

A person wearing a white full-body protective suit and gloves is using a sampling tool to collect a sample from a piece of equipment. The scene is dimly lit with a strong yellow light source, creating a high-contrast, industrial atmosphere. The person's face is partially visible through the suit's hood.

Contamination by cargo vapours.

Remember vapour line isolation for incompatible cargoes.

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The importance of manifold and first foot samples at load ports

Following the standard tanker practices of sampling when loading petroleum products could save owners millions of dollars in claims and save loss of time and ensuing losses for charterers and shipowners. When it comes to dealing with liquid cargo contamination claims, majority of the losses could have been avoided if the vessel had followed basic tanker seamanship practice.

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Gard has previously highlighted the importance of manifold samples as the multimillion dollar samples for tankers. This alert focuses on the importance of the manifold and first foot samples, and the lessons we have learnt from cases arising in the Black Sea ports. A recent notification from our correspondents, [Novorossiysk Insurance Company Nostra Ltd.](#), highlights several cases of flash point depression in gasoil cargoes that were loaded after cargoes of naphtha or unleaded gasoline. One common factor was that the charterers/shippers continued to load the cargo either without prompt testing of the first foot sample or in the hope that cargo will be blended off to correct flash point even after the first foot samples were found to be off spec on flash point. Generally, the shipowners or the master were not informed of the results of the analysis until it was too late.

In most of the cases handled by our correspondents, after the first foot has been loaded into the first pair of tanks, the loading is switched to other sets of tanks and resumed back into all tanks including the first pair after the first foot sample has been drawn. Unfortunately, the sample drawn is not tested until the first foot sample from each of the tanks is collected and by this time, the first pair of tanks and a few other tanks have been loaded with substantial quantities. This practise is apparently to save time in loading but often has resulted in downtime in disputes and mitigating the losses.

This is unusual in Gard's experience as the standard practice is to load the first foot in one pair of tanks and conduct a lab analysis on the samples taken to confirm that cargo is on/off spec before resuming loading in all the tanks. There is a significant difference in the quantity and cost of the off-spec cargo between the first foot sample from one set of tanks being off spec when compared to varying levels of cargo in 10 -14 tanks. A first foot sample being off-spec would generate a cargo claim for a quantity of about 170 MT and the average varying level in 14 tanks could be as much as 13,000 MT. In terms of costs, 13,000 MT of off spec cargo could generate millions of dollars in claims not only for the contaminated cargo, but also for associated expenses related to delay of the vessel. All this for a failure to apply basic tanker seamanship of testing the first foot sample early in time.

A common reason for depression of the flash point is contamination of a high flash point cargo, such as gas oil, by a cargo with a low flash point such as gasoline or naphtha. The source of the contamination could either be ship or shore based. Following are some of the causes of contamination:

- Physical contamination
 - Improper cleaning of the ship's tanks and pipelines to remove residues of the previous cargo, and/or
 - Contamination in shore pipelines.
- Vapour contamination: this usually occurs when high flash cargo is loaded into a tank containing vapours of previous low flash cargoes. Generally, the contamination process is slow. This could be explained by insufficient purging of the tanks by inert gas to ensure a hydrocarbon content in vapours is below 2% by volume.

The claim in these cases normally comprises the cost of bringing the cargo back on spec and associated expenses which can be significant. Rectification is often by blending slowly with high flash point cargoes or alternatively sending the cargo back into refining. Often, the terminal authorities have no facilities allowing discharge of off-spec cargo ashore and the vessel may be left to bring the off-spec cargo to disport facing risk of larger claims and detention.

Recommendations

The liability for contamination is dependent upon the evidence prudently gathered and documented in the custody transfer process. At load port, million-dollar samples are ones at the

manifold and first foot samples. This is not to undermine the importance of other samples such as ship's samples upon completion of loading, shoreline samples and shore tank samples.

1. As a general guide, a manifold sample shall be obtained at commencement of loading and thereafter at certain intervals to obtain a representation of what was the cargo in the shoreline and in the shore tank. The period over which such sample is taken should last till line displacement is completed and the cargo from the shore tank has reached the vessel. Where the shoreline is very short, it may be a matter of 10 minutes, but in other cases, it may take longer (say an hour or more).
2. First foot samples: loading shall be restricted to no more than a pair of tanks upon commencement. The samples should be tested at least for the most sensitive parameters before loading is continued in the remaining tanks. If the terminal insists on continuous loading without testing of samples, the ship's master should take instructions from owners.

Gard has published a number of updates on preventing losses from liquid cargo contamination. We refer to our recommendation on type: asset-hyperlink id:

9ed29ac14eb04b18b756fbc55f5fde0b and [contamination by cargo vapours](#). Below you can find the recommendations from our correspondents for ports in the Black Sea.

- Tank cleaning is often the prerogative of shipowners. The extent of tank preparation needed depends on the last cargoes and the proposed cargo. HM 50 provides a useful standard guide in this respect. Very often ships use Shell guide 2018 in their tank preparations. It should, however, be noted that Shell guide 2018 is aimed at Shell's owned and time-chartered fleet.
- Cleaning and draining of the vessel's cargo pipelines are as important as that of the tank.
- Hydrocarbon level in ullage space must be carefully checked by the crew, especially when loading gasoil after naphtha or gasoline cargoes.
- Proper physical and vapour segregation must be done when loading cargoes with incompatible flash points. It is advisable that owners instruct the Master to provide charterers, shippers and terminal authorities with an official letter clearly specifying that loading is to be commenced into one pair of tanks in accordance with the recommendations from the *American Petroleum Institute (API) with due adherence to first foot sampling, as specified in the Manual of Petroleum Measurement Standards, Chapter 17.8, Guidelines for Pre-loading Inspection of Marine Vessel Cargo Tanks, Second Edition, 2015. The master should issue a letter to this effect clearly stating that if the first foot analysis is off-spec, the results should immediately be brought to the attention of the Master/shipowner.

We would like to thank our correspondents, [Novorossiysk Insurance Company Nostra Ltd.](#), for their advice on the loading of light oil products at the Russian Black Sea ports of Novorossiysk, Taman and Tuapse.

**API (American Petroleum Institute) recommendations regarding first foot samples:*

If a first-foot sample is required, it should be taken when approximately 0.3 m (1 ft) of cargo has been loaded into the tank. A sample is then drawn from the tank. The sample should be examined or tested to determine conformity with cargo specifications. If the sample indicates potential contamination, no additional cargo shall be loaded into the tank until the problem is resolved.