

Transportation Safety Board
of Canada



Bureau de la sécurité des transports
du Canada

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The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

Marine Occurrence Report

Listing

of the "CELINE METZ"
Gulf of St. Lawrence
01 December 1991

Report Number M91L3033

Synopsis

While the "CELINE METZ" was outbound in the Gulf of St. Lawrence, under-deck cargo shifted when sea conditions caused the vessel to roll heavily. The vessel developed a list that the crew could not correct, and the master put back into port to secure the cargo. Before finally departing on the transatlantic passage, the vessel made a second return to port to rectify a less severe recurrence of the same problem.

The Board determined that the "CELINE METZ" listed because the unsecured under-deck cargo had shifted.

Ce rapport est également disponible en français.

TRANSPORTATION SAFETY BOARD
OF CANADA

BUREAU DE LA SÉCURITÉ DES
TRANSPORTS DU CANADA

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1.0 Factual Information

1.1 Particulars of the Vessel

"CELINE METZ"	
Port of Registry	Kingstown, St. Vincent and the Grenadines
Official Number	3108
Flag	St. Vincent and the Grenadines
Type	General cargo
Gross Tons ¹	8,501
Length	150.15 m
Breadth	20.2 m
Draught (depart Quebec-calc.)	F ² : 7.665 m A: 7.655 m
Built	1967 Rostock, Germany (then East Germany)
Propulsion	11,200 BHP (8,238 kW) MAN marine diesel engine driving a single fixed-pitch propeller
Managing Owner	Metz Ship Management Limassol, Cyprus

- 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 EST (Coordinated Universal Time (UTC) minus five hours) unless otherwise stated.

1.1.1 Description of the Vessel

The "CELINE METZ" is a conventional 'tween-deck general cargo vessel with five holds. The navigation bridge, crew accommodation and machinery space are located between holds Nos. 4 and 5. She was not specifically designed for the carriage of package cargo. The vessel was manned, certificated and equipped in accordance with the appropriate regulations.

1.2 History of the Voyage

The "CELINE METZ" loaded some 6,400 tonnes (t) of general cargo, including a small parcel of timber deck cargo and some containers on deck, in Montreal, Quebec, and Québec, Quebec, for discharge at Las Palmas, Canary Islands, and other transatlantic destinations. After dropping the pilot off at Les Escoumins, Quebec, on the morning of 30 November 1991, the vessel anchored for some 10 hours near Île-du-Bic, Quebec, to secure the containers. The following morning, 01 December, the "CELINE METZ" was outward bound in the Gulf of St. Lawrence, rolling moderately in a heavy stern sea. At about 1045³, as the vessel was some 50 miles east of the Gaspé peninsula, she rolled heavily, some 30° to starboard, only partially righted herself and remained listed 11° to starboard.

The master turned the "CELINE METZ" back into the St. Lawrence River to seek a port to rectify the situation. An examination of the cargo spaces revealed that some of the under-deck cargo had shifted to starboard. Transferring fuel oil

within the vessel reduced the list to 8°. The vessel was able to berth at Matane, Quebec, at 0940, 03 December, after having been delayed for a day at a Baie-Comeau, Quebec, anchorage because of bad weather.

While the "CELINE METZ" was at Matane, cargo was unloaded, reloaded and re-stowed, secured with wooden shoring and tomming. She departed for Halifax, Nova Scotia, on 12 December to load some 300 t of fuel, which the Matane port warden had directed the vessel to take on before the transatlantic passage to increase the weight in the double bottoms and to improve her stability.

The "CELINE METZ" subsequently departed Halifax at about noon on 15 December. In the early hours of the morning of 16 December, the master became concerned when the vessel was rolling heavily in adverse weather. He inspected the holds and 'tween-decks and decided to seek shelter because part of the cargo had again shifted. The vessel arrived at Shelburne, Nova Scotia, on the morning of 17 December, listing approximately 3° to port.

The list had been caused by a minor shift of under-deck cargo. This shift was augmented by fuel oil gravitating between common port and starboard tanks. The crew and shore carpenters hired at Shelburne re-secured the cargo, and the vessel was brought upright by transferring fuel oil in readiness for the transatlantic passage. The "CELINE METZ" finally departed Shelburne on 19 December and reportedly arrived at Las Palmas without further incident.

1.3 *Injuries to Persons*

No injuries attributable to the shift of cargo were reported.

1.4 *Personnel*

1.4.1 *Certification*

The crew members who were directly involved in this occurrence held the certification necessary for their positions and the vessel's trade.

1.4.2 *Experience*

The master had 16 years' service as a master on refrigerated cargo vessels, but he had no recent experience on general cargo vessels. He joined the "CELINE METZ" in Montreal on 14 November 1991, two weeks before this occurrence.

The chief officer had 19 years' sea service, mainly on bulk carriers, but he had no experience on general cargo vessels. He joined the "CELINE METZ" on 18 February 1991.

1.5 *Cargo*

1.5.1 *Description*

The 5,815 t of under-deck cargo loaded in Québec and Montreal consisted of bags of asbestos on pallets, packages of softwood lumber, and rolls and packages of paperboard. In addition, 29 containers of general cargo, aggregating some 520 t, and about 80 t of lumber were stowed on deck.

1.5.2 Stowage

The loading of cargo in the ports of Montreal and Québec was carried out by established stevedoring companies. The master had final authority over the proposed stowage plan for the nine discharge ports; this plan had been prepared by the vessel's owners for the master's guidance.

1.5.3 Securing

The crews of vessels in the ports of Québec and Montreal are not permitted to secure cargo because of the collective agreement between the International Longshoremen's Association and the Maritime Employers' Association. The agreement requires that such work be done by stevedores, and it was reported that, for reasons of economy, the master specifically declined to have the under-deck cargo secured by the stevedores while the vessel was in the ports of Montreal and Québec. On 12 eastbound transatlantic voyages made by the "CELINE METZ" and her four sister ships in 1991, no special measures were taken to secure under-deck cargo loaded in the ports of Montreal and Québec. There were no reports of cargo shifting on these voyages.

On this voyage of the "CELINE METZ", the stevedores did secure the timber cargo loaded on deck in the port of Québec, and, while the vessel was at anchor near Île-du-Bic, the crew secured the containers that had been loaded on deck.

1.5.4 Inspections

1.5.4.1 Authority

Port wardens in Canadian ports are normally Canadian Coast Guard (CCG) ship surveyors whose duties, including the inspection of cargo, are outlined in the *Canada Shipping Act* (CSA). The ports of Montreal and Québec are specifically exempted, and their port wardens are appointed by local business organizations. The Acts⁴ governing the operation of the offices of the port wardens of Montreal and Québec date from the nineteenth century and have only been subsequently amended to change the fee scale.

With respect to inspecting cargoes loaded in their ports, the port wardens of Montreal and Québec have duties that are broader in scope than those of their CCG counterparts.

The Montreal and Québec port wardens are authorized to board any vessel loading cargo consigned to a port outside Canada, that is, not within the limits of an inland voyage, to determine whether the vessel is fit to proceed to sea. The port wardens may inspect any vessel even if not requested to do so by an interested party.

4 *An Act to Amend and Consolidate the Acts Relating to the Office of Port Warden for the Harbour of Montreal* (assented to on 17 May 1882) and *An Act to Provide for the Appointment of a Port Warden for the Harbour of Quebec* (as amended in 1873).

1.5.4.2 At Montreal

Although it does not have the resources to inspect all vessels proceeding to sea, the office of the Montreal Harbour port warden normally inspects vessels with any type of deck cargo. The Montreal port warden's office inspected the "CELINE METZ" while the vessel was in Montreal.

The first inspection was carried out on 19 November 1991 during the loading of under-deck cargo. No specific instructions for securing this cargo were given during this inspection. On 26 November, shortly before the vessel departed for Québec, the port warden examined the securing of the containers on the deck but did not enter the holds. A certificate was then issued authorizing the "CELINE METZ" to proceed to Québec to finish loading.

1.5.4.3 At Québec

The office of the Québec port warden is a one-person operation, and this dictates the number of vessels that can be attended. However, the port warden usually inspects the same cargoes as his CCG counterparts. This includes inspection of the stowage of timber deck cargo and cargoes of grain or concentrate but not the stowage of containers and general cargo on deck or in the holds.

A vessel transporting timber deck cargo is required by regulation to request an inspection. The "CELINE METZ" made such a request for the morning of 29 November when she was preparing to load her timber deck cargo. After inspecting the vessel and giving

instructions regarding the stowage of the timber, the port warden issued a Certificate of Readiness to Load. When loading was completed, the port warden checked that the timber deck cargo was secure, saw the master's stability calculations and issued a Certificate of Fitness to Proceed to Sea shortly before the vessel departed that same day. The master made no complaints to the port warden regarding the stowage of the cargo in the holds.

1.5.4.4 After the Cargo Shifted

All compartments, except the No. 5 lower hold, which was inaccessible, were inspected on 02 December, after the vessel had acquired the initial 11° list. The packages in the lower holds and 'tween-decks were found jammed together and leaning to starboard, leaving a space on the port side, along the ship's side, which varied from 0.5 m to 1.5 m in width. The lumber and containers on the deck had not shifted.

1.6 Stability

1.6.1 Measures to Improve Stability

Because of the concern of those supervising the re-stowage and securing of the cargo while the vessel was at Matane, the after-peak tank and some double-bottom water ballast tanks were pressed up and the forepeak tank was emptied to increase transverse stability by eliminating unnecessary free surface effects. Previously, these tanks had not been completely filled as a precautionary measure against freezing damage from the

fresh water ballast taken on board at Québec.

1.6.2 *Regulatory Requirements and Recommendations*

The intact stability criteria for dry cargo vessels exceeding 100 m in length which carry general cargo are not specifically defined by the IMO regulations or recommendations. The International Convention for the Safety of Life at Sea, 1974⁵, refers to stability criteria for such vessels if they are under 100 m in length, and the CCG Standard for Intact Stability of Non-passenger Ships and Passenger Ships Carrying not more than 12 Passengers (STAB 6) proposes identical criteria for these vessels, but without length restriction. The STAB 6 criteria are therefore considered the most appropriate yardstick for assessment of the vessel's stability characteristics in this instance.

1.6.3 *Stability Documents*

A Trim and Stability Booklet, a Booklet for the Information of the Captain and other ship's data and plans were on board the vessel before loading was commenced at Montreal. Collectively, these provided sufficient information to accurately calculate and estimate the vessel's intact stability characteristics for the cargo-loading distribution adopted for this voyage.

5 Regulation 22 of Part B of the 1986 consolidation of the 1974 International Convention for the Safety of Life at Sea refers to the IMO's Recommendation on Intact Stability for Passenger and Cargo Ships under 100 Metres in Length.

1.6.4 *Calculations by the Vessel*

Loaded departure stability calculations were prepared by the vessel and seen by the port warden before the "CELINE METZ" left Québec on 29 November. The results of these calculations indicated compliance with the provisions of STAB 6, but calculations for the worst loading condition, the arrival condition at Las Palmas, were not presented.

While at Matane, revised stability calculations were prepared for the new loaded departure condition and for an estimated arrival condition at Las Palmas. The latter condition allowed for taking on an additional 311 t of fuel oil at Halifax before the vessel's transatlantic crossing, a provision of the Certificate of Fitness to Proceed to Sea issued by the port warden at Matane on 12 December.

1.6.5 *Calculations by the Transportation Safety Board of Canada (TSB)*

Review of the stability calculations prepared by the vessel revealed several errors in compilation and presentation which made the results invalid. The use of centres of gravity for homogeneous cargoes meant that the calculations did not fully represent the vessel's reserve transverse stability.

However, based on the reported deadweight distribution on completion of loading, calculations by the TSB confirm that, on departure from Québec, the stability characteristics of the "CELINE METZ" exceeded the minimum criteria of STAB 6. The calculations show that the vessel maintained satisfactory intact

stability characteristics throughout each stage of the voyage from Québec to Halifax.

Further calculations show that the righting moment caused by the transfer of fuel oil on 01 December was consistent with the reported reduction of the starboard list from 11° to 8°. They confirm that the loading of an additional 311 t of fuel oil at Halifax increased the vessel's stability such that the criteria of STAB 6 were amply exceeded throughout the remainder of the voyage to Las Palmas.

1.7 *Damage*

There were no reports of damage to the vessel.

1.8 *Weather*

1.8.1 *Forecasts*

The marine weather forecast for the Gulf of St. Lawrence, issued at 0430, 01 December 1991, predicted 35-knot (kn) gale-force winds with gusts to 45 kn. A storm warning issued the day before was downgraded to a gale warning.

1.8.2 *Weather Experienced*

On the morning of 01 December, the "CELINE METZ" recorded north-west winds of force 8 on the Beaufort scale (34 to 40 kn), producing a heavy swell.

Other vessels in the Gulf of St. Lawrence on 01 December reported a 2.5 m to 4.5 m swell.

1.9 *Search and Rescue*

Although the "CELINE METZ" did not request assistance, the CCGS "SIR WILFRID LAURIER" made contact with the vessel at 2200, 01 December 1991, and escorted her to Baie-Comeau as a precautionary measure.

2.0 *Analysis*

2.1 *Cargo Stowage*

The master and the chief officer are the senior vessel personnel responsible for the stowage of the cargo.

While the cargo stowage in the holds may have appeared to be reasonably compact, a person familiar with the general cargo trade would have realized that it was possible for the cargo to shift. Cargo on refrigerated vessels and bulk carriers normally does not have to be secured with dunnage.

The "CELINE METZ" was not specifically designed for the carriage of package cargo. To facilitate stowage of cargo and to reduce or eliminate the need for securing cargo, many vessels which trade frequently in the forest product and associated trades are constructed with open holds, incorporating side tanks, but having no 'tween-decks and having minimal deck overhang.

2.2 *Weather Conditions*

The weather was not extreme enough to constitute a hazard for a vessel the size of the "CELINE METZ". Although it is not unusual for an ocean-going vessel to roll 30°, it is unusual for a 30° roll to cause properly secured cargo to shift. The shifting of the cargo on the "CELINE METZ" was not caused by abnormal movement of the vessel; it was the result of the cargo not being adequately secured.

When the vessel listed, the master returned to port. He could not be sure that the vessel's listing condition would not worsen; information available to him indicated that the vessel had less positive stability than was the case, and re-stowing or securing the cargo could not be undertaken to remedy the situation in the existing weather conditions.

3.0 *Conclusions*

3.1 *Findings*

1. No steps were taken to secure the under-deck general cargo during loading in Montreal and Québec.
2. The vessel was not specifically designed or constructed to minimize the need for securing the cargo.
3. The senior personnel on the vessel in charge of cargo stowage had limited general cargo experience.
4. The port wardens in Montreal and Québec made their customary inspections of the vessel during loading.
5. Both lists that forced the vessel to return to port were caused by shifting of the cargo in the holds.
6. The weather experienced when the cargo shifted was not extreme for the geographical area or the season.
7. The vessel's intact transverse stability on sailing and at both times that the cargo shifted was in compliance with accepted marine criteria and CCG recommendations for dry cargo vessels.

3.2 *Causes*

The "CELINE METZ" listed because the unsecured under-deck cargo had shifted.

4.0 *Safety Action*

4.1 *Action Taken*

4.1.1 *Company's New Practice*

After this incident, the company changed its cargo stowage practices in favour of container operations and moved its loading operations to another terminal.

4.1.2 *Carriage of Cargoes*

Canada has endorsed the amendments to the International Convention for the Safety of Life at Sea (SOLAS 1990/91 amendments) which entered into force on 01 January 1994. SOLAS Chapter VI now contains provisions covering all cargoes which may pose a hazard to ships or personnel, including the stowage and carriage of general cargo.

In September 1994, the Canadian Coast Guard (CCG) issued Ship Safety Bulletin No. 11/94, Carriage of Cargoes "Solid Bulk and General", regarding the new SOLAS Chapter VI. The provisions of SOLAS Chapter VI are now mandatory for any loadline vessel carrying a cargo in Canadian waters.

4.2 *Action Required*

4.2.1 *Safe Stowage of Cargo*

Regulation 5, Chapter VI of SOLAS, "Stowage and securing", requires that:

Cargo and cargo units carried on or under deck shall be so loaded, stowed and secured as to prevent as far as practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard.

On 12 eastbound transatlantic voyages in 1991, the "CELINE METZ" and her four sister ships were loaded in the ports of Montreal and Québec in a similar manner to the occurrence voyage, with no special measures being taken to secure the under-deck cargo. There were no reports of cargo shifting on those voyages. Although these loading and securing arrangements were successful in the summer months, such practices were inadequate for winter conditions.

The stowage and securing of general cargo is expensive in terms of material and labour and represents a significant operating cost. The securing practices which govern the trade are usually carried out by longshoremen, such as marine carpenters from the local stevedoring company, under the supervision of the ship's superintendent of cargo operations (supercargo), of the ship's officers and, most often, of a marine cargo surveyor hired by the cargo owners or their underwriters.

The master had the final authority to approve the proposed stowage and securing plan prepared by the supercargo but, to save on labour costs, he declined to have the stevedores secure the under-deck cargo while the vessel was in port. The consequences of having unsecured cargo

shifting in the hold while crossing the North Atlantic in December were underestimated.

Within the last 10 years, at least 66 occurrences of cargo shifting on board general cargo vessels were reported to Canadian authorities; 75 per cent of these occurred between the months of November and April. The month of December had the greatest number of reported cases, 23. Of these 66 occurrences, 35 were related to deck cargo and 25 involved under-deck cargo shifting at sea. (The six remaining occurrences involved unsecured cargo falling in the hold during loading operations in port.)

The *Canada Shipping Act* (CSA) requires port wardens to conduct inspections for cargoes of grain, timber on deck and concentrates. On 12 January 1994, the Montreal Board of Trade decided to close its Port Warden Office leaving to the CCG the responsibility of ensuring safe cargo stowage on board vessels. However, loading and safe stowage of general cargoes are not subject to routine cargo surveys by CCG Ship Safety port wardens. It is the responsibility of owners and masters to ensure that their vessels are seaworthy and loaded safely at all times.

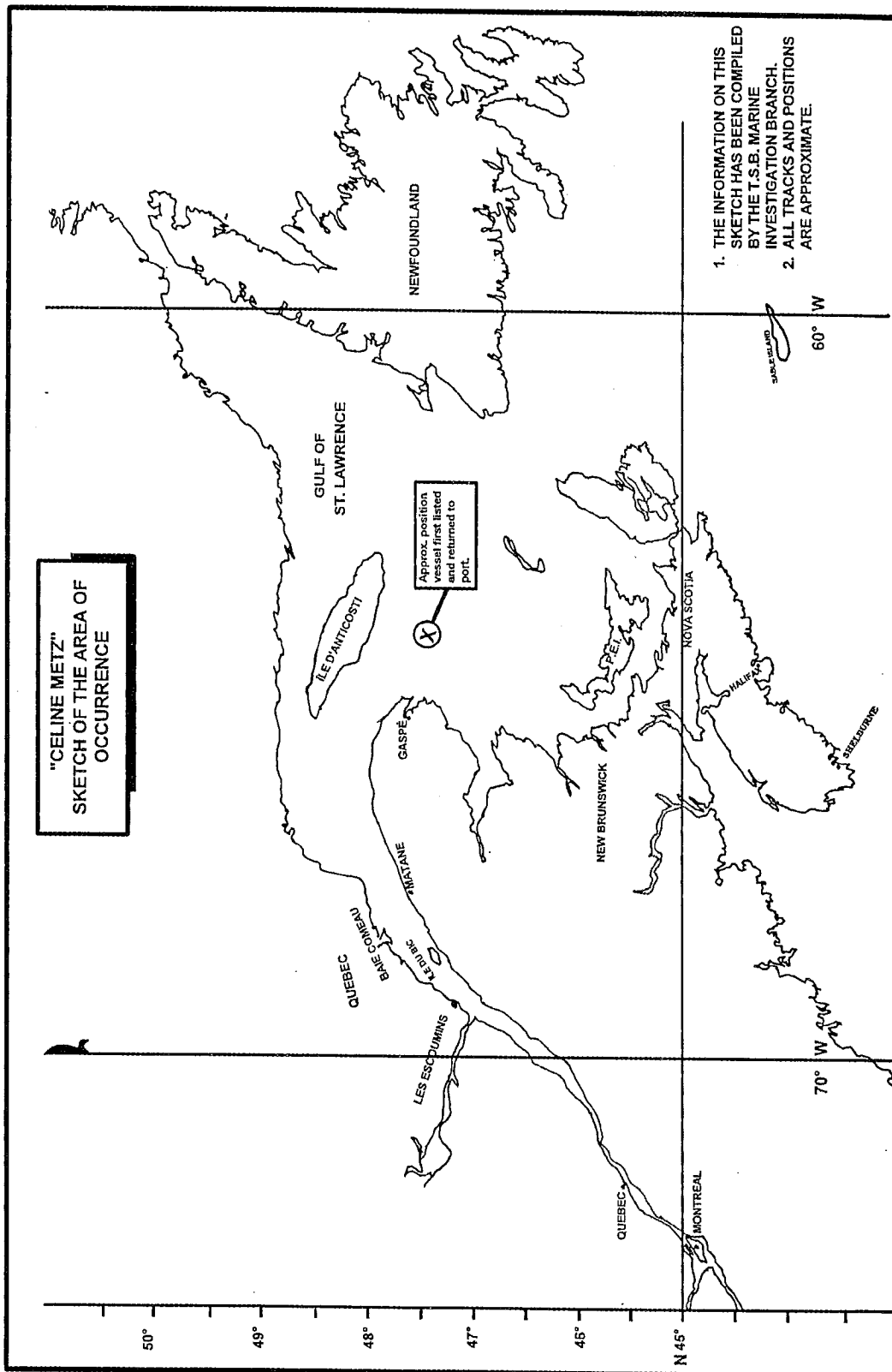
Given the frequency of marine occurrences involving shifting cargo and their potential consequences, the Board is concerned that general cargo vessels are granted clearance to cross the North Atlantic during winter months with inadequate loading and securing of under-deck cargo. Therefore, the Board recommends that:

The Department of Transport extend the role of Canadian Coast Guard port wardens to include the survey of the stowage and securing arrangements of under-deck cargo, as well as all types of deck cargo, on vessels departing Canadian ports.

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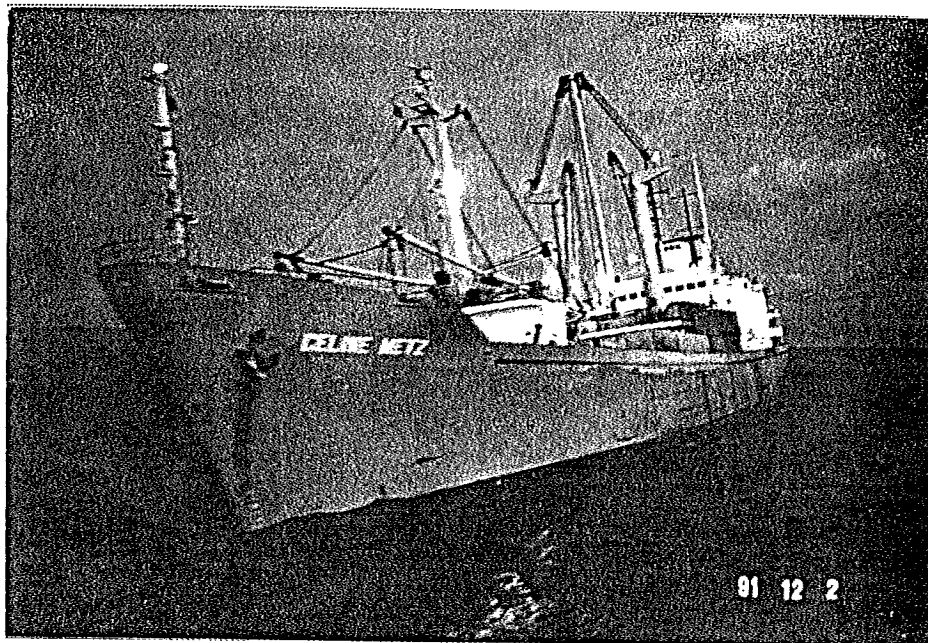
This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson, John W. Stants, and members Gerald E. Bennett, Zita Brunet, the Hon. Wilfred R. DuPont and Hugh MacNeil, authorized the release of this report on 15 December 1994.

Appendix A - Sketch of the Area of Occurrence



Appendix B - Photographs

'CELINE METZ'



'CELINE METZ' AT ANCHOR AT BAIE COMEAU, LISTED STARBOARD.
<<CELINE METZ>> INCLINÉ SUR TRIBORD MOUILLÉ À BAIE COMEAU.



SHOWING CARGO ON THE
PORT SIDE IN ONE OF
THE HOLDS OF THE
'CELINE METZ'.

VUE DES MARCHANDISES
DANS UNE DES CALES DU
<<CELINE METZ>>, CÔTÉ
BÂBORD.

Appendix C - Glossary

A	aft
BHP	brake horsepower
CCG	Canadian Coast Guard
CCGS	Canadian Coast Guard Ship
CSA	Canada Shipping Act
double bottom	Spaces contained between the outside bottom plating and the tank top.
EST	Eastern standard time
F	forward
IMO	International Maritime Organization
inland voyage	Voyage within the Great Lakes system and the St. Lawrence River, above Anticosti Island.
intact stability	Stability dependent on the watertight integrity of the hull being maintained.
kn	knot(s): nautical mile(s) per hour
kW	kilowatt(s)
m	metre(s)
peak tank	(Ballast) Tank at the extreme forward or after end of the vessel.
shoring (up)	(Timber) Strut or prop used as a support.
SI	International System (of units)
STAB 6	(Canadian Coast Guard) Standard for Intact Stability of Non-passenger Ships and Passenger Ships Carrying not more than 12 Passengers
t	tonne(s)
tomming	Complementary to shoring (up) in that the bracing is from a higher point.
TSB	Transportation Safety Board of Canada
'tween-deck vessel	Vessel with additional permanent decks, in the holds, below the upper deck.
UTC	Coordinated Universal Time
°	degree(s)