Report on the investigation of the collision between

Gas Monarch and *Whispa*

6 miles ESE of Lowestoft

during the evening of

16 April 2007

Marine Accident Investigation Branch
Carlton House
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Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

MAIB wishes to acknowledge the contribution made to this investigation by the Bahamas Maritime Authority, and to thank it for its co-operation and support.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

3/O	-	Third officer
AB	-	Able Bodied Seaman
AIS	-	Automatic Identification System
ARPA	-	Automatic Radar Plotting Aid
AWB	-	All-Weather Lifeboat
BML	-	Boatmasters' Licence
Cable	-	0.1 nautical mile
CIRM	-	Comité International Radio-Maritime
COG	-	Course Over Ground
COLREGs	-	International Regulations for Preventing Collisions at Sea 1972 as amended
CPA	-	Closest Point of Approach
DSC	-	Digital Selective Calling
EBL	-	Electronic Bearing Lines
EMS	-	Eitzen Maritime Services
GA	-	General Alarm
GMDSS	-	Global Maritime Distress and Safety System
GPS	-	Global Positioning System
GRP	-	Glass Reinforced Plastic
IIMS	-	International Institute of Marine Surveying
IMO	-	International Maritime Organization
ISM	-	International Management Code for the Safe Operation of Ships and for Pollution Prevention
kts	-	knots
kW	-	kilo Watts
LNG	-	Liquefied Natural Gas

LPG	-	Liquefied Petroleum Gas
LRS	-	Lloyd's Register of Shipping
m	-	metre
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MSN	-	Merchant Shipping Notice
nm	-	Nautical miles
OCIMF	-	Oil Companies International Marine Forum
OOW	-	Officer of the Watch
PA	-	Public Address
RYA	-	Royal Yachting Association
SCV	-	Small Commercial Vessel Code
SMS	-	Safety Management System
SOG	-	Speed Over Ground
SOLAS	-	Safety of Life at Sea Convention
STCW	-	Standards of Training, Certification and Watchkeeping for Seafarers
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency
VRM	-	Variable Range Marker

All times are UTC+1 and all courses are true

SYNOPSIS

The Liquefied Petroleum Gas (LPG) carrier, *Gas Monarch,* collided with the sailing yacht, *Whispa*, in dense fog 6 miles ESE of Lowestoft on the evening of 16 April 2007. There were no physical injuries on either vessel. There was no damage to *Gas Monarch* and initial structural damage to *Whispa* was relatively minor. However, the damage to the yacht worsened due to progressive flooding as she was towed to Lowestoft by a lifeboat.

Gas Monarch was proceeding at full speed, in fog, when her master left the bridge in the hands of his third officer (3/O) and an able bodied seaman (AB), contrary to his own standing orders. The 3/O had been on watch for about 1hour 40 minutes when *Whispa* appeared out of the fog on a crossing course at very short range. Evasive action by both craft was unsuccessful and the vessels collided.

Prior to the collision, the 3/O on *Gas Monarch* had detected *Whispa* by radar and had calculated that the contact would pass clear to starboard. *Gas Monarch* lost *Whispa's* radar contact at a distance of just under 3 miles, but carried on at full speed with no sound signals in the dense fog.

Whispa was motoring on her auxiliary engine with her skipper on watch and his crew member resting below. The yacht skipper had detected *Gas Monarch* by radar and monitored the target track close to his radar heading marker, for several miles. *Whispa's* skipper had limited knowledge of his radar's capabilities or limitations; without plotting, calculating a closest point of approach (CPA), or establishing *Gas Monarch's* speed he concluded that the vessels were on a collision course. *Whispa* made a bold alteration to starboard when the vessels were just over a mile apart (and closing at fully 18 knots) but this action, instead of moving *Whispa* clear of *Gas Monarch*, brought the two vessels onto a collision path.

Gas Monarch's bow struck *Whispa's* port transom and rudder, slewing the yacht round to port and pushing her clear, which allowed the vessels to pass without further contact.

The 3/O on *Gas Monarch* was in a state of shock as a result of the incident and did not slow the ship. Hearing *Whispa's* distress call stimulated him into calling the master, who rushed to the bridge, immediately stopped the ship, and identified *Gas Monarch* to the coastguard. *Gas Monarch* stood by *Whispa* until the yacht was taken in tow by the lifeboat.

The MAIB investigation identified a number of contributing factors to the accident, including:

- A failure by both vessels to abide by collision avoidance regulations
- Deteriorated performance and accuracy of both vessels' radars
- Lack of experience by *Gas Monarch's* third officer, compounded by lack of support from the master
- Inappropriate use of radar equipment by both vessels.

As a result of the accident, the managers of *Gas Monarch* have:

- Serviced and replaced magnetrons in both radars
- Implemented bridge team refresher training
- Reviewed and intensified its fleet audit procedures
- Recommended to her owners the replacement of electronic radar plotting aids with Automatic Radar Plotting Aids (ARPA)
- Accelerated S-VDR installation throughout its fleet.

As a result of the accident, *Whispa*'s owner has:

- Installed AIS "B" to improve detection by ships monitoring the system
- Installed a GMDSS DSC VHF radio
- Installed additional bilge pumps and bilge warning alarms.

In addition, the Oil Companies International Marine Forum (OCIMF) has:

- Added a Radar Performance Monitor guidance note to its Vessel Inspection Questionnaires
- Proposed amendments to its Tanker Management Self Assessment tool to reflect that all vessels should be fitted with ARPA as best practice.

Recommendations have been made to the Maritime and Coastguard Agency (MCA) and Comité International Radio-Maritime[1] (CIRM) regarding small commercial vessel training requirements and radar training.

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[1] CIRM is an international association for companies engaged in maritime electronics whose objectives are to promote the application of electronic technology for the safety of life and efficient conduct of vessels at sea.

Figure 1

Gas Monarch

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *GAS MONARCH*, *WHISPA* AND ACCIDENT

Vessel details		***Gas Monarch* (Figure 1)**
Registered owner	:	Stealth Maritime Corporation S.A.
Managers	:	Eitzen Maritime Services (EMS) Singapore
Flag	:	Bahamas
Port of registry	:	Nassau
Crew nationality	:	Filipino
Classification Society	:	Lloyd's Register
Type	:	Liquefied Gas Carrier
Built	:	1997 Japan
Construction	:	Steel
Length overall	:	99m
Gross tonnage	:	4402
Engine power and/or type	:	MAKITA MITSUI MAN B&W 7S26MC 2806kW
Service speed (laden)	:	12 knots (kts)
Draught	:	Forward 4.20m Aft 5.50m

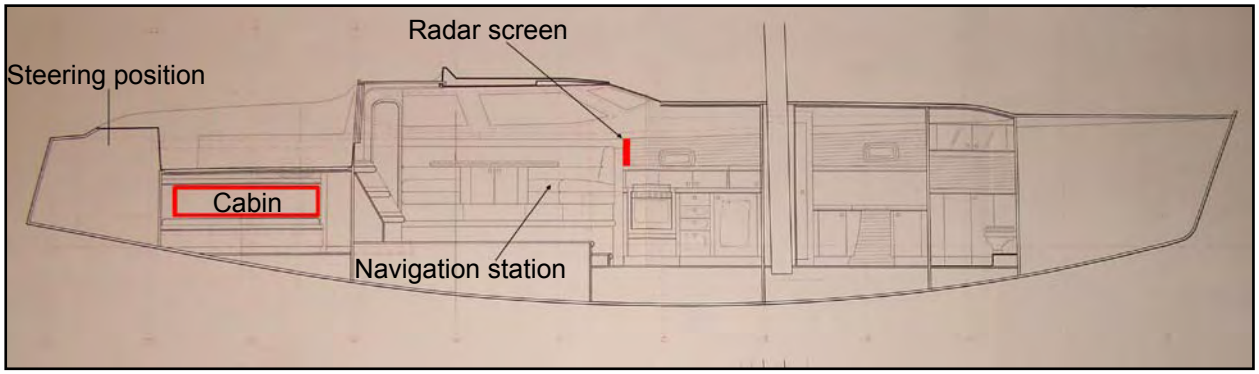
Accident details		
Time and date	:	2139 on 16 April 2007
Location of incident	:	6 miles ESE of Lowestoft, England
Persons on board	:	16
Injuries/fatalities	:	No physical injuries
Damage	:	None

Photograph kindly supplied by original owner

Figure 2

Whispa

Figure 3



GA Profile of *Whispa*

Vessel details

***Whispa* (Figures 2 and 3)**

Registered owner	:	Private
Flag	:	UK
Port of registry	:	Newcastle
Type	:	“Hamble 50” sailing yacht
Built	:	1998, Hamble, UK
Construction	:	Composite of cedar wood planking, epoxy resin and GRP
Length overall	:	15m
Gross tonnage	:	23.2
Engine power and/or type	:	Perkins 48.49kW
Other relevant info	:	Small Commercial Vessel Code, category 2

Accident details

Time and date	:	2139 on 16 April 2007
Location of incident	:	6 miles ESE of Lowestoft, England
Persons on board	:	2
Injuries/fatalities	:	No physical injuries
Damage	:	Structural damage to steering gear, counter and transom. Flood damage to electrical installations, machinery and fittings.

1.2 NARRATIVE

1.2.1 Background

Gas Monarch was owned by Stealth Maritime Corporation S.A., managed by Eitzen Maritime Services (EMS) Singapore and on charter to Statoil ASA.

Whispa was owned by her skipper. At the time of the accident, the yacht was being prepared for a new commercial venture. *Whispa* was so named due to her extremely good sound insulation, which cut out the majority of external noises.

1.2.2 Environmental conditions

- Dark
- Dense fog, visibility between 50 and 150m
- Light northerly wind of about 10kts
- Sea state was slight
- Two days before spring tide; southerly setting tidal stream approximately 2.0kts.

1.2.3 Events leading up to the collision

Figure 4 shows the relative tracks of *Gas Monarch,* reproduced from her Automatic Identification System (AIS), and *Whispa*, reproduced from her Global Positioning System (GPS). Frequent reference will be made to **Figure 4** throughout this report.

Gas Monarch was bound for Porto, Portugal with a cargo 2363 cubic metres (m^3) of propane gas. The vessel had sailed from Immingham on the river Humber, England, at 1418 on 16 April 2007.

When *Gas Monarch* left Immingham, the prevailing visibility was approximately 3 nautical miles(nm), but this had reduced to between 100 and 150m by 2000 hours when the 3/O and an AB lookout/helmsman took over the navigational watch. No fog signals were being sounded when the relieving watch took over and, on querying this, the 3/O was advised by the chief officer not to sound fog signals unless he encountered traffic. The master of *Gas Monarch* came to the bridge several times during the first hour of the 3/O's watch and was aware of the weather conditions and the vessel's navigational status (bridge manning, speed, steering mode and sound signalling) when he went to bed at 2100.

Whispa had left Ramsgate earlier that day and was proceeding northwards towards Whitby, making good approximately 4.5kts into an adverse tidal stream. The yacht was proceeding in autopilot, under power, with no sails up. The skipper, who was on watch, was at the below deck navigation station, while the crew member was resting in the aft starboard cabin. From the below deck navigation station the skipper was able to monitor the vessel's radar display. He went to the cockpit steering position at approximately 10-minute intervals to maintain a visual lookout.

1.2.4 Pre-collision: *Gas Monarch*

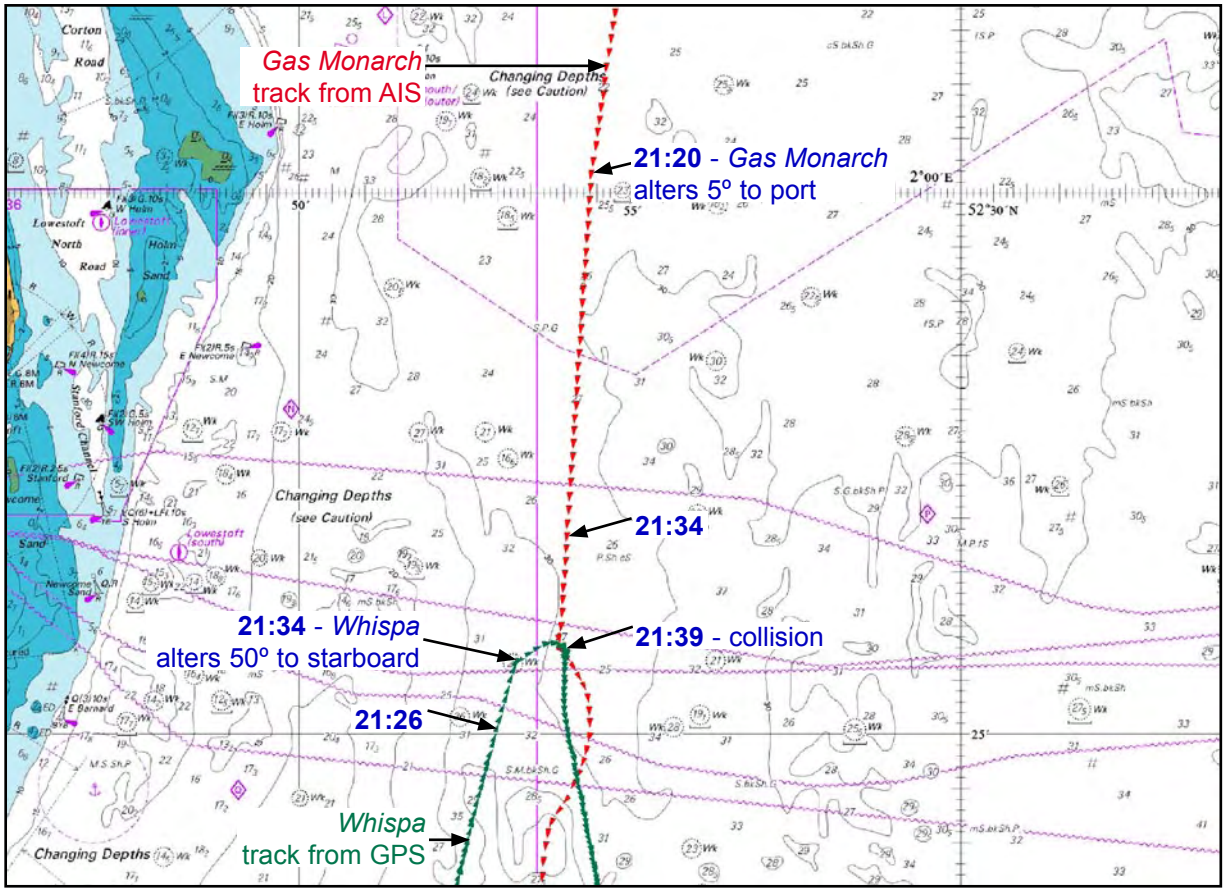
At 2118 *Gas Monarch* was proceeding on autopilot at full sea speed before a 2kt tidal stream, making good about 14.3kts, when *Whispa* was acquired as a radar contact at a range of just over 6 miles. After briefly observing the radar contact for a few minutes, when the radar contact was being displayed ahead of *Gas Monarch* at a distance of

about 5.5 miles **(Figure 4)**, the 3/O altered 5º to port to create a starboard to starboard passing situation. By appraising the contact's radar trails, the 3/O estimated the resulting CPA would be approximately 1nm on *Gas Monarch*'s starboard side. As the vessels closed to 3 miles **(Figure 4)**, the trails of *Whispa*'s radar contact indicated to the 3/O a reduced CPA of 0.7nm to starboard. When the vessels were just less than 3 miles apart, the yacht's radar contact was lost from both radar screens of *Gas Monarch*.

Once the target of *Whispa* had been lost from *Gas Monarch*'s radar screen, the 3/O began to intermittently shine the beam of an Aldis lamp into the surrounding fog, a precaution to warn the approaching vessel in the event the actual CPA was less than predicted. No consideration was given to sounding the vessel's fog horn or reducing her speed.

The 3/O informed his AB that the contact was lost from the radar screens and that he should be vigilant. As *Gas Monarch* closed on *Whispa,* the 3/O continued his routine navigational duties, and some 3 minutes before the collision applied a routine fix of the ship's position to the chart. Soon after this, *Whispa*'s port masthead tricolour light appeared fine on *Gas Monarch*'s starboard bow. The 3/O grabbed the Aldis lamp and shone it on *Whispa* and, at the same time, instructed the AB to place the steering to manual and go hard to starboard, followed by a hard port order once the ship started to swing. The evasive action was unsuccessful and the two vessels collided at 2139.

Figure 4



Relative tracks of *Gas Monarch* (reproduced from AIS) and of *Whispa* (reproduced from GPS)

1.2.5 Pre-collision: *Whispa*

Whispa's skipper first became aware of *Gas Monarch* as an unidentified radar target appearing at the edge of his radar's 6-mile range scale, fine on the port bow. At this stage he believed the range rings being displayed on the radar screen were set at 1-mile intervals. He did not plot the contact, but instead monitored its approach close to the radar screen's heading marker, until it was less than 3 miles away.

Whispa's skipper believed that a collision situation was unfolding, and before the contact entered his radar's alarmed guard zone, which was set at 2.5 miles, altered *Whispa*'s course 50º to starboard by pressing the autopilot 10º course alteration button 5 times in succession **(Figure 5)**. The yacht skipper then reduced the range on the radar to 3nm, which he believed would display range rings at 0.5 mile intervals, and continued to monitor the contact. However, instead of tracking clear down his port side as expected, the contact appeared to still be coming towards the yacht, now from a relative bearing of 50º on the port bow. As the vessels drew closer, *Whispa*'s skipper altered a further 20º to starboard, but still the radar contact continued to close on a steady bearing. The yacht skipper rushed from the navigation station to the cockpit, put the engine on to full ahead, switched off the autopilot and put the yacht on a course 085º. As he stared into the dark, a spotlight was suddenly shone onto the yacht for some 6 to 8 seconds. The light destroyed the skipper's night vision, but as he threw the vessel hard to starboard he was able to identify a bulbous bow bearing down on him shortly before it collided with *Whispa*'s port quarter.

Figure 5

Whispa's control console

1.2.6 Post-collision: *Gas Monarch*

Being unsure if *Gas Monarch* had hit the yacht, the 3/O ran to the port bridge wing, from where he saw *Whispa'*s lights disappear astern. He was in a state of shock at what had just happened, and it was not until he heard *Whispa* transmit a distress call on VHF radio, some 8 minutes after the collision, that he spurred himself into calling the ship's master. The master arrived on the bridge within seconds of being called, whereupon he took control, slowed the ship down and called for the chief engineer to stop the ship; the 3/O was instructed to call out to the crew, using the ship's public address (PA) system, and prepare for possibly rescuing the crew of the yacht. At the first break in *Whispa'*s distress transmission, *Gas Monarch'*s master identified his ship to the coastguard. *Gas Monarch* then stood by *Whispa* as instructed by the coastguard.

Lowestoft lifeboat was tasked by the coastguard to go to *Whispa'*s aid, and while awaiting her arrival *Gas Monarch*'s crew inspected their stem for damage; other than scratches to the paintwork, the ship appeared to be undamaged.

After *Whispa* was taken in tow by the lifeboat, *Gas Monarch* was released by the Coastguard and allowed to continue on her journey to Portugal.

1.2.7 Post-collision: *Whispa*

When *Whispa'*s transom and rudder were struck by the bulbous bow of *Gas Monarch,* the yacht was swung violently to port, which moved her just clear of the ship's bow. *Whispa* then passed down and clear of *Gas Monarch*'s port side by approximately 1m as the ship swung to port and carried on southwards. *Whispa'*s resting crew member was startled by the collision and immediately came on deck in time to see *Gas Monarch'*s stern disappearing into the fog.

It took several minutes for the skipper of *Whispa* to compose himself but, once calm, he and his crew member carried out a check for damage. It was apparent that the rudder stock deck plate **(Figure 6)** was displaced, and on inspecting below deck they discovered that the vessel's lazarette had some 18 inches depth of the water in the space. On putting the vessel's engine into forward gear (the skipper had put the engine in neutral immediately after the collision), it was found that the steering was severely damaged. No other damage was evident below decks, and they were not unduly worried about the yacht sinking because she had a transverse watertight bulkhead forward of the lazarette, thus containing water ingress to that compartment.

*Whispa'*s skipper and crew member discussed their predicament, and about 8 minutes after the initial collision transmitted a distress call on VHF radio, channel 16. This was answered immediately by Yarmouth Coastguard who, in turn, requested the Lowestoft all weather lifeboat (AWB) to attend. Lowestoft AWB arrived on scene at 2241, and passed a towline, which was then rigged with a bridle, to *Whispa'*s stem.

Once under tow, grinding noises were heard coming from *Whispa'*s stern, indicating damage to her rudder, and *Whispa* sheered dramatically to port. This made the tow very difficult. Drogues were then streamed from *Whispa'*s quarter, which helped improve the tow slightly.

About 10 minutes into the tow *Whispa's* crew member went down below to find a substantial amount of water in the aft cabins and main saloon area. This information was conveyed to the lifeboat cox'n who immediately retrieved the towline and went

alongside *Whispa* to assist. Two crewmen from the lifeboat boarded *Whispa* with a portable salvage pump, and after several minutes succeeded in starting and priming the pump. Thereafter it took over an hour to contain the flooding to a level where the tow could be resumed. The flooding had been caused as a result of hot air conduit pipes passing through the watertight lazarette bulkhead becoming sheared by the damaged steering gear during the tow. Once the route of the flooding had been established, *Whispa's* skipper was able to stuff rags into the sheared 4 inch bore pipes **(Figure 7)**. This reduced the flooding significantly.

At 0044 on 17 April, Lowestoft lifeboat resumed the tow, and by 0400 *Whispa* was safely alongside Lowestoft Haven Marina where staff were waiting to lift her from the water. Once clear of the water, the full extent of the collision damage was revealed **(Figures 8, 9 and 10)**.

1.3 *GAS MONARCH*

Gas Monarch was built in Japan in 1997. She was a fully pressurised LPG carrier with a total capacity of 5018m³ of gas in two independent tanks.

Gas Monarch was registered in Nassau, Bahamas, and classed with Lloyd's Register of Shipping (LRS).

Gas Monarch was on charter to Statoil at the time of the accident, and had been trading regularly between Porto, Portugal and Mongstad, Norway, loading and discharging at various North Sea ports between. In the previous months she had been chartered to other oil majors including Shell, ChevronTexaco and BP. All these major oil companies belong to the Oil Companies International Forum (OCIMF) and had duly carried out their own surveys to ensure the vessel met OCIMF's stringent requirements for carrying petrochemicals.

1.3.1 Crewing, watches and procedures

Gas Monarch had a safe manning document for 13 crew, but carried 16 crew members, all of whom were Filipino nationals. Navigational watches were kept by the chief officer, 2/O and 3/O, following a 4 hours on, 8 hours off routine. The master did not take a navigational watch, but was available for important navigational procedures including docking/undocking, heavy traffic situations, restricted visibility and any other time his presence was needed on the bridge. Watches were kept by an OOW and a lookout, with a requirement to call a helmsman to the bridge when on hand-steering.

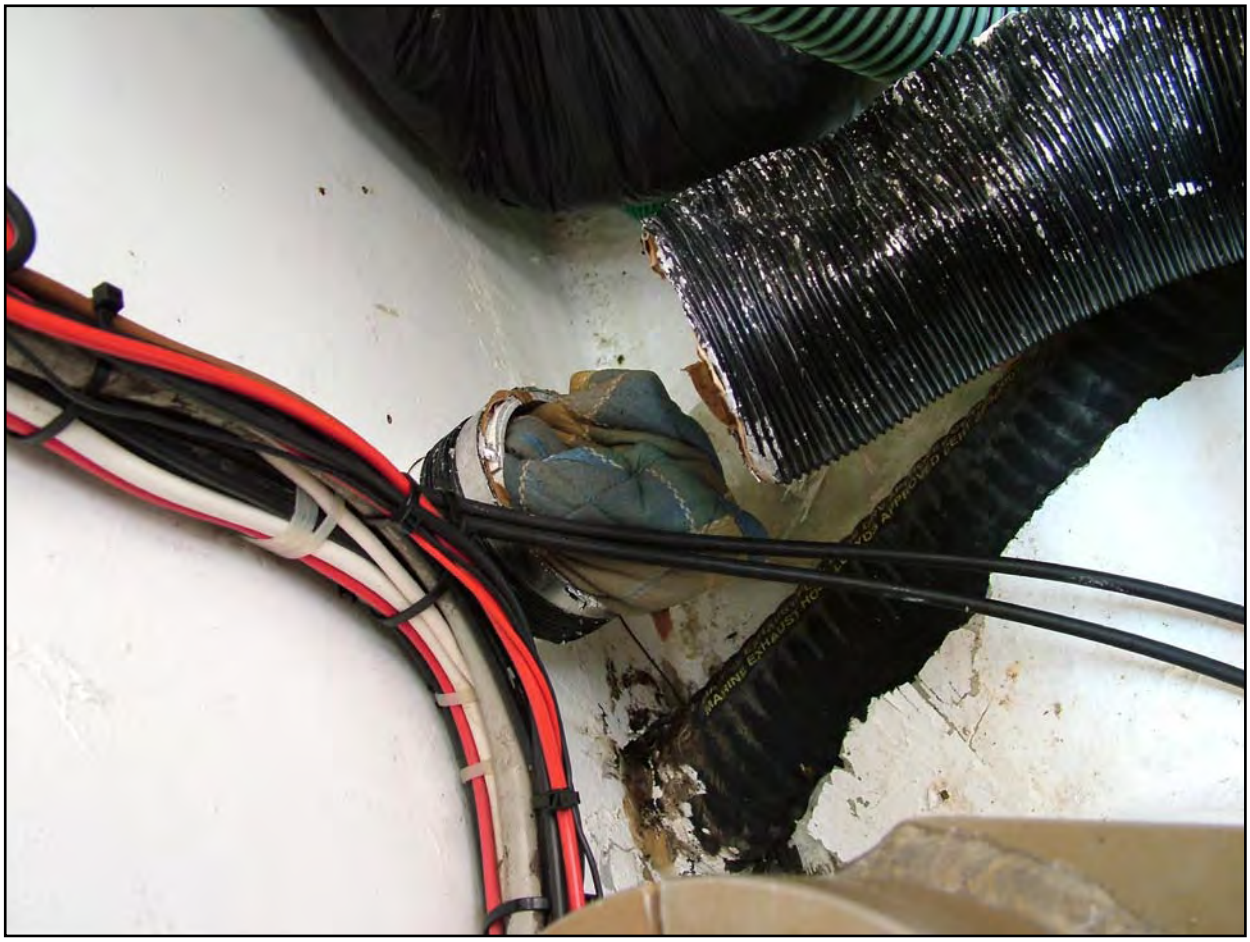
The master had posted his orders in the form of standing orders, individual orders for navigating in restricted visibility and night orders. He had also annotated the night order book, which was signed by himself and all navigating officers **(Annex 1)**.

Included in the master's orders were requirements to reduce speed in restricted visibility, the sounding of fog signals, and calling the master in traffic and at any other time it was felt his presence was required on the bridge. Notwithstanding the comprehensive and specific nature of these orders, when the master left the 3/O and AB on the bridge at 2100, visibility had already deteriorated to about 150m, the ship was proceeding at full sea speed, and no fog signals were being sounded.

Figure 6

Whispa's deck, showing the displaced rudder stock deck plate

Figure 7



Sheared air conduit

Figure 8

Damage to rudder by *Gas Monarch*'s bulbous bow

Figure 9

Damage to hull above rudder

Figure 10

Damage to *Whispa*'s transom and pushpit

1.3.2 Bridge team personnel

The master had sailed on LPG carriers for most of his 20 year career. He joined *Gas Monarch* for the first time 20 days before the accident but had sailed as master of two other LPG carriers for several months before this.

The 3/O had been on the ship for 6 weeks prior to the accident, and this was his first tour as an officer. It was his second time on the vessel, his previous contract being as an AB cadet, prior to his promotion.

The AB had been on the ship for 4 months and was a regular bridge team member.

1.3.3 Safety Management System (SMS)

The managers of *Gas Monarch,* EMS Singapore, held a valid ISM Code Document of Compliance issued by Det Norske Veritas on behalf of the Commonwealth of the Bahamas. The company's SMS covered the operation of bulk carriers, oil tankers, chemical carriers, gas carriers (LPG & LNG) and other cargo ships.

An Internal ISM Audit of *Gas Monarch* was carried out by EMS on 23 July 2006. This revealed one non-conformity relating to an engine room hot work infringement; the ship and other procedures were considered satisfactory, with the non-conformity subsequently addressed and removed. This audit was carried out while the ship was alongside in Gothenburg.

An initial ISM External Audit was carried out on 30 July 2006 by Lloyd's Register of Shipping (LRS). This audit included a meeting with the second officer (2/O) and 3/Os where master's orders, instructions and records were sampled (these were not the same officers as on board at the time of the collision). The audit raised one non-conformity relating to engine blackout and emergency procedures in the personnel and training manual. Corrective action was taken and the certificate duly endorsed on 7 September 2006. Subsequently, during February 2007, LRS issued a Safety Management Certificate for the vessel, valid until 29 July 2011.

In October 2006 the ship had an annual Cargo Ship Safety Equipment Certificate revalidated by LRS in Antwerp. This survey included such items as radar performance.

As well as an ISM approved Ship Operations Manual, which included required navigational procedures in varying circumstances, EMS had displayed on the bridge bulkhead a large comprehensive "Bridge Instructions" poster **(Figure 11)**, signed by both the master and the watch officers.

1.3.4 Recruitment

EMS Singapore acquired its crews through Jebsens Crewing Agency, Manila, a company which was 50% owned by EMS.

Seafarers were recruited through advertising and a formal interview process. As part of the selection process, candidate officers were required to successfully complete vocational competence tests, including navigation, fire-fighting etc. Candidates were required to attain a minimum 60% mark in these vocational competence tests.

Following recruitment, senior officers were given induction training at EMS offices, for up to 3 weeks, during which they received instruction on the company's procedures and requirements. *Gas Monarch*'s master was employed in accordance with this process.

The 3/O and AB had not been through the EMS recruitment process as they were already employed on the ship as cadet and AB when EMS took over the management of the vessel, following which their employment continued. As a cadet/AB, the 3/O had been nominated for promotion by various masters following satisfactory onboard performance and appraisal. On promotion to 3/O, he was given 3 days induction at the EMS office in Manila, with regard to his duties and company procedures.

1.3.5 Radars

Two JRC radars, an X band (JMA7252) and an S band (JMA7303), were fitted adjacent to each other to port of the centre line steering console in the wheelhouse **(Figure 12)**. When the 3/O took over the navigational watch at 2000, both radars were set on the 6-mile range scale with each providing an offset centre, ship's head up, stabilised display such that targets 9 miles ahead or 3 miles abaft the beam of *Gas Monarch* could be acquired. The 3/O occasionally scanned further ahead of the vessel by switching one of the radars to the 12-mile range. Neither radar had an Automatic Radar Plotting Aid (ARPA) capability, but both had facilities to plot contacts electronically. Additionally, other vessel AIS positional information was displayed on the radar screens. *Gas Monarch* was the first ship that the 3/O had sailed on without ARPA; he did not use the electronic plotting facility but preferred to rely on AIS. The 3/O monitored *Whispa*'s screen paint using the Electronic Bearing Lines (EBL) against the contact, and used her trails and variable range marker (VRM) as a means of estimating the vessel's closest point of approach (CPA).

BRIDGE INSTRUCTIONS

The attention of masters and officers is drawn to IMO STCW 1978, as amended in 1995 (STCW convention).
"Operational Guidance for Officers in Charge of a Navigational Watch"

THE MASTER

bears the utmost responsibility for the safety of the vessel

shall ensure that the Officers of the watch are familiar with the navigation and safety equipment before they are given a watch of their own

shall expressly inform the Officer and the others of the watch when he takes over, or hands over, the watch

shall ensure that exact time and ships position of such hand over is recorded in the deck log

shall organize the watchkeeping effectively and in a suitable way for the vessel, and plan the watch to enable all, himself included, to get necessary rest

shall issue written standing and special orders for the watch.

THE OFFICER OF THE WATCH

is not allowed to do anything that can endanger the safety of navigation

shall always comply with the Master's standing and special orders for the watch

shall instruct and inform the watch personnel to ensure safe watchkeeping

shall comply with vessel's check lists

shall during the watch specially check
- gyro and magnetic compasses
- lights and signals to be used

shall immediately call the Master

in accordance with the Master's standing orders

at deterioration of visibility

when movements of other vessels cause concern

in slightest doubt of the vessel's true position

on the breakdown of the engines, steering gear or any essential navigational equipment

in any situation causing any doubt.

LOOKOUT

A proper lookout shall at all times be maintained by sight and hearing and if necessary by radar, in order to detect in good time, risk of collision, grounding or other perils.

The lookout shall be well instructed in his duties.

The lookout shall not be engaged in anything which may impede the look out.

Note that objects can be hard to discover in distracting light from shore.

NAVIGATION

The voyage shall be pre-planned from berth to berth as described in the «Ship Operation Manual» and the company's «Passage Plan».

All available information should be considered eg:
- Charts
- Pilot Books
- Tide Tables
- Weather forecasts
- Night Order Book

Charts and publications should be corrected and well prepared for the planned voyage.

Positions should be taken frequently and always cross checked, if possible, with positions obtained by a different method.

The position of moored navigational buoys, or other floating marks should not be totally relied on.

Check, and double check, all courses laid out on the charts.

Navigational marks and light characteristics must always be positively identified and compared with that shown on the chart.

ANTICOLLISION

Always use radar.

Adjust the speed to the prevailing circumstances and conditions.

Check in good time approaching vessels by repeated observations, if possible with both radar and compass visual bearings.

Give-away vessel shall take early and substantial actions to keep well clear.

The effect of the action shall be carefully checked until the other vessel is finally past and clear.

If give-way vessel does not take proper actions, use sound and light signals, searchlight and/or VHF to call her attention.

If the vessel still does not take proper action: Take avoiding action yourself.

Restricted visibility:
Keep safe speed.
Post a lookout.
Sound fog signals.
Call the Master.
Use all radars.

Determine risks of close-quarter situations by plotting or other systematic observation.

AVOID CLOSE-QUARTERS SITUATIONS when possible.

Do not make manoeuvres based on scanty informations.

If only one radar is used, change range sufficiently frequently to determine echoes both at short and long distances.

If more than one person uses the same radar, report change of range.

RELIEF OF THE WATCH

The relieving watch shall – before taking over – acquaint themselves with the prevailing situation.
The leaving watch shall inform the relieving watch accurately, regarding all circumstances necessary for the safe navigation of the vessel.

The relieving watch shall specially pay attention to:
- other vessels in the vicinity
- own position, course and speed
- effect of squat in regard to water depth, draft, speed, trim and list
- visibility, weather, tide and currents
- prevailing navigational warnings
- standing and special orders.

The relieving watch must adapt their eyes before taking over.

The watch is not to be passed over to anyone who may be presumed to be unable to keep it. In that case the Master shall be called.

ANCHORING

When chosing anchor-site consider draft, bottom conditions, wind, currents and other vessels.

After anchoring the vessel's position shall be carefully fixed and plotted on the chart.

When the vessel is at anchor, the watch shall:
- continuosly check the position
- ensure that proper lights and shapes are shown and at restricted visibility signals are sounded
- maintain a proper lookout
- observe weather, tide and current.

Always bear in mind the risk of own or other vessels dragging anchors. If such risk arises, arrange for the engine to be made ready and call the Master immediately.

PILOT ON BOARD

does not free the officer of the watch of the responsibility for the safety of the vessel.

The officer of the watch shall see to it

that the pilot is well informed about draft, manoeuvrability, vessel data and other things that can affect the safe navigation.(Ref. Pilot Card and Check Lists.)

that positions are frequently plotted on the chart

that the radar is on and properly adjusted and that the range is not changed without the pilot's knowledge

that the pilot's order are correctly understood and carried out.

The officer of the watch should cooperate closely with the pilot. If he is in any doubt as to the pilot's actions or intentions, he should seek clarification from the pilot and, if still in doubt, immediately call the Master and take whatever action is necessary before the Master arrives.

Embarking and disembarking
Make the pilot ladder ready in good time, together with life-buoy, heavingline, man-ropes and appropriate lighting. Embarking and disembarking shall be supervised by an officer who can easily communicate with the Bridge.

Before the pilot leaves, information regarding other vessels' movements, currents, tide and other relevant things shall be obtained from him.

MANOEUVRING

If in doubt – do not hesitate to reduce speed.

The operation of the engine controls and the manual/automatic steering control as well as the manoeuvrability of the vessel shall be familiar to the Officers.

Stop distance and turning characteristics shall be posted on the Bridge.

In narrow waters the anchors shall be ready for immediate use.

At restricted visibility and in other difficult situations manual steering should be used if this facilitates the Officer's work and increases the safety.

Make sure that the helmsman is familiar with the steering controls, the meaning of rudder orders and that he is able to steer well.

Instructions for operation of the steering controls, as well as instructions for operation of the emergency steering, shall be posted on the Bridge.

When altering course, a special helmalteration and/or the new compass course shall be ordered for example

«Starboard ten»
«Port twenty to course 085» (three figures)
«Starboard to course 351» (three figures)
«Wheel amidships» means rudder 0 degrees
«Starboard/port hard over» means maximum rudder
«Steady up as she goes» means that the course when the order is given should be steered.

Check immediately that the order is correctly executed.

Use the manoeuvre- and warning-signals of the Collision Regulations.

ANTI-POLLUTION AND ENVIRONMENTAL PROTECTION

Masters and ships officers must ensure that the vessel complies with all the appropriate Pollution and environmental protection regulations, in particular the Marpol Convention.

A copy of the vessels Shipboard Oil Pollution Emergency Plan (SOPEP) shall be available on the bridge at all times.

EMS Ship Management

Bridge instructions from *Gas Monarch*

Figure 12

Gas Monarch's radars

Resulting from its own investigation, EMS requested ship's staff to conduct radar performance tests. These were carried out using the method advised in the radar operations manual **(Annex 2)**. These tests revealed that neither radar was achieving 50% of optimum attenuation. On 10 May 2007, the vessel was attended by service technicians in the port of Antwerp, where it was established the magnetron on each radar had deteriorated to well below optimum capability. It was also found that the radar scanner bearings on the X band radar were worn to the extent that they were allowing vertical play of 2cm in the antenna.

1.4 *WHISPA*

Whispa was built by Hamble Yacht Services in 1998. She was 15m in length and marketed as a "Hamble 50". She was a "one off" craft of great strength, with a composite material hull. The hull was crafted of 40mm x 20mm cedar planking, coated in epoxy resin externally, and covered over internally in glass reinforced plastic (GRP). Unusually, the yacht was fitted with transverse watertight bulkheads fore and aft, which added to her strength and rigidity. She had a wing keel and an aluminium mast, just under 20m in height, with a radar reflector set on a halyard just below the mast cross tree.

The yacht was designed for ease of operation and racing efficiency. She was fitted with port and starboard steering wheels and electrically powered winches in the cockpit to raise and lower the sails.

Below decks, in the forward starboard corner of the main saloon, was a navigation station **(Figure 13)** which contained a chart table, VHF radio, GPS, autopilot, Navtex, depth finder and radar screen. The distance from navigation station to cockpit was 5m.

Whispa was certified under the Small Commercial Vessel Code (SCV Code, MGN 280 (M)) for sailing, enabling her to operate in Area Category 2 (up to 60 miles from a safe haven) with up to 10 persons, including passengers and crew. One month before the collision, *Whispa* was examined and granted a Small Commercial Vessel Certificate by the International Institute of Marine Surveying (IIMS), a certifying authority by the Maritime and Coastguard Agency (MCA).

The certificate was issued after physical examination of the vessel, fittings and equipment, as a means of ensuring compliance with the SCV Code. The surveyor's checklist used during the examination showed that *Whispa* had bilge level alarms fitted to her automatic bilge pumps, as required by the Code, to provide early warning of water ingress. However, following the collision an examination of the yacht showed that there were no bilge alarms fitted to the vessel.

The radar fitted to *Whispa* was not required by the SCV Code.

Figure 13

Whispa's navigation station

1.4.1 *Whispa's* crew

Skipper

Whispa's skipper held a Royal Yachting Association (RYA) Offshore Yachtmaster's Certificate attained in 1977, with a commercial endorsement added in October 2005. He had no training in the use of radar, although the SCV Code strongly recommends it should be undertaken by those with it fitted on board their vessels.

Whispa's skipper had been a joint owner of the yacht since 2004 and sailed the yacht frequently. He became the sole owner a few days before the voyage that led to the collision commenced. The purpose of the voyage was to reposition *Whispa* at the Royal Quays Marina, North Shields, where the skipper intended to use the vessel commercially, for corporate day trips with paying guests.

The skipper had sailed many thousands of miles, including numerous passages in the area of the collision. He had sailed in fog on many occasions, sometimes for prolonged periods, without radar. This was only the third time he had sailed in fog when using radar, the two previous occasions being of brief duration.

Crew member

Whispa's crew member held an RYA coastal skipper qualification and had been sailing for over 30 years on both sail and motor craft. As part of that experience, she spent a period of time employed in worldwide boat delivery. It was her second trip on *Whispa*, with the previous occasion being a day trip on the Solent.

1.4.2 Radar

Whispa's radar, which had been on board since the yacht was built, was a Koden type 3404, 24-mile range radar, which provided a ship's head up, unstabilised display. The radar scanner was an 18 inch radome giving a beam width of 4.7º; the skipper was unaware of the effect of beam width on radar contacts.

Range ring spacing on the various ranges were as indicated below:

Range (miles)	1/8	1/4	1/2	3/4	1 1/2	3	6	12	24
Ring spacing	1/16	1/16	1/8	1/4	1/2	1	1 1/2	3	6

The skipper was unaware that his radar had a 24-mile range capability, and believed that the 6 and 3 mile scales had range ring spacing of 1 and 0.5 mile respectively **(Figures 14 and 15)**. It was the skipper's perception that, when the radar was set on the 6-miles range, contacts coming onto the extremity of the screen directly in front of the yacht were 6 miles distant, when in fact they were actually about 8 miles away due to the oblong shape of the screen **(Figure 14)**. On the 6-mile range, the radar screen was configured so that the last complete range ring was displayed at 6 miles; this screen configuration gave the effect of being continually off-centre, with additional off-centre options if required.

The radar had a facility to display recorded contact positions, enabling the user to approximate CPAs by simply extending a line through a series of successive stored positions **(Annex 3)** in the direction the contact was moving; *Whispa's* skipper was unaware of this facility. The radar operations manual, which was on board the yacht, explained this facility as well as explaining a method of calculating other vessel relative

Figure 14

Whispa's radar screen, showing 1.5 mile range rings and oblong screen

Figure 15

Whispa's radar screen showing 1 mile range rings on a 3 mile scale

speed and hence time to CPA, utilising a time and distance calculation. *Whispa'*s skipper was not aware of how to do this and therefore did not establish the unidentified target's relative speed or CPA by this method.

As well as the above facilities, the radar had an EBL; this was not used by the skipper after he detected *Gas Monarch'*s radar target on the radar screen, as the contact was fairly close to the heading marker.

1.4.3 Radar detection

The skipper of *Whispa* had never been given any reason to suspect that his vessel provided a poor radar target.

Gas Monarch detected the yacht at some 6 miles distance, and continued to do so until they were fewer than 3 miles apart, when the contact disappeared from her screens.

Lowestoft lifeboat detected *Whispa'*s target on her radar at about 4 miles distant. The cox'n then steered on a strong radar echo straight towards the yacht.

1.5 COLLISION PREVENTION REGULATIONS

The International Regulations for Preventing Collisions at Sea 1972, as amended (COLREGs), lays down rules applicable to all vessels to enhance safe navigation. The most pertinent regulations applicable to this accident, included in **Annex 4** of this report, are:

Rule 2 (Responsibility); Rule 5 (Lookout); Rule 6 (Safe speed); Rule 7 (Risk of collision); Rule 8 (Action to avoid collision); Rule 19 (Conduct of vessels in restricted visibility) and Rule 35 (Sound signals in restricted visibility).

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 VISIBILITY

The 24 hour forecast transmitted by the coastguard at 1850 on 16 April 2007, gave fog patches, with visibility moderate or good but occasionally very poor. The previous forecast gave visibility as moderate or good, occasionally poor overnight. The visibility predictions were fairly accurate, and fog was not unexpected by *Gas Monarch* or *Whispa,* although it was more prolonged than anticipated.

2.3 VESSELS' RADARS

2.3.1 *Gas Monarch* radar

Gas Monarch had two type approved commercial radars, JRC type JMA7252 and 7303, neither of which had ARPA facilities. The radars did, however, have electronic tracking facilities which would have allowed operators to select a target and plot its movements across the screen at pre-set time intervals, and thus allow the operator to determine CPA. This facility was not utilised by the 3/O as he had never sailed with any type of radar other than those with ARPA; instead he used the contact's trails, floating EBL and VRM as a means of calculating CPA. The radars were interfaced with the ship's AIS receiver, and therefore displayed vessels transmitting AIS information on the radar screens. Any AIS-transmitting vessel would remain on screen even if the radar paint was lost for any reason. *Whispa,* however, did not have (nor was required to have) AIS capability.

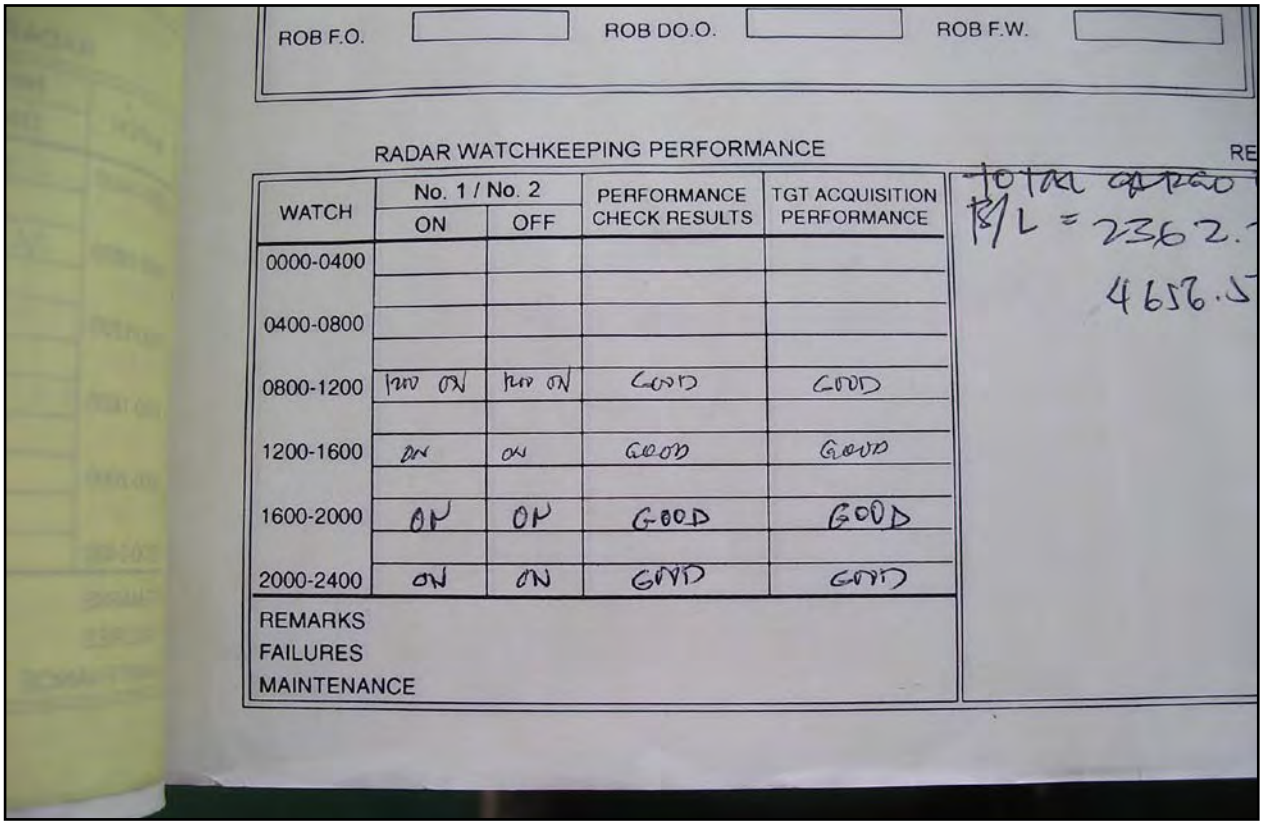
SOLAS requires all ships of 10,000gt and upwards, and ships of 300gt and upwards built after 1 July 2002, to be fitted with ARPA. *Gas Monarch* was exempt from ARPA requirements on both age and size and, according to current regulation, will not require ARPA throughout her life. It would appear that current regulation is driven by vessel size and age rather than the type of vessel or apparent risk; in this case a petroleum gas carrier. Had ARPA facility been available, and used, it would have given a "target lost" warning when *Whispa's* contact disappeared, and remained so until the 3/O acknowledged it. This might have had no effect on the final outcome, but it would have served to alert and highlight to the 3/O the need to take some positive action.

Several days after the collision, and at the ship manager's behest, the radars were tested using the integrated performance checking facilities, indicated in the operator's manual **(Annex 2)**. This test revealed low attenuation, and therefore probable magnetron deterioration.

IMO resolution No .MSC. 64(67) requires that a means should be available to regularly evaluate radar performance. Ideally, performance level should then be recorded in some numeric or calibrated fashion to allow simple recognition of deterioration. The ship's logbook had a dedicated section for Radar Watchkeeping Performance **(Figure 16)** which, in the lead up to the accident, had been marked up in both Performance Check Results and Target Acquisition Performance as being *"Good."* This, of course,

is subjective and open to individual interpretation. Had the performance check been carried out using the system's performance monitor, and calibrated results recorded, system deterioration should have been recognised.

Figure 16



ROB F.O. | ROB DO.O. | ROB F.W.

RADAR WATCHKEEPING PERFORMANCE

WATCH	No. 1 / No. 2 ON	No. 1 / No. 2 OFF	PERFORMANCE CHECK RESULTS	TGT ACQUISITION PERFORMANCE
0000-0400				
0400-0800				
0800-1200	No ON	No ON	GOOD	GOOD
1200-1600	ON	ON	GOOD	GOOD
1600-2000	ON	ON	GOOD	GOOD
2000-2400	ON	ON	GOOD	GOOD

REMARKS
FAILURES
MAINTENANCE

Gas Monarch's radar performance check from Deck Log Book

Soon after the accident, the vessel's radars were inspected by service technicians in the port of Antwerp, where it was confirmed that the magnetron on each radar had deteriorated to well below optimum capability, and they were duly replaced. It was also found that the radar scanner bearings on the X band radar were worn to the extent that they allowed vertical play of 2cm in the antenna. A recommendation was made by the technicians to have this attended to as a matter of urgency.

Less than a year previously, the X band radar's magnetron had been replaced in Amsterdam. It is possible that the play in the radar scanner was contributory to the deterioration of the magnetron in such a short time span. The play in the scanner could also be responsible for deflecting some of the radar's energy from the wave guide and, thus, also contribute to poor performance.

In October 2006, the ship had an annual Cargo Ship Safety Equipment Certificate revalidated by LRS in Antwerp. The survey inspection for issue of this certificate includes such items as radar performance. However, as such vessels are frequently alongside gas terminals at the time of survey, it is not always possible to switch radars on; thus the surveyor will often rely on the master's or first officer's opinion of the equipment.

2.3.2 *Whispa* radar

There was no requirement under the SCV Code for *Whispa* to have radar on board, despite her being allowed to operate out to 60 miles offshore from a safe haven, with passengers on board.

Her Koden 3404 radar **(Figure 14)** was designed for use by small commercial and leisure craft. It was not required to meet IMO performance standards and therefore had differing screen displays to IMO type-approved radar. However, due to the proliferation of IMO approved equipment in the maritime industry, it could be argued that, particularly in basic screen display functions such as ranges and range scales, all manufacturers should endeavour to meet those standards to reduce possible confusion when operators move from vessel to vessel and encounter different equipment.

The rectangular shape of the Koden 3404's screen does not provide an all-round picture on the range in use; instead it gives an offset centre showing greater range ahead of the craft than to the sides or behind **(Figure 14)**, with an additional facility to further offset the display if required. Whereas IMO approved radars have 6 range rings in their mandatory range scales, the 3404's ring spacing is inconsistent. Furthermore, the 3404 uses different range ring calibration than that of IMO approved radar, e.g. the ring spacing on 3-mile range is 3 x 1 mile rings and on 6-mile range, 4 x 1.5 mile rings, compared to 6 x ½ mile rings at 3-mile range and 6 x 1 mile rings on 6-mile range on IMO approved radar. While it is accepted that these ranges are clearly displayed on the top left-hand corner of the radar display **(Figures 14 and 15)**, users would need to remind themselves regularly that they are not dealing with the more commonly found range scales.

*Whispa'*s radar was provided with a ship's head up, unstabilised display. With this type of display, it is difficult for operators to maintain a plot or systematic observation of targets displayed on the screen as these will become blurred when the vessel yaws (even minimally) in a seaway. The physical size of the radar display (an effective diameter of 97mm) would also make plotting or systematic observation difficult. The radar's 18 inch (457mm) radome scanner gave a beam width of 4.7º, again making accurate plotting difficult due to the contact size being enlarged and therefore difficult to ensure that the same point on the contact was being used consistently during any attempt at plotting or systematic observation. Large beam width can create problems in contact discrimination and can, for example, cause contacts in close proximity to merge into one, as shown in the radar manual **(Annex 3)**. The skipper was not aware of the effect that beam width could have on a contact.

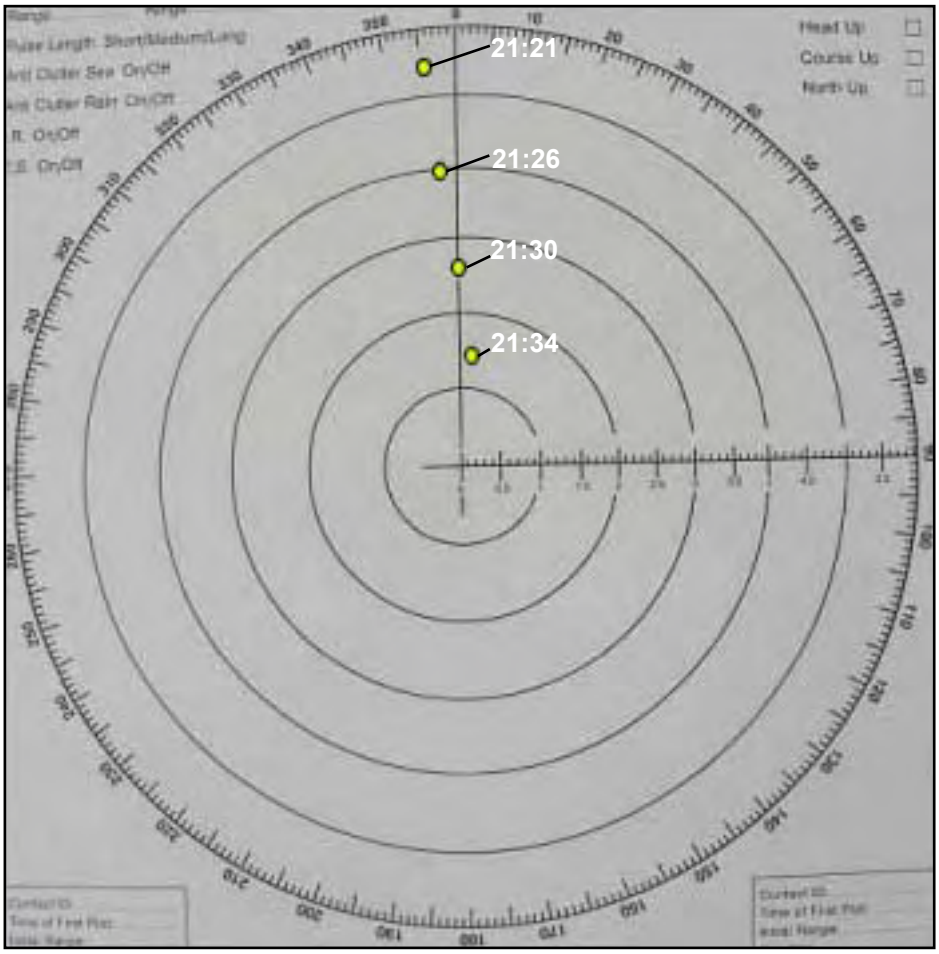
After the accident, when *Whispa* had been lifted ashore for repair, an experienced radar service technician visited the vessel and checked the validity of the radar's heading marker. The service technician found that the heading marker had a starboard error of no less than 2º, and thus the radar target of *Gas Monarch* would have been displayed on the radar screen slightly to port of her real bearing relative to *Whispa*. Due to *Whispa'*s navigation station being displaced some 5m from the steering wheels, it would be difficult for the skipper to compare the yacht's head with the radar heading

marker in the normal course of sailing, and is something that would have had to be done from the navigation station while on autopilot. MGN 63 (M+F) “Use of Electronic Aids to Navigation,” **(Annex 5)** states:

> *Mis-alignment of the heading marker, even if only slight, can lead to dangerously misleading interpretation of potential collision situations, particularly in restricted visibility when targets are approaching from ahead or fine on own ship’s bow. It is therefore important that checks of the heading marker should be made periodically to ensure that correct alignment is maintained. If misalignment exists it should be corrected at the earliest opportunity.*

The foregoing issues would go some way to explaining the radar image displayed on *Whispa’*s radar and her skipper’s perception that the unidentified contact appeared to be on a collision course, encouraging his alteration across its stem. **Figure 17** shows a representation of how *Gas Monarch*’s radar image might have appeared on a correctly aligned radar display without taking into account unstabilised display anomalies, heading marker error or enlargement of the image due to beam width expansion; all of these would have made accurate monitoring of a closing vessel very difficult even if the skipper had been aware of them. Also, due to the radar’s heading marker misalignment, the contact did not appear on the starboard side of *Whispa*’s heading marker at any time.

Figure 17



Representional radar plot of how *Gas Monarch* may have appeared on a correctly aligned display, not taking account of any beam width or unstabilised anomalies, prior to *Whispa*'s alteration of course to starboard.

2.4 *GAS MONARCH*'S ACTIONS

2.4.1 Master

Gas Monarch's master joined the ship 3 weeks before the collision. He had been on the bridge with the 3/O a few days earlier, in fog in the Baltic, while the ship was passing through a fleet of fishing vessels. On that occasion, the 3/O had requested the master's presence on the bridge, as required by the master's standing orders. This gave the master the opportunity to observe his 3/O's ability and, from this, he felt confident that the 3/O would call him in other situations, if required.

From the changeover of the watch at 2000 hours, the master was on the bridge fairly regularly monitoring the watch, as well as attending to paperwork in his cabin. The master left the ship's bridge to go to bed approximately 40 minutes before the collision. At that time, visibility was severely restricted, the ship was sailing at full sea speed, no sound signals were being made and the ship was being steered by automatic pilot. This was in direct contravention of his personal standing orders, restricted visibility orders and night orders **(Annex 1)**. The master's only verbal instruction to the 3/O was to call him if they encountered traffic.

Leaving the bridge in such conditions and navigational status could only have conveyed to the 3/O that the master's written orders were superficial and of little consequence. Additionally, the master's actions probably served to undermine the 3/O's training and instincts, thus preventing the 3/O from calling him when the radar contact with *Whispa* was lost.

It is surprising that an experienced master would act in this manner, not only in direct conflict with his own written orders, bit also given the lack of experience of his watch keeping officer. The fact that the master did not recognise the potential outcome of his actions reflects a high degree of complacency on his part, a factor that MAIB sees as contributory in many accidents which it investigates.

On being called to the bridge after the accident, the master immediately stopped his ship, notified the coastguard, and stood by *Whispa* until the lifeboat arrived. However, he did not instruct his crew to make ready their rescue boat, which could have resulted in precious time being lost had *Whispa* required urgent assistance.

The master did not communicate directly with the skipper of *Whispa.* He felt that because he had identified his ship on radio, *Whispa'*s skipper would call him directly if he wished to communicate. Unfortunately, *Whispa'*s skipper had not realised from the communication with the coastguard that *Gas Monarch* was the colliding vessel but, rather, a random ship standing by to give assistance. It is required by international convention[2] and the UK Merchant Shipping Act 1995 that, following a collision, the vessels involved exchange pertinent information with each other.

*Gas Monarch'*s crew were called to stations by use of the public address (PA) system rather than by the sounding of the general alarm (GA). The ship was then inspected for damage and stood by *Whispa* as requested by the coastguard.

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[2] Article 8 of the 1910 Convention for the Unification of Certain Rules of Law with respect to Collisions between Vessels.

2.4.2 Third officer

It was the 3/O's first trip as a deck officer since his promotion from AB cadet. *Gas Monarch* was also the first ship he had sailed on without ARPA and due to his unfamiliarity with the electronic plotting function of the radars, preferred to rely on the AIS information displayed on the radar screen when considering developing traffic situations. *Whispa,* however, did not have AIS, and therefore was not displayed as an AIS contact, or plotted or systematically observed by *Gas Monarch*.

On taking over the watch at 2000, the 3/O sought clarification about the use of sound signals and was advised by the chief officer not to sound the horn unless traffic was encountered. His understanding of the word "traffic" was that it meant more than one vessel. On previous ships he had sailed on, the horn was used in restricted visibility, regardless of traffic density. The advice caused the 3/O concern, but he did not wish to question his superiors and, with reluctance, he carried on as instructed.

After detecting *Whispa* by radar at about 6-miles range, the 3/O quickly established the two vessels were on a collision course and altered *Gas Monarch'*s course 5º to port, from a course of 188º to 183º. Rule 8(b) requires *any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar… Gas Monarch'*s 5º alteration of course was insufficient to have been apparent on *Whispa'*s radar screen.

Having executed the alteration to port, the 3/O then used a floating EBL to establish a CPA by simply aligning the EBL with the contact's trails. This use of the floating EBL to calculate *Whispa'*s CPA was unreliable due to the short trail length. An error of as little as 2º when projecting the trail over the length of the 6-mile range radar screen would have made a big difference to the indicated CPA. From observation of the floating EBL, the 3/O concluded the CPA of *Whispa* to be about 1 mile when the vessels were 5.5 miles apart; at 3 miles apart he revised the CPA to 7 cables (even though both vessels had, in reality, maintained a steady course). Post-collision examination of AIS and GPS data showed the CPA prior to *Whispa'*s alteration of course to be in the region of ⅓ of a mile (3.33 cables).

Rule 19 of the COLREGs requires, where a risk of collision has been determined by radar alone, vessels not in sight of one another in restricted visibility, should, *so far as possible*, avoid an alteration to port for vessels detected forward of the beam, and that any alteration is made in ample time. *Gas Monarch'*s 3/O made a port alteration because he felt a starboard adjustment would take the ship inshore towards shallow water. However, the nearest shallow water was some 3 miles to the west, thus giving ample room for *Gas Monarch* to alter course to starboard, in accordance with Rule 19. The chosen course of action, although made in ample time, was inappropriate and created a close quarters, starboard to starboard passing situation, with an unidentified vessel in dense fog.

Soon after the 3/O had estimated a CPA of 7 cables, *Whispa* was lost from both radars. Consequently he attempted to retune the radars by altering range scales and adjusting sea and rain clutter controls. On completion of adjustments, the radars were on auto tune, with sea anti-clutter set manually at about ⅓ sensitivity, while the rain anti-clutter was set at maximum suppression; these settings would have had the effect of masking weak images. Further confirmation of this is that, when on 1.5-mile range, the radar

screen was seen to clear with no speckles on it; a recognised sign of over-suppression. The combination of poor radar tuning due to operator inexperience, and magnetron deterioration, may explain the contact loss from the radars.

The 3/O's observations of *Whispa* were not systematic, as required by COLREGs Rule 7 (b), and the method of calculating CPA was unreliable. After losing the radar target he assumed that *Whispa* would pass clear on his starboard side and that there was no reason for *Gas Monarch* to alter course. Part (c) of Rule 7 stresses: *Assumptions shall not be made on the basis of scanty information, especially scanty radar information.* Once the radar target of *Whispa* was lost from *Gas Monarch'*s radar screens, it was inappropriate for the 3/O to allow *Gas Monarch* to continue on her course, unabated, on the assumption that *Whispa* would maintain her course and speed. *Gas Monarch'*s actions were based entirely on scanty radar information.

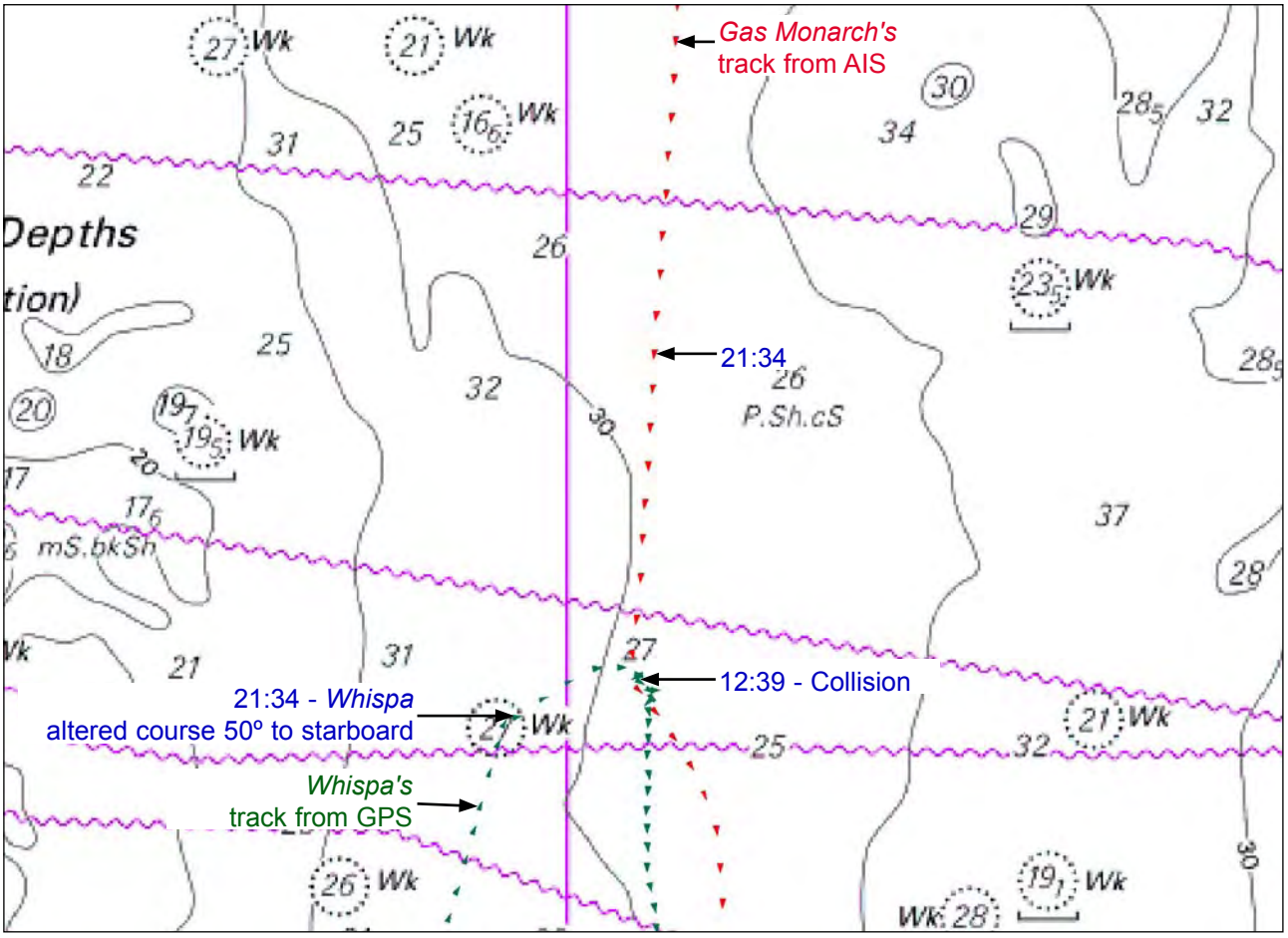
It would appear that *Gas Monarch*'s 3/O was confident that the lost contact was going to pass clear to starboard. This is evidenced by the 3/O going to the chart and fixing the vessel's position at the critical time of just 3 minutes before the collision. Nevertheless, the 3/O elected to occasionally shine his Aldis lamp into the fog as a precaution, just in case the lost radar contact did come too near. He recognised in hindsight that he should have used the fog horn, but elected the lamp, which made little impression in the fog. To not use sound signals in or near restricted visibility is a direct contravention of Rule 35 of the COLREGs.

When *Whispa'*s port navigation light appeared out of the fog, the 3/O immediately instructed the lookout to select hand-steering and to go hard starboard. At the same time, he shone the Aldis lamp towards the approaching vessel by way of a warning. As soon as the ship started to swing to starboard, a hard port instruction was given. These manoeuvres reduced the effect of the impact between the two vessels and helped to keep *Whispa* clear of *Gas Monarch'*s port side as they passed. The relative track movements of the two craft as they closed is shown clearly in **Figure 18** (note that *Gas Monarch'*s starboard alteration is not apparent on her AIS track due to its brevity, occurring between successive plots which were at 30 second intervals). The shining of the Aldis lamp, although well intentioned, destroyed *Whispa'*s skipper's night vision for a period of time and, again, the sound signal should have been used.

The 3/O ran to the port bridge wing in time to see the lights from *Whispa* disappear astern. He was not sure if *Gas Monarch* had collided with *Whispa,* but felt that, as he could see her lights, she must have been all right. He was stunned by the incident and stood, shaking, on the bridge for quite a while afterwards while *Gas Monarch* continued at full sea speed. It was not until he heard *Whispa'*s distress call approximately 8 minutes after the collision that he called the master to the bridge, whereupon the master took control.

Notwithstanding the 3/0 may have been in a state of shock following the collision, it is of concern that his immediate reaction to the incident was not to take action to verify the status of *Whispa* and make preparations to provide the yacht's crew with assistance if required. There are very strong similarities between this accident and that of the loss of the sailing yacht *Ouzo* and her three crew (MAIB Report No 7/2007), where *Pride of Bilbao* came perilously close, or collided with the yacht, but carried on sailing as the lights of the yacht were still visible afterwards.

Figure 18



Relative tracks of *Gas Monarch* (reproduced from AIS) and of *Whispa* (reproduced from GPS)

2.4.3 Lookout, *Gas Monarch*

Gas Monarch's bridge team consisted of the 3/O and an AB acting as lookout. The bridge doors and windows were shut, reducing the possibility of anyone on the bridge hearing other vessels' sound signals. Additionally, in such restricted visibility, the ship's SMS required that she go to hand-steering and a helmsman be called to the bridge to allow the lookout to continue his duties.

Rule 5 of the COLREGs requires that "*every vessel shall at all times maintain a proper look-out by sight and hearing …"* For the "hearing" part of this regulation to be effective, requires vessels to be making sound signals in restricted visibility, as required by Rule 35. Neither vessel was making such signals.

Gas Monarch had appropriate sound signalling equipment, with horns positioned forward and aft. Had she been sounding her horn, it is possible that it would have been detected on *Whispa,* thus giving an indication of proximity and relative position.

2.4.4 Speed, *Gas Monarch*

Rule 19 (b) also requires that in restricted visibility, "every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions."

It is appreciated that the criteria for determining a safe speed are open for debate and can be interpreted in different ways. However, a prudent approach would be to travel at a speed relative to the visibility, the characteristics of the vessel in question, the traffic density, navigational hazards and by having regard to the additional factors listed in Rule 6 (a) of the COLREGs.

At the time of the accident, *Gas Monarch* was sailing at full sea speed, before a tidal stream of some 2kts, giving a speed in excess of 14kts. The visibility from the time the master left the bridge was approximately 150m.

The use of radar has frequently, rightly or wrongly, encouraged seafarers to sail at speeds that would be totally unjustifiable without such an aid to navigation. Rule 6 (b) (i) recognises this fact and, in doing so, highlights the need for vessels with operational radar to be aware of the *characteristics, efficiency and limitations of the radar equipment. Gas Monarch'*s 3/O was not aware of the radar's deteriorated efficiency when *Whispa'*s contact disappeared from the radar. Once aware of his inability to regain the radar contact he should have reduced speed and called the master.

2.4.5 Commercial pressure

The master's decision to proceed at full sea speed in such conditions could have been due to commercial pressure. However, there was no suggestion of this from the master, and the managers of the vessel were content that this type of pressure was not applied by them or by the charterer.

The managers and owners do not condone their vessels travelling at an unsafe speed, at any time.

2.4.6 Bridge watchkeeping

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Chapter VIII lays down the regulatory standards for watchkeeping. Part 3 - "Watchkeeping at Sea" specifies the requirements that should be observed when maintaining a navigational watch. It is clear that these principles were not adhered to by the navigational team on *Gas Monarch*.

2.5 *WHISPA*'S ACTIONS

2.5.1 Skipper

*Whispa'*s skipper had received no training in radar navigation and had little experience of using the equipment in fog. He monitored an unidentified vessel approach on radar, without applying the EBL, due to the contact being close to the heading marker. He was not aware of the target tracking facility on his radar, and thus did not utilise it as a means of recording the ship's earlier positions on his radar screen.

In their book "A Guide to the Collision Avoidance Rules," A N Cockroft and J N F Lameijer[3] state; *Even continuous observation by a competent person is unlikely to be accepted as proper use of radar to obtain early warning of risk of collision if the bearings and distances of approaching vessels are not taken at regular intervals and carefully evaluated by plotting or by some equivalent method.*

It is very difficult to simply look at a contact's paint every few minutes and compare it to the previous estimated position from memory, or to be sure that the same part of the paint is being used for evaluation purposes. Using the EBL and target tracking facility on *Whispa'*s radar might not have given definitive clarification, but it would certainly have been better than relying on positions from memory.

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[3] A N Cockroft and J N F Lameijer, " A Guide to the Collsion Avoidance Rules." Sixth edition; NOV-2003; Butterworth-Heinemann; ISBN-13: 978-0-7506-6179-9; ISBN-10: 0-7506-6179-8

Had *Whispa'*s skipper been able to plot *Gas Monarch* effectively he would have seen that, although a close quarter's situation was developing, the two vessels were not on a collision course.

Cockroft and Lameijer go on to state in their publication: *Rule 8 (a) requires avoiding action to be taken in ample time in all conditions of visibility. When visibility is restricted it is generally necessary to take action to avoid a close quarters situation at an earlier stage. However, action should not be taken without first making a full assessment of the situation.*

*Whispa'*s skipper made no attempt to estimate the speed of the closing contact, or the time to CPA. The method of determining the relative speed of an approaching radar contact was explained in the radar manual **(Annex 3)**, which was stowed on board but the skipper was not aware of this information and his subsequent actions were taken without appropriate assimilation of the, albeit limited, information available.

*Whispa'*s skipper was unsure about the configuration of his radar's range rings and the total distance he was observing ahead of his vessel created by the radar screen's oblong configuration **(Figures 14 and 15)**. He was not aware that when on a 6-mile range scale the range rings were 1.5 miles apart, and when on 3-mile range the rings were 1 mile apart. Instead he believed them to be 1 mile and 0.5 mile apart respectively, as is more commonly found. However, regardless of the range scale in use, the skipper was confident that the helm alteration was demanded of the autopilot when the approaching vessel was close to the radar's 2.5 mile guard zone. Analysis of data stored by *Whispa'*s GPS showed that the alteration took effect when the vessels were 1.3 miles apart.

Whispa's autopilot was set to limit any helm applied to 4° to give a slow rate of turn and prevent over-steer in normal circumstances. The damping of the autopilot would have no doubt caused some delay to the actual course alteration taking effect, but it is questionable whether it would have delayed the turn by four minutes i.e. the time it would have taken for *Gas Monarch* to close from 2.5 miles to 1.3 miles. There was no magnetic compass at the navigation station, but prudent observation of the GPS would have shown that *Whispa*'s head was not swinging as demanded of the autopilot; there is no doubt that the delayed course alteration further endangered the yacht by placing her under the bows of the gas carrier.

Despite the skipper observing the approaching contact on the radar, the instrument was a potential liability rather than an aid, due to the faulty heading marker and his lack of familiarity with the equipment's functions.

While *Whispa'*s alteration of 50º to starboard was large enough to be readily apparent on a properly functioning radar, as Rule 8 (b) requires, a fundamental error of navigation occurred in the action not being taken in *ample time* as required by both Rules 8 and 19. At 1.3 miles apart, the vessels were some 4 minutes from collision. Even had the yacht skipper's perception of the distance between the two vessels been correct and the helm had responded instantly to his demand, the action to avoid the approaching close quarters situation would only have served to place *Whispa* at about the same CPA, but on the opposite side of *Gas Monarch*'s bow.

Rule 19 states that *an alteration to port [for vessels forward of the beam] should be avoided so far as possible.*

Whispa's skipper turned the vessel to starboard, hoping that the approaching ship was aware of the yacht's presence and would take the appropriate avoiding action of likewise altering her course to starboard. He was concerned that any alteration to port of *Whispa* would move the yacht towards the unidentified ship. The crucial point here for all seafarers is that, when presented with a developing close quarters situation, it must not be assumed that the other vessel is tracking your vessel's progress on radar; and emphasises the need to take avoiding action in *ample time*.

Rule 8 (e) states, *"if necessary to avoid collision or allow more time to assess the situation, a vessel shall slacken her speed or take all way off by stopping or reversing her means of propulsion."* Although *Whispa* was travelling at a speed appropriate to the prevailing conditions, when her skipper became concerned about a situation developing, he could have gained more time to further assess the situation by slowing his vessel to the minimum speed required to maintain steerage. This would have made little difference to the CPA (had both vessels maintained their course), but it would have given the skipper more time to consider an alternative course of action. One option could have been to turn 180º onto a reciprocal course and run full speed down tide, thus gaining substantially more time to assess the situation.

2.5.2 Speed, *Whispa*

*Whispa'*s speed over the ground of 4.5kts was not unreasonable for the conditions. Although Rule 6 of the COLREGs refers to Safe Speed, it is actually the only Rule that specifically makes reference to the *characteristics, efficiency and limitations of the radar equipment.* Rule 2 (a) however states that: *(a) Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.* Therefore the instructions regarding use of radar must be applied as a matter of good seamanship, and not only with safe speed in mind. *Whispa'*s skipper had limited knowledge of the characteristics, efficiency and limitations of his radar equipment. Had he not had radar on board, it is doubtful he would have known of *Gas Monarch'*s presence, and probably would have passed the other vessel without incident. The presence of the equipment encouraged *Whispa'*s skipper to attempt to navigate by radar whilst unaware of the heading marker error and without having enough knowledge and understanding of the equipment's functionality to do so safely.

2.5.3 *Whispa'*s radar reflectivity

*Whispa'*s hull form was extremely smooth and streamlined, with an aluminium mast extending almost 20m above sea level. A radar reflector was suspended from the mast cross tree at about 6m above sea level **(Figure 19)**. At no time previous to the accident had other skippers expressed concern to *Whispa'*s skipper about the vessel's radar image.

Gas Monarch detected the yacht at some 6 miles distance, and continued to do so until the two vessels were just under 3 miles apart, when it disappeared from her screens; it has since been established that *Gas Monarch'*s radar performance was deteriorated and that anti-rain clutter may have been set too high.

Figure 19

W*hispa*'s radar reflector and mast

The Lowestoft lifeboat detected *Whispa'*s target on her radar at about 4 miles from a selection of contacts. Once the lifeboat's cox'n was able to verify which contact was *Whispa,* he had no problem steering upon a strong echo all the way to the stricken craft.

From the various evidence and information available to MAIB there is no reason to believe that *Whispa* gave a weak echo return on properly tuned radar.

2.6 SMALL COMMERCIAL VESSEL CODE

The SCV Code (MGN 280 (M)) is applicable to UK commercial vessels of up to 24m Load Line length, which carry cargo, and/or no more than 12 passengers. The Code is a rationalisation of the commercial vessel codes, known as the Brown, Blue, Red and Yellow Codes of Practice. The SCV Code has effectively drawn together the "coloured" Codes of Practice and collated them into one harmonised SCV Code of Practice. This was completed in 2004 but has, as yet, not been ratified by statute. Until that time, the existing statute of the "coloured" codes presides. However, any vessel or item of equipment which has been declared as complying with the SCV Code is expected to do just that.

2.6.1 Vessel certification

Whispa was surveyed and certified by IIMS as complying with the SCV Code 1 month before the accident. She was classed as an MCA Category 2 vessel, allowing her to operate with paying passengers out to 60 miles from the nearest safe haven. *Whispa* had no paying passengers on board at the time of the accident; nevertheless, she was coded, and should have complied with Code requirements.

Following the collision, *Whispa* flooded while under tow by the lifeboat. It was only by chance that the flooding was discovered because the yacht had no bilge level alarms. The SCV Code states that bilge level alarms should be fitted in any space which has a through hull skin fitting to the sea (excluding void spaces) – *Whispa* had 16 through hull skin fittings. The SCV Code further states that, where automatic bilge pumps are used, they should have an audible alarm fitted to them to indicate when they have been activated – *Whispa* had 2 such pumps, but no alarms fitted. Furthermore, one of these automatic pumps was in the engine space, yet the Code states that automatic pumps should not be fitted in engine spaces, to avoid pumping pollutants overboard.

2.6.2 Skipper's certification

Whispa's skipper held an RYA Yachtmaster Offshore Certificate of Competency with a commercial command endorsement issued by the RYA on behalf of the MCA. This allowed him to act as skipper on commercial sailing vessels of up to 200gt. The recognised route to achieve commercial endorsement is, in addition to the RYA Certificate of Competency, to be in possession of a Basic Sea Survival Certificate and a Medical Fitness Certificate. There is no requirement for radar training. The SCV Code does, however, *strongly recommend* that skippers of vessels carrying radar undertake appropriate training in its use; it is worthy of note that this is not mandatory and that the Code does not clarify what "appropriate training" should consist of.

As a comparison with other similar legislation, this report looks at the recently introduced Merchant Shipping (Inland Waterways and Limited Coastal Operations) (Boatmasters' Qualifications and Hours of Work) Regulations 2006; summarised in MSN 1808 **(Annex 6)**. These regulations came into force in early 2007 and introduced new requirements for operating commercial vessels in inland waterways and limited coastal waters.

The certification, known as the Boatmasters' Licence (BML), is for the masters of passenger vessels, and non-passenger vessels (including: cargo vessels, tankers, tugs and pusher craft engaged in cargo operations, workboats and dredgers) when they are operating in inland waterways or in limited coastal areas (no more than 3 miles from land and no more than 15 miles from departure point). With a "sea" endorsement, the BML is valid for operations of up to 60 miles from a safe haven on a small commercial vessel.

Generally, the BML is for less arduous waters than SCV Code Category 2 waters. However, in some aspects the qualification structure would appear to be more onerous for the BML than that of the commercially endorsed RYA Certificate. In particular, if a vessel has radar on board it is a mandatory requirement for the BML holder to successfully complete the MCA approved Small Ships Navigation and Radar Course. It is also a requirement for a BML holder to be in possession of a Fire Safety certificate. However, under the SCV Code, radar and fire safety certificates are not required to allow the carriage of passengers on a small commercial vessel.

2.7 EITZEN MARITIME SERVICES

Gas Monarch's most recent ISM internal audit was carried out when the vessel was in port, alongside a berth. Whilst it is appreciated that any audit will provide only a snapshot of the effectiveness of a vessel's systems and procedures, it is doubtful whether that port audit could have provided the managers with the fullest indication of whether ship's staff were adhering to the SMS on a routine basis. Whilst it is understood that EMS do conduct a number of internal audits of their vessels when these are at sea, it should be recognised that the maximum opportunity must be made of at sea auditing if a full assessment of SMS compliance is to be achieved.

EMS had developed a comprehensive deck logbook which included a section for recording Radar Watchkeeping Performance **(Figure 16)**. On the date of the accident, and until the ship berthed in Porto, the radar performance section was completed with the word "good"; appropriate completion of the log should have included a "quantitative" assessment (e.g. number or percentage) to enable watchkeepers to evaluate differences in performance. It would not be unreasonable for ISM audits to check such an important item is being completed appropriately in an attempt to ensure compliance.

2.8 FATIGUE

The working and rest hours of *Gas Monarch*'s master and watchkeepers were examined, and it was considered that fatigue did not contribute to their involvement in this accident.

Similarly *Whispa'*s crew had been well rested before the vessel sailed from Ramsgate, and fatigue is not considered a contributory factor.

2.9 SIMILAR ACCIDENTS

During the course of the investigation, the MAIB's accident database was searched for relevant similar cases. In the last 10 years, there have been 87 hazardous incidents recorded between yachts and merchant vessels in open sea conditions, and 15 collisions. The following four cases represent a sample of the most relevant ones.

Aliniel/Pride of Bilbao 2000

On 28 August 2000, at about 2200, in moderate to good visibility, the 37500grt passenger ferry, *Pride of Bilbao,* was involved in a near collision with the yacht *Aliniel,* south of the Isle of Wight. *Pride of Bilbao*, when less than a mile from the yacht, changed her course and headed directly towards her. The yacht's crew only had enough time to put the engines full ahead and to shine a powerful light onto the sails; there was no time to use flares despite them being readily accessible by the chart table. *Pride of Bilbao* took effective emergency action and eventually passed less than a cable away.

During the subsequent exchange on VHF radio, the ferry apologised and stated that they had "lost" the yacht off the radar.

Tuila/unknown vessel 2000

Tuila, an 8.5m yacht, was lost with all four crew in the North Sea in July 2000. The yacht was on passage from Ijmuiden in the Netherlands to Harwich in the UK. She was being skippered by her owner, and was crewed by three students from Cambridge University.

The alarm was raised when she failed to arrive, and an extensive air and sea search failed to find the yacht. Three weeks later, three bodies were recovered from the sea off the Dutch coast, and the fourth body was recovered 2 months later.

About 4 months after the accident, a Dutch fishing vessel trawled up some wreckage from the seabed which showed signs of catastrophic damage.

Although no positive proof has been discovered, it is likely that *Tuila* was catastrophically damaged in a collision with a merchant vessel.

Wahkuna/*P&O Nedlloyd Vespucci* 2003

In 2003, in the English Channel, in thick fog, there was a collision between the 14.5m yacht, *Wahkuna,* and the container ship *P&O Nedlloyd Vespucci*. Each vessel had detected the other using radar from a distance, but had incorrectly interpreted the situation. The skipper of the yacht *Wahkuna* reduced speed after briefly assessing by eye on radar that the risk of collision existed. Had the yacht not reduced speed due to scant radar knowledge, the collision would not have occurred. The bow of the yacht was carried away in the collision and *Wahkuna* subsequently sank; *P&O Nedlloyd Vespucci* was unaware of the collision and carried on. Fortunately, the yacht carried a liferaft, which the crew successfully abandoned to. After several hours they were seen by a passing vessel and were safely rescued.

Ouzo/Pride of Bilbao 2006

In August 2006 the yacht *Ouzo* and her crew of three were lost when *Pride of Bilbao* collided with her, or passed so close that she caused *Ouzo* to become swamped or capsized in her wash.

The lookout on the ferry did not see the yacht until it was very close ahead, and she had not shown up on the ferry's radars. The OOW tried a last minute manoeuvre to avoid her and believed that he had been successful. The sighting of lights astern of the ferry, after the incident, was considered sufficient by the watchkeeping officer to assume that the yacht was safe, and the ferry continued to Bilbao without taking further action.

The three crew members' bodies were found in the days following the accident; no trace of the yacht has been found to date.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES

The following safety issues have been identified as a result of the MAIB investigation. They are not presented in any order of priority.

3.2 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT WHICH HAVE RESULTED IN RECOMMENDATIONS

1. *Whispa*'s radar had a heading marker error which was unrecognised by the skipper. [2.3.2]

2. *Whispa*'s skipper had received no training in radar navigation and had little experience of using the equipment in fog. [2.5.1]

3. *Whispa*'s skipper failed to appropriately apply the COLREGs. [2.5.1, 2.5.2]

4. There is disparity in the certification required by skipper SCV Code vessels. The BML certificate requires more comprehensive training, with particular regard to Radar and Fire Safety training, than RYA commercially endorsed certification. [2.6.2]

3.3 SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION WHICH HAVE NOT RESULTED IN RECOMMENDATIONS BUT HAVE BEEN ADDRESSED

1. *Gas Monarch*'s master left the bridge in the hands of his inexperienced 3/O in restricted visibility. [2.4.1]

2. *Gas Monarch*'s master condoned the improper navigational status of his ship in restricted visibility. Doing so was a contradiction of COLREGs, STCW and EMS's Safety Management System, with particular respect to:
   - Travelling at an unsafe speed for the prevailing weather conditions. [2.4.1]
   - Restricted visibility sound signals were not used. [2.4.1]
   - An extra hand was not on the bridge to allow hand-steering. [2.4.1, 2.4.3]

3. The actions of *Gas Monarch*'s master not only indicated a high degree of complacency, but also set a bad example to the 3/0 thus undermining the latter's training and ideal. [2.4.1]

4. *Gas Monarch*'s 3/O lacked experience and familiarity with the ship's radar systems. [2.4.2]

5. The 3/O contravened COLREGs and STCW requirements in respect to keeping a safe navigational watch. [2.4.2, 2.4.3, 2.4.4]

6. The 3/O did not call the master when the radar contact was lost. [2.4.4]

7. Shining an Aldis lamp on *Whispa* destroyed her skipper's night vision for a period of time. [2.4.2]

8. *Gas Monarch*'s radar magnetrons had deteriorated beyond an acceptable level, with subsequent effects on the displayed image. [2.3.1]

9. *Gas Monarch*'s radar performance checks were not recorded appropriately. [2.3.1]

10. *Gas Monarch* had no ARPA radar which would have highlighted, by means of an alarm, *Whispa*'s disappearance from the radar screen. [2.3.1]

11. *Gas Monarch* failed to stop immediately after the collision. [2.4.2]

12. *Gas Monarch*'s crew were called to stations by PA system rather the recognised GA. [2.4.1]

13. *Gas Monarch*'s rescue boat was not prepared to a state of readiness while standing by *Whispa.* [2.4.1]

14. The vessels failed to exchange information following the accident as required by international regulation. [2.4.1]

15. *Whispa*'s aft watertight bulkhead was breached and permitted through flooding. This went undetected due to the lack of early warning high level bilge alarms. [2.6.1]

16. *Whispa*'s survey and inspection under the SCV Code failed to detect the lack of high level bilge alarms, which endangered the craft when through flooding occurred. [2.6.1]

SECTION 4 - ACTIONS TAKEN

4.1 ACTIONS TAKEN BY EMS

In response to the collision between *Gas Monarch* and *Whispa*, **Eitzen Maritime Services** have taken the following actions:

- The ship's master and 3/O were required to attend refresher Bridge Team Management Courses.
- An EMS onboard trainer joined the ship and carried out refresher training with the entire bridge team, giving special emphasis to the conduct of vessels in restricted visibility.
- Reviewed its audit procedures to ensure restricted visibility navigational procedures are verified more thoroughly.
- Ship's staff have been instructed to carry out more stringent radar performance checks with additional verification to be carried out by superintendents and auditors.
- A case study of accident has been disseminated to all ships under EMS management.
- EMS strongly recommended the owners of *Gas Monarch* to replace all radars still using electronic plotting aids with ARPA.
- Following an appropriate performance check of the vessel's radars, the equipment was serviced and magnetrons replaced.
- Accelerated its programme to fit S-VDR across the fleet and implemented a regime whereby VDR data is used to assist masters and auditors when reviewing operational practices on board the vessels.

4.2 ACTIONS TAKEN BY *WHISPA*'S OWNER

During the vessel's repair, *Whispa*'s skipper/owner has:

- Installed AIS "B" to the yacht to improve detection by ships monitoring that system.
- Installed a GMDSS DSC VHF radio for ease of communication with, and alerting, GMDSS and AIS compliant vessels.
- Installed additional automatic bilge pumps.
- Fitted bilge alarms to the automatic bilge pumps to give warning of their activation due to rising bilge levels.

4.3 ACTIONS TAKEN BY OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)

As a result of this accident OCIMF has:

- Added a Radar Performance Monitor guidance note to its Vessel Inspection Questionnaires.
- Proposed amendments to its Tanker Management Self Assessment tool to reflect that all vessels should be fitted with ARPA as best practice.

4.4 ACTIONS TAKEN BY MAIB

As a result of the accident, the Chief Inspector of Marine Accidents has written to the International Institute of Marine Surveying regarding its inspection procedures which failed to detect that *Whispa* had no bilge alarms installed to give early warning of flooding.

SECTION 5 - RECOMMENDATIONS

The **Maritime and Coastguard Agency** is recommended to:

2007/198 Review the requirement for training and qualification for skippers and crew of small commercial vessels including, but not limited to, radar training, taking into consideration the current requirements for Inland Waterways and Limited Coastal Operations, Boatmasters' Qualifications.

The **Comité International Radio-Maritime** is recommended to:

2007/199 Encourage its members who make or supply radars for non-SOLAS convention vessels to emphasise to all small vessel radar users, wherever possible, the need to obtain appropriate training in its use, thus gaining best possible advantage from the equipment.

Marine Accident Investigation Branch
December 2007