Casualty Investigation Report CA 76

Collision between Isle of Man registered vessel British Vigilance and Bermudan registered vessel Stena King on the 25th March 2002

Isle of Man Government Marine Administration

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Index of Titles

Part 1 - Summary

Part 2 - (i) Details of Ships

(ii) Investigation and Evidence

Part 3 - Sequence of Events

Part 4 - Comments and Analysis

Part 5 - Conclusions

Part 6 - Recommendations

Part 7 - Appendices

Part 8 - Acknowledgements

Part 1

Summary

1.1. On Monday March 25th 2002 the Isle of Man registered ship "British Vigilance" 299,700 tons deadweight was involved in a collision with the Bermudan registered ship "Stena King" 457,927 tons deadweight in a position 25 degrees, 17.3 minutes North, 56 degrees 39.4 minutes East. The incident happened at approximately 0100 hours local time (GMT + 4 hours) some 15.2 miles off the coast of the United Arab Emirates and 17.0 miles east north east of the Port of Fujairah, in 130 metres of water. No injuries were received by the crew of the "British Vigilance". The "British Vigilance" caused no marine oil pollution or environmental damage, nor did the impact of the ships cause an explosion.

1.2. The "British Vigilance" had been proceeding out of an anchorage area off Fujairah in a ballast condition after a de-slopping and gas freeing operation and was on passage to the port of Dubai, UAE for dry docking. The "Stena King" had been proceeding out of an anchorage area off Khwar Fakkan in a fully loaded condition after a bunkering operation and was on passage to St Eustacious in the Caribbean.

1.3. The "British Vigilance" was manoeuvring at about 14.5 knots at the time of impact on a course of approximately 060 degrees. Nearest estimates place the "Stena King" on a course of 125 degrees, and her speed estimated to be 12 knots.

1.4. The "British Vigilance" sustained damage to her port side in way of No. 5 "U" shaped segregated ballast tank, the penetration extending into No. 5 port cargo side tank and No.6 port cargo side tank forward bulkhead. The damage covered an area on the ship's side from frame 150 to 160. The "Stena King" received damage to her hull in way of the fore part, the forecastle area in particular on the starboard side and the starboard windlass area.

1.5. The weather at the time of the incident was fine and clear, light variable airs, sea state calm, the visibility was greater than 10 miles, with a half moon visible.

1.6. The two ships remained connected after the resulting impact. The "British Vigilance" crew mustered at Emergency Stations and put their collision / grounding contingency plan into immediate operation. Contact was made between the "Stena King" and "British Vigilance". The "British Vigilance" informed Fujairah Port Control by VHF about the nature of the collision and confirmed the ship's position. The ships Masters exchanged information details after initial damage assessments. Two tugs were subsequently dispatched from Fujairah to check for any oil pollution and assist with the separation of the ships. After discussions to separate the two ships an agreed plan was put into operation and the two ships were finally separated at 1142 hours on the 25th March 2002. Assessment of the damage sustained by "British Vigilance" was completed by the ship's Classification Society Lloyds Register who allowed her to sail for Dubai, UAE and subsequent dry docking.

Part 2

(i) Details of Ships

2.1. The "British Vigilance" is a 299,700 tons deadweight double hull VLCC crude / product oil tanker fitted with bridge, accommodation and machinery spaces abaft seventeen cargo oil tanks surrounded by nine segregated ballast tanks.

2.2. The ship was built in 1993 at Odense Staalskibsvaerft, Lindo, Denmark for A.P. Moller and originally named as "Emma Maersk. She was delivered on the 6th September 1993 to Maersk and registered at Skovshoved with the Danish International Registry. For classification purposes she was entered with Lloyds Register of Shipping. The ship was bare boat chartered to British Petroleum Shipping Limited for 5 years in May 1997 and subsequently registered in the Isle of Man on the Demise Registry on the 3rd June 1997. BP Shipping Limited are responsible for the technical management of the ship. Their appointed Isle of Man managers are Dorchester Maritime Limited.

2.3 The ship is manned by mainly British Officers, one Australian and one Polish Officer complete the complement, with Philippines ratings. The current Safe Manning Certificate is issued for a total of 16 crew. At the time of the incident there were 24 crew and 6 supernumeraries on board.

Principal Particulars

IMO Number	9002611
Official Number	DR 0037
Call Sign	MWBJ 9
L.O.A.	343.71m
L.B.P.	327.00m
Breadth Moulded	56.40m
Depth Moulded	30.40m
Draught Moulded	21.596m
Freeboard	6.345m
Gross Tonnage	158,475
Nett Tonnage	95,332
Lightship	40,970
Summer Deadweight	299,700
Cargo Tank Capacity	340,813 cu.m. (total 17 cargo tanks)
Segregated Ballast Tanks	110,379 cu.m.

Machinery	Diesel - Mitsubushi 8UEC 75 LS (UMS)	
Power	23,535 kW @ 83 rpm	
Service speed	Loaded 14.5 knots, Ballast 16.0 knots	
Classification	Lloyds Register of Shipping + 100 A1 Oil Tanker (Double Hull) + LMC. UMS. LNC (AA). IGS. SPM. With descriptive notation; "PT-HT", "SBT- PL" COW	
Draft	Forward	6.89m
	Aft	9.47m
	Mean	8.18m
Height of eye	38.66m	
Bridge to Bow	291.90m	

2.4. The "Stena King" is a 457,927 tons deadweight single hull crude oil tanker fitted with bridge, accommodation and machinery spaces abaft 32 cargo oil tanks.

2.5. The ship was built in 1977 / 1978 by the China Shipbuilding Corporation, Kaohsiung, Taiwan as Hull Number 2 and originally named "Burmah Enterprise". She was delivered to her owners on the 1st August 1978. The present registered Owners are Royal Blue Shipping Limited of Bermuda, the operators Stena Bulk AB of Sweden and the managers Northern Marine Management Limited, Clydebank, Scotland, United Kingdom. The ship is presently classed with Det Norske Veritas and registered in Hamilton, Bermuda.

2.6. The ship is manned principally with British Officers and Philippines ratings.

Principal Particulars

IMO Number	7358133
Official Number	379622
Call Sign	VSBW 6
L.O.A.	378.39m
L.B.P.	360.40m
Breadth Moulded	68.05m
Depth Moulded	31.63m
Draught Moulded	25.04m
Freeboard	5.71m
Gross Tonnage	218,593
Nett Tonnage	176,452

Summer Deadweight	457,927
Cargo Tank Capacity	556,221 cu.m (total 32 cargo tanks)
Machinery	Diesel - IHI Steam Turbine
Power	33,097 kW @ 80 rpm
Service Speed	Loaded 14.0 knots
Classification	Det Norske Veritas +100 A1 Single hull oil tanker
Drafts	Forward) Aft) Unknown Mean)
Bridge to Bow	319.60m

Part 2

(ii) Investigation and Evidence

2.7. The basic details of this incident were reported to the Isle of Man Marine Administration almost immediately after the event by the owners British Petroleum.

An investigation officer from the Isle of Man Marine Administration attended as quickly as possible and this report is compiled from the physical evidence on board and from interviews with key personnel.

In line with the IMO Code for the Investigation of Marine Casualties and Incidents, IMO Resolution A 849 (20) the Isle of Man Marine Administration contacted the flag state for the "Stena King" and offered to act as lead investigating state in a combined investigation. The flag state for the "Stena King" were not able to share investigation data and participate in a combined report. This report is compiled on the basis of evidence solely from the "British Vigilance".

A draft version of this report was submitted to the owners, British Petroleum, key personnel on board the "British Vigilance" and the flag state for "Stena King". Comments received from the interested parties have been incorporated where appropriate.

Part 3

Sequence of Events

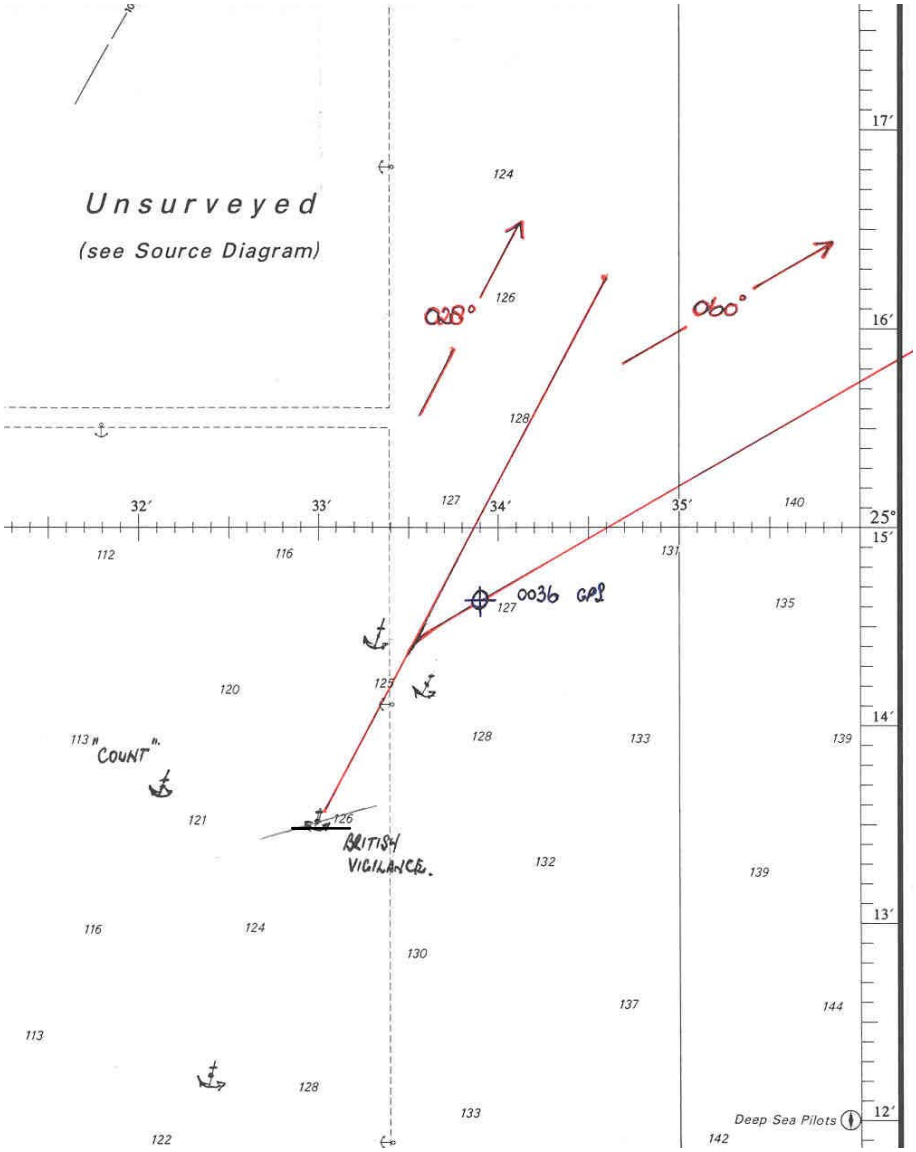
3.1. On the afternoon of the 24th March 2002, the "British Vigilance" arrived off the port of Fujairah, UAE, from Durban, South Africa. The ship intended to carry out the de-slopping, tank washing, purging and gas freeing of No.6 cargo slop tank prior to proceeding onwards to dry dock at Dubai, UAE. The remaining cargo oil tanks had been washed, purged and gas freed on the passage from Durban to Fujairah. The ship anchored with the starboard anchor at 1350 hours local time (GMT + 4 hours) at the eastern edge of Fujairah's (B) anchorage area in a position with the Eastern Jetty at Fujairah bearing 253 degrees, 10.3 miles. The ship was brought up to 10 shackles on deck in 125 metres of water.

3.2. The oil barge "Fair Astro" was made fast port side to alongside the "British Vigilance" at 1500 hours to remove the cargo slops and tank washings. The Chief Officer remained on deck to oversee this operation. Meanwhile anchor watches were kept by the Extra 2nd Officer, 1200 / 1600 hours, 2nd Officer 1600 / 2000 and 3rd Officer 2000 / 2400 hours until the time of departure. As the cargo operation progressed it was estimated the de-slopping would be completed by 2330 hours and this would be the time for heaving the anchor and departure. The Master issued his Night Orders at 1915 hours on the evening of 24th March 2002 prior to retiring. The Master requested to be called 15 minutes prior to commencement of heaving the starboard anchor. During the 2000 / 2400 hours anchor watch the 3rd Officer was kept informed by the Chief Officer as to progress with the de-slopping operation, he in turn kept the engine room Watchkeeping Officer informed. The Chief Officer confirmed to the bridge at 2230 hours the cargo operation would be completed prior to 2330 hours. The 3rd Officer now gave the engine room one hour's notice of departure. The bridge and engine room clocks were synchronised and the telegraph was tested. The 3rd Officer continued with testing the bridge equipment completing the departure checklist at 2250 hours.

3.3. At 2310 hours the cargo hose connection to the oil barge "Fair Astro" was disconnected. The Master was called at 2315 hours and arrived on the bridge at 2325 hours. Meanwhile the 3rd Officer informed Fujairah Port Control on the VHF about commencing heaving the anchor, they in turn requested confirmation of departure when the ship was underway. The weather in the vicinity of the anchorage was fine and clear, light variable airs, the visibility estimated to be in excess of 10 miles. At 2326 hours the main engine was kicked over on air. The 3rd Officer confirmed to the Master all of the equipment had been tested satisfactorily as per the departure checklist.

3.4 At 2330 hours SBE (standby on the engine) and bridge control was ordered on the telegraph, meanwhile the anchor party stood by on the forecastle. At 2336 hours the Master ordered the anchor party to commence weighing the starboard anchor. At 2340 hours the deck party were ordered to let go the slop barge "Fair Astro". At 2342 hours the barge was confirmed all gone and clear. At the same time the Chief Officer reported 9 shackles on deck. The Master's intention had

been to swing the vessel to port and proceed out of the anchorage area clearing the two closest of the four anchored vessels in the vicinity. The "British Vigilance" was lying with the ship's head towards the West. As the anchor continued to be heaved up the ship commenced a swing to starboard. The Master decided to continue with this swing as he thought sufficient room was available to clear the nearest anchored ship, the small tanker "Count".



Section of Admiralty Chart No. 3526 Offshore Anchorages Port of Fujairah.

"British Vigilance's" track from her anchorage position and other known ships anchored in the vicinity.

"British Vigilance" lay at anchor with the ship's head 254 to 272 degrees between 2240 hours and 2336 hours.

3.5. At approximately 2350 hours the extra 2nd Officer arrived in the wheelhouse to take up his 2400 / 0400 hours watch. After a few minutes to adjust his night vision the 3rd Officer commenced handing over the watch to the extra 2nd Officer. Similarly the relieving helmsman arrived and changed watch. At 2353 hours the "British Vigilance" cleared the anchored ship ahead by 7 cables as she swung to starboard at this time 6 shackles were reported on deck. At 0003 hours 25th March 2002 the Chief Officer reported the starboard anchor aweigh, with 3 shackles on deck. The Master ordered the helm hard a starboard. At 0006 hours the first engine movement was ordered, dead slow ahead, 25 rpm. The ship continued its starboard swing to come round onto a heading of 028 degrees. During this time the 3rd Officer had completed his hand over of the watch to the extra 2nd Officer.

3.6. At 0014 hours the helmsman steadied the ship's course at 028 degrees and the engine rpm was increased to slow ahead, 37 rpm. A visual sighting was made of a ship crossing from port to starboard. A minute later (0015) the Chief Officer reported the starboard anchor sighted and clear. Two minutes later (0017) the engine rpm was decreased to dead slow ahead 25 rpm and when a further minute passed (0018) the engine was stopped. This allowed the crossing ship sufficient room to pass close ahead. Part of the crossing ship disappeared from view under the bow as observed from the bridge. The ship was noted to be a small container ship when it cleared the starboard bow.

3.7. At 0019 hours the engine order was given to increase to dead slow ahead 25 rpm and at 0020 hours slow ahead 37 rpm. At 0020 hours the Chief Officer reported both anchors and forecastle area secure. He proceeded aft with the anchoring party down the port side checking on the water driven gas freeing fans and completion of the work at the manifold undertaken by other crew members working on deck. "British Vigilance" maintained her course of 028 degrees and passed between two anchored ships. As she cleared these anchored ships the Master adjusted the ship's course to 030 degrees to run onto waypoint No.2 as intended on the passage plan.

3.8. The Master and OOW were using both radars in relative motion, with a north up display and offset, alternating between the 3 and 6 miles ranges. Occasionally either officer would use a radar to scan up the ranges for long range detection of targets.

3.9. At 0030 hours the Chief Officer reported that he and the deck work party were now clear of the main deck and the deck lights could be switched off.

3.10. Once the 030 degrees course was established the Master scanned up the radar ranges. He observed that a group of vessels were lying on the intended track of 030 degrees approximately 12 miles ahead. He decided to alter course to starboard to a heading of 060 degrees to allow a good clearance of the these ships. The course alteration was executed at 0030 hours. At the same time the Master ordered an increase in the engine's speed to half ahead, 50 rpm. As the ship came round onto 060 degrees, the OOW recorded the vessel's position by GPS noting the time in doing so at 0036 hours.

3.11. At 0040 hours the engine rpm was increased to full ahead 65 rpm. Shortly after this increase the Master observed the green sidelight of a large ship on the port side of the "British Vigilance" at about 5 to 6 points (55 to 66 degrees). The OOW also observed the same green sidelight. No compass bearing was observed of this target. Both Officers estimated the other ship's aspect from the masthead lights and green side light using their binoculars. The Master noticed the wording on the ship's starboard side forward of the accommodation being "Stena Bulk" and the distinctive markings on the hull just aft of the starboard shoulder. The OOW knew the "Stena Queen" and "Stena King" were in the area of Fujairah as they had been heard talking on the VHF during the day while the "British Vigilance" was at anchor.

3.12. The OOW manually acquired the observed ship as a target on the 3cm ARPA radar to commence an automatic plot. No EBL (electronic bearing indicator line) or VRM (variable range marker) data was used on the target to determine initial information. After 3 minutes the ARPA radar displayed information on this target, course, speed, CPA, TCPA, bearing and distance. However, neither the Master or the OOW recollect this information. The other ship appeared to be passing ahead at a very close distance, "less than a mile". As this was determined to be a crossing situation the Master expected the other ship to alter course to starboard as she was the give way ship. Astern and to starboard of the "British Vigilance" there was open water and no other ships had been detected or sighted in the immediate vicinity of the "British Vigilance".

3.13. The 2nd Engineer telephoned the bridge shortly before 0050 hours to request adjustment to the bridge control engine telegraph as the full speed order was lagging behind the ordered 65 rpm. At 0050 hours the Master increased the engine rpm to navigation full ahead 83 rpm, he also telephoned the engine room to inform the 2nd Engineer that full away on passage would be at 0130 hours.

3.14. The Master observed the other ship's bearing to be opening slowly. The method used to determine this observation was the use of a fixed reference point within the wheelhouse. The Master now observed from the radar plot the other ship's distance to be 2 miles, and now some 6 points on the port side. The closeness of the other ship gave the appearance she was just forward of the beam. There appeared to be no attempt by the approaching ship to take action to avoid a close quarters situation. The "British Vigilance" did not use her sound or light signalling apparatus to utilise the recognised signal (5 short blasts), nor was a decision made by the Master to alter the "British Vigilance's" course. The Master decided to go out onto the port bridge wing to observe the situation. The OOW followed him to a point half way out. The Master now thought the other ship was too close and the possibility of a collision existed. He shouted the order "hard to starboard" to the helmsman and an acknowledgement of this order was repeated by the helmsman. The Master now realised the situation was ultimately too late and he ordered the OOW to sound the alarm. As the OOW made his way into the wheelhouse the Master continued to observe the other ship's approach. He thought the other ship was turning to port shortly before the collision. The Master turned and made his way in towards the wheelhouse as the other ship closed on his own ship.

3.15. As the "British Vigilance" attempted to veer away to starboard, the "Stena King" struck her on the port side in the vicinity of No.5 port "U" ballast tank. The impact was thought to have been made at 0100 hours.

3.16. The alarm ordered by the Master was not sounded prior to the collision. The Master now repeated the order to sound the general alarm to the OOW. After initialising the general alarm the OOW also recorded the ship's position from the GPS unit. This position was given as 25 degrees 17.3 minutes North, 56 degrees 39.4 minutes East. The Master came back into the wheelhouse and put the engine telegraph to stop at 0103 hours. With the ship's helm still hard to starboard the impact and joining together of the two ships caused the "British Vigilance" to veer round to port.

3.17. The sound of the general alarm brought the crew to their emergency stations. The ship's emergency contingency plan for a collision was put into immediate operation. At 0110 hours the "British Vigilance" had two fire monitors directed over her port side onto the forecastle of the "Stena King". The "Stena King" made its first VHF contact at this time confirming they were running their engines full astern. At 0115 hours the "British Vigilance" contacted Fujairah Port Control by VHF and informed them of the collision and ship's position.

3.18. At 0117 hours the 2nd Engineer reported to the Master there was no damage in the engine room. Meanwhile the Chief Officer was carrying out an inspection and damage assessment of the main deck, cargo and ballast tanks. At 0120 hours he reported, No. 5 port side cargo tank to be flooding, No.6 port cargo tank to be intact, No.5 centre cargo tank to be intact.

3.19. At 0124 hours further contact was established between the two ships. The "British Vigilance" prepared its life saving appliances on the starboard side. The Master contacted the Duty Officer at British Petroleum Shipping in the United Kingdom and the BP casualty message was sent at 0158 hours. At 0320 hours the "Stena King" requested the "British Vigilance" to remove its water monitors off the forecastle of the "Stena King" to allow an inspection team onto its forecastle. At 0332 hours the water monitors were reinstated. At 0336 hours the "Stena King" reported their main firemain line was cracked and damaged. At 0337 hours the ships respective Masters exchanged details. At 0442 hours the "Stena King" requested the removal of "British Vigilance's" boundary cooling from its water monitors. At 0512 hours the Master of the "Stena King" reported on the damage to his ship, deck, hull and cargo tanks were intact, confirmed a crack in No.1 starboard cargo oil tank, with no leakage sighted, and tank ullages remaining constant.

3.20. At 0542 hours the first of two tugs "Wadi Saham" and " Wadi Safad", and the supply ship "Diva" arrived on scene from Fujairah. They were contracted to assist with the separation of the two ships and monitor the surrounding area for any oil pollution.

3.21. Later that morning after discussions between each of the ship's respective representatives an agreed plan was implemented to separate the ships. At 1142 hours the "British Vigilance" and "Stena King" were parted. The "British Vigilance" manoeuvring ahead and to port to clear the bow of the "Stena King", the position was noted as being 25 degrees 11.9 minutes North, 56 degrees 37.3 minutes East. After assessment of the damage by Lloyds Register the "British Vigilance" was given permission to proceed to Dubai at 1725 hours on the 25th March 2002 for dry docking.

Part 4

Comments and Analysis

4.1. The investigation set out to establish why two well found very large oil tankers with experienced Officers aboard collided in relatively calm weather and good visibility. This Administration's investigation has centred only on the events which happened on board the "British Vigilance". Therefore any actions taken by Officers and crew on board the "Stena King" cannot be verified. The investigation examined the background of events leading to the collision to determine whether there were any factors which might have contributed to the event.

4.2. The Captain has served with British Petroleum Shipping for 4 years, 1 year as Chief Officer and the previous 3 years as Master. He holds a United Kingdom Certificate of Competency issued under the provisions of the International Convention on Standards of Training , Certification and Watchkeeping for Seafarers 1978 as amended 1995, (STCW), under Regulation II/2. There are no applicable limitations applying to his certificate.

4.3. The extra 2nd Officer has served with British Petroleum Shipping for 14 years all of which has been at the rank of 2nd Officer. He holds a United Kingdom Certificate of Competency issued under the provisions of the International Convention on Standards of Training , Certification and Watchkeeping for Seafarers 1978 as amended 1995, (STCW), under Regulation II/2. There are no applicable limitations applying to his certificate for the rank of Officer of the Watch (OOW).

4.4. The helmsman was a Philippines Deck Rating who holds a certificate in accordance with the provisions of the STCW Convention 1978 as amended 1995, under Regulation II/4. He therefore qualifies to undertake the duties of a navigational watch rating.

4.5. The passage plan was prepared by the 2nd Officer. The Master had authorised the plan and the other Watchkeeping Officers signed acknowledgement of their understanding. As the ship was anchored on the eastern edge of anchorage (B) a straight track line course of 030 degrees was plotted from this anchorage to waypoint 2. This course cleared all charted anchorage areas, the restricted anchoring area to the north east of Fujairah and the anchorage areas to the east of Khawr Fakkan. The ship's officers used Admiralty chart number 3521, Approaches to the Port of Fujairah and Khawr Fakkan during the period at anchor. There is a larger scale chart for this area, in particular the offshore anchorage areas, Admiralty chart number 3526 Ports of Khawr Fakkan and Fujairah including the offshore anchorages. This chart does not appear to have been used for navigation during the period at anchor. The chart could have proved significantly useful in acquiring the positions of the surrounding anchored ships prior to departure.

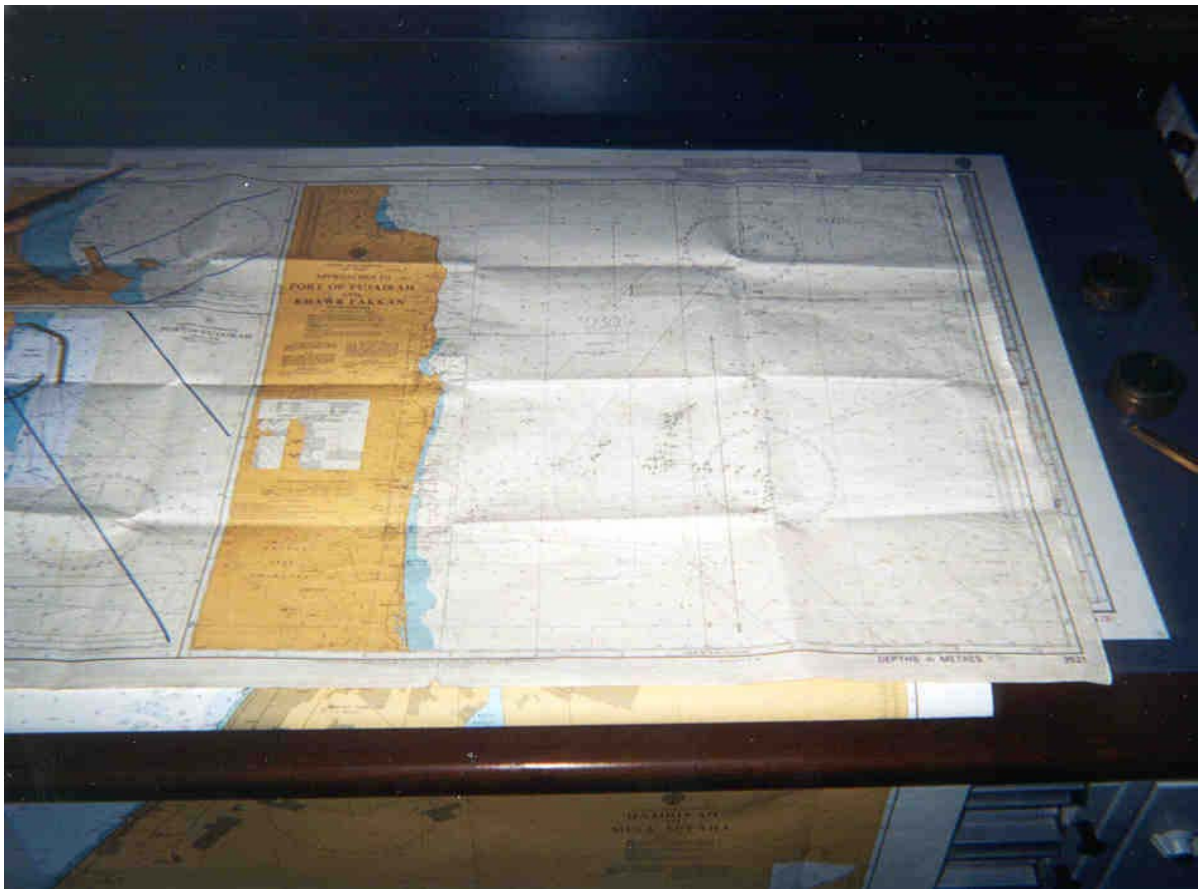
4.6. The 2000 / 2400 Watchkeeping Officer carried out the departure checklist. It should be noted that two items had not been completed in the relevant check boxes. Firstly checking of all gyro repeaters against the main gyros and magnetic compass, and secondly testing of the ship's whistle. The officer concerned has confirmed he did carry out these function tests. The course recorder / rudder angle trace data sheet was found to have the sector pin 180 degrees out of phase. The course recorder was also determined to be reading one and a half degrees high.

This was verified and checked against the ship's heading on the previous voyage (i.e. a trace reading indicated in the south west quadrant was confirmed as being the actual trace reading in the north east quadrant). An examination of navigational equipment maintenance records confirmed there were no other faults reported to bridge equipment.

4.7. The ship is supplied on a regular basis with the Admiralty Notices to Mariners, the last weekly edition recorded on board was No. 8, received at Durban. All chart small corrections were up to date. There were no outstanding navigational warnings for Nav Area 9, Persian Gulf, Red Sea, N. W. Arabian Sea affecting the intended track from Fujairah. There were no Temporary & Preliminary notices affecting the intended track.

The General Standing Orders issued by BP
Section 3 Navigation
3.5. Navigation in coastal waters

When coasting, the largest scale chart of the area available is to be used. Positions are to be obtained at frequent and regular intervals, employing more than one method wherever possible. Caution is to be exercised in acting upon positions obtained in circumstances where only one method of position fixing is available.



Picture No.1

Chart Table situated on Port Bridge Console with Chart No.3521
Approaches to Port of Fujairah and Khawr Fakkan

4.8. The weather in the area was reported to be fine and clear, with variable light airs, visibility in excess of 10 miles, given the ship's draught the height of eye at bridge level was 38.66 metres. This gives a distance of 13.0 miles for the sea horizon at that height of eye. The ship's manoeuvring data for the ballast condition provides for a blind sector distance over the bow of 400 metres, representing 2.15 cables. It should be borne in mind that the ship was in a lighter ballast condition than the data supplied.

4.9. The Master arrived on the bridge at the time the main engine was being "kicked over" on air. The Officer of the Watch confirmed all bridge gear had been tested satisfactorily. Standby and bridge control was ordered at 2330 hours the Master indicated he now took command of the ship from the Officer of the Watch. No record of this has been evidenced in the Deck Log Book contrary to the Additional Standing Orders and Advice issued by the Master and annexed to the BPS Standing Orders. The only other crew member present on the bridge was the helmsman.

4.10. There were at least four other ships anchored in an area close to the "British Vigilance". One to the north west and 8 cables off, one to the south-south west 1.1 miles off, and two others to the north-north east on the eastern edge of anchorage (B). It has not been determined whether any long range radar scanning was adopted to plan a route out of the anchorage to waypoint No.2, or assess the situation for other ships manoeuvring. The Master had intended to swing the ship to port and come round onto 028 degrees. This route clearly offered the greater amount of manoeuvring room with such a large ship. The "British Vigilance" was lying to a heading of approximately 272 degrees at 2336 hours. Once the heaving of the starboard anchor was under way the "British Vigilance" in fact began a swing to starboard. There was sufficient room for the ship to swing clear of the small oil tanker named "Count". The Master re-appraised the situation and continued with this starboard swing as it was much less of a swing to come onto the intended track. There may have been a tidal effect, the Sailing Directions (Pilot Book) gives warning to a diurnal tidal stream flowing 130 degrees / 310 degrees with a maximum rate of 0.6 knots, however, due to the complex nature of the tidal flow in the area tidal streams are difficult to predict.

4.11. At 2350 hours the change of watch relief's arrived for the 2400 / 0400 hours watch. Early detection could have been made of other ships manoeuvring in the area by keeping a proper lookout or use of the radar for long range scanning. At 0003 hours the Chief Officer reported the starboard anchor aweigh. The navigation lights were switched on, however, the deck lights remained on for the forecastle anchor party and the deck working party working at the port manifold. The "British Vigilance's" working lights may well have affected the detection of her navigation lights by other ships.

4.12. The first engine movement dead slow ahead was ordered at 0006 hours, the ship's head was now approximately 325 degrees and therefore clear of the small oil tanker "Count" now lying 7 cables on the port side. It is estimated the ship steadied her course on 028 degrees at 0014 hours when the Master ordered an increase in speed to slow ahead.

Picture No.2

Bridge Centre Console - Depicts position of bridge control telegraph, doppler speed log, echo sounder unit, starboard radar unit -10cm display

4.13. As the “British Vigilance” steadied on a course of 028 degrees a small ship was observed to be crossing ahead from port to starboard. The Master confirms the aspect and apparent speed of this ship indicated it would pass close ahead of the “British Vigilance”. It became obvious to the Master this ship would not be taking avoiding action by altering its course, or avoiding an already close quarters situation. The presence of this ship was not detected prior to weighing anchor or setting the 028 degrees course. The Master took the decision to slow and stop his own ship to allow the other ship to cross ahead of him with sufficient sea room, given the close proximity of two further anchored ships ahead. Engine movements of dead slow ahead ordered at 0017 hours and stop at 0018 hours. The OOW stated the target was acquired on the radar by the use of the automatic radar plotting aid system (ARPA). Evidence would suggest there was an insufficient time span available to draw any accurate data from the radar as to the true course, speed and closest point approach (CPA). It is estimated this small ship passed across the bow less than 2 cables ahead, based on the ship’s draft, height of eye and ballast condition visibility. The accommodation remained visible, however, the first tier of containers and hull superstructure disappeared from view. When the ship was clear to starboard the Master increased the speed to dead slow ahead again at 0019 hours.

4.14. The above-mentioned events in paragraph 4.12. give rise as to whether there were sufficient personnel manning the bridge team. The Master is there to support the bridge team which should comprise the OOW, helmsman and lookout as required. The manning levels of a navigational watch should be reassessed at any time on a passage. Amongst the factors to be taken into account should be the traffic conditions, the nature of the waters in which the ship is navigating and the workload on the bridge. A further contributing factor to the development of this close quarters situation in this scenario may have been the continued use of the ship's deck lights across the whole main deck area while manoeuvring at very slow speed in a congested anchorage area. The navigation lights of the "British Vigilance" may not have been clearly visible to the other ship, it should be noted the navigation sidelights on the "British Vigilance" are positioned on the mast risers situated midships at the manifold area. At the same time, for the safety of personnel it is important to provide effective lighting on deck. There is an unavoidable compromise between masking the navigation lights and safety of personnel. However, it is considered that the "British Vigilance's" control of lighting was reasonable.

4.15. At 0020 hours the Master increased engine speed to slow ahead. The Chief Officer reported that both anchors were secure. The anchor party proceeded aft down the port side, the Chief Officer made some checks on working deck equipment and completion of the work at the manifold. The main deck was cleared of personnel by 0030 hours, when the deck lights were switched off.

4.16. When the "British Vigilance" had passed between the two anchored ships, the Master adjusted the ship's course to 030 degrees to maintain a course track towards waypoint 2. The alteration of course is estimated to have taken place at 0028 hours. The Master was using the radar ranges to scan ahead for other traffic. During one of these scans he observed a group of ships about 12 miles ahead on the intended track of 030 degrees. The ship's speed was increased to half ahead at 0030 hours when the Master confirmed his intention to alter course to 060 degrees to pass clear of this group of ships ahead. This alteration took approximately six minutes to execute, the OOW recorded the ship's position by GPS noting the time of 0036 hours when the ship steadied on her new course of 060 degrees.

4.17. Prior to the course alteration to 060 degrees the "Stena King" must have been about 30 degrees on the bow at around 6 miles. It remains inexplicable that a group of ships dead ahead at about 12 miles were detected and identified while a target moving about 30 degrees to port at 6 miles was not. No explanation for this has been found and there must be doubt as to the effectiveness of both the visual and radar watchkeeping aboard the "British Vigilance".

Picture No.3

Shows GPS unit on Bridge Port Console adjacent to port side ARPA radar unit.

4.18. After steadying on 060 degrees the ship's speed was again increased to full ahead 65 rpm at 0040 hours. A short time interval after this the Master and OOW detected by sight a green sidelight of a large ship about 5 to 6 points to port. Both Officers used their binoculars to make further observations of this ship. The clear weather conditions and visibility, combined with light of a half moon allowed them to identify the approaching ship was a loaded VLCC. The wording "Stena Bulk" was clearly visible on the port hull forward of the accommodation. Similarly the Master confirmed he observed the blue and yellow flash markings just aft of her starboard shoulder. The Master and OOW confirmed they had a conversation on the bridge confirming the existence of two "Stena Bulk" ships in the vicinity of the anchorage areas. This fact was noted from VHF conversations between the two particular Stena ships earlier in the day when they were exchanging information of their respective impending voyage timetables. Both the Master and OOW therefore had some indication as to which ship was approaching.

4.19. At no time was a compass bearing taken of this target. A visual bearing using a fixed reference point from inside the wheelhouse was used individually by both Officers. When assessing the risk of collision it is essential to take a series of compass bearings. The use of relative bearings, for example the lining up of a window stanchion, must not be used to assess the risk. The target ship was acquired manually by the OOW on the ARPA radar. The OOW confirmed the bearing was not altering appreciably, while the Master thought the bearing was opening slowly. The ARPA radar displayed its designated electronic information a few minutes later, giving the target's course, speed, CPA, TCPA, range and bearing. Neither officer has been able to confirm the status of any of the initial displayed information to determine the target's intentions. The nearest information the OOW was able to specify was he thought the target's CPA was initially crossing ahead at "less than 1 mile". This particular vessel did not have a centrally located gyro compass repeater in the wheelhouse, only bridge wing gyro repeaters were available.

This must be considered to amount to a close quarters situation and it is concluded that the bridge team of the “British Vigilance” had sufficient information at about 0045 hours to know that a close quarters situation was in effect.[1]

Picture No. 4

Bridge Port Console - Port side ARPA radar unit used on 3cm display

[1] Reference [1966] 1 Lloyd’s Rep. 440 (EK / Debalzevo)

4.20. There are several factors to consider after this first point of detection and acquiring the initial information from the electronic plot.

Merchant Shipping (Distress Signals and Prevention of Collisions) Regulations 1996

Part B - Steering and Sailing Rules
Section 1. Conduct of vessels in any condition of visibility

Rule 7 : Risk of Collision

(a) Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt such risk shall be deemed to exist.

(b) Proper use shall be made of radar equipment if fitted and operational, including long range scanning to obtain early warning of risk of collision and radar plotting or equivalent systematic observation of detected objects.

(c) assumptions shall not be made on the basis of scanty information, especially scanty radar information.

(d) In determining if risk of collision exists the following considerations shall be among those taken into account;

> *(i) such risk shall be deemed to exist if the compass bearing of an approaching vessel does not appreciably change;*
> *(ii) such risk may sometimes exist even when an appreciable bearing change is evident, particularly when approaching a very large vessel or a tow or when approaching a vessel at close range.*

The Master and OOW initial observations of this target's aspect gave the appearance that the ship was heading in a south easterly direction. The earlier long range scanning by radar failed to identify this approaching ship manoeuvring outwards from another anchorage area. It is evident no detection was made by radar of "Stena King" for upwards of 5 to 6 minutes on the new course of 060 degrees. Similarly even when on the previous courses of 028 and 030 degrees. The target in all probability would not have been more than 6.0 miles distance from the "British Vigilance" at the time of 0036 hours. The Master and OOW have both confirmed the auto acquisition system on the ARPA radar was not switched on because the number of ships in close proximity would have caused;

(i) the system to reach maximum target storage capacity in a short period of time,
(ii) to repeatedly sound the alarm system

Neither were the APRA alarms for collision avoidance switched for similar reasoning. Furthermore both the Master and OOW have confirmed no compass bearings were observed of the approaching ship. They both used a fixed reference point inside the wheelhouse to visually observe a very large approaching target. The OOW observed from his fixed reference point the target's bearing as not appreciably changing, whereas the Master observed that the bearing was

opening. Either way the considerations in determining whether the risk of collision existed were not fully explored, nor did they follow accepted international practices.

The General Standing Orders issued by BP
Section 2, Collision Avoidance,
2.3. Regulations for Preventing Collisions at Sea

Frequent and accurate compass bearings are to be taken of approaching vessels in order to determine at an early stage, whether they represent a collision risk. Where such risk exists, early and positive action is to be taken in accordance with the appropriate Regulation(s) for preventing Collisions at Sea. Officers must always comply precisely with the applicable Regulation(s) remembering that the engines are at their disposal and that they should never hesitate to use them as necessary.

Whenever action is taken in accordance with the Regulations, a check must subsequently be made to ensure that it is having the desired effect. The sound signalling apparatus is to be used as required by the Regulations.

Additional Standing Orders & Advice : Issued by the Master

Collision avoidance : Be aware of the limitations of the ARPA radar equipment and bear in mind the information displayed is dependent on the data it has received. Whenever possible, actions taken to avoid collision using data displayed on the ARPA radar should be cross checked by other means, such as visual bearings.

Do not hesitate to use sound and light signals to inform another vessel of your intentions.

Bridge lookout : A good all round lookout is to be maintained by the rating on this watch and this will not be possible if he remains always within the confines of the wheelhouse. The OOW should ensure that the requirements for keeping a proper lookout are fully complied with.

In this case neither the Master or the OOW carried out a series of proper compass bearings. Neither the Master or OOW have been able to provide factual evidence from the radar as to the target's displayed data. Therefore it is difficult to ascertain with certainty the actions of the approaching ship. Furthermore it is recognised that assumptions should not be made on scanty information and in particular scanty radar information which may be misleading. Accuracy of the radar plot will depend upon the accurate input of own ship's course and / or speed, in this particular case the speed input, during the plotting interval. Inaccurate speed inputs into the radar will reduce the accuracy of the calculated target vectors. A change in the vectors of the target may not be immediately detected. It is highly probable the approaching target was itself increasing to full sea speed having left an anchorage area.

In respect of the radar information displayed, a greater awareness should have made by the Officers of the "British Vigilance's" own increasing speed

Ship's Manoeuvring Data :

Ballast Condition :	*Dead Slow Ahead*	*25 rpm*	*4.0 knots*
	Slow Ahead	*37 rpm*	*6.4 knots*
	Half Ahead	*50 rpm*	*9.1 knots*
	Full Ahead	*65 rpm*	*12.3 knots*
	Full Sea Speed	*83 rpm*	*16.0 knots*

It should be remembered the "British Vigilance" was in a lighter ballast condition than the above data. Therefore the increases in engine speed should be considered to be more efficient therefore producing a greater effect to increasing the speed for each of the above engine settings.

4.21. At 0050 hours the engine speed was increased further to full sea speed 83 rpm. The operation from full ahead to full sea speed is controlled by a computer programme which regulates the increase in speed of the main engine. About the time of this increase two telephone conversations took place between the engine room and bridge. The first concerned the telegraph setting for full ahead originally set at 0040 hours, which the Engineering OOW requested to have reset from the bridge.

The telegraph had not been positioned in the correct notch for full ahead. This was identified by the actual revolutions which were reading 60.5 rpm instead of the ordered 65 rpm.

The correction was necessary to allow for the increase from full ahead to full sea speed and the automatic programme to take over. The second telephone conversation was made by the Master to the Engineering OOW with respect to the estimated time for full away on passage which was confirmed to be at 0130 hours.

4.22. *Merchant Shipping (Distress Signals and Prevention of Collisions) Regulations 1996*

Part B - Steering and Sailing Rules
Section II. Conduct of vessels in sight of one another

Rule 15 : Crossing Situation

When two power driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel.

Rule 16 : Action by give-way vessel

Every vessel which is directed to keep out of the way of another vessel shall, so far as possible, take early and substantial action to keep well clear.

Rule 17 : Action by stand-on vessel

(a) (i) Where one of the two vessels is to keep out of the way the other shall keep her course and speed.

(ii) The latter vessel may, however, take action to avoid collision by her manoeuvre alone, as soon as it becomes apparent to her that the vessel required to keep out of the way is not taking appropriate action in compliance with these Rules.

(b) When, from any cause, the vessel required to keep her course and speed finds herself so close that collision cannot be avoided by the action of the give-way vessel alone, she shall take such action as will best aid to avoid collision.

(c) A power-driven vessel which takes action in a crossing situation in accordance with sub-paragraph (a) (ii) of this Rule to avoid collision with another power-driven vessel shall, if the circumstances of the case admit, not alter course to port for a vessel on her own port side.

(d) This rule does not relieve the give-way vessel of her obligation to keep out of the way.

Rule 34 :

(d) When vessels in sight of one another are approaching each other and from any cause either vessel fails to understand the intentions or actions of the other, or is in doubt whether sufficient action is being taken by the other to avoid collision, the vessel in doubt shall immediately indicate such doubt by giving at least five short and rapid blasts on the whistle. Such signal maybe supplemented by a light signal of at least five short and rapid flashes

The Master had determined that a crossing situation existed between the other ship and his own. The “British Vigilance” was the stand on ship, the other the giving way ship. He fully expected the other ship to alter course to starboard and pass clear around his stern. There was sufficiently clear water to do so, no other targets or ships were sighted or detected to starboard or close astern as the anchorage areas were now some 5 miles astern. He therefore continued on his intended course track of 060 degrees.

The Master states he did observe the other ship’s range at the radar, the plot at this time placed the target at a distance of 2 miles. It has not been correctly verified at what time this took place, however, a reconstruction of the probable plot suggests the target ship was 2 miles away at 0051 hours. Again no further data has been established about the target. This should have been the point at which the Master took some form of action (Rule 17 (b) to avoid the risk of collision. He should have utilised his signalling apparatus with five short and rapid blasts on the ship’s whistle and / or light signalling equipment. Consequently if no immediate action was taken by the other ship, he should have taken such action of his own.

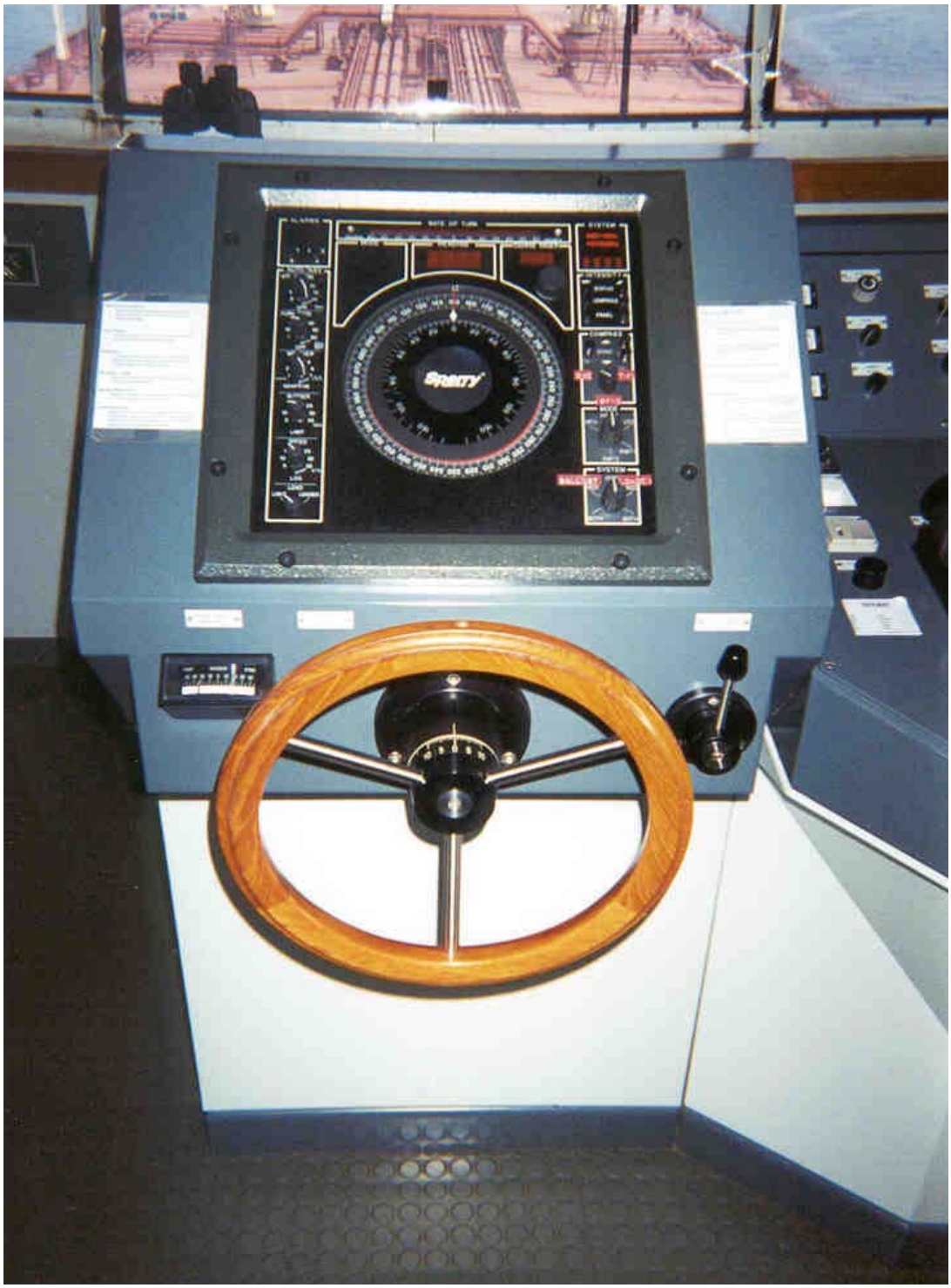
No evidence was established from either officer that they attempted to conduct a trial manoeuvre on the ARPA radar display. This would have shown the effect of an alteration of course away from the approaching ship to avoid the close quarters situation. Furthermore the Master must have known an approaching ship of this size would have trouble in altering her course in a short space of time.

At some stage the Master felt the other ship to be too close. He proceeded out onto the port bridge wing. The Master now appreciated the full realisation of the situation as to how close the other ship was to his own. He determined a collision was inevitable and ordered the OOW who had followed half way out onto the port bridge wing to sound the alarm. There is some confusion as to which alarm was ordered to be sounded. The Master’s intention was the general alarm should be sounded, the OOW thought the order was to sound the 5 short blasts. As the other ship continued too close the Master shouted a helm order “hard to starboard”. The Master recollects just prior to impact the other ship’s aspect changed giving the appearance that she was altering course to port. The Master was making his way back into the wheelhouse when the other ship struck the “British Vigilance”. It is estimated from the ship’s course recorder the “British Vigilance” had veered off approximately 8 degrees to starboard when the collision occurred. The Master estimates the angle of impact to be about 25 degrees abaft his beam. The helmsman confirmed the ship was paying off to starboard, evidenced by the rate of turn indicator on the steering console position showing a steady light beam to starboard. The light beam diminished rapidly to the zero position after impact and became a steady light beam to port indicating a rate of turn to port as the joined ships combined motion took effect. The drag effect caused the “British Vigilance” to veer off to port even with the helm remaining hard to starboard.

Picture No.5

View of Port Bridge Wing from Wheelhouse doorway

The Master made his way into the wheelhouse after the impact. The General Alarm was now sounded by the OOW. The Master then pulled the bridge control telegraph lever to stop. The time recorded for this event was 0103 hours. Given the initial shock of the collision, reaction to the events and his position outside the wheelhouse at impact, the Master must have taken no more than one minute to reach the bridge control telegraph to order the engine stopped. Therefore the collision is estimated to have taken place at approximately 0102 hours and not 0100 hours.



Picture No. 6

View of Steering Console

4.23. The impact of the two ships colliding woke those crew members off duty. The sounding of the general alarm immediately after the impact brought the crew to their respective emergency stations. The ship's emergency contingency planning scenario for a collision and damage was put into operation with immediate effect. The crew should be praised for their efforts in how this operation was conducted. Thereby reducing the possible risk of an explosion from occurring and for preventing any oil pollution. It is considered to be fortunate the "British Vigilance", a double hull oil tanker was not only in a ballast condition but in an almost gas free state with the exception of one cargo tank.

4.24. There is no doubt as to the "British Vigilance" being construed as the stand on ship. What is difficult to understand is why, two such experienced officers would ignore the very basics of sound seamanship practice. Accidents seldom happen as a result of a single event. They are almost always the result of a series of acts or omissions which inevitably lead to confusion and ultimately loss of awareness. The aim therefore should be to adopt practices which minimise the risk of a one man error. As the Master and OOW were together on the bridge it is evident that if two people were to check each other the risk of an error developing should have been significantly reduced.

4.25. To allow such a large target to approach their own ship with the obvious risk of a close quarters situation and inevitable collision confirms evidence of an error chain at work. The Company themselves inform officers in their general standing orders of the warning signs which lead to loss of awareness. They use seven examples to warn officers, several of these could apply in the above case ambiguity, distraction, confusion, improper lookout and breaking of normal rules and regulations.

4.26. None of this relieved the give way ship from its obligation to keep out of the way. The other ship should have taken early and substantial action itself to keep well clear as per Rule 16.

4.27. The actions of the "British Vigilance" as a stand on ship required to maintain her course and speed [Rule 17 (a)(i)] need to be considered in light of the speed increase at 0050 hours, 12 minutes before collision. Rule 15 suggests that the give way ship should avoid crossing ahead. Given the available sea room it is reasonable to assume that the "Stena King's" best manoeuvre in accordance with the Rules was an alteration of course to starboard to cross astern. On the basis that a close quarters situation was in existence at 0050 hours Rule 17 (a) (ii) it allows the stand on ship to take action. On this basis the speed increase was within the Rules. It is concluded that:

- a crossing situation as per Rule 15 was in existence.
- the "Stena King" was the give way ship.
- the "British Vigilance" did not act contrary to Rule 17 (a) (i) by increasing speed.

Part 5

Conclusions

5.1. A number of factors have been highlighted by this investigation. The investigation has centred on the actions of the "British Vigilance" alone and the evidence available to date. The actions of the "Stena King" can not at this stage be verified. Therefore on the basis of the analysis in Part 4 of this report the following conclusions are reached;

(a) A crossing situation was clearly defined within the meaning of the Rules. This established the "British Vigilance" as the stand on ship, the "Stena King" as the give way ship. The Master of the "British Vigilance" however, failed to comply with the following statutory Rules;

(i) Rule 7.(d)(i) & (ii) in determining whether a risk of collision existed.
(ii) Rule 17 (b) action by the stand on ship.

(b) Other facts have been highlighted in this investigation and their contribution should have acted as a warning sign. These facts contributed individually in their own small way;

(i) the composition of the bridge team was depleted by the lack of a proper lookout, the OOW and ultimately the Master should have ensured that the bridge manning level was appropriate for the prevailing traffic conditions and the nature of the waters in which the ship was navigating especially when departing from a congested anchorage.

(ii) the lack of a proper and effective lookout by sight and sound contributed to the fact that early detection of the approaching ship was not made.

(iii) the failure of long range scanning by radar to detect the approaching ship, even though other ships were detected some 12 miles ahead which caused the Master to alter course to the heading of 060 degrees.

(iv) the effect of changes in own ship's speed on the observed movement of the target ship and the hazard of changes in speed in relation to accuracy and direction of the target across the radar display.

(c) It must be concluded from the available evidence the main contributory cause with respect to the "British Vigilance's" participation in the collision was human error. There was sufficient information available to those responsible for the navigation of the ship, which could have prevented this collision.

Part 6

Recommendations

There have been many other reported crossing situation incidents where ships have collided in good visibility. Such collisions continue to happen even with the most sophisticated navigation equipment installed on board. Many accidents continue to happen because of simple mistakes in the lack of use or misuse of navigational equipment and the interpretation of the available information whether electronic or visual.

The following recommendations are made based on the available evidence at this time. It should be remembered the intentions of the "Stena King" have not been verified.

The following recommendations 6.1., 6.2. and 6.3. are directed to British Petroleum and the operation of their ships, however, they should apply to all ships.

6.1. (a) The Master should be censured for the failure in his actions to properly assess and apply the Rules in the observance of good seamanship.

(b) The Master should attend a refresher course in Bridge Team Management.

6.2. (a) The Officer of the Watch should be censured for the failure in his actions to properly assess and apply the Rules in the observance of good seamanship.

(b) The Officer of the Watch should attend a refresher course in Radar Navigation at Management Level.

6.3. The Company are to amend and highlight their General Standing Orders in the following areas;

(a) Section 2, Collision Avoidance 2.1. Lookouts; to reflect the proper and effective use of a lookout at night when manoeuvring in coastal waters.

(b) Section 2, Collision Avoidance 2.3. Regulations for Preventing Collisions at Sea; bring to the attention of all Officers the necessity to take frequent and accurate compass bearings of approaching ships in order to assess whether the risk of a close quarters situation exists.

(c) Section 3, Navigation 3.4. Radar; highlight the advantages and disadvantages of using the radar to assisting in collision avoidance.

(d) Introduce a section highlighting the importance of good bridge team management and the use of proper resources to effectively maintain the bridge team under different navigating and passage conditions.

The following recommendation 6.4. is for the marine industry in general and should not be specifically targeted at the Company.

6.4. This case highlights the need for the introduction of Voyage Data Recording (VDR) equipment to assist in casualty investigations as regulated under SOLAS Chapter V Safety of Navigation. The equipment is regulated to be fitted onto ships on or after the 1st July 2002. This report recommends the fitting of VDR equipment on Isle of Man registered ships at the earliest opportunity should be actively encouraged by the Administration.

Part 7

Appendices

Appendix 1

Picture No.1

Resting position of the “Stena King” embedded in port side of “British Vigilance”

Picture No.2

Depicts bow of “Stena King” embedded in port side of “British Vigilance” in way of No.5 “U” Port Ballast Tank

Picture No.3

Bow of “Stena King viewed from the port bridge wing of “British Vigilance”

Picture No.4

Note the extent of the damage on the forecastle in particular the starboard bow section of the “Stena King” as she is brought clear of the “British Vigilance” giving clear evidence as to the angle of approach at impact.

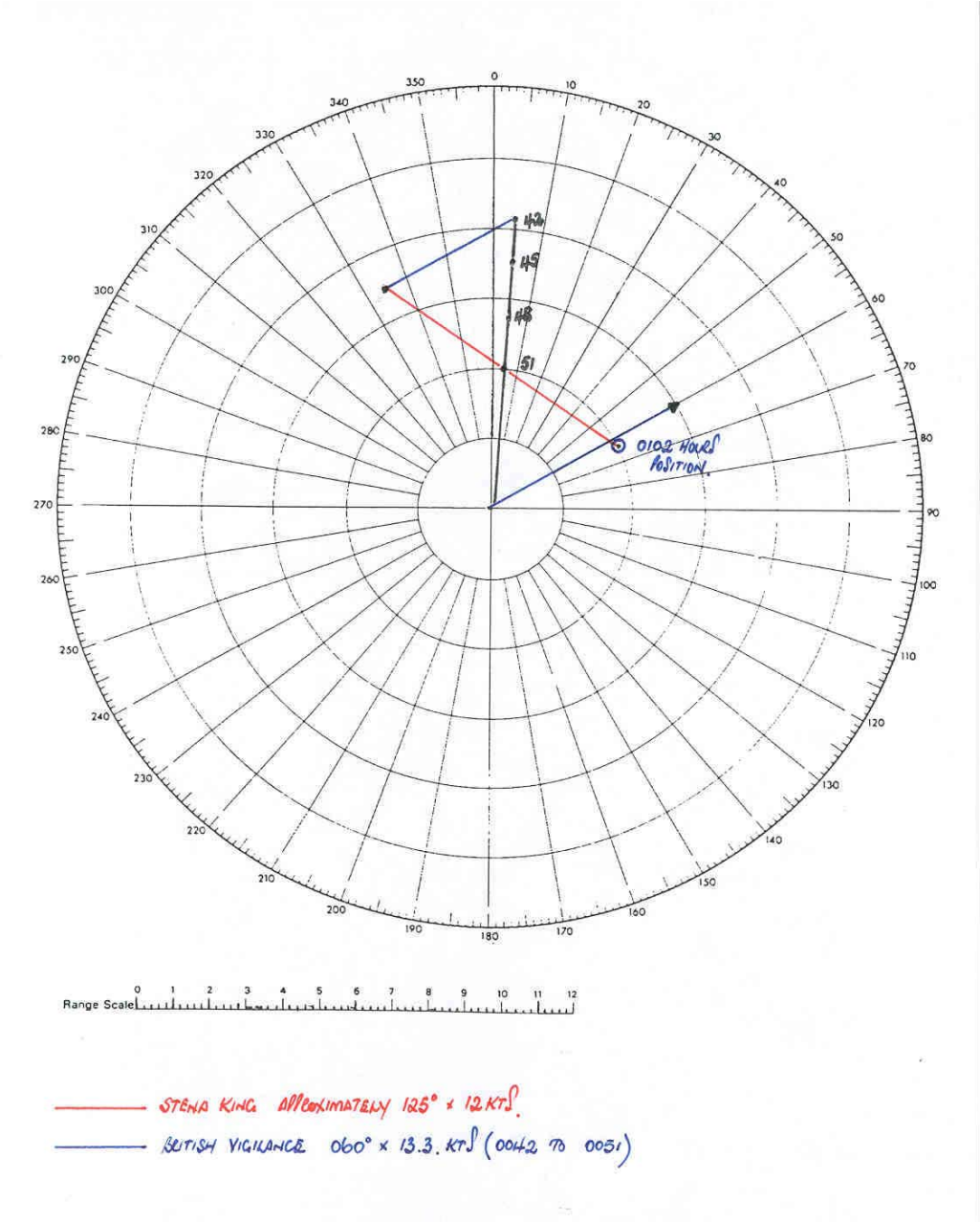
Picture No.5

Note the minimal damage to the port bow section of the “Stena King” compared to Picture No.4 which provides a clear indication as to the angle of impact

Picture No.6

Extent of damage sustained to “British Vigilance” in the area of No.5 “U” Port Ballast Tank, viewed from the probable angle of impact

Appendix II



Plotting Chart

Reconstruction of the most probable plotted course and speed of “Stena King” with the nearest estimated times of a plot from “British Vigilance”

Part 8

Acknowledgements

Master, officers and crew of the “British Vigilance”.

British Petroleum Shipping Limited, United Kingdom.

Admiralty Charts and Publications.