fairleads at 3m below waterlevel
Gross Registered tonnage		940t

659036

W.H. Supply and W.H. Sirius

Self Elevating Platforms

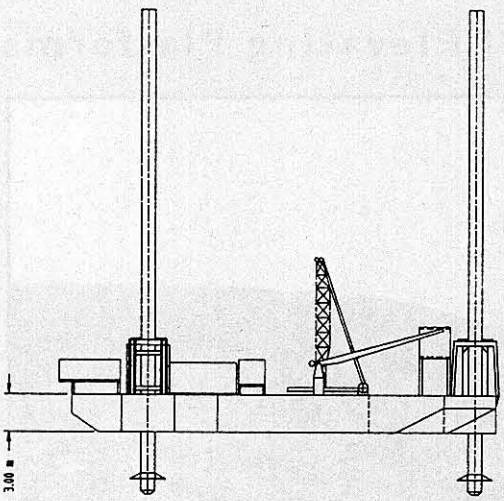
WESTHAM DREDGING COMPANY PTY LIMITED

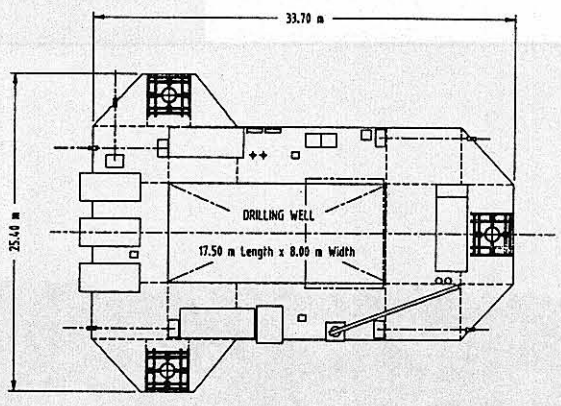
Level 8,122 Arthur Street North Sydney NSW 2060

PO Box 1891 North Sydney NSW 2059 AUSTRALIA

Telephone 02 9959 5715 Facsimile 02 9959 5721

W.H. SUPPLY and W.H. SIRIUS





Year of construction		1979
Yard		Eglo Engineering, Newcastle
Classification		Lloyd's OU 100A Mobile Drilling Unit
Hull dimensions	Length	33.7m
	Beam (mld)	25.4
	Beam (platform)	17.0m
	Depth (mld)	3.0m
	Plate thickness	7mm
	Draught (approx)	1.6m
	Centre well length	17.6m
	Centre well width	8.0m
	Nett weight*	446 tonne
	Payload	94 tonne
Leg Particulars	Number of legs	3
	Shape	cylindrical
	Length (overall) W.H.Supply	38.6m
	Length (overall) W.H.Sirius	32.70m
	Diameter (O.D.)	1.12m
	Pad Diameter	3.00m
Jacking system	Type	Rack and pinion
	Drive	Hydraulic
	No. of pinions per leg	4
	Capacity of each leg	180 tonne jacking
		270 tonne holding
	Total jacking capacity	540 tonne
	Jacking speed	6m per minut
	Preload	not required
Jacking conditions -	(subject to local conditions and Lloyd's approvals)	Working
	Wave height Hmax	2.0m
	Wind speed	50 knt
	Current	3 knt
	Water depth (max) W.H.Supply	27m (subject to wave climate and tides)
	Water depth (max) W.H.Sirius	21m (subject to wave climate and tides)
	Air gap (standard)	1.5 m
Positioning	Mooring system	6 point by anchors
	Electronic positioning equipment	E.D.M. + Computer/Telemetry Interfacing
	Accuracy	0.1m (min)

* Platform weight excluding fuel, water, drilling equipment, accommodation and explosives magazine

Pelican

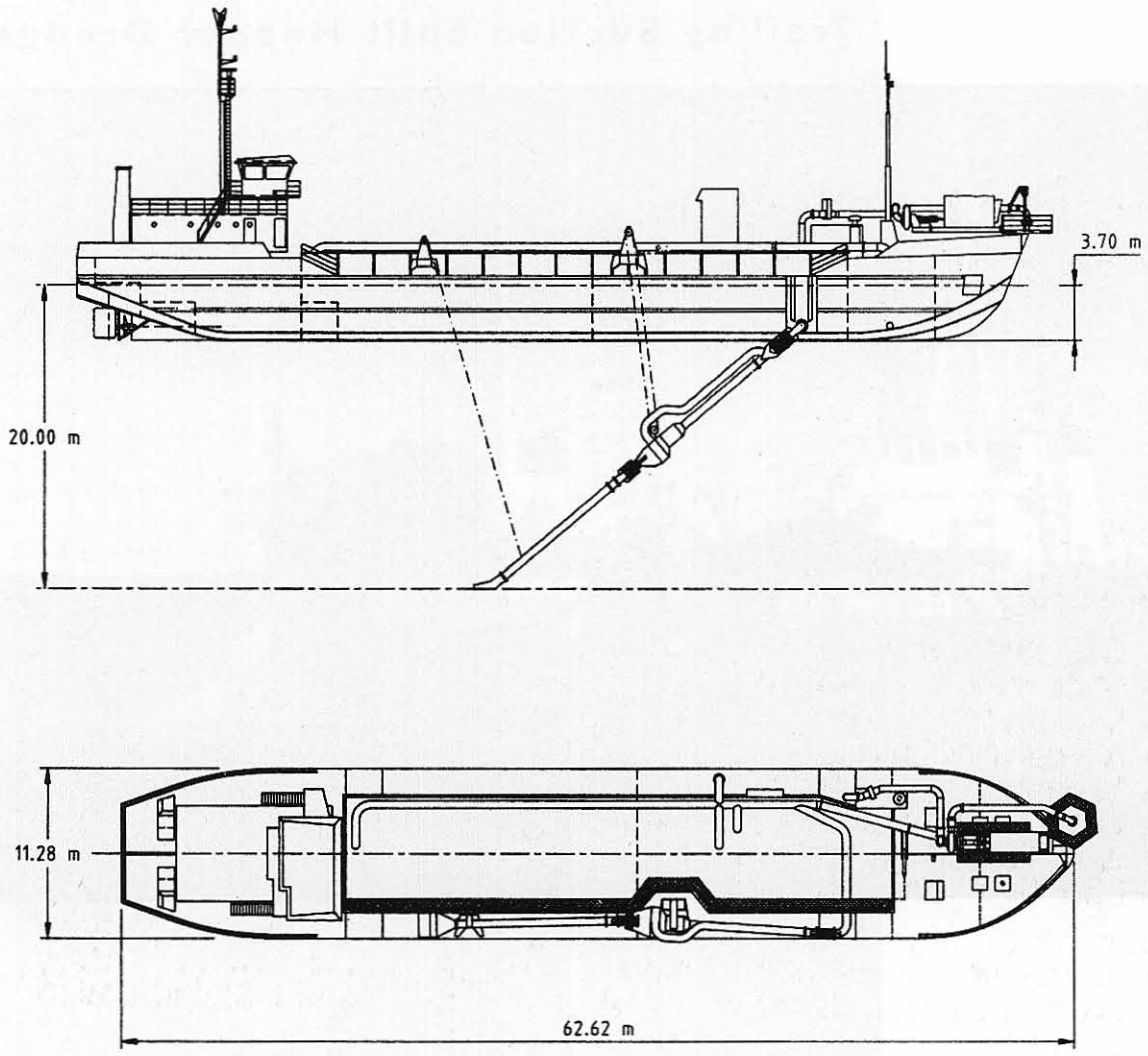
Trailing Suction Split Hopper Dredger

WESTHAM DREDGING COMPANY PTY LIMITED
Level 8,122 Arthur Street North Sydney NSW 2060
PO Box 1891 North Sydney NSW 2059 AUSTRALIA

Telephone 02 9959 5715 Facsimile 02 9959 5721

PELICAN

659039



Year of construction	1984
Yard	Stapel, The Netherlands
Classification	Bureau Veritas I 3/3 E coastal waters/suction dredger-dredging within 15 miles offshore
Length overall	62.62m
Beam	11.28m
Depth	4.27m
Draught at dredging mark	3.70m
Hopper capacity	965m3
Propulsive power	2 x 325kW
Dredge pump power	294kW
Generator/discharge pump power	375kW
Jet pump/bow thruster motor	299kW
Total machinery output	1,504kW
Laden speed	9 knots
Suction pipe diameter	450mm
Discharge system	split-hopper or discharge pump system
Pump ashore connection	optional side/bow coupling
Max. dredging depth	20.00m
Gross Registered tonnage	2340t
Nett Registered tonnage	1350t

THE PNEUMA SYSTEM®

A revolutionary dredging and transporting system has recently been developed by Pneuma International S.A.
This system, known as Pneuma®, is patented all over the world and specifically fulfills the following requisites:

— Compact design.
— Simplicity of operation
— Low working cost
— No wearing parts
— Minimum maintenance cost
— High solid content output
— No dredging depth limit
— Maximum flexibility

Through these advantages the Pneuma system may be used to solve all dredging and reflow problems as well as for the new technology of exploiting ocean deposits and the reconditioning of polluted underwater beds.

Years of research and practical testing, including collaboration with Public Corporations and Universities both in Italy and abroad, have led to the development of the Pneuma dredging and reflow system. This can operate from a land base as well as from the traditional barge and can be used for long distance transportation of slurries. Particular attention has also been given to the study of accessories and integrating systems to further increase the wide range of conditions under which the Pneuma system can work.

Capacities of Pneuma® plants.	
Plant type	Capacity up to
30/5	40 m³/h
60/10	80 »
100/20	120 »
150/30	175 »
300/60	360 »
450/80	600 »
600/100	950 »
1200/150	1500 »
1500/200	2000 »

DESCRIPTION OF THE PNEUMA® PUMP

Pneuma pumps have no moving mechanical parts in contact with the mixture to be pumped. They consist of the following components:

Pump body

Generally consisting of 3 cylinders with no internal rotating mechanisms apart from rubber inlet and delivery valves.
The pump can function:
— Immersed (usually mobile), in which case the pump becomes filled through inlet valves situated at the bottom of each cylinder (see fig. 2 - dredging plants).
— On the surface (usually fixed), in which case the pump becomes filled by gravity through a hopper placed on top of the pump body and connected by pipes to the inlet valves which, in this case, are located on the side (see fig. 3 - stationary conveying and booster type).

- **Distributor**

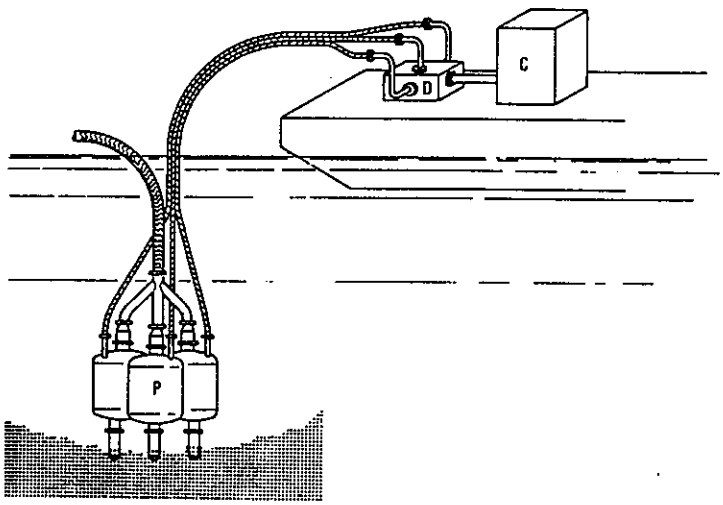
Situated between the compressor and pump body, on the ground near the compressor or underwater near the pump body.
It regulates the influx and discharge of compressed air to and from each cylinder of the pump body and assures uniform functioning and a continuous flow. The discharge of compressed air from each cylinder is directly into the atmosphere (open cycle) or, alternatively, a large part is recycled by the compressor (semi-closed cycle).

- **Air compressor**

Driven by any type of motor.

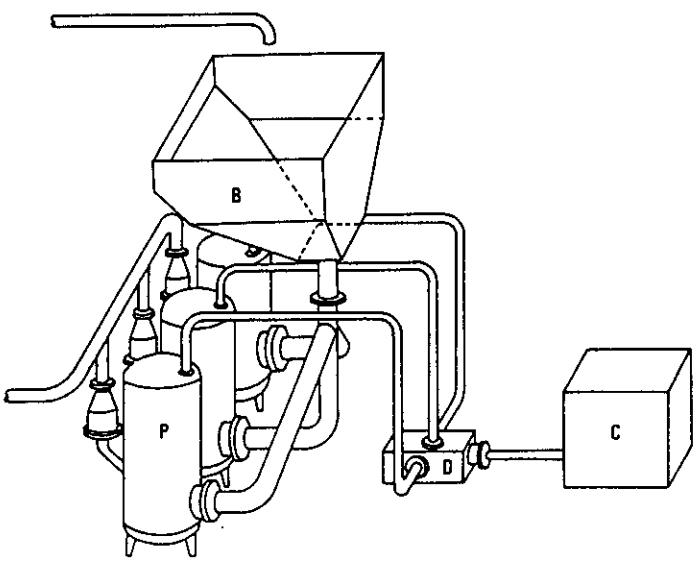
- **Compressed air pipes**
- **Mixture delivery pipe**

The compressor may be placed at a considerable distance from the pump body.
The delivery and air pipes are completely independent from the rest of the plant.



2

C = compressor
D = distributor
P = pump body
B = bin



3

HOW THE PNEUMA® PUMP WORKS

The work cycle of the Pneuma pump can be divided into three phases:

Phase one
Filling the pump

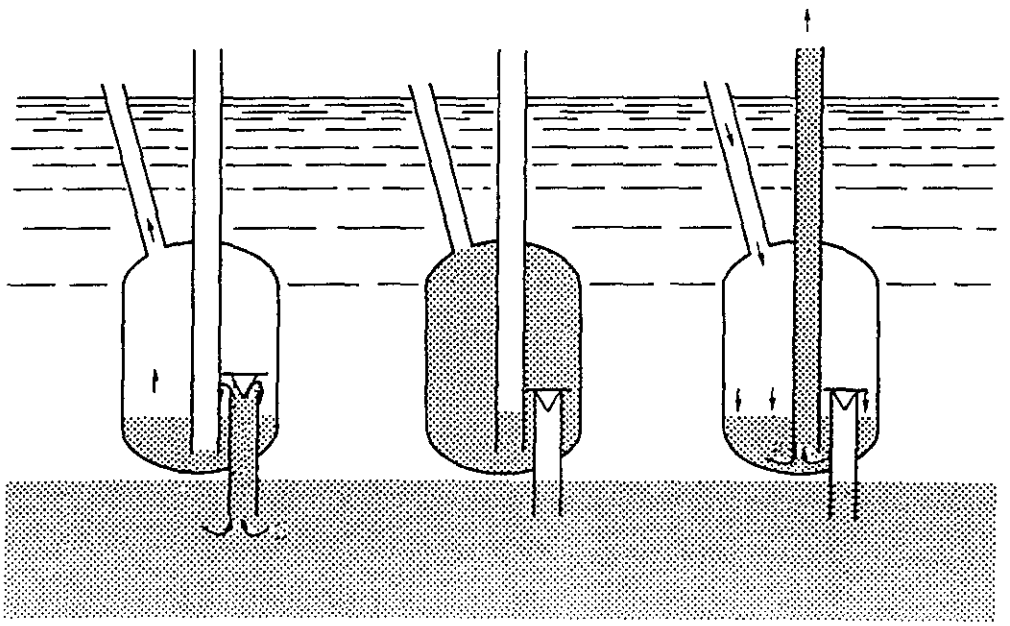
Each cylinder is rapidly filled with liquid, either by a counter pressure due to the hydrostatic head (in the case of immersed plants), or by gravity (in the case of stationary conveying and booster plants). As soon as one cylinder is filled, the inlet valve automatically closes by its own weight.

Phase two
Emptying the pump and reflowing

When the cylinder has been filled, compressed air, supplied by a compressor through the distributor and air hose, acts as a piston and the liquid is thus forced out through the delivery valve.

Phase three
Discharging compressed air and preparation for Phase one

When the cylinder has been almost emptied, the distributor discharges the air into the atmosphere. Once the internal pressure is released the cylinder once again becomes filled with liquid, as described in phase one.



In order to provide a continuously uniform delivery flow, the distributor acts alternatively on the three cylinders with an average of 1 to 3 cycles per minute.

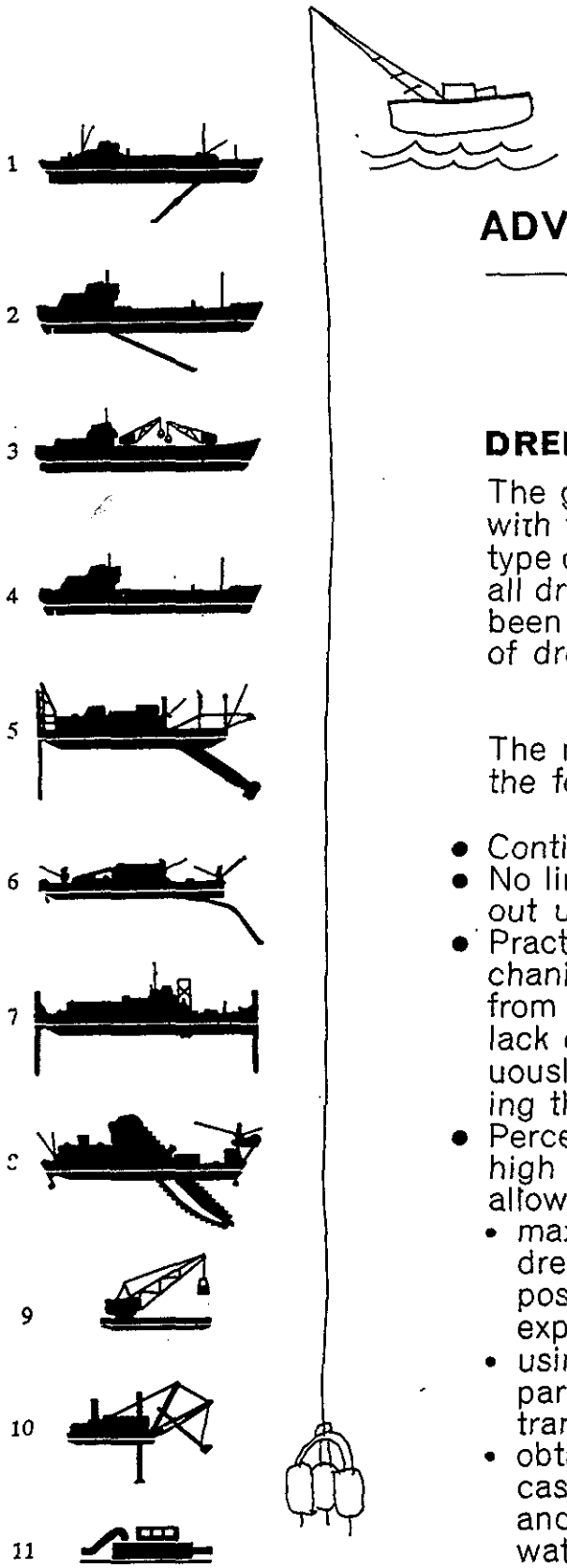
The Pneuma pump therefore works as a piston pump, the difference being that the piston is formed by compressed air. This acts as a means of elastic transmission, substituting any other mechanical members normally found in other types of pumps.

Since only the air which fills the connecting pipelines between the distributor and the pump body is lost with each transmission movement, it is advantageous to locate the distributor as near as possible to the pump body. This is easily done with stationary plants, whereas with dredging plants, where depths of up to 25 metres are involved, the problem is solved by placing the distributor above water level (usually on a pontoon).

For working at greater depths the distributor is immersed and placed near the pump body.

From the cycle of work phases of the pump it can be seen that phase one (filling) and phase two (emptying) are completely separate. They can therefore be carried out at two different velocities, one for filling and one for emptying. This technical characteristic permits the choice of the diameter of the delivery pipeline to be based on economic criteria rather than on the velocities necessary to induce suction, which is normally the case with centrifugal pumps.

659045



1 Trailing suction hopper dredge
2 Suction hopper dredge
3 Grab hopper dredge
4 Sea-going self-propelled hopper
5 Cutter suction dredge
6 Suction dredge
7 Barge unloading dredge
8 Bucket dredge
9 Floating grab crane
10 Dipper dredge
11 Booster station

ADVANTAGES OF PNEUMA®

DREDGING PLANTS

The great flexibility of the Pneuma Plants coupled with the ease to transport and mount them on any type of pontoon allows their use for handling almost all dredging problems, some of which have hitherto been impossible to solve with conventional types of dredging equipment.

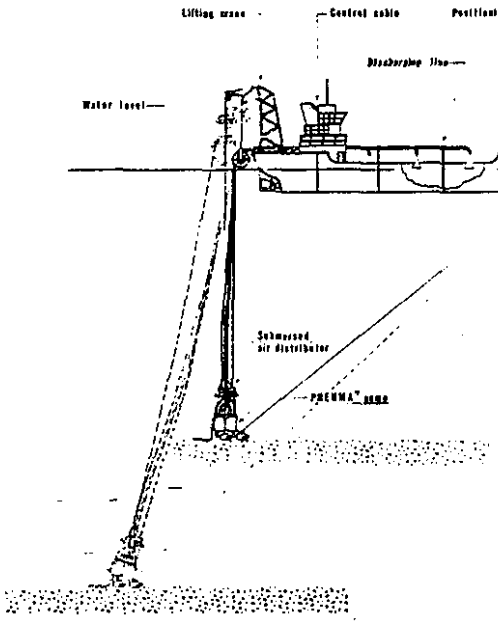
The main advantages of the Pneuma Dredges are the following:

- Continuous and uniform delivery flow.
- No limit to dredging depth (work has been carried out up to a depth of 50 mts).
- Practically no wear at all since there are no mechanisms in contact with the abrasive mixture apart from the self-acting spherical rubber valves. This lack of wear allows Pneuma pumps to work continuously 24 hours per day for many years, maintaining the same output and efficiency as at the start.
- Percentage of solids up to 60-80 % in volume. This high concentration of solids in the dredged mixture allows;
  - maximum filling of barges even in the case of dredging muddy layers and, therefore, making it possible to obtain a notable saving in sea transport expenses.
  - using reflow pipes of a small diameter in comparison with those used by normal dredges to transport the same amount of solids.
  - obtaining a considerable saving of water in the case of hydrotransport and when dredging lakes and basins, or wherever it is necessary to save water.

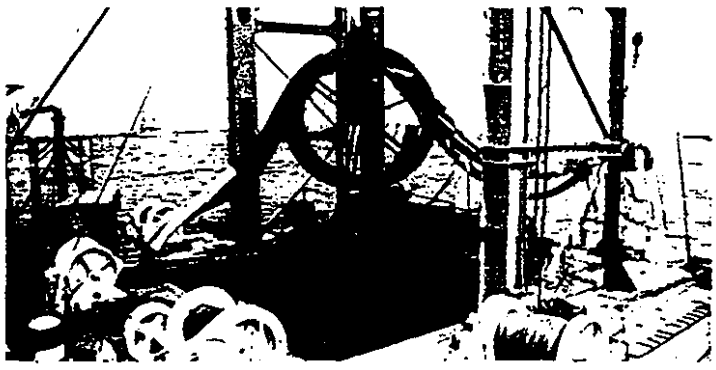
- Possibility to install the Pneuma dredging plant on any type of existing watercraft without the need to construct a special pontoon.
- Particularly suited for dredging polluted materials since it does not disturb the bed while working and therefore avoids secondary pollution.
- It can be assembled on pontoons which may be dismantled for transport by lorry, thus making it ideal for working in zones which are inaccessible to conventional dredges (mountain lakes, hydro-electric basins, small docks, canals, decantation zones etc.).
- Possibility of working with the pump suspended from a crane.
- Perfect levelling of the bottom without excavating more than the required section.
- Possibility of dredging in the presence of scrap materials without these causing interruptions in the dredging or damage to the plant.
- Possibility of easily and perfectly regulating the percentage of solids through diluition of the mixture by a remote control device.
- Possibility of reflowing to a great distance by the same dredging plant itself.
- Possibility of dredging without danger in the presence of explosive materials.
- Possibility of supplying any type of Pneuma plant to the sites where they are required at short notice.
- Particularly suited for dredging sand in open sea for beach reclamation purposes. In fact Pneuma can also work in rough water conditions as the pump body is supported by a slack cable and lays on the bottom. The rubber air and delivery hoses connect the pump body to the barge and only the barge is affected by rough water conditions.

Deep sea dredging

Pneuma pumps can solve the problem of dredging in deep seas because they have no depth limits. For this purpose the Pneuma plant, as described in the paragraph relating to dredging in deep water, can be installed on a self-propelled hopper ship.
According to the thickness of the material to be dredged the Hole Dredging or Trailing System can be used without anchorage. In the latter case, and particularly when dredging at great depths, it is possible to apply a special type of shovel and attachment which can penetrate the material horizontally even when the pump is not working vertically (see figs. 64-65b).



64

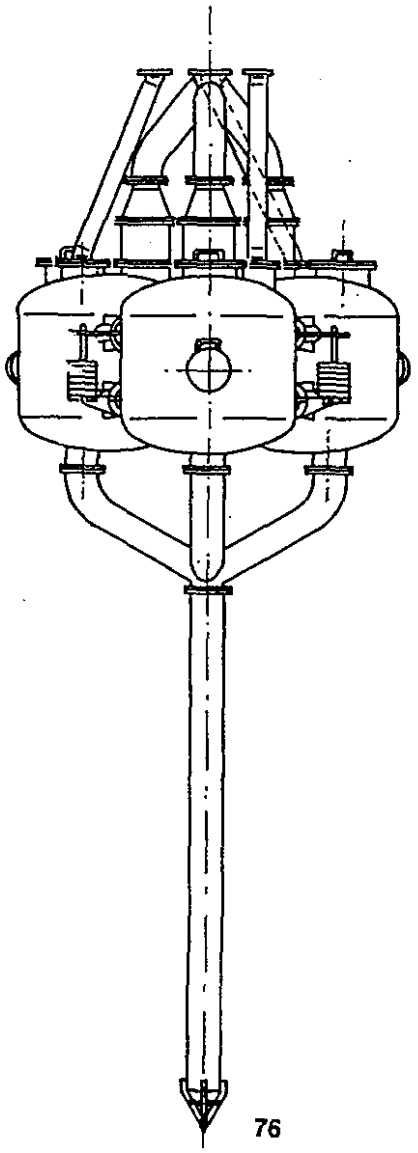


65

65b

Dredging for samples

A new patented Pneuma System has recently been developed for obtaining continous samples of material from the sea bottom, even if at a great depth and in open sea.
A normal Pneuma dredging pump is used with 3 inlet pipes joined to a single suction head of an appropriate diameter and length proportional to the size of the sample to be taken. The pump body is connected to a steel structure which rests on the bottom to guide it down and to avoid entry of additional material should the bed be formed of materials which lack cohesion and which could alter the value of the sample (see fig. 76).
Generally the speed of penetration is low so that a good differentiation between the thickness of the different bottom layers can be obtained.
Should the weight of the pump itself not be sufficient to drive the inlet head into the material when it is compact, a system of using a high pressure water jet around the inlet tube itself helps penetration.



76