Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

MARINE INVESTIGATION REPORT

M00H0008

FOUNDERING

FISHING VESSEL *AVATAQ*

WESTERN SHORE OF HUDSON BAY

25 AUGUST 2000

Canada

Marine Investigation Report

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Report Number M00H0008

Summary

While bound from Churchill, Manitoba, towards Arviat, Nunavut, with 15 823 kg of general cargo and a crew of four, the *Avataq* encountered gale-force winds. When the vessel was approximately 10 nautical miles south of Arviat, the crew reported that the vessel was taking on water and that the bilge pumps were not working. The vessel subsequently foundered, and all four crew members perished.

This report is also available in Inuktitut.

Other Factual Information

	***Avataq* (A.K.A. *Judith Rose III*)**
Port of Registry	Yarmouth, Nova Scotia
Flag	Canada
Official Number	395436
Type	Small fishing vessel, molded GRP—open construction
Gross Tonnage[1]	29.41
Length	12.01 m
Draught	Aft: 2.1 m
Built	1979
Propulsion	Caterpillar 111 kW, 8-cylinder marine diesel engine, single propeller
Number of Crew	4
Registered Owner	Avataq Enterprises, Rankin Inlet, Nunavut

Description of the Vessel

The *Avataq* was a small fishing vessel of open construction, with forward accommodation and wheelhouse (Figure 1). Two flush, non-watertight hatches were inset into the afterwelldeck. The hull was constructed of moulded glass-reinforced plastic (GRP) and stiffened by 19-mm plywood bulkheads spaced 82 cm apart. Some of these bulkheads had been removed to accommodate cargo below decks. Deck beams consisted of 10-cm-by-10-cm spruce overlaid with a 2.5-cm plywood deck. The afterdeck was drained by two threaded 7.6-cm scuppers on each side. An aluminum skiff was carried secured to the foredeck.

The vessel was equipped with one electric yacht-type bilge pump capable of pumping 1500 litres per hour, one handpump, and one Yamaha gasoline-driven portable pump of unknown capacity. No bilge alarm was fitted. Navigation and communications equipment included a radar, global positioning system, citizens' band (CB) radio, and a portable medium-frequency (MF), 503-kHz bush radio.

[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.

Figure 1. *Avataq* circa 1990

Description of the Voyage

On 21 August 2000, the *Avataq* arrived in the Port of Churchill, Manitoba, to discharge a small amount of cargo and to load for a return voyage to Arviat and Rankin Inlet, Nunavut. The vessel departed Churchill at 0500 central daylight time[2] on August 24 and proceeded on a course northwards following the 94th meridian. At approximately 2330, as the vessel came into radio range of Arviat, the captain initiated a series of radio calls, on CB radio Channel 14, advising a relative that the crew were on deck re-securing cargo that had come loose and that they expected to arrive in Arviat at 0200 the next morning. Another radio call at 0030 indicated that the vessel was in a position 10 nautical miles south of Arviat, that the bilge pumps were not working properly, and that the vessel was taking on water. A final radio transmission was heard from the vessel at 0130 advising that the *Avataq* was taking water over the bow and stern and was sinking. Despite attempts by the shore station to contact the vessel, no further transmissions were heard.

Search-and-Rescue Operations

Several residents of Arviat overheard the radio conversation between the vessel and shore. When communications could not be re-established with the *Avataq*, a group of residents proceeded south along the coastline on all-terrain vehicles in an attempt to locate the vessel. At 0255, the searchers called the head of the local Emergency Measures Organization (EMO) in Arviat and informed him that the *Avataq* was missing and might have sunk.

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[2] All times are central daylight time (Coordinated Universal Time minus five hours).

After evaluating the situation, Arviat EMO called Nunavut Emergency Services (NES) in Iqaluit, Nunavut, at 0257 to apprise them of the situation, followed by a second call at 0319. Arviat EMO then proceeded to find an aircraft to conduct a search.

At 0340, NES Iqaluit called the Canadian Coast Guard (CCG) in Iqaluit to ascertain if any other vessels were available in the area. Meanwhile, local residents of Arviat were preparing to search in small vessels but were prevented from departing by adverse weather conditions. At 0510, Arviat EMO received a call from and provided an update to NES Iqaluit, who in turn notified the Rescue Coordination Centre (RCC) in Trenton, Ontario, at 0519 that the *Avataq* might have sunk. A Cessna Caravan was located in Rankin Inlet and took off at 0600 with four spotters on board. This aircraft arrived on scene at 0640 at the vessel's last known position and started searching.

RCC Trenton retasked a search-and-rescue (SAR) Hercules aircraft (which was on another mission in Franklin Strait) to the area of the sinking. The Hercules arrived on scene at 0810 and dropped a Canadian Search and Rescue Planning (CANSARP)[3] drift buoy. Fuel and crew change requirements allowed the aircraft to remain on scene for only 35 minutes. The aircraft then departed for Churchill.

At the time of the occurrence, the motor tanker *Mokami* had nearly completed discharging cargo in Arviat. However, due to the vessel's lightly ballasted condition and weather conditions outside the harbour, the *Mokami* could not safely depart to participate in the search. A second commercial vessel, the *Nalinee Naree*, which had departed Churchill at about the same time as the occurrence, was contacted at 1214 and tasked to participate in the search. Between the time of the initial response and the time the SAR mission was reduced on August 30 at 0935, a total of four SAR helicopters, three Hercules SAR aircraft, one private aircraft, two commercial vessels, and numerous private small vessels participated in the search.

The body of a crew member was located and recovered by a Royal Air Force Chinook helicopter at 1908 on August 25, and the body of the captain was located and recovered by a local vessel at 1705 on August 26. Both victims, who were wearing full-length personal flotation device (PFD) coveralls, were found in the vessel's debris field. The local coroner determined that both victims died of hypothermia. The vessel sank in estimated position latitude 60°55' N, longitude 093°59' W.

Lifesaving Equipment

The *Avataq* was equipped with a four-person Beaufort liferaft secured by a pelican hook to a cradle on top of the wheelhouse. A hydrostatic release and deep chocks were not fitted for the liferaft, nor were they required to be fitted. Liferafts are required to be serviced annually at an approved facility; this liferaft was last serviced in 1995. Numerous overflights of the debris field

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[3] *CANSARP* is a computer model developed to automate the process of search pattern generation. It predicts the best search paths in order to minimize search area, time, and resource requirements, in turn maximizing the speed and effectiveness of search operations. Components of the CANSARP program model include surface current, wind speed, wind direction, leeway of SAR objects, and characteristics of search vessels and detectors used during searches.

failed to locate the liferaft or its canister; however, an aluminum fishing skiff carried on the foredeck was seen floating. The *Avataq* was not equipped with an emergency position-indicating radio beacon (EPIRB), nor was the vessel required to be so equipped.

At the time of the occurrence, six Mustang PFD coveralls (models 185 and 195) were stored at the back of the wheelhouse. The suits worn by the recovered victims were in serviceable condition but were not equipped with marker lights or sound-signalling devices (whistles). A hanger was found in the back of the suit worn by the master, and the suit worn by the crew member was not fully zipped up. The estimated survival time of victims wearing model 185 or 195 Mustang PFD coveralls in 8°C water is five hours.[4]

Environmental Conditions

When the *Avataq* departed Churchill at 0500 on August 24, the Environment Canada marine weather forecast predicted winds from the west, veering to the northwest later in the day with a predicted windspeed of 15 knots increasing to 30 knots overnight.

A gale warning for the Churchill and Arviat marine regions was broadcast on VHF and MF radio by Environment Canada at 1503 local time. Actual wind reports taken from the Arviat airport show that, during the evening of August 24, winds were 10 to 15 knots from the southwest veering westward at 2200.[5] Between 2300 and 2400, windspeed increased from 12 knots to 23 knots. At 0130, when the *Avataq* foundered, winds had further veered to the west-northwest and were 26 knots, gusting to 33 knots.

The water temperature in the area of the occurrence was between 8°C and 10°C.

Crew Certification

The master and the crew of the *Avataq* held no formal marine qualifications.

For the local voyages upon which the *Avataq* was engaged, the master would have been expected to hold a certificate as Master, Ship of Not More Than 350 Gross Tons, or Tug, Local Voyage. This certificate is intended to ensure that the master is knowledgeable in meteorology, ship management, and general seamanship. A further prerequisite to the certificate is the successful completion of courses in simulated electronic navigation (SEN II), marine emergency duties (MED C and D) and the provision of a Restricted Radio Operator Certificate with Maritime Qualification.

In 1990, CCG Ship Safety, now Transport Canada Marine Safety (TCMS),[6] recognized the problem of conveying safety and certification requirements to Inuit vessel owners, some of

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[4] Information provided by Mustang Canada.

[5] Winds can be expected to be at least five knots stronger over water than on land.

[6] The CCG was transferred to the Department of Fisheries and Oceans. The Ship Safety Branch remained with Transport Canada and became Transport Canada Marine Safety on 01 April 1996.

whom are not fluent in English or French. Although TCMS does not have surveyors who are fluent in Inuktitut, the *Small Fishing Vessel: Safety Manual* (TP10038) is printed in Inuktitut and has reportedly received wide distribution over the past six or seven years as part of the CCG's Boat Safety Program.

Vessel Certification and History

The *Avataq* was built in 1979 at Barrington Passage, Nova Scotia, and registered as the *Judith Rose III*. Construction was not supervised by CCG Ship Safety nor was the vessel built to approved plans. In 1989, the vessel was sold to owners in Iqaluit, where it underwent inspection by CCG Ship Safety. After repairs and modifications, it was certificated as a small fishing vessel. Notwithstanding the requirements of the *Small Fishing Vessel Inspection Regulations*, no plans were submitted to CCG Ship Safety for approval.

The initial inspection certificate of the *Avataq* restricted it to voyages within 20 miles from shore. Due to the remote operating area, a second restriction required that a voyage plan be deposited with the vessel's home base before sailing and that the vessel report its position by radio twice daily. In 1995, the vessel was sold to new owners in Rankin Inlet, Nunavut, where it underwent a second periodic inspection by CCG Ship Safety.

After this inspection, the *Avataq* was still limited to voyages within 20 miles of shore; however, the requisite voyage plan and radio position reports were not noted on the new certificate. This final inspection certificate expired in July 1999 and, up to the time of the occurrence, the owner had not requested that the vessel be re-inspected and the certificate renewed.

At least 34 small fishing vessels are registered to owners living in Nunavut, the Northwest Territories, and the Yukon Territory. Only two of these vessels are currently inspected by TCMS. The primary activity of these vessels registered as commercial fishing vessels is subsistence fishing or whaling and the carrying of cargo between coastal communities. As early as 1990, a CCG inspector had expressed concern to his regional office over the safety of small fishing vessels operating in the Arctic.

Vessel Activity

Between 1995 and August 2000, the *Avataq* made two to four voyages per year between the Port of Churchill and communities on the western shore of Hudson Bay. During the same period, the *Quinaluguaq* conducted a similar number of voyages. Before departure, a representative of the Port of Churchill would visit the vessel to obtain an "outward declaration" form and collect port fees.

Since approximately 1995, both the *Avataq* and *Quinaluguaq* had called routinely at the Port of Churchill to load cargo. The cargo-carrying activity of these vessels was known to officials of the Port of Churchill and to the TCMS port warden. Because the maritime operations at the port are seasonal, TCMS does not maintain a full-time inspection presence. A port warden is hired on

contract for the short shipping season, primarily to ensure the safe loading of grain cargos. However, under the *Canada Shipping Act*, the Minister of Transport may empower a "port warden or other competent person" to inspect vessels for any defects believed to exist.[7]

Vessel Loading and Stability

Information provided by cargo consignors and gathered from the examination of salvaged cargo indicates that the vessel was carrying an estimated 15 823 kg of the following cargo:

- Propane: 3727 kg
- Building materials: 12 096 kg

Cargo consigned to the *Avataq* was stored by Northern Transportation Ltd. and released when the vessel was prepared to load.[8] The crew loaded and secured the cargo without the aid of stevedores. Once the vessel was loaded and ready for departure, a representative of the port obtained an "outward declaration" form from the master, indicating the tonnage of cargo on board, from which port dues were calculated before departure. The master declared to the port that there were 10 160 kg of cargo on board.

The precise on-board disposition of the cargo cannot be ascertained. In the past, the vessel had been loaded with steel pipe "space-frames", wood construction materials, and large propane bottles stowed on deck. Smaller propane bottles were stowed in the hold on either side of the engine room. On departure, the vessel's freeboard is estimated to have been approximately 40 cm. To prevent water ingress onto the afterdeck, the scuppers were plugged with threaded barrel plugs. Because of the low freeboard, it was common practice for the crew to cover the afterdeck with a plastic tarpaulin attached to the gunwale to reduce the amount of water shipped.

On one previous voyage, the *Avataq* nearly capsized after taking a large angle of heel. In that instance, cargo was lost overboard and the vessel righted itself. A small fishing vessel that is not engaged in fishing herring or capelin is not required by regulation to have approved stability information. However, at the time of the occurrence, the vessel was operating as a cargo carrier.

Previous Occurrences

In a previous occurrence investigated by the TSB, the pleasure craft *Qasaoq*, with 10 Inuit hunters on board, sank near the mouth of Frobisher Bay, resulting in the loss of 8 persons.[9] The Board found that the vessel was not equipped with adequate lifesaving equipment or with a suitable radio for broadcasting a distress call on the designated distress frequencies. In addition, the Board found safety deficiencies in the handling of distress calls by Iqaluit EMO that unduly delayed the SAR operation.

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7 *Canada Shipping Act*, Part V, subsection 392(4) and section 398.

8 Northern Transportation Ltd. is a marine transportation company owned by the Government of Nunavut.

9 TSB Report No. M94H0002.

As a result, personnel from the key agencies involved in SAR operations in the North and representatives of local authorities met to review mandates and to discuss procedures relating to SAR operations.[10] It was agreed that the appropriate RCC in Trenton or Halifax must be immediately notified of marine accidents. To avoid misunderstandings and delays, emergency dispatching and communications were to be handled by a dedicated EMO centre, effective 01 April 1996.

A series of four boating safety documentaries produced by the CCG for the Inuit was broadcast locally on community television. Furthermore, safety posters and copies of the *Small Fishing Vessel: Safety Manual* (TP 10038) in Inuktitut, containing a 1-800 information number, were distributed to local fishing communities.

Analysis

Vessel Activity

Although a well-established marine transportation system exists to facilitate the summer resupply of Canada's northern territories, the system's complex scheduling is not always flexible enough to provide for the short-term needs of northern communities. As a result, a demand has developed for smaller vessels such as the *Avataq* that can operate on a more flexible schedule. Economically, it is more advantageous for a northern vessel operator to purchase an existing vessel in southern Canada than to construct a purpose-built vessel. Therefore, small fishing vessels such as the *Avataq*, which may be unsuitable to carry cargo, have become commonplace in the North.

TCMS does not maintain a resident surveyor in the Port of Churchill, nor would it be reasonable to expect it to do so. The *Canada Shipping Act*, however, does provide a statutory mechanism for the inspection of any vessel by a port warden or other competent person. In a small port such as Churchill, with relatively few ship movements, the identification of vessels loading cargo in an unsafe manner is not difficult, particularly if a trained and competent port warden is already present and directed to act as the eyes and the ears of TCMS.

There was an awareness that the *Avataq* and other similar fishing vessels were engaged in the loading of cargo at the Port of Churchill for delivery to communities on the western shore of Hudson Bay since the vessel began operating out of Rankin Inlet in 1995. During this time, concerns for the safety of the vessel's loading practices had not been identified and passed on to the appropriate authorities. As a result, no assessment was made to determine whether the vessel's cargo was properly loaded or if it was seaworthy as a cargo vessel.[11] Cargo vessels are required to have load-line markings and to have a stability book to assist the master in safely loading the vessel.

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[10] The key agencies were the Department of National Defence, the Royal Canadian Mounted Police, the RCC, the CCG, and the EMO of the Government of the Northwest Territories.

[11] *The International Maritime Dictionary*, 2nd edition, defines "seaworthiness" as "[t]he sufficiency of a vessel in material, construction, equipment, and crew for the trade or service in which it is employed."

Foundering

Following Inuit seafaring (*Quajimajatuqangit*),[12] the Inuit of the western shore of Hudson Bay traditionally followed a route close inshore between Churchill and Arviat, anchoring each night. Modern electronic aids to navigation have given vessel operators the tools to confidently take a more direct route offshore, generally following the 94th meridian towards destinations along the western shore of Hudson Bay. Consequently, vessels such as the *Avataq*, when following this offshore route, are more likely to be caught offshore by unexpected severe weather conditions.

Little is known of the stability characteristics of the *Avataq* when heavily loaded, with little residual freeboard. The design to which the *Avataq* was built is such that the space below deck was subdivided into a number of small compartments by transverse bulkheads. As a result, the *Avataq* carried most of its bulky, heavy cargo lashed on the deck. As demonstrated on a previous voyage during which the vessel nearly capsized, when loaded with 15 823 kg of cargo in this manner, the vessel's centre of gravity would have risen to a point where the vessel had little margin of stability. When fully loaded, the vessel's freeboard was 40 cm. The scuppers were therefore below the waterline, and barrel plugs had been screwed into them to prevent water from flooding the afterdeck.

Although this arrangement prevented water from backflooding the afterdeck, it also caused the vessel to retain any water shipped on deck. When the *Avataq* encountered heavy seas south of Arviat, it began to ship water on the afterdeck. Without watertight hatches, some of the shipped water would have downflooded into the hull; however, most would have been retained on the afterdeck. Whenever water is shipped and retained on deck, a free surface effect effectively reduces stability by causing a rise in the virtual centre of gravity. The free surface effect of the shipped water retained on the afterdeck probably reduced the vessel's already marginal transverse stability characteristics, causing the *Avataq* to heel, downflood, and sink.

Lifesaving Equipment

When a vessel founders in a remote location, the safety equipment carried must be capable of preserving the life of its crew in whatever environment the vessel may be operating, until help can arrive. The safety equipment carriage requirements for small fishing vessels, however, do not take into account vessels operating in remote regions in severe climatic conditions. The crew of a vessel that sinks rapidly may not have time to manually launch a liferaft before abandoning ship. As evidenced by the hanger found within the PFD coverall of the captain, the *Avataq* foundered quickly and the crew had little time to don survival equipment and manually launch the liferaft. A liferaft sitting in deep chocks or equipped with a suitable release mechanism such as a hydrostatic release is likely to deploy and be available to the crew in the water. During the subsequent extensive air search, neither the raft nor its canister were spotted in the debris field, suggesting that they likely sank with the vessel.

Once the crew members found themselves in the water without a liferaft, their survival time was limited in part by the amount of thermal protection they were wearing. Full immersion suits are not comfortable to work in; consequently, most small vessel operators are more familiar

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[12] *Quajimajatuqangit* refers to traditional knowledge or practices.

with and tend to use PFD coveralls. The two victims whose bodies were recovered were wearing PFD coveralls, which provide protection against hypothermia for less time than a full immersion suit. In the best of circumstances, the response time of SAR resources to accidents in Arctic regions can be beyond the capabilities of PFD coveralls to keep a victim in the water from succumbing to hypothermia. Conversely, the carriage and the wearing of immersion suits significantly increases the crew's chance of surviving in the water until SAR resources arrive. Indeed, in the January 1993 sinking of the scallop dragger *Cape Aspy* off Nova Scotia, one crew member wearing an immersion suit was recovered from the frigid water approximately six hours after the vessel sank.[13]

At present, there are no statutory requirements for lifesaving equipment such as liferafts, deep chock or hydrostatic releases, and immersion suits to be carried on board small fishing vessels such as the *Avataq*. Given that operating conditions vary from location to location across Canada, safety equipment carriage standards, appropriate for vessels operating in southern Canada, do not provide protection for the crews of vessels operating in the isolated Arctic marine transportation environment.

Crew Training

Although coastal seafaring is a traditional activity dating back thousands of years in the Canadian Arctic, the use of small fishing vessels carrying heavy cargoes on offshore voyages has engendered new hazards for northern seafarers. Special technical skills and knowledge are required to ensure safe and efficient vessel operations. Although such knowledge can be acquired on the job, formal courses and training, coupled with sea-going experience, provide an enhanced awareness of safe operational practices. Without the guidance derived from such training, the crew of the *Avataq* did not have the required knowledge of cargo loading, stability, and the deleterious effect of free surface water to recognize the risks associated with operating the vessel under conditions that could be expected to be encountered during the voyage.

The lack of appropriate safety equipment on board the *Avataq* indicates that the crew might not have been aware of the potential consequences of an on-board emergency that would force them to rapidly abandon ship.

MED training provides mariners with a better understanding of hazards associated with the marine environment and their vessel. This training provides crews with the knowledge of the type of safety equipment that should be carried and of the necessary coping skills for on-board emergencies such as abandoning ship into cold water.

Without the knowledge acquired through formal MED training, the master and the crew of the *Avataq* might not have recognized the seriousness of their situation. The liferaft was likely not freed from its lashings before the vessel sank.

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[13] TSB Report No. M93M4004.

Search and Rescue

Nunavut, the Yukon Territory, and the Northwest Territories occupy a geographically large and isolated region. Gales are frequent during the short shipping season, and the seawater and air temperatures remain relatively cold. Survival time for persons in the water or in liferafts can be limited, requiring a prompt SAR response if lives are to be saved. A prompt SAR response, however, requires immediate notification of the appropriate RCC so that aircraft or vessels may be dispatched.

The MCTS centres in Iqaluit and Thunder Bay act as "ears" for the RCCs, monitoring MF radio communications and listening for distress calls. The *Avataq*, however, was equipped with only a short-range CB radio and with an MF radio incapable of transmitting on 2182 kHz, the marine distress and calling frequency. As a result, when the *Avataq* began experiencing problems, which culminated in its foundering, the MCTS centres and RCC Trenton were unaware that it was in distress.

An advantage of CB radio is its extensive use throughout the Arctic region as a means of inexpensive, short-range communications. Since many homes and vehicles in Arviat were equipped with CBs, the calls from the *Avataq* leading up to and at the time of the foundering were monitored by several members of the community. Rather than informing the local EMO officer, an ad hoc land-based search party was organized in an attempt to locate the vessel. As a result, Arviat EMO and NES Iqaluit officials were not notified for almost 1.5 hours.

No procedures were in place to ensure that the appropriate RCC was notified. NES Iqaluit proceeded to assess whether the *Avataq* had indeed foundered and to identify local SAR resources. A telephone call was made to CCG MCTS Iqaluit seeking information on what vessels were in the vicinity of the occurrence. However, the nature of the emergency was not communicated to MCTS Iqaluit, which in turn did not inform RCC Trenton that the *Avataq* might have foundered. While local authorities may wish to react, an efficient SAR operation requires that the appropriate RCC be notified as soon as possible. Resources may then be dispatched expeditiously to the area. In this occurrence, although Arviat EMO was informed of the distress by area residents at 0255 and immediately called NES Iqaluit, NES Iqaluit did not inform RCC Trenton until 2.5 hours later.

EPIRBs, which operate on 406 MHz, provide an immediate distress signal and have become common; however, the *Avataq* was not equipped with one and was not required to be so equipped. Had the vessel carried a float-free EPIRB or had the emergency been immediately communicated to NES Iqaluit, RCC Trenton would have become aware sooner of the vessel's sinking. Given earlier notice, the Hercules aircraft that was operating north of the area could have arrived on scene within the estimated survival time of those persons in the water who were wearing PFD coveralls.

Findings as to Causes and Contributing Factors

1. The heavy cargo load and the resulting low freeboard made the *Avataq* vulnerable to shipping water on deck as the weather deteriorated.

2. The free surface effect of water shipped on the afterdeck and retained by the stopped-up scuppers probably reduced the vessel's already marginal transverse stability, causing the *Avataq* to heel, downflood, and sink.

3. The involvement of RCC Trenton and the subsequent tasking of SAR resources were delayed while concerned local citizens conducted a land search and while NES Iqaluit assessed whether the *Avataq* had actually sunk.

4. The *Avataq* was not equipped with an appropriate MF radio or a 406-MHz EPIRB with which to send distress signals, nor was it required to be so equipped.

5. The *Avataq* was not equipped with an automatically releasing liferaft or immersion suits to increase the crew's probability of survival in cold water, nor was it required to be so equipped.

Findings as to Risk

1. There was an awareness that the *Avataq* and other similar vessels were engaged in loading cargo at the Port of Churchill for delivery to communities on the western shore of Hudson Bay. Concerns for the safety of the vessels' practices had not been identified and passed on to the appropriate authorities. As a result, no assessment was made to determine whether the vessels were safely loaded or seaworthy for carrying cargo.

2. Without the knowledge acquired by formal training or experience in cargo loading, stability, or free surface effect, the crew of the *Avataq* did not recognize the risks associated with operating the vessel in the conditions encountered during the voyage.

3. Safety equipment carriage standards that are deemed to be appropriate for vessels operating in southern Canada are not adapted for the protection of crews of vessels operating in the isolated Arctic marine environment.

4. The NES does not have clear procedures in place to ensure that the appropriate RCC is notified promptly in situations when SAR resources may be needed.

5. Without the knowledge acquired by formal training in MED, northern operators of small commercial vessels may not have the ability to assess accurately their vessel's safety equipment carriage requirements or the skills necessary to safely abandon ship into cold water.

Safety Action

Action Taken

By TCMS

After this occurrence, TCMS met with the Government of Nunavut and agreed to translate the *Ship Registration Guide* into Inuktitut.

Amendments to the *Life Saving Equipment Regulations* came into force on 14 March 2002 and require all vessels under 25 m that are equipped with liferafts to have provision for the rafts to float free in the event of a sinking. TCMS has issued *Ship Safety Bulletin* (SSB) No. 03/2001 recommending that all vessels, irrespective of size, have float-free arrangements for liferafts. TCMS is also proposing amendments to the *Life Saving Equipment Regulations* to require that liferafts be stowed in readily accessible locations. In the interim, SSB No. 07/2001 has been issued reminding vessel owners of the importance of having lifesaving equipment visible and accessible. TCMS, with assistance from industry groups, is also examining certification and training requirements for small commercial and fishing vessels, with a goal of designing mandatory operator training and qualifications.

Amendments to the *Ship Station (Radio) Regulations* and the *Ship Station (Radio) Technical Regulations* are being phased in over the next few years. As of 01 April 2002, small commercial vessels more than 8 m long (which includes the *Avataq*) operating more than 20 miles from shore are required to carry an EPIRB.

Since the occurrence, TCMS has reorganized the Prairie and Northern Region Branch and moved its headquarters to Winnipeg, Manitoba, from Ottawa.

By CCG MCTS Central and Arctic Region

With the support of Department of National Defence Search and Rescue New Initiatives funding for three years, MCTS Iqaluit implemented an Inuktitut language marine radio safety service during the 2001 operating season. The service is based in Iqaluit and provides coverage 20 hours per day, 7 days per week, during July, August, and September. Regularly scheduled broadcasts focus on weather and tide information, as well as hazards to navigation. Although the system is intended to cover the waters of Frobisher Bay, the coverage area in fact extends beyond and in other directions as well. A listening watch is also kept on the MF "hunters'" frequencies favoured by Inuit hunters and seafarers.

Safety Concerns

TC Marine Inspections

The Board continues to be concerned that any shortcomings with the monitoring of small commercial vessels, particularly in remote areas, may result in vessels being used for carrying cargo beyond their capabilities. The *Avataq* had been operating as a cargo vessel for at least five years before this occurrence but was not inspected for this type of operation. As a result, neither

the inspector nor the master had participated in an assessment of the capabilities of the vessel to carry cargo according to the applicable regulations. The determination of the appropriate operating parameters for this type of voyage was left to the knowledge and the experience of the crew. Because the master was uncertified, it would not be reasonable to expect that he possessed the competences required to determine whether he should have been operating the *Avataq* given the loaded condition and the area of operation. By not defining the operational parameters of the vessel and the capabilities of its crew through the certification process, a master's ability to assess risks is potentially compromised. The fact that he or she may not perceive the risk in time to take corrective action increases the probability and the adverse consequences of an accident.

Emergency Response

The investigation into the 1994 sinking of the pleasure craft *Qasaoq* in Frobisher Bay with the loss of 8 lives identified deficiencies with the timeliness of the Iqaluit EMO's notification of the occurrence to RCC Halifax (TSB Report No. M94H0002). Although the delay did not play a role in the outcome of the occurrence, it was identified as a deficiency that had potential to place lives at risk in the isolated Arctic environment.

After this occurrence, personnel from key agencies[14] involved in the SAR operations in the Arctic and representatives of local authorities met to review mandates and to discuss procedures relating to SAR operations. It was agreed that RCC Trenton or RCC Halifax must be immediately notified of marine accidents.

At the time of the *Avataq* occurrence, there was a delay of 2.5 hours before NES Iqaluit informed RCC Trenton of the occurrence. This delay held up the tasking of a SAR Hercules that was already in the area and reduced the efficacy of the SAR response.

Given the continuing delays in notifying the appropriate RCC, the Board is concerned that the agreements made between the key agencies after the *Qasaoq* occurrence have not been effectively implemented, resulting is a continued risk to seafarers and others in peril in the area. The Board will continue to monitor and assess these types of occurrences with a view to determining the need for further safety action.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 22 January 2002.

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[14] The key agencies were the Department of National Defence, the Royal Canadian Mounted Police, the RCCs, the CCG, and the EMO of the Government of the Northwest Territories.

Appendix A—Sketch of Occurrence Area