

Immobilized & Imperiled: Crew Safety Endangered in the Wake of Bunker Failures

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During February 2025, a prominent shipowner had one of its vessels bunker 405mt of VLSFO in New York. This case study highlights what happened next and the consequential dangers and costs contaminated marine fuel posed to the vessel, its crew and the owner.

The bunker was purchased against the ISO8217 specifications, yet the initial VPS laboratory test report, whilst showing the fuel met the ISO8217 specification, also indicated via CGMS-Headspace Screening, the presence of Volatile Organic Compounds (VOCs) in the form of Indene and 4-Methylphenol. Following this finding, a more detailed forensic GCMS-Vacuum Distillation analysis was performed, which identified the presence of a number of chemical compounds not typically associated with marine fuels:

Sr. No.	Component	Concentration in PPM
1	Alkene compounds	423
2	Styrene compounds	161
3	Phenolic compounds	8782

On the 27th February, VPS provided cautionary notes within this GCMS-VD report:

- The Alkene and Styrene compounds were collectively present in substantial concentration and are known to cause sticking and seizure of fuel pumps plunger and barrel.
- The Phenolic compounds were present in a disproportionately high concentration of 8782 ppm (0.88%). These compounds are known to cause sludge formation in fuel filters / separators and fuel injection issues.

However, despite VPS test results and advisory comments, for numerous reasons, the vessel had no other choice but to begin to use this fuel from 28th February and subsequently struggled to consume the bunker. As the vessel makes frequent calls to ECA-based ports, there is a regular requirement for fuel changeovers to occur, ie from VLSFO to LSMGO and vice versa. However, with this specific VLSFO bunker, the vessel experienced excessive sludge formation in filters and purifiers, which forced the vessel to slow down or stop and perform several cycles of filter and purifier cleaning until the changeover in the system was complete.

On 3rd May the tank containing the above grade was stripped to allow for the next grade of VLSFO to be used. Within a few hours, whilst the last of contaminated bunkers were being used, all Main Engine plunger barrels seized, the purifiers clogged, and the filters (fine filter / jet filter/ transfer pump filter) were choked. It was noticed that an unusual and excessive plastic-like, hardened sludge, had formed and this inundated the settling / service tanks and sludge tanks.



Hard Sludge from the Filters



Hard Sludge from the Pipelines



Heavy Sludge in the Purifiers

The vessel was subsequently without propulsion for over 3 days. It drifted from outside ECA waters close to fixed oil rig structures within the US Gulf region, as it tried to recover from the precarious situation. This posed a significant safety risk to the vessel and crew.

The after effects of this case continued for several days and involved the following:

- A major emergency alert due to the loss of propulsion, necessitating the involvement of Qualified Individual (QI), USCG and tugs assistance to be on standby as a contingency measure for mobilisation, if necessary.
- Several days of cleaning and clearing of filters/ purifiers/ pipelines and tanks.
- Severe disruption to the rest hours of the crew with significant overtime incurred.
- A financial burden on the owners due to the engagement of various shore workshops to clean sludge and tanks onboard while conducting full manual tank cleaning.
- Considerable time and effort in reporting to Authorities, followed by Flag State and USCG Inspections.



Excessive Filter Clogging



Fuel Plunger Stuck in Top Cover

In conclusion, this case study shows that considerable shipboard damage and work stress can be caused due to contaminated bunkers. It is also worth noting, following the final stripping of the fuel, the situation became even worse, indicating the contamination may well have settled in the lower part of the fuel. However, the far greater risk posed, was one of the safety of the crew and vessel, when the vessel became immobilized at sea due to such a bunker condition. On reflection, the consequences of this could quite easily have been even more disastrous & immeasurable, than they were.

For further information on how the risks associated with chemically contaminated fuel can be avoided, please contact:

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