C O N T E N T S

SUMMARY

On 9 September 1991 the 6710 tonnes deadweight Panamanian registered motor tanker Jovian Loop grounded on Unison Reef in the inner two-way route of the Great Barrier Reef, while on passage from Broome to Townsville with a part cargo of tallow.

The ship was refloated after one hour, without assistance, and continued on its voyage to Townsville. No pollution resulted from the grounding and the ship sustained only minor damage.

Under the provisions of the Navigation (Marine Casualty) Regulations the Marine Incident Investigation Unit undertook an investigation to identify the circumstances of the grounding.

PERSONS INTERVIEWED

The following persons were interviewed at Townsville on 10 September 1991:

Captain An Sam-Kug	Master
Son Tack-Hoon	Mate
Yang Deok-Won	2nd Mate
Gim Hag-Jae	Seaman 12-4
Park Tae-Myin	Seaman 4-8
Captain G E N Holmes	Pilot

Captain G E N Holmes also provided a written statement on the incident and a written comment on the course keeping ability of the Jovian Loop, based upon observations during a subsequent passage.

Under Regulation 16(3) of the Navigation (Marine Casualty) Regulations the Inspector must, where a report relates to a person's affairs to a material extent, if it is reasonable to do so, provide the person with a copy of the report or the relevant part of the report. Such a person may then provide written comments or information relating to the report.

Copies of the draft report were provided to all persons interviewed, a submission being received only from the Pilot.

SEQUENCE OF EVENTS

The Panamanian registered, 6710 tonnes deadweight products tanker Jovian Loop sailed from Broome, Western Australia on 3 September 1991 bound for Townsville, Queensland with a part cargo of tallow, contained in No.2 port cargo tank.

The ship was also carrying water ballast in the fore peak tank and No.5 starboard cargo tank. The ship's draught was recorded as being 2.25 metres forward, 5.15 metres aft.

At 0300,8 September the ship arrived off Goods Island, at the western approaches to the Torres Strait, where a pilot of the Queensland Coast and Torres Strait Pilot Service was embarked, for the passage through the Torres Strait and inner two-way route of the Great Barrier Reef.

Operational watchkeeping procedures on board were on the three watch system (four-hours-on, eight-hours-off), with one officer and one seaman to each watch; these procedures were maintained for the passage through the Torres Strait and inner two-way route. In addition, the Master was also on the bridge for the full period of the 8-12 watch and he also visited the bridge at various other times to check on progress. In confined waters the seaman on watch steered the ship manually; in the more open waters and with the Pilot's agreement, the officer of the watch allowed the ship to be changed over to automatic steering. This was done by a switch on the steering consul being operated by the seaman.

As is normal practice, in areas of relatively open waters and when he considered it safe to do so, the Pilot would leave the bridge to take a rest in the pilot's cabin, one deck below the bridge.

The passage proceeded smoothly and uneventfully throughout 8 September.

On 9 September the Jovian Loop passed Pipon Island at 0258 on a True (T) course of 116° and at 0310, with Hales Island abeam to starboard at 2.0 miles, course was altered to 135°T. The weather was fine with good visibility; the sea and wind conditions being noted in the deck log book as rough and south-easterly force 6, respectively.

At 0333, with Rocky Point Island abeam to starboard at 2.0 miles, the course was altered to 153° gyro to make 152°T, an allowance being made for a gyro error of lo high. From the positions plotted on the chart the Jovian Loop was making good a speed of 13.10 knots.

Once the ship had steadied on the 153° gyro course the Pilot took the opportunity to go below to freshen up. He confirmed the correctness of the heading by noting the position of Barrow Island light, fine to starboard, and by radar, of which the heading marker was correctly just touching the trace of Noble Island (approximately 17 miles ahead).

The Pilot stated that, before leaving the bridge, he marked a position on the navigation chart at which he wished to be called (3.6 miles before the next alteration position) and instructed the Second Mate that he should be called when the ship reached that position, or at 0400, whichever the sooner. Satisfied that the Second Mate was aware of the course and of the need to call him, the Pilot left the bridge at 0338.

Shortly after steadying the ship on the course ordered by the Pilot, the seaman changed over from manual to automatic steering.

At 0345 the Second Mate plotted the ship's position on the chart and found that the ship was slightly to the east of the course line drawn on the chart. He went to adjust the course three degrees to starboard, noted that the heading by gyro compass was 1320 and altered course to 135°. He then went into the curtained off chart table area and wrote up the deck log book, in preparation for the end of his watch, leaving the seaman to keep a lookout.

The Mate and the 4-8 seaman watchkeeper arrived on the bridge at about 0350, the Mate taking over the responsibility of the watch at 0355.

At 0400 the Mate plotted the ship's position on the chart and the position showed that the ship was not on the course line, but was very close to Unison Reef. Before the Mate could respond to the situation, the Pilot, who had not been called as he had requested, arrived on the bridge. The Pilot immediately realised that the ship was considerably off course, noted the ship's heading as 125° and ordered "starboard 20". He then went out to the port bridge wing, looked over the side and, seeing that the ship was not making way through the water, realised that the ship was aground. He therefore ordered "stop engines".

The Master arrived on the bridge at 0405, shortly after the engines had been stopped, having been called by the Mate. Once fully advised of the situation the Master instructed the officers and the crew to sound round the ship, to check the depth of water and establish the degree to which the ship was aground. He also ordered all internal tanks to be sounded, to ascertain whether the hull had been breached. At some time the engine was put to slow astern; however, the ship remained fast and the engine was stopped again at 0424.

All empty tanks were found to be dry with no ingress of water and the soundings around the ship indicated that the Jovian Loop was not too hard aground. Low water had occurred at 0328, thus the tide was flooding, but to assist in refloating the ship the Master ordered that the fore peak ballast tank be pumped out.

At 0456 the engine was put astern again and at 0500 the Jovian Loop moved off Unison Reef under its own power. All tanks were again sounded and found to be intact, so the Master decided that it was safe to continue the voyage to Townsville. No oil or cargo was observed to have leaked from the ship whilst the ship was aground or during refloating operations.

Once underway the Pilot passed advice of the incident to the Queensland Coast and Torres Strait Pilot Service of&e in Sydney, this advice then being relayed to the Inspector of Marine Accidents, as required under Regulation 4 of the Navigation (Marine Casualty) Regulations.

The Jovian Loop arrived at Townsville on 10 September 1991 where an underwater survey found paint loss and minor setting up of some bottom plates (Attachment 9).

C O M M E N T

At no time during the investigation was it suggested by anyone on board the Jovian Loop that the grounding was the result of any form of mechanical failure or malfunction. The main engine was still running at full speed at the time of the grounding and there were no reports or claims of steering gear or gyro compass failure, both being fully operational when the ship was refloated. It is therefore necessary to look at on board operational procedures and the actions of those on duty on the bridge prior to and at the time of the grounding.

Pilotage and Responsibilities

The employment of a pilot by ships transmitting the inner two-way route of the Great Barrier Reef became compulsory for the majority of ships on 1 October 1991. Prior to that date pilotage was recommended, under IMO Resolution A619, for ships of 100 metres in length and over and for all loaded oil tankers, chemical tankers and gas carriers, irrespective of size. The Master of the Jovian Loop, in employing a pilot of the Queensland Coast and Torres Strait Pilot Service on 8 and 9 September, was complying with the recommendations contained in that IMO Resolution.

A pilot is a person with local knowledge who is employed to assist the master of a ship to transit an area in safety. However, the employment of a pilot does not relieve the master of his overall responsibility for the safety of the ship, or the ship's officers from their watchkeeping duties. Section 10 of Chapter II of the Standards of Training, Certification and Watchkeeping for Seafarers Convention states:

"Despite the duties and obligations of a pilot, his presence on board does not relieve the master or officer in charge of the watch from their duties and obligations for the safety of the ship.

The master and oficer of the watch shall co-operate closely with the pilot and maintain an accurate check of the ship's position and movement."

Despite this, as the Torres Strait and inner two-way route is a long pilotage, masters generally leave the conduct of the ship to the pilot. It is normal practice, however, when it is safe to do so, for pilots to take a rest in certain, less demanding, areas and at such times it is up to the individual master to determine whether or not he should be present on the bridge during the pilot's absence.

The Jovian Loop is a relatively small ship and there are no toilet facilities on the bridge, thus it was necessary for the pilot to leave the bridge even should he merely wish to use a lavatory or to wash.

During 8 September the Pilot had been able to leave the bridge in order to get some rest on two occasions, 0700 to 0950 and 1130 to 1300. On 9 September he had been able to obtain some further rest from 0030 to 0130, whilst the Jovian Loop was crossing Princess Charlotte Bay.

The Master had not left instructions to be called by the officer of the watch in cases where the Pilot left the bridge during the 4-8 and 12-4 watches; he stated that he was satisfied with the abilities of the Mate and 2nd Mate. Due to the inexperience of the 3rd Mate the Master maintained a presence on the bridge for the full periods of the 8-12 watch.

In deciding to leave the bridge at 0338 to go to the lavatory and to freshen up the Pilot took into account the fact that there was a distance of 9.4 miles to run to the next alteration of course position. Also behind his decision was the fact that another ship, the Gefion Baltic, was some 4 to 5 miles astern and overtaking the Jovian Loop at a rate of 1.8 knots, ruling out his absence from the bridge at a later stage. Although the ship's track lay only 1.5 miles off Unison Reef, the Pilot stated that the reef shows well on radar at a distance of 3 miles, also, that from his observations of the 2nd Mate during the passage he had no reason to doubt the officer's abilities.

Although the Master of the Jovian Loop had elected not to be called during the pilot's previous absences from the bridge, as the Pilot intended to be away from the bridge for a period of 20 minutes in a relatively restricted area, it is considered that the Master should have been advised on this occasion.

Passage Planning

Prior to the passage through the Torres Strait and inner two-way route the Second Mate had laid off the courses on the various charts; however, this appears to have been the total sum of any passage planning. For the passage the Pilot followed his own courses, which occasionally differed slightly, but not significantly, from those drawn on the chart by the Second Mate.

No record was kept aboard the Jovian Loop of courses steered or of times and positions of alterations of course at any time during the passage through the Torres Strait and inner two-way route, the deck log book, in the section for courses steered, merely containing the entry "var'ly". Neither is the ship fitted with a course recorder, which would provide such a record.

Bridge Equipment

The Pilot stated that he noted a number of deficiencies on both the radars and the automatic steering. One radar set operated only on relative/ship's head up, while there was a 2° error in the heading marker alignment on the other, gyro stabilised, set. There was an error on the variable range marker of both sets, but the ship's officers were apparently aware of this and made corrections when taking off radar distances.

The Pilot noted that when the course was altered in the automatic mode, the course had to be set 4 or 5 degrees higher than the course required. During a subsequent four day passage from Brisbane to Goods Island, the pilot noted that the gyro compass wandered

between 2° low error and 6° high error. These errors were apparently induced by alterations of course, an alteration to starboard inducing a high error, one to port a low error. A high error was also noted to develop whilst steering a straight course. However, such errors were not of sufficient magnitude to cause the grounding on 9 September. Also, had the groundin g been due purely to gyro error the heading would still have been indicated as being 153°, not 132° or 135°.

The Pilot also stated that on the north bound passage the Helmsman switched over to automatic steering whenever possible. The changeover switch was close at hand on the consul and could be operated by the Helmsman without the knowledge of the Pilot or the Officer of the Watch.

Analysis of Stated Actions Prior to Grounding

From the interviews conducted in Townsville there is conflicting evidence as to actions of persons and as to the course being steered from 0333.

According to the Pilot, the steering had been conducted in the manual mode from before 0258 and was still in the manual mode when he left the bridge at 0338. Course alterations were carried out by initially giving wheel orders to the helmsman and then the course to steer when the ship had been brought round to the correct heading; the officer usually standing next to the steering console during course alterations. Following the course alteration at 0333 from 135°T to 153°G (to make 152°T) the pilot stated that he checked that the heading was correct by observing the position of Barrow Island light, visible fine on the starboard bow and also by observing the radar heading marker just touching the trace of Noble Island. The Pilot stated that he then marked a position on the chart, notated “PCP” (Please Call Pilot), at which he wished to be called, then took the 2nd Mate to the chart table and showed him the ship’s position and the course of 152°T, which had been drawn on the chart by the 2nd Mate. Satisfied that the 2nd Mate understood everything, he then left the bridge, leaving instructions to be called at the position he had marked on the chart, or at 0400, whichever the sooner. The Pilot also stated that he was not calied as requested, but returned to the bridge when he realised that the time was 0400, noting the time of his arrival on the bridge as 0401; also, that when he returned to the bridge the steering was in the manual mode and there were four persons present, the Mate, the 2nd Mate, plus the two seamen watchkeepers.

The Second Mate stated that “the courses were the Pilot’s, that changes were ordered by the Pilot and that I did not check”. It was only after plotting the position at 0345 and he went to adjust the course by 3 degrees that he saw that the ship was on a course of 1320, so he made an adjustment in order to steer to 135°. He also stated that when the Pilot left the bridge, the light (Barrow Island) was off the bow, the steering was in the automatic mode and the alteration of course had been in automatic. He further stated that he had not been shown the chart by the pilot, merely being told to call the pilot at 0400 and that he had been too busy (writing up the log book) to check on the Pilot’s course. After adjusting the course to 135° he had finished writing up the deck log book and then had handed over the watch to the Mate, following which he had left the bridge at 035.5, going straight to his cabin and to bed, only being aware that the ship was aground when he felt the engine going astern.

The Mate stated that the course as handed over to him by the 2nd Mate was 135°. He also stated that the 2nd Mate left the bridge at 0355 and that when he took over the watch the steering was in the manual mode.

Initially the Helmsman stated that he was always on the wheel during that watch, but then stated that the steering was sometimes in automatic. He stated that he did what the Pilot said, then changed to automatic steering and that the course was 132°. He also stated that he had left the bridge before the grounding occurred and was watching a video when he was told by the 4-8 watchkeeper what had happened.

The Master stated that when he arrived on the bridge, in addition to the Pilot, both the Mate and 2nd Mate were present, as were both the seamen watchkeepers.

The area on the chart where, according to the Pilot, he had marked the position at which he was to be called, had been erased prior to the plotting of the ship's position at 0540. This may have been because the Pilot's notation would have obscured the plotted position.

The statements made by the 2nd Mate and the 12-4 watchkeeper with respect to their having left the bridge, although corroborated in the 2nd Mate's case by the Mate, are at variance with the statements made by the Pilot and the Master. From the demeanour of the Pilot during interview the investigating officer had no reason to doubt the Pilot's testimony.

According to entries made in the bridge bell book (Attachment 8) the engine was stopped at 0356 then manoeuvred astern from 0358 until 0424. The engine was again put to slow astern at 0456 and stopped at 0502 after the ship had pulled off the reef. All the entries covering these movements were in the 2nd Mate's hand writing. The Pilot was of the opinion that the officers did not realise the ship was aground until he called for the engines to be stopped, which was after 0401. It is considered that the times of 0356 and 0358 recorded in the bell book were written at a later time and were estimates.

Analysis of Courses

The distance from the position as plotted on the chart by the 2nd Mate at 0345 to that marking the grounding position is 3.78 miles on a course of 138°T (Attachment 6). The time required to travel this distance at 13.1 knots is 17.3 minutes, providing a notional time of grounding of 0402.3.

Projecting a course of 132°T back from the 0345 position (Attachment 6) intersects the 152° track 1.4 miles from the 0333 position, indicating that an alteration took place at 0339.5 as, or just after, the pilot left the bridge.

It is noted that a line joining the plotted position of 0310, off Hales Island, and the grounding position passes very close to both the 0333 and the 0345 positions (Attachment 7). This line gives a track of 139°T and a distance of 11.1 miles, which at 13.1 knots (50.8 minutes) provides a grounding time of 0400.8.

There is no record in the ship's log books of the course alterations. From the Pilot's account of his actions and the evidence of the positions plotted on the navigation chart at the appropriate alter course positions, it is considered that at 0310 the Jovian Loop was brought onto a heading of 135° and at 0333 onto the correct heading of 152°T. The Inspector accepts that the Pilot performed his usual checks, both visual and radar. In support of this is the 2nd Mate's statement that the light (Barrow Island) was off the bow. This is consistent with the Pilot's statement of the light being fine to starboard and also with the heading being 153°G, as at that time the bearing of the light would have been 165°G. The fact that a line joining the 0310 and grounding positions passes very close to the 0333 and 0345 positions is considered to be purely coincidental.

It is further considered that the Jovian Loop deviated from the correct course of 152°T some time shortly after the Pilot left the conning position to make a notation on- the chart and to go below.

Analysis of Causes

The deviation from the correct course could have been due to one of a number of reasons :

- Pilot error, by miscalling the course to be steered.
- Misunderstanding by the Helmsman of the the course to be steered.
- The Helmsman forgetting the course ordered and reverting to the previous course.
- The course setting for the auto pilot being misaligned when the change-over from hand to automatic steering was made.

The course from 0310 to 0333 had been 135°T, thus at 0333 there was an alteration of course to starboard of 17 degrees. This alteration had been made by the Pilot issuing (starboard) helm orders to the Helmsman and then the order to steer 153° Gyro, during which time the 2nd Mate was reportedly standing by the steering position. A mis-call of two digits is considered to be highly unlikely, but had the Pilot unconsciously miscalled the course as " 132 " such a miscall should have been obvious, as following an alteration to starboard such a mis-call was for a course to port of the previous course.

Although the Helmsman's knowledge of English was restricted to helm and course orders the Pilot did not report any problems of misunderstanding occurring in the earlier stages of the passage. The Helmsman stated that the course as ordered by the Pilot was 132° and therefore, despite being steadied on the correct heading of 153°, he may have altered course back to port without reference to either the 2nd Mate or the Pilot. However, such an action would have been 'immediate' and so should have been noticeable to the Pilot when he checked the radar for the alignment of the ship's heading marker with Noble Island.

As the ship was actually seen to be steadied on the correct course by the Pilot, it is considered improbable that the Helsman forgot the course given to him to steer.

When changing the control switch over to the automatic steering mode the Helmsman may not have checked to ensure that the course setting was in the correct position. Had the Helmsman, unbeknown to the Pilot, switched over to automatic steering whilst the ship was steering 135° and had he then failed to adjust the auto setting to the new course of 153°, given the reported tendency of the system to settle a few degrees to port of the set course, on changing over to automatic steering at 0338, or thereabouts, the ship would have been brought to port to the heading of around 132°.

It is considered most likely that the Helmsman switched over to automatic steering after the Pilot left the wheelhouse, but failed to check that the course was set correctly. As a result of which the Jovian Loop swung to port and settled on a heading of 132°.

When going to adjust the course after plotting the ship's position for 0345 the 2nd Mate noted the heading as being 132°. However, he failed completely to grasp that anything was amiss, that the ship was not steering the course of 152°T as drawn on the chart, but instead was headed towards the reef. He merely adjusted the course by 3 degrees and then went into the curtained off chart table area to write up the log book.

In failing to ensure that the ship remained in manual steering whilst the ship was in close proximity to a reef and by failing to ensure that the ship maintained the correct course the 2nd Mate failed in his responsibilities for the safe conduct of the ship .

The Mate, in accepting the watch from the 2nd Mate and a course of 135°, failed to pick up the discrepancy from the course line as drawn on the chart and the fact that the course being steered was taking the ship onto Unison Reef.

Had a proper passage plan been drawn up, followed and monitored, such an error as occurred should not have gone unnoticed. As it was, the 2nd Mate did not take a proper interest in the navigation of the ship while the Pilot had charge; he did not pay attention to, or monitor, the Pilot's advice, or ensure that the ship was navigated properly.

Actions following the Grounding

When the Master arrived on the bridge he correctly organised the crew to take soundings, both of the depth of water around the ship and of the ship's tanks. From these soundings it was ascertained that the ship was not heavily aground and that none of the tanks had been breached. However, according to the bell book the engine was run astern shortly after the grounding occurred until 0424, in an apparent attempt to refloat the ship before the watertight integrity had been confirmed. This action could have been highly dangerous had tanks been breached and the ship pulled free.

CONCLUSIONS

It is considered that :

1. At 0333, in a position with Rocky Point Island bearing 225° at 2.0 miles, the Pilot altered the course of the Jovian Loop to a heading of 153° Gyro, for 152° True, and ascertained that the heading was correct by observing the relative positions of Barrow Island light and Noble Island.

2. After the Pilot left the conning position the Helmsman, without instruction from the Pilot or 2nd Mate, changed over to automatic steering, but failed to check the course setting. As a result of this the Jovian Loop went off course to port, settling on a heading of 132°.

3. The grounding of the Jovian Loop on Unison Reef was a direct result of the ship's deviation from the course ordered by the Pilot and of the 2nd Mate's failure to notice the deviation.

4. The 2nd Mate failed in his responsibilities in that:

   i he failed to monitor the Pilot's actions;
   ii when left in sole charge by the Pilot he failed to monitor the ship's progress, instead busying himself with writing up the log book;
   iii he failed to appreciate the danger posed to the ship by proceeding on a course of 135°.

5. When taking over the watch at 0355 the Mate failed to pick up the discrepancy between the course line drawn on the chart (152°) and the course being steered as handed over by the 2nd mate (135°).

6. The Master was remiss in that he did not leave instructions with the Officer of the Watch to be called if the Pilot left the bridge for more than a few minutes.

7. The Master acted correctly in ascertaining the soundings around the ship and of the ship's tanks.

8. Manoeuvring the engine astern, shortly after 0400, before ascertaining whether the hull had been breached was a dangerous course of action.

9. The on-board operational procedures were poor in that:

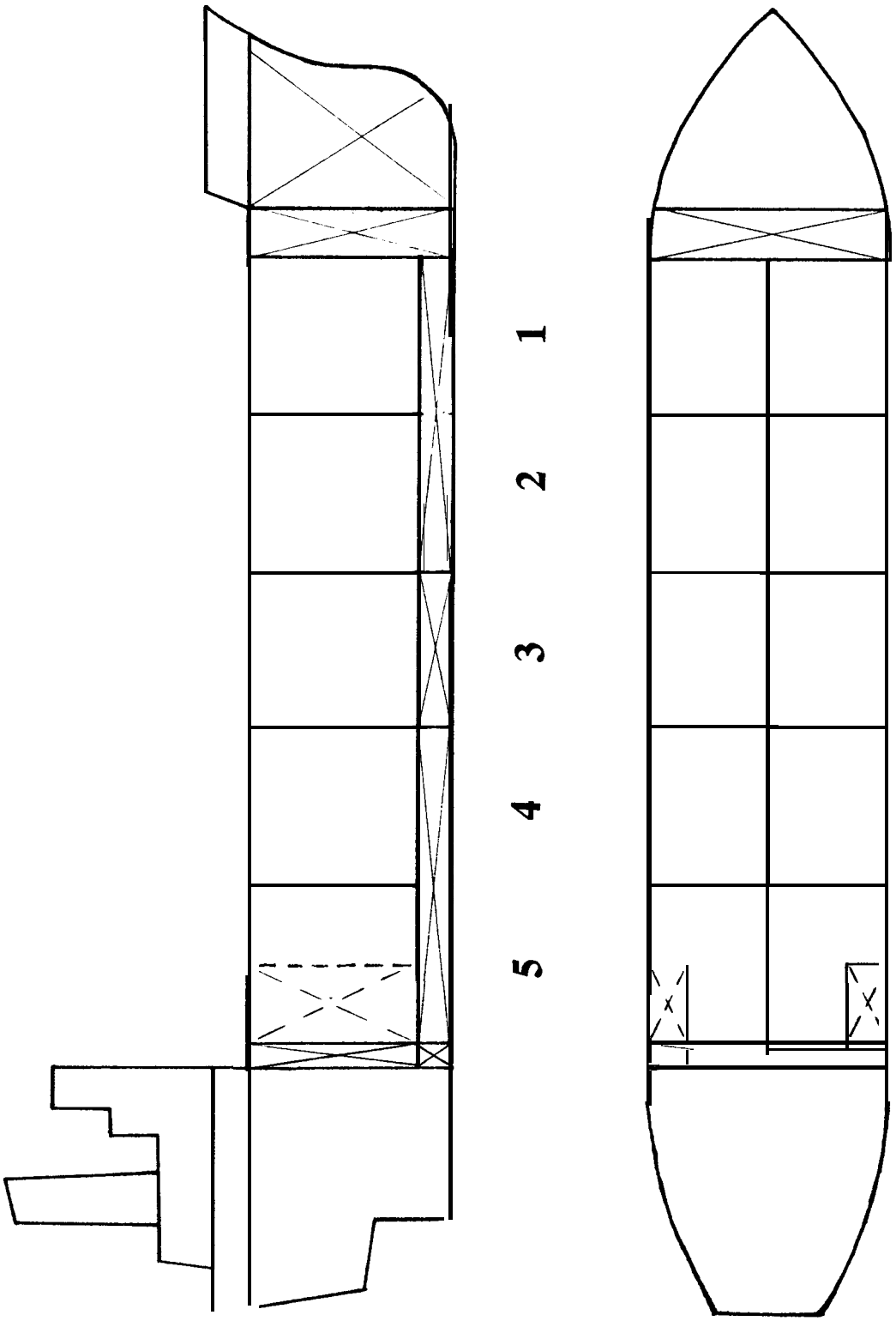
   i a proper passage plan had not been prepared and followed;
   ii no proper record of courses, alterations of course and positions was maintained;
   iii there was no proper supervision, by the officer of the watch, of when the helmsman should change over to automatic steering mode.

ATTACHMENT 1

DETAILS OF SHIP

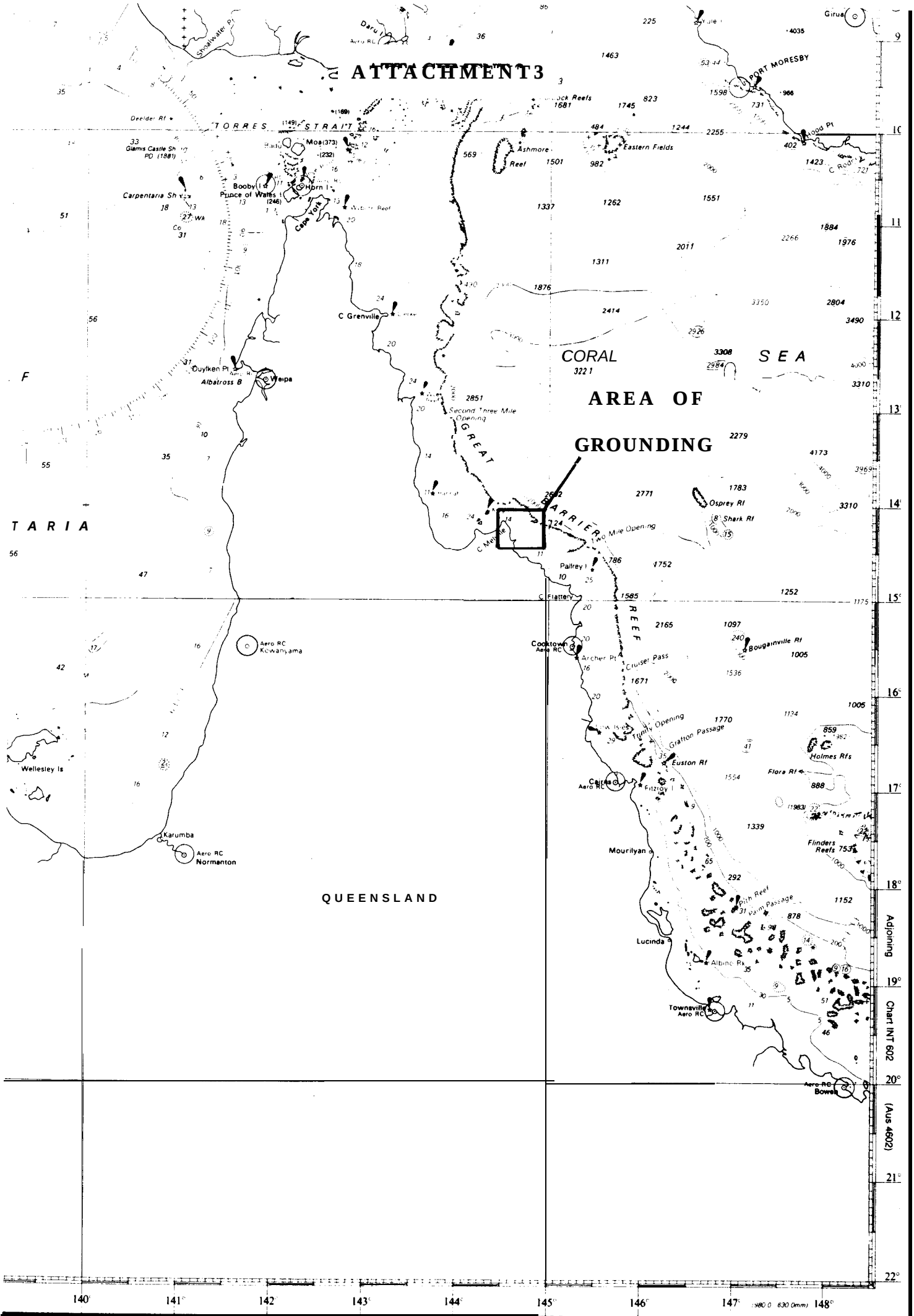
Name:	JOVIAN LOOP
Port of Registry:	Panama
Builder:	Kurushima Dockyard Kochi, Japan
Year Built:	1983
Type of ship:	Chemical Tanker
Number of cargo tanks:	10
Owner:	Jovian Maritime S. A, Panama
Operator:	Dorval Tankships P.L.
Crew:	23 - South Korean
Classification Society:	Nippon Kaiji Kyokai
Length overall:	107.64 metres
Beam:	16.50 metres
Moulded Depth:	8.50 metres
Summer Draught:	7.005 metres
Tonnages: Gross	4,027
Nett	2,128
Deadweight	6,7 10.25
Main Engine:	Mitsubishi 6UEC-37-11
Service Speed:	12.90 knots

ATTACHMENT 2



CARGO TANK ARRANGEMENT

ATTACHMENT 3

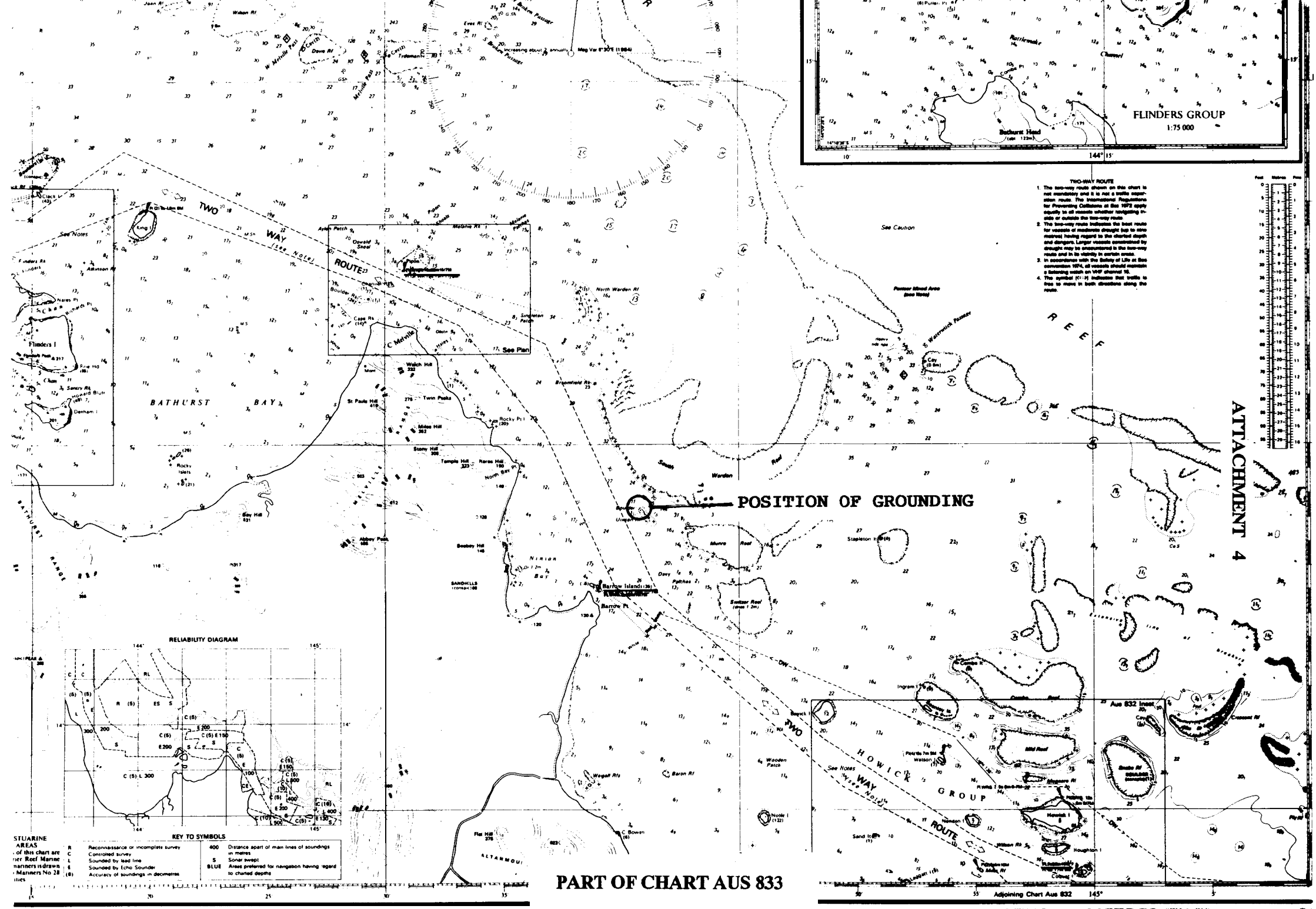


New Editions 10th March 1982
7th July 1986

DEPTHS IN METRES

Pos. Original 1974

I NT 603
Aus 4603



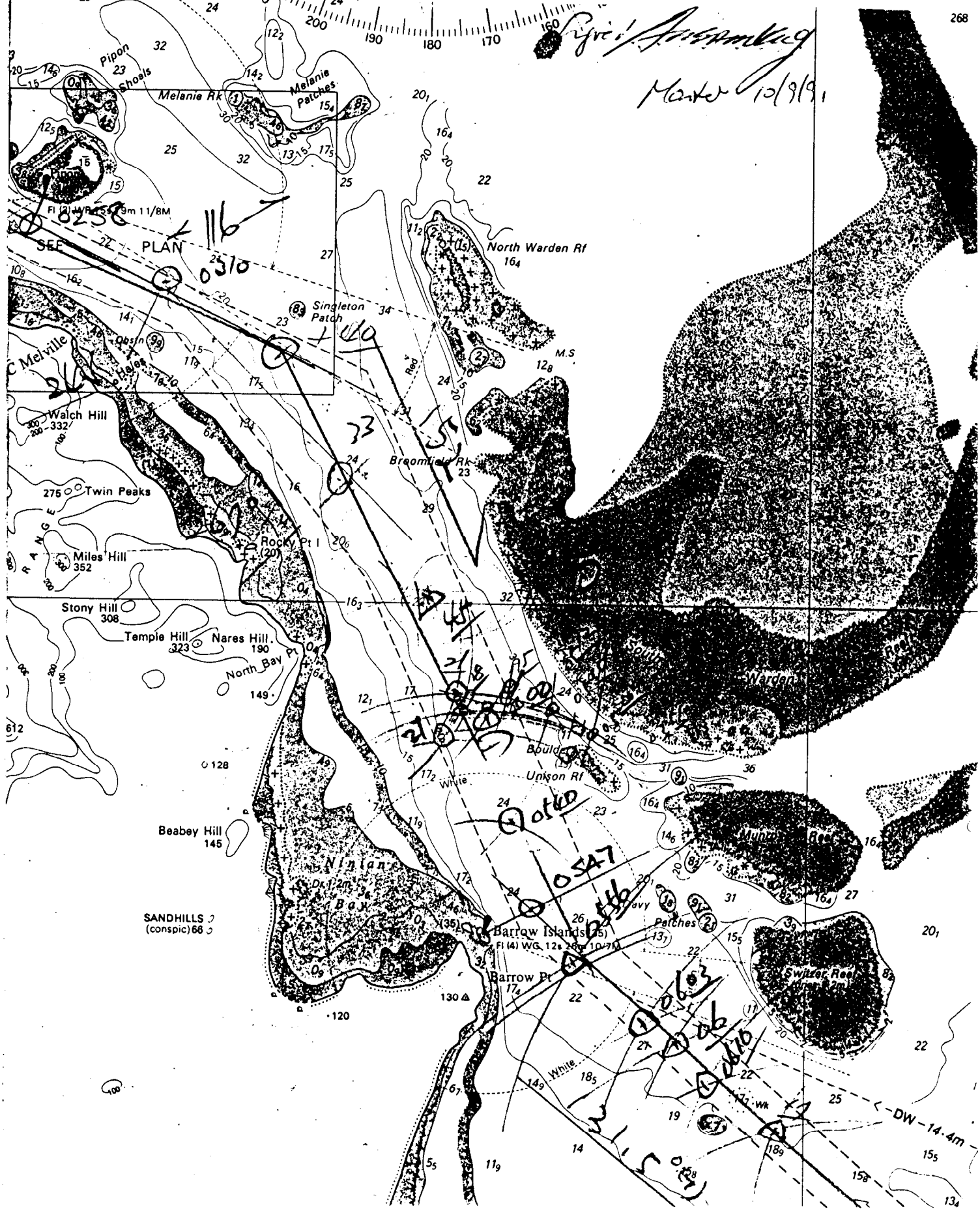
PART OF CHART AUS 833

Aus 8

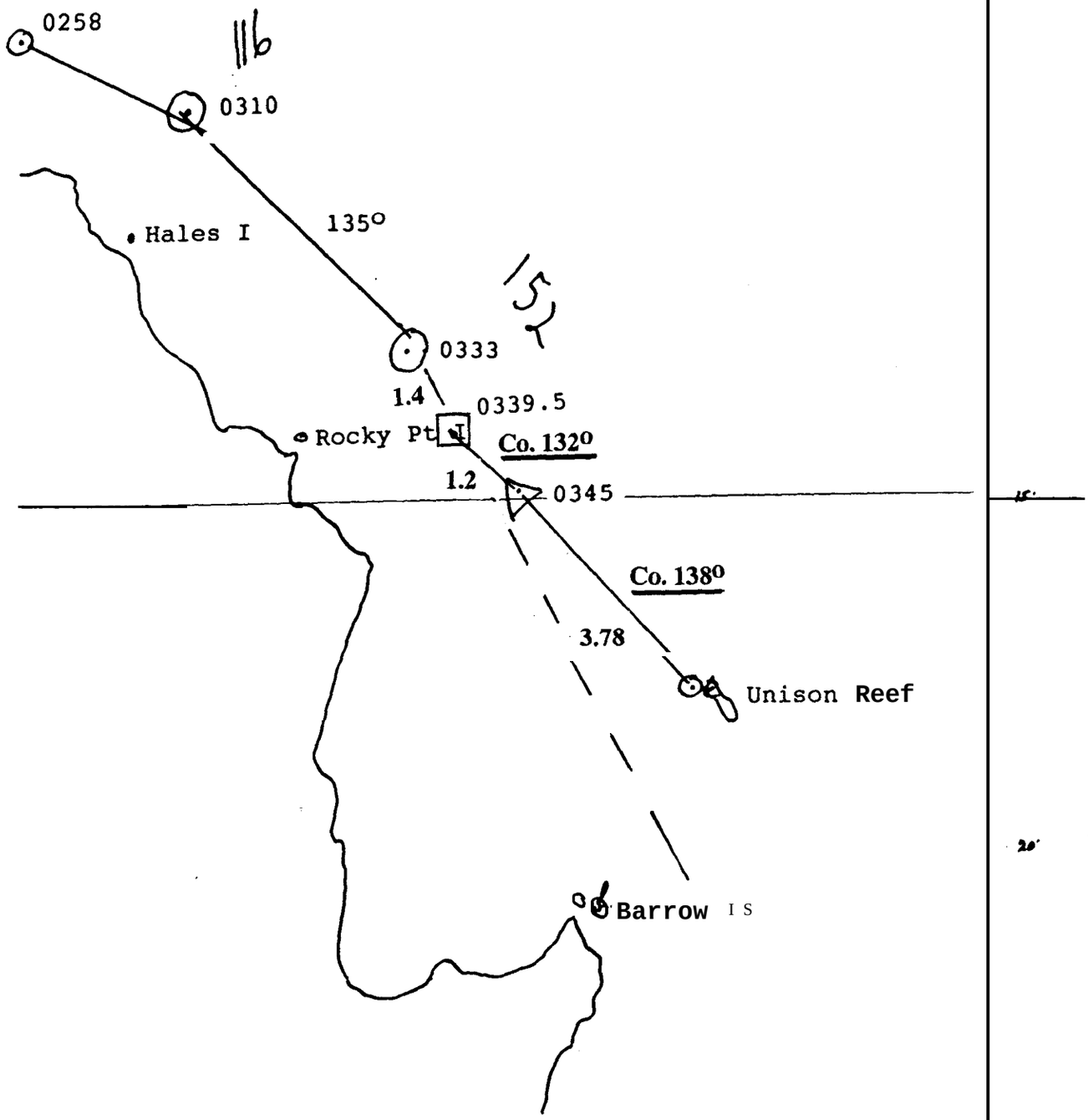
ATTACHMENT 5

TRUE COPY OF JOVIAN LOOP CHART AUS 833

IN USE AT TIME OF GROUNDING UNISON REEF

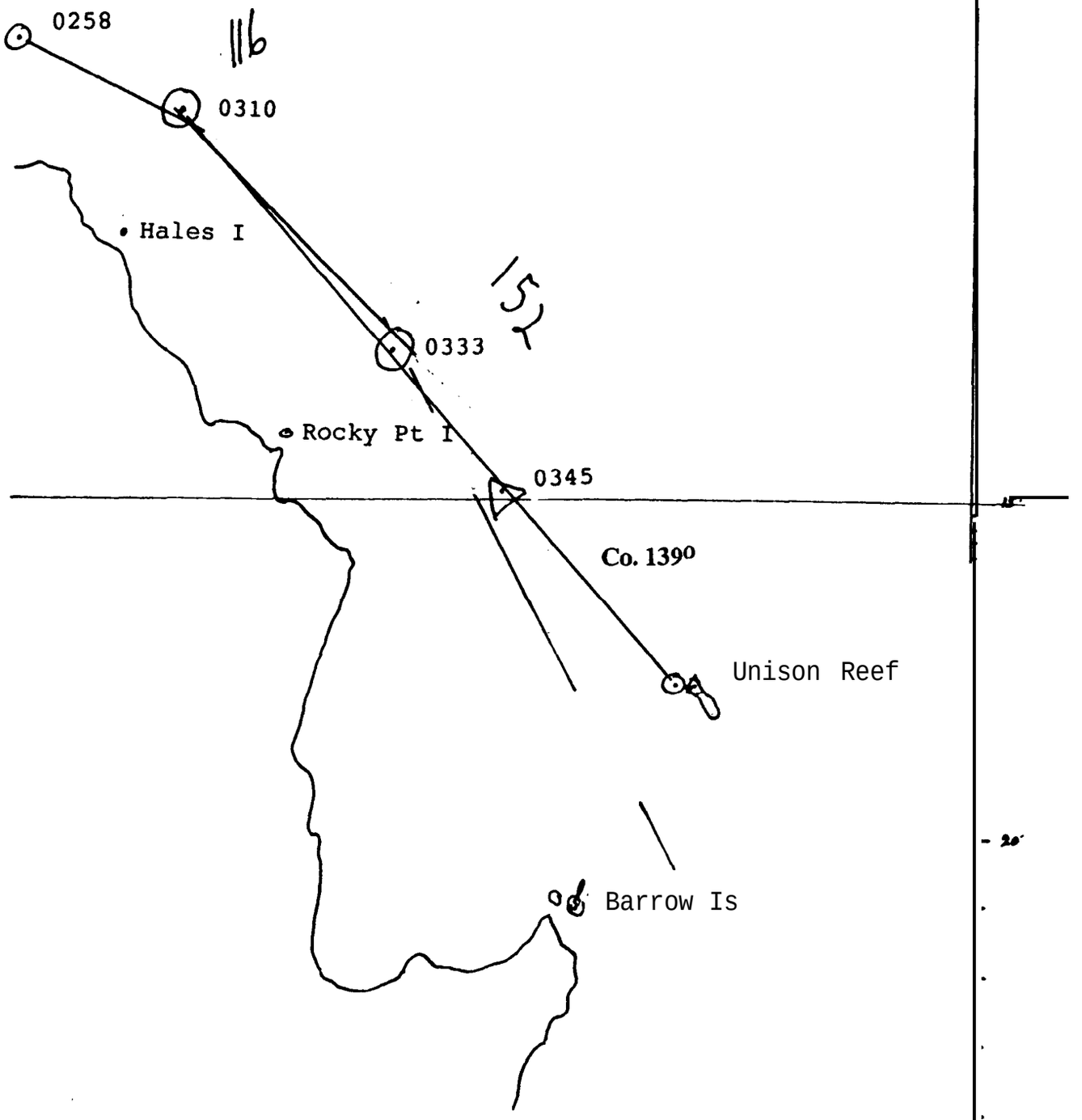


ATTACHMENT 6



PROJECTED COURSE LINES

A'ITACHMENT 7



ALIGNMENT OF POSITIONS

ATTACHMENT 8

Voy. No.	Draft F.
Date 8th Sept	" A.
Port PRINCE. WALES CHANNEL.	" M.
Berth	
Name of Pilot G. HOLMES	
0230 S/B engd'	
US H/H & S/H. 48 DB/L	
0300 pilot on board	

Voy. No. 1S/BOUND	Draft F. 1-2t
Date 9th Sept 91	" A. 1-1F
Port	" M. 3-
Berth	
Name of Pilot HOLMES	
0346 Stop engd	
t8 S/A	
0400 H/A	
21 S/A	
24 Stop engd	
t6 S/A	
0502 Stop	
02 50 S/H	
03 50 H/H	
04 10 H/H	

2nd officer left about 0530

EXTRACT FROM BELLBOOK

ATTACHMENT 9

CAVIANA PTY. LTD. ***T/A***

BEWR Marine Services

P.O.Box 1155
Townsville,Q.4810

Phone: (077) 726610
Mobile: (077) 018 778803
Fax: (077) 213972

Name of Job:	In-Water Visual Inspection of "JOVIAN LOOP"
Client:	Adelaide Steamship
Client Representative:	Reid Anderson
Diving Company:	BEWR Marine Services
Location:	No. 8 Wharf, Townsville Port
Job Description:	In-water visual inspection of vessel to determine any possible damage to bottom and propeller area,
Supervisors/Divers:	Bryan Dodd, Kent Spanton, Kim Jensen
Date of Job:	10/09/91

REPORT No: 72

On Monday, September 9,1992 BEWR Marine Services was requested by Reid Anderson to attend to the vessel "JOVIAN LOOP" on Tuesday September 10 and carry out a visual in-water inspection of the bottom and propeller area to determine what if any damage was evident.

Initially, the Dive Supervisor attended to the vessel to determine the access to the site. After speaking with the Captain it was decided that use of the Dive vessel/platform in order to have quicker access to all areas of the hull. The Dive team then moved all the dive gear to the vessel "JEEVES" and returned to the site aboard the dive vessel with their equipment set up.

Once on site, the dive team carried out the necessary safety checks and a diver entered the water. Entering at the bow the diver reported pieces of coral stuck on the bow, with minimal paint damage running along the Starboard side approximately .5 metre wide. Using a parallel track search pattern the Diver covered the entire bottom and propeller area. As he moved aft, the diver reported that the minor paint damage area on the starboard side widened to approximately 2 metres and bare metal was exposed at this widest section.

In frames C3/C2 the diver fomd slight indentations in the metal 2Omm deep and 500mm wide in the middle of the paint damaged area. There was a second concave area noted in section C3/C4. This indentation is the same size as the first indentation. From frames C3/C2 onwards the paint damage covers the entire flat, from the turn of the bilge starboard to the turn of the bilge on the port. Sections C5/C4 of the bottom shows shiny metal all across the flat with no paint evident,

CAVLANA PTY LTD *T/A*

BEWR Marine Services

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The major paint damage was found to stop just aft of C5/C4. Sections SL/CS showed some isolated paint damage on the starboard side. only slight paint damage was discovered under the skeg. No damage was found on either the propeller or the rudder. Upon completing the inspection the diver was retrieved to the diving platform.

The Dive Supervisor relayed the findings of the inspection to both the Captain of "JOVIAN LOOP" and to the Adelaide Steamship representative Mr. Reid Anderson. After ensuring that no more work was required of them the dive team departed from the site.

For

Bryan Dodd
Operations Manager