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## OUTLINE OF EVENTS

At 0320 West Australian time, 14 February 1991, the Panama registered bulk carrier *Sanko Harvest* grounded in shoal water between Hastings Island and Hood Island, in position 34° 07.4' South, 122° 05.1' East, approximately 19 miles south south east of Esperance, while on passage from Tampa, USA, via Cristobal, Panama, to Esperance, West Australia, loaded with 30,791 tonnes of fertiliser.

No person was killed or injured as a result of the grounding but extensive bottom damage was sustained from the impact with the reef, resulting in the release of heavy bunker oil from the double bottom fuel tanks. The National Plan to Combat Pollution of the Sea by Oil was activated by 0600 14 February.

From the 14 February onwards, the condition of the ship deteriorated, being in a position exposed to the prevailing weather and swell, resulting in the progressive breach of further tanks and cargo holds. On the advice of the ship's owners the *Sanko Harvest* was evacuated by the crew, for their safety, at 1655 15 February. The ship broke into three sections and sank during the night of 17/18 February.

Captain C W Filor, Inspector of Marine Accidents, undertook an investigation into the circumstances leading to the incident with the object of identifying the cause.

**Note**

The measurements of depth, dimensions, and quantities of cargo and fuel are expressed in metric measurement.

Distances are expressed in nautical miles (1853.18 metres).

Times are expressed in 24 hour notation in local ship time. On 14 February this was Western Australian Time (UTC+8).

All courses and bearings are expressed in 360° notation relative to true north.

Depths shown on chart extracts from charts Aus 4709 and Aus 119 are shown in metres; and from BA 1059 and BA 3189 in fathoms.

A U S T R A L I A

EXTRACT FROM CHART Aus 4079

Australia South Coast  
Published May 1975 REDUCED  
Showing general area of Casualty

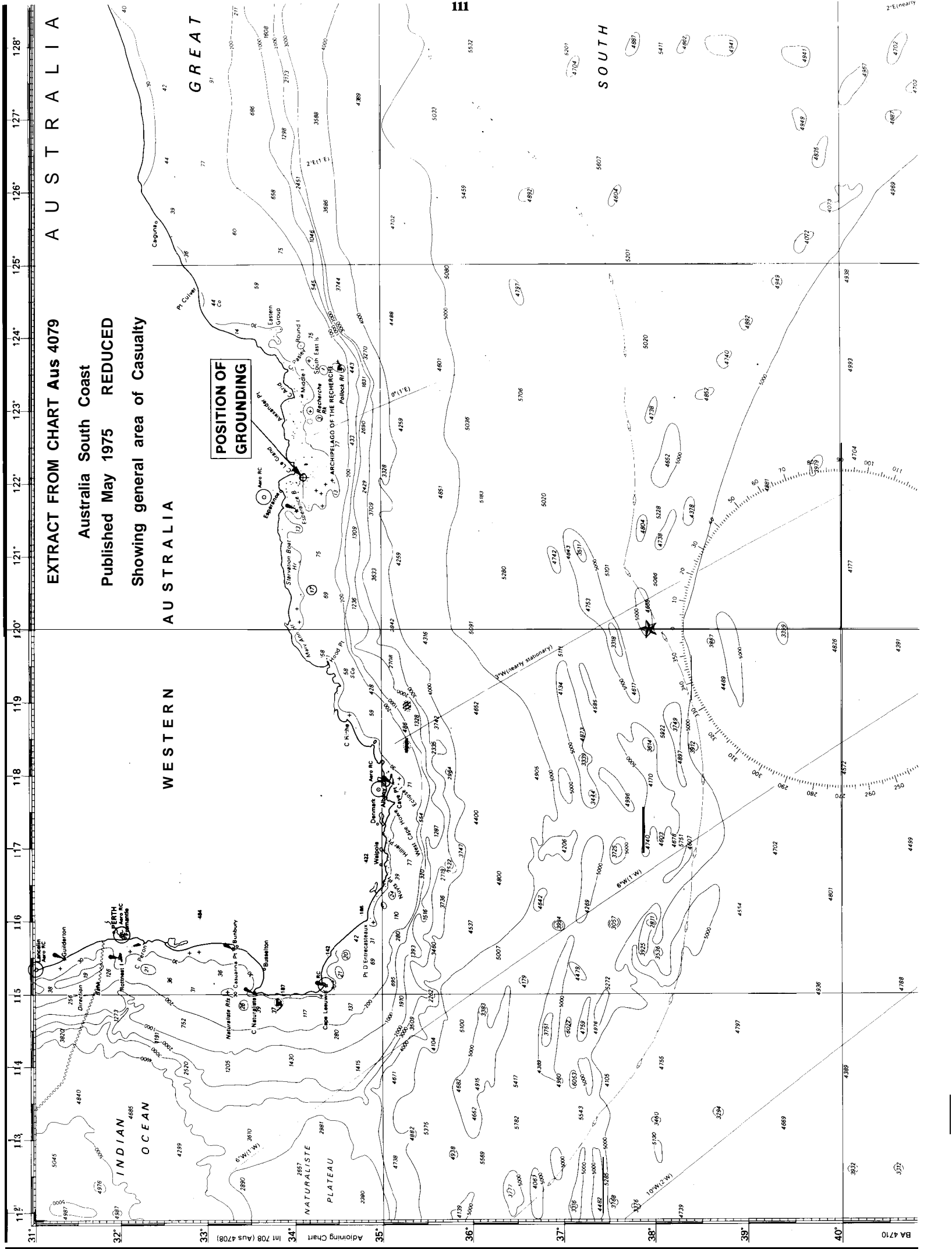
WESTERN AUSTRALIA

G R E A T

S O U T H

POSITION OF  
GROUNDING

iii



SUBMISSION ON BEHALF OF MASTER  
AND SECOND OFFICER

Under the provisions of sub-regulation 16(3) of the Navigation (Marine Casualty) Regulations, this report was submitted in draft form to the Master, Second Mate, solicitors acting on behalf of the ship's operators, inviting written comment and information relating to the report within 28 days. An extension of time was sought and granted.

On 22 May a submission was received by the Inspector of Marine Accidents.

The Master and Second Officer submitted that they disagree with the conclusions of the report and do not accept that the report contains a full and accurate statement of the relevant **facts**

The Master specifically referred to the fact that he was aware of the longer route (by the Causeway Channel ) and made his final decision to navigate his chosen route on 13 February and that the primary reason for doing so was that it provided better objects for fixing the vessel's position. Accordingly, the estimated time of arrival was of secondary importance.

Other matters of details were also brought to the attention of the Inspector and, where appropriate, have been incorporated into the text.

The Inspector has carefully considered the submission and considers that the conclusions reached are fair and reasonable.

## P E R S O N S   I N T E R V I E W E D

At Esperance on 16 February 1991:

In Hyeon KIM	Master, Transitional Certificate of Competency as Master, BS792 44264, issued 19.12.90
Dong Ug GIM	Second Deck Officer, Transitional Certificate of Competency as 2nd Deck Officer, BS903 55220, issued 26.12.90

At Esperance on 17 February 1991 supplementary interviews were conducted with:

Min Jong GIM	Chief Deck Officer, Transitional Certificate of Competency as 1st Deck Officer, BS820 51481, issued 16.06.90
Song Kuk HAN	Third Deck Officer, Transitional Certificate of Competency as 3rd Mate BS852 48209, issued 29.3.90
Yasuhiro Sensui	Manager, Marine Section, Ship Management Department, The Eastern Shipping Co.Ltd.
Captain Ian R Harrod	Harbour Master, Port of Esperance.

United Salvage Pty. Ltd. provided comprehensive details of the grounded condition of the vessel.

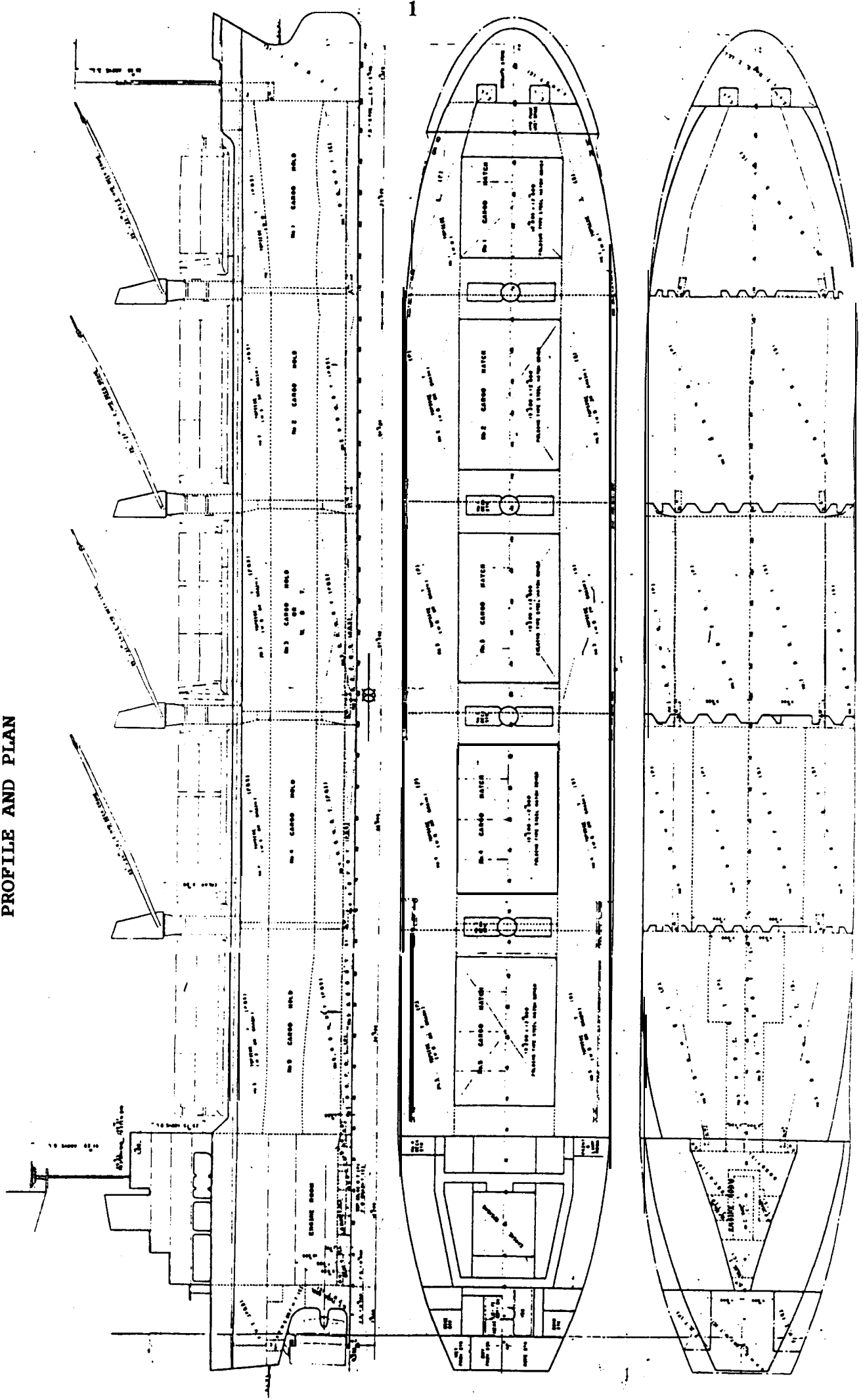
## S C O P E   O F   R E P O R T

The report of the investigation into the circumstances of the grounding of the *Sanko Harvest* is issued under the provisions of sub-regulation 16(2) of the Navigation (Marine Casualty) Regulations (the Regulations). Under the provisions of sub-regulation 8(1) of the Regulations, the purpose of the investigation is to identify the circumstances in which the incident occurred and to determine its cause.

The report is therefore confined to the operation of the *Sanko Harvest*. It does not cover either the issue of the resultant pollution and the measures taken under the National Plan to Combat Pollution at Sea, or the issues of salvage, except in as much that such issues are germane to the purpose of the report.

# SANKO HARVEST

## PROFILE AND PLAN



## SANKO HARVEST

The *Sanko Harvest*, call sign 3EVD3, was a Panamanian bulk carrier, registered number 14984-85-B, owned by Seawall Shipping Corporation, for which the Eastern Shipping Company of Tokyo were agents. It was built by Mitsubishi Heavy Industries Ltd in 1985 and powered by a Mitsubishi 6 cylinder diesel engine. The ship was 167.6m in length, with 5 holds and a summer deadweight capacity of 33024 tonnes. (Attachment 6)

The navigation aids and equipment were manufactured by the Japan Radio Company and consisted of two radars (10 & 3cm), an Automatic Radar Plotting Aid (ARPA), direction finder, VHF and MF radio and gyro compass. All equipment was reported to be in satisfactory condition. The ship did not carry a satellite navigator or track plotter. Prescribed wireless telegraphy equipment was carried but communications were normally conducted by telex via satellites on the Inmarsat "A" system.

The vessel had a total crew of 20 under the command of Captain In Hyeon Kim. The ship carried one deck officer and one engineer in excess of the numbers required by "Minimum Safe Manning Certificate", number 4373, issued by the Panamanian authorities for 16, which did not include catering staff.

The Master, Captain Kim, first went to sea in 1982 and was employed directly by the Hanjoo Maritime Co. Ltd. of Pusan. He had served with ships connected with the Sanko Line for all his seagoing career. On 19 December 1990 he was issued with a Panamanian *Transitional Certificate of Competency* as master, issued in Pusan by the Panamanian Consular Office, valid for one year. The Manager of the Marine Section of the Eastern Shipping Company had vetted Captain Kim's suitability for command before confirming his promotion. Captain Kim joined the *Sanko Harvest* in Tampa, Florida; it was his first command. Captain Kim had visited Australia before, but this was his first voyage to Esperance.

The other deck officers were also employed on behalf of the Eastern Shipping Company by Hanjoo Maritime and all held *Transitional Certificates of Competency*, valid for 12 months, issued on behalf of the Panamanian authorities by the Panamanian Consular Office, Pusan. Of the other deck officers, the Chief Officer had served some seven to eight years at sea and joined the *Sanko Harvest* in June 1990. The Second Officer, Mr Dong Ug Gim, first went to sea in 1981 and held a *Transitional Certificate of Competency* as second deck officer, issued on 26 December 1990. He joined the *Sanko Harvest* with the Master on 28 December, in Tampa. Both the Chief and Second Officers had been to Australia on previous voyages, but neither had visited Esperance. The Third Officer had limited seagoing experience and had joined the ship in April 1990, with a *Transitional Certificate of Competence* as 3rd Mate.

*Transitional Certificates of Competency* are issued by the Panamanian authorities in recognition of an equivalent certificate of competency issued by one of 39 countries. Korean Certificates are recognised as equivalent by Panama. The *Transitional* certificate is issued for a period of up to 15 months following a check on the credentials of the applicant. Before the expiry of the designated period the applicant attends an examination in a selected centre and, if successful, a full license is issued. These exams are undertaken by the Bureau Veritas Classification Society, on behalf of the Panamanian Marine Authorities.

The ship held the required international safety certificates and other required documentation, all of which were valid. (Attachment 8)

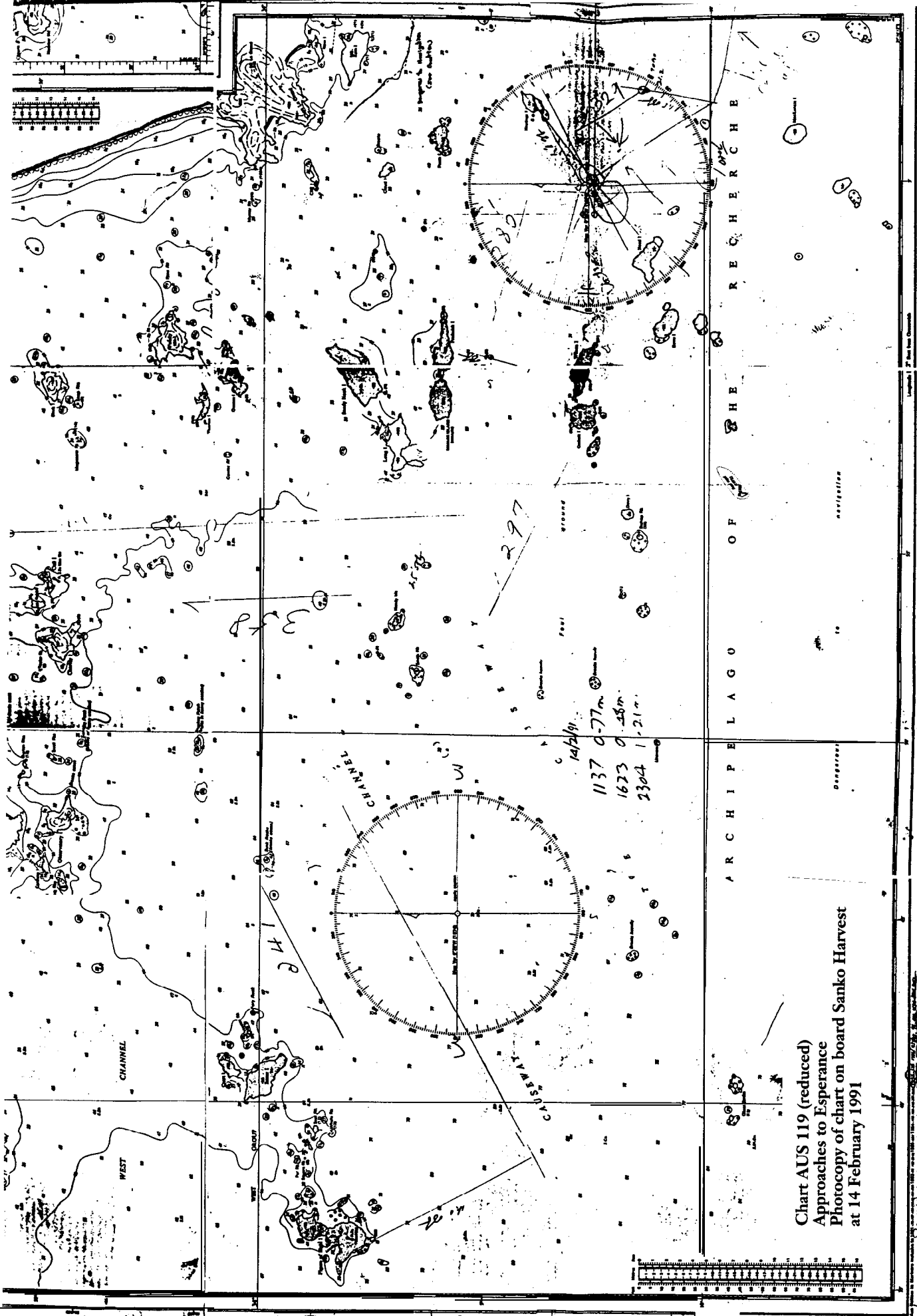


Chart AUS 119 (reduced)  
 Approaches to Esperance  
 Photocopy of chart on board Sanko Harvest  
 at 14 February 1991

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## SEQUENCE OF EVENTS

The *Sanko Harvest* loaded 21993 tonnes of di-ammonium phosphate and 8798 tonnes of triple strength super phosphate in bulk, in the port of Tampa. Di-ammonium phosphate has a stowage factor of 1.2 cu metres per tonne and an angle of repose of 30°. Triple strength super phosphate has a stowage factor of 0.84 cu metres per tonne with an angle of repose of 30°-40°. Both commodities come in granular form and are referred to in Appendix C of the International Maritime Organization Code of Safe Practice for Solid Bulk Cargoes as having no hazardous properties.

The ship sailed from Tampa on 8 January 1991, via the Panama Canal, for three Australian ports, Esperance, Kwinana and Geraldton. The ship arrived in Cristobal, at the eastern end of the Panama Canal in the evening of 12 January and took on 1154 tonnes of heavy bunker C oil. The total quantity of bunker fuel on board sailing Cristobal was 48.23 tonnes of bunker A diesel oil and 1290 tonnes of bunker C. The *Sanko Harvest* cleared the Panama Canal at 2320 (UTC+5) 13 January. The distance to Esperance was approximate 9300 miles with an estimated time of arrival as the morning of 13 February. The voyage to Australia was uneventful. The officers kept the traditional 3 watch system, with the Second Officer keeping the 12 to 4.

The Second Officer was responsible for navigation planning. Before departing from Cristobal he submitted the courses, distances and times for the Master's approval. The Master also stated that he consulted the Volume 1 of the Australian Pilot. Shortly after leaving Cristobal all courses were laid off on the appropriate charts. These charts were checked for outstanding corrections against the British Admiralty Notices to Mariners held on board, which were complete to number 47 issued on 1 December 1990, the most recent notices having been received in Tampa. The Second Officer noted that, amongst other corrections, the last small correction shown on chart Aus 119, Approaches to Esperance, was Aus 543 of 1986. He apparently entered 10 corrections to bring the chart up-to-date, covering the period from January 1987 to 1 December 1990, and recorded the corrections at the bottom left hand corner in accordance with accepted practice. He also recorded the corrections in a separate record of chart corrections.

The voyage followed a route through Cook Strait, New Zealand, via Bank Strait in the southern part of Bass Strait, south of King Island and thence 290° to a position 34° 22' South, 122° 17' East, off Twin Rocks approximately 35 miles south south east of Esperance. The course across the Great Australian Bight to the position off Esperance was drawn on chart Aus 4709 (Southern Ocean-Australia, South Coast) on a scale of 1:3,500,000. The latter part of this course line was transferred to the larger scale British Admiralty (BA) chart 3189 (Attachment 2), for the initial part of the passage through the Recherche Archipelago, and the final approaches to Esperance were drawn on chart Aus 119. (For route through the Archipelago see Attachment 1) Courses for departure Esperance were also shown on Aus 119 and BA 1059 (Attachment 3). The courses were approved by the Master.

On 25 January the Sydney agents, Sanko Sydney, sent a telex to the Master outlining a provisional discharge program based on an estimated time of arrival at Esperance of the afternoon of 13 February. Further details relating to the quantity to be discharged were sent to the ship on 1 February.

On 2 February with the ship's noon position at 41° 58' South 174° 30' East, the estimated time of arrival Esperance was calculated as 1000 13 February 1991. On 5 and 6 February telexes from Sanko Tokyo, confirming the program based on arrival on 13 February, were received by the ship. On 8 February the Master notified the company of an amended estimated time of arrival of 2000 local time 13 February. The following day, with 1315 miles to run from the noon position, this was further amended to the early hours of 14 February.

On 10 and 11 February the *Sanko Harvest* experienced a reduction in average speed, due to head winds which put back the estimated time of arrival to later in the morning of 14 February. On 12 February the Master received two messages, one from Sanko Sydney, the other from the local agents in Esperance, asking the Master to endeavour to arrive in time to commence discharge at 0800. This required arrival at the pilot station not later than 0600.

At noon on 13 February the vessel was in position 35° 17' South, 125° 27' East with 209 miles to run on the planned route to Esperance. Fuel oil bunkers recorded as being on board at the time consisted of 39.7 tonnes of light diesel and 676.57 tonnes of bunker C. The course of 290° was maintained into the Second Officer's watch. At midnight the wind and sea conditions were recorded in the log book as south westerly force five (17-21 knots) with overcast sky and 10 miles visibility. At 0130, with 38.3 miles, to run the Second Officer altered course to 3280 and the planned passage through the Recherche Archipelago commenced, utilising radar distance and bearings.

The Master stated that he went to bed at 2200 on 13 February, leaving instructions that he was to be called at a position marked on the chart 4.5 miles west of Mondrain Island. He was called at the prescribed position shortly before 0300 14 February. He arrived on the bridge shortly after, feeling no undue tiredness or fatigue. The ship proceeded at a reduced speed of 10.5 knots to make the pilot ground at 0530. At 0307 the course was altered to 332° to pass between Hastings and Hood Island. The Master went to the radio room to send a telex to the Harbour Master, Esperance, confirming the ships time of arrival at the pilot ground. As he returned to the bridge the ship grounded in position 34° 07.4' South, 122° 05.1' East, apparently in shoal water not shown on the ship's chart.

The Master sounded the general alarm and mustered the crew. The ship's tanks were sounded and flooding into the forepeak tank, and numbers 1, 2 port, 3 port and 4 port double bottom water ballast tanks was found. The ship was seen to be leaking oil from forward and the crew deployed the limited amount of absorbent material contained on board. The escape of oil also suggested that 3 and possibly 4 port double bottom fuel tanks had also been breached. Captain Kim then telexed his owners and informed them of the grounding.

The vessel grounded on a falling tide, approximately 5.5 hours after predicted high water Esperance and 2.5 hours before the predicted low water at 0600. The ship was travelling on a course of 332° at about 10.5 knots. When the vessel brought up on the reef the heading altered to 343°. The draught at the time of the incident was approximately 10.059 forward and 10.409 metres aft. Based on a daily fuel oil consumption of 20 tonnes per day, there was approximately 36 tonnes of diesel oil, 664 tonnes of fuel oil (with approximately 500 tonnes distributed between numbers 3, 4 and 5 double bottom fuel tanks) (Attachment 5), 38 tonnes of lubricating oil and a small quantity of hydraulic oil remaining onboard.

At 0520 the ship slewed around to starboard and brought upon a heading of 050°, with a 5° list to port.

At 0530 Captain Ian Harrod, Harbour Master, Esperance arrived at the Port Authority offices and noted the telex from the *Sanko Harvest* sent at 0320. Shortly afterwards he received a VHF radio message from the ship informing him that the ship was aground and was leaking oil. The ship's position was approximately 19 miles south south east of Esperance. Captain Harrod informed the Federal Sea Safety Centre, Canberra of the incident, following the procedures of the National Plan to Combat Pollution of the Sea by Oil. Captain Harrod arranged for the Esperance Harbour's oil boom to be loaded on to the harbour tug and then proceeded to the casualty, shortly after 0600.

Captain Harrod arrived on board the *Sanko Harvest* at 0800. He examined the ship's chart in use at the time (AUS 119) and observed that the last small correction noted in the bottom left hand corner was Aus 500. He stated that he told Captain Kim that the chart in use was not the latest edition. The ship's staff then referred to the notices to mariners on board and found Aus notice 577 notifying mariners that a new edition of the chart would be published shortly. Captain Harrod also stated that there was no suggestion that alcohol or drugs were a factor in the grounding.

United Salvage Pty Ltd of Sydney responded to the incident at 0930 14 February and a salvage team was dispatched to Esperance. The Salvage master arrived in Esperance at 1930 and after a meeting with local port administrators was taken to the ship by launch, where he arrived shortly after 2245.

The condition of the ship continued to deteriorate, by noon on 14 February a further five tanks were confirmed to be breached with number 3 port and number 4 port and starboard double bottom fuel tanks flooded and loosing oil to the sea. By the time the Salvage Master arrived a further three tanks had been breached and were flooded including 3 starboard double bottom fuel tank.

Arrangements were made by United Salvage for a Fremantle tug to be placed on stand-by ready for dispatch to Esperance and for pumps, compressors and other equipment to be made available.

During the early hours of 15 February water was detected in the bilges of numbers 2 and 4 holds and by 0650 both holds were flooded and cargo was being lost.

On the morning of the 15 February an underwater inspection was made of the hull. A great deal of buoyancy had been lost and the ship was effectively being prevented from sinking by the reef on which it had grounded (Attachment 6). There was serious doubt as to whether it would be possible to refloat the ship, particularly in view of the worsening sea condition. United Salvage, through its Sydney office notified the ship's owners at 1308:

*"Technically, the vessel was in a sunk condition yesterday with the loss of 4,900 T of ballast tank buoyancy and was only held up by contact with the reef on the port side. . . . , we believe it is only a matter of time before there is a further failure of the hull....."*

The decision to order the tug to sail from Fremantle and bring in salvage equipment was deferred until further appraisals were made by the salvors and ship's owners.

At 1400 the Esperance harbour tug arrived at the vessel with an additional (more substantial) oil pollution boom, dispersant and spray equipment. The Master gave instructions for the ship's lifeboats to be swung out and made ready in case of emergency.

By mid afternoon 15 February, it was apparent that the ship was seriously stressed and shortly after 1500 Captain Kim received a telex from the owners advising him to evacuate the ship before sunset. Arrangements were made through the Harbour Master for two local vessels to evacuate the crew to Esperance. All crew and salvage personnel had left the ship by 1655 hours.

Over 16 February the salvage crew attended the vessel and reported on the deteriorating situation. Aerial inspections were made of the oil pollution threat by Captain Harrod, as on scene co-ordinator, and others of the oil spill response team. Spraying with dispersant was conducted by the Esperance Harbour tug and by helicopter.

During the evening of 17 February a heavy swell developed, estimated to be between 3.5 and 4 metres. During the night, believed to be in the early hours of 18 February, the ship broke up and sank.

## C O M M E N T

The Master and Second Officer appeared open and frank in answering questions at interview. There was no suggestion that either the ship's electronic navigational equipment or its equipment or cargo contributed to the grounding of the *Sanko Harvest*.

The *Sanko Harvest* grounded in an area where it is known that hydrographic surveys are incomplete, on a reef that had been reported in 1988. There are therefore, three fundamental issues:

- (i) Captain Rim's choice of route through the Recherche Archipelago;
- (ii) the reason that the most recent chart was not in use; and,
- (iii) the reason the charts on board (Aus 119, BA 1059, BA 3189) did not show the area of shoal water between Hood and Hastings Island.

### **G e n e r a l**

Chapter V, Regulation 20 of the Annex to the International Convention for the Safety of Life at Sea, 1974, to which Panama is a party, requires that:

*"All ships shall carry adequate up-to-date charts, sailing directions, list of lights, notices to mariners, tide tables and all other nautical publications necessary for the intended voyage. "*

The Master stated that he consulted the relevant sailing directions, the Australian Pilot Volume 1. This gives the following advice to mariners approaching from the east and wishing to proceed through the Archipelago:

*"Passage through the archipelago should not be attempted at late in the afternoon or at night....."*

The Pilot goes on to describe the two routes shown in pecked lines on chart 3189, cautioning that the inner track passes close to *numerous rocks and dangers* and that frequent position fixing is necessary.

Navigational charts are issued by a number of national hydrographic offices and are kept up to date by the weekly issue of small corrections. These corrections maintain the chart in an up-to-date condition until a new edition is published. Inevitably there is some delay between the issue of the weekly editions of small corrections and those weekly editions being available to the ship, either through the mail or from a local agent, and any new urgent or immediate dangers are promulgated by local radio navigation warnings. Australia issues *Australian Notices to Mariners* while the British issue *Admiralty Notices to Mariners*. The *Sanko Harvest* carried mainly British Admiralty Charts and received Admiralty Notices to Mariners on a regular basis. Notices from other hydrographic services are reproduced in the Admiralty Notices as soon as possible after notification.

There are three charts of the Recherche Archipelago on a scale of less than 1:1,000,000:

- (a) BA Chart 1059, Doubtful Island Bay to the Head of the Great Australian Bight, on a scale of 1:1,610,000, published in 1881. The last small correction number issued relevant to this chart was Aus 153 reproduced in Admiralty Notices to Mariners edition 10 of 1990.
- (b) BA Chart 3189, Cape Le Grande to Cape Pasley, on a scale of 1:143,900, published in 1902 with the most recent small correction number also being Aus 153/90. This chart shows two alternative “recommended routes” as described in the Australian Pilot, Volume 1, for the eastern approaches to Esperance, through the Recherche Archipelago.
- (c) Aus 119, Approaches to Esperance, on a scale of 1:75,000, the latest edition being published in September 1990 (Attachment 4). In this edition the area in which the *Sanko Harvest* grounded is enclosed by a pecked line notated unsumeyed and the actual position of the grounding is covered by an inset of Bandy Creek Boat Harbour, which obliterates an area which extends from latitude 34° 15' South (south of MacKenzie Island) to Hope Island 34° 06', South 122° 06' East.

This chart replaced an earlier edition of the chart, published in 1974 (and reprinted on eight occasions in Australia and also reproduced by the British Hydrographer). Its release was notified by Australian notice to mariners number 618 of 1990 (weekly edition 44 of 9 November 1990). The notification that the new Australian edition had been published was reproduced in the British Admiralty Notices to Mariners edition 7 of 23 February 1991, number 547 (3).

Charts BA 1059, BA 3189 and the British Admiralty reproduction of the 1974 edition of Aus 119, printed in 1982, were carried aboard the *Sanko Harvest*. These three charts contained clear warnings in respect of the dangers of navigating the Recherche Archipelago, because of the lack of survey information. Chart Aus 119 carried aboard, showed the cautionary note *Dangerous to Navigation* at the bottom portion of the chart, below the legend *Recherche Archipelago* in black lettering and the area east of the *Causeway* was designated *Foul Ground*.

There was a further warning added to the three charts as small correction 490 of 1986 adding the words *Dangerous to Navigation (see caution)* to the east border of the chart, at 34° 03.5' South in reference to a new legend in the title block:

**“DANGEROUS TO NAVIGATION**  
*The Recherche Archipelago is inadequately surveyed.*  
*Vessels without local knowledge shot& not traverse the area and*  
*passage should not be attempted at night.”*

### **(i) The Choice of Route**

At interview Captain Kim stated that he had consulted the Australian Pilot and realised that the waters off the south coast of Australia are well known for its reefs. Captain Kim also stated that he had noted and understood the warnings on the chart but had not paid them sufficient attention. He and the Second Officer had discussed the proposed route soon after clearing the Panama Canal. The route was selected because the islands in the area provided good radar targets. This statement was supported by the courses, and distances off detailed in note form

on the chart. Neither the Chief nor Third Officers passed any remark or discussed the passage with the Master or Second Officer, or passed any remark on the route chosen.

Although the route through the Recherche Archipelago had been drawn up by the Second Officer, in consultation with the Master, soon after departure from the Panama Canal, Captain Kim stated that he appreciated an alternative approach to Esperance was from the south west by a fairway known as the *Causeway*. He had, he said, not decided which approach to use. He made the decision to use the course originally planned through the Archipelago on 13 February, partly because of the loss of time on passage and the necessity of reaching Esperance to allow the discharge to start at 0800. It was estimated that an approach from the south west would add 60 miles extra distance from the noon position.

From the 13 February noon position, 35° 17' South 125° 27' East, the *Sanko Harvest* had 208 miles to run on the planned course, through the archipelago, giving an estimated time of arrival of approximately 0430 14 February at 12.5 knots. By taking the longer route by way of Causeway there was approximately 253 miles to run, allowing a reasonable clearance of Waterwich reef at the south west extreme of the archipelago, giving an estimated time of arrival at the pilot of 0815. Had the Master decided to approach Esperance by the Causeway before noon 10 February, the extra distance involved would have been even less, in the region of 20 miles. The Inspector also noted, that while he had no reason to doubt that Captain Kim had considered the option of approaching Esperance from the south west, the original intention (as evidenced by the course lines shown on the chart) was to approach the port from the most direct route from the east.

The information given on the charts was adequate to warn mariners of the dangers of the area. The specific warnings on the 1974 edition of chart Aus 119, together with the absence of sounding lines should have indicated, to an experienced mariner with the necessary command of English, that the proposed route was unsafe. Other than the Master none of the officers aboard the *Sanko Harvest* appeared to appreciate this.

The Master's command of English was good, while the Second Officer's was limited. The Inspector is satisfied that the Master's understanding of spoken and written English was more than sufficient to understand the written warnings contained in the various nautical publications. While the Second Officer appeared able to read technical English related to navigation it was not clear that he fully comprehended the information.

At interview the Master appeared to appreciate the absence of soundings in such an area indicated that the area had not been adequately surveyed. The Second Officer however, appeared to consider that the absence of soundings could indicate very deep water.

## **(ii) Chart Edition**

Notification that a new edition of Aus Chart 119, Approaches to Esperance, did not appear in chart correction notices available to the Master of the *Sanko Harvest*. This notification appeared in the Admiralty Notices to Mariners, edition 49 of 15 December 1990, notice Aus 618 (reproduced from the Australian Notices to Mariners, weekly edition 44 of 9 November 1990) bringing to the attention of mariners the availability of the Australian edition of the chart. The availability of the Admiralty reproduction of Aus 119 was not promulgated until 23 February 1991. Therefore the Master would not have known of the existence of the chart and, even if he had received the Australian Weekly Notices before sailing Panama, it is doubtful if this edition of the chart would have been available from chart suppliers in Cristobal

so soon after its publication.

While the 1974 edition differs from the 1990 edition, in that the route selected by the Master through the Recherche Archipelago was not contained within pecked lines denoting the unsurveyed area, it would, if properly corrected, show all the relevant navigational information to show that the area was inadequately surveyed and therefore dangerous to navigation. Charts BA 1059 and 3189 were the most recent editions available. The information given on any one of the charts available, including the absence of soundings on a coastal chart should have deterred the Master from attempting to navigate through the Archipelago.

### **(iii) Chart Corrections**

In weekly edition 20 of the 1988 British Admiralty Notice to Mariners there were two notices affecting the approaches to the Esperance area. Notice Aus 218 established an anchorage in Esperance Bay. Notice Aus 219 was a composite notice in 5 sections affecting the three charts Aus 119, BA 3189 and BA 1059. Section 5 of this notice (Attachment 7) gave the co-ordinates of the underwater rocks on which the *Sanko Harvest* stranded.

The notation of small corrections shown on Chart Aus 119 indicated that the chart was corrected to the most recent notice received on board. However examination of the chart shows that the relevant correction had not, in fact, been made in its entirety.

Charts BA 3189 and BA 1059 also were effected by notice AUS 219, however neither chart had been corrected, the last small correction shown was 490 of 1986. Mr Gim had failed to enter either Aus 506 of 1987 or Aus 219 on chart BA 3189 or Aus 219 on chart BA 1059. Therefore, although the location of the reef in approximate position 34° 07.3' South 122° 04.5' East, had been properly promulgated and the relevant notice was aboard the *Sanko Harvest*, the relevant charts had not been corrected properly.

At interview the Second Officer stated that, when entering corrections on charts, he would not always include corrections that did not affect the safe navigation of the *Sanko Harvest*. He stated that he recalled the correction in question and also acknowledged that this failure contributed to the grounding.

The Inspector noted that the practice aboard ship was not to correct the ship's folio of charts as notices were issued, rather to only bring charts up-to-date when the charts were to be used. The *Sanko Harvest* carried an extensive folio of charts covering a large part of the world's oceans and the problem of keeping the whole range of charts up-to-date is considerable. The method of chart correction used by the ship was acceptable, providing the appropriate corrections were made.

### ***Other Factors***

The Inspector is satisfied that neither the decision to follow the selected route through the Recherche Archipelago nor the conduct of navigation on the morning of 14 February was influenced by drugs or alcohol, and therefore these are not issues in the grounding.

The Master stated that he was well rested, and the officers had followed a routine of watch keeping that should not have exposed them to any undue stress that would result in identifiable fatigue.

It should also be noted that all officers noted the proposed approach to Esperance. However, the plan raised no comment apart from the discussion held between the Master and Second Officer earlier in the voyage.

The certificates of competency held by the officers were appropriate for the vessel and area of operation. The Inspector, however considers that the Master and deck officers demonstrated a general lack of experience, which was reflected in a disturbing lack of appreciation of fundamental principles in the use of charts and of safe navigation.

## CONCLUSION

The Inspector concludes that the grounding of the *Sanko Harvest* was caused by:

1. The lack of appreciation by the Master and Second Officer (and other officers who were aware of the planned approach to Esperance) of the warnings contained on the charts and Australian Sailing Directions, Volume 1.
2. The failure of the Second Officer to properly apply the available corrections to the charts of the area, in particular his failure to enter small correction Aus 2 19 of Admiralty Notices to Mariners, weekly edition 20 of 21 May 1988, which described the geographical location of the shoal water upon which the *Sanko Harvest* grounded;
3. The Master's decision to navigate in an area where acceptable hydrographic surveys were either incomplete or had not been undertaken;

Further:

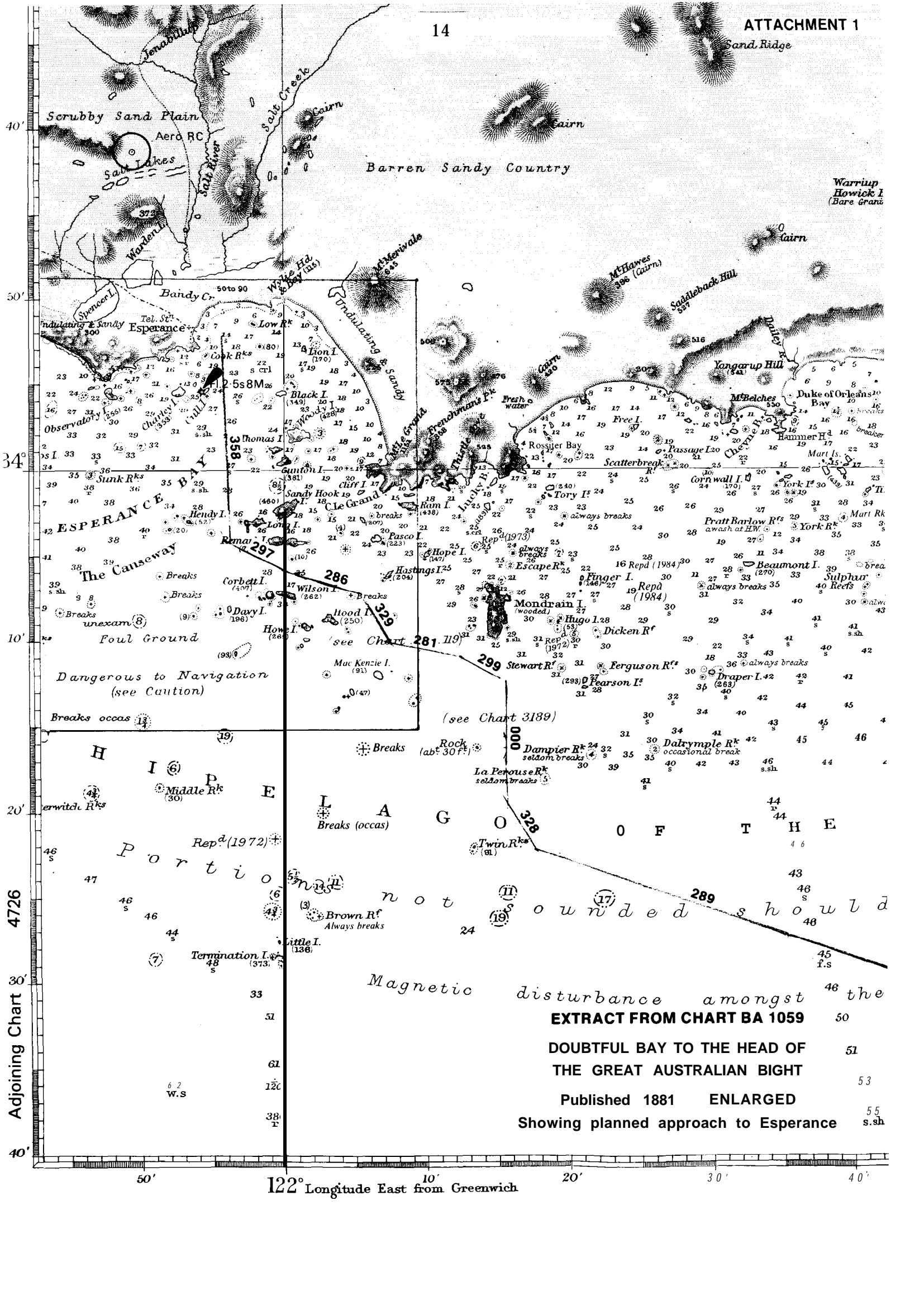
4. The ship had on board the appropriate charts, notices to mariners and other publications to allow safe navigation;
5. Had the charts held on board, particularly Aus 119, BA 3189 and BA 1059, been properly corrected, they would have provided proper and reliable navigational information;
6. The 1990 edition of chart Aus 119 was not available to the Master and hence the outcome of the voyage had the ship been in possession of this edition is not an issue;
7. The grounding was caused by human failure alone. Neither the cargo, nor the mechanical equipment, nor navigational equipment contributed to the incident;
8. Neither the Master nor the Second Officer were in any way under the influence of drugs or alcohol;
9. There is no evidence that fatigue was a contributing factor.

Sand Ridge

Scrubby Sand Plain

Barren Sandy Country

Wariup Howick I (Bare Grass)



Esperance

ESPERANCE BAY

The Causeway

Foul Ground

Dangerous to Navigation (see Caution)

Breaks occas

Portioma not bounded should

Magnetic disturbance amongst the

EXTRACT FROM CHART BA 1059 DOUBTFUL BAY TO THE HEAD OF THE GREAT AUSTRALIAN BIGHT

Published 1881 ENLARGED Showing planned approach to Esperance

122° Longitude East from Greenwich

34° 30' 10' 20' 30' 40'

50' 10' 20' 30' 40'

Total Information

Height above datum of soundings

Average Heights

High Water Mean Higher Mean Lower Mean Lower

Low Water Mean Higher Mean Lower Mean Lower

Mean Higher Mean Lower Mean Lower

Heights at Springs

Mean Higher Mean Lower

Mean Higher Mean Lower

Mean Higher Mean Lower

DANGEROUS TO NAVIGATION The area of the Recherche Archipelago is inadequately surveyed. Vessels without local knowledge should not traverse the area and passage should not be attempted at night.

AUSTRALIA SOUTH COAST

CAPE LE GRAND TO CAPE PAS

WITH PART OF THE ARCHIPELAGO OF THE RECHERCHE

SURVEYED BY COMMANDER J.W.COMBE, R.N.

Assisted by Lieutenants H.W.Holby, R.W.Gilman, C.W.Brown, E.B.Miles, J.D.Nava & M.R.J. Dailey, Boatswain, R.N.

H.M. SURVEYING SHIP 'PENGUIN' 1900

Bearings prior to the 1913 compass and are given from Seaward (true 120° true)

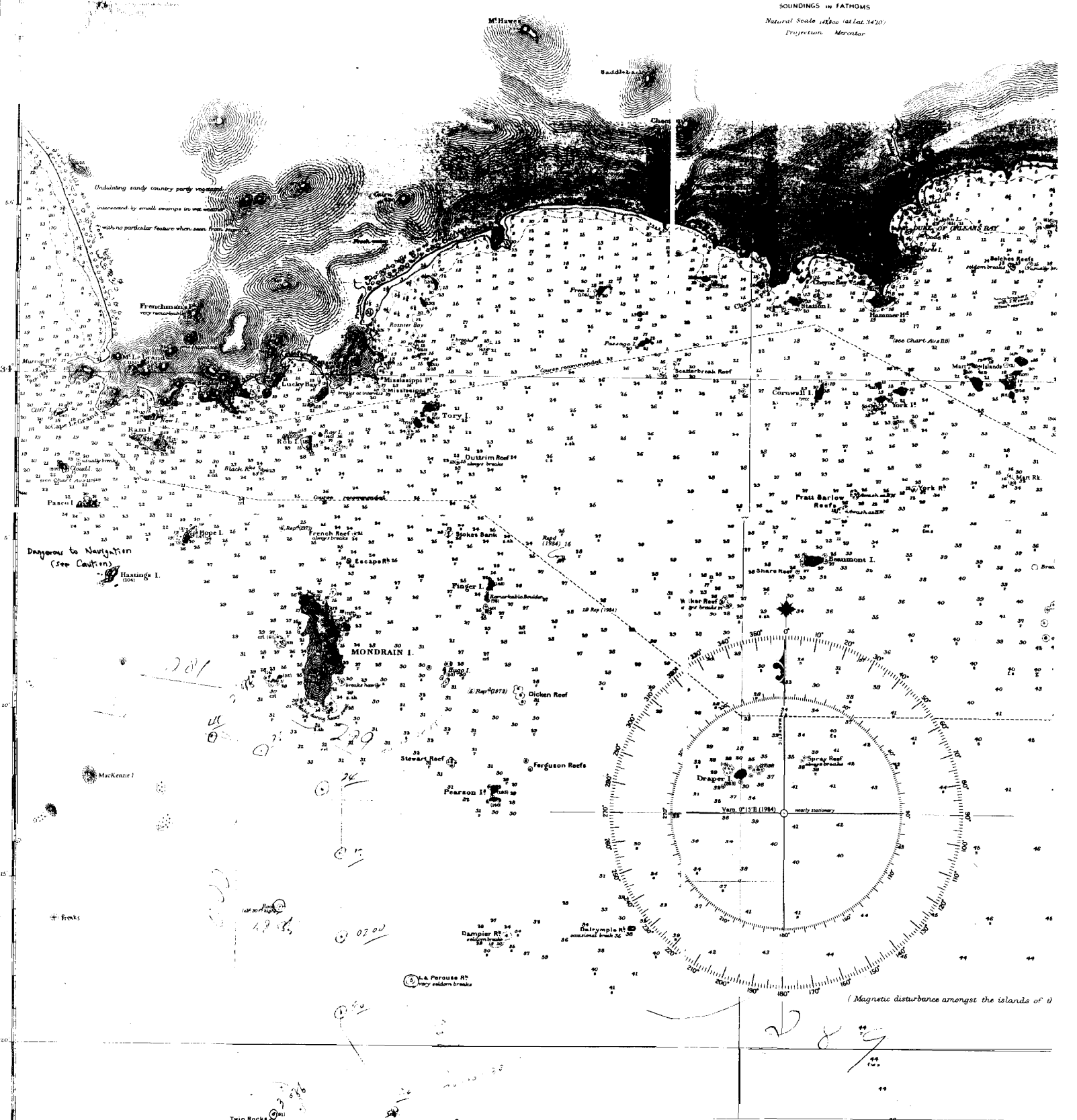
All heights are expressed in feet above High Water Springs

For Abbreviations see Admiralty Chart 5011

SOUNDINGS IN FATHOMS

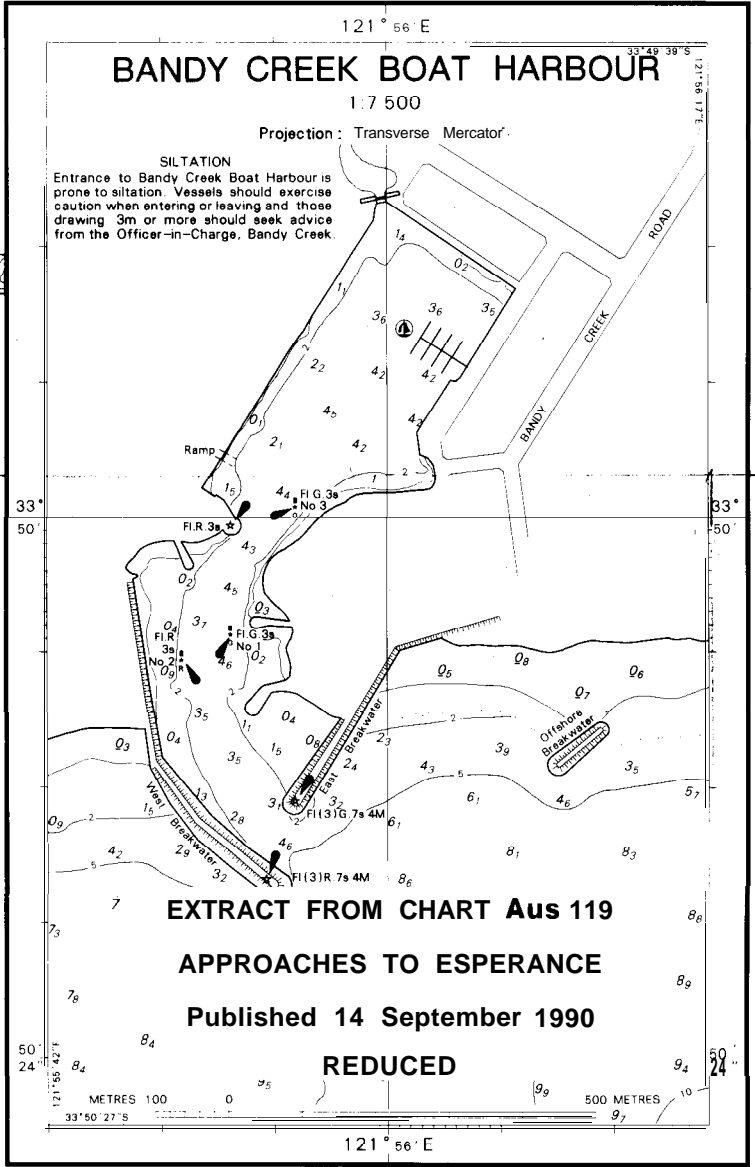
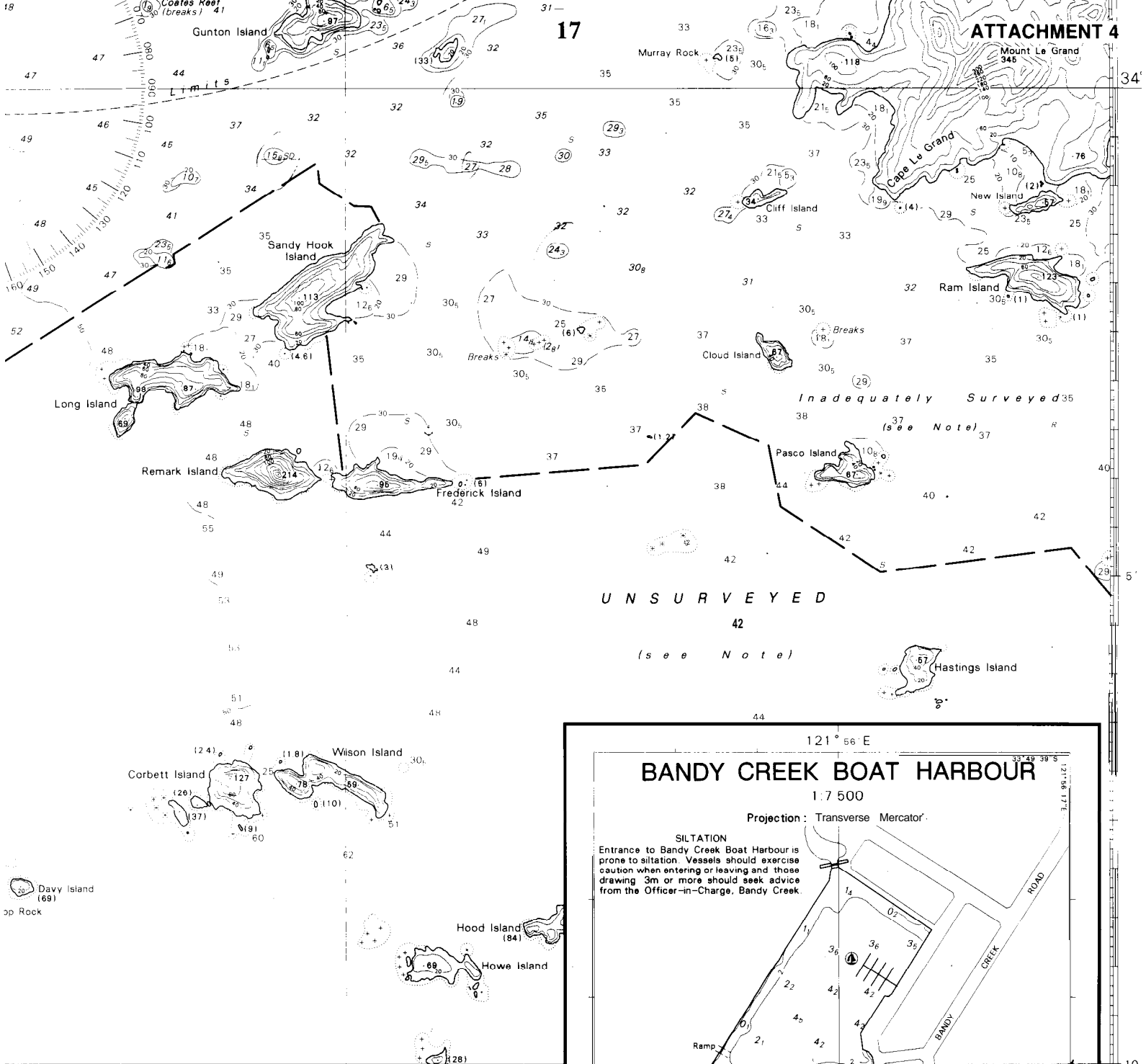
Natural Scale 1:800 (vertical 1:470)

Projection Mercator



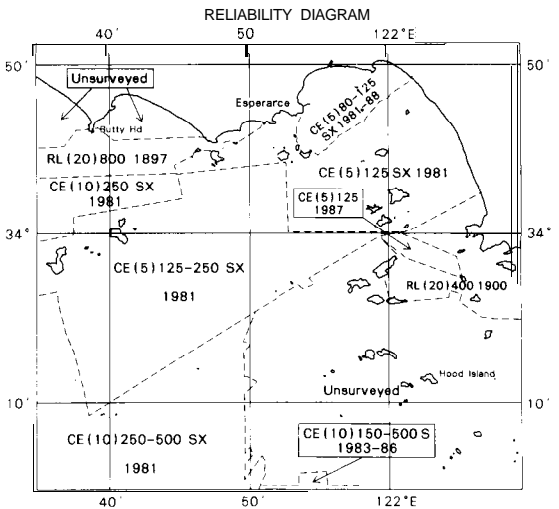
BA 3 189 (reduced) Cape Le Grande to Cape Pasley Copy of chart on board Sanko Harvest at 14 February 1991





E

- SYMBOLS**
- or inadequate survey
  - line
  - sounder
  - findings in decimetres
  - of main lines of soundings
  - in examined
  - W Wire swept



**EXTRACT FROM CHART Aus 119**  
**APPROACHES TO ESPERANCE**  
 Published 14 September 1990  
**REDUCED**





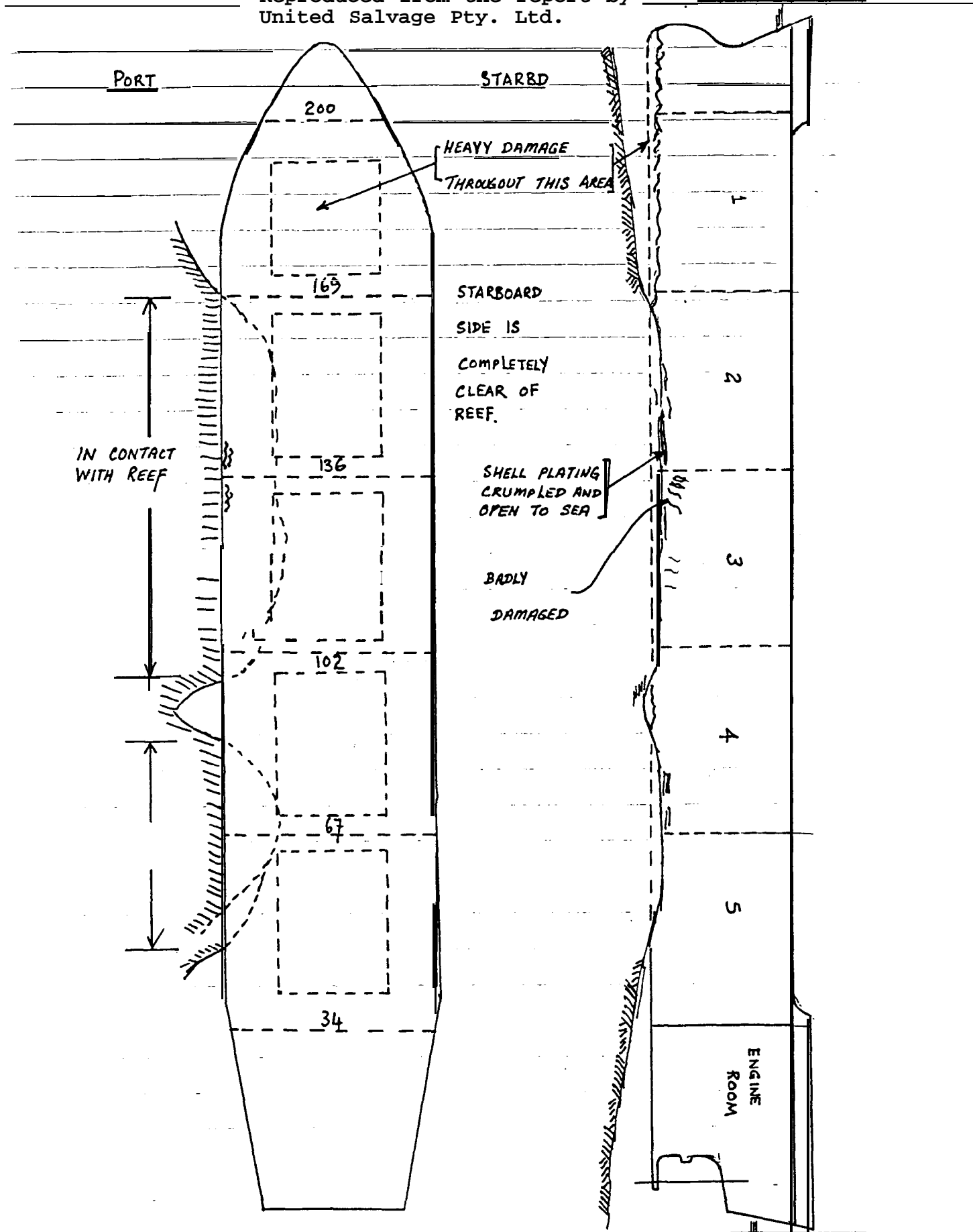
SKETCH DIVERS SURVEY  
15.02.91

NO. ....

"SANKO HARVEST" DIVERS SURVEY 15 FEB 91

Date 15 .02 .91

Reproduced from the report by  
United Salvage Pty. Ltd.



Notices  
1491-1563/88  
Aus 212-224/88.

# ADMIRALTY NOTICES TO MARINERS

## WEEKLY EDITION 20

21 May 1988

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- I** Explanatory Notes. Indexes to Section II
  - II** Admiralty Notices to Mariners. Corrections to Charts
  - III** Reprints of Radio Navigational Warnings
  - IV** Corrections to Admiralty Sailing Directions
  - V** Corrections to Admiralty Lists of Lights and Fog Signals
  - VI** Corrections to Admiralty Lists of Radio Signals
- 

Mariners are requested to inform the Hydrographer of the Navy, Ministry of Defence, Taunton, Somerset TA1 2DN (Telex 46274), immediately of the discovery of new dangers, of changes or defects in aids to navigation and of shortcomings in Admiralty charts or publications. Copies of form H 102, which is a convenient form on which to send in a report, may be obtained *gratis* from any Admiralty Chart Agent or the reproduction at the end of section V of the weekly edition of Notices to Mariners may be used. A copy of the form, which may be used as a *pro forma*, is also printed in The Mariner's Handbook (NP 100).

Taunton

R. O. MORRIS, *Rear-Admiral*.  
*Hydrographer of the Navy.*

## I

## \*219 WESTERN AUSTRALIA — SOUTH COAST — Gunton Island to Hood Island — Shoals.

1. Substitute depth  $15\frac{1}{2}$  m, with legend *SD*, for depth 17 $\frac{1}{2}$  m in approx position 34° 01' 59" S, 121° 59' 11" E.

2. Insert a depth 8 $\frac{1}{2}$  fms, enclosed by contour, in position 33° 01' 00" S, 121° 59' 51" E and delete 21 fms close W.

3. Insert depths, enclosed by contours, in approx positions as follows:

	Depth Metres	Lat S	Long E	Remarks
(a)	19	34° 00'.12	122° 01'.39	Delete depths 36 m close E and 29 m, with legend unexam, close SW
(b)	27	34° 00'.78	122° 01'.54	
(c)	24	34° 01'.66	122° 02'.58	
(d)	30	34° 00'.68	122° 02'.72	
(e)	27	34° 01'.28	122° 04'.67	On HA 3189 depth 5 fms in position 34° 01'.48 S, 122° 04'.97 E and delete depths 20 fms close W & 19 fms close S.

4. Delete depths, with legend unexam, in approx positions as follows:

	Depth Metres	Lat S	Long E
(a)	22	34° w.4	121° 58'.8
(b)	29	34° 01'.3	122° 03'.4

5. Insert underwater rocks, with legend *Breaks*, in positions as follows:

	Lat S	Long E	Remarks
(a)	34° 07'.21	122° 04'.12	On BA 3189 position 34° 07'.41 S, 122° 04'.42 E and BA 1059 position 34° 07'.51 S, 122° 04'.75 E.
(b)	34° 07'.40	122° 04'.75	On BA 3189 position 34° 07'.60 S, 122° 05'.05 E. Enclose 5(a) & (b) by a danger line.

Charts [Last correction] — Aus 119 (1, 3-5) [218/88] — BA 3189 (3c, 5) [499/86] — BA 1059 (2, 5) [506/87].

Australia Pilot Vol 1, 1973 — p. 41.

HMAS *Moresby*.

(AII 68/126)

## \*220 SOUTH AUSTRALIA — SPENCER GULF — Wedge Island — Light altered.

Former Notice — 73 (P)/88 is cancelled.

Amend the light (35° 10'.6 S, 136° 29'.0 E approx) to Fl(2) 15s 206m 17M or Fl(2) 15s 676ft 17M.

Charts [Last correction] — Aus 776 [202/88] — BA 1762 [201/88] — BA 3359 [201/88] — BA 2389 [203/88].

List of Lights Vol K/87 — 1870.

Transport & Communications, ATH 17/88.

(AII 71/78)

(15 April 1988)

**ATTACHMENT 8**  
**SHIP'S PARTICULARS**

Name:	SANKO HARVEST
Registered:	Panama
Owners:	Seawall Shipping Corporation
Managing Agents:	The Eastern Shipping Co. Ltd., Tokyo.
Built:	1985
Builders:	Mitsubishi Heavy Industries Ltd, Shimonoseki, Japan.
Call Sign:	3EVD3
Classification Society :	Nippon Kaiji Kyokai (NK)
Official Number:	14984-85-B
Lloyds Number:	8307521
Tonnage Gross:	19,340
Tonnage Net:	12,311
Tonnage Deadweight:	33024
Length Overall:	174.71 metres
Length Registered:	167.6 metres
Breadth:	27.03 metres
Number of Holds:	5
Depth:	14.8 metres
Draught Summer:	10.63 metres
Engine:	Mitsubishi 6 cylinder diesesl
Engine Power:	5681 kW
Service Speed:	14 knots

**Certificates**

	issued	expires
Registration:	17/5/89	22/7/93
International Tonnage:	26/4/85	
Cargo Ship Safety Equipment:	19/6/89	28/2/91
Safety Construction:	13/7/90	1/6/95
Safety Radio Telegraphy:	9/4/90	28/2/91
Minimum Safe Manning:	3/7/85	