Sampling - A Guide to Reducing Contamination Claims

September 2010

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1. General Comment

In the 1970s and 1980s there were a large number of claims arising from claimed shortages said to have been due to various problems encountered in the industry. After various inspections into the causes of these "losses" improved measurement techniques, procedures and equipment were introduced. Ship crews, inspectors and terminal personnel have all been trained and more aware of how to measure containers correctly. As a result, claims arising from short deliveries have been significantly reduced. The next significant source of claims associated with the transport of liquid cargo is the "contamination of the cargo". This can occur on loading, during passage and/or discharge and in all instances the first instance of contamination occurs in the shore systems, the ship's lines and/or transfers. It is now suggested that a similar sampling regime be inscribed in the carriage of petroleum products, crude oils and vegetable oils. Samples drawn from ship's cargo tanks are generally drawn through the vapour locks, using ship's sampling devices. On some occasions these initial samples indicate the cargo is off specification. In these circumstances some companies require "open hatch" sampling to be undertaken. In many instances these latter samples show the cargo is on specification. Vapour locks and closed sampling equipment are prone to be contaminated with the last cargo through them if they have not been cleaned between cargoes, or if additives have been added to prior cargoes. The locks. Consequently, it is suggested that in circumstances where the cargo is reported to be off specification on board the ship, "open hatch" sampling should be performed to verify the representativeness of the samples drawn through the vapour locks. The samples which should be drawn at this point would be Upper (U), Middle (M), Lower (L) and Dead Bottom (DB), together with a 'running' sample. The running sample can then be used for further analysis and the U, M, L and DB samples can be retained for further analysis if necessary. Obviously, obtaining representative samples is the main problem when sampling and consideration should be given to the sampling equipment used. In most cases nowadays, closed sampling systems require a specific sample and often the vessel's equipment is used if the samples do not have to be used as appropriate samples that fit. The first consideration should be what exactly these closed samples sample. Sometimes these are "core" samples which only sample the cargo at a point into the tank. Sometimes the "sample" tanks that may only open when striking the tank bottoms. If the cargo is homogeneous then a sample from anywhere should be appropriate but sometimes contaminations can occur in layers in tanks and not all samples are appropriate. Given that most cargoes are carried without incident, it is difficult to recommend that top, middle, bottom samples should be taken from each tank after loading for each cargo, as this inevitably would give rise to issue of storage and sampling certificates. We would recommend, however, that individual tank contents are taken and retained, rather than "composites". For most petroleum products and cargoes a running or average sample should be taken after loading (where there is no suspicion of contamination) to reduce the number of samples. For "core" type samples, a middle sample. In the transportation of specific toxic chemicals and gas cargoes, specific guidelines are already set down in industry publications by institutions such as the IPI and should be followed by the carriers.

2. Sampling Procedures

Cargo surveys are generally appointed by cargo interests to draw specific samples of the cargo on board during loading, after the completion of loading and prior to the start of discharge. The surveyor should use standard techniques which may not draw samples from all possible locations, depending on their instructions. These surveyors are also not obliged to provide duplicates for the carrier of the cargo. Any samples left on board the ship at the port are generally attended for the receivers of the cargo. The cargo is representative of the cargo carriage of the cargo and is expected to deliver the cargo to the nominated receiver in the same condition as was loaded. In the chemical industry, it has long been the practice to draw samples on loading. 1. At the ship's mawnt at the start of loading 2. At the ship's mawnt at some point during loading 3. At the ship's mawnt after reception at the reception of cargo received (first foot sample). 4. From ship's tank on completion of receipt. At the point of discharge similar samples (2, 3 and 4 above) are drawn before and during the discharge of the cargo. These samples can be identified as: 1. From ship's tanks prior to discharge. 2. From ship's mawnt at start of discharge. 3. From ship's mawnt during discharge. This sequence of sampling allows the surveyor to investigate into contamination of the cargo, to identify when and where the contamination occurred (in the shore systems, the ship's lines and/or transfers). It is now suggested that a similar sampling regime be inscribed in the carriage of petroleum products, crude oils and vegetable oils. Samples drawn from ship's cargo tanks are generally drawn through the vapour locks, using ship's sampling devices. On some occasions these initial samples indicate the cargo is off specification. In these circumstances some companies require "open hatch" sampling to be undertaken. In many instances these latter samples show the cargo is on specification. Vapour locks and closed sampling equipment are prone to be contaminated with the last cargo through them if they have not been cleaned between cargoes, or if additives have been added to prior cargoes. The locks. Consequently, it is suggested that in circumstances where the cargo is reported to be off specification on board the ship, "open hatch" sampling should be performed to verify the representativeness of the samples drawn through the vapour locks. The samples which should be drawn at this point would be Upper (U), Middle (M), Lower (L) and Dead Bottom (DB), together with a 'running' sample. The running sample can then be used for further analysis and the U, M, L and DB samples can be retained for further analysis if necessary. Obviously, obtaining representative samples is the main problem when sampling and consideration should be given to the sampling equipment used. In most cases nowadays, closed sampling systems require a specific sample and often the vessel's equipment is used if the samples do not have to be used as appropriate samples that fit. The first consideration should be what exactly these closed samples sample. Sometimes these are "core" samples which only sample the cargo at a point into the tank. Sometimes the "sample" tanks that may only open when striking the tank bottoms. If the cargo is homogeneous then a sample from anywhere should be appropriate but sometimes contaminations can occur in layers in tanks and not all samples are appropriate. Given that most cargoes are carried without incident, it is difficult to recommend that top, middle, bottom samples should be taken from each tank after loading for each cargo, as this inevitably would give rise to issue of storage and sampling certificates. We would recommend, however, that individual tank contents are taken and retained, rather than "composites". For most petroleum products and cargoes a running or average sample should be taken after loading (where there is no suspicion of contamination) to reduce the number of samples. For "core" type samples, a middle sample. In the transportation of specific toxic chemicals and gas cargoes, specific guidelines are already set down in industry publications by institutions such as the IPI and should be followed by the carriers.

3. Sampling Containers

Sample containers are made in varying sizes, materials, designs and colours. The most common of these are glass, plastic and metal. The decision as to which type of sample container would be most appropriate to use will depend very much on the nature of the product being sampled and the sampler's intentions regarding analysis and storage. Each type has its own advantages and disadvantages. Whether a metal or plastic vessel is used depends on the type of vessel that has been used in the past. If in doubt, we would recommend that glass bottles be used as the first choice. Generally, crude oils and refined oils are more suited to metal / plastic, and products and chemicals are better in glass. In many cases failures of cargoes are for sampling failures, as the samples are taken through the pipe, there are often high sensitivity sampling points, but there are few high sensitivity sampling points. When choosing the containers commonly used we would make the following comments: a. Metal containers are generally made of tin and some are lined (e.g. lacquer lining). Some liquids may react with the tin or lacquer lining over time, and, as the cans be used should be lacquered to prevent this occurring. These containers are best used where transport of the sample is not a problem. b. Plastic bottles are significantly cheaper when purchased in bulk quantities where the product itself is classified as "dangerous" liquid and the samples are in glass or plastic containers. c. Plastic bottles come in various qualities, designs and sizes. These bottles are also robust, but are often accepted for transportation but are not generally suitable for long-term storage. Liquids contaminated with low flash point material should not be stored in such containers as the lighter fractions will be lost through the plastic. On the other hand there are no special chemicals which require plastic containers c. Glass bottles again come in many sizes and shapes. The principal parameter to consider with glass bottles is the colour. If the product being stored is sensitive to light then brown or green bottles should be used in all instances appropriate containers should be obtained in order to prevent leakage through the inner lining. These bottles can be made of glass or plastic. For size of container we would suggest sample containers of 500ml or 1lt would be the most appropriate. Lowered flash point contamination samples should be analysed as quickly as possible and retained free of the light ends through and plastic. However, if they are to be stored, then ideally it should be as at cold a temperature as possible and the samples should be stored down (making sure they don't leak).

4. Retention Of Samples

Samples drawn for the purposes of retention should be carefully labelled. The label should include the following information: a. Ship's name b. Location of sample c. Date and time sample was drawn d. Type of sample draw - e.g. Upper, Middle, Lower, Dead bottom, manned spot, manifold continuous spot, etc. e. Location from which sample was drawn f. e.g. tank number, manifold number, etc. 1 identity of person taking sample g. Identity of liquid sampled h. All of the samples drawn should be sealed and a record of the seal number and the information recorded on the label should be compiled and retained on board the ship. If possible, try to have the sample from the attending surveyor and endorsed. Generally, however, surveyors will not recognize samples taken by vessel's crew (which is always surprising given that most sampling is performed by vessel's crew while the surveyors watch). It is also incumbent on vessel personnel to ensure that surveyors take the appropriate samples when a problem arises. Vessel's crew should point out any difficulties and let the surveyors know. They can then draw a duplicate sample at the same time, or sample for themselves if the surveyor does not take any (sometimes problems happen when the surveyor is not on board). The ship's samples should be retained on board in a secure location (e.g. sample store in the cockpit). This location should not be subject to extreme conditions as this may affect the quality of the material being stored. Given that contamination claims are growing, especially in the time of loading and unloading, the retention time on board the vessel would not be lengthy. However, if space allows for a longer extended period, it would be wise to retain samples for a period of 1 year.

5. Conclusion

Contamination claims often result in large sums of money being at stake. Often, the cause and/or location of the contamination can be quickly identified if the appropriate samples have been taken in suitable conditions. However, in some cases, the ship owner will accept the blame. It is always the fault of some other party. And the easiest target is the ship's crew as he is the most vulnerable. To reduce the number of claims a good start would be to introduce standard procedures in the preparation and carriage of the cargoes to the highest industry standards. Most, if not all, shippers have already introduced these standards. All that remains is the gathering and retaining of the evidence. The purpose of this paper is to support and aid that process. This aspect is left to the surveyors and their clients. The guidance outlined above may not be a complete answer to all claims but they should reduce the costs and time involved in defending them. The costs associated with sampling efficiently and ultimately disposal of unused samples takes into account the cost of the cargo and the value of the claims. Therefore, we would strongly suggest that samples are always drawn when a liquid cargo, as well as engine fuel, is received. This way the ship interests have a better chance to show what was actually received as opposed to simply being told was expected.