

FRANKLIN

National Facility Oceanographic Research Vessel

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RESEARCH PLAN

CRUISE FR 1/92

Sail Sydney	2200 hrs	Tuesday	21 January 1992
Call Watsons Bay	0900 hrs	Friday	24 January 1992
Call Watsons Bay	1600 hrs	Saturday ^{Friday}	26 January 1992
Call Watsons Bay	0900 hrs	Tuesday ^{Wednesday}	29 January 1992
Arrive Sydney	1500 hrs	Thursday	31 January 1992

Peter Nichols, George Cresswell, Rhys Leeming
CSIRO Division of Oceanography

TRACING SEWAGE IN SYDNEY'S COASTAL WATERS AND SEDIMENTS USING ORGANIC MARKERS

Phase II

Post Commissioning of the Deep Ocean Outfall

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For further information contact:

December 1991

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FRANKLIN is owned and operated by CSIRO

RV Franklin

Research Plan

Cruise FR 1/92

Depart Sydney 22.00 Tuesday January 21 1992
Calls: Watsons Bay 0900 Friday January 24, 1992
Calls: Watsons Bay Sunday 26 January 1600 and Wednesday
29 January 0900
Arrive: Sydney 1500 Friday January 31, 1992

Principal Investigators: Peter D. Nichols
George R. Cresswell
Rhys Leeming

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**Tracing Sewage in Sydney's Coastal Waters and Sediments using
Organic Markers
Phase II. Post Commissioning of the Deep Ocean Outfalls**

Research Plan

FRANKLIN Cruise FR 1/92

Sydney Outfall Studies

Scientific Objectives

- To determine the physical oceanographic features of near-shore coastal waters adjacent to Sydney, with particular reference to major deep water sewage outfalls.
- To collect water and sediment and related samples for laboratory determinations of organic marker compounds, other chemical and biological parameters and indicator microorganisms.
- To determine the distribution, fate and impact of Sydney's sewage effluent using combined chemical, microbiological and physical oceanographic data.

Cruise Objectives

- Conduct regular CTD stations and underway ADCP measurements along the cruise track.
- Deploy and recover chemistry moorings; one at site of DOOM and one at DOOB.
- Collect water and sediments at stations adjacent to the NSW east coast in the Sydney region.
Multiple casts will be required at a large number of stations.
- Collect water and sediment at three stations within Sydney Harbour.
- Collect underway surface water temperature, salinity, pH and fluorescence data.
- Conduct daily ADCP transects to the 500 m contour in addition to the continuous ADCP measurements routinely performed. Transects will be both parallel to and perpendicular to the coast (3 hours daily).
- Provide appropriate sample collection and preparation facilities for external organisations (ANSTO metals; CSIRO Centre for Advanced Analytical Chemistry, rapid detection methods; Sydney Water Board, viruses and microbiology; NSW State Pollution Control Commission, Oceanography) undertaking collaborative studies with the Division of Oceanography.

Cruise track

The cruise track is shown on the attached Figures. Mooring locations are shown in Table 1. CTD profiles will be taken at each mooring location and at all stations. The sediment grab will be used at all stations. Multiple CTD casts may be required at a large number of stations.

Time Estimates

Mooring deployment	4	hr
Mooring recovery	4	hr
87 CTD stations (includes Grab)	110	hr
ADCP sections	24	hr
Steaming (approx 800 nm at 5–10 knots)	90	hr
<hr/>		
	9	days 16 hours

ORV Equipment

CTD
 ADCP
 Rosette
 Hydrology
 Seatech profiling fluorometer/transmissometer
 Thermosalinograph
 Underwater pH and fluorometer
 Biology container
 Smith-McIntyre grab (if built)

User Equipment

Filtration equipment

Personnel

Peter Nichols	CSIRO Division of Oceanography	Chief Scientist
Rhys Leeming	CSIRO Division of Oceanography	
Mark Rayner	CSIRO Division of Oceanography	
Val Latham	CSIRO Division of Oceanography	
David Terhell	CSIRO ORV	
Phil Adams	CSIRO ORV	
Jeff Dunn	CSIRO ORV	
George Cresswell	CSIRO Division of Oceanography	
Jan Peterson	CSIRO Division of Oceanography	
John Bavor	University Western Sydney	Leg 2
Simon Apte	CSIRO Centre Advanced Chemistry	Leg 2
Nick Ashbolt	Sydney Water Board	Leg 2
David Waite	ANSTO	Leg 3
Ron Szymczak	ANSTO	Leg 3
Randell Lee	NSW SPCC	Leg 3
John Stocker	CSIRO Headquarters	Leg 4
Christian Peterson	CSIRO Oceanography	Leg 4
Film Crew	CSIRO Oceanography	Leg 4

Leg 1 January 21–24
 Leg 2: January 24–26
 Leg 3: January 26–29
 Leg 4: January 29–31

This research plan is in accordance with the directions of the National Facility Steering Committee for the Oceanographic Research Vessel *Franklin*.



A. D. McEwan
CSIRO Oceanography



G. W. Paltridge
National Facility Steering Committee

Table 1: Mooring details

Number	Location*	Equipment
1	33°55.00'S 151°19.98'E (Bondi)	Acoustic release, Seastar water sampler, sediment trap
2.	33°58.32'S 151°18.22'E (Malabar)	Acoustic release, Seastar water sampler, sediment trap

* Still to be finalised.

Abbreviations

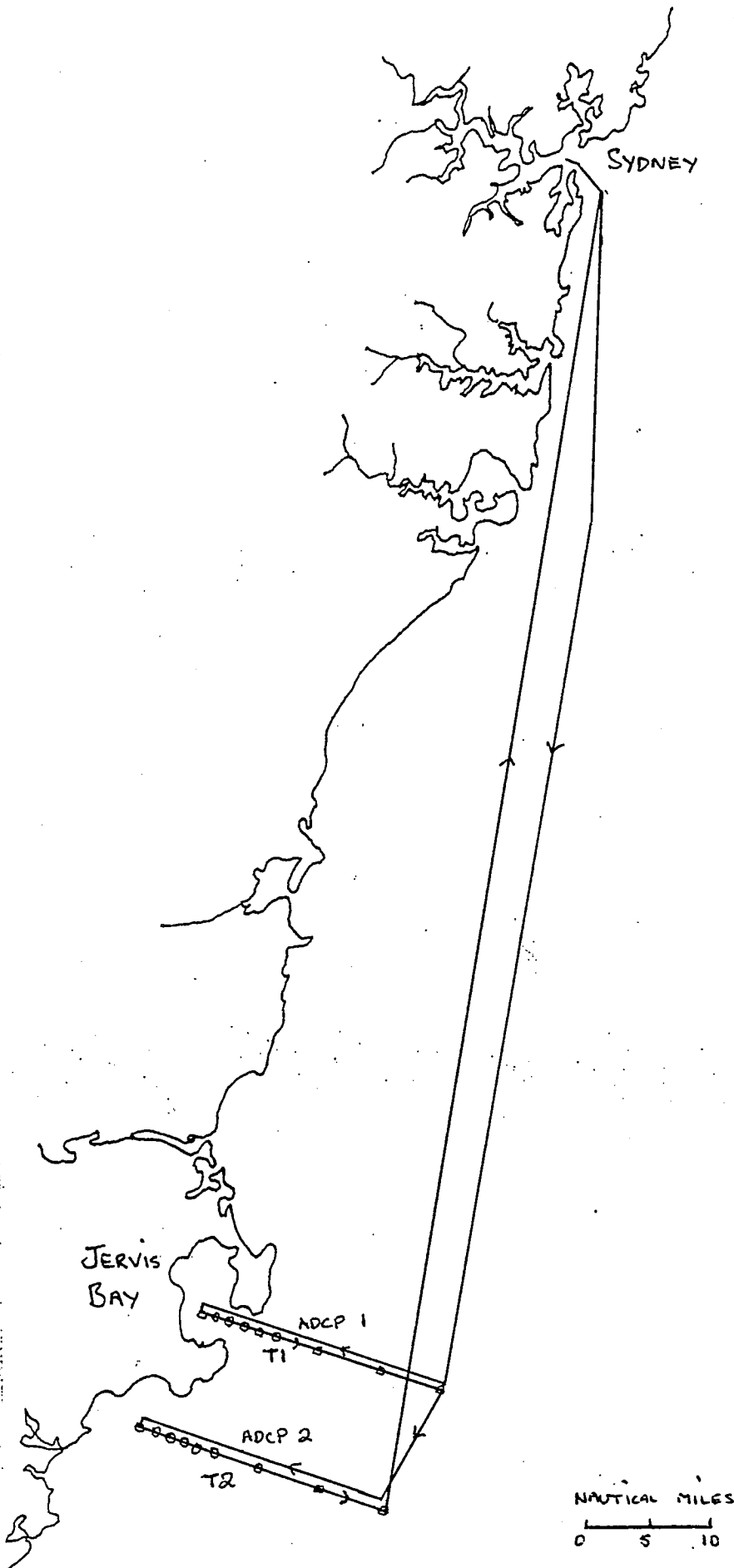
ADCP	Acoustic Doppler Current Profiler
ANSTO	Australian Nuclear Science and Technology Organisation
CTD	Conductivity, Temperature, depth
DOOM	Deep Ocean Outfall Malabar
DOOB	Deep Ocean Outfall Bondi
SPCC	State Pollution Control Commission (NSW)

Start Time	Day	Hrs	Total Hrs	Destination
<i>Leg 1</i>				
22.00	Tue	10	10	Transit to Jervis Bay
08.00	Wed	3	13	ADCP 1 east to west
11.00	Wed	16	29	T1 (9 stations, start west end)
03.00	Thur	3	32	ADCP 2 east to west
06.00	Thur	16	48	T2 (9 stations, start west end)
22.00	Thur	10	58	Transit to Watsons Bay
08.00	Fri	1	59	Embarkation time
<i>Leg 2</i>				
09.00	Fri	1	60	Transit to M1
10.00	Fri	1.5	61.5	Deploy M1
11.30	Fri	0.5	62	Transit to M2
12.00	Fri	1.5	63.5	Deploy M2
13.30	Fri	0.5	64	Transit to Bot Bay
14.00	Fri	2	66	Bot Bay; CTD
16.00	Fri	12	78	T3 (6 stations, start west end)
04.00	Sat	3	81	ADCP 3 (west to east)
07.00	Sat	18	99	T7 (9 stations, start east end)
01.00	Sun	3	102	ADCP 4 (east to west)
04.00	Sun	12	114	T5 (6 stations, start west end if possible)
16.00	Sun	2	116	Transit to Watsons Bay
18.00	Sun	1	117	Embarkation time
<i>Leg 3</i>				
19.00	Sun	3	120	ADCP 5 west to east
22.00	Sun	18	138	T10 (9 stations, start east end)
16.00	Mon	12	150	T8 (6 stations, start west end)
04.00	Tues	3	153	ADCP 6
07.00	Tues	1	154	Transit to Watsons Bay
08.00	Tues	1	155	Embarkation time
<i>Leg 4</i>				
09.00	Tues	1	156	Transit back to T4
10.00	Tues	12	168	T4 (6 stations, start west end)
22.00	Tues	3	171	ADCP 7
01.00	Wed	13	184	T6 (6 stations, start east end) + recovery M2
14.00	Wed	12	196	T9 (6 stations, start west end)
02.00	Thur	4	200	ADCP 8 and transit to T12
06.00	Thur	12	212	T12 (6 stations, start west end)
18.00	Thur	12	224	T11 (6 stations, start west end)
06.00	Fri	2	226	Transit and Recover M1
08.00	Fri	1	227	Transit to Watson's Bay
09.00	Fri	1	228	Watson's Bay CTD
10.00	Fri	2	230	Embarkation time for press
12.00	Fri	2	232	Farm Cove CTD
14.00	Fri	0.5	232.5	Transit to berth
14.30				

Because stations on the transects are so close, transit times between stations are taken as part of the time taken to do the station. Separate transit times are given for longer distances. T1 = Transect #1

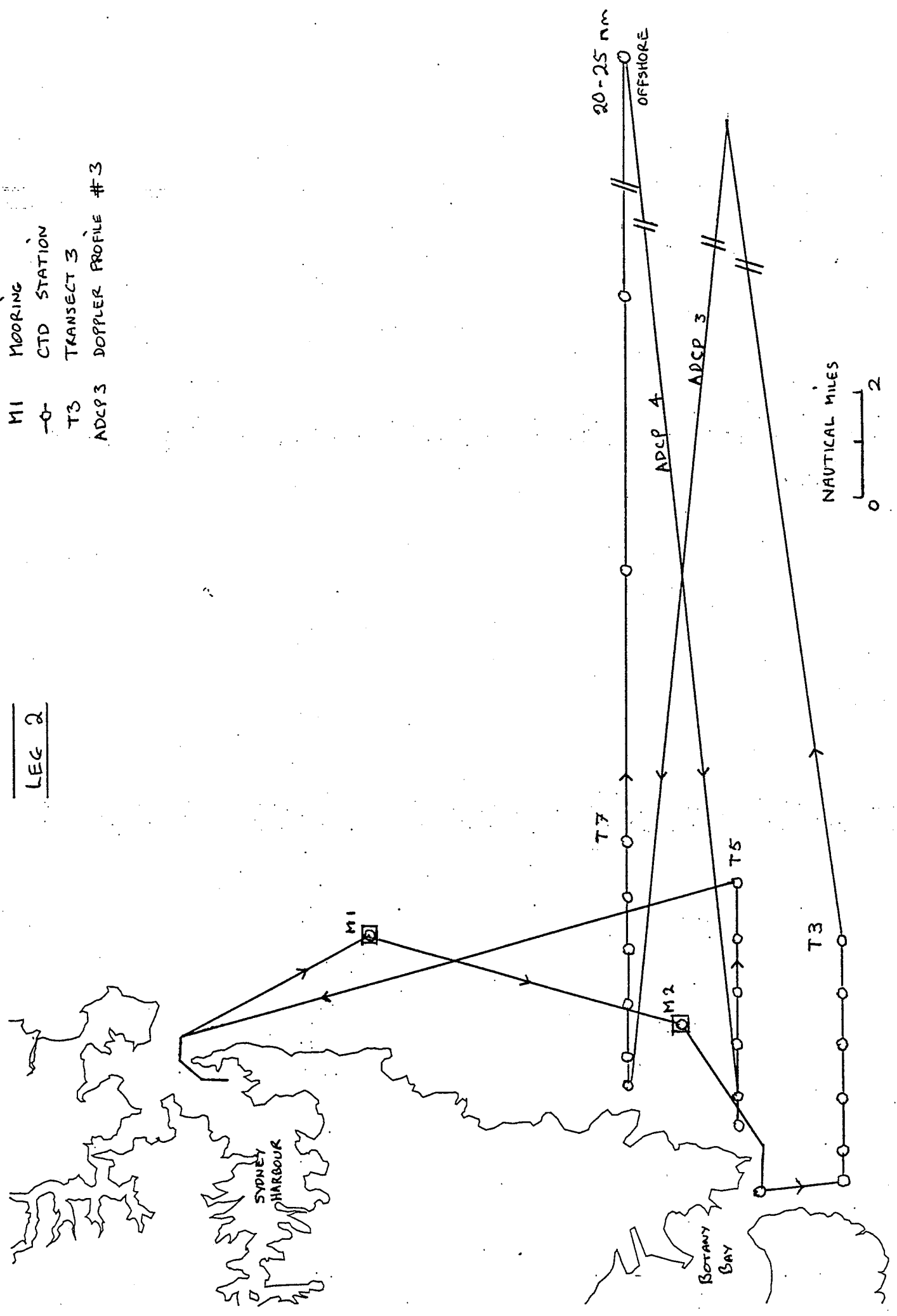
LEG 1

M1 MOORING
—○— CTD STATION
T3 TRANSECT 3
ADCP3 DOPPLER PROFILE #3



LEG 2

- M1 MOORING
- O- CTD STATION
- T3 TRANSECT 3
- ADCP3 DOPPLER PROFILE #3



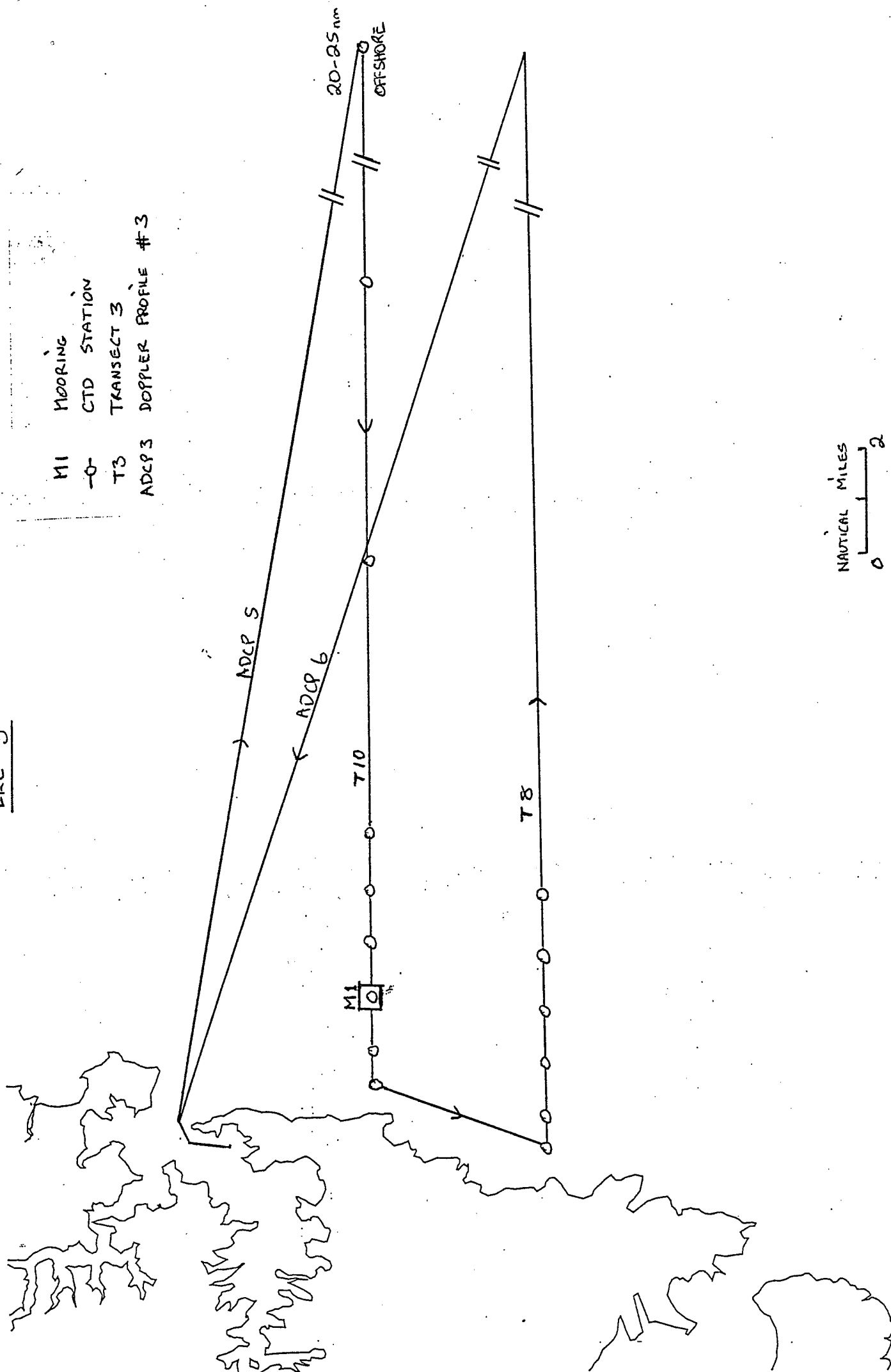
Lee 3

MOORING

CTD STATION

TRANSECT 3

ADCP3 DOPPLER PROFILE #3



LEG 4

M1 MOORING
 -O- CTD STATION
 T3 TRANSECT 3
 ADCP3 DOPPLER PROFILE #3

