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United States Coast Guard

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REPORT ON A VERY SERIOUS MARINE CASUALTY INVOLVING THE CRUISE SHIP 'VIKING POLARIS' SOUTH OF CAPE HORN, 29 NOVEMBER 2022

ACTION BY THE COMMANDANT

On 1 December 2022, the United States Coast Guard (USCG) entered into an agreement with the Norwegian Safety Investigation Authority (NSIA) designating the USCG as a Substantially Interested State (SIS) in accordance with International Maritime Organization (IMO) Resolution MSC.255(84). Personnel from USCG Activities Europe participated and assisted the NSIA throughout this investigation. The USCG has reviewed NSIA's investigative report, including the findings of fact, analysis, conclusions, and safety recommendations. USCG comments on NSIA's findings and additional safety recommendations are provided.

COMMENTS ON THE REPORT

1. The loss of life and injuries on board the Norwegian-flagged cruise ship 'Viking Polaris' (IMO 9863209) were a tragic accident. The families of those impacted have our deepest sympathies and condolences.

2. I want to thank the NSIA for their cooperation, collaboration, professionalism, and expert analysis, which facilitated the expeditious completion of this thorough investigation.

3. On 28 November 2022, while operating in Antarctica, one of the Zodiacs operating from 'Viking Polaris' suffered a keel bladder rupture resulting in serious injury to one passenger and throwing another overboard. The investigation determined that a causal factor for the Zodiac bladder failure was significant overinflation due to a lack of ship management procedures to address training in relation to proper Zodiac bladder inflation. In order to raise awareness of this potential training gap and unsafe condition, the USCG published Marine Safety Alert 04-23 (https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/CG-5PC/INV/Alerts/USCGSA_0423.pdf?ver=60wbD9Wv2Fa8I3m_352cAA%3d%3d) on 17 March 2023 to emphasize the importance of proper maintenance and adherence to manufacturer's recommendations for filling/inflating Zodiac buoyancy chambers.

4. On 28 November 2022, the man overboard (MOB) situation from the excursion Zodiac exposed passengers to a great risk of hypothermia. The single Zodiac operator was not able to effectively respond to the MOB without the assistance of other passengers on board calling into question the adequacy of the vessel's manning for emergency situations. In response to

this finding, the USCG intends to engage with the International Maritime Organization (IMO) to study and explore excursion vessel guidelines and regulations for all SOLAS signatory passenger ships, with an emphasis on Polar region operations. This effort should consider, at a minimum, manning to account for MOB situations and Personal Protective Equipment (PPE) to protect all personnel against cold water immersion.

5. On 29 November 2022, the 'Viking Polaris' was struck with a breaking wave that caused significant damage to the vessel and loss of life. Structural engineering analysis determined the forces from the breaking wave were not accounted for and exceeded the current classification society's structural rule set. The report also captured past examples of incidents relating to breaking waves where loss of life or serious injuries were identified. It is unclear if incidents resulting in less severe outcomes (i.e., no loss of life or serious injuries) are being reported to Flag States for trend analysis and applicable safety oversight. In addition, it is unclear if excursion vessel casualties with less severe outcomes are receiving appropriate oversight. Accidents and near-misses that do not result in passenger deaths are not reported to the IMO and may be unreported or overlooked by cruise ship Flag State investigators. In response to the concern regarding marine casualty reporting criteria inadequacy, the USCG intends to engage with the IMO to conduct a study to identify the prevailing risk of casualties involving breaking waves, inflatable excursion vessel operations, and availability/criteria of casualty information and reporting, with an emphasis on Polar regions.

ACTION ON NSIA RECOMMENDATIONS

Safety Recommendation Marine 2023/07T: On 29 November 2022, the cruise ship 'Viking Polaris' was en route from Antarctica to Ushuaia in Argentina when a breaking wave struck the ship's side south-east of Cape Horn. The wave shattered the windows of seven cabins, resulting in one fatality and injuring another eight passengers.

The investigation has shown that the sea conditions at the time of the accident were within the sea states defined in the wave scatter diagram the ship was designed for. No faults of significance to the outcome of the incident have been identified in the design basis. However, it is revealed that the minimum requirements in the IACS class rules, including DNV's, doesn't provide a dimensioning minimum pressure sufficient to withstand a breaking wave. The NSIA is of the opinion that the windows were insufficiently dimensioned to withstand the pressure loads from this breaking wave, and that the applicable IACS rules, international requirements and standards give too low values to withstand the pressure loads from breaking waves within the validity of the rules and regulations.

The Norwegian Safety Investigation Authority recommends that DNV promote the problem in question in the International Association of Classification Societies (IACS) to ensure that all class rules, independent of class society, are developed to include requirements that account for breaking waves against the shipside. This also has to be reflected in DNV's own rules.

> **Action:** I concur with this NSIA recommendation. The USCG also plans to engage IACS to promote the recommended changes.

Safety Recommendation Marine No 2023/08T: On 29 November 2022, the cruise ship 'Viking Polaris' was en route from Antarctica to Ushuaia in Argentina when a breaking wave struck the ship's side south-east of Cape Horn. The wave shattered the windows of seven cabins, resulting in one fatality and injuring another eight passengers.

Wind speeds that could cause waves to break are common for much of the year in the Drake Passage and the area where the accident happened. Under such conditions, it is therefore a possibility that 'Viking Polaris' and her sister ship 'Viking Octantis' will be exposed to breaking waves hitting the side of the ship. The NSIA considers that a robust design that takes account of breaking waves will constitute a stronger barrier than operational measures alone. The current dimensioning of the windows means that they will not be able to withstand the pressure from all breaking waves which may arise within the extent of validity of the rules and regulations.

The Norwegian Safety Investigation Authority recommends that the Norwegian Maritime Authority, which has the overall responsibility for safety at sea for vessels flying the Norwegian flag, ensure that Viking Expedition Ship II LTD implements reinforcements to ensure that breaking waves do not cause damage to windows on the two existing expedition vessels.

> **Action:** I concur with this NSIA recommendation. The USCG will share this recommendation with our relevant field offices for awareness, review, and verification, as appropriate, during port state control examinations.

Safety Recommendation Marine No 2023/09T: On 29 November 2022, the cruise ship 'Viking Polaris' was en route from Antarctica to Ushuaia in Argentina when a breaking wave struck the ship's side south-east of Cape Horn. The wave shattered the windows of seven cabins, resulting in one fatality and injuring another eight passengers.

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The Norwegian Safety Investigation Authority recommends that Viking Expedition Ship II LTD, in cooperation with Wilhelmsen Ship Management (Norway) AS, implement reinforcements to ensure that breaking waves do not damage the windows on the two existing expedition vessels.

> **Action:** I concur with this NSIA recommendation. While I recognize that the vessel was built within the current parameters for design basis, it is apparent from this investigation that there is a potential for 'Viking Polaris', 'Viking Octantis', and vessels of similar design to be exposed to breaking waves that could result in pressure loads beyond those considered under current rules, exposing vessels to future casualties. I also recognize that

Wilhelmsen Ship Management has introduced operational parameters/restrictions to mitigate risks; however, design modifications and reinforcements that consider increased pressure from breaking waves would reduce the risk of a similar casualty and enhance passenger safety. The USCG will share this recommendation with our relevant field offices for awareness, review, and verification, as appropriate, during port state control examinations.

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W. R. ARGUI [redacted]
Rear Admiral, U.S. Coast Guard
Assistant Commandant for Prevention Policy