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Marine Occurrence Report

Collision

Between the Bulk Carrier "SEALNES"
and the Fishing Vessel "MR. FISSION"
in the Approaches to Vancouver Harbour
British Columbia
19 December 1993

Report Number M93W0012

**TRANSPORTATION SAFETY BOARD
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Synopsis

Shortly after midnight on 19 December 1993, in good visibility, the "SEALNES" was approaching the First Narrows, inbound to Vancouver Harbour, when she collided with the "MR. FISSION" which was drifting in the main channel after an engine malfunction. The three crew members of the "MR. FISSION" were promptly rescued by one of the tugs in the area before their capsized vessel sank.

The Board determined that the "SEALNES" and the "MR. FISSION" collided because both vessels were not maintaining a proper look-out and neither vessel had determined that a risk of collision existed.

Ce rapport est également disponible en français.

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1.0 Factual Information

1.1 Particulars of the Vessels

	"SEALNES"	"MR. FISSION"
Official Number	N-00753	-
Licence Number	-	13K99191
Port of Registry	Bergen, Norway	Not registered
Flag	Norwegian	Canadian
Type	Bulk carrier	Fishing vessel
Gross Tons ¹	19,385	less than 5
Length	170.39 m	9.14 m
Breadth	27.56 m	-
Draught	7.24 m	0.6 m
Built	1984, Japan	1985, Nanaimo, British Columbia
Propulsion	One six-cylinder Sulzer diesel engine, rated 8,474 kW ² , driving a single fixed-pitch propeller	One inboard diesel engine, rated 206 kW, driving a single fixed-pitch propeller
Owners	Aboitiz Jebsen Bulk Transport Corporation, Manila, Philippines	Andrew Swiba Vancouver, British Columbia
Crew	23	3

1 Units of measurement in this report conform to International Maritime Organization (IMO) standards or, where there is no such standard, are expressed in the International System (SI) of units.

2 See Glossary for all abbreviations and acronyms.

3 All times are PST (Coordinated Universal Time (UTC) minus eight hours) unless otherwise stated.

1.1.1 Description of the Vessels

"SEALNES"

The "SEALNES" is a typical geared bulk carrier with accommodation, navigation bridge and machinery space located aft. The vessel is constructed with a raised forecastle and a bulbous bow.

"MR. FISSION"

The "MR. FISSION" was a licensed fishing vessel used as a dive-tender. The engine was controlled from the wheel-house and was mounted in a casing, accessible from the afterdeck.

1.2 History of the Voyage

"SEALNES"

On the evening of 18 December 1993, completing a voyage from Japan, the "SEALNES" arrived at the Victoria Pilot Station where a British Columbia Coast Pilot boarded and assumed the conduct of the vessel for the passage to Vancouver. At 0025³, 19 December, the "SEALNES" passed buoy QB, approximately 2.5 miles west of the First Narrows, on a course of approximately 090° as she lined up to pass under the Lions Gate Bridge. The engine setting was at half ahead and the speed over the ground was estimated to be nine knots. The speed was gradually being reduced as the "SEALNES" neared the bridge.

At 0029, the "SEALNES" was advised by the Vessel Traffic Centre (VTC) in Vancouver of two unidentified targets in the area of the First Narrows. One echo

was in the vicinity of the "Cap" light, a light structure at the mouth of the Capilano River, and the other was approaching the bridge, outbound. Following this message, one of the two tugs which had been dispatched to assist the "SEALNES" in the berthing operation, the "CATES 2", broadcast on the radiotelephone and advised being at the "Cap" light. The pilot of the "SEALNES" identified the navigation lights of two tugs, the "CATES 2" and the "CATES 3", on the port bow. Reportedly, no navigation lights were seen either ahead or to starboard of the "SEALNES" by the navigation team on the bridge, nor were radar targets detected in those areas.

At approximately 0038, the chief officer, who was standing by on the forecastle head in preparation for docking, heard a slapping sound over the starboard bow. When he looked over, he saw a small boat abreast of the No. 1 hatch and falling astern; the boat was listing heavily and sinking stern first. The chief officer immediately reported the sighting to the wheel-house and the propeller of the "SEALNES" was stopped, but only briefly, because, with the limitations of the narrow channel and the proximity of the Lions Gate Bridge, the propulsion was required to maintain steerage way. The "SEALNES" passed under the bridge at 0045 and, with the help of the two assisting tugs, she secured alongside Vancouver Wharves at 0112.

"MR. FISSION"

As the "SEALNES" was approaching the First Narrows inbound, the "MR. FISSION" was headed out of Vancouver Harbour by

way of the First Narrows. The "MR. FISSION" was on passage from the vicinity of Coal Harbour toward False Creek, and it was the intention of the owner who was operating the vessel to cross over toward the north shore and pass beneath the Lions Gate Bridge keeping to the starboard side of the channel. However, the engine stopped when the vessel was in the vicinity of Burnaby Shoal and, shortly after being restarted, it stalled again. Because of the malfunctioning engine, the operator decided not to cross the traffic lanes but to remain on the south side while passing through the First Narrows, keeping as close to shore as possible.

No times were recorded on the "MR. FISSION"; however, the VTC radar video record showed that the vessel passed under the Lions Gate Bridge at 0032, and the engine apparently stalled the second time when the vessel was some 500 m west of the bridge at 0036. The "MR. FISSION" did not advise the VTC of the difficulties being experienced with the main engine. Despite several attempts, the operator could not restart the engine on this occasion, and the engine compartment was uncovered by the two other crew members to try to determine the problem. The operator suddenly saw a black shape approaching his vessel and he successfully restarted the engine and engaged it in gear. However, before the "MR. FISSION" had a chance to move, she was lifted and overturned, throwing the three crew members into the water.

1.3 *Rescue of the "MR. FISSION" Crew Members*

The tug "SEASPAN PLANET" was overtaking on the starboard side of the "SEALNES" when the collision occurred. The officer of the watch (OOW) of the "SEASPAN PLANET" notified the VTC of the incident, reduced speed, summoned the master to the wheel-house and turned the tug about to approach and give assistance to the sinking "MR. FISSION".

When the tug "CATES 2" reported to the VTC, the tug "CATES 3" was also near the "Cap" light. As the two tugs were close to each other, they appeared as one target on the radar screen. At the time of the collision, the "CATES 3" was off the port quarter of the "SEALNES". When the call from the "SEASPAN PLANET" to the VTC was overheard, the "CATES 3" went around the stern of the "SEALNES", approached the sinking "MR. FISSION" and recovered the three crew members from the water.

The survivors were transferred to the "SEASPAN PLANET" to be landed and met by waiting ambulances.

1.4 *Injuries to Persons*

The three crew members of the "MR. FISSION" were thrown in the water, but otherwise the collision caused no injury.

1.5 *Damage to the Vessels*

Reportedly, the starboard side of the bulbous bow of the "SEALNES" struck the starboard side of the "MR. FISSION". There was no damage to the "SEALNES".

The "MR. FISSION" was overturned and sunk; the extent of the damage to the vessel was not determined.

1.6 *Vessel Certification*

"SEALNES"

The vessel was certificated, manned and equipped in accordance with existing regulations.

"MR. FISSION"

Being less than 15 gross tons, the "MR. FISSION" was exempt from inspection by the Ship Safety Branch of the Canadian Coast Guard. She was inspected for insurance purposes on 15 December 1993 in Vancouver.

1.7 *Personnel Qualifications and Experience*

"SEALNES"

The master, chief officer and OOW held appropriate qualifications issued by the Government of the Philippines for the class of vessel on which they were serving and for the voyage being undertaken. All three had completed Radar Observer's and Automatic Radar Plotting Aid (ARPA) courses.

The master had served in that capacity since 1990 and had been master of the "SEALNES" for one month. He had 20 years' seagoing experience. The chief officer also had some 20 years' seagoing experience and the OOW had six years' seagoing experience.

Pilot of the "SEALNES"

The pilot was duly licensed by the British Columbia Pilotage Authority. He had 22 years' experience in a seagoing capacity before his 15 years as a pilot in the coastal waters of British Columbia. The "SEALNES" was his first assignment following a regular 10-day break.

"MR. FISSION"

The owner/operator did not possess a certificate of competency nor was he required to by regulation. He had had no formal training in navigation and/or seamanship. He was an experienced diver and had owned the "MR. FISSION" since January 1993, operating the vessel in the seafood harvesting industry. He had no previous watchkeeping or navigation experience.

1.8 *Weather and Tidal Information*

1.8.1 *Weather*

Both the "SEALNES" and the "MR. FISSION" reported light winds, calm sea and a visibility of approximately 10 miles. These observations were similar to those reported by the First Narrows recording station.

1.8.2 *Tide and Current*

The *Canadian Tide and Current Tables* published under the authority of the Canadian Hydrographic Service (CHS) indicate that high water in Vancouver Harbour was predicted to be at 2050, 18 December 1993, with a succeeding low water at 0305, 19 December 1993. The heights above chart datum were 3.4 m and 1.7 m, respectively. The maximum ebb current predicted at the First Narrows was 2.8 knots at 0035, 19 December 1993. The CHS *Vancouver Harbour Tidal Current Atlas* indicates that, for the period covering this occurrence, the ebb tidal stream was running fair with the main channel between Burnaby Shoal and the Lions Gate Bridge with tide rips toward the south shore, west of the bridge. CHS chart No. 3493 shows the tidal stream running fair with the channel immediately to the west of the Lions Gate Bridge.

1.9 *Manning of the Navigation Watch*

"SEALNES"

With the vessel in full stand-by mode preparatory to arriving in port, the bridge was manned by four persons: the pilot who was on the starboard side conning the vessel from the vicinity of the radars, the master who was at the forward window to the port side of the centre line monitoring the vessel's progress, the OOW who was at the control console on the port side monitoring and recording the vessel's progress, and a quartermaster who was at the helm. There were also six crew members on the forecastle deck preparing lines for a tug, under the direction of the

chief officer. There was no designated look-out.

"MR. FISSION"

The operator had the conduct of the vessel. After the first malfunction, the two crew members were occupied attempting to determine the problem with the main engine, leaving the operator with the sole responsibility for all navigational duties, including maintaining a proper look-out.

1.10 Navigation Equipment

1.10.1 Radar

The "SEALNES" is fitted with two radar sets and an ARPA, all of which are located toward the starboard side of the wheel-house. During the pilotage, both radar sets were in operation; however, it was a clear night and the vessel was not being navigated by radar. The pilot was the only member of the navigation team to refer to the radar, and no continuous radar watch was kept. Reportedly, the vessel has no radar "blind" sectors.

The "MR. FISSION" was equipped with one radar set which was reported to have been in operation; however, the operator had elected to navigate by visual observations. In any event, the operator was distracted from his navigation duties by the malfunction of the main engine.

1.10.2 Lights

The "SEALNES" was exhibiting the prescribed navigation lights. As she was approaching the dock and about to make the tugs fast, deck working lights were

also lit. Deck lights interfere to some extent with the night vision of those on the vessel's bridge but they do not interfere with the visibility of the prescribed lights.

Reportedly, the "MR. FISSION" was exhibiting prescribed sidelights and a masthead light. In addition, the two docking lights mounted on the hull forward were lit. "Docking lights", which are set into the hull symmetrically on each side of the stem, are installed on many fishing vessels in British Columbia. They are white lights and their construction, intensity and characteristics are very similar to standard automobile headlights. Two searchlights, mounted on top of the wheel-house, were trained on the afterdeck for illumination. All lights were reported to have been burning when the vessel was under way and were reportedly visible to other vessels approaching the First Narrows before the collision.

1.10.3 Radiotelephone Equipment

The "SEALNES" is equipped with two very high frequency (VHF) radiotelephones and was monitoring VHF channel 12, the Vessel Traffic Services (VTS) frequency; channel 16, the international distress and calling frequency; and channel 17, an inter-ship frequency.

The "MR. FISSION" was fitted with one VHF radiotelephone which had dual-channel monitoring capability and was monitoring VHF channels 12 and 16.

1.11 Forward Visibility

As with any geared bulk carrier which has the navigation bridge located aft, the "SEALNES" has "blind" sectors in the forward arc of visibility from the wheelhouse. These are caused by the cranes, the mast and the raised forecastle head. With the exception of a narrow area immediately forward of and under the forecastle, these "blind" sectors can be eliminated by making full use of the width of the navigation bridge.

1.12 The Vessel Traffic Centre (VTC) and Radio Communications

The "SEALNES" was participating in the Vancouver VTS system and the "MR. FISSION", being less than 20 m in length, was not required to participate and was not a participating vessel. The "SEALNES" duly reported to the VTC as she approached Vancouver Harbour and, approximately 10 minutes before the collision, was given a traffic report by the Marine Traffic Regulator (MTR) advising of the two unidentified non participants in the area of the First Narrows.

The national VTS Manual of Operations states that information relevant to the safe navigation of ships shall be provided in a timely manner. The regional Vancouver VTS Manual of Operations is more specific with regard to the duties of the MTR and requires that radar surveillance be maintained, with unusual vessel movement taking priority, and that traffic advisories be given when previously irrelevant information becomes relevant.

Relevant traffic includes any vessel, whether or not a participant, whose anticipated movements may conflict with the intended line of advance of the reporting vessel.

The transcript of radio communications recorded by the VTS indicates that, in the 10 minutes between the traffic report to the "SEALNES" and the time of the collision, the VTC communicated with eight other vessels, mainly local harbour traffic. Reportedly, this occupied the MTR's attention such that he did not see the echoes of the "SEALNES" and the still unidentified target continue to close. In this respect, the VTC radar video record showed that it was possible to determine from the radar picture that the vessel represented by the unidentified target had stopped in the main inbound shipping lane in the path of the "SEALNES". There was no follow-up advice from the VTC to the "SEALNES" regarding the unidentified target.

Before the accident, there were radio communications between the VTC, the "SEALNES" and the "CATES 2". No calls were made by or addressed to the "MR. FISSION". The exchanges with the "SEALNES" were limited to reporting her position and acknowledging messages addressed to her.

1.13 Collision Regulations

When transiting a narrow channel, the conventional arrangement is for a vessel to proceed such that she will meet and pass opposing traffic port-to-port. Rule 9 of the International Regulations for Preventing Collisions at Sea (the Collision

Regulations), covering vessels in narrow channels, states, in part, that "a vessel proceeding along ... a narrow channel ... shall keep ... to the ... limit of the channel ... which lies on her starboard side." It is also good seamanship practice to make due allowance for the limitations of another vessel, and Rule 9 also states that "a vessel of less than 20 metres in length ... shall not impede the passage of a vessel which can safely navigate only within a narrow channel or fairway."

1.14 *Information Processing and Situational Awareness*

Situational awareness has been defined as "an accurate perception of the factors and conditions that affect a vessel and its crew during a specific period of time"⁴. To maintain situational awareness, a person scans for signals or cues which can be interpreted to reveal important information such as location, speed, the presence of hazards, and traffic. The bridge team has to maintain situational awareness to navigate a vessel safely.

When performing everyday tasks, a person is familiar with the normal flow of activities and action alternatives and does not always consult the complete set of defining attributes before acting. Instead, a person who expects certain cues will use these cues to quickly confirm the assessment of the situation and take what is apparently appropriate action without referring to other information which may corroborate or conflict with the evaluation. Once a hypothesis is adopted, it is very resistant to change, a phenomenon commonly called "hypothesis locking or confirmation bias"⁵.

4 Geiss-Alvarado Associates, *Human Error Accident Training*, U.S. Coast Guard training manual (July 1991).

5 R.G. Green et al., *Human Factors for Pilots*. (Aldershot, 1991), p. 60.

2.0 Analysis

2.1 Personnel Factors on the "SEALNES"

The navigation team on the "SEALNES" had been advised by the VTC MTR of two radar targets, one off the "Cap" light and a second approaching the Lions Gate Bridge outbound. The navigation team would naturally try to account for the two targets in terms of their current understanding of the situation⁶. Two tugs were expected to assist in berthing the vessel. After the two tugs were identified, the location of the outbound target, ahead of the "SEALNES", was not determined. It is considered that the most probable explanation for the "MR. FISSION" not being detected by the "SEALNES" is that the navigation team equated the two targets with the tugs they were expecting.

With any potential danger from the two reported radar targets now apparently discounted, the navigation team continued preparing for the berthing operation without perceiving a need to validate or confirm the conclusion that the target which had been reported in a position ahead of the "SEALNES" had been one of the tugs. No information was brought to the attention of the navigation team from

on board or from other sources, such as the VTS or the "MR. FISSION", that would have forced them to re-evaluate the situation. The "SEALNES" continued toward her berth unaware of the vessel in her path.

2.2 Conduct of the "MR. FISSION"

The operator's original intentions showed that he was aware of the danger from traffic in the main channel, but his final decision to keep to the port side of the channel, even with the intent of keeping close to the shore, had the effect of putting his vessel close to the lane used by inbound traffic. In the event, when the main engine subsequently broke down, the tidal stream carried the "MR. FISSION" outward in the main inbound lane. Although the vessel was not participating in the VTS traffic scheme, good seamanship practice suggests that it would have been prudent, at that point, to have advised the VTC by radio of the situation so that some warning could be given as to the whereabouts of the "MR. FISSION". The most probable explanation for the "SEALNES" not being observed by the "MR. FISSION" is that the operator was distracted from navigational duties, such as maintaining a proper look-out, by the problem with the main engine.

2.3 Vessel Traffic Services (VTS) Traffic Advisory

It would have been useful for the MTR to have further monitored the unidentified target which represented the "MR. FISSION". When the traffic report

⁶ *ibid*, p. 59.

was given to the "SEALNES" after passing buoy QB, the target was on the wrong side of the channel. The VTC radar video record showed that it shortly became evident that the target had stopped in the channel, a situation which warranted a further advisory to the "SEALNES".

3.0 *Conclusions*

3.1 *Findings*

1. The "MR. FISSION" experienced difficulties with the main engine when about to undertake a passage of the First Narrows.
2. The operator of the "MR. FISSION" elected to keep his vessel to the port side of the channel close to the south shore.
3. A subsequent breakdown of the engine of the "MR. FISSION" resulted in the vessel being carried by the tidal current into the main inbound shipping lane.
4. The inbound "SEALNES" had been advised by the Vessel Traffic Centre (VTC) of two unidentified targets in the First Narrows.
5. One of the two tugs which were to assist in berthing was identified as being in one of the target locations.
6. After the two assisting tugs were sighted, those navigating the "SEALNES" did not determine the location of the other target.
7. Those on the "MR. FISSION" were preoccupied with the engine and did not keep a look-out or alert the VTC of their situation.
8. The VTC Marine Traffic Regulator (MTR) did not monitor the unidentified target after giving the traffic report to the "SEALNES".
9. There was no follow-up advice from the VTC to the "SEALNES" regarding the unidentified target having stopped in the main channel.
10. Neither vessel was aware of the presence of the other and they collided.
11. The "MR. FISSION" was overturned in the collision and the occupants were thrown into the water.
12. The crew members of the "MR. FISSION" were promptly picked up by one of the tugs in the vicinity.

3.2 *Causes*

The "SEALNES" and the "MR. FISSION" collided because both vessels were not maintaining a proper look-out and neither vessel had determined that a risk of collision existed.

4.0 Safety Action

4.1 Action Taken

4.1.1 Navigational Skills

While the crew members of the "MR. FISSION" were preoccupied with the engine problem, they did not keep a look-out or alert the Vessel Traffic Centre (VTC) of their situation. This behaviour may be indicative of a lack of awareness of basic seamanship and navigational skills.

The Board has previously expressed concern that a lack of basic operational skills on the part of operators of small fishing vessels has contributed to the frequency and severity of marine occurrences. As a result, the Board recommended that:

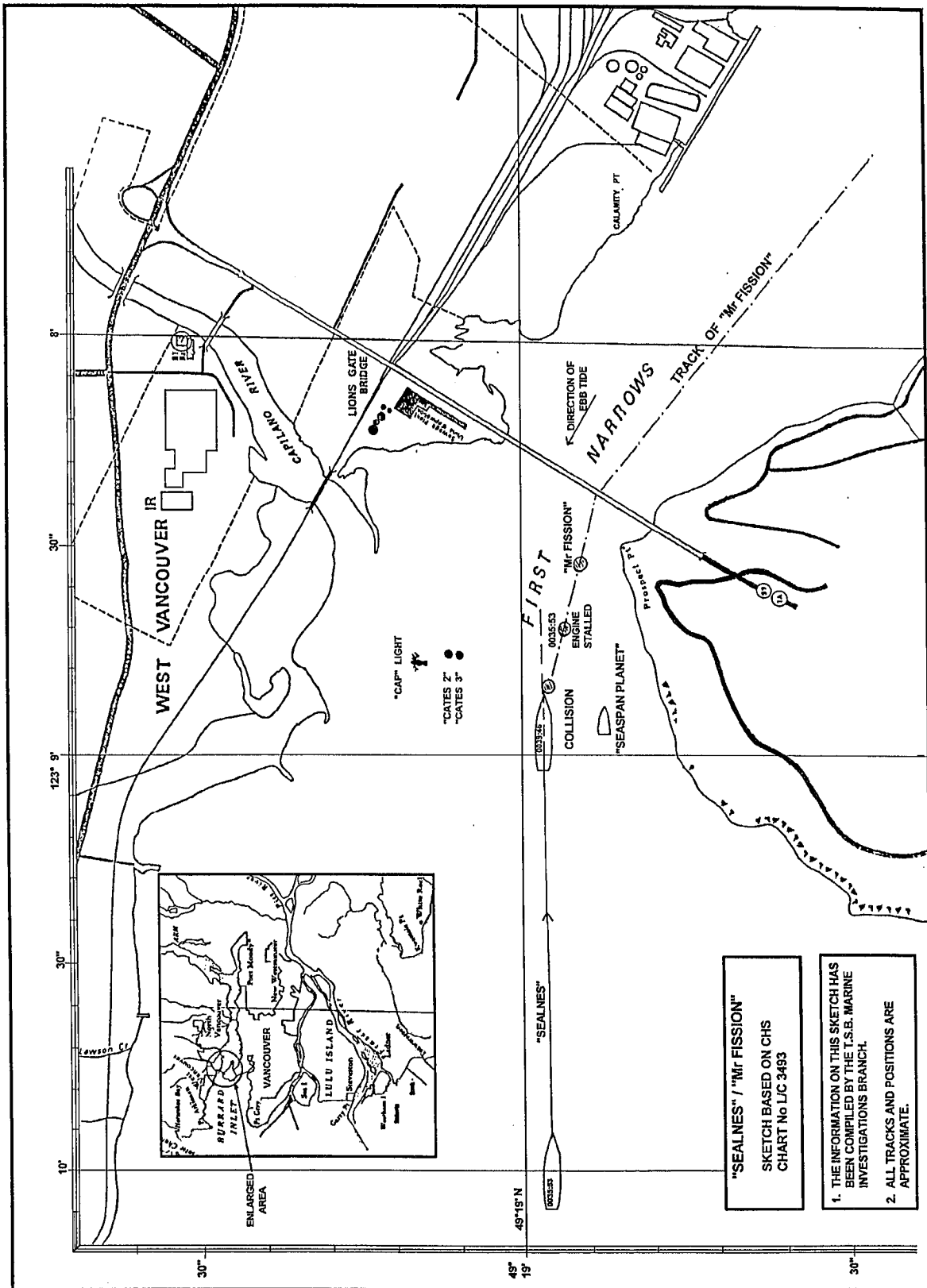
The Department of Transport ensure that any person required to have the conduct of a commercial fishing vessel possess the basic skills for safe navigation.

(M94-10, issued July 1994)

In response, Transport Canada indicated that requiring certification for competency by way of traditional methods of examination is not practical for commercial fishing vessels below a specific size. However, the Canadian Coast Guard (CCG) will continue to work toward requirements which will encompass those commercial fishing vessels not traditionally requiring certification.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson, John W. Stants, and members Zita Brunet and Hugh MacNeil, authorized the release of this report on 01 August 1995.

Appendix A - Vancouver Harbour and Approaches



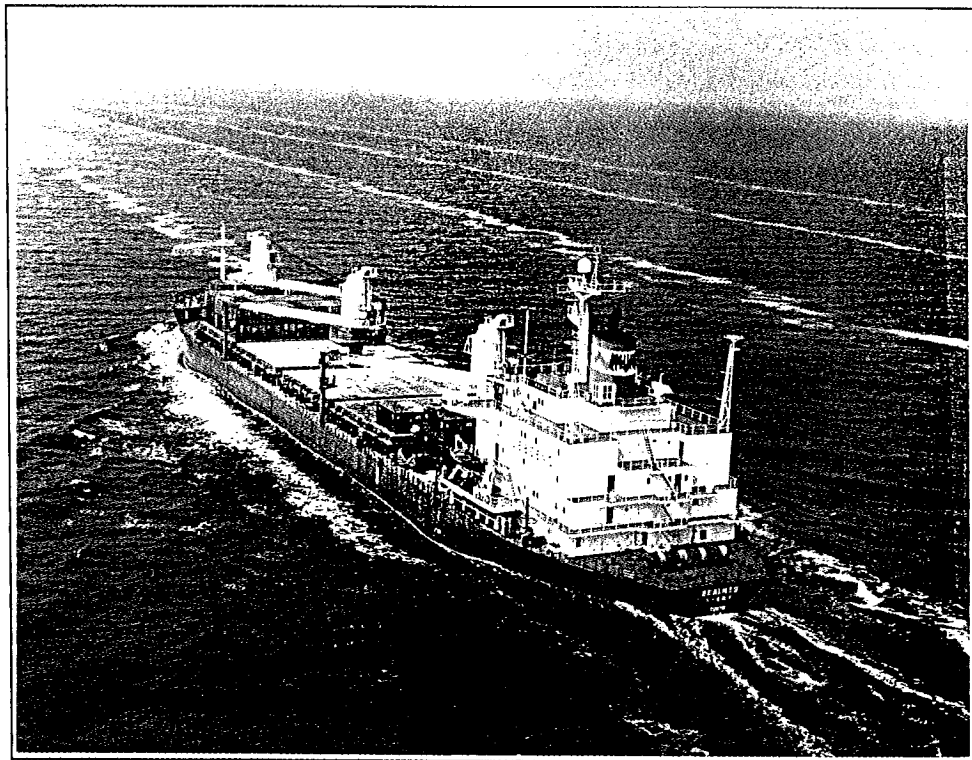
"SEALINES" / "MR FISSION"
 SKETCH BASED ON CHS
 CHART No LC 3493

1. THE INFORMATION ON THIS SKETCH HAS
 BEEN COMPILED BY THE T.S.B. MARINE
 INVESTIGATIONS BRANCH.
 2. ALL TRACKS AND POSITIONS ARE
 APPROXIMATE.

Appendix B - Photographs



"SEALNES" alongside Vancouver Wharves.



"SEALNES" (photo courtesy of Fotoflite, UK)



Appendix C - Glossary

ARPA	Automatic Radar Plotting Aid
"blind" sector	Arc of horizon obscured by intervening structures.
bulbous bow	Extension to vessel's forefoot to reduce resistance.
CHS	Canadian Hydrographic Service
forecastle	Superstructure at extreme forward end of upper deck.
helm	Tiller, wheel by which the rudder is controlled.
IMO	International Maritime Organization
kW	kilowatt(s)
m	metre(s)
MTR	Marine Traffic Regulator
OOW	officer of the watch
PST	Pacific standard time
quarter	After portion of ship on either side of the stern, the equivalent arc of visibility.
(tide) rips	Agitation of surface of water caused by current.
SI	International System (of units)
TSB	Transportation Safety Board of Canada
UK	United Kingdom
UTC	Coordinated Universal Time
VHF	very high frequency
VTC	Vessel Traffic Centre
VTS	Vessel Traffic Services
°	degree(s)