MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

FLYER TO THE SHIPPING INDUSTRY

Crew evacuated following exposure to phosphine gas

***Arklow Meadow*:** smoke from fumigant residue during discharge of maize cargo

NARRATIVE

On 5 December 2012, a fumigated cargo of maize was being discharged from the general cargo vessel *Arklow Meadow* in Warrenpoint, Northern Ireland when it became apparent that the fumigant (aluminium phosphide), which had been placed on top of the cargo before the vessel sailed from the Ukraine 14 days earlier, was still active.

Before the vessel's arrival in Warrenpoint, the atmosphere at the tops of the cargo holds had been tested and was less than 0.2ppm. Cargo operations had started and a number of fumigant retainers had been landed into hoppers and stores ashore before the remainder were removed from the cargo by ship's crew.

The fumigant retainers removed by the crew were initially placed on the wet deck, where they started to smoke. The smoking soon stopped when the retainers were moved to the holds' observation platforms. Meanwhile, a number of fumigant retainers had spilled onto the ground when they were being taken out of a hopper by a stevedore.

At this point, cargo operations were stopped and the spilled fumigant on the quay **(Figure 1)** was cordoned off. The fumigant retainers that remained by the vessel's holds were also collected and placed inside plastic bags. However, these soon started to smoke, so the crew were evacuated ashore. The local fire brigade was alerted and they reacted quickly to arrive on the scene. A 50 metre cordon was established around the vessel and houses and retail premises surrounding the port area were evacuated as a precautionary measure. Eight of *Arklow Meadow*'s crew and a stevedore who had potentially been exposed to phosphine gas were taken to hospital for observation and decontamination.

Figure 1: Fumigant retainers and spilled fumigant

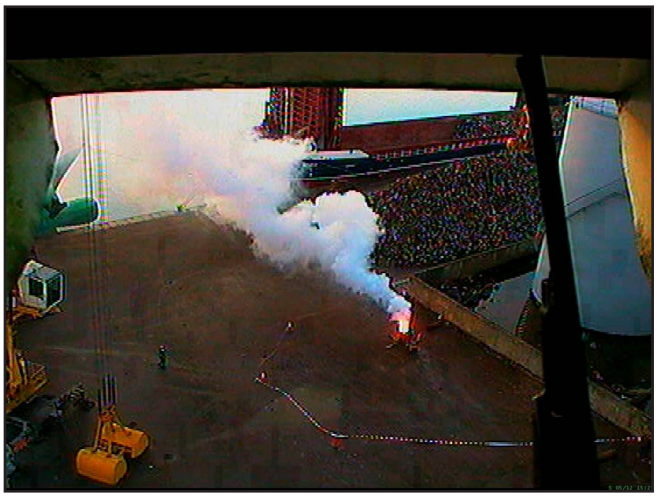

Figure 2: Disposal of the fumigant

A total of 89 fumigant retainers were recovered from the vessel and shore areas, leaving 21 fumigant retainers unaccounted for. The recovered retainers were neutralised by immersing them in water **(Figure 2)**. It took 5 days for the level of phosphine gas in the vessel's cargo holds to reduce to an acceptable level.

SAFETY LESSONS

Fumigants are dangerous if not handled correctly and appropriate precautions are not taken. To improve the safety of ships' crews and shore workers when handling fumigated grain cargoes, vessel owners, managers and crews, shippers and port authorities are strongly advised to take into account the lessons to be learned from this accident. In particular:

- A number of factors may cause a fumigant to remain active, regardless of the length of voyage. Where possible, all fumigant residues should be removed from the cargo holds before cargo discharge commences.

- The removal and disposal of fumigant and fumigant residues is potentially hazardous and should, wherever possible, be undertaken by a qualified fumigator.

- Owners and ship managers should ensure that comprehensive procedures and guidance covering the carriage of fumigated cargoes is provided on board their vessels.

- Masters must take responsibility for the safety of their crews when carrying fumigated cargoes. This requires compliance with the appropriate international recommendations, national requirements, and the instructions provided by the fumigator at the load port.

- Port authorities handling fumigated cargoes need to develop and implement procedures and emergency plans for the handling of fumigated cargoes, including: maintaining a list of accepted fumigators, the briefing of stevedores and other shore workers, and the safe disposal of fumigant (active and expired).

This flyer and the MAIB's investigation report are posted on our website:
www.maib.gov.uk

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October 2013