81-1618

930001

OCEAN MINING A.G.

TASMANIA OFFSHORE EXPLORATION PROGRAMME.

OPERATIONS REPORT - MARCH 1966.

Part 1A

Ocean Mining A.G.
38 Canning Street,
Launceston, Tas.

10th. March 1966.

AMG REFERENCE POINTS ADDED

SUMMARY

The Phase 1 seismic and sampling programmes for the Oyster Bay licence area were completed on the 21st. and 31st. March, respectively. Bad weather held up operations for several days during the month but only the [illegible] seismic programme ended behind schedule. A total of 456.5 nautical miles of seismic traverse were run, and 48 holes were drilled in the Oyster Bay area.

The seismic data have been processed and detailed maps of bedrock topography and sediment distribution and thickness have been compiled. These will be used to determine the best sites for the Phase 2 drilling programme.

The samples collected in the Oyster Bay area willbe analysed during April.

The seismic programme for the North East coast lease area began on the 27th. March, and although bad weather again interrupted work, 41.5, nautical miles of traverse had been completed by the 31st. March. Positioning of the seismic profiling vessel during this programme will be controlled by the Raydist system introduced during March.

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930005

Operational Report - March 1966.

Part 1 - Operational Progress.

During the month of March 1966, Ocean Mining A.G. completed Phase 1 of seismic and sampling operations for the Oyster Bay lease area and then embarked on a similar programme in the neighbouring North East Coast of Tasmania lease area (see Fig. 1.) Summaries of the seismic and sampling operations are submitted in Tables 1 and 2.

Seismic Operations

The M. V. Annette M. was chartered on the 1st March and work began immediately at the Launceston ship yard on the transfer of the seismic profiling equipment from the M. V. Yellowtail. Accomodation for the recording equipment and plotting table was erected on board. The conversion was completed on the 4th. March.

The Annette M. then sailed for Oyster Bay arriving there on the 6th. March. Seismic profiling was started on the 7th. and continued although repeatedly interrupted by heavy seas and strong winds, until the 21st. March. The several days of bad weather prevented work being completed on the 16th. March as originally scheduled. (see Part 2 Feb. Operational Report). The Annette M ran 295.3 nautical miles of seismic traverse which when added to the mileage traversed by the M. V. Yellowtail in February makes a total of 456.8 nautical miles of traverse for the Oyster Bay lease area. Excellent records were obtained at a ship speed of 6.5. knots in calm waters. The speed of the survey ship and the record quality however, decreased rapidly in rough weather, consequently, the period of intermittent bad weather from the 11th to 18th March considerably delayed operations and extra traverse miles had to be run during the brief periods when the sea was calm and visibility good, in order to provide clear records which could replace those of poorer quality collected during bad weather conditions.

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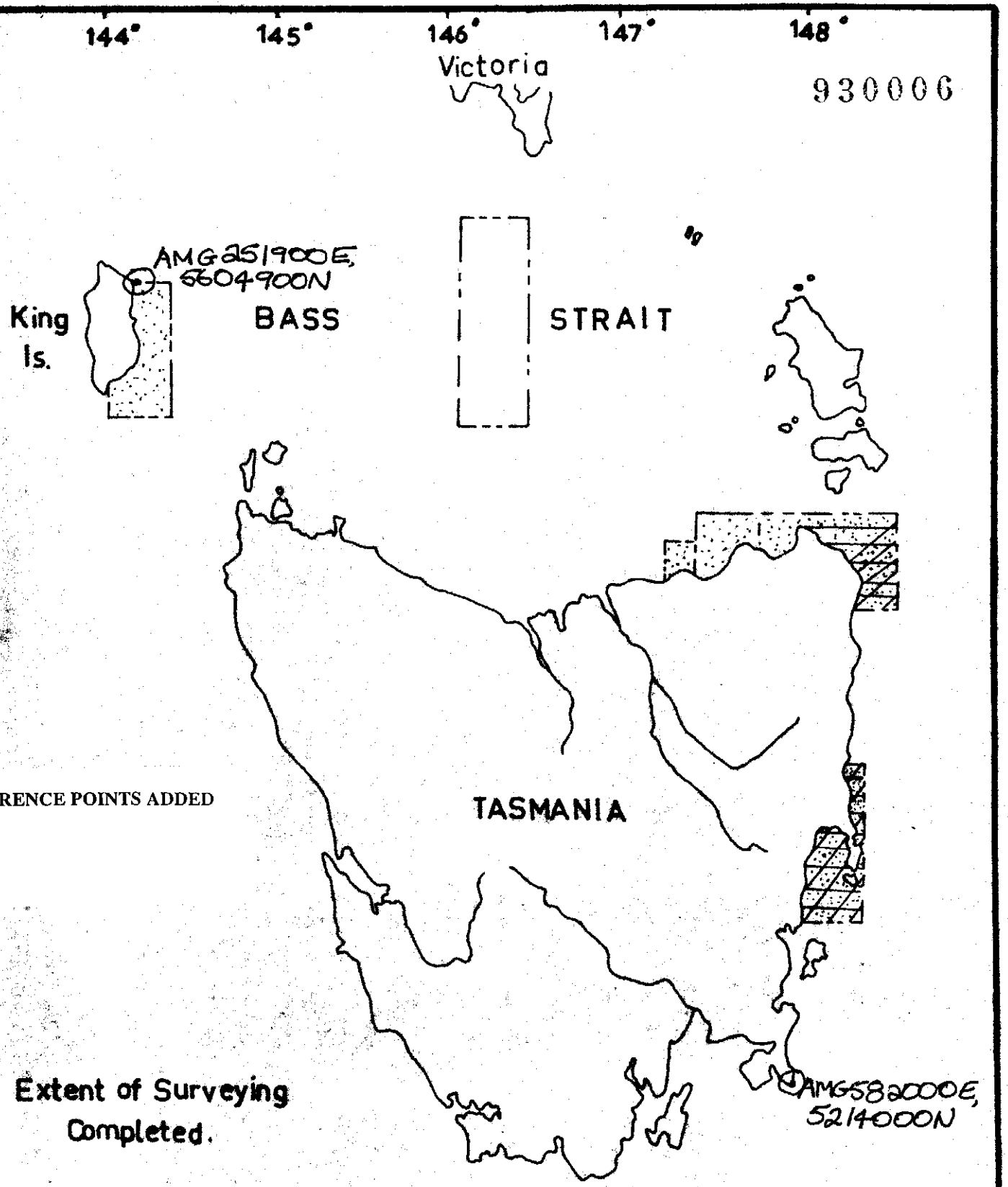

AMG REFERENCE POINTS ADDED

FIG.1. Map Showing State of QMAG. Operations at End of March 1966.

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TABLE 1. SUMMARY - SEISMIC OPERATIONS - MARCH 1966.

DATE	LEASE AREA	OCCUPATION	NAUT. MILES PROFILED	RECORD QUALITY
March 1	Oyster - Bay	Conversion of M. V. Annette		
2		and transfer of equipment from		
3		M. V. YELLOWTAIL.		
4				
5		Sail from Launceston to Oyster		
6		Bay.		
7		Seismic Profiling	25.0	Good
8		" "	36.9	"
9		" "	31.8	"
10		" "	54.1	"
11		Auxiliary Generator failure		
12		Bad Weather		
13		Equipment maintenance		
14				
15		Seismic Profiling	20.5	Fair
16		" "	25.3	"
17		" "	17.2	"
18		" "	11.9	"
19		Bad Weather. Hydrophone repairs		
20		Seismic Profiling	28.8	Fair - Good
21		" "	43.8	" "
22		Sail to St. Helens.		
23		Equipment Maintenance		
24				
25		Rest Period		
26				
27	N. E. Coast	Travel to St. Helens. make ready for sea duty.		
28		Sea trials - Raydist.		
29		Seismic Profiling	20.0	Fair - Poor
30		" " (Bad Weather)	21.5	Fair - Good
31		Bad Weather - more Raydist beacons		
	Nautical	miles traversed in Oyster-Bay during March		295.3
	"	" " off N.E.Coast "	"	41.5

Accurate positioning of the Annette M during the Oyster Bay survey was controlled visually by two surveyors set up at survey trig. stations onshore. These surveyors were in radio contact with the vessel throughout the survey. When the vessel traversed areas not visible from existing triangulation stations accurate positioning was maintained with the measurement of horizontal sextant angles by a man on board. A detailed track chart showing the positions of the seismic traverse within the Oyster Bay lease area is attached to this report. (see Map 1.)

Following the completion of the Oyster Bay survey the Annette M Sailed to St. Helens, a small port on the North East Coast of Tasmania. The vessel docked late on the 22nd. March. On the 23rd. March, the seismic equipment was examined and minor damage sustained while surveying in rough seas was repaired.

During the rest period for the Annette M crew, from 23rd. to 25th March, the shore based beacons for the Raydist radio positioning system were installed at trig. points on the north east coast of Tasmania in readiness for the next survey. Tests on these beacons were completed by the 26th. and the third mobile station was installed aboard the Annette M. Sea trials with this new positioning system were completed on the 28th. March, and surveying began early on the 29th. March. Bad weather once again prevented surveying on the 31st. March. This interruption however, coincided with a break in surveying planned to enable the shore party to move the land based beacons to new survey trig. points. At the end of the month the vessel had completed 41.5 nautical miles of seismic traverse in the North East Coast lease area.

Sampling Operations.

Sampling operations in the Oyster Bay lease area began on the 1st. March using OMAG oblique jet airlift sampling system installed aboard the 38ft. fishing vessel Marlisa. As shown in Table 2, inclement weather prevented sampling on 9 working days but nevertheless by working long hours during periods when the sea was relatively calm and the visibility good the sampling operations in Oyster Bay were completed on schedule by 31st. March.

TABLE 2. SUMMARY - SAMPLING OPERATIONS - MARCH 1966.

930009

DATE	LEASE AREA	OCCUPATION	HOLES DRILLED
March 1	Oyster Bay	Equipment Maintenance	
2		Bad Weather	
3		Drilling Abandoned - Bad Weather	
4			
5		Modification of Equipment	
6			
7		Sampling	1
8		"	1
9		"	5
10		"	4
11		"	1
12		Work Abandoned - Bad Weather	
13			
14			
15			
16		Sampling	5
17		Sampling - Bad Weather	1
18		Abandoned Work early	1
19		Transfer of Equipment to M.V. Aardverk	
20		Equipment Maintenance	
21		Sampling	2
22		Sampling in Bad Weather	1
23		Work Abandoned-Bad Weather	
24			
25		Sampling	5
26		"	3
27		"	5
28		"	5
29		"	7
30		Travel to St. Helens.	
31		Crew Relief.	
		TOTAL	48

A total of 48 holes were drilled within the lease area at sites determined on the basis of seismic survey results and the results of the previously completed bathymetric survey.

A map (Map 2) showing the locations of the sampling stations is attached.

All the samples were transferred to the Launceston field office where they have been dried and each sample split into four equal fractions. One split of each sample will be submitted to the Department of Mines, one will be retained for reference, the others will be subjected to detailed analysis.

Operational Staff.

During March the operational staff complement was enlarged to deal with the increased activities in the field and of course, the processing of data resulting from these activities. Staff organisation at 31st. March is shown in Table 3.

Management Visitors.

G. K. Biemesderfer (Bethlehem Steel Corporation), L. L. Brundred (Ocean Science and Ingineering Inc.) and F. J. Lampietti (OMAG) visited the Launceston Field Office and and offshore operations during the early part of March.

C. B. Edwards (Charter Consolidated), R. Pratten (Electrolytic Zinc Corp.) have been invited to visit the operation in progress during April. Arrangements have already been made for the visit of J. G. Symons and R. Jennings (Department of Mines) to the sampling operations off the north east coast of Tasmania.

Aquisition of Exploration Licence.

The Utah Development Corporation's licence for the Furneaux Group of Islands expired in March. The Corporation, however, applied for, and were granted permission to retain the Southern part of the area covered by their previous licence. Their new licence covers the area around and including Clarke and Barren Islands.

OMAG applied for and were granted permission to explore the offshore areas around the larger Flinders Island to the north of the new U.D.C. licence area. The exploration licence for the Flinders Island (onshore areas) was granted to Kathleen Investments.

TABLE 3 STAFF COMPLEMENT - 31st. March, 1966

930011

	NAME	APPOINTMENT	COMMENCED EMPLOYMENT
Professional Staff	S. R. M. Harvey	Field Manager	Before 1st. March.
	W. Davies	Senior Geologist	
	R. E. Warren	Geophyscist	
	A. Von Rahden	Engineer	
	F. Libby	Geologist	
Non Professional Staff	J. Beaverstock	Lab. Technician	14th. March
	A. S. R. Davies	Secretary	Before 1st. March.
	G. Donnelly	Typist	3rd. March.
	B. Izzard	Raydist Plotter	8th. March
	L. Locsei	Driller	Before 1st. March.
	D. Murray	Geological Asst.	21st. March.
	L. G. Shields	Raydist Beacon Operator	24th. March.
	C. Thompson	Geophysical Asst.	3rd. March.
Part Time Staff	J. Dixon G. E. Donnelly J. Goodricke C. Moore E. Summerhaze	Data Processing & Draughting	
Staff included in contracts and charters	R. Macfadyen	Raydist maintenance engineer.	
	J. Pyke	Skipper & Crew	
	P. Jackson	Annette M.	
	T. Choppin	Skipper & Crew	
	B. Bone	Aardverk.	
	B. Buton		
	G. Roozendal	Skipper - Marlisa.	

930012

Part 2. - Results of operations - March 1966.

Results of the Seismic Surveys

The seismic survey results for the Oyster Bay lease area have been processed and detailed maps of bedrock topography and sediment distribution and thickness have been compiled. These are submitted as two series, each consisting of four sheets.

BEDROCK TOPOGRAPHY - 4 SHEETS (MAPS 4, 5, 6, and 7).
SEDIMENT DISTRIBUTION AND THICKNESS - 4 SHEETS (MAPS 8, 9, 10, and 11.)

The bedrock topography maps show that the lease area consists of two well-defined provinces, that is, the area within Oyster Bay itself and the outer exposed coastal strip running north from Schouten Island to the town of Bicheno.

Maps 4 & 5 covering the area within the bay, reveal the presence of a relatively broad, flat terrace to the west. The terrace is cut by a few small channels running south east toward the centre of the bay. In the central and eastern parts of the bay there are a large number of steep - sided, submerged channels of probably Tertiary or post-Tertiary age. These channels, like those crossing the western terrace, are almost certainly the drowned lower courses of an earlier river system which drained the Oyster Bay basin. Present-day river valleys represent the headwaters of the former system. The main channels generally trend from north to south and, in places, are approximately half a mile wide. Numerous smaller tributary channels, 300 -500 feet wide, lead into the main channels from adjoining parts of the bay. On the eastern side of the bay, several short channels, up to 180 feet deep, run westward off the prominent granite mountains forming the Freycinet Peninsula.

A comparison of maps 4 and 5 with the sediment distribution and thickness maps of the same areas (maps 8 & 9) shows that all the channels within the bay are filled with sediment which in places is up to 150 feet in thickness. The broad western terrace is covered by a veneer of Recent sediment 15 -- 30 feet thick. It should be noted, that the estimation of sediment thicknesses on the seismic records is based on a sound velocity of 4,800 feet/sec, that is, the velocity of sound in sea water. The velocity of sound in unconsolidated sediments of the type sampled would be greater by a factor of approximately 1.6. Therefore the sediment thickness as revealed by the isopachs on maps 8 and 9 may

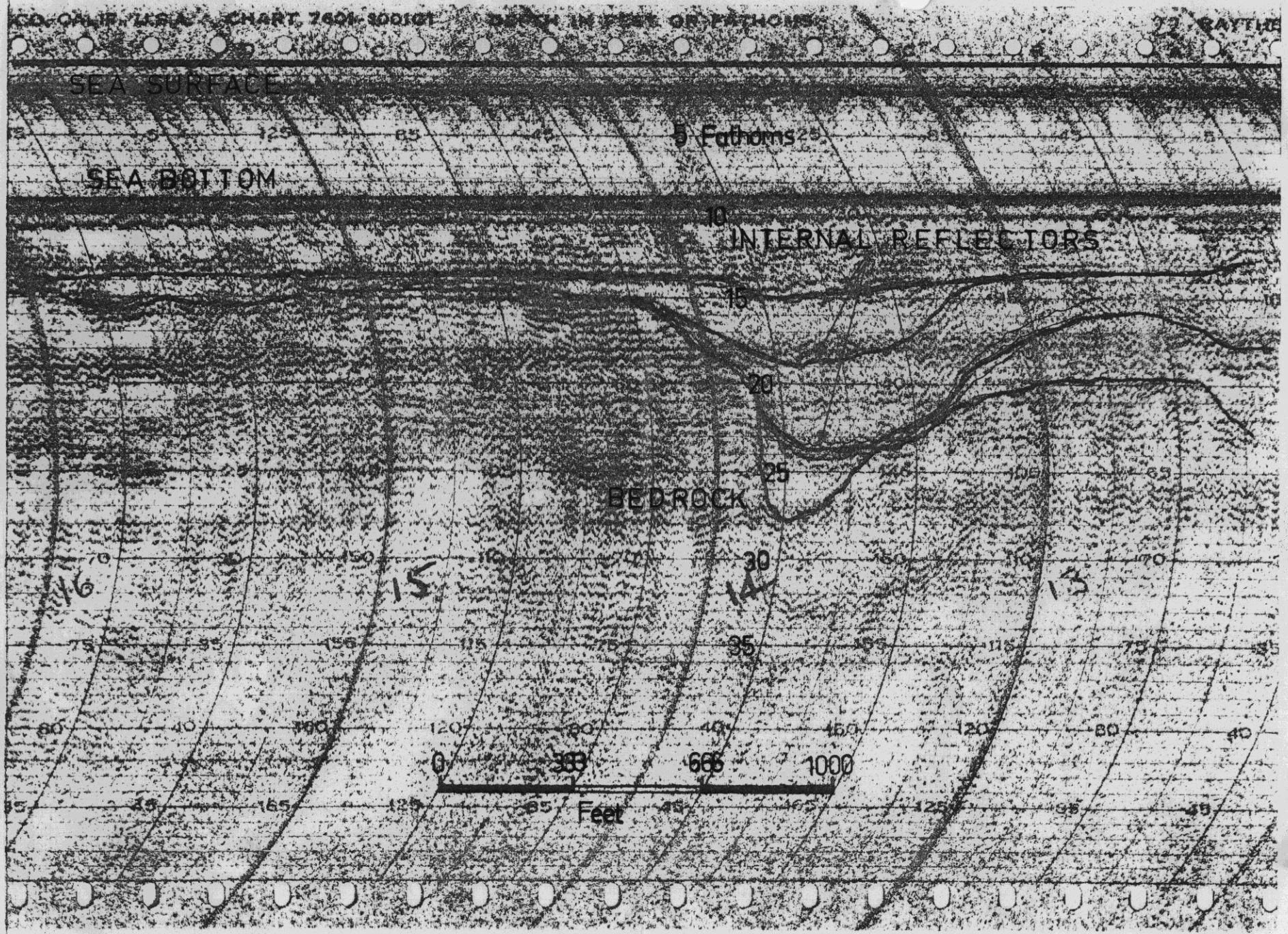

FIGURE 2. SEISMIC RECORD - OYSTER BAY
MARCH 1966.

5 cm

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be considered minimal. In view of this, many of the channels may be considered too deep to be dredged to bedrock level with conventional mining equipment. An examination of the seismic records, however, (See Fig. 2) has revealed the presence of intermediate reflectors between the sea bottom and bedrock levels. These are possibly late or post-Tertiary erosion surfaces and would be within the mining depth limit of approximately 150 feet below the sea surface. The economic importance of these surfaces and an evaluation of the composition of the sediment resting on them can only be made during the phase 2 drilling programme.

The bedrock topography(maps 6 & 7) of the outer exposed, coastal strip extending northward from Schouten Island to Bicheno shows the bedrock surface shelving steeply seaward in the area south of the Nuggets to depths ranging from 30 - 40 fathoms (180 --240 feet) within a distance of 5000 feet offshore. North of the Nuggets (Map 7), the bedrock surface shelves less steeply offshore. A steep sided channel (180 feet deep) running seaward in the small embayment north of Butlers Point forms a prominent feature on Map 7. In addition, other minor channels forming the offshore extensions of present-day rivers draining into embayments along the coastline are shown.

The sediment distributions and thickness maps (maps 10 and 11) show the presence of a thick wedge of sediment increasing in thickness seaward and overlying the outer part of the steeply sloping bedrock shelf, south of the Nuggets. This wedge is over 20 fathoms (120 feet) in thickness off Schouten Passage (Map 10). The inshore boundary of the wedge runs roughly parallel to the coastline approximately half a mile off shore except where it forms tongue - like extensions into the embayments along the coast. Some of these tongues of sediment, particularly those extending onto Wineglass Bay (Map 10), the southern end of Friendly Beaches and the channel north of Butlers Point (Map 11) should be examined during the Phase 2 drilling programme.

SAMPLING RESULTS

The results of the Phase 1 sampling operations in the Oyster Bay lease are summarized in Table 4. These results show a reasonably close correlation with the geological conditions as revealed by the seismic operations.

TABLE 4 SUMMARY OF SAMPLING RESULTS

DATE	HOLE NO.	DEPTH IN FEET	BEDROCK	PROBABLE BEDROCK	SEDIMENT TYPE	PROFILE THICKNESS IN FEET
March 3	1	10			Fine Sand	30 - 60
7	1	12			Fine Sand	30 - 60
8	1	16			Fine Sand	24
9	1	16	Yes		Fine Sand and gravel	18
"	2	17		Yes	Fine & Coarse Sand	18
"	3	17		Yes	Fine shelly Sand	18
"	4	13		Yes	Medium Shelly sand	6 - 12
"	5	24			Fine Sand	90
10	1	30			Fine Shelly Sand	?
"	2	30			Fine Shelly Sand	90
"	3	3		Yes	Fine Sand	6
"	4	22			Fine Sand	100
11	1	14			Fine shelly Sand	60
16	1	14		Yes	Fine Shelly Sand	12
"	2	6		Yes	Fine Sand	6
"	3	3			Medium Shelly sand	6
"	4	18			Medium Sand	90
"	5	15			Fine Medium Sand	?
17	1	0.5	Yes		Medium Shelly Sand	0
18	1	12		Yes	Medium coarse sand fine gravel	?
21	1	11			Fine Medium Shelly Sand with clay	120
"	2	14			Fine Medium Shelly Sand	30 - 60
22	1	12			Fine Medium Coarse sand	90
25	1	15			Fine Medium Shelly sand	30
"	2	7			Fine Shelly Sand	24
"	3	5		Yes	Coarse Sand fine gravel	30
"	4	4		Yes	Coarse Sand fine gravel	24
"	5	22			Fine Medium Shelly Sand & Clay	60

TABLE 4 CONT'D

DATE	HOLE NO	DEPTH IN FEET	BEDROCK	PROBABLE BEDROCK	SEDIMENT TYPE	PROFILE THICKNESS IN FEET
March 26	1	10			Coarse shelly sand and gravel	24
"	2	21			Fine Medium Coarse Sand	24
"	3	22			Fine Shelly Sand some clay	?
27	1	31			Fine Shelly Sand	90
"	2	31			Fine Medium Coarse Sand Fine gravel Some Clay	90
"	3	21			Fine shelly Sand & Gravel	?
"	4	18			Fine & Medium shelly Sand	60
"	5	12			Fine Medium Sand Some Gravel	25
28	1	5			Medium Sand Gravel	30
29	2	8			Fine Medium Sand Gravel	18 - 24
"	3	24			Fine Medium Sand	21
"	4	20			Fine Medium Sand	16
"	5	12		Yes	Fine Shelly Sand	12
29	1	0	Yes		-	0
"	2	10	Yes		Fine medium Sand & Gravel	6
"	3	6	Yes		Fine Medium Sand & Gravel	?
"	4	20			Fine medium Sand & Gravel	24
"	5	17			Fine Medium Sand & Gravel	18
"	7	12			Fine Medium Sand	36
"	6	0	Yes		-	0

A cursory examination of the samples has revealed that the grain size in the upper layers of the unconsolidated sediment sampled within Oyster Bay is generally sufficiently coarse to enable easy recovery of any heavy minerals of economic importance, should they be found in mineable quantities. Many samples contained substantial proportions of heavy minerals although it must be borne in mind that less important constituents such as magnite and ilmenite may possibly predominate in the heavy mineral concentrates derived from these samples.

A large number of the samples collected on the eastern side of Oyster Bay and also in the sheltered embayments, such as Wineglass Bay, along the more exposed outer coastline of the lease area, consist of coarse, angular quartz and felspar grains which have almost certainly been derived from the neighbouring mineralised granite masses.

In the case of samples collected in Oyster Bay this is significant. It might have been anticipated that sediment all over the Bay floor would have been diluted by contributions from the relatively barren watersheds north and west of the Bay where granites do not outcrop. The fact that this mixing of sediment types does not occur is encouraging.

930018

PART 3 OPERATIONAL PLANS - APRIL 1966.

During April the Phase 1 seismic survey and sampling programmes for the north east coast lease area will be processed. Work has already begun on the seismic data. Records collected from the area between Anson Bay and Cape Naturaliste, the most easterly part of the area, have shown the presence of a large number of relatively small, shallow lenses of Recent sediment infilling depressions in what is almost certainly granitic bedrock. These lenses will be sampled in the forthcoming weeks.

In addition, a careful examination of the maps and other data collected in the Oyster Bay lease area in March is being made to determine the best sites for drilling in this area during Phase 2 of the joint venture operations.

The periods of bad weather during March were responsible for delaying the completion of the Phase 1 seisure surveying programme in the Oyster Bay lease area and consequently a revision of the schedules for April and May is now necessary. The revised schedules are submitted in Table 5.

TABLE 5 REVISED SCHEDULES FOR THE PHASE 1 Seismic and Sampling Programmes

PROGRAMME	LEASE AREA	ESTIMATED SURVEY DAYS	START OF SURVEY	END OF SURVEY
SEISMIC	N. E. COAST	18	27th. April	15th. April.
	King Island	14	21st, April	4th. May
SAMPLING	N. E. Coast	20	4th. April	29th. April.
	King Island	15	2nd. May.	20th. May.

930019

PART 4. SUMMARY OF TOEC EXPENSES . PAYMENTS BY LAUNCESTON OFFICE

930020

January 16 to 31st. March, 1966.

Subject to adjustment

Washington Payments outstanding

A Phase 1 - Seismic
B Phase 11 - Drilling
O Organization
G General

CATEGORY	CLASS A	CLASS B	CLASS O	CLASS G
1. Personnel .				
1. 1 O.M.A.G.				
I. 2 Local or temporary	3715.66			
1. 3 Contract	1035.80			
1. 4 Management				
2. Equipment Purchases.				
2. 1 Vehicle				2118.25
2. 2 Operational	1755.53	89.87		
2. 3 Expendable	808.71			
3. Services.				
3. 1 Equipment and rental				
3. 2 Communications			85.85.	6.00
3. 3 Shipments				
3. 4 Graphic	68.12			
3. 5.Outfitting	240.60			1894.94
3. 6 Domestic and utilities	476.88			
4. Ship Operation.				
4. 1 Charters	8016.37			
4. 2 Fuel	832.25			
4. 3 Expendable	609.30			
5. Transportation.				
5. 1 International				
5. 2 Local	607.16		129.30	
5. 3 Per diem	999.73	63.35	496.00	
5. 4	106.58			
6. Legal				
6. 1 Organization			746.41	
6. 2 Auditing				
6. 3 Permits, duties fees	663.42			
SUB TOTALS	19038.11	153.22	1447.56	4019.19

OVERALL TOTALS A$24,658.08

[~US$27,740.16]

OCEAN MINING
A.G. PART 2

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OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS · APRIL, 1966

81-1618

Ocean Mining A.G.
38 Canning Street,
Launceston, Tas.

10th May, 1966

SUMMARY

Progress in the Tasmanian offshore exploration programme continues apace. By the end of April work in three of the four licence areas was complete. A total of about 785 line-miles of seismic profiling have been run and ninety tests of the sediment profiled have been made. April surveying revealed several targets of interest in the north-eastern licences and test probes confirm the existence of likely sediment.

Preparations for the King Island survey are well underway and work may finish there by mid-May.

The Flinders Island licence recently applied for was granted in April: bathymetric study of the region will commence shortly.

In the United States work on the drilling vessel WANDO RIVER nears its end. The vessel should leave for Tasmania before the beginning of June.

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PART I PROGRESS

Seismic and sampling operations in the North Eastern licence areas were completed before the end of April, as shown in Figure 1. Both operations were repeatedly interrupted by periods of adverse weather, the seismic survey finishing seven days later than anticipated. A comparison of scheduled and actual operating times is provided in Table 1. The fact that sampling ended well within schedule is a tribute to the sampling crew's willingness to continue working on planned relief days. The crew was, of course, allowed an extended relief period on termination of the cruise.

Seismic Operations

Seismic profiling in the North Eastern licence areas began on the 27th March. By the 1st April, 41.5 nautical miles had been traversed. During the earlier part of April, bad weather seriously affected operations and profiling could be carried out on only two days within the first eight. Bad weather continued to delay work until the third week of the month when relatively calm seas on several consecutive days allowed a reasonable advance. In the vicinity of Swan Island, tidal currents with estimated velocities of 4 to 5 knots hampered operations considerably. By 23rd April, however, profiling was completed; 287 nautical miles having been run. This gives a total of 328.5 traverse miles for the North Eastern licences. Figure 2 shows the tracks followed during the survey.

Positioning for the seismic vessel, Annette M, was provided throughout the survey by the Raydist system. Daily maintenance on the Raydist shore beacons ensured that they were kept in good running order and were able to function continuously.

Sampling Operations

Although sampling in the North East began on 5th April, a day later than previously planned, the programme was completed by 27th April, well within scheduled time. A summary of these operations is submitted in Table 5.

Forty-one holes were drilled in water depths ranging from 58 to 147 feet. Distribution of the sample stations is shown in Figure 3. The maximum depth drilled was 27 feet. Bedrock or probable bedrock was reached in over 50 per cent of the holes drilled.

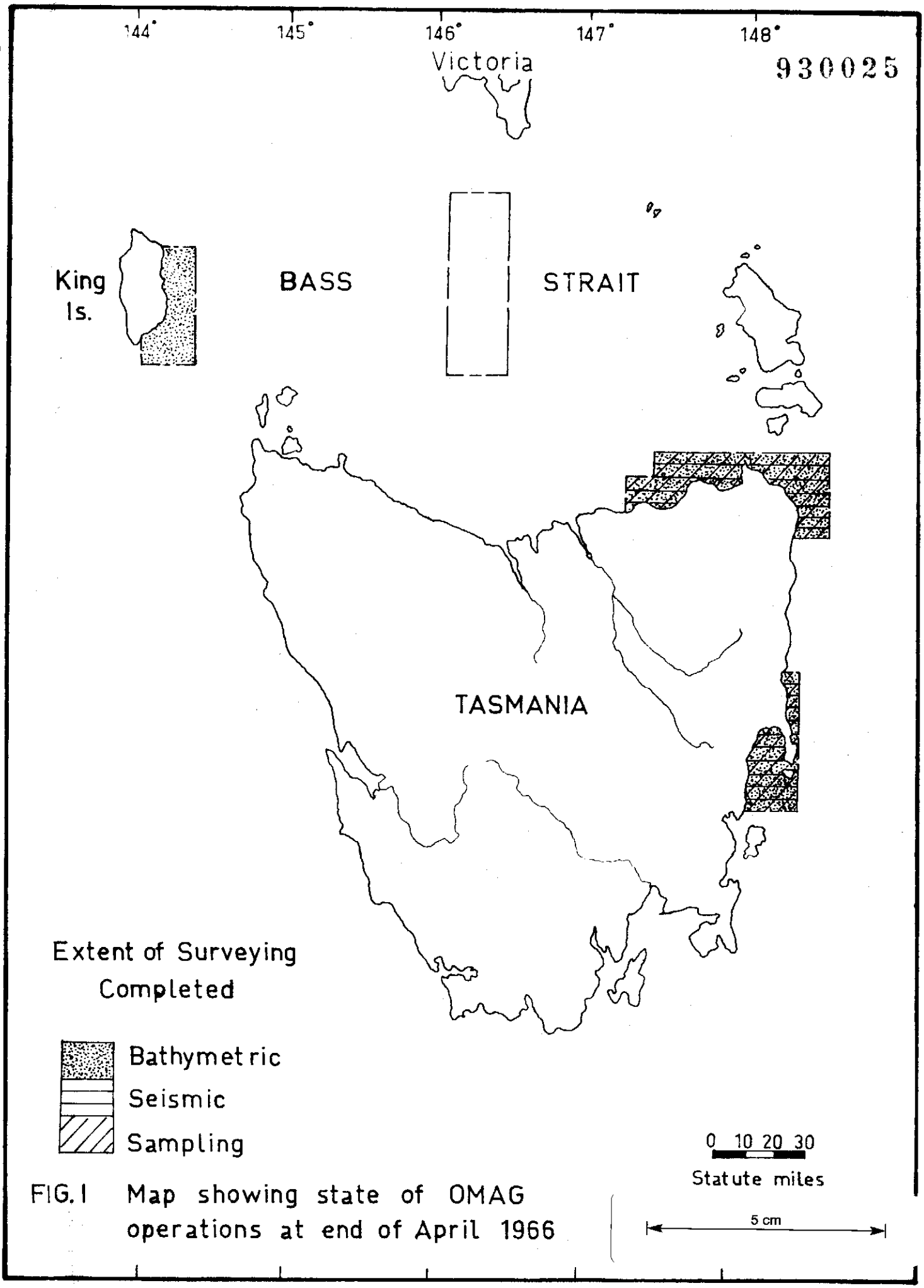

FIG. 1 Map showing state of OMAG operations at end of April 1966

TABLE 1 COMPARISON OF SCHEDULED AND ACTUAL PROGRESS.
NORTH EASTERN LICENCE AREAS, TASMANIA

Programme	Revised Schedule, March Report			Actual Times		
	Commence	End	Estimated Survey Days (Not including Crew Relief Periods)	Commence	End	Estimated Survey Days (Not including Crew Relief Periods)
Seismic	27th March	16th April	18	27th March	23rd April	25
Sampling	4th April	29th April	20	5th April	27th April	22

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TABLE 2 SEISMIC OPERATIONS · APRIL, 1966

Date	Licence Area	Occupation	Naut.Miles Profiled	Record Quality
April 1	North East Coast, Tasmania.	Bad weather - hydrophone repairs		
2		Profiling	33	Good-fair
3		Bad weather		
4		Profiling	25	Fair-poor
5		Bad weather - move ship and Raydist beacons		
6		Bad weather		
7		Bad weather		
8		Sail to Bridport - stores etc.		
9		Easter holidays		
10		" "		
11		" "		
12		Sail from Bridport. Check Raydist		
13		Bad weather. Calibrate Raydist baseline.		
14		Profiling	40	Fair
15		Bad weather		
16		Bad weather		
17		Bad weather		
18		Profiling	38	Fair
19		Profiling - move Raydist beacons	23	Good
20		Calibrate baseline-profiling	22	Good
21		Profiling	50	Good
22		Profiling	56	Good
23		Sail to Launceston. Dismantle Raydist: transport to L'ton.		
24		)		
25		) Rest period		
26		)		
27		) Ship and Raydist maintenance		
28		) and repairs. Preparation for		
29		) King Island.		
30		)		

Total	287
Nautical miles traversed in March	41.5
Overall total	328.5

Gale force winds and heavy seas often prevented sampling, particularly during the first two weeks of the month, but by working long hours during short spells of good weather an average drilling rate of two holes per day was maintained throughout the cruise. Strong tidal currents, a further hazard to sampling operations, were encountered at many stations, especially at those east of Cape Portland and in the vicinity of Swan Island.

Sample stations were selected on the basis of bathymetric and seismic data. Stations of particular interest revealed by the seismic operations were marked by buoys dropped from the Annette M. Accurate positioning of the survey vessel was maintained through measurement of horizontal sextant angles by an observer on board.

At each station, small samples were collected from the sluice box, a system used to rudely concentrate samples from each hole drilled. On selected stations, aggregate samples, each approximately 50 lbs. in weight and representing a split of all the sediment sampled at each station, were also collected.

It must be borne in mind however, that the Phase I sampling system has not be designed to give precise assessments of ore grade but merely to - a) provide a preliminary assessment of the sediment types existing in the lease areas. b) show whether certain minerals of economic importance do exist in the lease areas and c) prove the validity of the seismic data interpretation.

Processing and Analysis of Samples

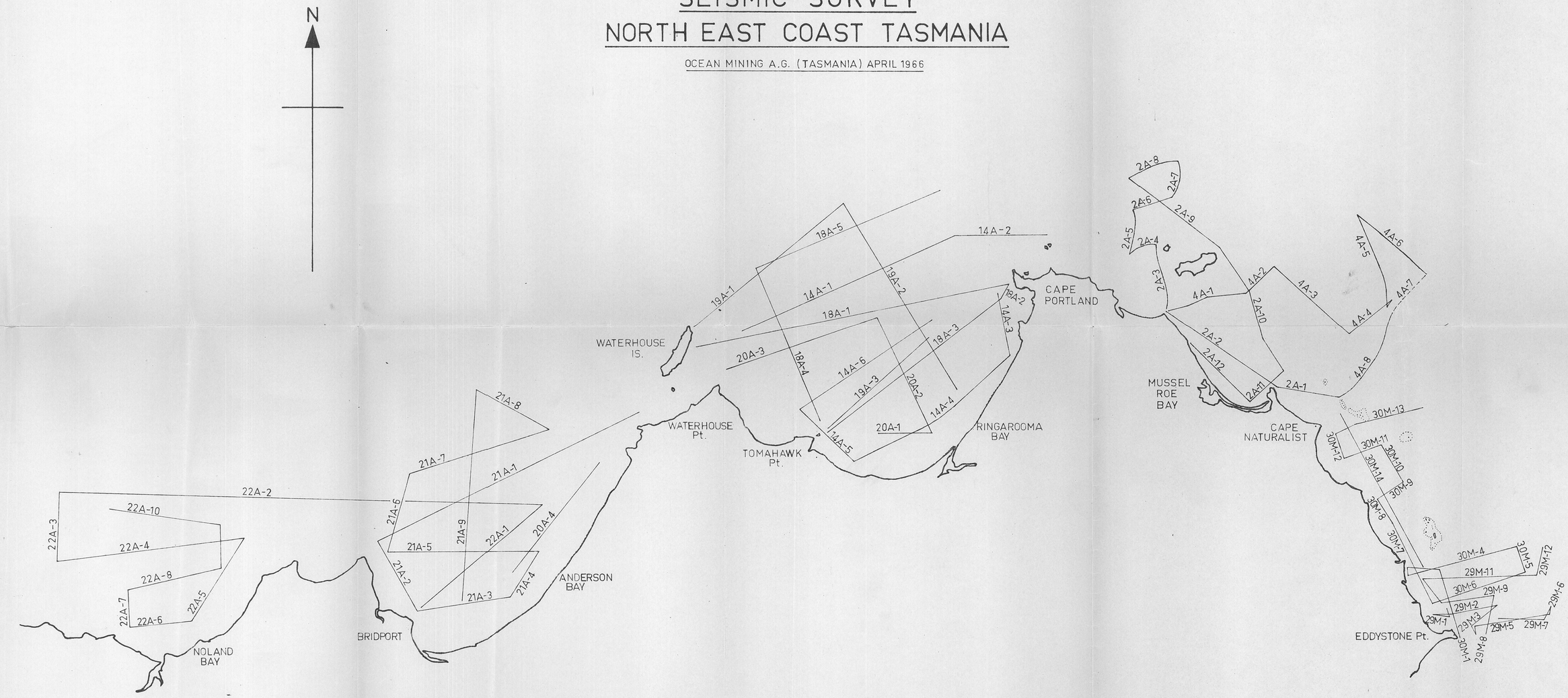
All the samples from the North East were duly transferred to the Launceston offices where arrangements had been made to dry and split them ready for analysis and submission to the Department of Mines.

Splits of samples from the Oyster Bay licence area have been submitted for semi-quantitative spectrographic analysis. Any samples yielding favourable results will be subjected to more detailed examination. Aggregate samples from Oyster Bay have been delivered to the Department of Mines Laboratories in Launceston for detailed size analyses. Each size fraction will be chemically analysed in order to determine whether minerals of economic importance, such as cassiterite, zircon etc. tend to exist in certain size grades.

Arrangements have been made with Mr. Jennings, Senior Geologist of the Department of Mines, to carry out petrographic analyses on splits of samples submitted to his Department.

TRACK CHART
SEISMIC SURVEY
NORTH EAST COAST TASMANIA

OCEAN MINING A.G. (TASMANIA) APRIL 1966



1 : 150,000

0 2 4 6 8 10

APPROX. SCALE IN MILES

5 cm

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FIG. 2

SAMPLE STATIONS
NORTH EAST COAST TASMANIA

OCEAN MINING A.G. (TASMANIA) APRIL 1966

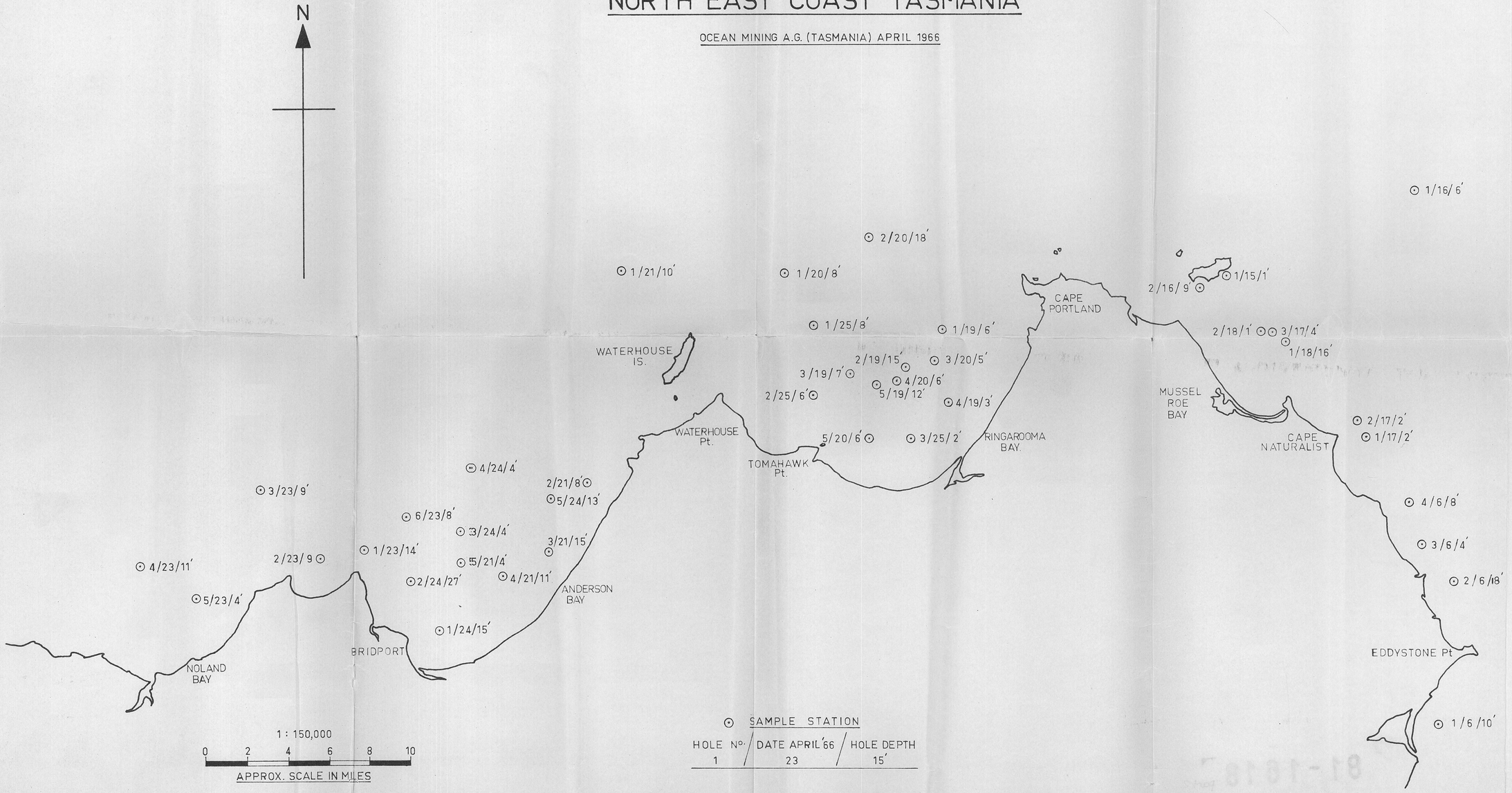

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FIG. 3

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TABLE 3 SAMPLING OPERATIONS · APRIL, 1966

Date	Licence Area	Occupation	Holes Drilled
April 1	)		
2	)		
3	)	Rest period	
4	)		
5	North East Coast,	Travel to St. Helens. Equipment maintenance.	
6	Tasmania.	Sampling	4
7		Bad weather. Shelter St. Helens	
8		Bad weather	
9		Bad weather	
10		Bad weather	
11		Bad weather	
12		Leave Port - Heavy fog, high seas. Anchor overnight at Eddystone Point	
13		Sail from Eddystone Pt.-Cape Naturaliste	
14		Sampling	3
15		Sampling abandoned in gale force winds	1
16		Sampling abandoned in heavy seas. Dragging anchors.	2
17		Gale force winds. Repair damage sustained on anchoring system.	
18		Sampling abandoned. Bad weather.	2
19		Sampling	5
20		Sampling	5
21		Sampling	5
22		Bad weather. Lay at anchor	
23		Sampling	6
24		Sampling	5
25		Sampling	3
26		Sail to Launceston	
27		Arrive Launceston	
28	)		
29	)	Rest period	
30	)		
		Total	41

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Preparations for Geophysical Survey, King Island

From 18th to 21st April an OMAG representative visited King Island. Prospective shore sites for the Raydist beacons along the east coast of the Island were examined and permission to set up the beacons at these sites was obtained from respective land owners. The best anchorages were noted and refuelling and victualling facilities for the survey vessels were organised. Accommodation and transport for the Raydist beacon operator were also arranged.

Staff

The staff complement was modified during April. Staff organisation at 30th April is shown in Table 4.

Management Visitors

Mr. R. Pratten of the Electrolytic Zinc Corporation visited Launceston Field Headquarters on 21st April. The Director and Chief Geologist, Tasmanian Mines Department have postponed their visit until the main sampling programme is underway.

Acquisition and Renewal of Exploration Licences

On 19th April OMAG was granted an exploration licence, E.L.1/66, for offshore areas surrounding Flinders Island. Exploration licences 22/65, 23/65, 24/65 and 25/65 for the King Island, Bass Strait, Pipers River and Oyster Bay licence areas were renewed on 22nd April.

Phase II Progress

Construction of the 25-ton drilling rig for the Phase II sampling programme and installation of the rig aboard the survey vessel WANDO RIVER are well advanced.

TABLE 4 STAFF COMPLEMENT - 30th April, 1966

	Name	Appointment	Commenced Employment
Professional Staff	S.R.M.Harvey	Field Manager	Before 1st March
	W. Davies	Senior Geologist	
	R.E. Warren	Geophyscist	
	A.von Rahden	Engineer	
	F. Libby	Geologist	
Non Professional Staff	J. Beaverstock	Lab.Technician	14th March
	C. Brough	Data Processing	15th April
	A.S.R.Davies	Secretary	Before 1st March
	G. Donnelly	Typist	3rd March
	B. Izard	Raydist Plotter	8th March
	L. Locsei	Driller	Before 1st March
	D. Murray	Geological Asst.	21st March
	D. Peacock	Geophysical Plotter	20th April
	L.G.Shields	Raydist Beacon Operator	24th March
	C. Thompson	Geophysical Asst.	3rd March
Part Time Staff	G.J. Donnelly	Data Processing and Draughting	
	J. Goodricke		
	C. Moore		
Staff included in contracts and charters	R. Macfadyen	Raydist maintenance engineer.	
	J. Pike	Skipper and crew Annette M.	
	P. Jackson		
	T. Choppin	Skipper and crew Aardverk.	
	B. Bone		
	B. Button		

PART II PRELIMINARY RESULTS

Seismic Survey

Examination of the seismic data shows that the sea bottom in the easterly section of the licence area, between Eddystone Point and Cape Portland, is largely bare bedrock with several minor infilled drainage channels and isolated, relatively small ponds of sediment. The latter are generally less than half a square mile in area. Few of these ponds can be considered as important targets for Phase II sampling operations. Within this easterly section however, there are some considerable areas of sediment. The most striking of these occurs in Mussel Roe Bay. The sediment has a minimum area of about eight square miles and in the centre of the bay attains a thickness of approximately seventy feet. The records suggest that this mass probably extends further offshore. In addition, the records reveal the presence of a sediment-filled channel extending north-westwards , from the bay centre.

West of Cape Portland lie the three major bays of the licence area, Ringarooma, Anderson and Noland. They display varying characteristics.

Apart from isolated sediment patches, the eastern part of Ringarooma Bay appears to be rock-floored. A sediment body with a maximum thickness of about two hundred feet occurs to the west. A possible extension of the old Ringarooma-Boobyalla drainage system has been observed lying no more than fifteen fathoms below present sea level. It constitutes a significant target for Phase II sampling.

Rock again outcrops in the centre of Anderson Bay, but extensive sediment bodies apparently exist on eastern and western sides of the Bay.

Noland Bay appears to be devoid of sediment, except well offshore in water depths of 20 to 25 fathoms.

Sampling

A summary of the sampling results to date is submitted in Table 4. Cursory examination of the samples shows them to consist mainly of sand and gravel. Fifty per cent of the samples contained substantial proportions of dark minerals and lithic fragments. Much of the sediment was undoubtedly derived from granitic and meta-sedimentary rocks, although pebbles and fragments of basic igneous rocks were occasionally found and it is almost certain that some of the darker minerals observed are

probably uninteresting silicates and iron oxides derived from these. Most of the holes were drilled in shallow sediment and over fifty per cent were drilled to bedrock or probable bedrock. Three holes, two in Ringarooma Bay and one in Anderson Bay, were drilled to compact clay layers which prevented further penetration; the thickness of these clay layers is unknown.

TABLE 5 SAMPLING RESULTS

Date	Hole No.	Hole Depth in Feet	Water Depth in Feet	Bedrock	Probable Bedrock	Sediment Type
April 6	1	10	66			Fine-medium sand
	2	18	87			Fine to very coarse sand and fine gravel
	3	4	46	x		Fine to medium sand and gravel
	4	8	86		x	Medium sand and gravel
" 14	1	2	69		x	Pea gravel
	2	2	58		x	Pea gravel
	3	4	90			Medium sand and gravel
" 15	1	1	42	x		Medium sand
" 16	1	6	138		x	Sand and gravel
	2	9			x	Fine to medium sand
18	1	16	100			Coarse sand to gravel
	2	1	92	x		Coarse sand to gravel
" 19	1	6	104	x		Coarse sand
	2	15	102	Compact clay		Fine sand and gravel
	3	7	96		x	Fine to coarse sand
	4	3	70	x		Fine to medium sand
	5	12	81			Fine to medium sand
" 20	1	8	123			Fine to medium sand
	2	18	84	x		
	3	5	102	x		Coarse sand and fine gravel
	4	6	90	Compact clay		Coarse sand and fine gravel.
	5	6	66		x	Fine to medium sand.
" 21	1	10	132		x	Coarse shelly sand
	2	8	72			Fine medium sand
	3	15	78		x	Medium sand
	4	11	93	x		Fine-medium sand
	5	4	99	Compact clay		Fine-medium sand
" 23	1	14	94			Fine-medium sand
	2	9	96			Fine sand.
	3	9	147			Fine to medium sand
	4	11	135		x	Fine to medium sand
	5	4	92		x	Fine to medium sand
	6	8	113			Medium sand
" 24	1	15	46		x	Medium-coarse sand

TABLE 5 (CONT.) SAMPLING RESULTS

Date	Hole No.	Hole Depth in Feet	Water Depth in Feet	Bedrock	Probable Bedrock	Sediment Type
April 24	2	27	54			Fine to medium sand
	3	4	117		x	Medium sand
	4	4	128		x	Medium-coarse sand
	5	13	114			Fine-medium sand and quartz gravel
" 25	1	8	117			Fine sand
	2	6	87	x		Fine-medium sand
	3	2	63	x		Fine-medium sand

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PART III PLANS FOR MAY, 1966

By mid-May all seismic data for the North East coast licence areas should be processed and detailed maps of bedrock topography, sediment distribution and thickness should be completed.

All samples have been dried and will be split into four parts. One split of each will be delivered to the Department of Mines, Hobart, one will be analysed, one retained for reference and the fourth will be stored for any further work which may later be seemed necessary. The same procedure will be adopted for the King Island samples.

Phase I seismic and sampling operations in the King Island licences should terminate during May. Revised schedules for these surveys are submitted in Table 6. Processing of King Island data will begin while field work is still in progress.

Preparations for the Phase I Flinders Island survey will be completed by mid-May. Accommodation and transport on the Island have been arranged. Bathymetric, seismic and sampling surveys should begin as outlined in Table 6 before the end of May.

Final preparations in the USA for the Phase II sampling programme should also be complete by mid-May. The survey vessel Wando River is expected to leave for Tasmania by 25th May.

TABLE 6 REVISED SCHEDULES FOR PHASE I SEISMIC AND SAMPLING PROGRAMMES - KING ISLAND LICENCE, AND PROPOSED BATHYMETRIC SEISMIC AND SAMPLING SCHEDULES FOR FLINDERS ISLAND LICENCE

Programme	Licence Area	Survey Vessel	Commence	End	Estimated Survey Days including travel to and from survey site
Bathymetry	Flinders	Marlisa	18th May	4th June	19
Seismic	King Island	Annette M	2nd May	17th May	16
	Flinders	"	24th May	18th June	25
Sampling	King Island	Aardverk	5th May	20th May	16
	Flinders	"	27th May	21st June	25

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OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS · MAY, 1966

Part 3

Ocean Mining A.G.
38 Canning Street,
Launceston, Tas.

10th June, 1966.

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SUMMARY

OMAG Operations continued on schedule throughout May. By mid-May work had been completed in five licence areas. A total of 1,055 traverse miles had been profiled and 117 sample stations examined. Operations in the Flinders Island Licence were well underway by the end of the month.

Although sampling was undertaken primarily in order to enhance our understanding of sediment types within each licence, it is worth noting that spectrographic examination of the Oyster Bay specimens has revealed the widespread occurrence of small quantities of tin, zirconium, titanium and chromium.

Final arrangements were made for the departure of the WANDO RIVER from USA. The ship is expected to arrive in Tasmania during July.

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PART 1 PROGRESS

General

An appraisal of the progress made since Phase I Operations began at the end of January shows that 1,055.8 nautical miles of seismic traverse and 117 drill holes were completed by mid-May. A breakdown is given in Table 1. These figures compare favourably with the 850 miles of seismic traverse and 95 sample sites estimated in the prospectus submitted to Joint venture participants in October, 1965. Work accomplished up to the end of May is shown diagramatically in Figure 1.

Progress during May

A spell of reasonably good weather during the first half of May allowed Phase I seismic and sampling operations in the King Island licence to be completed on schedule. A comparison of scheduled and actual progress is shown in Table 2.

On 21st May the survey vessel Marlisa sailed to Flinders Island and began a bathymetric reconnaissance of that Licence.

Following a scheduled rest period and refit, the seismic and sampling vessels Annette M and Aardverk departed for Flinders Island. Surveying began immediately on arrival in the Licence.

Seismic Operations

Preparations for surveying the King Island Licence were completed on 1st May and the Annette M departed from Launceston on the following day.

While the vessel was in transit, the geophysicist in charge and the Raydist operator flew to King Island and set up shore stations in readiness for the survey.

All equipment tests were completed by 5th May and profiling began immediately in the northern half of the Licence. Surveying continued, except when briefly interrupted by bad weather, until the programme was completed on 16th May. As shown in Table 3, a total of 267 nautical miles of traverse was run in ten days of actual profiling. Location of the traverses run is given in Figure 2.

TABLE 1 SUMMARY OF PROGRESS MID-MAY, 1966

Licence	Programme		
	Bathymetry: distance traversed, nautical miles	Seismic: distance traversed nautical miles	Sampling: holes drilled
Oyster Bay	450	460.3	48
North East Coast, Tasmania, including Pipers River	610	328.5	41
King Island	310	267	28
Flinders Island		INCOMPLETE	
Totals	1,370	1,055.8	117

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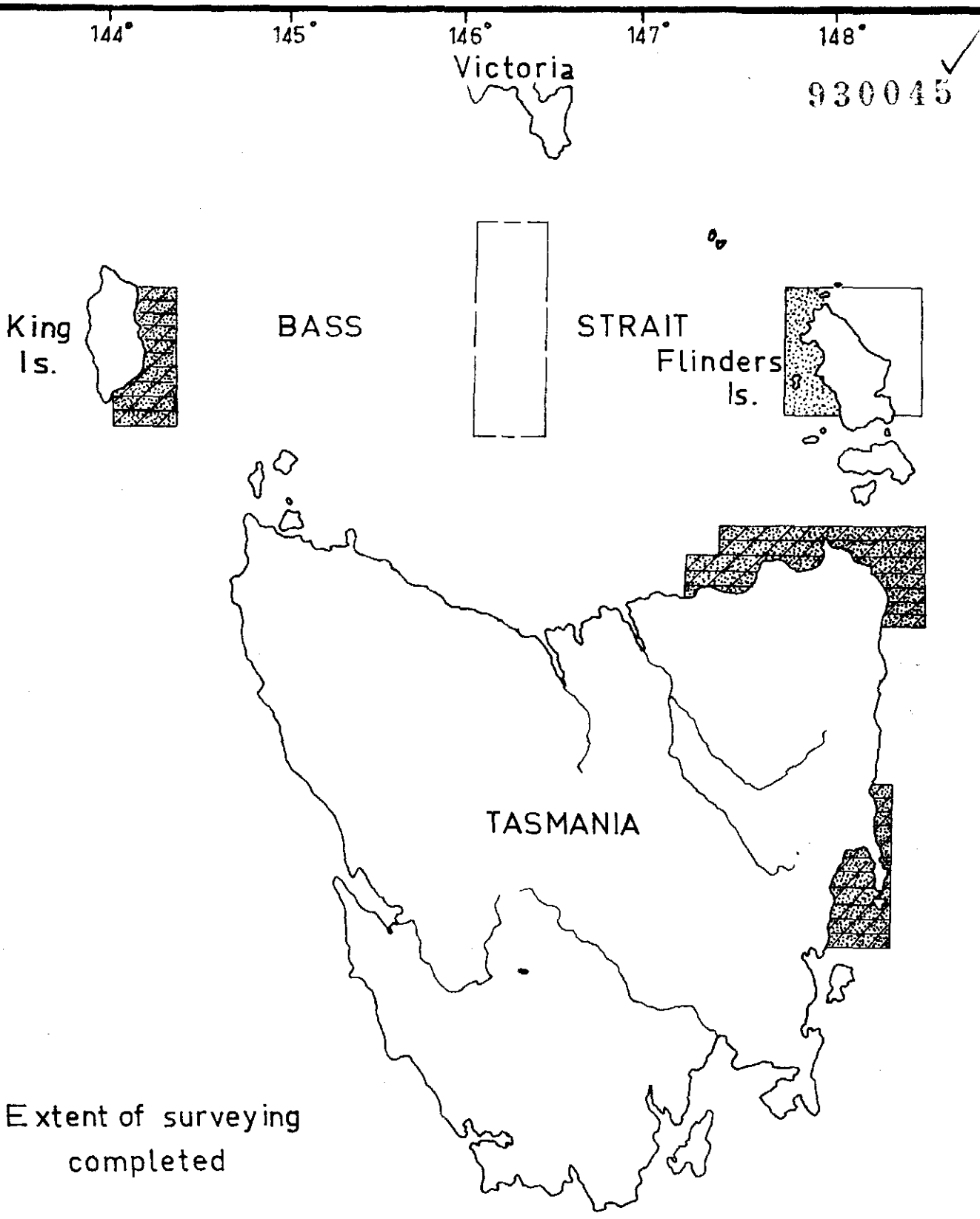

FIG.1 Map showing state of OMAG operations at end of May 1966

TABLE 2 COMPARISON OF SCHEDULED AND ACTUAL PROGRESS
KING ISLAND LICENCE AREA, TASMANIA.

Programme	Revised Schedule, April Report			Actual Times		
	Commence	End	Estimated Survey Days (not including Crew Relief Periods	Commence	End	Actual Survey Days
Seismic	2nd May	17th May	16	2nd May	18th May	16
Sampling	5th May	20th May	16	4th May	16th May	13

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TABLE 3 SEISMIC OPERATIONS · MAY, 1966

Date	Licence Area	Occupation	Naut.Miles Profiled	Record Quality
May 1	King Island	Preparations for King Island survey		
2		Sail to King Island		
3		" " "		
4		Arrive King Island-offload equipment		
5		Cut Raydist base line		
6		Calibrate Raydist	11	Fair
7		Profiling	10	"
8		"	14	"
9		"	53	Good poor
10		"	19	Fair
11		"	29	Good fair
12		Extremely bad weather Repair Raydist		
13		Profiling	47	Good fair
14		"	39	Fair
15		"	31	"
16		"	14	"
17		Sail to Launceston		
18		Arrive Launceston		
19		Rest period		
20		" "		
21		" "		
22		" "		
23)				
24)		Equipment and ships		
25)		maintenance and		
26)		repair.		
27)				
28	Flinders Is	Sail to Flinders Island		
29		Arrive Flinders Island		
30		Profiling	48	Good
31		Profiling	34	Good fair
		Total	349	
		Total for King Island	267	

On returning to Launceston the ship's crew was allowed a short rest period before making preparations for the Flinders Island survey. Seismic profiling began in the Flinders Island Licence on 30th May, and in the last two days of the month eighty-two miles of traverse were run.

Sampling Operations

The sampling vessel Aardverk left Launceston for King Island on 4th May, a day earlier than scheduled. As shown in Table 4, operations were completed by 17th May. Twenty-eight holes were drilled in water depths ranging from 24 to 106 feet. The maximum sediment depth drilled was 22 feet and bedrock or probable bedrock was reached in about 70% of the holes drilled. Distribution of sample stations is shown in Figure 3.

As in previous surveys, sample stations were selected on the basis of bathymetric and seismic data. At each station samples were taken from the sluice box. In addition, aggregate samples, representing a split of all sediment sampled at one station, were occasionally collected.

Following a scheduled rest period at the end of the King Island survey, the sampling equipment was overhauled and the Aardverk refitted ready for the Flinders Island survey. The vessel left Launceston for Flinders Island on 30th May.

Processing seismic data and analysis of samples

Seismic records collected in the North East Licence area were processed and maps showing sediment distribution and thickness and bedrock topography were compiled.

Processing of records from the King Island Licence was well advanced by 31st May.

Samples from the King Island Licence were delivered to the Launceston Field Office where they were dried and split ready for analysis and submission to the Department of Mines. Splits of samples from the North East Coast and King Island Licences were despatched to a commercial laboratory for semi-quantitative spectrographic analysis. Aggregate samples from these Licences were submitted to the Department of Mines laboratories, Launceston, for more comprehensive tests and analyses.

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TABLE 4 SAMPLING OPERATIONS MAY, 1966

Date	Licence Area	Occupation	Holes Drilled
May 1	North East Coast, Tasmania	Rest Period	
2		Equipment maintenance-prepare vessel for sea.	
3		"	
4	King Island	Sail to King Island	
5		"	
6		Arrive King Island	
7		Sampling	2
8		"	7
9		"	5
10		"	5
11		"	4
12	)	Bad weather, abandoned	1
13	)	sampling.	4
14		Bad weather	
15		Sail to Launceston	
16		" " "	
17		Arrive Launceston	
18		Rest Period	
19		" "	
20		" "	
21		" "	
22		" "	
23		Equipment and ships maintenance	
24		"	
25		"	
26		"	
27		"	
28		Preparations for Flinders Island cruise	
29		" " "	
30	Flinders Island	Sail to Flinders Island	
31		" " "	
		Total	28

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Staff

Although no increases were made, a minor reorganization of staff occurred during May. The staff roster at 31st May is shown in Table 5.

Management visitors

Mr. C.B. Edwards, representing Charter Consolidated and the Anglo American Corporation, visited the Launceston offices and the operations off King Island on the 6th and 7th May.

Phase II Progress

Final preparations for the departure of the WANDO RIVER from Long Beach, California were made during May.

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TABLE 5 STAFF COMPLEMENT 31st MAY, 1966

	Name	Appointment	Commenced duty, Launceston
Professional staff	S.R.M.Harvey	Field Manager	
	W. Davies	Senior Geologist	
	R.E.Warren	Geophysicist	
	A.von Rahden	Engineer	
	A.Scholtens	Geologist	2nd May
Non-professional staff	J.Beaverstock	Lab.Technician	
	R.Boys	Draughtsman	9th May
	C.Brough	Data Processing	
	A.S.R.Davies	Secretary	
	G.Donnelly	Typist	
	B.Izard	Raydist Plotter	
	L.Locsei	Driller	
	D.Murray	Geological Asst.	
	D.Peacock	Geophysical Plotter	
	L.G.Shields	Raydist Beacon Operator	
Part-time staff	J.Goodricke	Data Processing and draughting	
	C.Moore		
Staff: included in charters	J.Pike	Skipper and crew: Annette M	
	P.Jackson		
	T.Choppin	Skipper and crew: Aardverk	
	B.Bone		
	B.Button		
	J.Roozendaal	Skipper: Marlisa	

PART II PRELIMINARY RESULTS

Seismic Survey Results

Preliminary examination of the seismic data for the King Island Licence shows that the sea floor in the shallower inshore parts of Sea Elephant Bay and its northern neighbour between Cowper and Lavinia Points possesses a relatively thin and patchy sediment cover. Sediment thickens seaward and Elephant Shoal, approximately 5 miles offshore, which has been mapped on Admiralty charts as probably bare bedrock, is in fact a thick wedge of unconsolidated sediment up to 50 feet in thickness and approximately 8 square miles in area.

Less extensive sediment bodies occupy the small bays along the south-east coast of the Island. One of particular interest was found in Grassy Bay, off the mining area owned by King Island Scheelite Ltd.

Sampling

As shown in Table 6, most of the samples collected in the King Island Licence consisted of fine to medium-grained sand. Generally, the samples contained substantial proportions of dark coloured minerals; ilmenite, particularly, was a relatively common constituent. Sediment thicknesses revealed by sampling correspond reasonably well with those arrived at by seismic methods. Both show that bedrock outcrops extensively and that sediments, where present, are generally thin.

Results of Analyses

Results of semi-quantitative spectrographic analysis of Oyster Bay samples were received late in May. Values for important elements are given in Table 7. In addition, examination of aggregate samples from the same Licence and the North East Coast Licence were completed at the Tasmanian Mines Department Laboratories.

It must be borne in mind that the samples were collected primarily to allow improved interpretation of seismic data and provide information for the development of a mineral dressing plant for Phase II Operations. Choice of sample stations was not deliberately aimed at any

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King Island May '66

TABLE 6 SAMPLING RESULTS

Date	Hole No.	Hole Depth in Feet	Water Depth in Feet	Bedrock	Probable Bedrock	Sediment Type
May 7	1	0	39	x		No sample
	2	5	36			Fine-medium sand
8	1	0	58	x		No sample
	2	2	52	x		Fine-medium sand
	3	3	72	x		" " "
	4	3	90		x	Fine sand
	5	6	52	x		Fine-medium sand
	6	0	24	x		No sample.
	7	14	66	x		Fine-medium sand
9	1	13	33			" " "
	2	22	33			" " "
	3	4	81	x		" " "
	4	18	33		x	" " "
	5	5	84		x	" " "
10	1	5	42			" " "
	2	0	81	x		No sample
	3	5	104		x	Fine-medium sand
	4	10	106			Fine sand
	5	9	52	x		Fine-medium sand
11	1	12	38		x	Fine-medium-coarse sand
	2	9	39			Medium-coarse sand
	3	4	69			Fine-medium sand
	4	4	68		x	Medium-coarse sand
12	1	12	84			Fine sand
13	1	0	62	x		No sample
	2	14	76		x	Fine sand
	3	18	42			Fine-medium sand
	4	2	75	x		" " "

TABLE 7 RESULTS OF SEMI-QUANTITATIVE ANALYSES ON SAMPLES FROM OYSTER BAY

May '68

Hole No./ Date in March	Nature of Sample	Offshore Locality	Parts Per Million				
			Sn	Zr	Ti	V	Cr
1/3rd	Grab 2'	Picnic Is.	3	100	500	80	800
1/3	Grab 10'	Picnic Is.	8	<50	400	20	600
1/7	Grab 6'	Picnic Is.	40	100	500	100	600
1/8	Grab 16'	Picnic Is.	60	100	500	100	600
1/8	Grab 8'	Picnic Is.	30	80	500	50	1000
1/9	Average	Schouten Waterfall	60	<50	700	100	600
2/9	Average	Schouten Waterfall	30	100	800	50	500
3/9	Average	Schouten Waterfall	8	100	500	20	400
4/9	Average	Schouten Waterfall	10	150	700	80	800
5/9	Average	Picnic Is.	20	150	700	15	300
1/10	Average	9-Mile Beach	30	<50	200	10	300
2/10	Average	9-Mile Beach	20	<50	500	60	1500
3/10	Average	Cooks Bay	50	50	500	20	500
4/10	Average	Schouten Passage	25	<50	500	20	700
1/11	Average	Coles Bay	20	<50	300	20	500
1/16	Average	Knob Hill	16	<50	500	100	1500
2/16	Average	Freycinet Pen.	15	<50	250	25	300
3/16	Average	Mill Pond Beach	15	<50	250	15	500
4/16	Average	Schouten Reef	15	150	500	30	500
5/16	Average	9-Mile Beach	60	50	500	30	600
1/17	Average	Schouten Point	15	50	150	15	300
1/18	Average	Isthmus Beach	50	<50	400	50	1500
1/21	Sluice	W.Freycinet Pen.	50	<50	250	15	500

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TABLE 7 (CONT.)

May '66

Hole No./ Date in March	Nature of Sample	Offshore Locality	Parts Per Million				
			Sn	Zr	Ti	V	Cr
2/21	Sluice	W. Freycinet Pen.	40	<50	200	30	700
1/22	Sluice	W. Freycinet Pen.	15	150	300	10	150
1/25	Grab 18'	Weatherhead Point	15	<50	250	20	400
2/25	Sluice	Weatherhead Point	10	<50	200	30	500
3/25	Sluice	Isthmus Beach	3	50	300	30	500
4/25	Sluice	Isthmus Beach	25	<50	200	30	500
5/25	Sluice	9-Mile Beach	10	<50	300	30	800
1/26	Sluice	S. Schouten Is.	15	<50	200	20	1000
2/26	Sluice	Bryan's Corner	15	50	300	10	300
3/26	Grab 13'	Bryan's Corner	30	400	1500	10	300
1/27	Sluice	Hepburn Point	2	<50	150	30	500
2/27	Sluice	9-Mile Beach	5	150	500	40	300
2/27	Grab 31'	9-Mile Beach	5	<50	400	30	600
3/27	Sluice	9-Mile Beach	2	<50	300	25	200
4/27	Sluice	9-Mile Beach	8	50	250	15	600
5/27	Sluice	Hazard Point	8	50	300	30	500
1/28	Sluice	E. Sleepy Bay	500	<50	200	20	500
2/28	Sluice	Wineglass Bay	400	50	500	10	400
3/28	Sluice	Wineglass Bay	25	<50	500	25	600
4/28	Sluice	Wineglass Bay	10	100	300	20	400
5/28	Sluice	Wineglass Bay	8	<50	200	15	500
2/29	Sluice	Friendly Beaches	8	<50	200	20	600
3/29	Sluice	Friendly Beaches	8	<50	300	15	1200
4/29	Average	Friendly Beaches	8	<50	200	15	800
5/29	Sluice	Friendly Beaches	200	<50	400	15	500
7/29	Sluice	Butler's Inlet	70	500	600	30	1500

930053

possible mining targets and concentrating on board the sampling vessel was of the crudest. No attempt was made to relate volumes concentrated to total volumes samples.

Spectrographic results indicate the widespread occurrence of small quantities of tin, zirconium, titanium and chromium. At first glance, the titanium and chromium values appear to indicate the presence of chromium-rich ilmenite although many of the chromium values are abnormally high for such a condition.

Grain-size and qualitative analyses on the unconcentrated aggregate samples show that tin occurs predominantly in the finer, minus-200-mesh fractions of the samples. Qualitative tabling tests on the minus-72-mesh fractions of one of these samples revealed no cassiterite but did show heavy white and brown bands. Samples from these bands assayed 30 per cent zirconium and 9 per cent titanium suggesting the presence of zircon and rutile. Unfortunately, none of the aggregate samples was sufficiently rich in tin to warrant hydraulic cyclone tests to study this means of recovering cassiterite.

930057

17

PART III PLANS FOR JUNE, 1966.

Processing of the King Island seismic data will be completed during June and work will begin on the records and samples from the Flinders Island Licence. Seismic and sampling operations in the latter Licence should be finished by 20th June. Revised schedules for these surveys are shown in Table 8.

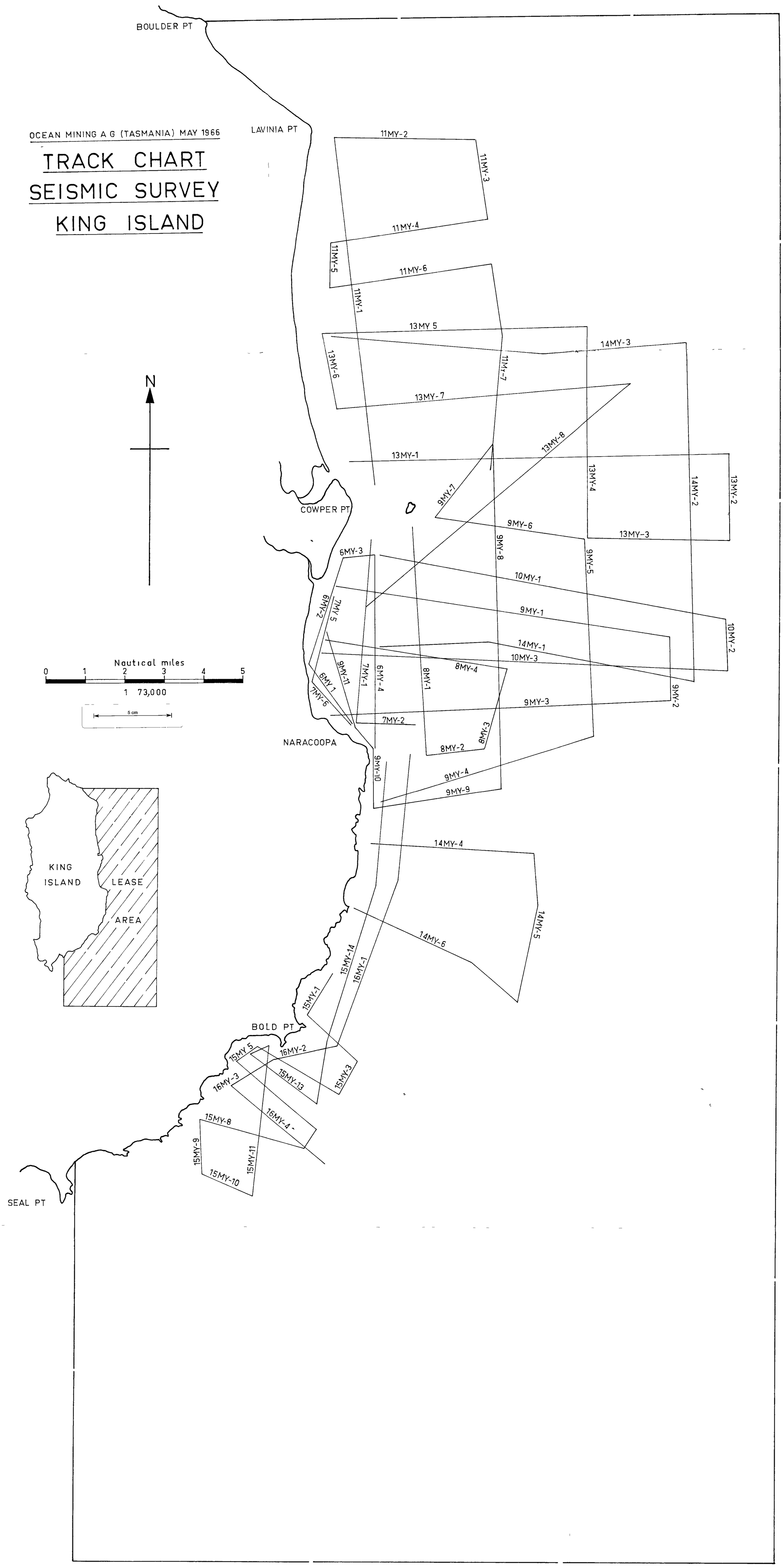
Results of spectrographic analyses on samples from the North East Coast and King Island Licences, together with results of mineral dressing tests on aggregate samples from King Island are expected by mid-June.

Preparations will be made for the arrival of the WANDO RIVER and the beginning of Phase II Operations.

TABLE 8 REVISED SCHEDULES FOR FLINDERS ISLAND LICENCE

Programme	Survey vessel	Commence survey	End survey	Estimated Survey Days including travel to & from site
Bathymetry	Marlisa	21st May	6th June	17
Seismic	Annette M	28th May	18th June	22
Sampling	Aardverk	30th May	20th June	22

930059



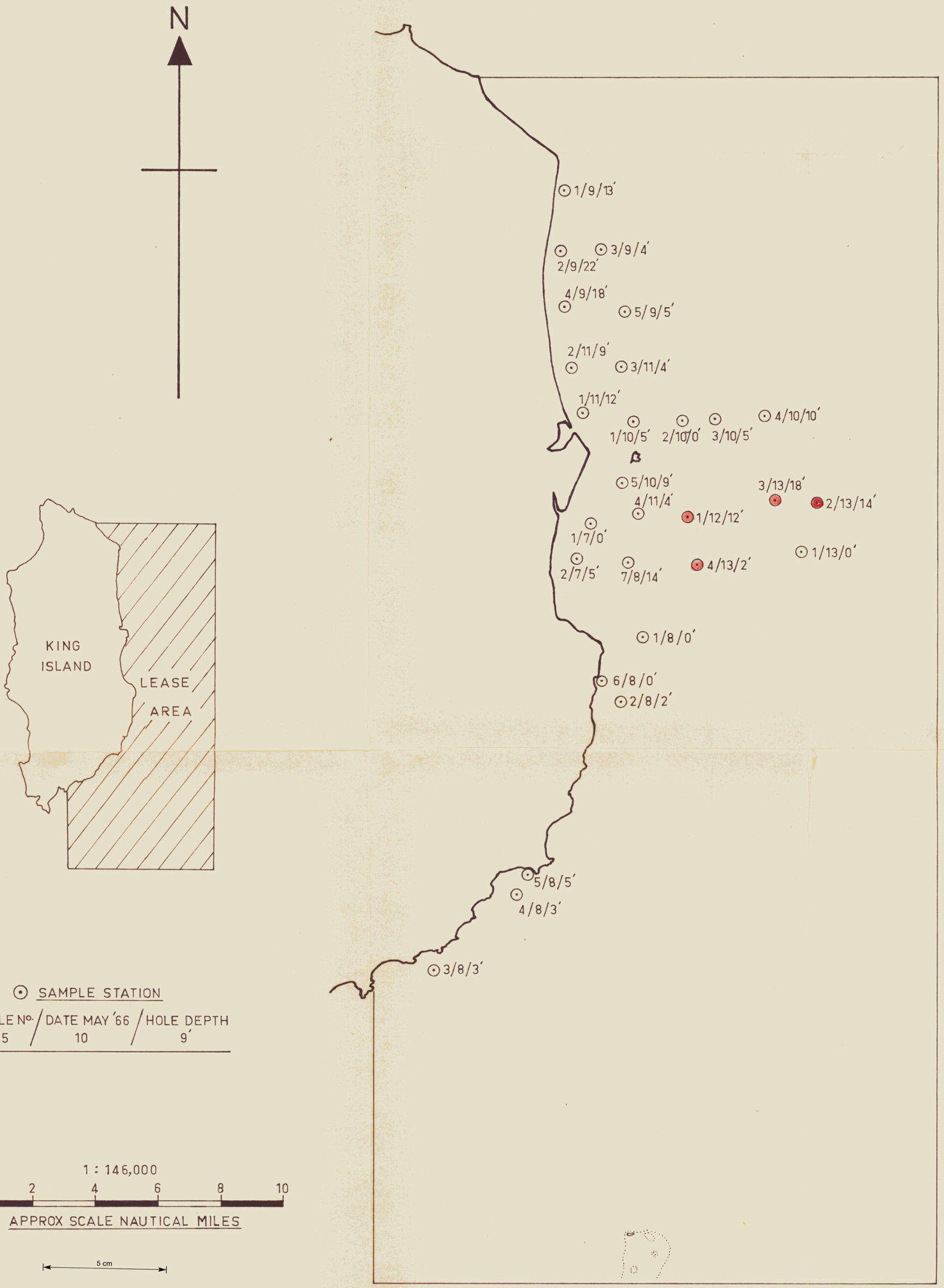
81-1618 Part 3

930059 FIG. 2

8004

OCEAN MINING A.G. (TASMANIA) MAY 1966

SAMPLE STATIONS
KING ISLAND



81-1618 part 3
930060

FIG. 3

930061

OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS - JUNE, 1966.

Part 4

Ocean Mining A.G.,
Field Headquarters,
38 Canning Street,
Launceston, Tasmania.

22nd July, [illegible].

930062

SUMMARY

Completion of seismic and sampling work in the Flinders Island licence on 12th June brought Phase I Field Operations to an end. Totals of 1,812 and 1,436 nautical miles of bathymetric and seismic traverse were realized and 143 stations were sampled.

Preparations were made for preliminary sampling in the areas under licence for phosphate exploration. Work will begin in mid-July.

Preliminary results of spectrographic, X-ray and mineralogical analyses on samples from Oyster Bay, North East Coast and King Island licences have revealed the concentrations of tin, titanium, zirconium and chromium enhancing prospects for the Phase II drilling programme.

930063

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930064

PART I PROGRESS

General

Phase I field operations ended on the 12th June. Table 1 shows that, since operations began at the end of January, 1,812 nautical miles of bathymetric traverse, 1,436 nautical miles of seismic profiling and 143 sediment tests were completed. The licence areas surveyed are shown in Figure 1.

Progress during June

Excellent weather during the first two weeks of June allowed the Phase I Operations in the Flinders Island licence area to be completed eight days ahead of schedule. A comparison of scheduled and actual progress is given in Figure 2. The seismic surveying programme, which is most susceptible to bad weather, was run almost without interruption and good records were acquired with relative ease.

Following a brief rest period, work began in mid-June on general demobilization of staff, equipment and survey vessels concerned with Phase I Operations.

During the latter part of the month, arrangements were made to equip the vessel Aardverk in readiness for preliminary sampling in areas under licence for phosphorite exploration.

Seismic Operations

Profiling in the Flinders Island licence area was well underway by 1st June with 82 nautical miles of traverse having been completed at the end of May. As shown in Table 3, 298 nautical miles had been profiled by the 9th June, making a total of 380 traverse miles for the licence area. Location of the traverses is shown in Figure 2.

On completion of the survey the Annette M returned to Launceston and after a scheduled rest period for the crew, the seismic equipment was dismantled and transferred to the Launceston field office. The work was completed by 20th June when the charter agreement on the Annette M expired.

TABLE 1. PHASE I PROGRESS TO 30th JUNE, 1966.

LICENCE	AREA SQUARE MILES	PROGRAMME		
		Bathymetry: distance traversed nautical miles	Seismic: distance traversed nautical miles	Sampling: holes drilled
Oyster Bay	740	450	460	48
North East Coast, Tasmania	1000	610	329	41
King Island	600	310	267	28
Flinders Island	1600	442	380	30
Totals End of Phase I Operations	3940	1812	1436	143

930065

930066

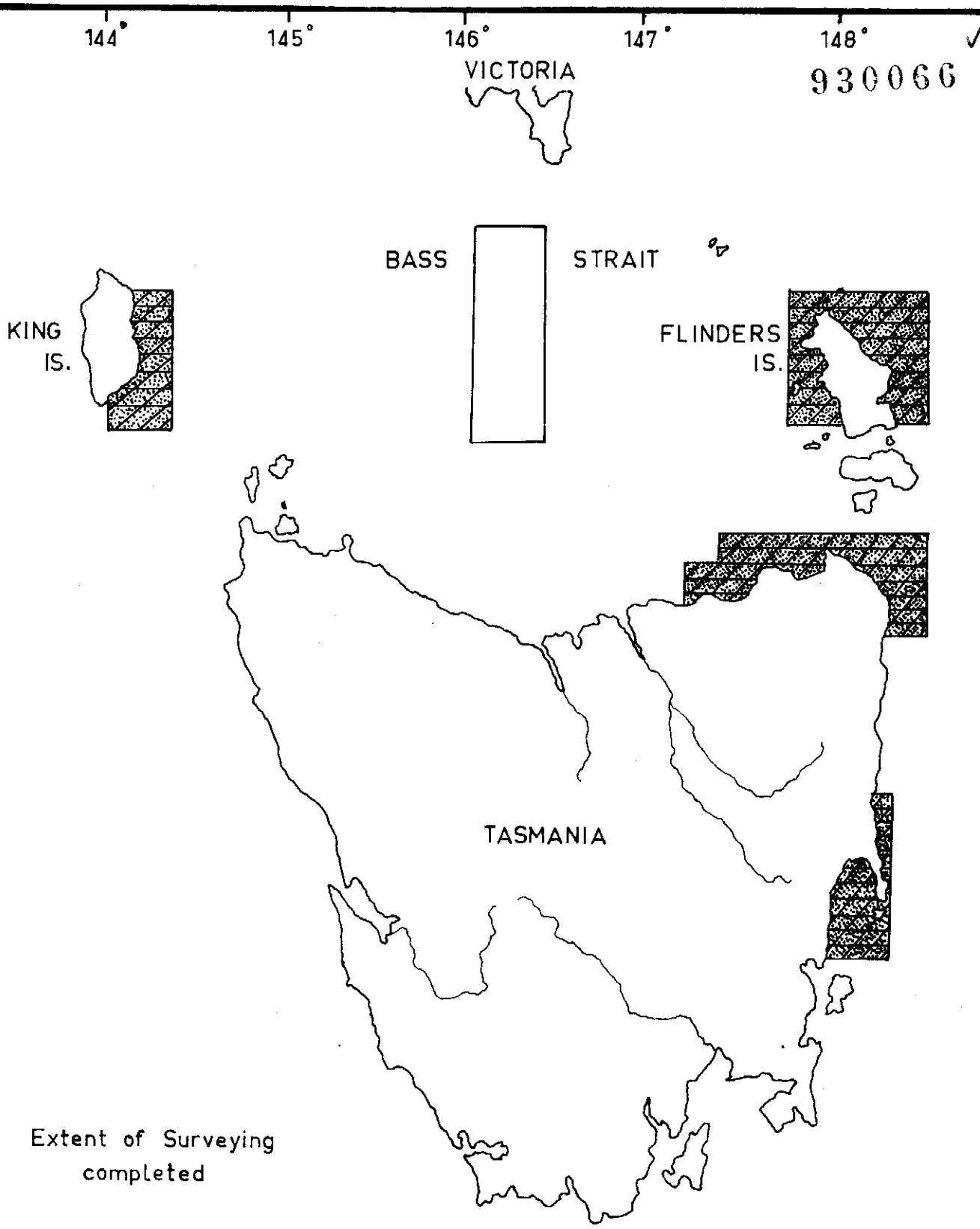

FIG. 1 Map showing state of OMAG operations at end of June 1966

TABLE 2 COMPARISON OF SCHEDULED AND ACTUAL PROGRESS
FLINDERS ISLAND LICENCE AREA, TASMANIA

Programme	Revised Schedule, May Report			Actual Times		
	Commence	End	Estimated survey days not including crew relief periods	Commence	End	Actual survey days
Seismic	28th May	18th June	22	28th May	10th June	14
Sampling	30th May	20th June	22	30th May	12th June	14

930067

TABLE 3 SEISMIC OPERATIONS - JUNE, 1966

Date	Licence Area	Occupation	Naut.miles profiled	Record Quality
June 1	Flinders Island	Profiling	29	Fair
2		"	53	Good
3		Bad Weather, equipment testing		
4		Profiling	39	Good
5		"	55	"
6		"	34	"
7		"	37	"
8		"	32	"
9		"	19	"
10		Transit to Beauty Point		
11		Rest Period		
12		" "		
13		" "		
14		)		
15		) Demobilization,		
16		) disassembly of seismic		
17		) equipment and transfer		
18		) to Launceston		
19		)		
20		End of Charter, Annette M		

Total for June 298

Total for Flinders Island 380

07

Sampling Operations

The sampling vessel Aardverk arrived in the Flinders Island licence area on 2nd June. Work began immediately and as shown in Table 4, continued without interruption until 10th June. Thirty holes were drilled. Locations of the sample stations are given in Figure 3. The maximum sediment depth drilled was 19 feet and bedrock or probable bedrock was reached in over 60% of the holes.

According to procedure adopted in earlier surveys, sample stations were selected on the basis of bathymetric and preliminary seismic data and both sluice box and occasional aggregate samples were collected.

The vessel returned to Launceston on 12th June and the crew were allowed a short rest period. On 16th June, the jet lift equipment was dismantled and removed from the vessel.

Preparations were then made to fabricate and install a U-frame, 14 feet high, on the stern of the Aardverk for preliminary sampling for phosphorite. The large stern winch used for anchoring the vessel during the jet-lift operations is to be stripped and modified to haul the dredges.

Processing seismic data and analysis of samples

Processing of seismic records collected in the King Island licence area was completed during June together with maps showing sediment distribution and thickness and bedrock topography. By the end of June all the records from the Flinders Island area had been processed and the resultant maps should be completed during July.

Samples from Flinders Island licence were delivered to Launceston and were immediately dried and split ready for analysis and submission to the Department of Mines. As in the case of samples from other licence areas, one set of splits was despatched to a commercial laboratory for semi-quantitative emission spectrographic analysis. Splits of any samples which reveal relatively high contents of tin will be subjected to precise, X-ray fluorescence analysis and to mineralogical examination.

TABLE 4 SAMPLING OPERATIONS - JUNE, 1966

Date	Licence Area	Occupation	Holes Drilled
June 1	Flinders Island	Transit to Flinders Island	
2		" " " "	
3		Sampling	1
4		"	2
5		"	4
6		"	5
7		"	3
8		"	5
9		"	4
10		"	6
11		Transit to	
12		Launceston	
13		Rest Period	
14		" "	
15		" "	
16		" "	
17		)	
18		)	
19		) Remove jet lift	
20		) sampling equipment	
21		) from M.V. Aardverk.	
22		) Design U-frame and	
23		) dredges for	
24		) phosphorite exploration	
25		)	
26		)	
27		)	
28		)	
29		)	
30		)	
		Total	30

Reorganisation of survey vessels and staff

Following the end of the Flinders Island operations, the bathymetric and seismic survey vessels, Marlisa and Annette M were released from charter.

A small reduction in the non-professional staff complement was effected during the month; only the personnel required for the completion of Phase I data processing and preparations for Phase II Operations were retained. The staff roster at 30th June is given in Table 5.

Management visitors

Mr. F.J. Lampietti, Executive Director of Ocean Mining A.G., visited the Launceston field office following the TOEC Board meeting on 28th June. During his stay, which lasted until 10th July, he reviewed the results of Phase I Operations and plans for the Phase II dredging and drilling programme.

Phase II progress

A delay in the departure date of the WANDO RIVER was called for while further tests were carried out on the newly-installed Horton Drilling Rig. The tests were successful and preparations were made for the ship's departure from Long Beach, California on the 3rd July. It is estimated that the ship will arrive in Tasmania within 42 days of its departure.

Preparations for the preliminary exploration of the licence area in the middle of Bass Strait were well under way by 30th June. Work is scheduled to begin during July.

Organisation of the Raydist positioning system for Phase II Operations also began during June.

930072

TABLE 5. STAFF 30th June, 1966

	Name	Appointment	Occupation
Professional	S.R.M.Harvey	Field Manager	Phase I and II
	W.Davies	Senior Geologist	Phase I and II
	R.E.Warren	Geophyscist	Phase II Raydist preparations
	A.von Rahden	Engineer	Phase II Wando River
	A.Scholtens	Geologist	Phase II Dredging
Non-Professional	J. Beaverstock	Lab. Technician	Phase II Sample preparations
	R.Boys	Draughtsman	Phase I Final draughting
	A.S.R.Davies	Secretary	Phase I and II Administration
	G.Donnelly	Typist	Phase I and II Administration
	B.Izard	Mechanic	Phase II Dredging
	D.Murray	Geologist Asst.	Phase II Dredging
	D.Peacock	Geophyscial Asst.	Phase I Final data processing
	L.G.Shields	Raydist Operator	Phase II Raydist preparations
Part-time	J.Goodricke	Data Processing and draughting	Phase I Final data processing
	C.Moore		
Staff included in charters	T.Chopping	Skipper and crew M.V.Aardverk	Phase II
	R.Bone		
	W.Button		

PART II PRELIMINARY RESULTS June '66

Seismic Survey Results

Preliminary examination of the seismic records from the Flinders Island licence show that, in much of the area, the sea floor is swept clean by complex and swiftly moving currents. On the west of the Island, unconsolidated sediment is confined mainly to bays and coves such as Killiecrankie and North Bays. Sediment lenses also occur on the lee sides of features such as South Pascoe and Prime Seal Islands.

To the east of Flinders Island, relatively large sediment bodies occur around Beagle Spit and Babel Island and in the south-eastern part of the licence. The latter body varies from 1 to 4 fathoms in thickness and undoubtedly extends beyond the licence area.

Sampling results

Samples collected in the Flinders Island licence area consisted mainly of fine to medium-grained sand. Descriptions of sample sites and samples are given in Table 6. Sediment thicknesses in holes which reached bedrock correspond favourably with those revealed by seismic profiling and indicate that although bedrock outcrops extensively within the licence, it is generally covered, in more sheltered localities such as bays and off the east coast of Flinders Island, by a relatively thin veneer of unconsolidated sediment.

Results of Analyses

i. Spectrographic Analyses. Semi-quantitative emission spectrographic analyses on samples from the North East Coast and King Island licences were completed during June. The more important results are given in Tables 7 and 8.

It must be emphasised once again however. that the samples analysed have no relation to actual volumes of sediment sampled and therefore the results are not indicative of ore grade.

Table 7 shows that tin occurs in considerably higher quantities in the samples from the eastern half of the North East Coast licence, that is, in Ringarooma Bay, and off Swan Island, Mussel Roe Bay and Cobblers Rocks. All eight samples from the eastern part of Ringarooma Bay, for example, showed tin values ranging from 500-10,000 parts per million.

TABLE 6 SEDIMENT TESTING - FLINDERS ISLAND LICENCE

June '66

Date	Hole No.	Hole depth in feet	Water depth in feet	Bedrock	Probable Bedrock	Sediment type
June 3	1	7	39			fine-medium grey sand
4	1	9	132			" " " "
	2	3	78		x	coarse shelly sand
5	1	0	42	x		
	2	0	54	x		
	3	1	66	x		fine-medium grey sand
	4	2½	30	x		coarse shelly sand
6	1	17	72		x	fine-medium sand
	2	1½	36			medium sand
	3	0	70	x		
	4	1	114			coarse shelly sand
	5	10	114		x	medium grey sand
7	1	-	60	Hole abandoned - strong current		
	2	9	60		x	coarse shelly sand
	3	-	60	Hole abandoned - strong current		
8	1	19	63			fine-medium sand
	2	15	63		x	medium sand
	3	5	63		x	fine-medium sand
	4	3	123	x		" " "
	5	2	90	x		coarse shelly sand
9	1	4	36	x		" " "
	2	3	54		x	" " "
	3	5	54		x	fine-medium sand
	4	6	66	x		" " "
10	1	8½	102			" " "
	2	2	24			coarse sand overlying clay
	3	3	78		x	coarse shelly sand
	4	3	96	x		medium-coarse sand
	5	2	48		x	very coarse sand
	6	2	51		x	coarse sand

13

June '66

The analyses also show that, locally, chromium is relatively abundant. Whether this reflects the presence of free chromite or chromium-rich ilmenite has yet to be resolved. Zirconium was found in all samples analysed, and although not shown in Table 7, it should be noted that in samples from the eastern half of the licence, certain rare earths such as caesium, occurred consistently.

Tin values in the Kind Island samples, as shown in Table 8 are relatively low. However, samples from the outer part of Sea Elephant Bay and the wedge of sediment 50 feet thick known as Elephant Shoal showed high titanium and zirconium values suggesting that these samples are rich in ilmenite and zircon.

ii. X-ray Fluorescence Analyses. In view of the semi-quantitative nature of the spectrographic analyses, precise X-ray fluorescence analyses were carried out on those samples from the North East Coast showing higher tin values. Table 9 shows that there is a reasonably close correlation between the results obtained by the two methods of analysis.

iii. Mineralogical Analyses. Heavy mineral fractions (Specific Gravity 2.9) in splits of ten samples from the Oyster Bay licence were subjected to mineralogical examination. This work was undertaken by the Tasmanian Department of Mines. The fractions were small, generally, constituting less than 1 per cent of each split. Mineral identification and grain counts, as given in Table 10, showed that zircon and ilmenite were the most common constituents with topaz relatively common in some samples. Rutile was noted in several splits but being dark in colour and almost opaque was generally indistinguishable from ilmenite. Cassiterite was seen in only one sample.

Results of mineralogical examination of the eight samples from the eastern part of Ringarooma Bay which had relevant high tin values were also received during June. Though splits will probably be studied by Officers of the Mines Department in Hobart, the results received come from an independent authority. The samples contain higher percentages of heavy minerals than those from Oyster Bay. Cassiterite and zircon were shown to be relatively common constituents in all samples examined. A comparison of Tables 9 and 11 shows that there is a rough correlation between cassiterite grain counts and the results of spectrographic and X-ray fluorescence analyses.

TABLE 7 RESULTS OF SEMI-QUANTITATIVE ANALYSES ON SAMPLES FROM THE NORTH EAST COAST LICENCE AREA

June '66

Hole No./ April Date	Hole depth in feet	Nature of sample	Offshore locality	Parts Per Million				
				Sn	Zr	Ti	V	Cr
1/6	10	Sluice	Anson Bay of Fires	2	50		8	400
2/6	18	"	Purdon Bay	2	50		6	10
3/6	4	"	Cod Bay	500	1500		10	1000
4/6	8	"	Cobbler Rocks	1000	200		8	1500
1/17	2	"	Black Reef	40	400		12	800
2/17	2	"	Black Reef	500	50		15	600
3/17	4	"	Tree Point	2500	100		20	1000
1/16	6	"	Cape Barren Is.	300	2000		20	3000
2/16	9	"	Swan Is.	3000	1000		100	2000
1/18	16	"	Mussel Roe Channel	300	150		8	300
2/18	1	"	Mussel Roe Channel	50	50		8	100
1/19	6	"	Ringarooma Bay	2500	50		12	1500
2/19	15	"	Ringarooma Bay	1000	80		10	200
3/19	7	"	Ringarooma Bay	5	50		7	50
4/19	3	"	Ringarooma Bay	10000	100		8	800
5/19	12	"	Ringarooma Bay	500	50		20	500
1/20	8	"	Waterhouse Island	4	50		1	3
2/20	18	"	Ringarooma Bay	6	50		20	400
3/20	5	"	Ringarooma Bay	7000	600		20	5000
4/20	6	"	Ringarooma Bay	5000	50		12	150
5/20	6	"	Ringarooma Bay	600	300		25	500
1/21	10	"	Papanui Rock	5	50		1	3
2/21	8	"	Anderson Bay	100	600		150	8000
3/21	15	"	Anderson Bay	100	150		100	800
4/21	11	"	Anderson Bay	100	500		30	1500
5/21	4	"	Anderson Bay	2	500		80	2000

cont.

930076

TABLE 7 CONCLUDED

Hole No./ April Date	Hole depth in feet	Nature of sample	Offshore locality	Parts Per Million				
				Sn	Zr	Ti	V	Cr
1/23	14	Sluice	E. Sandy Point	2	500		30	500
2/23	9	"	W. Sandy Point	2	500		100	500
3/23	9	"	Ninth Island	2	500		80	500
4/23	11	"	Noland Bay	3	50		6	50
5/23	4	"	Noland Bay	50	500		100	700
6/23	8	"	Anderson Bay	2	50		50	120
1/24	15	"	Anderson Bay	60	50		100	150
2/24	27	"	Anderson Bay	30	400		150	1500
3/24	4	"	Anderson Bay	20	80		80	700
4/24	4	"	Anderson Bay	2	100		50	600
5/24	13	"	Anderson Bay	2	100		30	600
1/25	8	"	Ringarooma Bay	80	500		6	200
2/25	6	"	Ringarooma Bay	2	50		2	3
3/25	2	"	Ringarooma Bay	2000	500		60	3000

June '66

93004

TABLE 8 RESULTS OF SEMI-QUANTITATIVE ANALYSES ON SAMPLES FROM THE KING ISLAND LICENCE AREA

Should be "V" CEB. 22/4/68

Hole No. May date	Hole depth in feet	Nature of sample	Offshore locality	Parts Per Million				
				Sn	Zr	Ti	U	Cr
2/7	5	Sluice	Sea Elephant Bay	60	100	1500	20	200
2/8	2	"	Naracoopa Pt.	3	100	2000	50	1500
3/8	3	"	Brig Rocks	3	100	5000	50	400
4/8	3	"	Grassy Bay	1	50	200	10	30
5/8	6	"	Grassy Bay	25	50	600	50	20
7/8	14	"	Sea Elephant Bay	1	300	800	10	15
1/9	13	"	Lavinia Pt.	70	50	400	2	5
2/9	22	"	Lavinia, Cowper Bay	60	500	1500	20	250
3/9	4	"	Lavinia, Cowper Bay	2	300	1500	30	500
4/9	18	"	Lavinia, Cowper Bay	2	50	200	12	600
5/9	5	"	Lavinia, Cowper Bay	80	300	1500	12	400
1/10	5	"	Cowper Pt.	1	80	1000	50	10
3/10	5	"	Cowper Pt.	1	200	1500	10	200
4/10	10	"	Cowper Pt.	3	50	300	8	7
5/10	9	"	Sea Elephant Bay	60	300	3000	50	2000
1/11	12	"	Sea Elephant Bay	80	500	3000	50	700
2/11	9	"	Lavinia, Cowper Bay	60	300	1500	8	50
3/11	4	"	Lavinia, Cowper Bay	60	500	5000	50	600
4/11	4	"	Sea Elephant Bay	1	300	2000	10	500
1/12	12	"	Elephant Shoal	2	2000	10000	50	500
2/13	14	"	Elephant Shoal	3	1000	>10000	70	1000
3/13	18	"	Elephant Shoal	2	1500	10000	50	1500
4/13	2	"	Sea Elephant Bay	3	1500	>10000	120	1500

June '66

930078

TABLE 9 COMPARISON OF SPECTROGRAPHIC AND X-RAY FLUORESCENCE ANALYSES OF SELECTED SAMPLES FROM THE NORTH EAST COAST LICENCE.

Sample numbers from sample map in April report	Location	Spectrographic Sn, p.p.m.	Fluorescence Sn, %
Hole No./April/Depth Date feet			
4 / 6 / 8	Cobblers Rocks	1,000	0.02
3 / 17 / 4	Tree Point	2,500	0.13
1 / 19 / 6	Ringarooma Bay	2,500	0.20
2 / 19 / 15	" "	1,000	0.065
4 / 19 / 3	" "	10,000	1.15
3 / 20 / 5	" "	7,000	0.44
4 / 20 / 6	" "	5,000	0.64
3 / 25 / 2	" "	2,000	0.07

June '66

640066

TABLE 10 RESULTS OF MINERALOGICAL ANALYSIS OF SELECTED SAMPLES FROM OYSTER BAY LICENCE

Sample numbers from sample map in March report	Location	Heavy fraction (SG 2.9) % of total	Light fraction (SG 2.9) % of total	Percentage of heavy fraction					
				Cassiterite	Zircon	Ilmenite	Rutile	Topaz	Others
3/ 8/16	Picnic Island	0.1	75.1		20	50	2	3	25
1/ 9/16	Schouten Waterfall	0.7	95.7		45	35	6	4	10
3/10/ 3	Cooks Bay	0.1	93.0		32	30	3	5	30
5/16/15	9-Mile Beach	0.3	95.1		40	- 28 -		1	31
1/18/12	Ismuth, W. Beach	0.1	88.0		40	- 50 -		2	8
1/21/11	W. Freycinet Peninsula	0.8	95.3		42	- 32 -		20	6
1/28/ 5	Sleepy Bay E.	1.7	94.3		54	19	5	13	9
2/28/ 8	Wineglass Bay	0.5	96.6		24	30	5	22	21
5/29/17	Friendly Beaches	0.6	93.5		25	17	3	14	41
7/29/12	Butlers Inlet	0.9	88.1	2	30	26	4		38

June '65

Analyses by Department of Mines, Hobart.

93006

TABLE 11 RESULTS OF MINERALOGICAL ANALYSIS OF SELECTED SAMPLES FROM NORTH EAST COAST LICENCE

Sample numbers from sample map in April report	Location	Heavy fraction (SG 2.9) % of total	Light fraction (SG 2.9) % of total	Percentage of heavy fraction					
				Cassiterite	Zircon	Monazite	Magnetite	Other opaques	Others
1/19/ 6	Ringarooma Bay	2.6	85.0	5	15	5	1	39	34
2/19/15	"	2.8	93.7	10	15	3	1	48	18
4/19/ 3	"	5.3	76.9	19	20	4	1	42	14
5/19/12	"	1.0	90.3	6	24	0	0	51	19
3/20/ 5	"	7.0	84.8	10	13	1	0	22	54
4/20/ 6	"	2.5	88.9	27	18	4	0	40	11
5/20/ 6	"	0.7	90.3	9	21	1	1	42	26
3/25/ 2	"	2.7	81.7	12	25	4	0	33	26

June '66

Analyses by independent authority.

930031

Monazite was found in all samples but one, and may well be the source of the rare earth values noticed in the spectrographic results. Opaque minerals generally represented between 30 and 50 per cent of all heavy mineral fractions: ilmenite and chromite, which are difficult to differentiate, appear to predominate.

The mineralogical examinations have also shown that most of the minerals of economic importance are confined to the finer (0.0209") grain-size fractions. This endorses the results of the grain-size analyses on aggregate samples. In most cases mineral grains were free of lithic fragments, a factor of importance when considering possible methods of mineral recovery.

21

PART III PLANS FOR JULY 1966.

Processing of Phase I data will be completed by mid-July. Work will continue on the preparation of drilling maps and Raydist positioning overlays for Phase II operations. Surveying of Raydist beacon sites will also be undertaken during July.

Sampling in the areas under licence for phosphate exploration will also begin in this month.

Results of spectrographic analyses on samples from the Flinders Island licence are expected during July - together with results of mineralogical examination of samples from the King Island licence.

8005

93008 1

OCEAN MINING A G (TASMANIA) JUNE 1966

TRACK CHART SEISMIC SURVEY FLINDERS ISLAND

N

5 cm

Nautical miles

0 1 2 3 4 5

West Sister Is

North Point

North Bay

Bligh Point

Killiecrankie Bay

Cape Frankland

Marshal Bay

Settlement Point

Arthur Bay

Prime Seal Is (Hummock Is)

Long Point

Parry Bay

Trousers Point

Sellars Pt

Babel Is

Logan Lagoon

Beagle Spit

F L I N D E R S I S L A N D

7JN1 7JN2 7JN3 7JN4 7JN5 7JN6

4JN1 4JN2 4JN3 4JN4 4JN5 4JN6 4JN7 4JN8

1JN1 1JN2 1JN3 1JN4

6JN7 6JN8 6JN9 6JN10 6JN11 6JN12 6JN13 6JN14 6JN15 6JN16 6JN17 6JN18 6JN19

5JN1 5JN2 5JN3 5JN4 5JN5 5JN6 5JN7 5JN8 5JN9 5JN10 5JN11

9JN1 9JN2 9JN3 9JN4 9JN5 9JN6 9JN7 9JN8 9JN9

6JN1 6JN2 6JN3 6JN4 6JN5 6JN6

31MY1 31MY2 31MY3 31MY4 31MY5 31MY6 31MY7 31MY8

30MY1 30MY2 30MY3 30MY4 30MY5 30MY6 30MY7 30MY8 30MY9 30MY10 30MY11 30MY12

8JN1 8JN2 8JN3 8JN4 8JN5 8JN6 8JN7

2JN1 2JN2 2JN3 2JN4 2JN5 2JN6 2JN7 2JN8

FIG.2

8005

8006

OCEAN MINING A.G. (TASMANIA) JUNE 1966

SAMPLE STATIONS FLINDERS ISLAND

West Sister Is.

North Pt.

North Bay

Bligh Pt.

2/7/– ⊙

Beagle Spit

1A/7/– ⊙

1/7/9′ ⊙

1/8/19′ ⊙

1/3/7′ ⊙

Killiecrankie Bay

2/8/15′ ⊙

3/8/5′ ⊙

3/5/? ⊙

Cape Frankland

1/5/0′ ⊙

2/5/0′ ⊙

N

Nautical miles

0 1 2 3 4 5

5 cm

3/9/4′ ⊙

4/9/3′ ⊙

Marshal Bay

2/9/7′ ⊙

5/9/5′ ⊙

4/5/2-6″ ⊙

Sellars Pt.

Babel Is.

1/6/17′ ⊙

2/6/4-6″ ⊙

1/4/9′ ⊙

6/9/– ⊙

4/8/3′ ⊙

5/8/2′ ⊙

FLINDERS ISLAND

Settlement Pt.

6/6/10′ ⊙

5/6/GS ⊙

2/4/3′ ⊙

Prime Seal Is. (Hummock Is.)

1/9/3′ ⊙

6/10/2′ ⊙

Arthur Bay

5/10/2′ ⊙

3/6/GS ⊙

4/6/GS ⊙

4A/6/GS ⊙

Long Pt.

4/10/2-6″ ⊙

1/10/8-6″ ⊙

Parry Bay

2/10/2′ ⊙

3/10/2-6″ ⊙

Logan Lagoon

Trousers Pt.

⊙ SAMPLE STATIONS

HOLE No. / DATE JUNE 1966 / HOLE DEPTH

4 / 16 / 12′

Symbols at hole depth

— Indicates no sample taken

? " penetration uncertain

GS " only grab sample taken

81-1618 part 4

930058 FIG.3

Part 4 8006

930086

OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS - JULY, 1966.

Part 5

Ocean Mining A.G.
Field Headquarters,
38 Canning Street,
Launceston, Tasmania.

14th August, 1966.

51

930087

SUMMARY

Processing of Phase I data was completed by mid-July.

Results of spectrographic analyses on samples from Flinders Island licence showed minor concentrations of titanium and rare earths but only small amounts of tin.

Considerable progress was achieved in general mobilization for Phase II operations.

Preliminary sampling for phosphate in the Bass Strait licence began on 31st July.

By the end of July, Wando River had completed half its voyage across the Pacific Ocean en route for Tasmania. The vessel is expected to arrive about 17th August.

930088

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PART I PROGRESS

General

Final processing of Phase I seismic and sampling data was completed by mid-July. Results of spectrographic analyses on samples from the Flinders Island licence were received at the end of the month.

In particular, however, July has been a month of general mobilization for Phase II drilling and dredging operations.

Progress during July:

Preliminary phosphate exploration

Preparations for preliminary exploration for phosphate in the Bass Strait and West King Island licences were completed in the latter part of the month.

Steel dredges were constructed in a Launceston foundry. A pivoting U-frame, 14 feet high, was assembled on the stern of the m/v Aardverk and a small electric winch was adapted to lower and raise the frame over the stern of the vessel. A large hydraulic winch, previously used for anchoring the vessel was modified to carry two winch drums, each loaded with 2,000 feet of ½ inch gauge wire. The drums may be run independently and possess separate braking systems. The vessel, thus equipped, is capable of sampling the sea bottom in water over 100 fathoms deep. A Bendix Radio Direction Finding system was installed on board in order to provide reasonably precise navigation in these licences which are relatively far offshore. All equipment had been installed by late July and successful tests were undertaken off the mouth of the River Tamar during the latter part of the month.

Dredging operations in the Bass Strait licence began on 31st July.

Preparations for Phase II drilling

A small survey party was despatched to the North East Coast and Oyster Bay licences early in the month. Raydist beacon sites, which would allow the best possible coverage of the major target areas selected for drilling,

were surveyed. Work in these two licence areas was completed by the end of July.

The locations of these beacon sites were plotted on maps and Raydist overlays compiled at a scale of 1:24,000. These maps and overlays will allow accurate fixing of Phase II drilling stations.

Cabled messages from the Wando River revealed that the vessel was approximately half way across the Pacific Ocean by the end of July and had, in fact, remained on schedule for the first part of its voyage. The vessel's estimated time of arrival in Tasmania, on leaving Fanning Island in mid-Pacific, was 17th August.

Staff Complement

A reorganization of staff occurred during July. The people working on Phase I data processing gradually became more involved in the preparations for Phase II operations. By 31st July, essentially all personnel were fully employed on the second phase. Table 1 shows the staff roster at the end of July.

Management visitors

Mr. W. Bascom, President of Ocean Science and Engineering and Mr. F.J. Lampietti, Executive Director of Ocean Mining A.G., visited the Launceston offices after the T.O.E.C. Board meeting on 28th July.

Application for licence areas

On 5th July, public notice was given in the Mercury newspaper, of O.M.A.G's intention to make applications for exploration licences in respect of two areas off the southern coast of Tasmania. The location of these areas is shown in Figure 1.

The smaller area, bordering the south west corner of Tasmania, is 93 square miles in area and will be examined for concentrations of alluvial cassiterite. The larger one, about 2,550 square miles in area, was selected as a possible phosphate bearing area.

The licences were offered to the T.O.E.C. Board on 28th July and representatives from Anglo American Corporation, Charter Consolidated, Electrolytic Zinc Ltd.

and Ocean Science and Engineering agreed in principle that the areas should be included in the joint venture. The matter, however, was deferred pending discussions with representatives of Bethlehem Steel Corporation.

TABLE 1 STAFF COMPLEMENT 31st July, 1966.

	Name	Appointment	Occupation
Professional	S.R.M. Harvey	Field Manager	Phase I and II
	W. Davies	Senior Geologist	Phase I and II
	A. von Rahden	Marine Engineer	Phase II Wando River
	A. Scholtens	Geologist	Phase II dredging
	P. Skipwith	Geologist	Phase II
Non-professional	J. Beaverstock	Laboratory Tech.	Phase II Sample preparations
	R. Boys	Draughtsman	Phase I and II
	A.S.R. Davies	Secretary	Phase I and II Administration
	L. Taylor	Typist/Secretary	Phase I and II Administration
	D. Griffiths	Data plotter	Phase II
	B. Izard	Mechanic	Phase II drilling preparations
	L. Locsei	Welder/Mechanic	Phase II dredging
	D. Murray	Geologist Asst.	Phase II dredging
	L.G. Shields	Raydist Operator	Phase II Raydist preparations
Part-time	J. Goodricke	Data processing and draughting	Phase I and II
Staff included in charters	T. Chopping R. Bone W. Button	Skipper and crew m/v Aardverk	Phase II dredging

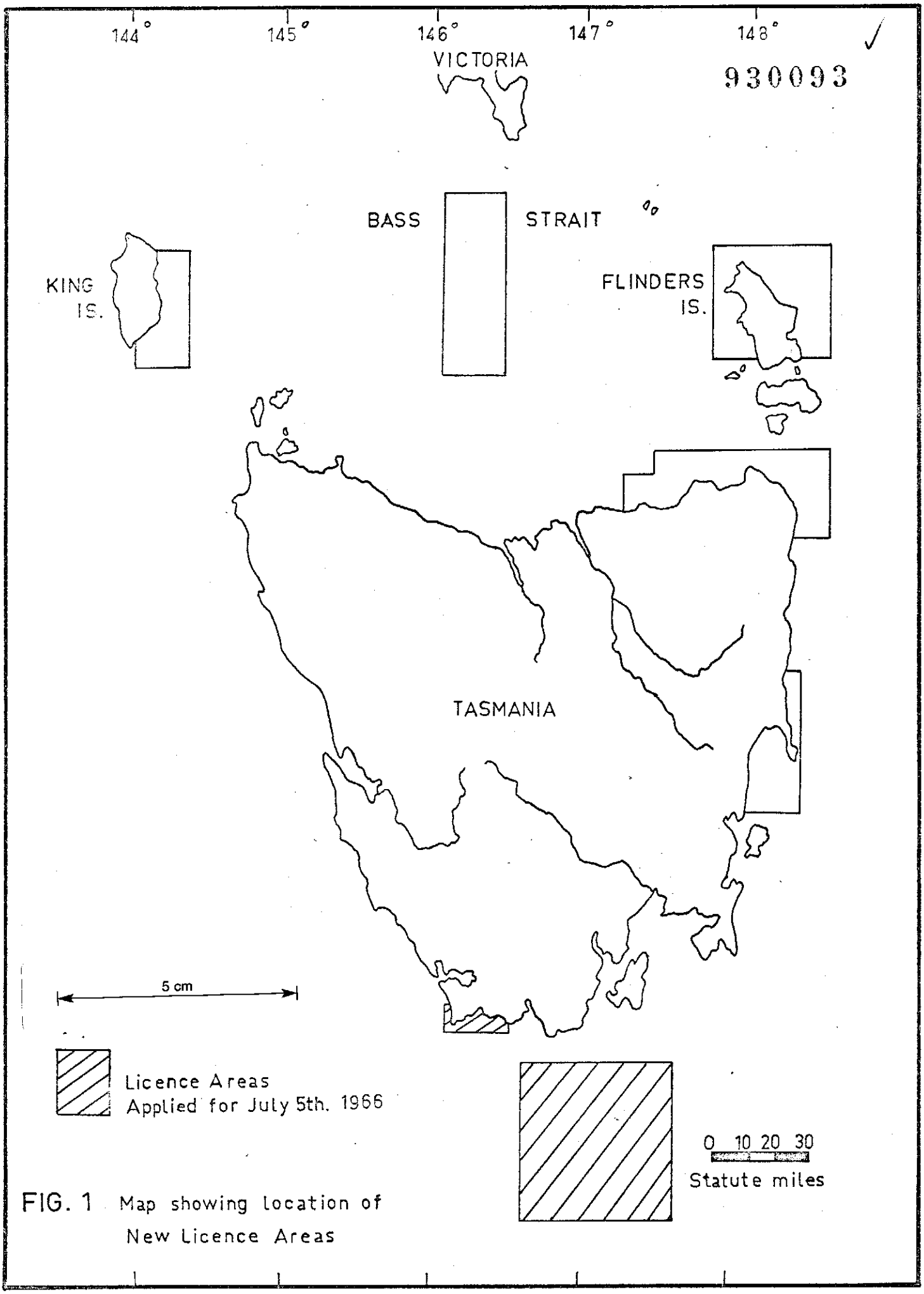


FIG. 1 Map showing location of New Licence Areas

PART II PRELIMINARY RESULTS

Results of Analyses

Semi-quantitative emission spectrographic analyses on samples from the Flinders Island licence were completed by the end of July. The more important results are shown in Table 2 and Figure 2.

Tin values were low but generally comparable with those for the King Island and Oyster Bay samples. Analyses on samples from south of Babel Island, Beagle Spit, Killiecrankie Bay and the Northern half of Marshall Bay showed relatively high titanium and rare earth values, which indicate, as in the case of the samples from the North East Coast and King Island licences, the possible presence of ilmenite and monazite.

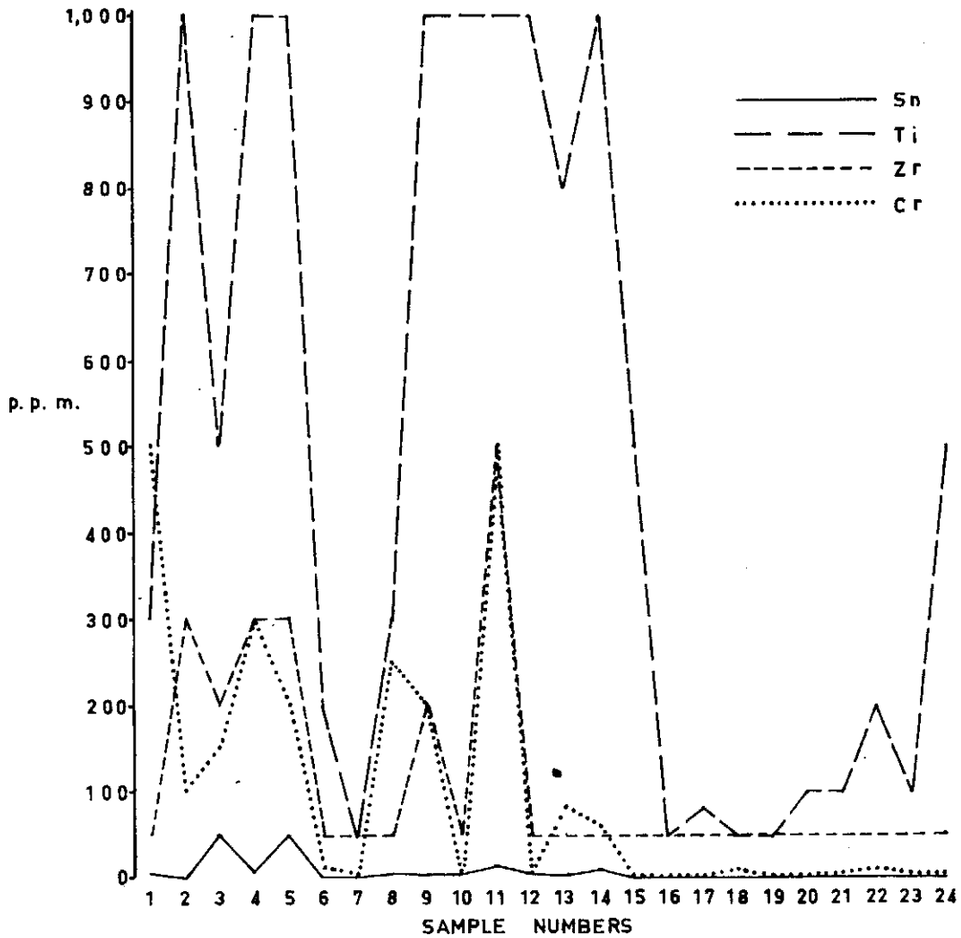
09

930095

SPECTROGRAPHIC RESULTS

Sample	p. p. m.			
	Sn	Ti	Zr	Cr
1	4	300	< 50	500
2	1	1000	300	100
3	50	500	200	150
4	7	1000	300	300
5	50	1000	300	200
6	< 1	200	< 50	12
7	< 1	50	< 50	6
8	3	300	< 50	250
9	1	1000	200	200
10	2	1000	< 50	6
11	15	1000	500	500
12	6	1000	< 50	6

Sample	p. p. m.			
	Sn	Ti	Zr	Cr
13	5	800	< 50	80
14	10	1000	< 50	60
15	2	500	< 50	6
16	< 1	< 50	< 50	< 3
17	1	80	< 50	5
18	2	50	< 50	10
19	< 1	< 50	< 50	< 3
20	< 1	100	< 50	< 3
21	< 1	100	< 50	5
22	< 1	200	< 50	8
23	2	100	< 50	5
24	1	500	< 50	5



SAMPLE LOCATIONS

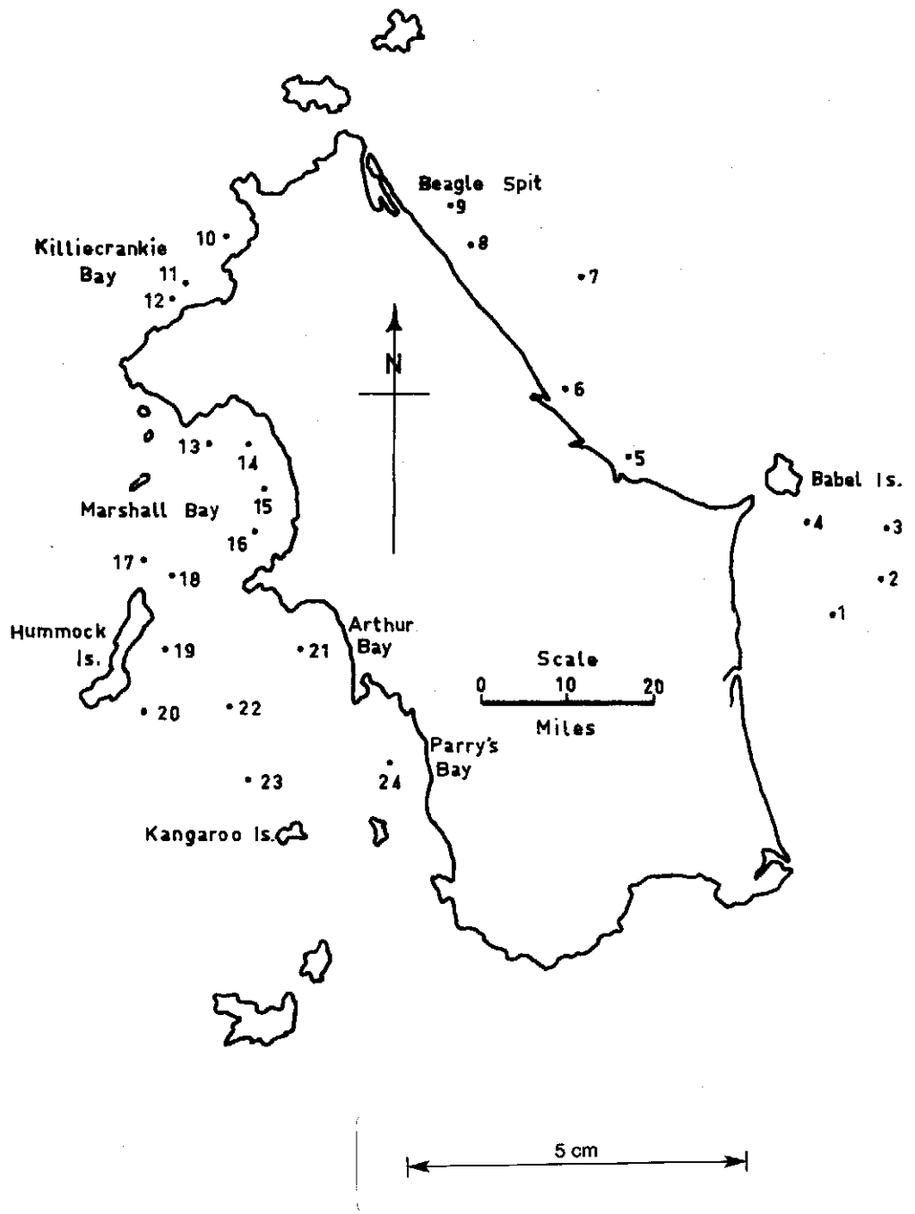


FIGURE 2 . DISTRIBUTION OF TIN, TITANIUM, ZIRCONIUM & CHROMIUM, FLINDERS ISLAND, TASMANIA.

OCEAN MINING A. G. JUNE '66

TABLE 2 RESULTS OF SEMI-QUANTITATIVE ANALYSES ON SAMPLES FROM THE FLINDERS ISLAND LICENCE AREA

Hole No./ June Date	Hole depth in feet	Nature of sample	Offshore locality	Parts Per Million				
				Sn	Zr	Ti	V	Cr
1/ 3	7	Sluice	Beagle Spit	3	< 50	300	6	250
1/ 4	9	"	Babel Island	50	200	500	8	150
2/ 4	3	"	Sellar Bay	4	< 50	300	5	500
1/ 5	1	"	Foo Chow Bay	<< 1	<< 50	200	5	12
3/ 5	1	"	" " "	<< 1	<< 50	50	3	6
4/ 5	2½	"	" " "	50	300	1000	7	200
1/ 6	17	"	Babel Island	7	300	1000	25	300
6/ 6	10	"	" "	1	300	1000	10	100
1/ 7	9	"	Beagle Spit	1	200	1000	7	200
1/ 8	19	"	Killiecrankie Bay	2	< 50	1000	6	6
2/ 8	15	"	" "	15	500	1000	20	500
3/ 8	5	"	" "	6	< 50	1000	5	6
4/ 8	3	"	Prime Seal Island	1	<< 50	80	1	5
5/ 8	2	"	" " "	2	<< 50	50	3	10
3/ 9	4	"	Marshall Bay	5	<< 50	800	15	80
4/ 9	3	"	" "	10	<< 50	1000	10	60
5/ 9	5	"	" "	2	<< 50	500	1	6
6/ 9	6	"	" "	<< 1	<< 50	< 50	1	< 3
1/10	8½	"	Prime Seal Island	< 1	<< 50	100	1	< 3
2/10	2	"	Whitemark	1	<<< 50	500	8	5
3/10	2-3	"	Parry's Bay	2	<< 50	100	2	5
4/10	2-3	"	Prime Seal Island	<< 1	<< 50	200	2	8
5/10	2	"	Davies Hill	<<< 1	<< 50	100	8	5
6/10	2	"	Prime Seal Island	< 1	< 50	< 50	< 1	3

930096

PART III PLANS FOR AUGUST, 1966.

Preliminary sampling in the areas under licence for phosphate exploration will continue during August. A tentative schedule is given in Table 3.

Wando River is expected to dock in Tasmania on 17th August. Preparations for its arrival will be finalised during the early part of the month.

Testing of Raydist equipment and surveying of Raydist beacon sites will be completed by mid-August. Production of drilling maps and Raydist positioning overlays will also be completed by this time.

TABLE 3 SCHEDULE FOR PRELIMINARY PHOSPHATE DREDGING PROGRAMME

VESSEL : M/V AARDVERK

Licence	Area in Square Miles	Commence Survey	End Survey	Survey Days
Bass Strait	1900	31st July	14th August	14
West of King Island	3290	20th August	3rd September	14

9300938

930089

OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS - AUGUST, 1966.

Part 6

Ocean Mining A.G.,
Field Headquarters,
38 Canning Street,
Launceston, Tasmania.

10th September, 1966.

930100

SUMMARY

Preliminary dredging operations proceeded according to schedule during August. A total of 43 samples was collected from the Bass Strait and West King Island licences. Phosphatic nodules were found in several samples from the latter licence.

Bathymetric and preliminary sampling work in the South West Tasmanian licence was completed during the month.

All samples have been processed and split and results of chemical analyses are expected during September.

Bad weather hampered progress of the m/s Wando River across the Pacific Ocean. The vessel is expected to arrive in Tasmania early in September. Phase II drilling operations will begin before the end of the month.

02

930101

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PART I PROGRESS

General

Preliminary sampling in the Bass Strait and West King Island licences was completed during August. Bathymetric and sampling operations in the south west Tasmanian licence were also completed during the month.

A general indication of work accomplished since operations began early in the year is presented in Figure 1.

Progress during August

Preliminary phosphate exploration

As shown in Table 1, dredging operations with m/v Aardverk began in the Bass Strait licence on 31st July and were concluded by 18th August. By this time, 33 samples had been dredged from 34 stations uniformly distributed within the licence. Locations of sample stations are given in Figure 2. The samples were collected from the sea floor in water depths ranging from 43 to 46 fathoms.

Positioning of the vessel was controlled by a Radio direction finder, celestial navigation, horizontal sextant angles when possible and dead reckoning (compass reading and ship log).

Following the completion of the Bass Strait licence sampling programme, and after a brief rest period during which routine maintenance was carried out on the vessel and sampling equipment, the m/v Aardverk left Launceston to dredge the West King Island licence. Table 2 shows that dredging began on 27th August and a short sampling programme was completed before bad weather forced the vessel to seek shelter on the last day of the month. Ten samples were collected, eight by dredge and two by Van Veen grab sampler. Figure 3 shows the locations of the sample stations together with the positions of twelve stations sampled by grab during a brief survey undertaken by O.M.A.G. before Phase I Operations began in January. All samples were collected in water depths ranging from 48 to 110 fathoms.

930103

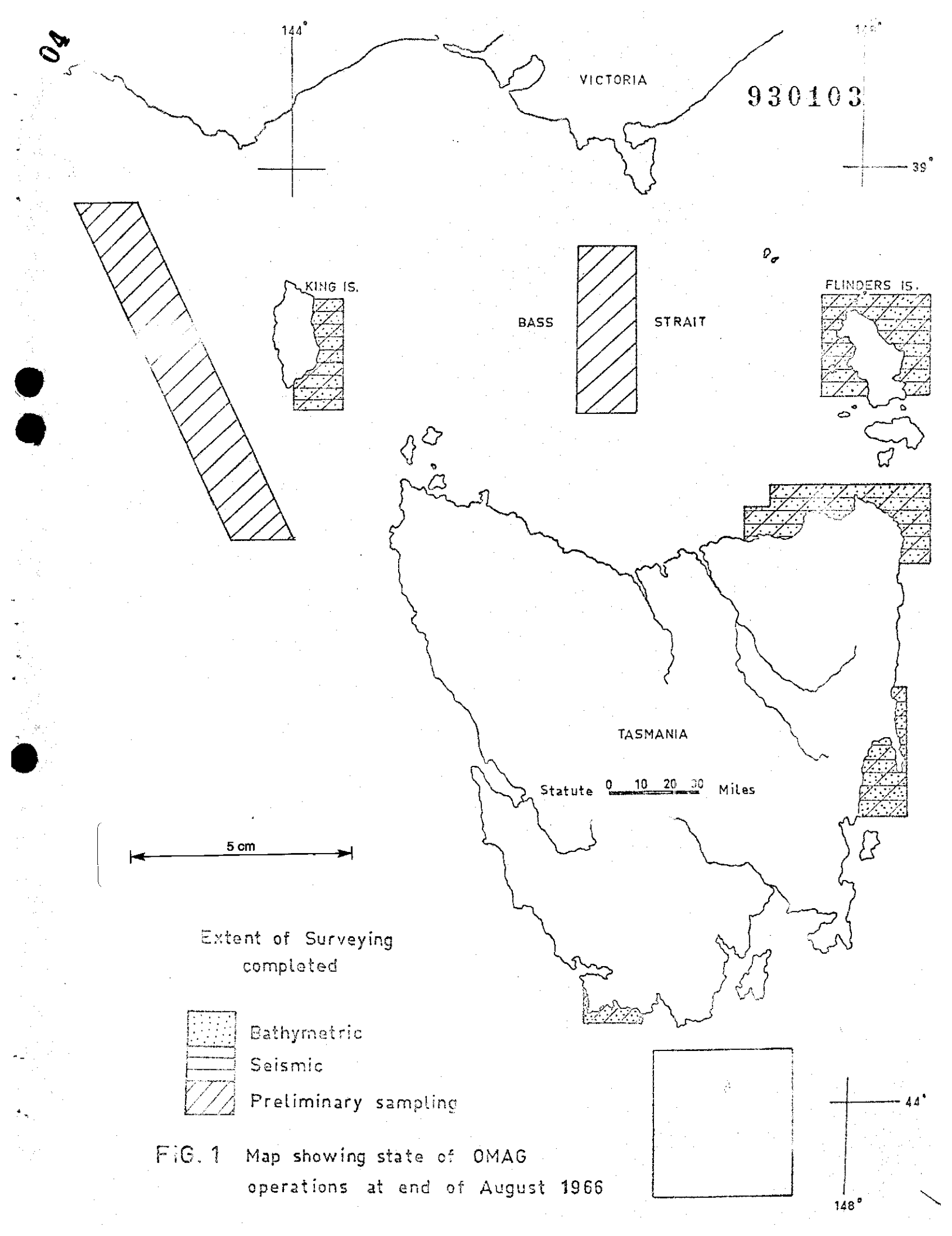

FIG. 1 Map showing state of OMAG operations at end of August 1966

TABLE 1. COMPARISON OF SCHEDULED AND ACTUAL PROGRESS

PRELIMINARY PHOSPHATE SAMPLING

VESSEL: M/V AARDVERK

Licence	Area in Square Miles	Scheduled Times			Actual Times		
		Commence	End	Estimated Survey Days	Commence	End	Actual Survey Days
mid Bass Strait	1900	31st July	14th August	14	31st July	18th August	19
West of King Island	3290	20th August	3rd September	14	22nd August	31st August	10

TABLE 2. PRELIMINARY DREDGING OPERATIONS

AUGUST, 1966

930105

Date	Licence Area	Occupation	Stations Sampled
July 31	Bass Strait	Sail from Launceston	
Aug. 1(		Dredging - return to port	1
2(		to adjust compass	
3(		Operations abandoned -	
4(		bad weather	
5		Sail to licence	
6		Dredging	3
7		Return to port - bad weather	
8		Sail to licence - dredging	6
9		Dredging	9
10		Compass failure - return to port	
11(			
12(		Crew relief	
13(			
14		Maintenance of equipment	
15		Sail from Launceston	
16		Dredging	7
17		Dredging	7
18		Return to port	
19		Vessel in dry dock - change propellor	
20(			
21(		Maintenance of equipment	
22	West King Island	Prepare for cruise	
23		Sail from Launceston	
24(			
25(		To licence area	
26(			
27		Dredging	4
28		Dredging	5
29		Bad weather - dredging abandoned	1
30(		Shelter at Currie,	
31(		King Island.	

TOTAL: 43

Sampling of new licence areas

On 1st August the jet lift equipment was re-installed aboard the m/v Marlisa in readiness for sampling the newly acquired South West Tasmanian licence. A cruise log is presented in Table 3. Adverse weather conditions prevented offshore sampling for several days, nevertheless, by the 12th August samples had been collected from 11 offshore stations and 15 stations along Cox Bight, Recherche and New Harbour beaches. Sample station locations are shown in Figure 4. Offshore drill sites were chosen on the basis of results of a bathymetric survey carried out during July. Locations of offshore drill sites were fixed by horizontal sextant angles and beach sample stations by magnetic compass bearings.

Marlisa returned to Hobart, arriving on 15th August. The samples were transported to the Launceston office by road on the same day.

Processing and Analysis of samples

Samples from the Bass Strait, West King Island and South West Tasmanian licences were delivered to the Launceston field office where they were dried and split ready for analysis.

The phosphate (P_2O_5) content of sample splits from the former licences will be determined precisely. Splits of samples from the South West Tasmanian licence, on the other hand, will be subjected to preliminary, semi-quantitative spectrographic analysis. All analyses will be undertaken by an independent authority.

Phase II progress

Radio reports from the m/s Wando River throughout August showed that gales and heavy seas in mid-Pacific hampered progress to some degree. The vessel was forced to seek shelter on several occasions. It is now expected to arrive in Tasmania within the first week of September. All arrangements have been made to effect routine maintenance aboard the vessel as swiftly as possible following its arrival.

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930107

TABLE 3. SAMPLING OPERATIONS - S.W. COAST LICENCE
AUGUST, 1966.

Date	Licence Area	Occupation	Holes Drilled	Beach Samples
Aug. 1	S.W. Coast	Preparation of equipment		
2		Overhaul of equipment		
3		Overhaul of equipment		
4		Steamed to Dover for fuel Overhaul of equipment		
5		Testing equipment	1	
6		Anchored in Recherche Bay, bad weather		
7		Anchored in Recherche Bay, bad weather		
8		Anchored in Recherche Bay, bad weather		1
9		Steamed to New Harbour		
10		Anchored in New Harbour, bad weather		1
11		Sampling	9	
12		Sampling	1	13
13		Steamed to Kettering		
14		Steamed to Hobart, packed samples and equipment		
15		Returned to Launceston		
		TOTALS:	11	15

New Raydist equipment arrived in Launceston during mid-August. This was duly tested and, after minor adjustments, was in a fully operational state before the end of the month.

Organisation of pilot plant facilities for sample treatment during Phase II drilling operations was finalised during August. The work will be undertaken in laboratories belonging to the Department of Mines.

On returning from Hobart to Launceston following the sampling programme in the South West Tasmanian licence, the m/v Marlisa collected several large samples from the North East Coast licence. The samples, each over 500 lbs., were collected from the locations which showed the greatest concentrations of tin during Phase I Operations. They will be used for initial ore dressing experiments and preliminary testing of pilot plant equipment.

Staff complement

The Staff organisation during August was essentially the same as in July. A roster is presented in Table 4.

930109

TABLE 4 STAFF COMPLEMENT 31st August, 1966.

	Name	Appointment	Occupation
Professional	S.R.M. Harvey	Field Manager	Phase I and II
	W. Davies	Senior Geologist	Phase I and II
	A. von Rahden	Engineer	Phase II preparations for Wando River
	D.J. Young	Staff Geologist	Phase II sampling and Raydist
	A. Scholtens	Geologist	Phase II preliminary dredging
	P. Skipwith	Geologist	Phase I - S.W. Tas. sampling
Non-professional	J. Beaverstock	Laboratory Tech.	Phase II Sample preparations
	R. Boys	Draughtsman	Phase II
	A.S.R. Davies	Secretary	Phase I and II administration
	L. Taylor	Typist/Secretary	Phase I and II administration
	D. Griffiths	Data plotter	Phase II
	B. Izard	Mechanic	Phase II drilling preparations
	L. Locsei	Welder/Mechanic	Phase II dredging
	D. Murray	Geologist Asst.	Phase II dredging
	L.G. Shields	Raydist Operator	Phase II Raydist preparations
Part time	J. Goodricke	Data processing and draughting	Phase I and II
Staff included in charters	T. Chopping R. Bone W. Button	Skipper & crew m/v Aardverk	Preliminary dredging
	G. Roosendal B. Wenn	Skipper & mate m/v Marlisa	Sampling S.W. Tasmania

13

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PART II PRELIMINARY RESULTS

Sampling results

Bass Strait Licence

All the samples dredged from the Bass Strait licence consisted of fine greenish grey calcareous mud. Fragments of bryozoan and coral tests were common. Descriptions of the samples are given in Table 5.

Echo sounder records of the sea floor showed uniformly flat profiles at all stations dredged indicating that most of the sea floor in the licence is probably covered by an extensive blanket of this calcareous mud.

Crude geochemical field tests suggest that the phosphate (P_2O_5) content of the samples is indeed well below economic grade.

West King Island Licence

Samples from the West King Island licence, however, were generally much coarser, consisting of shelly, coralline sand with well rounded and also angular nodular masses. Table 6 provides descriptions of the samples. Figure 5 shows examples of the nodules. They range from 1 inch to 24 inches in diameter, and are grey-brown in colour. All are hard, finely crystalline masses. Some of the rounded specimens possess a high polish. Field tests showed that they are phosphatic. Nodules have been selected, crushed and submitted for precise analysis.

South West Tasmanian Licence

Preliminary examination of the samples from the South West Tasmanian licence showed that they consist in the main of medium grained sand. Dark minerals were common in all samples.

Descriptions of the drill sites and samples are given in Table 7. Bedrock was reached in most of the holes drilled. A thick layer of peat was encountered at one sample station.

930111

TABLE 5. SAMPLING RESULTS - E.L. 23/65
BASS STRAIT LICENCE, AUGUST 1966.

Date	Sample No.	Water Depth (ft.)	Sediment type
31.7.66	1	270	Light grey clay
6.8.66	2	258	Light grey clay with coral-debris
"	3	264	No sediment recovery; coral-debris
"	4	264	" " " " "
8.8.66	5	264	Light grey clay
"	6	264	" " "
"	7	270	" " "
"	8	270	" " "
"	9	270	" " " , shells, coral and shell fragments
"	10	270	" " " " "
9.8.66	11	270	Light grey clay
"	12	270	" " "
"	13	270	No sediment recovery; coral fragments
"	14	270	Light grey clay
"	15	270	" " " (little bit greenish)
"	16	276	Light grey clay (with coral fragments)
"	17	276	Light grey clay
"	18	270	" " "
"	19	264	" " "
16.8.66	20	243	" " "
"	21	264	" " "
"	22	270	" " "
"	23	270	" " "
"	24	270	" " " .
"	25	270	" " "
"	26	270	" " " plus shell fragments, no sediment recovery
"	27	270	Shell debris, coral fragments
17.8.66	28	264	" " " "
"	29	270	Light grey clay
"	30	270	" " "
"	31	270	" " "
"	32	270	" " "
"	33	264	" " " coral fragments
"	34	252	" " " " "

15

930112

TABLE 6 SAMPLING RESULTS - E.L. 22/65
WEST KING ISLAND LICENCE, AUGUST 1966

Date	Sample No.	Depth ft.	Sample Description
27.8.66	13	378	Coral and coral debris
"	14	414	No recovery
"	15	318	Cemented, calcareous fragments
"	16	384	No recovery
28.8.66	17	288	Cemented calcareous fragments and rounded and angular nodules
"	18	414	As sample No.17, increased amount shell and coral fragments
"	19	384	As sample No.17
"	20	354	As sample No.15
"	21	510	Shelly and coralline debris
29.8.66	22	348	Shelly and coralline debris

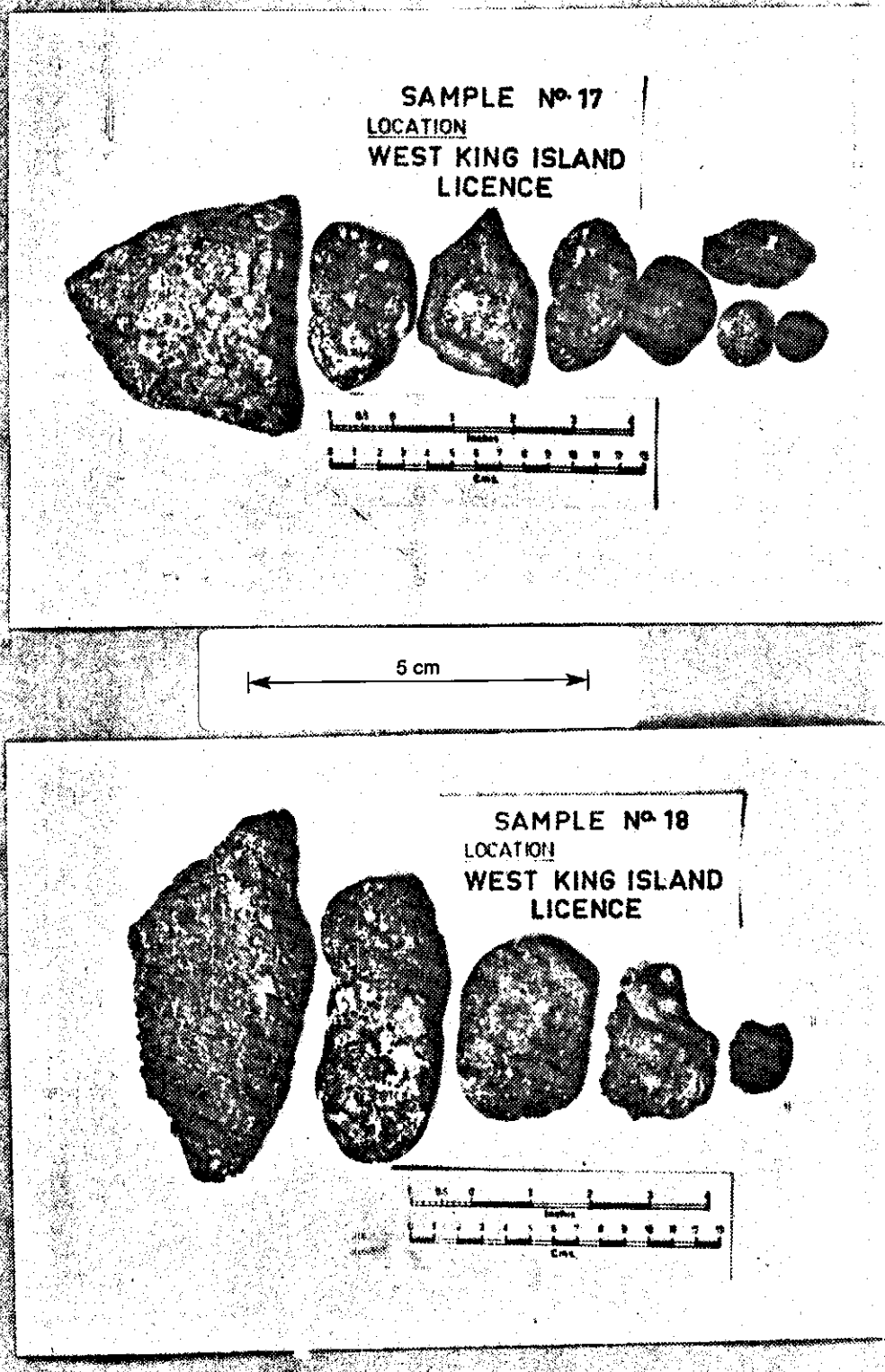

FIGURE 5. NODULES DREDGED FROM THE SEA FLOOR - WEST KING ISLAND LICENCE

TABLE 7 SEDIMENT TESTS

SOUTH WEST COAST LICENCE, AUGUST 1966

Date	Hole No.	Hole depth in ft.	Water depth in ft.	Bedrock	Probable Bedrock	Sediment type
Aug.11	1	11	93	x		Medium grey sand with some shell fragments
	2	15	114		x	Medium grey sand with some shell fragments
	3	0	60	x		
	4	12	60		x	Medium grey sand and some gravel
	5	10	33		x	Medium-coarse grey sand and gravel
	6	17	27		x	Medium grey sand and gravel
	7	4	87	x		Fine-medium grey sand and gravel
	8	23	105		x	Medium grey sand
	9	24	33		x	Medium grey sand and gravel
Aug.12	1	36	33		x	Medium-coarse dark grey sand and gravel

PART III PLANS FOR SEPTEMBER

All servicing and installation of equipment on board the m/s Wando River will be completed within two weeks following the vessel's arrival at Launceston early in September. Drilling operations, as shown in Table 8, should be well underway before the end of the month.

Arrangements have been made to maintain a continuous transportation of samples from the ship to the pilot plant at Launceston so that processing of samples may begin immediately and as far as possible be run in phase with the drilling operations.

The m/v Aardverk will proceed to Hobart and then, as weather and sea conditions permit, sail out into the South Tasmanian licence where a preliminary dredge sampling programme will be undertaken. This work should be completed before the end of September.

Results of analyses on the samples from Bass Strait, West King Island and South West Tasmanian licences are expected during the month.

TABLE 8 SCHEDULED PHASE II OPERATIONS, SEPTEMBER 1966

PHASE II DRILLING M/S WANDO RIVER

September 10th	September 11th-25th	September 26th
Arrive Launceston	Crew relief, servicing, Raydist Installation, equipment testing and modification	Commence drilling operations in North East Coast Licence

PHASE II PRELIMINARY PHOSPHATE DREDGING,

M.V. AARDVERK

September 1st-6th	September 7th-10th	September 10th-23rd
Steam direct from West King Island Licence to Hobart	Crew relief	Dredging South Tasmanian Licence

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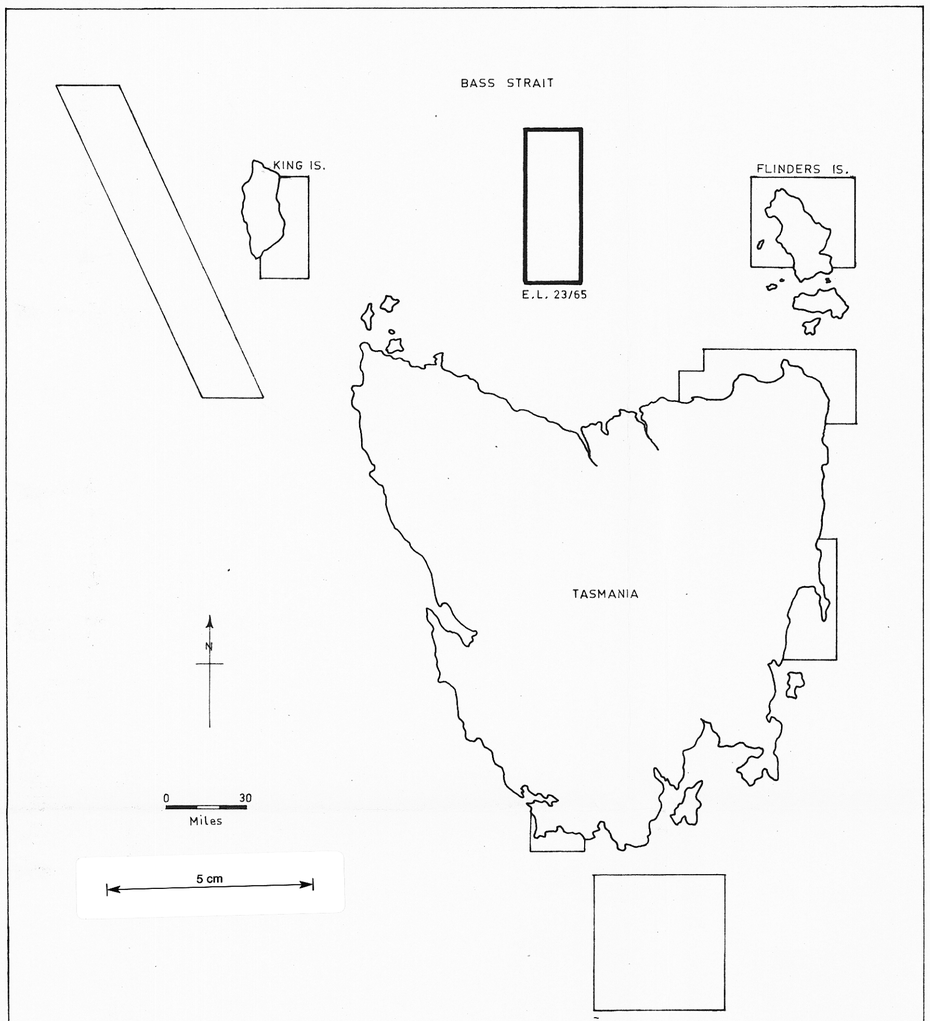
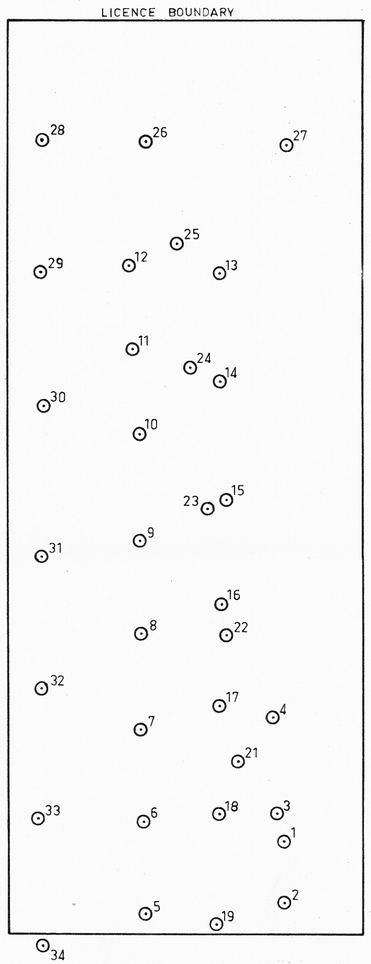
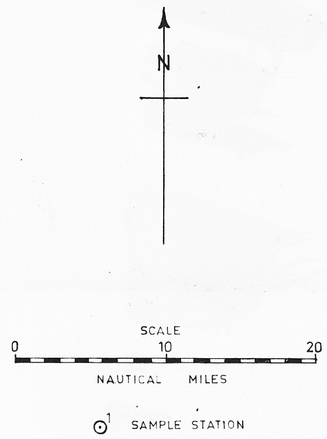
OCEAN MINING A.G.

BASS STRAIT
E.L. 23/65
SAMPLE STATIONS

AUGUST 1966







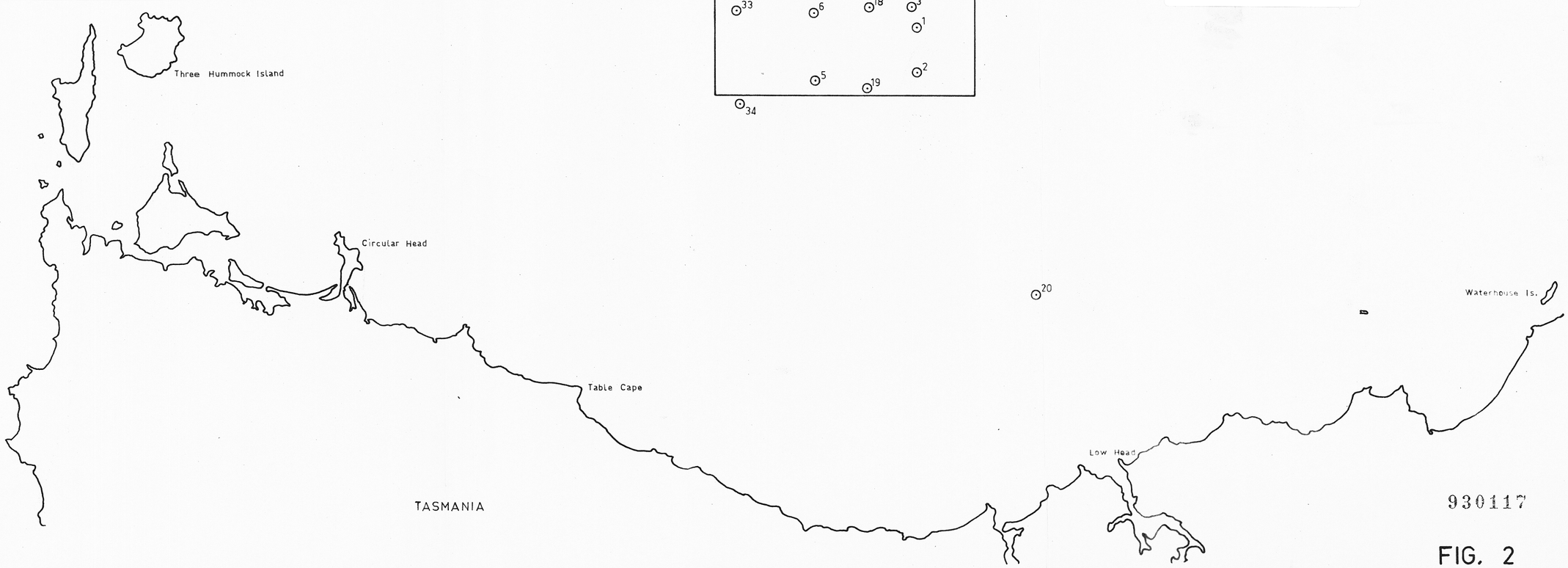


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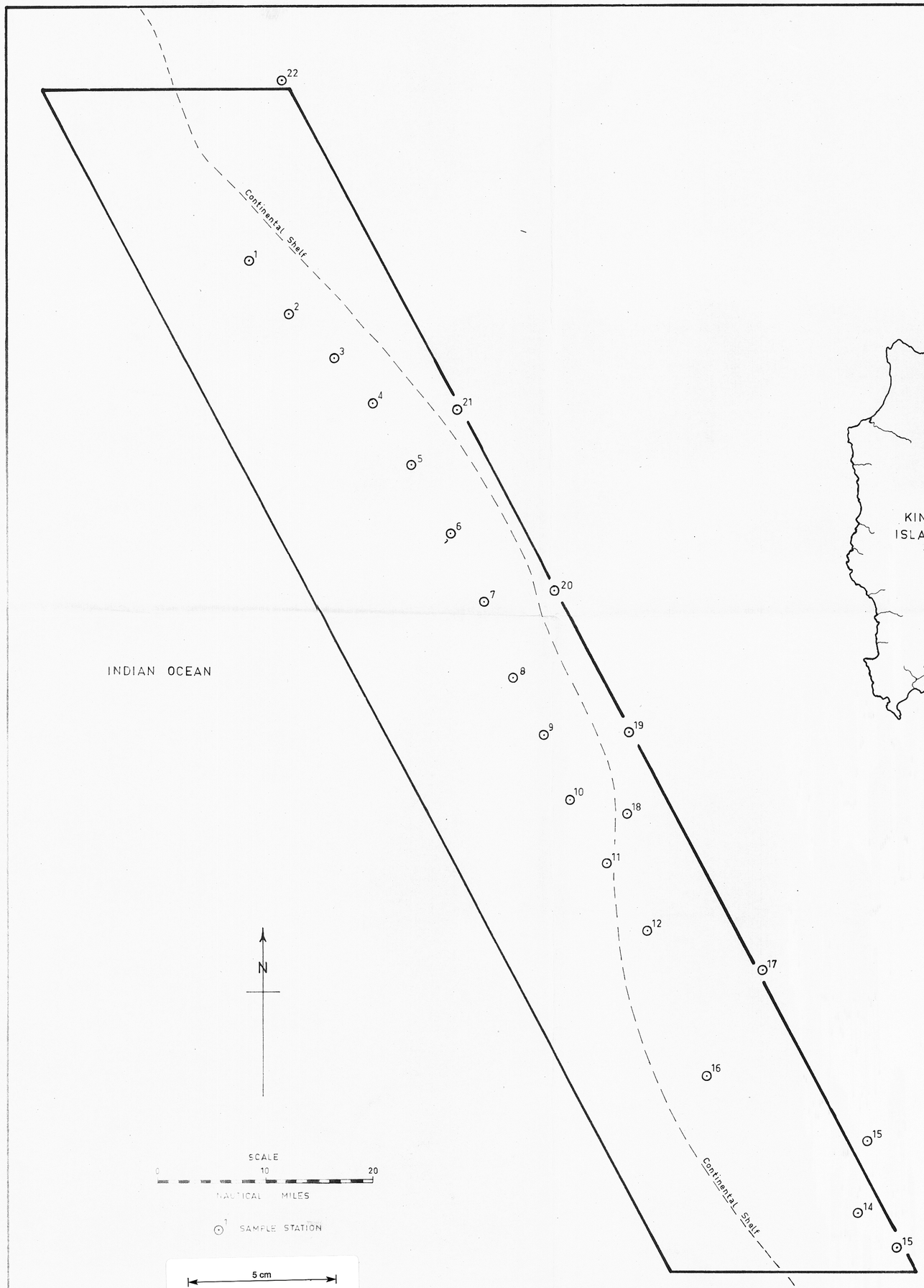
FIG. 2

OCEAN MINING A. G.

WEST KING ISLAND
E.L. 22/65
SAMPLE STATIONS

STATIONS 1-12 JANUARY 1966
STATIONS 13-22 AUGUST 1966





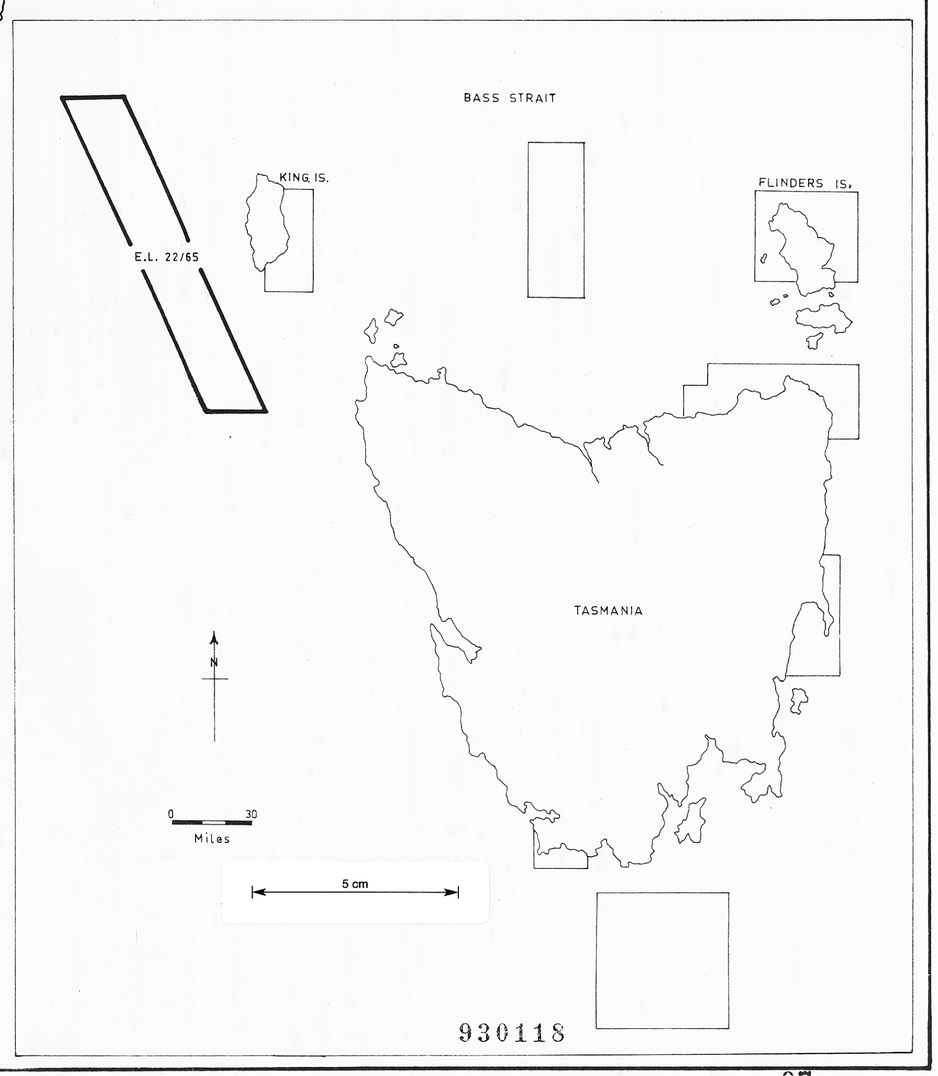


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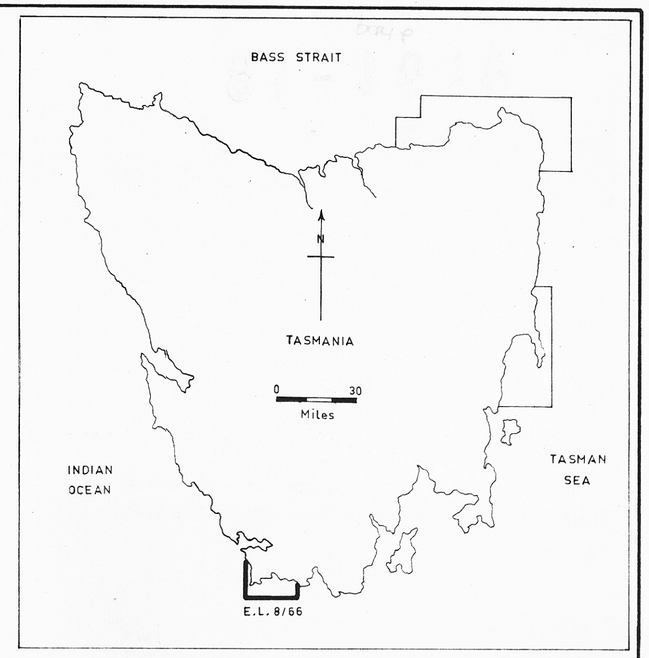
FIG. 3

07

OCEAN MINING A.G. (TASMANIA) AUGUST 1966

SOUTH WEST COAST TASMANIA
SAMPLE STATIONS



N

B1/10
B1/9
9/11/24
7/11/4
8/11/23
Telopea Pt.
South West Cape
Cox Bluff
1/11/11
B13/12
B12/12
B11/12
B10/12
B9/12
B1,2,3/12
B4, 5, 6, 7, 8/12
6/11/17
5/11/10
4/11/12
Cox Bight
3/11/0
2/11/15
1/12/36
Louisa Is.
Red Pt.

Licence Boundary

De Witt Island

Sample station
Hole No. / Date Aug. 66 / Hole depth
4 / 10 / 15

Beach sample
Sample No. / Date Aug. 66
B6 / 12

0 1 2 3 4 5
Statute Miles

5 cm

930119 Aug. '66 FIG. 4

030 00

930120

OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS - SEPTEMBER, 1966.

Part 7

Ocean Mining A.G.,
Field Headquarters,
38 Canning Street,
Launceston, Tasmania.

October, 1966.

930121

SUMMARY

Wando River, having sustained extensive storm damage was, on arrival in Tasmania early in September, subjected to an extensive overhaul and refit. The work was essentially completed at the end of the month.

Phosphate dredging from the m.v. Aardverk continued throughout the month and on the basis of the preliminary results achieved, steps were taken to modify and extend the phosphate licences off the West and Southern coasts of Tasmania.

Results of semi-quantitative spectrographic analyses on samples from the South West Tasmania licence were received during September together with results of final mineralogical analyses on samples from east Ringarooma Bay.

930122

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03

PART I PROGRESS

General

Following the arrival of the m.v. Wando River in Launceston on September 12th, every effort was directed to routine maintenance and repair of equipment damages sustained while steaming through stormy seas in the Pacific Ocean. This work was essentially completed by the end of the month.

Preliminary sampling of the original Southern Tasmanian Phosphate licence was completed during September, and in addition several samples were collected outside the northern boundary of the licence area. A comparison of scheduled and actual progress is given in Table 1.

Areas surveyed since operations began early in the year are shown in Figure 1.

Progress during September

Phase II Drilling

m.v. Wando River

The Wando River arrived in Launceston from Long Beach, U.S.A., on September 12th after a protracted voyage across the Pacific Ocean. During the voyage continuous heavy weather was encountered and some structural damage resulted. Routine inspection following the Wando River's arrival showed that it would be necessary to effect some repairs in dry dock and these were carried out between 15th-18th September.

General maintenance and repairs to damaged equipment on deck, and installation of the Raydist equipment was carried out while the vessel was in dry dock and continued through to the end of the month. By the end of September the Wando River was nearly ready to start drilling operations. Several test holes were drilled in the Launceston dock area, where the vessel was berthed, in order to test drilling procedures. M.V. Wando River was ready to start Phase II drilling on October 2nd.

Raydist Equipment

Two Raydist antennas, each over one hundred feet high, were erected at surveyed points in Ringarooma Bay. Field trials confirmed the operational ability of the equipment and it was duly prepared for the arrival of the Wando River in the drilling area.

TABLE 1. COMPARISON OF SCHEDULED AND ACTUAL PROGRESS
PRELIMINARY PHOSPHATE SAMPLING
VESSEL M.V. AARDVERK

Licence	Area in Square Miles	Scheduled Times		Actual Times	
		Commence	End	Commence	End
Southern Tasmania	2,550	10th Sept.	23rd Sept.	10th Sept.	26th Sept.

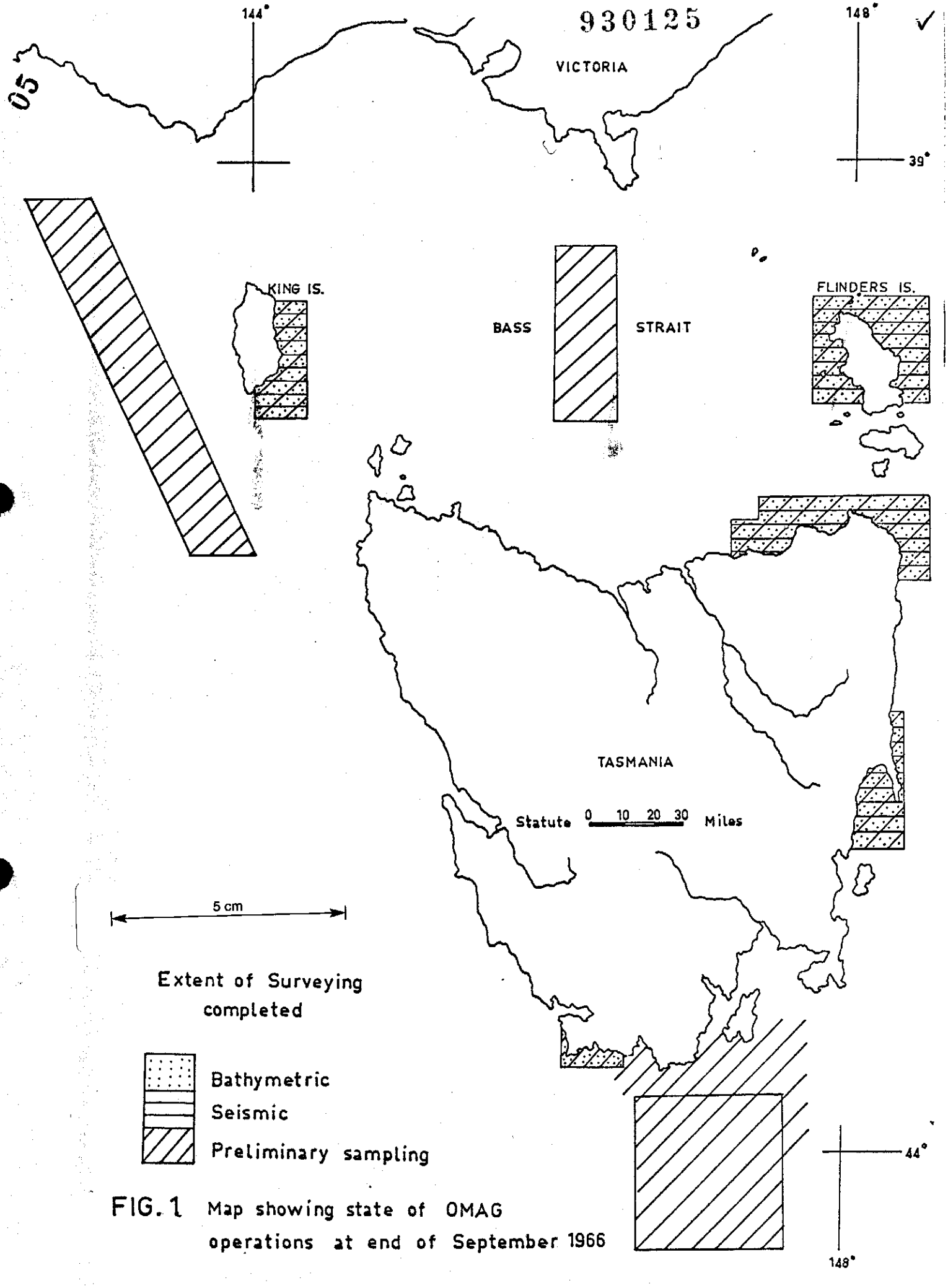


FIG. 1 Map showing state of OMAG operations at end of September 1966

Drilling Programme

A drilling programme designed to test the target areas defined in the Summary Report submitted to the TOEC Board in July, was finalised and all available site data, water depth, sediment thickness etc., was plotted on the relevant base maps.

Drill sites of primary and secondary priority were selected on a grid controlled basis within target areas in the North East Coast and Oyster Bay licence areas.

Preliminary Phosphate Exploration

As shown in Table 1, sampling of the original Southern Tasmanian licence by m.v. Aardverk commenced on September 10th immediately following the sampling programme in the West King Island licence, and was completed by September 13th. During this period 13 samples were dredged from stations uniformly distributed inshore of the 100 fathom contour within the licence area, at depths of between 67 and 93 fathoms. Locations of the sample stations, numbered 1 to 13, are given in Figure 2.

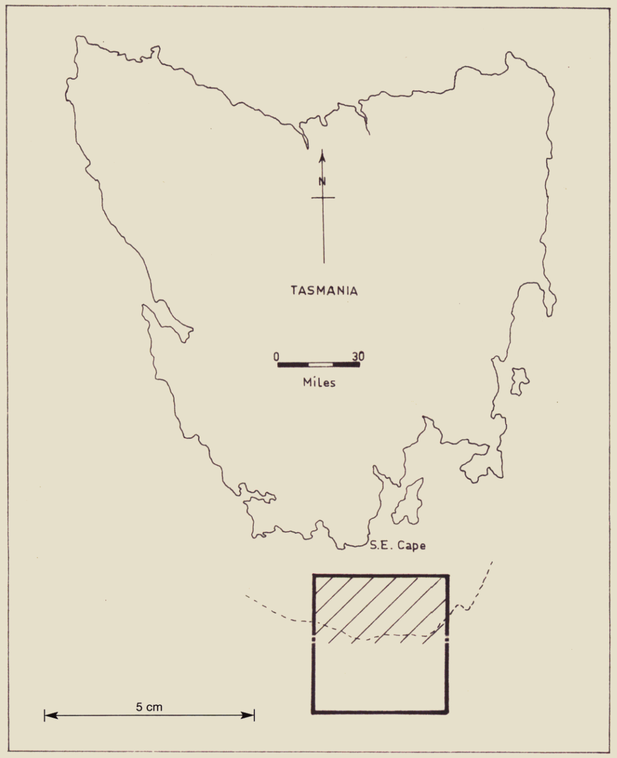
The nature of the samples collected during this cruise indicated that nodular deposits may extend to the north and east of the licence. Therefore, it was decided that m.v. Aardverk would undertake a second cruise off Southern Tasmania with a view to prospecting the areas of the sea floor adjacent to the Southern Tasmanian licence.

Poor weather hampered the start of this operation until September 23rd. Between then and September 26th, the Aardverk sailed 230 miles and collected 14 samples from 13 stations in water depths ranging from 38-86 fathoms. The location of these stations, numbered 14 to 26, is also shown in Figure 2. Table 2 summarises phosphate dredging operations during September.

All samples have been washed and dried and selected material submitted to the Department of Mines and an independent authority for analysis.

Staff Complement

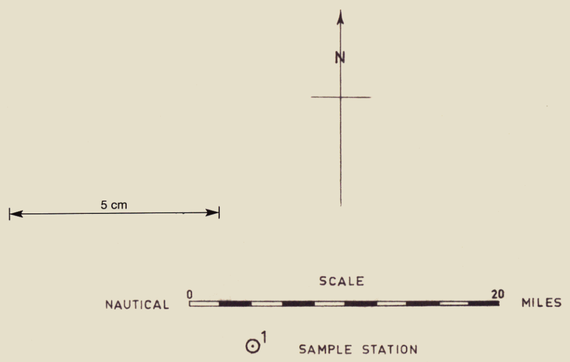
Some reorganisation of staff occurred immediately prior to the arrival of the Wando River. An engineer and two riggers were appointed towards the end of the month to operate the Wando River drilling rig. Table 3 lists the staff roster at the end of September.



OCEAN MINING A.G.

SOUTHERN TASMANIA
E.L. 7/66
SAMPLE STATIONS

SEPTEMBER 1966



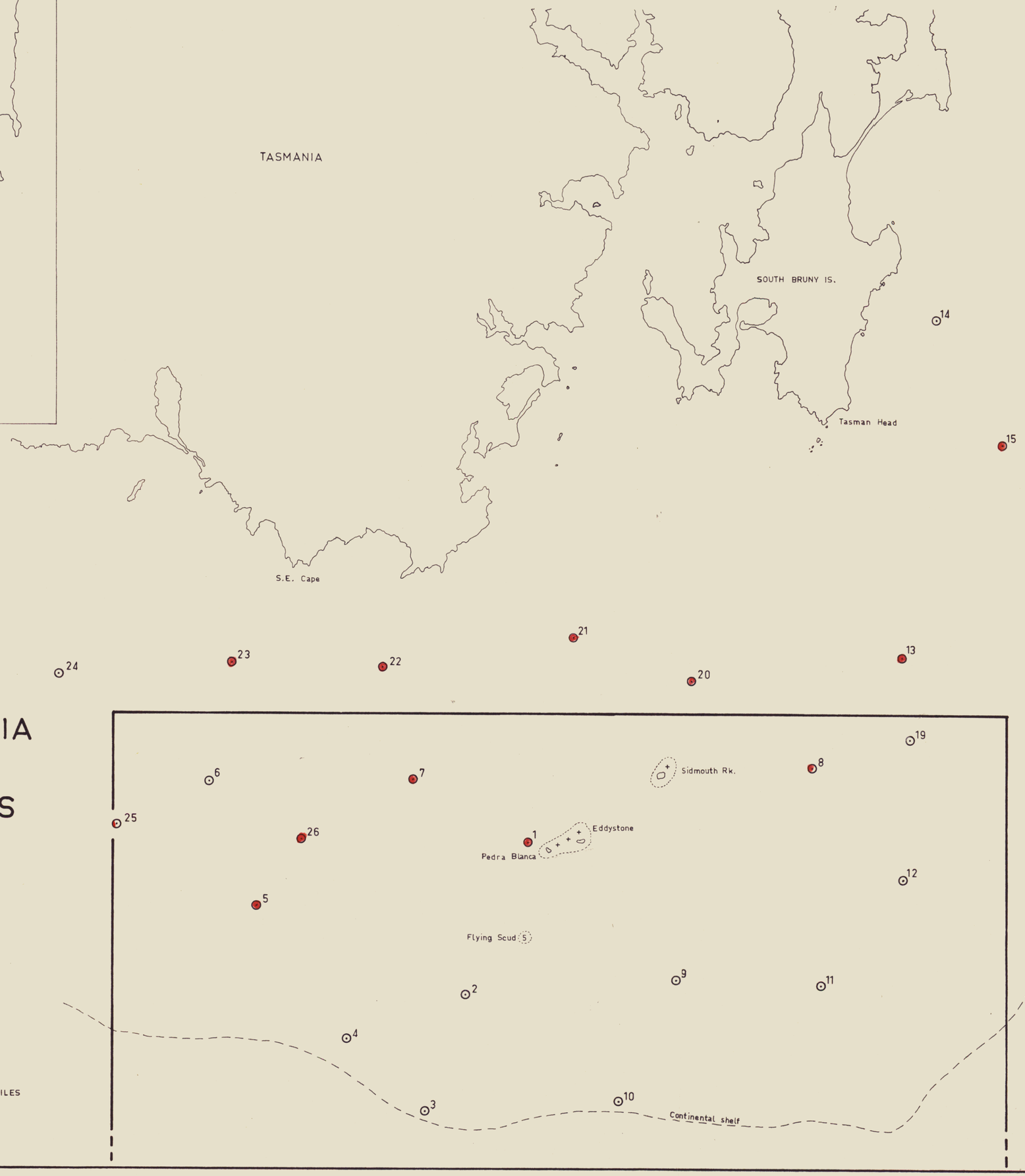


FIG. 2

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TABLE 2. PRELIMINARY DREDGING OPERATIONS
SEPTEMBER, 1966.

Date	Licence Area	Occupation	Stations Sampled
Sept 1	West King Is.	Arrive Burnie from King Island.	
2		Leave Burnie for Hobart.	
3		Swan Island to Schouten Is.	
4		Schouten Is. to Hobart	
5		Crew Relief.	
6		Repair 24VDC generator	
7(			
8(		Remain Hobart - bad weather.	
9(			
10	South Tasmania	Leave Hobart, arrive Cloudy Bay.	
11		Dredging.	7
12		Dredging	6
13		Arrive Hobart.	
14(			
15(		Crew relief, Geologist to	
16(		Field Headquarters with	
17(		samples.	
18(			
19(			
20(		Standby in Hobart - gale	
21(		warnings.	
22(			
23		Leave Hobart for areas adjacent to lease.	
24		Dredging.	6
25		Dredging.	7
26		Arrive Hobart.	
27(			
28(		Crew relief, travel to	
29(		Field Headquarters with	
30(		samples.	
		Total:	26

930129

TABLE 3 STAFF COMPLEMENT 30th September, 1966.

	Name	Appointment	Occupation
Professional	W.Davies	Field Manager	Phase I and II
	D.J. Young	Staff Geologist	Phase II sampling and Raydist
	A. Scholtens	Geologist	Phase II preliminary dredging
	P. Skipwith	Geologist	Phase II- N.E.Coast sampling
	A. von Rahden	Senior Engineer	Phase II preparations for Wando River
	D. Lawson	Engineer	Phase II Wando River
Non-professional	J.Beaverstock	Laboratory Tech.	Phase II Sample preparations
	R. Boys	Draughtsman	Phase II
	A.S.R.Davies	Secretary	Phase I and II administration
	L. Taylor	Typist/Secretary	Phase II administration
	D. Griffiths	Data Plotter	Phase II
	G. Milliken	Rigger	Phase II Wando River
	P. Jackson	Rigger	Phase II Wando River
	L. Locsei	Welder/Mechanic	Phase II Wando River
	D. Murray	Geologist Asst.	Phase II dredging
	L.G. Shields	Raydist Operator	Phase II Raydist preparations
Part time	J. Goodricke	Data processing and draughting	Phase I and II
	R.D. McBain	Raydist consultant	Phase II
Staff included in charters	T. Chopping R. Bone W. Button	Skipper & crew m/v. Aardverk	Preliminary dredging South Tasmania
	G. Roosendal B. Wenn	Skipper & mate m/v. Marlisa	Survey N.E. Coast

Modification and Extension of Exploration Licences

Preliminary dredge sampling in the three original phosphate licences, the results of which were outlined in the TOEC Operations Report for August, suggested the desirability of some modification and extension of the phosphate exploration licences. As a result, applications were made to the Tasmanian Department of Mines to relinquish the phosphate areas then held. In return permission was sought, and subsequently granted, to take up two new licences. The disposition of both old and new licences is shown in Figure 3. Such licence changes are, of course, in accordance with the agreement between participants in the TOEC Joint Venture which allows Ocean Mining A.G., as managers of the exploration work, to modify areas on the basis of exploration results.

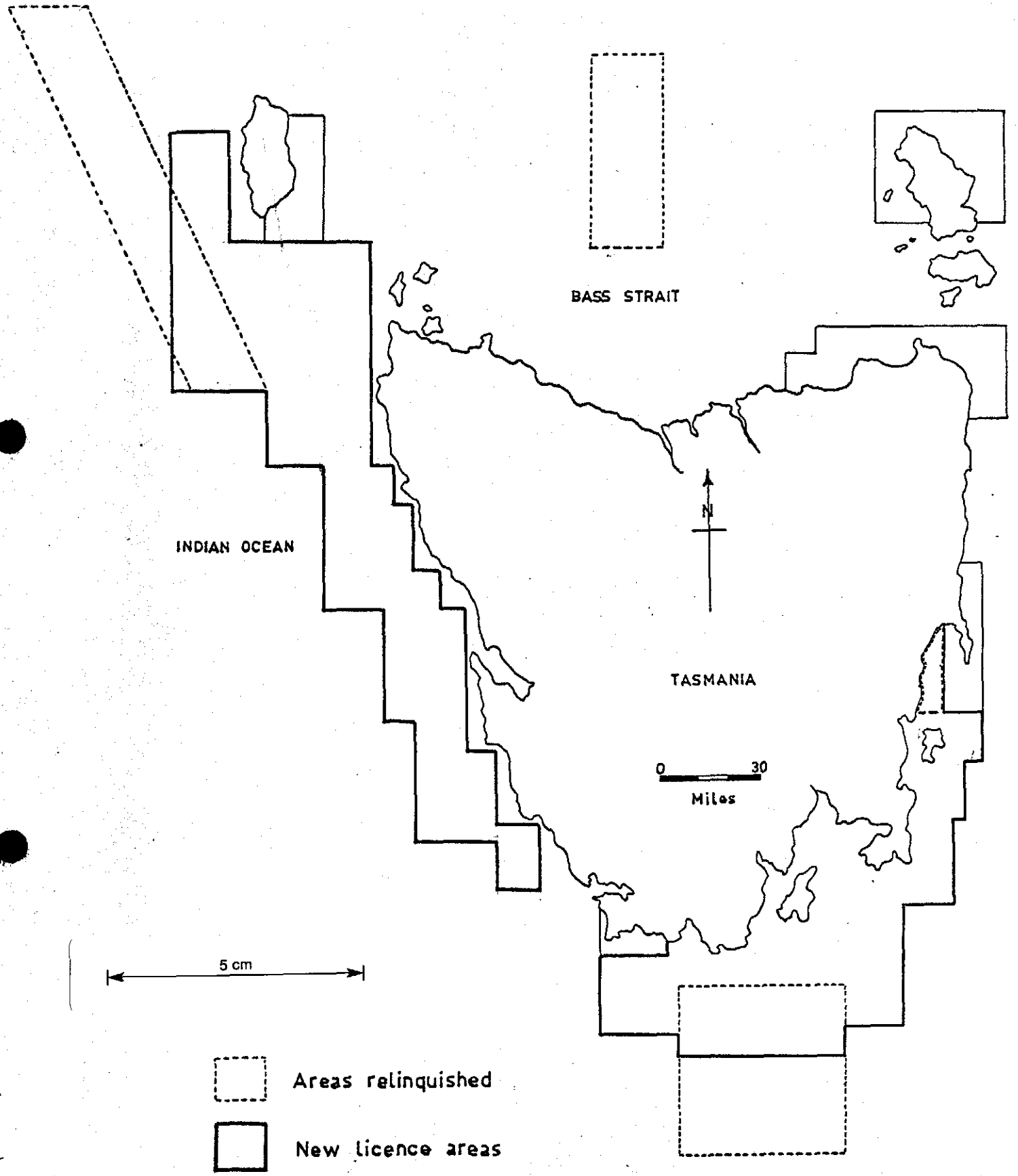
As shown on the map, the new licences are so located that they:

(1) extend only to the edge of the continental shelf (100 fathom contour);

(2) cover all likely extensions of the nodular deposits discovered during the preliminary sampling programme.

The three original phosphate licences totalled approximately 8,000 square miles whereas the two new areas cover about 13,000 square miles.

Applications for the two new licences were made in the name of Ocean Mining A.G. The licences were duly offered to the TOEC Board on 29th September and representatives from Anglo American Corporation, Charter Consolidated and Electrolytic Zinc Ltd. agreed in principle to the modifications and extensions. It was further agreed that a final decision on the changes and request for further funds to cover the cost of exploration of the extra areas should be deferred pending submission of a memorandum giving details of the changes to all members of the TOEC Board, including representatives from Bethlehem Steel and Ocean Science and Engineering who were not present at the Board meeting on 29th September.



Sept. '66

FIG. 3 Modification of licence areas

PART II PRELIMINARY RESULTS

Sampling Results

South Tasmania licence

It can be seen from Table 4 that the most promising samples are restricted to depths between 60 and 80 fathoms with a relative concentration of nodules between 60 and 70 fathoms. Samples from water depths exceeding 80 fathoms consisted mostly of shell and coral debris. Similar detritus also predominates in depths shallower than 60 fathoms.

The phosphatic nodules occur in two forms, mostly as dark brown, heavy, smooth nodules from 1-6 ins. diameter, and as rusty brown, less dense irregular masses. Both types reacted when tested with nitric acid and ammonium molybdate solution, a crude test to indicate the presence of phosphate. Reaction with the denser, smooth nodules was generally more positive. Photographs of both types of nodules are shown in Figure 4.

Echo sounder records show a gently sloping sea floor descending gradually to about 90 fathoms at the edge of the continental shelf.

Results of Analyses

South West Tasmanian licence

Semi-quantitative emission spectrographic analyses on samples from the South West Tasmania licence were completed during September. A summary of the results is presented in Table 5. Unfortunately analyses for titanium were not completed by the end of September but will be submitted at a later date.

The degree of concentration of tin in both beach and offshore samples appears to be lower than anticipated. Similarly, zirconium values were generally low.

North East Coast licence

Results of mineralogical examinations of the eight Phase I samples from the eastern half of Ringarooma Bay which showed relatively high tin values were received during September. These analyses were carried out by the Tasmanian Department of Mines. In Table 6 the results are compared with those found by two other authorities who examined splits of the same samples in June and July.

13

930133

TABLE 4 SAMPLING RESULTS

SOUTH TASMANIA PHOSPHATE DREDGING sept. '66

Station No.	Depth (fths)	Composition	
		Nodules (% of Total Sample)	Shell, coral, organic matter etc. (% of Total Sample)
1	75	20	80
2	87	<1	>99
3	93	-	100
4	91	-	100
5	85	10	90
6	83	-	100
7	67	>99	<1
8	72	5	95
9	88	-	100
10	91	-	100
11	93	-	100
12	88	-	100
13	75	20	80
14	38	-	100
15	57	10	90
16	74	15	85
17	85	<1	>99
18	86	-	100
19	76	-	100
20	72	80	20
21	62	50	50
22a	63	85	15
22b	64	95	5
23	67	50	50
24	60	-	100
25	86	<5	>95
26	81	20	80



FIGURE 4. NODULES DREDGED FROM THE SEA FLOOR - SOUTH TASMANIA LICENCE

TABLE 5 RESULTS OF SEMI-QUANTITATIVE ANALYSES ON SAMPLES FROM THE SOUTH WEST TASMANIA LICENCE

930135

Sept. '66

Hole No./ Aug.Date	Hole depth in feet	Nature of Sample	Location	Parts per Million			
				Sn	Zr	Ti	Cr
1/ 5		Sluice	Hope Bay	5	<50		10
2/ 8		Beach	Catamaran Beach	2	"		15
1/10		Beach	New Harbour Beach	2	"		80
1/11	11	Aggregate	Cox Bight	8	"		100
1/11		Sluice conc.	" "	20	500		60
2/11	15	Aggregate	" "	2	100		80
2/11		Sluice conc.	" "	8	100		20
4/11	12	Aggregate	" "	5	120		12
4/11		Sluice conc.	" "	150	100		15
5/11	10	Aggregate	" "	10	200		40
5/11		Sluice conc.	" "	60	100		20
6/11	17	Aggregate	" "	4	<50		100
6/11		Sluice conc.	" "	7	"		25
7/11	4	Aggregate	New Harbour	<1	200		25
7/11		Sluice conc.	" "	2	100		12
8/11	23	Aggregate	" "	<1	<50		20
8/11		Sluice conc.	" "	4	"		70
9/11	24	Aggregate	" "	10	"		20
9/11		Sluice conc.	" "	12	150		15
1/12	36	Aggregate	Louisa Bay	1	"		300
1/12		Sluice conc.	" "	12	"		120
1/12		Beach	Cox Bight	1	<50		200
2/12		"	" "	12	"		120
3/12		"	" "	4	"		200
4/12		"	" "	15	100		200
5/12		"	" "	2	50		300
6/12		"	" "	<1	50		20
7/12		"	" "	1	<50		20
8/12		"	" "	2	"		150

.../contd.

930136

TABLE 5 (contd.) RESULTS OF SEMI-QUANTITATIVE ANALYSES ON SAMPLES FROM THE SOUTH WEST TASMANIA LICENCE

Sept '66

Hole No./ Aug. Date	Hole depth in feet	Nature of Sample	Location	Parts per Million			
				Sn	Zr	Ti	Cr
9/12		Beach	Cox Bight	3	<50		250
10/12		"	" "	6	50		25
11/12		"	" "	6	"		150
12/12		"	" "	7	<50		30
13/12		"	" "	100	600		500

17

930137

TABLE 6 RESULTS OF MINERALOGICAL ANALYSES OF EIGHT SAMPLES FROM THE EASTERN HALF OF RINGAROOMA BAY - NORTH EAST COAST LICENCE

Sept. '66

Sample Numbers as per April Rpt.	Heavy fraction (SG 2.9) % of total			Mineral Percentages in Heavy Fraction																	
				Cassiterite			Zircon			Rutile			Monazite			Ilmenite			Opaques		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1/19/6	3.5	2.6	2.6	1	5	2	20-25	15	32	10	-	7	-	5	-	-	-	50	20-25	40	-
2/19/15	4.4	2.8	2.8	-	10	1	30	15	50	5-10	-	2	-	3	-	-	-	44	40	49	-
4/19/3	5.4	5.3	5.3	7-10	19	3	10-15	20	43	5-10	-	1	-	4	-	-	-	48	35	43	-
5/19/12	1.5	1.0	1.0	2- 3	6	1	30	24	16	1	-	3	-	-	-	-	-	70	60	51	-
3/20/5	7.7	7.0	7.0	10-15	27	13	25	13	40	1	-	1	-	1	-	-	-	35	25	22	-
4/20/6	3.3	2.5	2.5	10-15	10	5	20	18	41	10	-	2	-	4	-	-	-	36	30	40	-
5/20/6	1.3	0.7	0.7	2- 3	9	2.5	35	21	47	5	-	3	-	1	-	-	-	31	35	42	-
3/25/2	4.0	2.7	2.7	1- 2	12	2	30	25	22	1	-	9	-	4	-	-	-	51	40	33	-

Key to Analytical Bodies

A - Australian Mineral Development Laboratories

B - Independent authority

C - Tasmanian Mines Department

18
930138

PART III PLANS FOR OCTOBER

Phase II Drilling

Table 7 provides a tentative schedule for the first cruise of the Wando River. Provision has been made to amend this if sea, weather or general conditions in a particular area temporarily hamper drilling operations.

The m/v Marlisa, formerly used in Phase I bathymetric and sampling operations, will act as a support vessel for the Wando River and assist in anchoring manoeuvres and in ferrying samples from ship to shore.

Preliminary Phosphate Exploration

Further preliminary phosphate dredging using the m/v Aardverk, has been scheduled for October. This work will be carried out in the South Tasmania licence. The schedule is shown in Table 7.

930139

TABLE 7. PHASE II OPERATIONS SCHEDULED FOR OCTOBER

DRILLING - CRUISE 1
VESSEL: M/V WANDO RIVER

Date Oct.	Location		Occupation
	Licence	Target Area	
1/5			Test drill rig, anchoring procedure etc.
6/17	North East Coast	Ringarooma Bay	Drilling Primary holes
18/20	" " "	Mussel Roe Bay	" " "
21/23	Oyster Bay	Around Freycinet Peninsula	" " "
24/31			Routine maintenance, crew relief

PRELIMINARY PHOSPHATE DREDGING
VESSEL: M/V AARDVERK

Date in October	Licence	Occupation
1/3	South Tasmania Licence	Crew relief
4/12	" " "	Dredging
13/16	" " "	Crew relief
17/28	" " "	Dredging

81-1618

930140

OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS – OCTOBER, 1966

PART 8

Ocean Mining A.G.,
Field Headquarters,
38 Canning Street,
Launceston, Tasmania.

October, 1966

Oct. 66

930141

SUMMARY

Phase II drilling in Oyster Bay licence was completed during early October. Twelve holes were drilled in water depths ranging from 28 to 83 feet. A total of 170 samples were collected and 439 feet of core recovered.

Twenty-one holes were drilled in Ringarooma Bay by the end of the month. The holes were drilled in water depths ranging from 54 to 109 feet and 167 samples were collected from a total of 403.5 feet of core.

Mineral dressing and Assay results on an initial fifty samples from Oyster Bay showed low tin values.

Results of phosphate analyses by three independent authorities were, to some degree, conflicting. Nevertheless encouraging values were found on analysing nodules from samples dredged from the West Tasmanian licence.

01

930142

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Figure 1	State of Operations, 31st October, 1966.
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Figure 5	Drill Logs, Oyster Bay Licence.

02

930143

PART I PROGRESS

General

Preparations for Cruise I by the Wando River were finalised by October 3rd and the vessel left Launceston to begin drilling in Ringarooma Bay on October 4th.

Preliminary dredging in the modified South Tasmania licence progressed satisfactorily and by the end of October most of this licence had been sampled on a reconnaissance basis by the survey vessel m.v. Aardverk.

Selected phosphate samples were submitted for analysis to three independent authorities, and samples obtained by the Wando River from Ringarooma Bay and Oyster Bay have been forwarded to the Metallurgical Laboratories, Department of Mines, Launceston, for mineral dressing tests and assay.

Work accomplished by the end of October is shown in Figure 1.

Progress during October

Phase II Drilling

Following the completion of preparations for Cruise I on October 3rd, the Wando River sailed for Ringarooma Bay. Three point and four point anchoring trials to determine the most suitable method for anchoring the ship in varying conditions of sea bottom, wind and current showed that standard 250 lb. Danforth anchors could not hold the vessel on the predominantly weed-covered sea floor of Ringarooma Bay. Four new anchors capable of holding the ship under these conditions were immediately designed and ordered. In the meantime it was decided to despatch the Wando River to Oyster Bay licence, where no anchoring problems were anticipated, in order to complete a short drilling programme planned for this licence.

Thirteen holes were drilled at 12 sites around Freycinet Peninsula in Oyster Bay, between the 8th and 18th October, and a total of 170 samples collected. The location of the holes is shown in Figure 2.

Immediately after drilling the last scheduled hole in the Oyster Bay licence, a heavier than normal swell shattered one of the forward anchoring winches which was under stress on a taut anchor wire. This necessitated a return to Launceston for repairs and Cruise I was therefore terminated on October 19th.

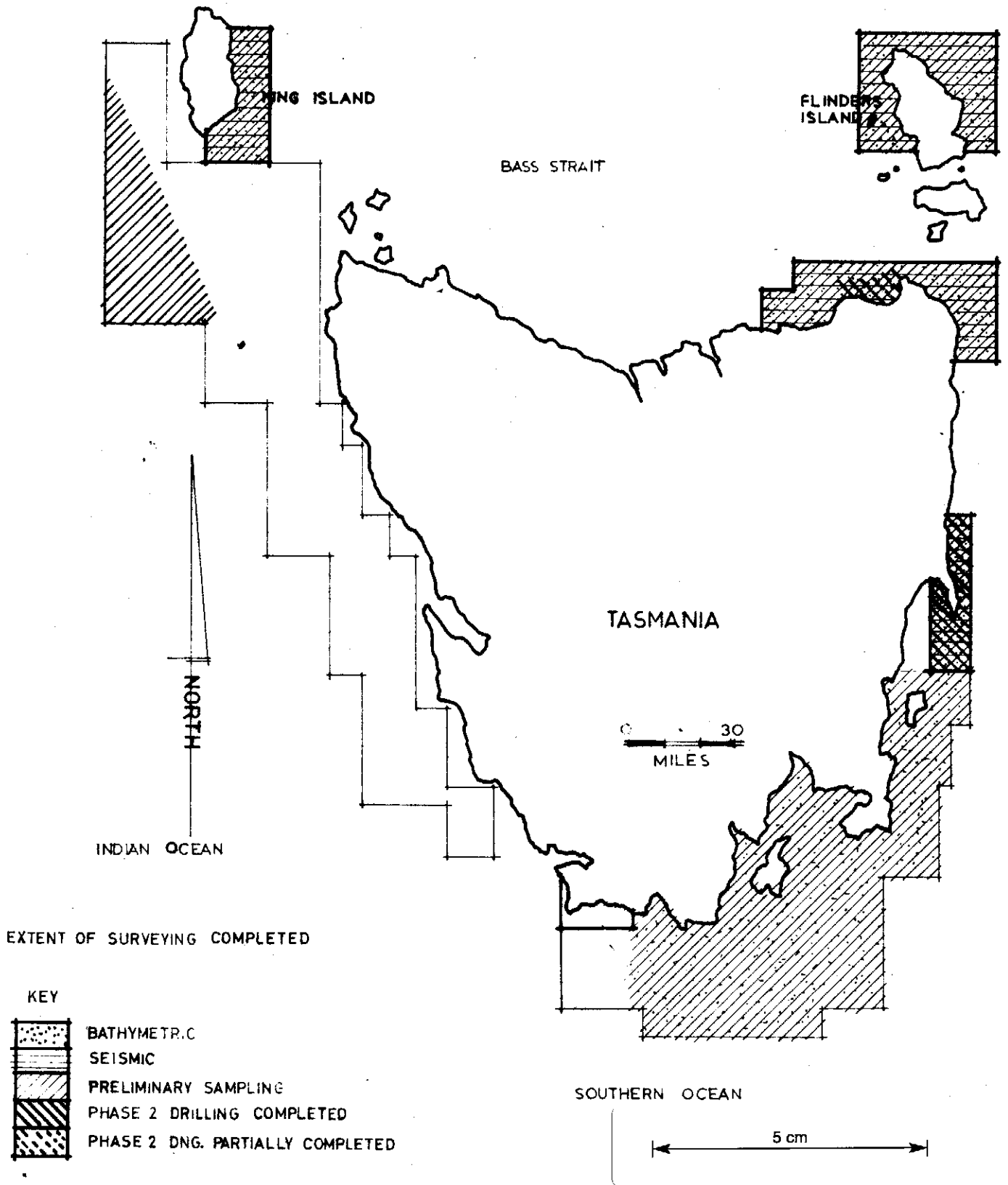


FIG 1 MAP SHOWING STATE OF OMAG OPERATIONS TO 31ST OCTOBER 1966

930145

Cruise II started on October 25th with the Wando River arriving in Ringarooma Bay on the 26th. Trials with the new anchors proved highly successful. By the end of the month 21 holes of primary importance had been drilled in Ringarooma Bay, and 167 samples obtained. The location of these holes is shown in Figure 3. Selected samples from Oyster Bay and all samples from Ringarooma Bay have been forwarded to the Tasmanian Department of Mines Laboratories for analysis.

An operation log for m.v. Wando River is given in Table 1.

Support Vessel

During the first cruise, the small survey vessel m.v. Marlisa was used as a general support vessel for the Wando River. The primary function of this vessel entailed assisting the larger drilling ship in her complicated anchoring procedure and as a consequence of this assistance, anchoring time at each drilling site was reduced by more than fifty percent. In addition, the smaller vessel acted as a tender boat, supplying spares to the Wando River and transporting samples ashore. Visiting personnel also, were ferried to and from the shore by this boat. Marlisa was released from Charter on October 21st and replaced by a more suitable vessel, the m.v. Tondeloya.

Raydist Equipment

The steep topography and lack of vehicle access to Freycinet Peninsula prevented the effective use of the Raydist equipment at Oyster Bay. However, it was possible to accurately locate drilling sites in the Oyster Bay licence by other navigational methods such as sextant, radar, and dead reckoning. Holes drilled in Ringarooma Bay, on the other hand, have been located, wherever possible, by Raydist, with continuous checks by sextant, radar, and dead reckoning.

Mineral Dressing

One hundred and five selected samples from Oyster Bay and 44 samples from Ringarooma Bay were submitted to the Launceston laboratories of the Tasmanian Department of Mines for analysis. The flow sheet for this operation is shown in Table 2.

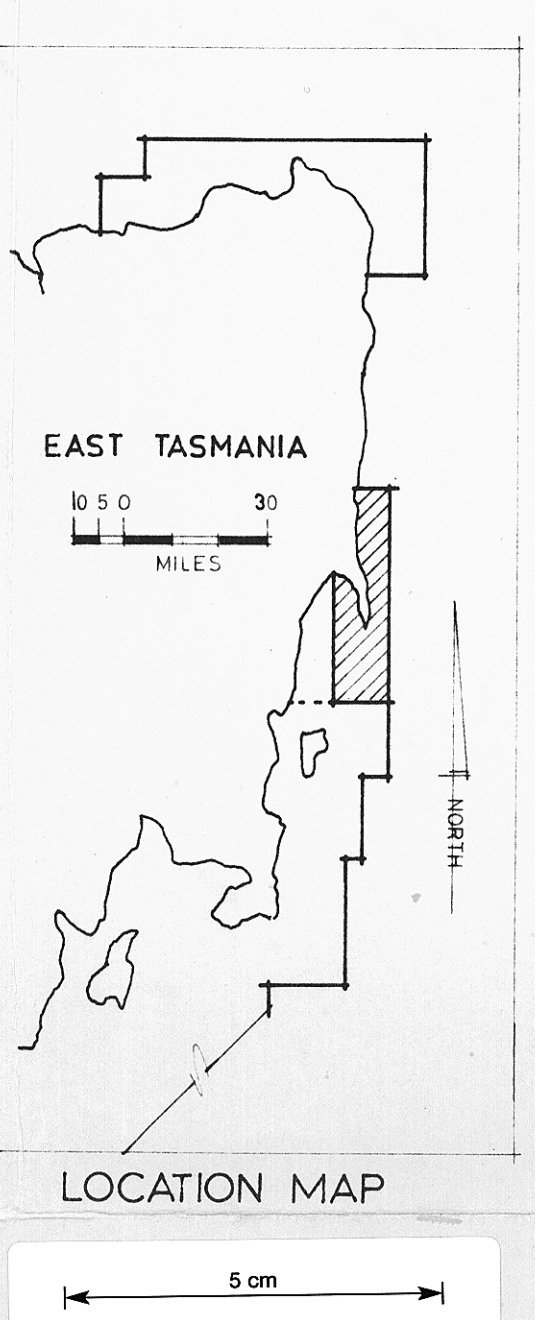
In treating fine clayey samples where the material was uniformly fine, alternative methods of analysis were employed. Only a small number of such samples were

930146

DRILL HOLE SITES
OYSTER BAY — TASMANIA

M/S WANDO RIVER

OCEAN MINING A G (October 1966)



APPROXIMATE SCALE IN MILES

0 1 2 3 4

5 cm

FIG 2

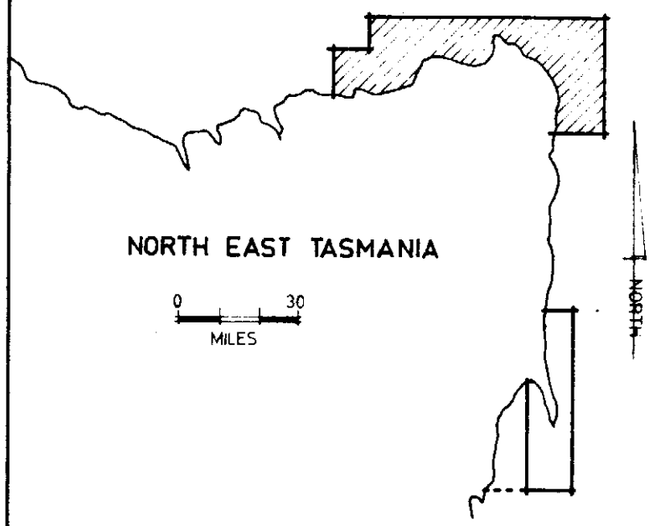
8007

05

DRILL HOLE SITES
RINGAROOMA BAY

OCTOBER

OCEAN MINING A G



LOCATION MAP

0 1 2 3
MILES

5 cm

CAPE PORTLAND

RAYDIST BEACON

17
12
19
11
21
18
16
8
20
9
10
13
14
3
15
2
7
1
5
6
4

TOMAHAWK POINT

RAYDIST BEACON

RAYDIST BEACON

NORTH

930147

FIG 3

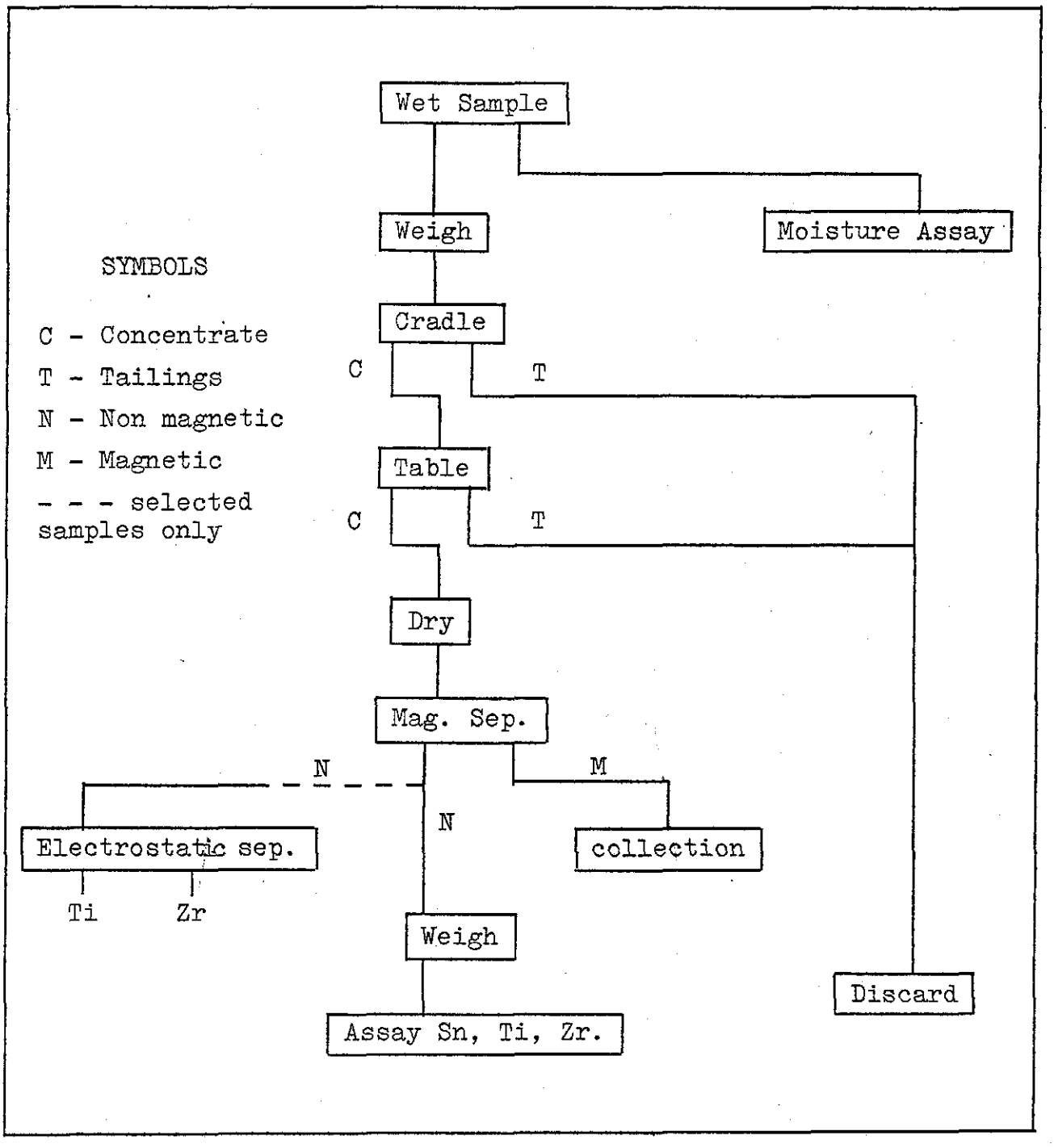
930148

TABLE 1

OPERATION LOG
OCTOBER
M.V. WANDO RIVER

Date	Licence Area	Operation	Stations Sampled
1- 3		Preparations for cruise.	
4		Start Cruise I, transit to Beauty Point, swinging compasses.	
5		Swinging compasses, transit to Ringarooma Bay.	
6	NE Coast	Anchoring trials. Positioning of Raydist calibration buoy.	
7		Anchoring problems. Transit to Coles Bay.	
8	Oyster Bay	Arrived Coles Bay, drilling OB 1.	1
9		Drilling OB 2, OB 3.	2
10		Drilling OB 4. Repairs to drill clamp.	1
11		Drilling OB 6, OB 7.	2
12		Breakdown of servo pump.	
13		New anchors and servo pump fitted.	
14		Anchors modified and tested.	
15		Drilling OB 5, OB 8, OB 9.	3
16		Drilling OB 2A, OB 12.	2
17		Drilling OB 10. Transit to Wineglass Bay.	1
18		Drilling OB 13. Winch breakdown. Transit to Launceston.	1
19		Arrive Launceston. End Cruise I.	
20-24		Crew relief, fitting of additional water tanks. Equipment modification, maintenance and repair.	
25		Start Cruise II. Transit to Beauty Point.	
26	NE Coast	Transit to Ringarooma Bay. Anchoring trials. Raydist calibration.	
27		Drilling NE 1-4.	4
28		Drilling NE 5-7.	3
29		Drilling NE 8-12.	5
30		Drilling NE 13-17.	5
31		Drilling NE 18-21.	4
		Total Stations	34

TABLE 2 SAMPLE TREATMENT FLOW SHEET



930150

selected for examination because of the difficulties in concentrating and recovering very fine heavy mineral particles. The selected samples were pulped and dispersed with sodium silicate and then split into three parts which were treated as follows:

(a) normal treatment viz., cradle, table and magnetic separation;

(b) run over the Buckman tilting deck, then the deck concentrate was tabled and the table concentrate subjected to magnetic separation;

(c) run over the Holman slime table (half size) with the table concentrate again magnetically separated.

Size analyses were carried out on the concentrates of samples showing higher tin values in order to determine whether the cassiterite was recoverable.

Splits of all samples sent to the Department of Mines were air dried at the Field Headquarters in readiness for further studies.

Preliminary Phosphate Exploration

Following tentative acceptance by the TOEC Board of the modified phosphate licences as outlined in the September report, a preliminary phosphate sampling programme was designed to prospect the southern and south-eastern portions of the South Tasmania licence.

Originally scheduled to commence on October 4th, bad weather hampered the start of this cruise until October 8th. Between then and October 13th the Aardverk sailed over 400 miles within the licence and dredged 22 samples from depths ranging from 40 to 86 fathoms.

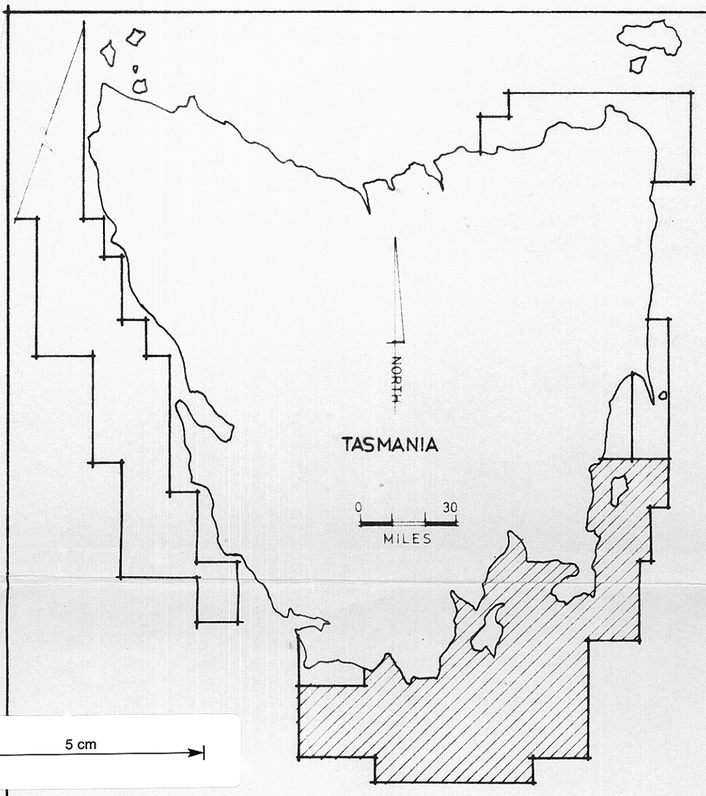
Sample locations are shown in Figure 4.

Plans for a second cruise to obtain samples from the south-west of the area between 17th-24th October were thwarted by bad weather.

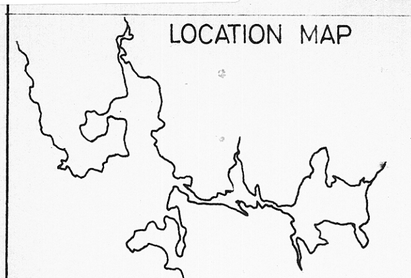
An operation log for m.v. Aardverk is given in Table 3.

OCEAN MINING A G

SOUTHERN TASMANIA
EL 10/66
SAMPLE STATIONS



LOCATION MAP



C. BOUGAINVILLE
C. BOULLANGER
MARIA IS
BARREN HEAD
MARION BAY
EAGLEHAWK NECK
TASMAN PENISULAR
STORM BAY
NORTH BRUNY ISLAND
SOUTH BRUNY ISLAND
TASMAN IS
TASMAN HEAD
SOUTH WEST CAPE
ISLE DU GOLFE
DE WITT IS
MAATSUYKER IS
SOUTH CAPE
SOUTH EAST CAPE

NORTH

8 7 6 5 4 3 2 1 0 8 16
MILES

5 cm

KEY
⊙ STATIONS SAMPLED SEPTEMBER 1966
⊕ STATIONS SAMPLED OCTOBER 1966

930151

FIG 4

8008

930152

TABLE 3 PRELIMINARY DREDGING OPERATIONS

OCTOBER

M.V. AARDVERK

Date	Licence Area	Occupation	Stations Sampled
1- 2		Weekend	
3- 7		Standby in Hobart, adverse weather	
8	South Tasmania	Transit to lease	2
9		Adverse weather limited operations	3
10	South East Tasmania	Transit to lease for better weather	5
11		Dredging	4
12		Dredging	5
13	South Tasmania	Transit to Hobart	4
14-18		Crew relief	
19-24		Standby Hobart, adverse weather	
25-31	West Coast Tasmania	Preparations for survey of West Coast Licence.	
		Total samples	23

Licences

Application has been made to the Tasmanian Department of Mines for the renewal of the North East Coast and East King Island licences, due to expire on November 18th.

Approval to modify and expand the initial phosphate exploration licence areas has been granted by the Tasmanian Department of Mines and the relevant new licences (EL10/66, 11/66, 25/65) have been issued.

Staff

Minor reorganisation of staff occurred during the month.

Table 4 lists the staff complement as at 31st October, 1966.

Visitors

Dr. Arnold Waters and Mr. C.B. Edwards of the Anglo American Corporation visited Field Headquarters on October 2nd. Mr. G. Biemesderfer of Bethlehem Steel arrived at Field Headquarters on 17th October and stayed until 1st November in order to visit the Wando River following the TOEC Board meeting on 25th October. All aspects of the TOEC programme were discussed with these gentlemen.

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930154

TABLE 4 STAFF COMPLEMENT 31st October, 1966.

	Name	Appointment	Occupation
Professional	W. Davies	Field Manager	Phase II
	D.J. Young	Staff Geologist	Phase II
	A. Scholtens	Geologist	Phase II Dredging
	P. Skipwith	Geologist	Phase II Wando River
	A.von Rahden	Senior Engineer	Phase II Wando River
	D. Lawson	Engineer	Phase II Wando River
Non-professional	J.Beaverstock	Laboratory Tech.	Phase II processing
	A. Burgess	Draughtsman	Phase II
	A.S.R.Davies	Secretary	Phase II Administration
	L. Taylor	Typist/Secretary	Phase II Administration
	D. Griffiths	Data Plotter	Phase II
	G. Milliken	Rigger	Phase II Wando River
	P. Jackson	Rigger	Phase II Wando River
	L. Locsei	Welder/Mechanic	Phase II Wando River
	D. Murray	Geologist Asst.	Phase II Wando River
	L.G. Shields	Raydist Operator	Phase II Raydist Field Operator
	R.W. Taylor	Seaman	Phase II Dredging
	C.P. Blundell	Seaman	Phase II Dredging
Part time	J. Goodricke	Data processing and draughting	Phase II
	R.D. McBain	Raydist consultant	Phase II
Staff included in Charters	T. Chopping R. Bone W. Button	Skipper & crew m.v. Aardverk	Preliminary dredging South Tasmania
	G.W. Head E. Taylor	Skipper & mate m.v. Tondeloya	Tender boat Wando River

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930155

PART II RESULTS

Drilling Results

Oyster Bay

Table 5 shows drill hole data for thirteen holes in Oyster Bay. The location of these holes, and stratigraphic columns compiled from the drill logs, are shown in Figure 5. The stratigraphic columns show that bedrock was reached in seven holes and that sediment thicknesses of between 21 and 87 feet were penetrated in water depths of up to 83 feet.

Except for hole 1 and the lower portion of hole 4 which consisted mostly of fine silt and clay, medium to coarse shelly sand and gravel with occasional silt and clay lenses predominated in the areas drilled. No obvious correlation exists between drill holes, there being a considerable variation vertically and laterally within the unconsolidated sediment body in the licence. Fine clay samples from hole 1 have been submitted for tests because the clay has properties similar to those of bentonite.

Compaction of core varied depending on sediment type. In most cases it was negligible. Loss of core, through a partially closed core catcher, due to vibration on retraction from the hole proved problematic in the initial holes drilled in this licence.

North East Coast

Table 6 shows data for the 21 holes drilled in Ringarooma Bay during October. The location of these holes is shown in Figure 3. Bedrock was reached in 19 holes at an average sediment thickness of 22.5 feet. Medium to coarse grained sand and fine gravel predominated in most of the cores collected, with occasional layers of silt and clay up to ten feet but generally less than two-three feet thick. Stratigraphic columns for all holes drilled in Ringarooma Bay will be presented in the November report.

A modified core catcher reduced core loss to a minimum. A significant loss of core only occurred at two sites and this resulted from damage to the core catcher whilst penetrating through pebble and boulder rich sediment.

12

930156

TABLE 5

DRILL HOLE DATA

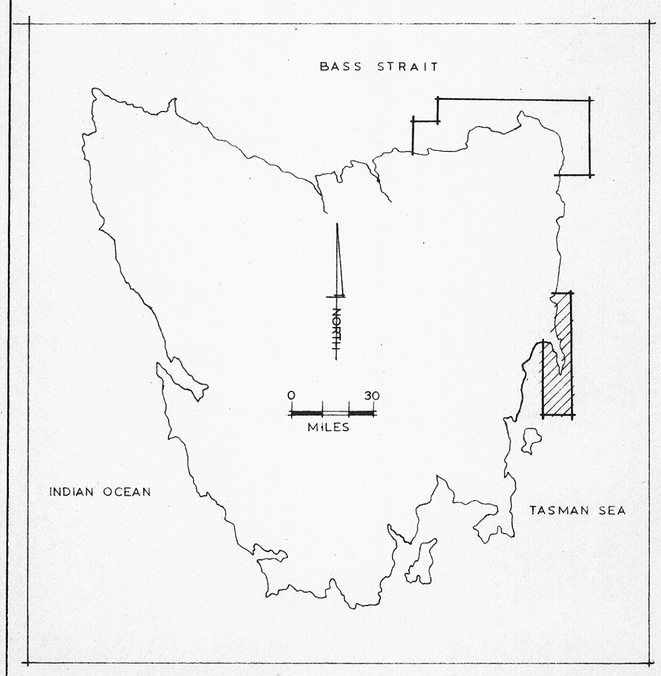
OYSTER BAY

Hole No.	Date October 1966	Water Depth ft.	Drill Penetration ft.	Core Recovered ft.	Bedrock Reached
1	8th	43	87	65.0	Yes
2	9th	68	42	-	"
2A	16th	83	42	30.0	"
3	9th	28	50	50.0	"
4	10th	43	62	47.0	No
5	15th	28	26	21.5	"
6	11th	37	78	50.0	"
7	"	43	34	27.0	Yes
8	15th	44	20	12.5	"
9	"	28	21	17.5	No
10	17th	54	58	40.5	"
11	16th	Hole abandoned due to adverse sea conditions			
12	"	33	52	48.5	Yes
13	18th	49	32	29.5	"
		Totals	604	439.0	

930157

DRILL LOGS (PHASE 2)
OYSTER BAY - TASMANIA
M/S WANDO RIVER
OCEAN MINING A G - (October 1966)

APPROXIMATE SCALE IN MILES
0 1 2 3 4



KEY

- WATER
- PEBBLES
- GRANULES
- SAND
- SILT
- CLAY
- SHELLS
- PEAT
- BEDROCK

VERTICAL SCALE 1/8" = 1'0"

FIG 5

8009

13

TOEC Oct '66

11.

930158

TABLE 6

DRILL HOLE DATA

NORTH EAST COAST TASMANIA

Hole No.	Date October 1966	Water Depth ft.	Drill Penetration ft.	Core Recovered ft.	Bedrock Reached
1	27th	54	8.5	8.5	Yes
2	"	84	30.5	30.5	"
3	"	65	9.0	8.5	"
4	"	58	23.5	22.5	"
5	28th	83	11.5	11.5	"
6	"	74	21.0	18.5	"
7	"	74	38.0	37.5	"
8	29th	62	47.0	38.0	"
9	"	76	25.5	25.5	"
10	"	75	15.0	14.5	No
11	"	73	29.0	28.5	Yes
12	"	87	30.0	14.0	"
13	30th	88	11.0	5.0	"
14	"	82	8.0	7.5	"
15	"	86	28.0	25.0	"
16	"	98	8.0	8.0	"
17	"	82	10.5	10.5	No
18	31st	109	21.0	21.0	Yes
19	"	106	19.5	19.5	"
20	"	95	15.0	15.0	"
21	"	101	36.0	33.0	"
		Totals	445.5	403.5	

Mineral Dressing and Assay Results

Examination of fifty samples from the Oyster Bay licence was completed during October. The results are summarised in Table 7. The remainder of the samples from this licence will be analysed by mid November.

In reporting the results the terms "nil" and "trace" are used for tin values as follows:

> "nil" shown as Head Assay - no tin found in the non-magnetic fraction;
>
> "trace" - tin occurred in the non-magnetic fraction but on calculation of the Head Assay was found to be less than 1 part per million.

Assay results on this initial batch of samples show only very low tin values.

Size analyses on samples OB 977 and 982 which showed the highest values, revealed that only 25 to 33 percent of these two samples is coarser than Cyclosizer Fraction 3 which is the limit for recoverable tin by gravity means.

Generally therefore, the results to date are discouraging but a final appraisal of the potential of the Oyster Bay licence as a whole will be withheld until the results of tests upon the remaining fifty-five samples from the licence have been finalised.

Phosphate Sampling Results

Results of the dredging programme in the eastern half of the South Tasmania licence are provided in Table 8. Only three samples possessed nodules and in each case the nodular material constituted only small percentages of the total sample dredged.

Phosphate Analyses

Results of analyses of nodular and associated sediment were received from three independent authorities during October. The results are presented in Table 9.

In certain cases, analyses were made on the same samples by different authorities. The results are generally dissimilar.

TABLE 7 ASSAY RESULTS - OYSTER BAY LICENCE
(N.B. FIFTY SAMPLES ONLY)

Sample No.	Head Assay			
	Non Magnetic	p.p.m. Metals		
	Per Cent	Sn	Ti	Zr
OB. 1-17	0.14	Trace	16	24
1-24	0.28	1	31	57
986	0.07	Nil	30	31
997	0.05	Trace	64	73
994	0.07	1	99	81
977	0.79	10	40	37
982	0.28	6	17	13
983	0.13	Nil	134	150
973	0.72	Nil	47	26
941	0.65	Trace	42	43
971	0.14	Nil	76	36
968	0.09	Nil	62	62
965	0.27	1	164	180
970	0.12	Trace	76	46
961	0.11	Nil	90	62
957	0.12	Nil	103	84
952	0.05	Trace	15	10
945	0.08	3	34	55
950	0.04	Trace	28	20
948	0.17	Nil	35	31
943	0.09	Trace	53	56
937	0.15	Nil	109	82
936	0.20	Trace	94	111
938	0.08	Trace	12	11
882	0.11	Nil	33	36
883	0.09	Trace	39	40
884	0.15	Nil	68	94
885	0.03	Nil	18	12
886	0.04	Nil	30	14
887	0.04	Nil	41	26
888	0.11	Trace	124	111
889	0.09	Nil	75	80
890	0.09	Nil	75	71
891	0.08	Nil	111	70
892	0.11	Nil	82	55
893	0.06	Nil	98	8
894	0.10	Nil	119	95
895	0.10	Nil	139	133
896	0.12	Trace	137	125
897	0.08	Trace	69	54

contd.

16

930161

TABLE 7 (contd.)

Sample No.	Head Assay			
	Non Magnetic	p.p.m. Metals		
	Per Cent	Sn	Ti	Zr
OB. 898	0.19	Trace	55	57
899	0.07	1	44	54
900	0.09	1	35	56
901	0.09	Trace	98	78
902	0.10	1	35	39
904	0.15	2	22	32
905	0.09	2	28	45
906	0.09	5	28	47
907	0.08	5	18	29
908	0.46	5	20	31

17

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TABLE 8 SAMPLING RESULTS

SOUTH TASMANIA PHOSPHATE DREDGING

OCTOBER

Cruise A

Sample No.	Date	Depth (fth)	Nodules: Composition %
27	8.10.66	40	-
28	"	42	-
29	9.10.66	46	-
30	"	64	-
31	"	71	10
32	12.10.66	79	15
33	"	74	-
34	"	71	-
35	"	63	-
36	13.10.66	59	-
37	"	73	-
38	"	86	25
39	"	81	-
Cruise B			
1	10.10.66	55	-
2	"	66	-
3	"	50	-
4	"	64	-
5	"	48	-
6	11.10.66	59	-
7	"	65	-
8	"	50	-
9	"	64	-
10	12.10.66	86	-

TABLE 9

PHOSPHATE ANALYSES

OCTOBER

Licence	Sample No.	Sample Split	Percentage P_2O_5		
			AMDEL	Department of Mines Launceston Tasmania	Electrolytic Zinc Ltd. Risdon Tasmania
West Tasmanian Licence	13	A	0.1	-	-
	15	A	0.05	-	-
	17	A	0.1	-	5.1
	17	B	3.7	-	7.85
	17	C	-	-	0.15
	18	A	5.0	-	14.75
	18	B	0.15	-	5.3
	18	C	-	-	26.4
	19	A	0.3	-	-
	20	A	0.1	-	-
	21	A	0.15	-	-
	22	A	0.05	-	-
South Tasmanian Licence	1	A	0.57	-	-
	5	A	0.28	-	-
	7	A	1.92	-	3.2
	13	A	0.43	-	-
	20	A	-	0.59	4.6
	22	A	-	0.43	-
		B	-	0.67	-
		C	-	0.36	-

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Oct '66

In general, however, analyses carried out by the Laboratories of Electrolytic Zinc Ltd. showed the most encouraging results. Furthermore, nodules from the West Tasmanian licence generally showed higher P_2O_5 values.

It should be noted that values below 1 percent reflect the P_2O_5 contents of fragments of cemented, sandy and shelly material also dredged from various sites within the licences.

The results of further analyses on nodules are expected during November.

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PART III PLANS FOR NOVEMBER

Phase II Drilling

Table 10 shows the schedule for the latter part of Cruise 2 of the Wando River in the North East Coast licence. Following completion of the work in this area the ship will return to Launceston and the crew will be allowed a short rest period before beginning work in the East King Island licence.

The transfer of Raydist equipment from the North East Coast to King Island will be effected during the rest period. General preparations, including equipment maintenance, refuelling and reprovisioning will also be carried out during this period. It is anticipated that Cruise 3 will continue into early December.

Preliminary Phosphate Dredging

Dredging will begin in the unexplored central and southern parts of the West Tasmanian Phosphate Licence. This programme will continue into December.

TABLE 10

PHASE II OPERATIONS SCHEDULED FOR NOVEMBER

DRILLING - CRUISES 2 AND 3

VESSEL: M.V. WANDO RIVER

Date: October	Licence	Target Area	Occupation
1 - 16	North East Coast	Ringarooma Bay Mussel Roe Bay	Drilling Primary and Secondary holes
24 - 31 continuing into early December	East King Island	Elephant Shoal Seal Elephant Bay	Drilling Primary and Secondary holes

PRELIMINARY PHOSPHATE DREDGING

VESSEL: M.V. AARDVERK

Date	Licence	Target Areas
6 - 31 continuing into December	West Coast Tasmania	Central and Southern parts of licence.

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OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS - NOVEMBER, 1966.

Part 9

Ocean Mining A.G.,
Field Headquarters,
38 Canning Street,
Launceston, Tasmania.

December, 1966.

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930168

SUMMARY

Steady progress was achieved in the Phase II drilling programme during November. Fifty holes were drilled in the North East Coast licence and six holes in the East King Island licence.

Cruise II of the Wando River ended on 15th November and by this time seventy holes had been drilled in Ringarooma Bay.

Final assay results on outstanding Oyster Bay samples were discouraging.

Assay results for 184 samples from 31 holes in Ringarooma Bay were received during November. Although they do not provide a complete coverage, a number of these holes, particularly those put down in the central and eastern parts of the Bay, showed encouraging results.

Mineral dressing and assay results show that concentrations of tin tend to occur in the younger sands and gravels within the Bay. These deposits average approximately 15 feet in thickness and rest upon silts and clays which are predominantly non-tin bearing.

Preliminary phosphate dredging continued, although hampered by bad weather and 15 samples were collected from the hitherto unsampled southern portion of the West Tasmania licence.

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FIGURE NOT IN TEXT

Figure 5	Stratigraphic Columns, Ringarooma Bay

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PART I PROGRESS

General

Cruise II by the Wando River, which started on October 25th, continued till November 15th. A total of 70 holes were drilled in Ringarooma Bay and one in Mussel Roe Bay. Fifty of these holes were drilled during November. Three hundred and thirty-seven samples were collected from the fifty holes. The samples were dried, split and submitted for analysis.

After a short interval for crew relief and general maintenance, m.v. Wando River sailed for King Island on November 24th to start Cruise III.

Assay results for 184 samples from 31 holes in Ringarooma Bay were received during the month.

Preliminary phosphate dredging in the West Tasmania licence by m.v. Aardverk was hampered by continuous strong westerly to north westerly winds and heavy seas but fifteen samples were collected from stations in the southern portion of the licence.

Bathymetric information for both South and West Tasmanian licences was processed and the relevant maps compiled.

Plotting of drill hole and assay data for Ringarooma Bay continued throughout November. Revised sediment isopach and bedrock topography maps incorporating seismic and drill hole data were draughted. These have been used as base maps for calculating area and sediment volume data to facilitate grade estimates following the receipt of assay results.

Scheduled and actual progress during November are compared in Table 1.

Work accomplished by the end of November is shown in Figure 1.

Progress during November

Phase II Drilling

An operations log for m.v. Wando River is given in Table 2. This shows that Cruise II, continuing from October, ended on November 15th with the return of the vessel to Launceston for

TABLE 1. COMPARISONS OF SCHEDULED AND ACTUAL OPERATIONS
NOVEMBER, 1966

M.V. WANDO RIVER

Date Nov.	Scheduled Operations	Date Nov.	Actual Operations
1-16	Drilling, Ringarooma Bay and Mussel Roe Bay	1-15	Drilling, Ringarooma Bay and Mussel Roe Bay
17-23	Crew relief	16-23	Crew relief, routine maintenance
24-30	Drilling, East King Island	24-30	Drilling, East King Island

M.V. AARDVERK

1-4	Acting as support vessel to Wando River	1-4	Acting as support vessel to Wando River
6-30	Dredging, West Tasmania Licence	5-14	Slipped for annual inspection
		15-30	Dredging, West Tasmania Licence

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STATE OF OMAG OPERATIONS TO NOVEMBER 30TH 1966

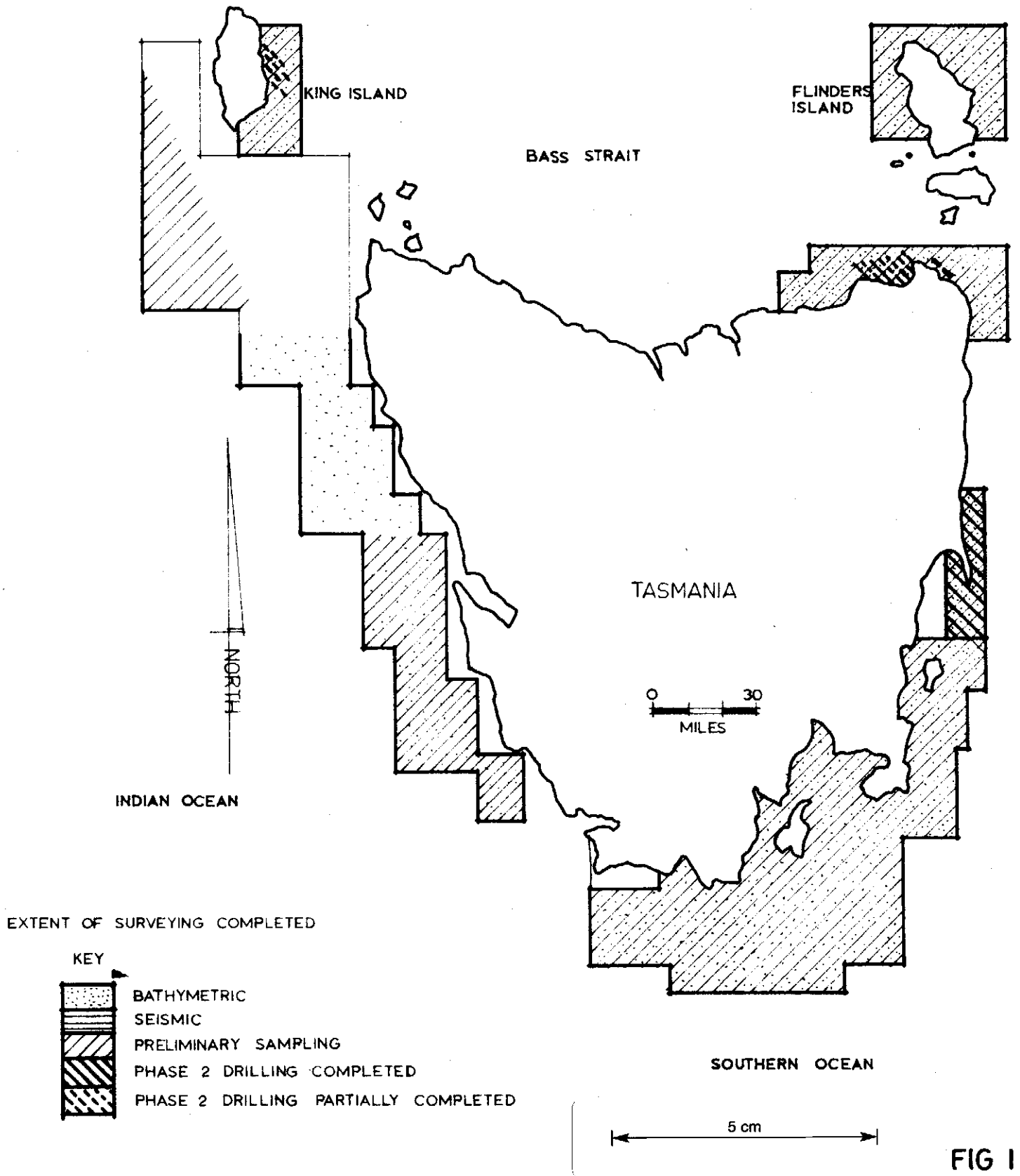

FIG 1

TABLE 2. OPERATION LOG

NOVEMBER 1966

M.V. WANDO RIVER

Date	Licence Area	Operation	Stations Sampled
1	N.E. Coast	Drilling NE22 Ringarooma Bay	1
2		Drilling MR81 Mussel Roe Bay	1
3		Drilling NE24-27	4
4		Drilling NE28-33	6
5		Repairs to rig. Drilling NE34	1
6		Drilling NE35-39	5
7		Drilling NE40-45	6
8		Drilling NE46-49	4
9		Adverse sea conditions	
10		Drilling NE50-56	7
11		Drilling NE57-61	5
12		Drilling NE62-66	5
13		Adverse sea conditions	
14		Drilling NE67-70, 23	5
15		Arrive Launceston. End Cruise 2	
16-23		Crew relief, routine maintenance and repair	
24	East King Island	Start Cruise 3. Sheltering at Beauty Point	
25		Transit to King Island	
26		Arrive King Island. Adverse weather	
27		Adverse weather, calibrating Raydist	
28		Drilling EKI 1-4	4
29		Adverse weather	
30		Drilling EKI 5-6	2
		Total Stations	56

routine maintenance and crew relief. During November, 49 holes were drilled in Ringarooma Bay and one in Mussel Roe Bay. Three hundred and thirty-seven samples were obtained from the November holes and all were submitted to the Launceston Laboratories of the Tasmanian Department of Mines for mineral dressing and assay. Splits of these samples were taken to the field office where they were dried and split again ready for further analyses. Locations of all holes drilled in Ringarooma Bay during October and November are shown in Figure 2.

Cruise III by the Wando River commenced on November 24th, but because of almost continuous inclement weather only six holes had been drilled in this exposed licence by the end of the month. The location of these holes is shown in Figure 3.

Drill Hole Location

Most of the holes in Ringarooma Bay and all of the holes in the East King Island licence have been located by Raydist. Occasional checks on the ship's position from shore-based theodolite stations compared favourably with Raydist readings. Calibration buoys moored at surveyed stations at sea also provided further check points when positioning the drilling vessel. The buoys, however, were susceptible to tidal current changes and were only visible over short distances in choppy seas. Nevertheless they were generally of considerable aid when checking other positioning systems.

Some maintenance problems were encountered with the Raydist early in Cruise II. In each instance, while the Raydist was being serviced, drilling continued, and these holes were located by a combination of radar and horizontal sextant angles. Although these methods are less accurate than Raydist, subsequent checks revealed that they were not significantly in error bearing in mind the reconnaissance nature of the drilling programme. It is apparent, however, that if closer spaced drilling is ultimately required, positioning of the drilling ship must be controlled by Raydist or some other similarly accurate method.

Preliminary Phosphate Exploration

An operations log for m.v. Aardverk is given in Table 3. Continuous bad weather and the exposed nature of the West Tasmanian coast has hampered the progress of the Aardverk's dredging programme. Three brief spells of calmer weather,

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DRILL HOLE SITES RINGAROOMA BAY

OCTOBER NOVEMBER

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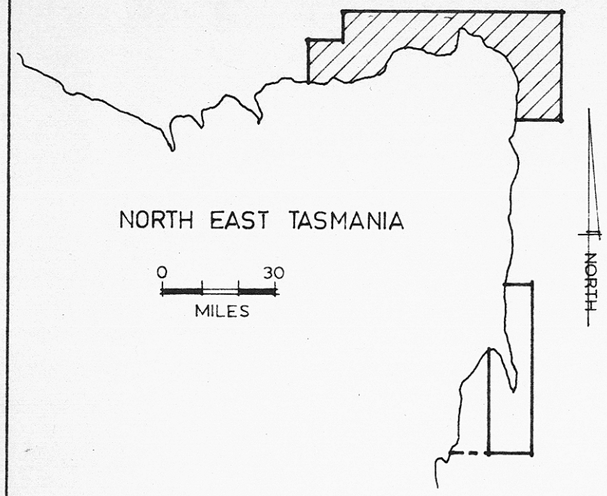


LOCATION MAP

5 cm

0 1 2 3

MILES

CAPE PORTLAND

RAYDIST BEACON

TOMAHAWK POINT

RAYDIST BEACON

RAYDIST BEACON

OFFSHORE LEASE BOUNDARY ONE MILE approx

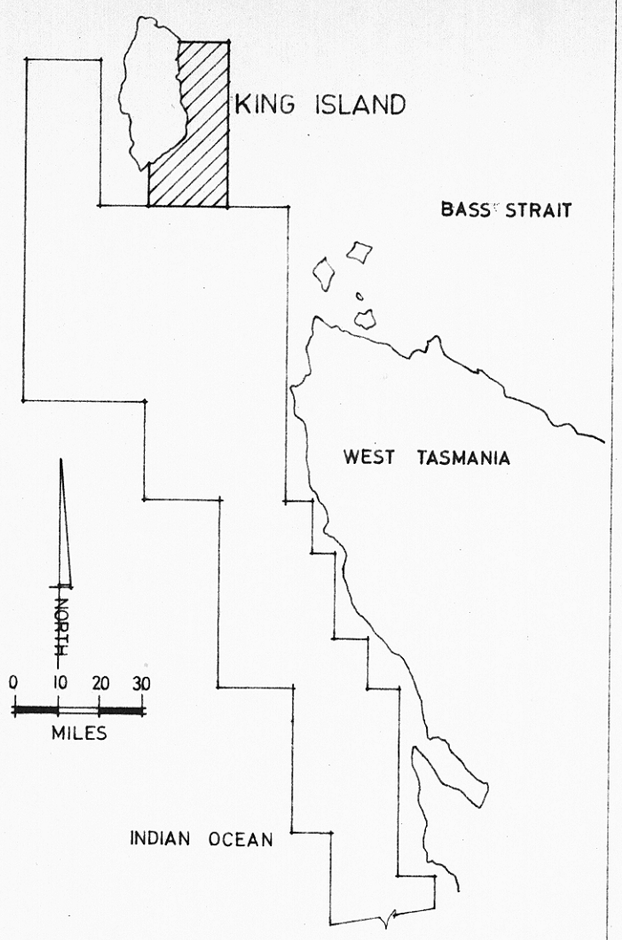
NORTH

NOTE

⊙ HOLES DRILLED IN OCTOBER

⊘ HOLES DRILLED IN NOVEMBER

FIG 2



LOCATION MAP

5 cm

DRILL HOLE SITES
KING ISLAND

NOVEMBER 1966

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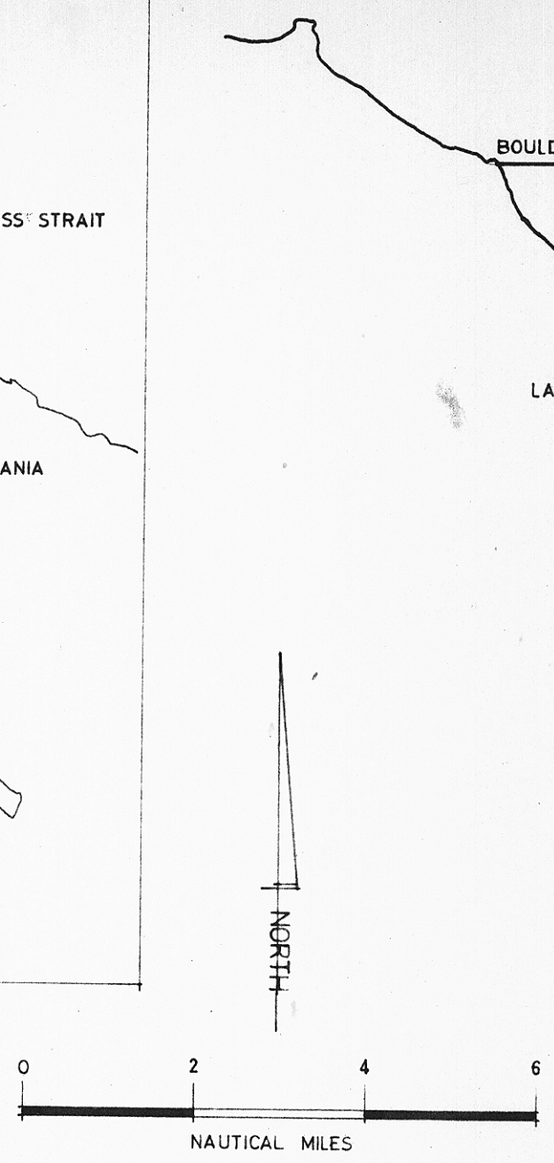

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FIG 3

TABLE 3. OPERATION LOG
NOVEMBER 1966
M.V. AARDVERK

Date	Licence Area	Operation	Stations Sampled
1- 4	N.E. Coast	Acting as temporary support vessel to Wando River	
5-14		Slipped for annual inspection	
15		Standby, bad weather	
16	West Tasmania	Transit to Partridge Island	
17		Transit to Port Davey	
18		Transit to Port Hibbs, dredging	6
19		Transit to Strahan	
20		Standby, bad weather	
21		Dredging	5
22		Dredging	4
23		Transit to Strahan, bad weather	
24-26		Crew relief	
27-30		Standby, bad weather	
		Total Stations	15

however, allowed the vessel to obtain 14 dredge samples and one Van Veen grab sample from 15 stations uniformly distributed throughout the southern portion of the licence. Samples were obtained from an irregular sea bottom ranging in depth from 45 to 88 fathoms, the depth range which, from past experience, has proved to be the most promising. The location of these stations is shown in Figure 4.

Renewal of Licences

Exploration licences for areas bordering the East King Island and North East Coast of Tasmania were renewed on the 18th November and are now valid until the 18th May, 1967.

Staff

Two additional staff were appointed on a temporary basis during the month to assist and increase the rate of processing samples at Field Headquarters and at the Department of Mines.

Table 4 lists the staff complement at November 30th.

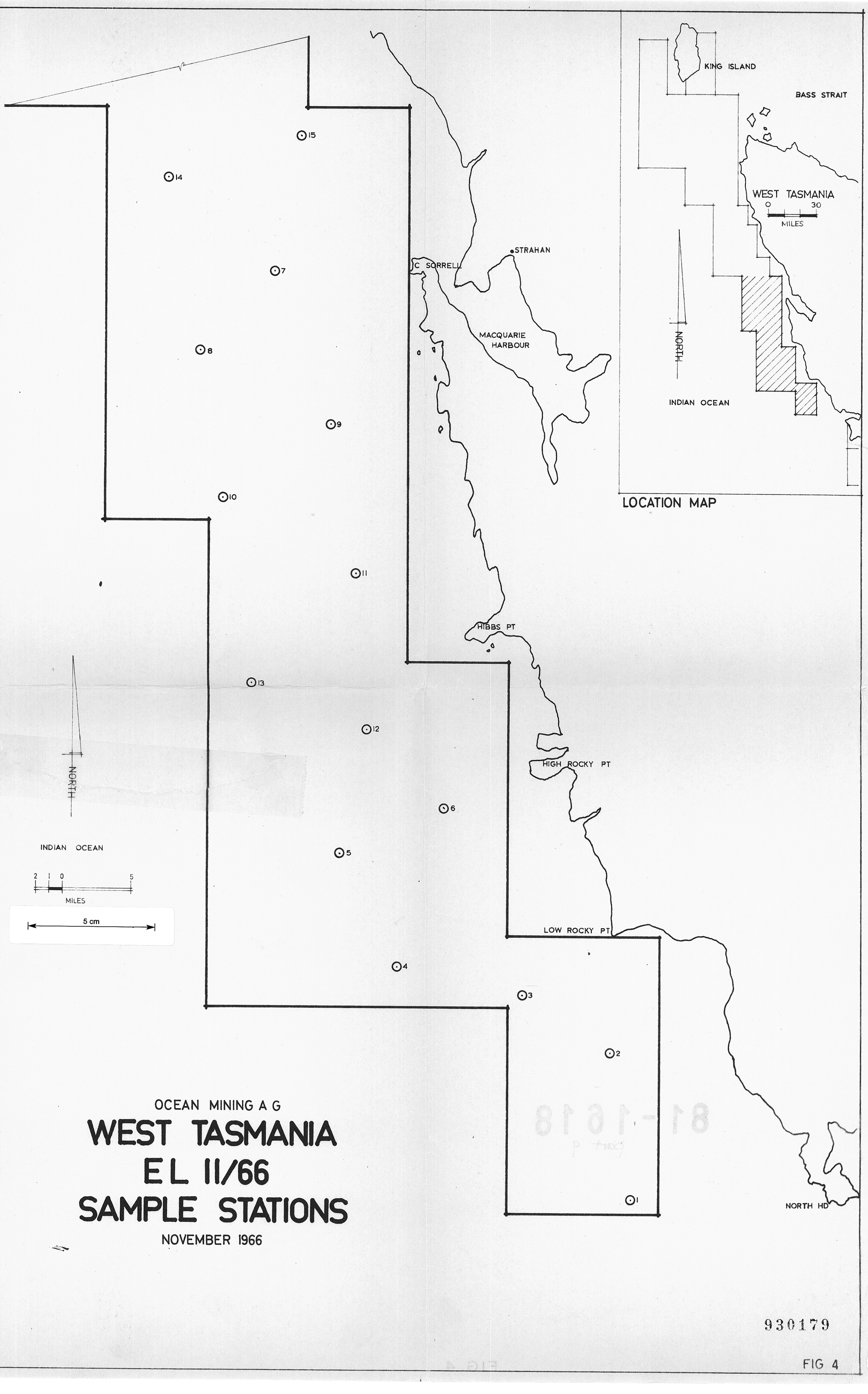
Management Visitors

Mr. F.J. Lampietti, Executive Director of Ocean Mining A.G., and a member of the Board of T.O.E.C., visited Field Headquarters and drilling operations in Ringarooma Bay between 10-15th November.

OCEAN MINING A G

WEST TASMANIA
E L 11/66
SAMPLE STATIONS

NOVEMBER 1966



LOCATION MAP

930179

FIG 4

TABLE 4. STAFF COMPLEMENT 30th November, 1966.

Status	Name	Appointment	Occupation
Professional	W.Davies	Field Manager	Phase II
	D.J. Young	Staff Geologist	Phase II
	A. Scholtens	Geologist	Phase II Dredging
	P. Skipwith	Geologist	Phase II Wando River
	A.von Rahden	Senior Engineer	Phase II Wando River
	D. Lawson	Engineer/Driller	Phase II Wando River
Non-professional	J.Beaverstock	Laboratory Tech.	Phase II Sample processing
	A. Burgess	Draughtsman	Phase II
	A.S.R.Davies	Secretary	Phase II Administration
	L. Taylor	Typist/Secretary	Phase II Administration
	D. Griffiths	Data Plotter	Phase II
	G. Milliken	Rigger	Phase II Wando River
	P. Jackson	Rigger	Phase II Wando River
	L. Locsei	Welder/Mechanic	Phase II Wando River
	D. Murray	Geologist Asst.	Phase II Wando River
	S. Webster	Raydist Operator	Phase II Raydist
	R.W. Taylor	Seaman	Phase II Dredging
	C.P. Blundell	Seaman	Phase II Dredging
Part time	J. Goodricke	Data processing and draughting	Phase II
	R.D. McBain	Raydist Consultant	Phase II
Temporary staff	P. Gibson	Laboratory Tech.	Sample processing
	J.Campbell-Smith	Laboratory Tech.	Sample processing
Staff included in Charters	T. Chopping R. Bone W. Button	Skipper & crew m.v. Aardverk	Preliminary dredging South Tasmania
	G.W. Head E. Taylor	Skipper & mate m.v. Tondeloya	Tender boat to Wando River

PART II RESULTS

Drilling Results

North East Coast

Drill hole data for the 49 holes drilled in Ringarooma Bay during November are presented in Table 5, and stratigraphic columns for all the Ringarooma Bay holes drilled are given in Figure 5 (see folder at end of report). Only four holes failed to reach bedrock. Sediment thicknesses ranged from 2 feet to 48 feet and averaged 19.5 feet. Water depths ranged from 53 feet to 122 feet and averaged 94 feet.

A small amount of core was lost from several holes, generally from those in more than 20 feet of sediment when it was occasionally necessary to vibrate the core barrel during retraction from the hole. Comparison of the figures for drill penetration and core recovery indicate that 98.3 percent of the sediment penetrated was retained. Only a few sites were drilled with more than 15 percent core loss and these will be redrilled during Cruise IV.

In some areas of Ringarooma Bay a general correlation of sediment type between drill holes is evident, as for example between holes 30, 33, 61, 63 and 64. Generally however, the cores show a considerable variation in sediment thickness throughout the bay.

Clay layers more than two feet thick were rare, only one hole, hole 17, being composed almost entirely of clay. Fine silt and silty clay beds however were relatively common, particularly in the lower portions of many holes. Recovery of cassiterite from these deposits would undoubtedly be difficult if they prove to be tin-bearing.

The upper portion of most cores however, was generally composed of medium to coarse sand with occasional pebbly and/or silty beds. This coarser upper layer generally varies from 6-15 feet in thickness but in a few localities is as much as 40 feet thick.

East King Island

Table 6 shows data for six holes drilled in the East King Island licence during November. Continuous adverse weather resulted in anchoring and core recovery problems. However,

TABLE 5. DRILL HOLE DATA

NORTH EAST COAST TASMANIA

Hole No.	Date November 1966	Water Depth ft.	Drill Penetration ft.	Core Recovered ft.	Bedrock Reached
22	1st	87	13	13	Yes
23	14th	65	22.0	22.0	"
24	3rd	58	2	2	"
25	"	60	2	2	"
26	"	89	35	35	No
27	"	90	20	19.5	Yes
28	4th	105	19.5	19.5	"
29	"	89	8.5	8.5	"
30	"	95	28	25.5	"
31	"	102	10	9	No
32	"	109	10	9.5	Yes
33	"	106	28	24	"
34	5th	80	48	46	No
35	6th	109	15.5	15.5	Yes
36	"	112	24	20.5	"
37	"	103	41	37.5	"
38	"	113	30	25	"
39	"	75	28	19	"
40	7th	93	4	4	"
41	"	102	22.5	22.5	"
42	"	95	16	10	"
43	"	82	3	3	"
44	"	72	2.5	2.5	"
45	"	94	10	9.5	"
46	8th	104	7	7	"
47	"	110	12	10	"
48	"	113	12.5	12.5	"
49	"	53	10	3	No
50	10th	91	9	9	Yes

.../contd.

TABLE 5. (contd.)

DRILL HOLE DATA
NORTH EAST COAST TASMANIA

Hole No.	Date November 1966	Water Depth ft.	Drill Penetration ft.	Core Recovered ft.	Bedrock Reached
51	10th	75	16	14.5	Yes
52	"	73	2.5	2.5	"
53	"	60	3.5	3.5	"
54	"	57	2	2	"
55	"	64	4.5	4.5	"
56	"	92	42	33	"
57	11th	112	20	19.5	"
58	"	120	21.5	16.5	"
59	"	111	32	32	"
60	"	103	30	28.5	"
61	"	100	25	22	"
62	12th	82	30	24	"
63	"	122	21	16	"
64	"	116	39	33	"
65	"	105	42.5	42.5	"
66	"	87	44.5	44.5	"
67	14th	94	35	33	"
68	"	71	39.5	37.5	"
69	"	67	12.5	12.5	"
70	"	60	12	11.5	"
		Totals	970	954	
		Percent recovered		98.3	

TABLE 6 DRILL HOLE DATA

EAST KING ISLAND

Hole No.	Date November 1966	Water Depth ft.	Drill Penetration	Core Recovered ft.	Bedrock Reached
1	27th	43	7	5.5	Yes
2	"	63	7	4.0	Yes
3	"	76	20	20	Yes
4	"	65	10	7.5	No
5	30th	72	16	4.0	Yes
6	"	72	17	8.5	Yes
		Totals	77	31.5	

nineteen samples were collected and submitted for analysis.

Phosphate Sampling Results

Results of the dredging programme in the southern portion of the West Tasmania licence are shown in Table 7. Nodular material was dredged from 10 of the 15 stations sampled, ranging in depth from 53 to 85 fathoms. As in the South Tasmania licence this is the approximate depth range to which nodular material is restricted. Nodules found ranged from dense, well rounded, dark brown varieties to larger, light brown, semi-porous, soft, irregular masses. Splits of all samples were submitted to an independent authority for analysis.

Mineral Dressing and Assay Results

Oyster Bay

The assay results for 55 samples from this licence, not included in the October report, are given in Table 8. Only very low tin values were recorded. All holes drilled therefore, showed generally discouraging results and the licence as a whole may be considered to be a poor mining prospect.

North East Coast

Assay results for 184 samples from 31 holes in Ringarooma Bay are given in Table 9 in parts per million (p.p.m.). These samples are from holes 1-21, 28, 29 and 40-45, located as shown in Figure 2. Upper portions of holes 2, 18, 19, 28, 42 and 45 showed average assay values ranging from 35 to 83 p.p.m. Sn. The highest value recorded was 196 p.p.m. Sn in sample 135 from hole 18. Except for hole 19 these holes were located along the west side of a channel passing through the general area which showed the highest tin values during the Phase I reconnaissance sampling programme. Five other holes were sited in this channel but assay results for these have not yet been received.

A more complete appraisal of the potential of the area as a whole will be made on receipt of assay results for the remaining 39 holes.

The stratigraphic distribution of tin, titanium and zirconium in each hole is presented in histogram form in Figure 6.

TABLE 7. SAMPLING RESULTS

WEST TASMANIA PHOSPHATE DREDGING

NOVEMBER '66

Sample No.	Date	Depth (fths)	Composition of Sample	
			Nodules %	Other %
WT 1	18th	79	-	100
2	"	70	80	20
3	"	76	85	15
4	"	88	<1	>99
5	"	77	10	90
6	"	56	65	35
7	21st	73	80	20
8	"	87	10	90
9	"	53	>90	<10
10	"	81	80	20
11	"	45	85	15
12	22nd	53	65	35
13	"	81	-	-
14	"	85	70	30
15	"	53	95	5

TABLE 8 ASSAY RESULTS

OYSTER BAY LICENCE

NOVEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic Percent	p.p.m. Metals		
			Sn	Ti	Zr
13	OB854	0.14	Trace	55	65
	855	0.10	Trace	36	48
	856	0.10	Trace	20	34
	857	0.11	1	13	42
	858	0.10	Trace	3	8
	859	0.08	Nil	2	5
	860	0.07	Trace	5	20
	861	0.06	Trace	18	47
	862	0.40	5	190	619
	863	0.10	Trace	30	60
	864	0.05	1	15	44
	865	0.08	2	9	31
10	866	0.07	1	61	71
	867	0.03	Nil	29	20
	868	0.04	Nil	30	22
	869	0.04	Nil	29	20
	870	0.08	Nil	42	39
	871	0.07	Nil	46	40
	872	0.04	Nil	32	24
	873	0.06	Nil	39	42
	874	0.03	Nil	24	22
	875	0.04	Trace	23	16
	876	0.03	Nil	34	17
	877	0.04	Nil	44	23
	878	0.03	Trace	36	9
	879	0.02	Trace	16	10
	880	0.03	Trace	20	12
	881	0.02	Trace	24	11
3	903	0.12	2	64	79
	909	0.10	Trace	5	9
	910	0.11	Trace	5	5
	911	0.18	Trace	9	13
	912	0.08	Trace	8	9
8	913	0.17	Trace	138	15
	914	0.14	Trace	70	95
	915	0.22	4	132	108
	916	0.24	2	117	178
	917	0.17	Trace	63	77

.../contd.

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TABLE 8 (contd.) ASSAY RESULTS
OYSTER BAY LICENCE
NOVEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic Percent	p.p.m. Metals		
			Sn	Ti	Zr
9	OB918	0.20	Nil	176	358
	919	0.20	Nil	218	264
	920	0.11	Nil	92	84
	921	0.08	Trace	45	39
	922	0.08	Nil	37	26
	923	0.06	Nil	38	25
	924	0.05	Trace	35	31
5	925	0.27	Nil	132	181
	926	0.49	Nil	60	87
	927	0.15	Trace	85	105
	928	0.14	Nil	119	136
	929	0.39	Nil	114	141
	930	0.08	Nil	79	72
	931	0.15	Nil	123	99
	932	0.07	Nil	80	87
	933	0.18	Nil	122	126
	934	0.12	Nil	114	118

TABLE 9

ASSAY RESULTS

NORTH EAST COAST LICENCE

NOVEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic Percent	p.p.m. Metals		
			Sn	Ti	Zr
1	NE 1	0.03	Trace	17	10
	2	0.06	Trace	44	22
	3	0.09	Trace	9	6
	4	0.02	Trace	3	2
2	5	0.05	67	7	9
	6	0.03	21	Nil	4
	7	0.02	3	4	4
	8	0.02	1	5	8
	9	0.10	1	8	10
	10	0.08	Trace	9	11
	11	0.06	Trace	4	4
	12	0.07	Trace	5	7
	13	0.12	Nil	14	8
	14	0.12	Nil	29	8
	15	0.12	Nil	14	8
	16	0.41	2	10	9
	17	0.06	Nil	18	14
	18	0.10	1	79	41
3	19	0.09	3	72	37
	20	0.16	6	32	26
	21	0.06	Trace	6	7
4	22	0.07	Trace	71	54
	23	0.14	Trace	28	43
	24	0.06	Trace	44	57
	25	0.11	Trace	33	68
	26	0.11	Nil	11	44
	27	0.10	Nil	7	28
	28	0.30	Nil	12	44
	29	1.02	Nil	12	15
	30	0.54	Nil	Nil	27
	31	0.08	Trace	29	27
5	32	0.14	Trace	26	29
	33	0.13	Trace	21	48
	34	0.44	Nil	8	127
	35	0.22	Nil	5	11
	36	0.61	Nil	15	32

.../contd.

TABLE 9 (contd.) ASSAY RESULTS

NORTH EAST COAST LICENCE

NOVEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic Percent	p.p.m. Metals		
			Sn	Ti	Zr
6	NE37	0.12	Trace	38	48
	38	0.10	Trace	52	50
	39	0.28	Nil	72	68
	40	0.51	8	25	74
	41	0.26	3	6	6
	42	0.28	1	3	4
	43	0.83	Trace	10	Nil
	44	0.61	Nil	11	Nil
7	45	0.11	Trace	48	61
	46	0.09	Trace	8	8
	47	0.12	8	82	166
	48	0.08	4	48	52
	49	0.16	Trace	87	99
	50	0.18	Nil	104	89
	51	0.12	Nil	7	4
	52	0.18	Trace	13	12
	53	0.08	Trace	16	17
	54	0.09	1	19	24
	55	0.27	14	29	54
	56	0.55	6	17	29
	57	0.59	9	7	Nil
8	58	0.07	6	28	33
	59	0.06	9	33	41
	60	0.08	5	30	39
	61	0.08	9	31	60
	62	0.19	29	29	39
	63	0.72	19	31	32
	64	0.49	2	12	Nil
	65	0.12	5	13	12
	66	0.08	4	11	13
	67	0.13	38	11	20
	68	0.11	7	6	8
	69	0.19	5	9	10
	70	0.31	3	7	11
	71	0.36	Trace	9	13
	72	0.32	Trace	6	7

.../contd.

TABLE 9 (contd.) ASSAY RESULTS

NORTH EAST COAST LICENCE

NOVEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic Percent	p.p.m. Metals		
			Sn	Ti	Zr
9	NE74	0.36	Trace	68	94
	75	0.33	Trace	22	30
	76	0.25	Trace	20	13
	77	0.16	Trace	31	27
	78	0.47	Trace	14	21
	79	0.15	7	12	18
	80	0.10	4	24	4
	81	0.12	22	28	42
	82	0.06	8	4	4
	83	0.06	Trace	1	Nil
10	84	1.28	10	31	56
	85	0.57	9	36	82
	86	0.22	4	20	40
	87	0.09	8	12	23
	88	0.26	1	13	35
	89	0.44	2	19	39
	90	0.10	Trace	54	56
11	91	0.13	Trace	41	39
	92	0.07	Trace	14	13
	93	0.10	2	9	5
	94	0.10	12	12	17
	95	0.04	10	5	9
	96	0.03	2	4	7
	97	0.08	Trace	11	19
	98	0.05	Trace	11	18
	99	0.48	Nil	21	11
	100	0.27	Trace	15	12
12	101	0.08	10	8	21
	102	0.10	1	17	21
	103	0.17	Trace	18	14
	104	0.28	Trace	20	21
	105	0.45	Trace	33	34
	106	0.28	1	45	59
13	107	0.47	6	35	50
	108	0.32	5	32	44
14	109	0.91	4	Nil	Nil
	110	0.31	1	6	Nil
	111	0.49	Trace	9	Nil
	112	0.43	Nil	8	9

.../contd.

TABLE 9 (contd.) ASSAY RESULTS

NORTH EAST COAST LICENCE

NOVEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic Percent	p.p.m. Metals		
			Sn	Ti	Zr
15	NE114	0.09	Trace	11	6
	115	0.20	2	19	17
	116	0.15	3	8	10
	117	0.12	Trace	11	17
	118	0.10	1	9	18
	119	0.07	2	4	6
	120	0.31	6	47	58
	121	0.32	9	22	44
	122	0.22	7	68	99
	123	0.43	17	61	150
16	124	0.94	2	23	36
	125	0.07	Trace	19	36
	126	0.01	Trace	32	60
	127	0.20	1	15	21
17	128(	No concentrate obtained Entirely grey clay			
	129(				
	130(				
	131(				
	132(				
18	133	0.12	4	23	33
	134	0.15	49	10	21
	135	0.20	196	16	44
	136	0.11	6	3	3
	137	0.19	2	Nil	Nil
	138	0.03	3	5	6
	139	0.03	1	6	12
	140	0.06	Trace	3	3
19	141	0.82	43	15	48
	142	0.17	9	4	10
	143	0.12	Trace	7	5
	144	0.27	Trace	6	8
	145	0.06	Trace	3	3
	146	0.16	Nil	Nil	Nil
	147	0.08	Trace	1	Nil
	148	0.24	2	10	9

.../contd.

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TABLE 9 (contd.) ASSAY RESULTS

NORTH EAST COAST LICENCE

NOVEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic Percent	p.p.m. Metals		
			Sn	Ti	Zr
20	NE149	0.09	2	37	51
	150	0.25	Trace	7	7
	151	0.07	2	2	3
	152	0.26	3	13	20
	153	0.13	2	3	6
	154	0.09	54	2	4
21	155	0.18	2	58	85
	156	0.11	Trace	23	27
28	215	0.21	67	27	37
	216	0.23	41	11	24
	217	0.15	Trace	6	8
	218	0.31	Trace	7	Nil
	219	0.03	Trace	2	4
	220	0.14	Nil	9	12
	221	0.12	Nil	4	Nil
	222	0.17	Nil	7	3
29	223	0.11	5	7	6
	224	0.12	Trace	3	2
	225	0.11	Trace	3	Nil
	226	0.15	Trace	5	3
40	315	0.11	17	28	62
41	316	0.16	1	24	33
	317	0.02	1	9	9
	318	0.04	3	9	7
	319	0.31	1	Nil	Nil
	320	0.01	Trace	Trace	1
	321	0.01	Trace	2	Trace
	322	0.07	Trace	Nil	26
	323	0.13	2	17	33
42	324	0.06	42	13	24
	325	0.09	110	3	13
	326	0.11	40	10	19
43	327	0.04	4	2	2
44	328	0.06	23	4	11
45	329	0.09	51	5	7
	330	0.05	24	2	4
	331	0.05	42	7	19
	332	0.11	30	3	7

This shows that the heavy mineral content of most cores analysed to date is highest in samples from the upper ten feet of the sediment body, and that the values tend to decrease with increasing depth. This applies particularly to holes 2, 4, 6, 11, 18, 19, 20, 21. Only in hole 15 did the heavy mineral content increase with depth.

Comparison of the histograms with the stratigraphic columns presented in Figure 6, and with the drill logs, show that the highest tin values are generally restricted to the coarser grained sediments, particularly coarse grained, quartz, gravel and pebble beds, and coarse grained, grey, quartzose sands. Fine silt and clay layers on the other hand invariably show, in the samples so far analysed, a very low heavy mineral content.

In general therefore, it may be concluded that preliminary mineral dressing and assay results confirm Phase I indications that recoverable cassiterite is concentrated in the younger, coarser sandy and gravelly sediments within Ringarooma Bay.

Clay Analysis

Because of the apparent bentonitic properties evident in much of the clay from Oyster Bay, tests were conducted on a representative clay sample by the Tasmanian Department of Mines. The results of this test are as follows:

Sample	% +350 Mesh	Viscosity Centimetres/sec.
OB.977	15.6	14
Blue Label Bentonite	2.9	45

The material is therefore too coarse and too viscous to be used as a substitute for bentonite.

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PART III PLANS FOR DECEMBER

Phase II Drilling

To ensure that a period of crew relief and ship's maintenance coincides with the Christmas period, Cruises III and IV by the Wando River have been shortened from the standard three weeks' duration. Cruise III in the East King Island licence, which started on November 24th, is scheduled to end about December 7th, depending on the weather.

During Cruise IV, scheduled from December 12th to December 23rd, Wando River will return to the North East Coast licence to drill further holes in Ringarooma Bay and test holes in Mussel Roe and Anderson Bays. In addition, holes drilled in Cruise II in which there was significant core loss will be redrilled.

Table 10 shows shows the schedule for the latter part of Cruise III and for Cruise IV by the Wando River.

Mineral Dressing and Assaying

Pilot plant studies on samples from Ringarooma Bay and the East King Island licence will continue during December. It is anticipated that the results of analyses on the initial 70 cores collected from Ringarooma Bay will be completed by mid-December.

Splits of samples showing relatively high concentrations of tin on assay will be subjected to further analysis by an independent authority in order to check the preliminary values recorded.

Data Processing

Revision of sediment isopach and bedrock topography maps by incorporating drill hole data with seismic information will continue for the main target areas.

Following receipt of assay results, estimations of ore grade and volume will be computed.

Preliminary Phosphate Dredging

Phosphate dredging by m.v. Aardverk will continue in the

TABLE 10 PHASE II OPERATIONS SCHEDULED FOR DECEMBER

DRILLING - CRUISES III AND IV

VESSEL - M.V. WANDO RIVER

Date December	Cruise	Licence	Target Area	Occupation
1- 7	III	East King Island	Sea Elephant Bay	Drilling Primary & Secondary Holes
12-23	IV	North East Coast	Mussel Roe Bay Anderson Bay Ringarooma Bay	Drilling Primary Holes Drilling Primary Holes Drilling Tertiary Holes

PRELIMINARY PHOSPHATE DREDGING

VESSEL - M.V. AARDVERK

Date December	Licence	Target Area	Occupation
1-20	West Coast Tasmania	Central & Northern parts of licence	Dredging and Bathymetric programme

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West Tasmania licence till mid-December. A schedule is provided in Table 10. Samples containing nodular material will be submitted for analysis. An appraisal of the phosphate licences, on the basis of these preliminary results, will be made by the end of the month and plans for more detailed surveys of the more promising areas will be formulated.

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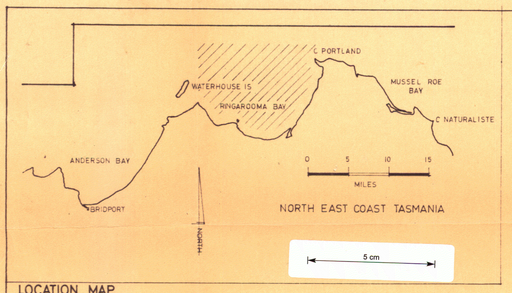


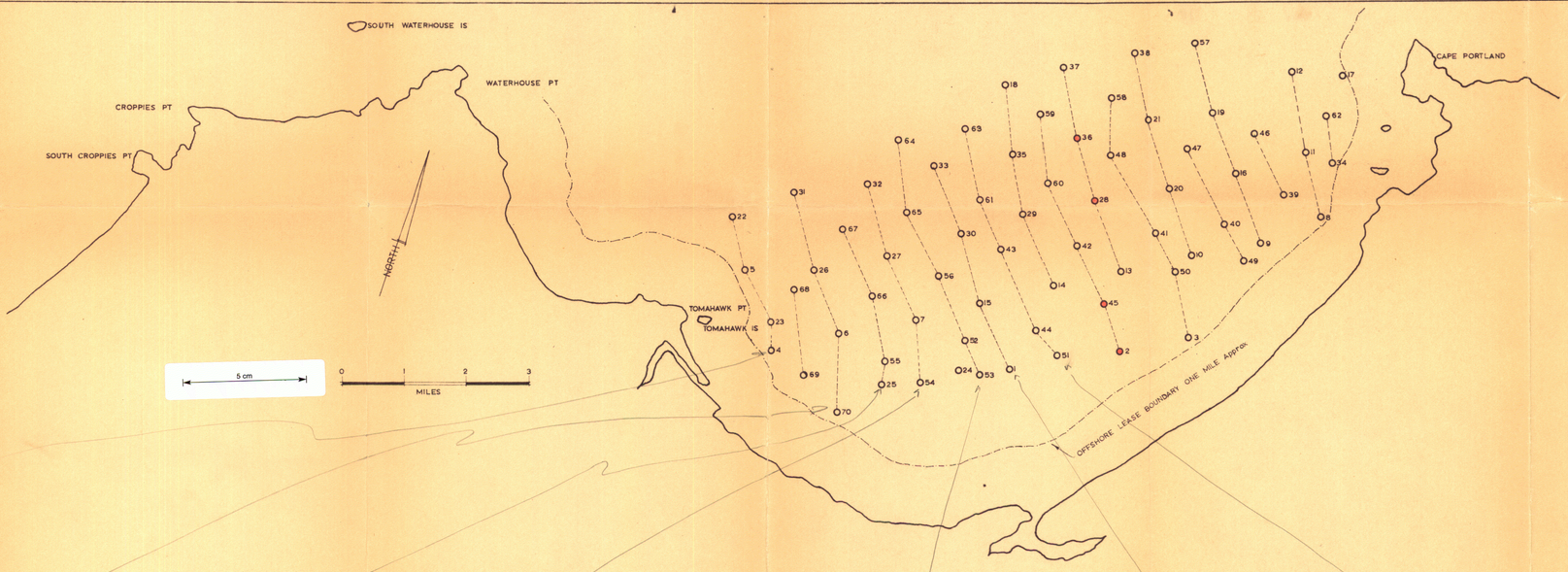
LOCATION MAP

OCEAN MINING A G

STRATIGRAPHIC COLUMNS RINGAROOMA BAY

NOVEMBER 1966

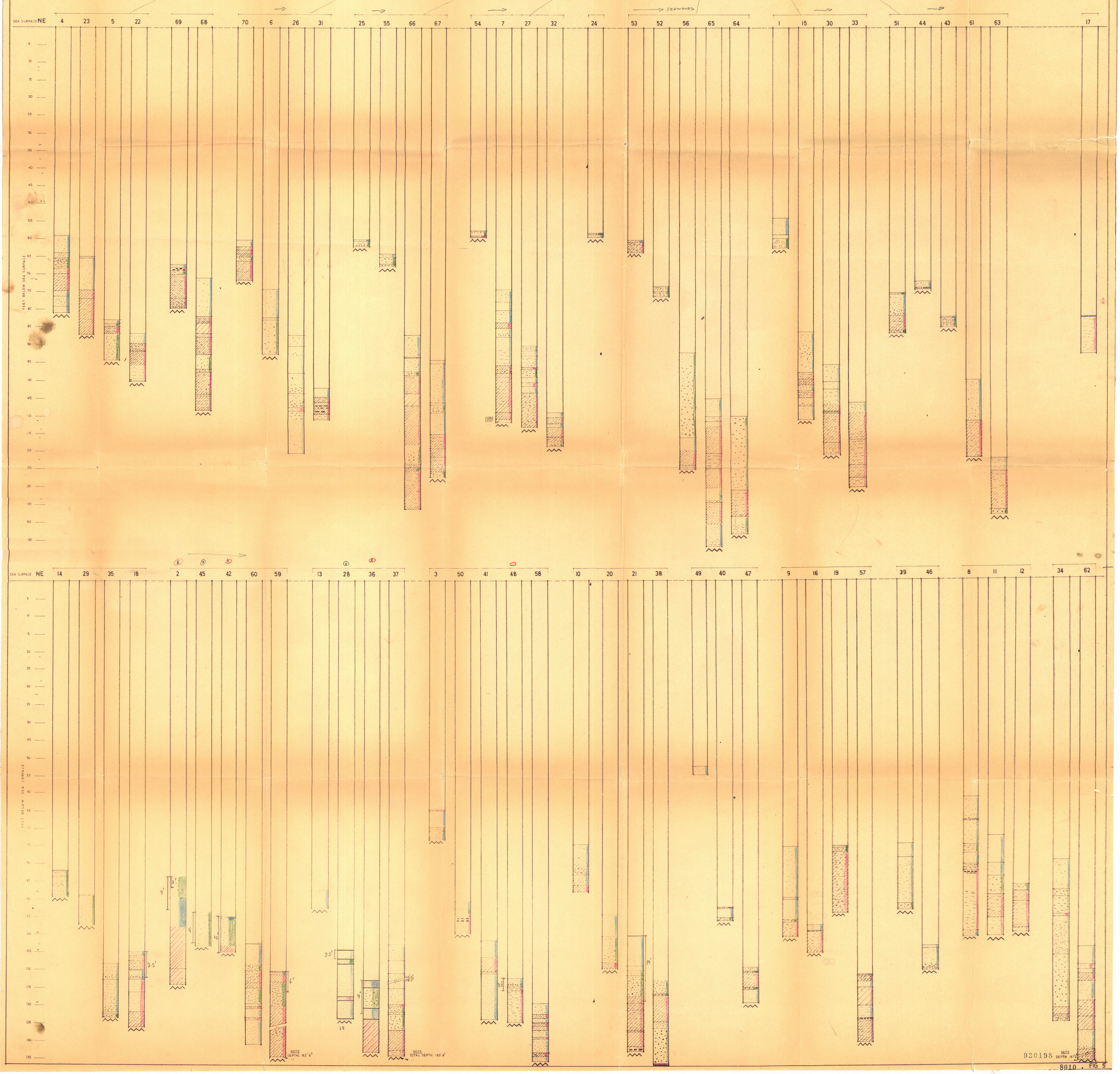
HALES 0-70



KEY TO CORE VOLUMES

- WATER
- PEBBLES
- GRANULES
- SAND
- SILT
- CLAY
- SHELLS
- PEAT
- BEDROCK

VERTICAL SCALE 1/8 = 1.0'



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OCEAN MINING A.G.
TASMANIA OFFSHORE EXPLORATION PROGRAMME
REPORT OF OPERATIONS - DECEMBER, 1966.
Part 10.

Ocean Mining A.G.,
Field Headquarters,
38 Canning Street,
Launceston, Tasmania.

January, 1967.

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~~Jan. 1967.~~
Dec 1966

SUMMARY

Adverse weather disrupted field operations repeatedly during December.

Sample treatment and assays at the Tasmanian Department of Mines Laboratories have confirmed the presence of low grade tin deposits in Ringarooma Bay. In general, however, it is considered that these preliminary results do not reflect the true potential of the area as a mining prospect. Results of tests suggest that ninety-five percent of all cassiterite found is sufficiently coarse grained to be effectively concentrated by tabling.

Examination of the stratigraphic distribution of tin in the first batch of cores studied shows that most of the cassiterite is concentrated in the upper ten feet of sediment within Ringarooma Bay.

Analyses of additional samples from the West Tasmania Phosphate Licence provided further encouraging results.

Cruises for R/V Wando River and M/V Aardverk, scheduled for January, have been planned to carry out drilling and dredging on more closely spaced grid patterns within areas which already show promise.

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PART I PROGRESS

General

Cruise III by the Wando River, which began on November 24th, continued in the East King Island and West Tasmania Licence areas till December 7th. Eight holes were drilled in the East King Island Licence and five bulk phosphate samples were dredged in the West Tasmania Licence. Operations during this cruise by the Wando River were seriously hampered by adverse weather.

After a short interval for crew relief and routine maintenance, Cruise IV, to the North East Coast Licence, started on December 11th and continued till December 23rd. Adverse weather again restricted operations but eleven holes were drilled in Ringarooma Bay and two in Mussel Roe Bay during this cruise.

Assay results for 181 samples from 23 holes in Ringarooma Bay and for 16 samples from one hole in Mussel Roe Bay were received during the month. Three hundred and sixty-five samples from 54 holes in Ringarooma had been received by December 31st. Assay results for 230 samples from 27 holes in Ringarooma Bay were still outstanding at the end of the month.

All drill hole and assay data was plotted as received, and the calculation of tin grade and value proceeds satisfactorily.

Preliminary phosphate dredging by the Aardverk proceeded steadily off the West Coast of Tasmania and by the end of the month 33 stations in the central and northern parts of the licence had been sampled by either dredge or Van Veen grab.

Scheduled and actual progress during December are compared in Table 1.

Work accomplished by the end of December is shown in Figure 1.

TABLE 1. COMPARISONS OF SCHEDULED AND ACTUAL OPERATIONS
DECEMBER, 1966

R.V. WANDO RIVER

Date	Scheduled Operations	Date	Actual Operations
1-7	Drilling, East King Island	1-7	Drilling and Dredging, East King Island
7-11	Crew relief, routine maintenance	8-10	Crew relief, routine maintenance
12-23	Drilling, N.E. Coast Licence	11-22	Drilling, N.E. Coast Licence
24-30	Crew relief, Christmas holidays	23-30	Crew relief, Christmas holidays

M.V. AARDVERK

1-20	Dredging Central and Northern parts of West Tasmania Licence	1-2	Crew relief, routine maintenance
		3-21	Dredging West Tasmania Licence
21-30	Crew relief, Christmas holidays	22-30	Crew relief, Christmas holidays

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STATE OF OMAG OPERATIONS TO DECEMBER 31ST 1966

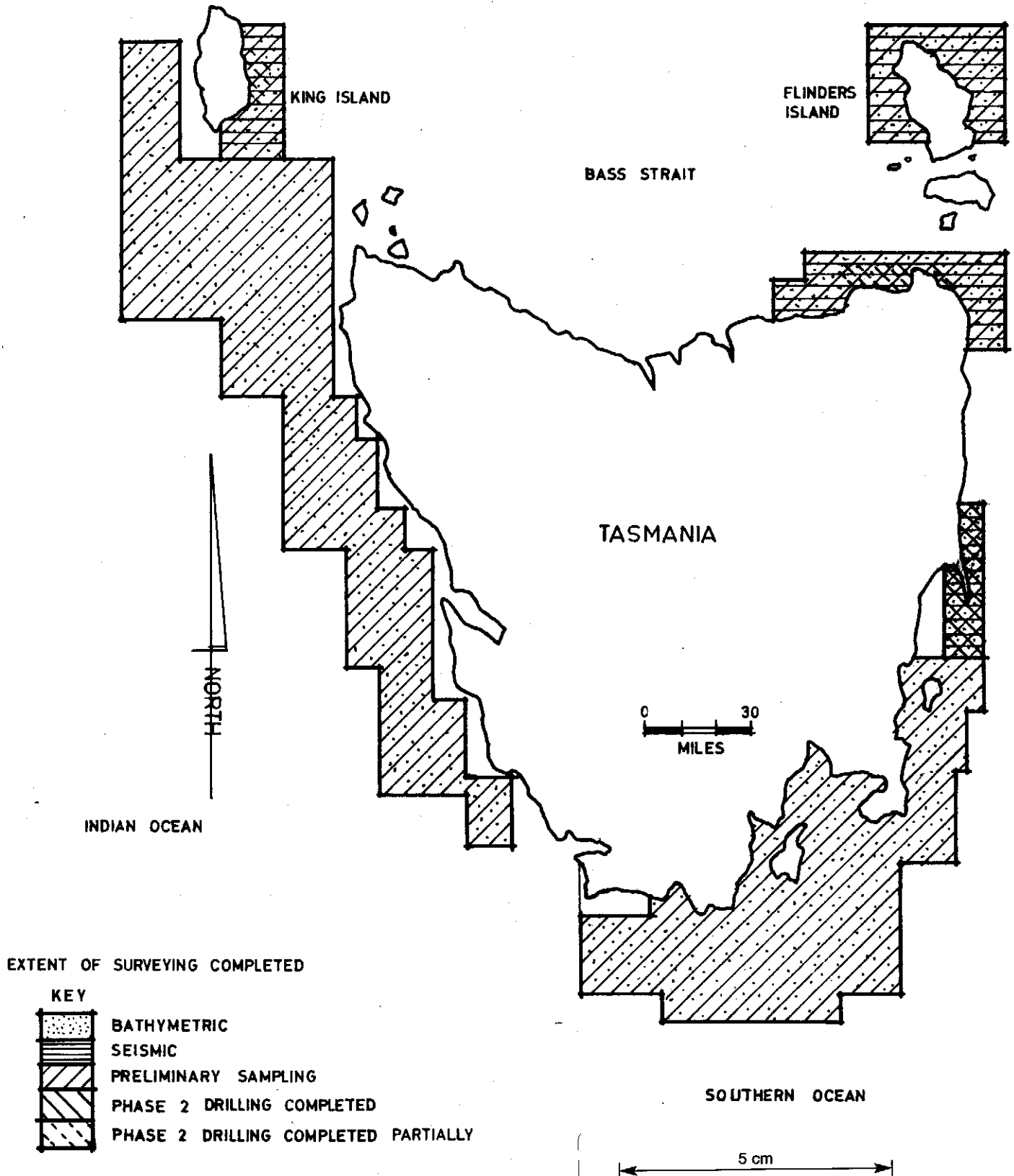

FIG 1

Progress during December

Phase II Drilling

An operations log for R/V Wando River is shown in Table 2. This shows that Cruise III to King Island which started on November 24th, ended on December 7th with the arrival of the vessel in Launceston. The bad weather which hampered operations in November continued into December. An attempt was made to drill two holes in the East King Island Licence on December 1st, in heavy seas, with poor results. Drilling was abandoned at Hole 7 because of excess ship movement, and six feet of drill core was lost from Hole 8 for the same reason. The locations of holes drilled is shown in Figure 2.

Cruise IV, scheduled for the period between 11th to 23rd December, was planned to drill targets in Ringarooma Bay which had been broadly outlined by assay results received prior to the start of the cruise. Strong winds and heavy seas continued to curtail operations and only eleven holes were drilled in Ringarooma Bay. Two holes were also drilled in Mussel Roe Bay during a period of north-westerly weather when it was not possible to drill in Ringarooma Bay. Locations of holes drilled in Ringarooma and Mussel Roe Bays are shown in Figures 3 and 4.

Drill Hole Location

The Raydist Direction Monitoring equipment continued to function efficiently and all of the Ringarooma Bay holes were located by this system. The two holes in Mussel Roe Bay were located by a combination of Raydist, horizontal sextant angles and ships Radar. Drilling in Mussel Roe Bay was only attempted when adverse weather prevented drilling in Ringarooma Bay. In order to avoid delays during such periods Raydist stations were not moved from Ringarooma Bay to Mussel Roe Bay. Instead, Red station, at Cape Portland on the east side of Ringarooma Bay, functioned well in Mussel Roe Bay, so that the positioning of the ship along any given arc based on Red station was readily achieved either by radar or compass bearings.

Preliminary Phosphate Exploration

An operations log for M/V Aardverk is given in Table 3. Although continuously hampered by bad weather good progress was made in sampling the remainder of the West Tasmania

TABLE 2

OPERATION LOG

DECEMBER 1966

M.V. WANDO RIVER

Date	Licence Area	Operation	Stations Sampled
1	East King Island	Drilling KI 7, KI 8	2
2		Dredging WR 1	1
3		Dredging WR 2-5	4
4		Attempted dredging, too rough	
5		Anchored, adverse sea conditions	
6		Transit to Launceston	
7		Arrive Launceston. End Cruise III	
8-10		Crew relief, routine maintenance and repair	
11	N.E. Coast	Start Cruise IV Transit to Ringarooma Bay	
12		Drilling NE 71-74	4
13		Adverse sea conditions	
14		Steamed to Mussel Roe Bay for better weather	
15		Drilling NE 02, adverse sea conditions	1
16		Steamed to Ringarooma Bay drilling NE 75, 76	2
17		Adverse sea conditions, steamed to Mussel Roe Bay, drilling NE 03	1
18-21		Adverse weather, sheltering	
22		Drilling NE 77-81 Transit to Launceston End Cruise IV	5
23-30		Crew relief, routine maintenance and repair	
		Total Stations Dredged	5
		Total Stations Drilled	15

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TABLE 3

OPERATION LOG
DECEMBER 1966
M.V. AARDVERK

Date	Licence Area	Operation	Stations Sampled	
			Dredge	Grab
1-2	West	Crew relief		
3	Tasmania	Sampling, WT 16-20	3	2
4		Sampling, WT 21, 22	2	
5		Adverse sea conditions, sheltered at Sandy Cape		
6		Sampling, WT 23-29, WT 42, 43	6	3
7		Sampling, WT 30-33, WT 44-48	7	2
8		Adverse sea conditions, sheltered at King Is.		
9		Sampling, WT 34-41	7	1
10		Transit to Launceston		
11-13		Crew relief		
14		Preparations for cruise		
15		Transit to Stanley		
16-20		Adverse sea conditions sheltered at Stanley and Hunters Is.		
21		Transit to Launceston		
22-30		Crew relief, Christmas holidays etc.		
		Total Stations	25	8

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Phosphate Licence. Occasionally in severe weather conditions, and while traversing areas where the sea floor showed extremely irregular relief, dredging proved difficult. In these circumstances Van Veen Grab samples were collected. A total of 25 dredge samples and 8 Van Veen Grab samples were obtained from depths ranging from 23 to 84 fathoms. Locations of sample stations is shown in Figure 5.

A short cruise from the 15th to 21st December, during which it was planned to obtain more samples from between 50 and 80 fathoms to the south west of King Island, one of the more promising areas revealed by previous work, was thwarted by bad weather. During this period the Aardverk sheltered in a north-west gale at Stanley and at Hunters Island, returning to Launceston on 21st December.

While the Wando River was at King Island during Cruise III, an attempt was made to obtain bulk phosphate samples by dredging on those occasions when the seas were too rough to drill in the East King Island Licence. This project was only partly sucessful because of the problems of trying to maintain headway while dredging in very rough seas. Handling the heavy dredge at deck level also proved difficult in the prevailing conditions and in the interests of safety the programme was abandoned after five stations had been sampled. The location of these stations is shown in Figure 6.

Sample Processing

One hundred and fifty-two samples collected in December from the North East Coast Licence and nineteen samples from the East King Island Licence were dried and split, and submitted to the Tasmanian Department of Mines Laboratories in Launceston for analysis. Splits of all samples were also retained at the Launceston Field office, some of which will be submitted for further analyses.

Staff

Some minor reorganisation of staff occurred in December, These changes were affected either to facilitate the processing of samples at the Metallurgical Laboratories of the Tasmanian Department of Mines, or the processing

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0 5 20
MILES

KING ISLAND

NORTH

LOCATION MAP

BOULDER ROCK

LICENCE BOUNDARY

LAVINIA POINT

8

NORTH

EAST KING ISLAND

0 2 4 6
NAUTICAL MILES

5 cm

3

2

1

SEA ELEPHANT ROCK

7

4

6

5

NARACOOPA

FRASER BLUFF

OCEAN MINING A G

DRILL HOLE SITES KING ISLAND

DECEMBER 1966

⊙ HOLES DRILLED IN NOVEMBER 1966

● HOLES DRILLED IN DECEMBER 1966

FIG 2

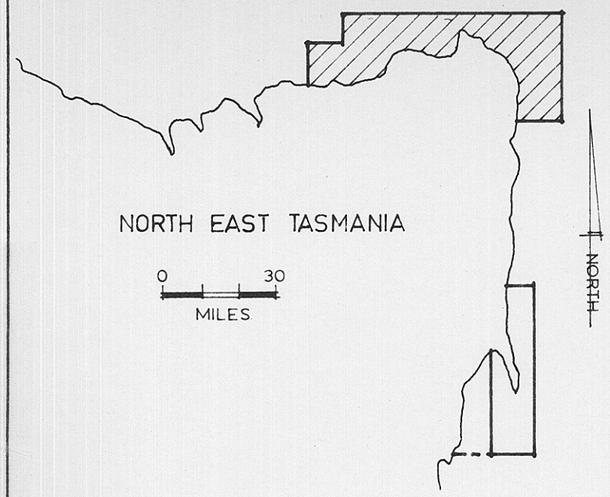
09

930210

DRILL HOLE SITES
RINGAROOMA BAY

OCT · NOV · DEC 1966

OCEAN MINING A G



LOCATION MAP

5 cm

0 1 2 3

MILES

CAPE PORTLAND

RAYDIST BEACON

TOMAHAWK POINT

RAYDIST BEACON

RAYDIST BEACON

OFFSHORE LEASE BOUNDARY ONE MILE approx

NORTH

NOTE

- HOLES DRILLED IN OCTOBER
- HOLES DRILLED IN NOVEMBER
- HOLES DRILLED IN DECEMBER

FIG 3

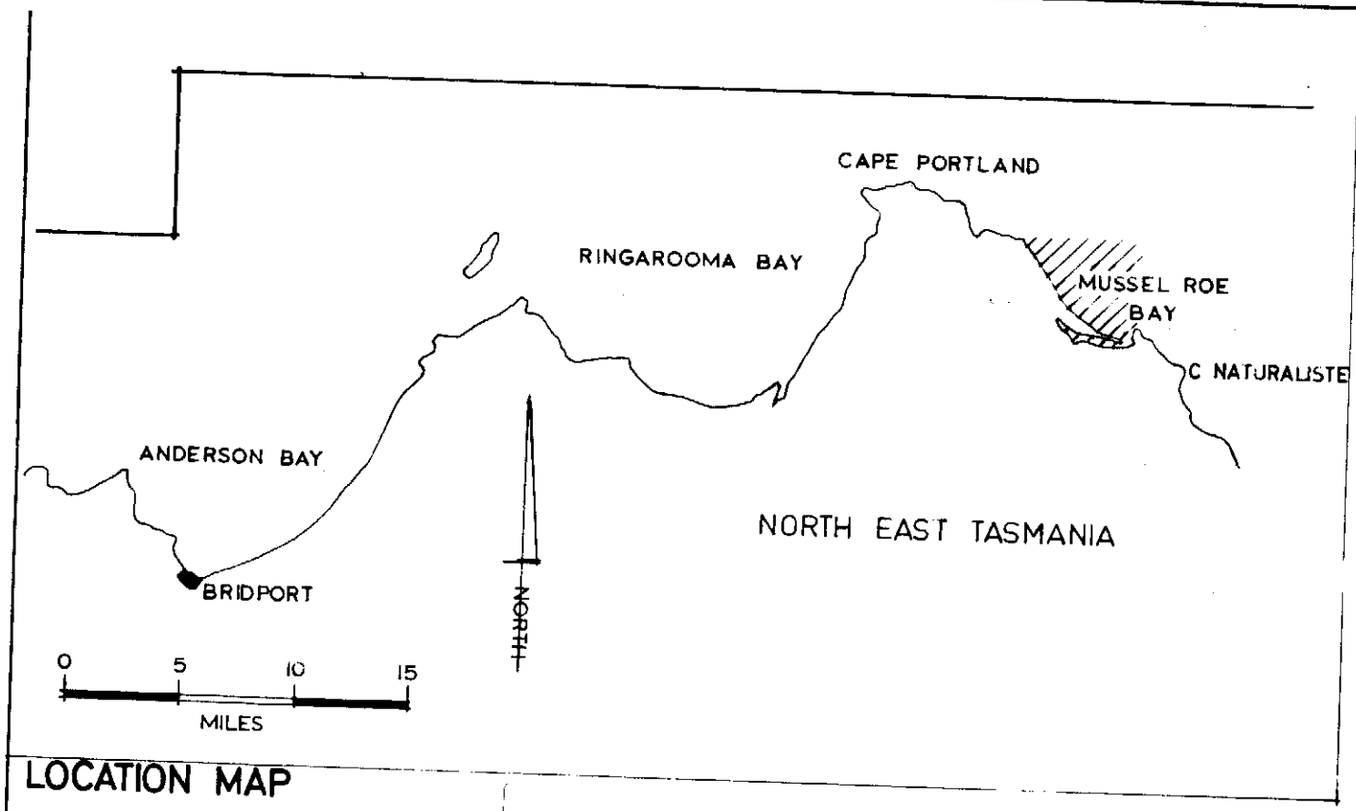
10

930211

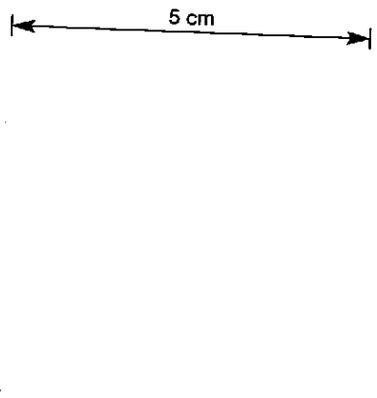
OCEAN MINING A G

DRILL HOLE SITES MUSSEL ROE BAY

DECEMBER 1966



LOCATION MAP





FIG

OCEAN MINING A G

SAMPLE STATIONS WEST TASMANIA LICENCE

M/V AARDVERK

DECEMBER 1966

KING IS

THREE HUMMOCK IS

HUNTER IS

BASS STRAIT

CAPE GRIM

ROBBINS IS

SANDY CAPE

WEST TASMANIA

INDIAN OCEAN

NORTH

0 5 20

MILES

5 cm

STRAHAN

P. HIBBS

HIGH ROCKY POINT

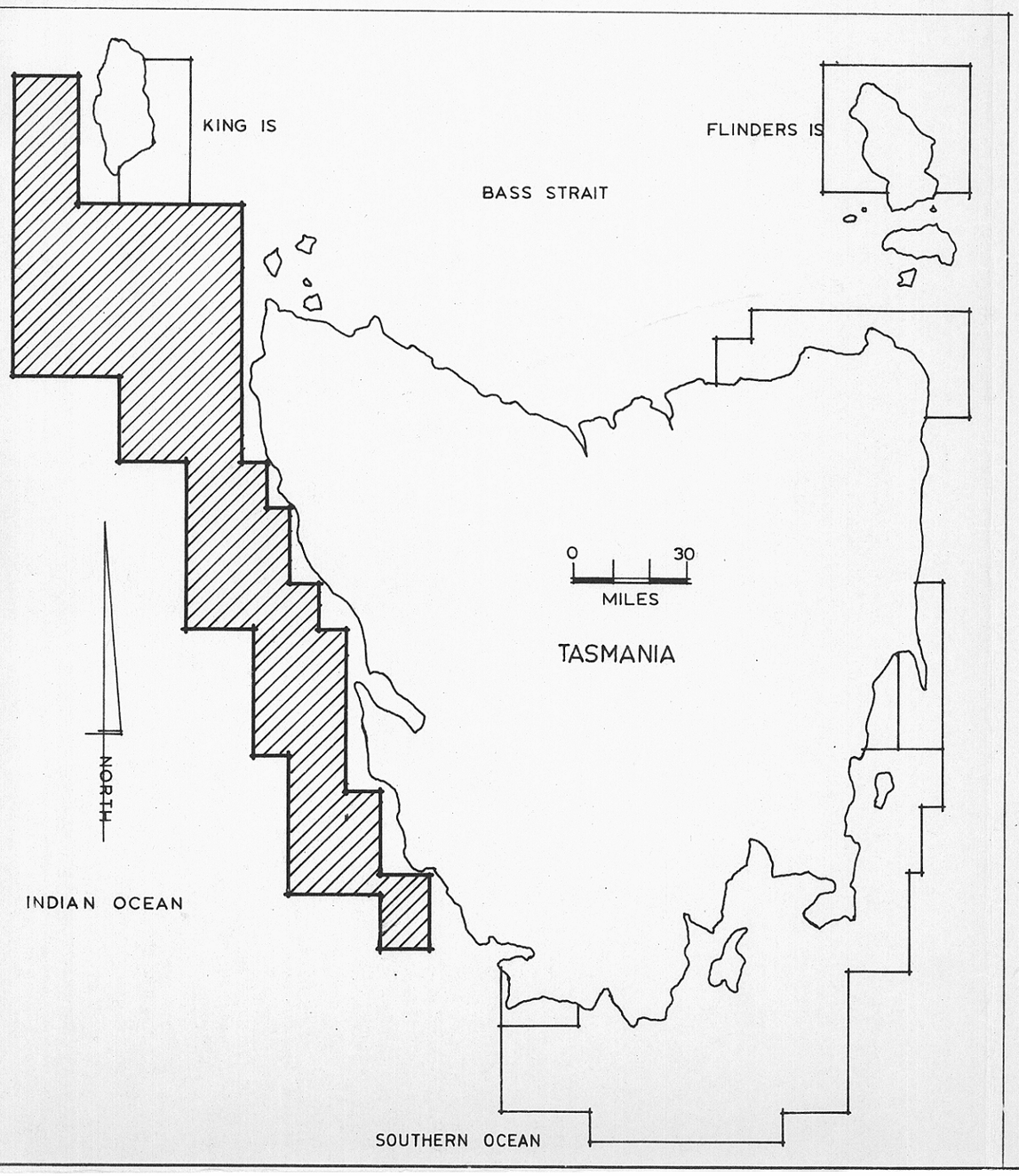
LOW ROCKY POINT

PORT DAVEY

SOUTH WEST CAPE

SOUTHERN OCEAN

LOCATION MAP



KEY

- STATIONS SAMPLED 1–12 JANUARY 1966
- STATIONS SAMPLED 13–22 AUGUST 1966
- STATIONS SAMPLED 1–15 NOVEMBER 1966
- STATIONS SAMPLED 16–48 DECEMBER 1966
- GRAB SAMPLES

930212

FIG 5

930213

OCEAN MINING A G

SAMPLE STATIONS WEST TASMANIA LICENCE

R/V WANDO RIVER

DECEMBER 1966

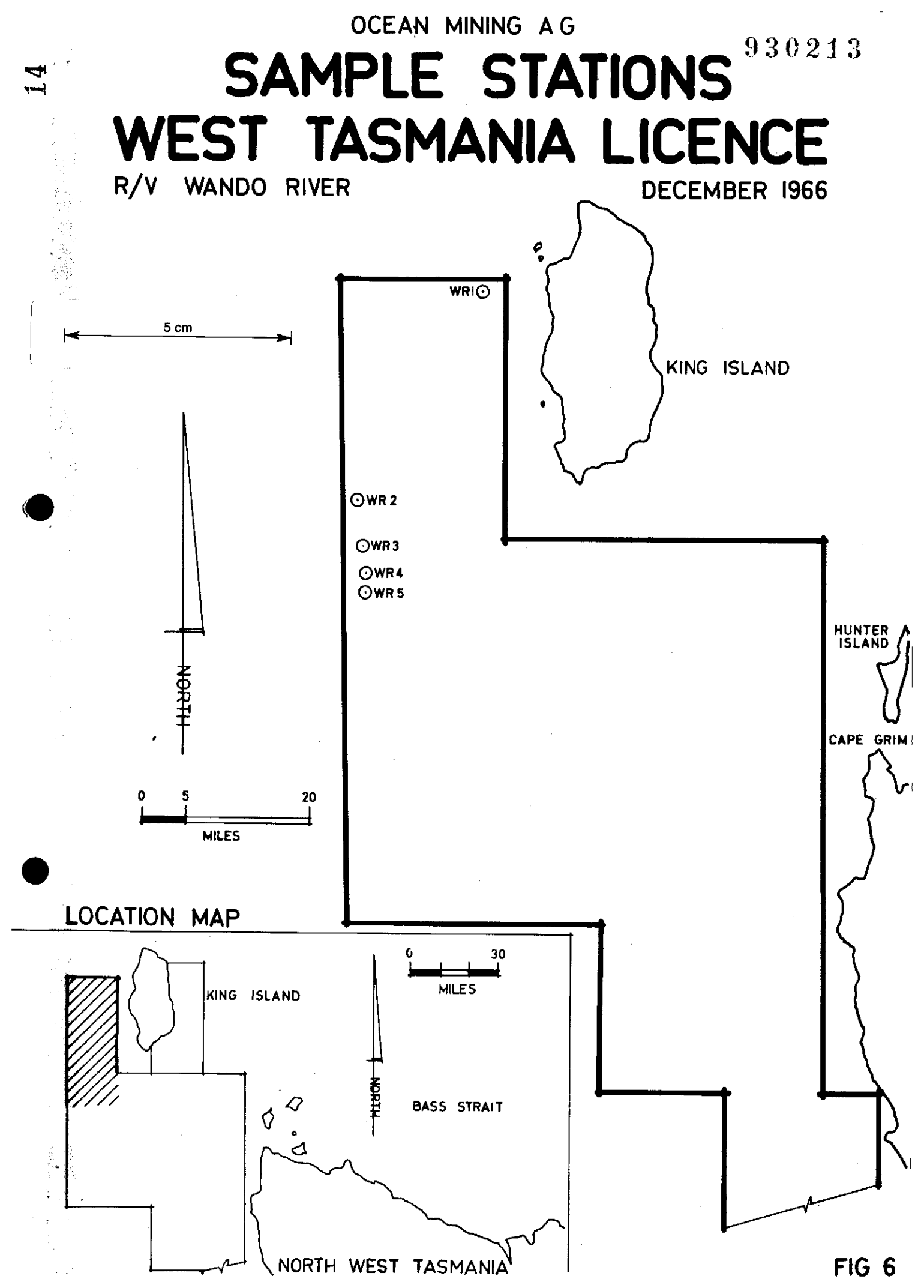


FIG 6

of sample data and assay results at Field Headquarters.

Table 4 lists the staff complement at December 31st.

Management Visitors

Mr. C.B. Edwards and Mr. R.D. Pratten, Board Members of T.O.E.C., visited Field Headquarters on 13th December. Plans for these gentlemen to observe drilling operations aboard the Wando River on December 14th at Mussel Roe Bay were thwarted by rough seas.

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930215

TABLE 4 STAFF COMPLEMENT 31st DECEMBER, 1966.

Status	Name	Appointment	Occupation
Professional	W. Davies	Field Manager	Phase II
	D.J. Young	Staff Geologist	Phase II
	A. Scholtens	Geologist	Phase II Dredging
	P. Skipwith	Geologist	Phase II Wando River
	A. von Rahden	Senior Engineer	Phase II Wando River
	D. Lawson	Engineer/Driller	Phase II Wando River
Non-professional	J.Beaverstock	Laboratory Tech.	Phase II Sample processing
	A. Burgess	Draughtsman	Phase II
	A.S.R. Davies	Secretary	Phase II Administration
	L. Taylor	Typist/Secretary	Phase II Administration
	D. Griffiths	Data Processing	Phase II
	P. Jackson	Senior Rigger	Phase II Wando River
	F. Cowie	Rigger	Phase II Wando River
	L. Locsei	Rigger	Phase II Wando River
	D. Murray	Geologist Asst.	Phase II Wando River
	S. Webster	Raydist Operator	Phase II Raydist
	R.W. Taylor	Seaman Aardverk	Phase II Dredging
	C.P. Blundell	Seaman Aardverk	Phase II Dredging
Part time	J. Goodricke	Data processing and draughting	Phase II
	R.D. McBain	Raydist Consultant	Phase II
Temporary staff	W. Campbell-Smith	Data Processing	Phase II
	J. Campbell-Smith	Laboratory Tech.	Phase II Sample processing
Staff included in Charters	T. Chopping	Skipper M/V Aardverk	Preliminary Dredging West Tasmania
	G.W. Head	Skipper & Mate	Tender boat to
	D. Rule	M/V Tondeloya	Wando River

930216

PART II RESULTS

Drilling Results

North East Coast

Drill hole data for the eleven holes drilled in Ringarooma Bay and for the two holes drilled in Mussel Roe Bay are given in Table 5. Stratigraphic columns for these holes will be shown in a subsequent report. One hole, NE 03, failed to reach bedrock after penetrating 33 feet of sediment in Mussel Roe Bay. Bedrock was reached in all other holes and over ninety-five percent of the sediment drilled was recovered, a good result considering the adverse weather conditions and greater water depths in which drilling was undertaken in December.

Unfortunately 36 samples from 4 holes in Ringarooma Bay were lost overboard in 30 feet of water while being transferred from ship to shore in heavy seas. These were subsequently recovered by a diver without loss of drilling time.

East King Island

Only one hole, from which 16 feet of sediment was recovered, was drilled in the East King Island Licence in December. Nineteen samples from this hole were submitted for analysis.

Phosphate Sampling Results

Results of the dredging programme undertaken by M/V Aardverk in the West Tasmania Licence are shown in Table 6. Nodular material was recovered from 24 of the 33 stations sampled, in depths ranging from 23 to 84 fathoms. Fourteen samples contained more than twenty-five percent nodular material. Only the denser, darker coloured masses reacted positively when treated with Ammonium Molybdate and dilute Nitric Acid. The darker nodules were absent from several samples but formed 10 to 80 percent of the nodular fractions in the remainder.

Splits from selected samples were submitted for analysis.

TABLE 5

DRILL HOLE DATA
R.V. WANDO RIVER
DECEMBER 1966

Hole	Area	Date	Water Depth ft.	Drill Penetration	Core Recovered	Bedrock Reached
KI 7	E. King Is	1st	95	0	0	No
8	"	"	62	22.0	16.0	Yes
NE 71	Ringarooma Bay	12th	115	23.5	21.5	"
72		"	118	32.5	31.5	"
73		"	120	39.0	33.0	"
74		"	118	28.0	28.0	"
75		16th	104	22.5	22.5	"
76		"	100	30.0	30.0	"
77		22nd	99	15.0	15.0	"
78		"	110	33.5	31.5	"
79		"	108	23.0	23.0	"
80		"	100	41.0	41.0	"
81		"	97	25.0	23.5	"
NE 02	Mussel Roe Bay	15th	47	22.5	22.5	"
03		17th	92	33.0	33.0	No
			Totals	390.5	372.0	% Recovered 95.3

930217

TABLE 6

SAMPLING RESULTS

WEST TASMANIA PHOSPHATE DREDGING

DECEMBER 1966

Sample No.	Date	Depth (fths)	Composition of Sample	
			Nodules %	Other %
WT 16	3rd	81	25	75
17	"	84	50	50
18	"	41	1	99
19*	"	61	-	100
20*	"	59	no recovery, rough bottom	
21	4th	52	no recovery, rough bottom	
22	"	84	5	95
23	6th	52	99	1
24	"	61	-	100
25	"	53	5	95
26	"	49	-	100
27	"	67	no recovery, rough bottom	
28	"	61	30	70
29	"	45	60	40
30*	7th	23	50	50
31	"	38	35	65
32	"	33	50	50
33	"	33	5	95
34	9th	57	-	100
35	"	57	40	60
36	"	56	10	90
37	"	58	30	70
38	"	44	10	90
39	"	49	50	50
40*	"	50	-	100
41	"	39	35	65
42	6th	53	1	99
43	"	50	40	60
44	7th	47	15	85
45*	"	51	-	100
46	"	45	1	99
47	"	45	2	98
48	"	41	30	70

* Grab Samples

Mineral Dressing and Assay Results

North East Coast

Ringarooma Bay

Assay results received in December for 181 samples from 23 holes in Ringarooma Bay are presented in Table 7. The samples are from holes numbered NE21, 22, 24 to 39, 46 to 49, 58 to 61 and 63. Locations of the holes are shown in Figure 3. The following cores contained significant amounts of tin:- Hole NE21, 32, 36, 38, 47, 48, 59 and 63.

The highest tin value, 237 p.p.m., occurred in sample NE 427 at the bottom of hole NE 63. Five feet of core below this sample, however, was lost on retraction of the drill. Unfortunately this was one of the few holes where sediment was lost because of failure of the core catcher.

The values in Table 7 together with those presented in the November Report outline an area of about 15 square miles within which 28 holes were drilled. Assay results for 20 holes were received by the 31st December and fourteen of them possessed samples which showed tin values in excess of 50 p.p.m..

Although the results indicate low grade tin values it is anticipated that richer tin bearing ground exists to seaward of the area already drilled.

Furthermore, bearing in mind that the holes drilled to date are separated by distances ranging from three quarters of a mile to one and a half miles - a widely spaced grid - it is reasonable to conclude that these holes probably only revealed background values and have missed contacting narrow, linear, and small pockets of concentrated tin ore which almost certainly exist within the area.

The stratigraphic distribution of tin, titanium and zirconium in each of the cores assayed by the 31st December is presented in Figure 7.

TABLE 7

ASSAY RESULTS
NORTH EAST COAST LICENCE
RINGAROOMA BAY
DECEMBER 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic	p.p.m. Metals		
		Percent	Sn	Ti	Zr
21	NE 155	0.18	2	58	85
	156	0.11	Trace	23	27
	157	0.08	Trace	18	25
	158	0.15	3	26	39
	159	0.18	50	18	47
	160	0.21	88	15	36
	161	0.20	151	20	56
	162	0.17	4	10	34
	163	0.09	2	7	32
	164	0.18	2	7	13
	165	0.13	Nil	10	Trace
	166	0.15	Nil	17	39
	167	0.05	2	13	22
22	168	0.24	Trace	62	96
	169	0.06	Trace	18	26
	170)				
	171)				
	172)	Clays-not treated			
	173)				
24	190	0.32	3	25	24
25	191	0.31	1	21	16
26	192	0.30	Nil	34	32
	193	0.13	Nil	17	18
	194	0.15	Nil	23	15
	195	0.11	Trace	15	17
	196	0.16	1	62	91
	197	0.28	Nil	39	19
	198	1.12	2	225	414
	199	0.04	Trace	15	22
	200	0.27	2	5	4
	201	0.29	Trace	7	2
	202	0.06	1	3	1
	203	0.08	5	3	4
	204	0.25	7	5	6
	205	0.10	5	6	4

.../contd.

TABLE 7 (contd.)

ASSAY RESULTS

NORTH EAST COAST LICENCE

RINGAROOMA BAY

DECEMBER 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic	p.p.m. Metals		
		Percent	Sn	Ti	Zr
27	NE 206	0.25	Nil	34	Nil
	207	0.23	Trace	32	31
	208	0.33	Trace	18	30
	209	0.26	Trace	6	11
	210	0.15	16	30	48
	211	0.19	5	8	16
	212	0.09	4	9	17
	213	0.08	6	11	16
	214	0.09	5	6	9
30	227	0.25	2	28	52
	228	0.41	Nil	15	31
	229	0.22	Trace	20	22
	230	0.06	Trace	26	24
	231	0.02	Trace	5	6
	232	0.10	Trace	12	13
	233	0.14	Trace	10	11
	234	0.09	1	9	14
	235	0.08	Nil	3	4
	236	0.04	2	5	8
	237	0.25	5	8	19
31	238	0.79	Trace	9	23
	239	0.21	Trace	6	14
	240	0.28	Nil	3	2
	241	0.16	Nil	7	19
32	242	0.33	2	33	49
	243	0.15	Trace	63	53
	244	0.15	Trace	45	49
	245	0.17	43	83	114
33	246	0.12	6	61	77
	247	0.11	Trace	24	18
	248	0.07	Trace	14	11
	249	0.14	Trace	29	22

.../contd.

TABLE 7 (contd.)

ASSAY RESULTS
NORTH EAST COAST LICENCE
RINGAROOMA BAY
DECEMBER 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic	p.p.m. Metals		
		Percent	Sn	Ti	Zr
33	NE 250	0.12	Trace	22	17
	251	0.07	Trace	14	9
	252	0.23	Trace	38	40
	253	0.32	Trace	107	102
	254	0.08	Trace	Nil	1
34	255	0.14	5	14	22
	256	0.11	7	32	42
	257	0.26	11	52	80
	258	0.09	5	9	16
	259	0.10	1	5	10
	260	0.06	2	3	84
	261	0.40	8	122	27
	262	0.37	4	113	25
	263	0.29	10	24	42
	264	0.13	2	40	8
	265	0.40	2	5	9
	266	0.08	Trace	3	5
	267	0.23	2	4	10
	268	0.71	Nil	Nil	Nil
	269	0.93	Nil	Nil	Nil
	270	0.12	2	20	36
	271	0.42	5	13	34
35	272	0.11	12	27	32
	273	0.23	16	6	10
	274	0.06	3	4	7
	275	0.12	2	4	5
	276	0.13	3	5	8
	277	0.08	6	3	9
36	278	0.11	121	13	40
	279	0.11	64	14	33
	280	0.21	116	19	56
	281	0.09	2	11	26

.../contd.

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TABLE 7 (contd.)

ASSAY RESULTS
NORTH EAST COAST LICENCE
RINGAROOMA BAY
DECEMBER 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic	p.p.m. Metals		
		Percent	Sn	Ti	Zr
36	NE 282	0.03	Trace	3	7
	283	0.01	Trace	2	1
	284	0.27	10	8	12
37	285	0.16	1	40	53
	286	0.10	2	65	175
	287	0.09	1	37	53
	288	0.11	1	59	60
	289	0.12	1	65	74
	290	0.10	22	76	93
	291	0.11	50	33	67
	292	0.10	19	40	63
	293	0.15	5	15	22
	294	0.40	12	17	30
	295	0.09	8	6	10
	296	0.05	1	5	14
	297	0.22	6	7	8
	298	No concentrate			
38	299	0.10	21	34	52
	300	0.06	4	10	12
	301	0.09	9	40	56
	302	0.19	14	46	74
	303	0.17	51	23	40
	304	0.25	45	22	39
	305	2.38	45	300	19
	306	0.85	14	10	6
	307	0.63	1	8	9
	308	0.16	1	13	18
39	309	0.12	1	11	10
	310	0.13	Trace	15	17
	311)				
	312)	Analyses incomplete			
	313)				
	314)				

.../contd.

TABLE 7 (contd.)

ASSAY RESULTS
NORTH EAST COAST LICENCE
RINGAROOMA BAY
DECEMBER 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic	p.p.m. Metals		
		Percent	Sn	Ti	Zr
46	NE 333	0.25	13	11	17
	334	0.05	2	2	3
	335	0.13	Trace	Nil	2
	336	0.07	2	2	3
47	337	0.19	47	17	40
	338) 339)	Clays - not treated			
	340	0.13	8	6	8
48	341	0.21	116	17	38
	342	0.08	19	6	14
	343	0.48	1	9	13
	344	0.17	Trace	4	13
	345	0.22	1	9	10
58	377	0.07	2	25	36
	378	0.20	5	18	48
	379	0.18	Trace	11	27
	380	0.08	Trace	3	7
	381	0.08	Trace	2	5
	382	0.02	1	2	5
59	383	0.06	2	13	57
	384	0.08	4	5	11
	385	0.12	133	10	36
	386	0.11	17	33	60
	387	0.12	Trace	18	22
	388	0.02	1	4	9
	389	0.02	Trace	5	9
	390	0.30	Trace	15	18
	391	0.07	Trace	10	18
	392	0.25	Trace	10	15
	393	0.07	Trace	6	11
	394	0.20	1	7	15

.../contd.

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TABLE 7 (contd.)

ASSAY RESULTS
NORTH EAST COAST LICENCE
RINGAROOMA BAY
DECEMBER 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic	p.p.m. Metals		
		Percent	Sn	Ti	Zr
60	NE 395	0.04	3	10	32
	396	0.07	3	22	32
	397	0.13	2	37	28
	398	0.08	5	7	12
	399	0.08	2	18	22
	400	0.31	Nil	7	7
	401	0.33	Nil	8	10
	402	0.21	1	9	19
	403	0.10	2	7	16
	404	0.05	Trace	4	13
	405	0.05	Trace	2	5
61	406	0.16	Trace	43	63
	407	0.06	Trace	33	40
	408	0.10	4	29	51
	409	0.05	1	30	27
	410	0.03	Trace	22	37
	411	0.07	Trace	6	7
	412	0.01	Trace	1	2
	413	0.08	2	13	13
63	422	0.15	8	24	31
	423	0.10	1	7	6
	424	0.13	5	Nil	4
	425	-	Trace	) not complete	
	426	-	10	)	
	427	0.15	237	5	15

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Mussel Roe Bay

Assay results for 16 samples from Hole 01, located as shown on Figure 4, are presented in Table 8. Tin values for the lower portion of this hole are moderately high, with two samples assaying 52 and 96 p.p.m.. Unfortunately, however, the upper 30 feet of the sediment in this core is apparently barren.

Comparison Assay/Spectrographic Analysis

Splits of most samples showing relatively high tin values as reported by the Tasmanian Department of Mines, in addition to being re-assayed by Mines Department themselves, are submitted to the Australian Mineral Development Laboratories in Adelaide for confirmation. The results from Adelaide are still outstanding.

In addition splits of samples covering a range of sediment types were also submitted for check analyses. The results of this comparative study are presented in Table 9. It should be noted, however, that this first batch of samples was submitted to the Australian Mineral Development Laboratories before the tin assays by the Mines Department were completed. Only one sample, NE 5, contained a significant amount of tin. Generally, there is a close correlation between the results obtained by both laboratories.

Ore Dressing Investigation

As a further check on the reliability of the assay results, small splits of two samples obtained by jet lift from Ringarooma Bay during Phase 1, and subsequently assayed by the Australian Mineral Development Laboratories, were submitted to the Tasmanian Department of Mines for check assay. The results are as follows.

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OMAG Sample No.	AMDEL Semi-Quantitative Spectrographic Analysis Sn (p.p.m.)	MINES DEPT. X-Ray Sn (p.p.m.)
4-19-3	10,000	10,060
3-20-5	7,000	5,000

During this investigation studies were also undertaken to determine the percentage of recoverable tin, and to determine the stages during sample treatment at which tin losses, if any, might be occurring.

It is apparent that very little tin is being lost during sample treatment and the report from the Tasmanian Department of Mines states, in part:-

> "Item 5 shows high grade concentrates which indicate free cassiterite grains. The tailings from the table are low in tin. The tin in these tailings is coarse, sample 4-19-3 being almost all plus 100 mesh, and in sample 3-20-5, plus 200 mesh. This tin, which overall does not amount to much, should be recoverable if lower grade concentrates were made."
>
> "With material similar to that represented by these samples recovery by tabling can be expected to exceed 95 percent."

Sample Density Determinations

To assist in the calculations of ore grade the Tasmanian Department of Mines was requested to determine the density of several composite samples from the North East Coast and East King Island Licences. Six of these determinations were received in December and are presented in Table 10.

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TABLE 8

ASSAY RESULTS
NORTH EAST COAST LICENCE
MUSSEL ROE BAY
DECEMBER, 1966

Hole No.	Sample No.	Head Assay			
		Non Magnetic	p.p.m. Metals		
		Percent	Sn	Ti	Zr
01	NE 174	0.13	Nil	43	60
	175	0.09	Trace	26	32
	176	0.09	Trace	37	50
	177	0.10	Trace	40	27
	178	0.14	Nil	36	53
	179	0.28	Nil	34	59
	180	0.19	Nil	23	36
	181	0.07	1	34	51
	182	0.09	Trace	29	53
	183	0.18	Trace	61	83
	184	0.08	Trace	5	6
	185	0.06	2	10	8
	186	0.13	52	14	4
	187	0.16	96	7	34
	188	0.27	7	43	82
	189	0.42	6	38	103

Dec. '66

TABLE 9. COMPARISON OF ASSAY RESULTS

Sample Number	Tin (p.p.m.)	
O.M.A.G.	Tasmanian Dept. of Mines X-Ray Analysis	A.M.D.E.L. Semi-Quant. Spec. Analysis
OB 862	5	5
OB 907	5	7
NE 5	67	80
NE 20	6	3
NE 33	Tr.	6
NE 40	8	5
NE 142	9	3
NE 149	2	2
NE 155	2	3
NE 176	Tr.	1
NE 181	1	7
NE 191	1	3
NE 192	Nil	1
NE 243	Tr.	3

TABLE 10. SAMPLE DENSITY DETERMINATIONS
TASMANIAN DEPARTMENT OF MINES

O.M.A.G. Sample Numbers	Density lb/cu.ft.
NE 152-169	93
NE 186-200	105
NE 221-236	90
NE 265-293	109
KI 1-19	97

On the basis of these results and for the purpose of ore grade calculations, an average density of 100 pounds per cubic foot (2,700 lb/cu. yd.) appears to be a reasonable weight/unit volume estimate.

Phosphate Analyses

The results of fifteen P_2O_5 analyses for samples from the West Tasmania Licence are presented in Table 11. The location of these samples is shown in Figure 5. Table 11 shows that two of the samples, from stations WT 7 and WT 28, have relatively high P_2O_5 contents. Station WT 28 is 30 miles off the north-west coast of Tasmania, and Station WT 7 is ten miles to the west of the entrance to Macquarie Harbour. Sample station spacing at both localities is between 10 and 20 miles, and closer spaced sampling will be undertaken as soon as possible.

Two types of phosphate nodules are being recovered by dredging; a dense, hard, grey-brown or chocolate-brown nodule, and a less dense, yellow-brown nodular mass. It is apparent that the dense, dark brown variety is generally richer in phosphate.

TABLE 11. PHOSPHATE ANALYSES
DECEMBER 1966

Licence	Sample No.	Percentage P_2O_5
West Tasmania	WT 2a	0.34
	2b	0.59
	3a	0.25
	3b	0.26
	6	0.17
	7a	13.40
	7b	11.40
	8	0.36
	14	2.05
	17	0.47
	24	0.42
	25	0.45
	28	20.80
	35	0.52
	37	0.37
South Tasmania	ST20	0.40

PART III PLANS FOR JANUARY

Phase II Drilling

During Cruise V by the Wando River, scheduled for the 4th to 18th January, a further 27 holes will be drilled in Ringarooma Bay in an attempt to define extensions of the low grade tin bearing ground already found and also strike possible small localised higher grade concentrations of cassiterite not contacted by the widely spaced holes drilled in November. Further holes will also be drilled in Mussel Roe Bay.

Following a five day break for crew relief and maintenance the Wando River is scheduled to return to the East King Island Licence to complete the drilling programme delayed by adverse weather in December. Table 12 shows the schedule for Phase II drilling in January. The programmes, however, are subject to modifications based on the results received from the Tasmanian Mines Department Laboratories.

Mineral Dressing and Assaying

All possible measures have been taken to increase the rate and efficiency of sample processing in January. Extra sample holders for the X-ray machine have been acquired and so the number of samples which may be assayed in any given period will be doubled.

Further tests on recovery of cassiterite and an investigation of possible losses during treatment will be undertaken. Samples of ilmenite, separated from concentrates will be analysed for chromium content.

Splits of all samples showing relatively high tin content will be submitted for check analyses.

Data Processing

Production of maps and diagrams showing drilling results and processing the results of sample treatment will be a major programme during January. This work will undoubtedly continue into early February.

Phosphate Dredging

Following the completion of the preliminary phosphate dredging programme in December, all efforts will be directed during January toward more detailed surveys of areas which prove to be phosphate bearing. In particular further work will be undertaken in the more promising areas west of King Island and Macquarie Harbour. A schedule of operations is shown in Table 12.

TABLE 12 PHASE II OPERATIONS SCHEDULED FOR JANUARY

DRILLING - CRUISES V AND VI

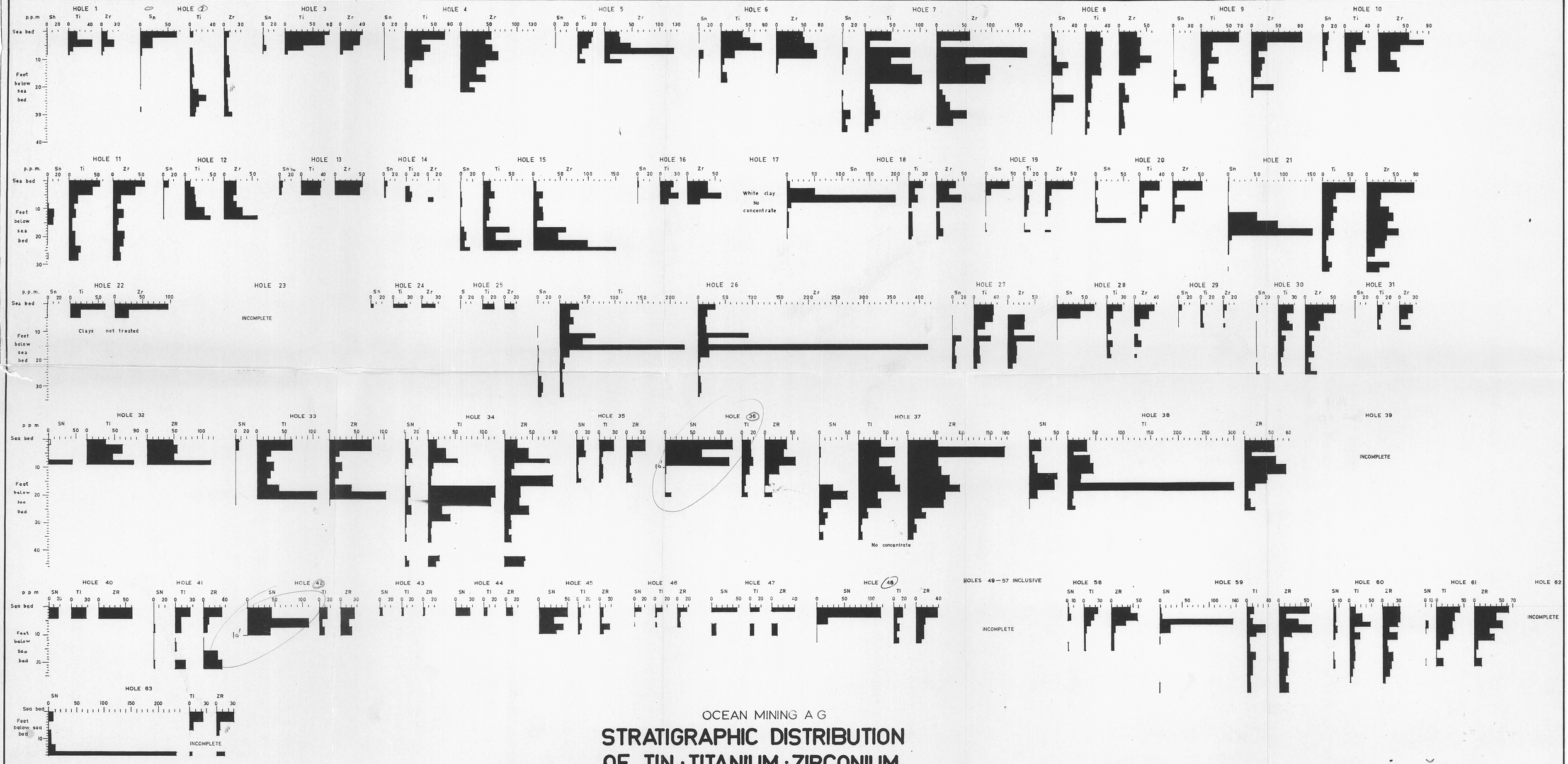
VESSEL - R.V. WANDO RIVER

Date January	Cruise	Licence	Target Area	Occupation
4-18	V	N.E. Coast	Ringarooma Bay Mussel Roe Bay Anderson Bay	Drilling Drilling Drilling
23-9 Feb.	VI	E. King Id.	Sea Elephant Bay	Drilling

PRELIMINARY PHOSPHATE DREDGING

VESSEL - M.V. AARDVERK

Date January	Licence	Target Area	Occupation
3-13	West Tasmania	30 miles to the south of King Island	Dredging
17-31		West Point to Macquarie Harbour	Dredging



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STRATIGRAPHIC DISTRIBUTION OF TIN · TITANIUM · ZIRCONIUM RINGAROOMA BAY

DECEMBER 1966

(NOTE 52 HOLES ONLY)

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FIG 7