NEWSLETTER OF THE USCG LIQUEFIED GAS CARRIER NATIONAL CENTER OF EXPERTISE

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THE GAS GAUGE

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- *Oil and Gas Journal*
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- website

This is the first of a series of newsletters that we will be using to distribute information to the Coast Guard Liquefied Gas inspection community, particularly the Foreign Gas Carrier Examiners (FGCE). We will strive for a semi-annual publishing but ultimately will be driven by the availability and importance of information to convey. Thanks go to LCDR Randy Jenkins at MSU Port Arthur for submitting the winning title in the "name-the-newsletter" contest.

To help you navigate, here is how it will be organized. The information bar to the left provides important online links and the dashboard below summarizes the current gas ship workload and past/future trends. The past trends are based on actual workload while the future trend is more subjective, based on the anticipated growth in the LNG/LPG shipping market in those areas. The "On the Horizon" section will summarize anticipated regulatory, operational, & training changes that you should know about. The rest of the content is split between liquefied gas shipping (the tankers carrying the product) and LNG used as a marine fuel. Active hyperlinks are in italics. Embedded somewhere, we'll always include some opportunities to "gauge" your liquefied gas shipping knowledge. This is for you, if there is something missing, or something irrelevant, please let us know so we can make the next one better.

USCG Liquefied Gas Dashboard

(as of 15 Oct 2013)

District	Unit	FGCE's	Avg Exams	4 yr trend	future trend
1	MSD Portsmouth	1	8	↓	–
	SEC Boston	8	59	↓	↑
	SEC New York	1	1	–	–
	SEC SE New England	4	6	–	–
5	MSD Lewes DE	0	1	–	–
	SEC Baltimore	2	1	–	↑
	SEC Delaware Bay	1	5	↑	–
	SEC Hampton Roads	3	6	↓	↓
7	MSD St Croix	1	4	–	↑
	MSU Savannah	1	12	–	↑
	SEC San Juan	2	8	–	↑
	SEC St Pete	2	11	–	↑
8	DDE Victoria TX	1	5	↓	↑
	MSU Lake Charles	1	10	↓	↑
	MSU Port Arthur	5	15	↓	↑
	MSU Texas City	3	5	–	↑
	SEC Corpus Christi	1	4	↑	↑
	SEC Houston	8	65	–	↑
	SEC Mobile	2	2	–	↑
	SEC New Orleans	4	12	↓	↑
11	SEC LA/LB	1	1	–	–
	SEC San Francisco	1	3	–	–
13	MSU Portland	3	2	↑	–
	SEC Puget Sound	1	1	–	↑
14	MSD American Samoa	0	1	–	–
	SEC Guam	0	1	↑	–
	SEC Honolulu	0	3	–	–
17	MSD Homer	0	1	–	–
	ACTEUR	3	4	↓	–

On the Horizon

Your LGCNCOE has been busy!

- The FGCE Performance Qualification Standard (PQS) is being revised and we expect an early 2014 completion. Supporting field guidance is being developed simultaneously.
- We are working on an inspection task list for inspecting ships with LNG fuel systems. This will eventually be incorporated into revised or new PQS and associated field guidance. Sector Mobile has been a major supporter in getting our staff experience with the LNG fuel systems being installed on the Harvey Gulf OSV's.
- A LNG bunkering job aid is being developed, which we expect will be available early in 2014.
- Together with the C-school updates, targeted On-the-job Training (OJT) is being organized to support field unit needs. Sectors Honolulu and Corpus Christi have each sent an

inspector for about two weeks of one-on-one training. To support future training for nearby and visiting inspectors, a LNG/LPG cargo simulator will be installed at the NCOE very soon.

- The Society of International Gas Tanker & Terminal Operators (SIGTTO)/USCG Mutual Training Agreement (MTA) was made official on August 27. The agreement is inclusive of all of the association members.
- The Society for Gas as a Marine Fuel (SGMF) is being established as a new non-governmental organization, similar to SIGTTO. It is expected that this new organization will begin accepting members sometime this Fall. Once established, we expect to initiate a similar MTA with SGMF.

GAS CARRIER INSPECTOR COURSE (MS-513)

A new contract was recently awarded to Calhoun-MEBA to host this revised curriculum that now includes Coast Guard Certificate of Compliance (COC) exam procedures for gas carriers, and aligns very closely with the new FGCE PQS. Instructors will be a mix of industry experts and LGCNCOE staff. A course was originally scheduled for 9/9/13-9/13/13 and many submitted an electronic training request (ETR) for that training. That date was cancelled and it is going to be rescheduled for a date in FY14 that has not yet been determined. If you submitted an ETR for the original listing, you will need to resubmit once the new date is posted. Keep an eye on our website for the dates. The LGCNCOE will be screening and prioritizing candidates, with preference being given to those coming from FGCE Attainable Feeder Ports. Make sure the Training Management Tool (TMT) is updated and lists the applicants as being assigned the FGCE competency.

WEBSITE/CG PORTAL

Our website and CG Portal site have been improved to provide you greater access to relevant information. At any point in time, if there is any information you need or want, please let us know.

INTERNATIONAL GAS CARRIER (IGC) CODE UPDATE

The revised IGC Code was approved at the International Maritime Organization (IMO) Maritime Safety Committee (MSC) 92 in June 2013. It is going through a final review phase with a target adoption at MSC 93 in May 2014. It will enter into force some time after that.

INTERNATIONAL GAS FOR FUEL (IGF) CODE

The first draft of the IGF Code came out of the Subcommittee on Bulk Liquids and Gases (BLG)-17 in February of this year. There is a correspondence group that continues to work on the outstanding items. This completed work will be sent to and evaluated by the new Sub-Committee on Carriage of Cargoes and Containers (CCC) in November 2014. For those not aware, the IMO agreed to restructure the existing subcommittees, going from 9 to a total of 7. The part of BLG's work program that covered liquefied gas shipping topics will now be covered in the CCC Sub-Committee. For those interested in reading more about the restructuring please visit the USCG's IMO website (link provided on the front page vertical information bar).

Liquefied Gas Shipping

LGCNCOE SUPPORT

The LGCNCOE staff is available to support your field unit with qualified FGCE's, often with very little notice. This support can take many forms; participating in or leading a gas carrier COC exam, conducting training, serving as PQS verifying officer, participating in a FGCE qualification board, etc. If we can't support directly, we're often capable of identifying a nearby source to fill the need.

When many field units need petrochemical ship inspection training, they often think of Sector Houston. We have agreed with Sector Houston to facilitate all requests for LNG/LPG ship training in their area of responsibility. As such, please coordinate with our office directly if you have a need for training. We have already arranged very successful training for multiple units.

MISSING OR UNREADABLE MAXIMUM ALLOWABLE RELIEF VALVE SETTINGS (MARVS) PLATE NUMBERS

Although not frequent, there have been a number of occasions during COC exams where the MARVS data plate was found missing or unreadable due to wear or painting. The data plate is required by IGC 8.2.1 and 46 CFR 154.801 (c)(1) and should be

readable and present at all times. If not, inspectors should review/verify the MARVS testing report that was conducted by a competent authority. A non-conformity should be documented on the Form B. In the rare case that the condition is not corrected before your departure, it is typical to allow 30 days to the satisfaction of the Recognized Organization.

MARVS CG-ENG POLICY LTR No. 04-12 AND *LGCNCOE FIELD NOTICE #1-2012*

The IGC specifies lower stress factors for Type B and C cargo tanks than those prescribed in 46 CFR 54/154. As a result, CG-ENG issued Policy Letter 04-12 authorizing the use of higher MARVS for certain vessels built with Type B and C tanks. Vessels authorized to operate with higher MARVS settings must be built IAW the 1993 edition IGC code and maintain a current International Certificate of Fitness (COF) for the Carriage of Liquefied Gases in Bulk. The Marine Safety Center (MSC) will apply this new policy during their Subchapter O Endorsement (SOE) review and any accepted equivalent MARVS will be reflected on the vessel's SOE. LGCNCOE Field Notice #1-2012 was distributed last year to clarify application of the recognized Classification Societies language in the policy letter. The Notice also provides a rough list of vessels meeting the criteria in the policy letter. If any questions arise regarding whether or not the equivalent MARVS criteria applies to a vessel, please refer the request to MSC for further review and possible SOE modification. The SOE must reflect the actual MARV's being utilized on board, so if you find that the crew has independently applied the criteria and installed higher settings, please confer with MSC, again, for evaluation and SOE issuance.

CARGO COMPRESSOR LEAKAGE

During some COC exams, cargo compressor leaks have been discovered by the ship's fixed and portable gas detection equipment and by marine chemists. All shaft seals have a design leakage rate, labyrinth seals having the greatest rate while double mechanical seals have virtually zero leakage and are used for highly toxic cargoes. Reciprocating compressors tend to be fitted with labyrinth seals and therefore have a greater leakage rate. Slight leakage from the compressor seals should be considered acceptable if this is within the limits of the manufacturer and class. However, the design leakage should not be noticeable in a traditional ship with a cargo compressor room as the mechanical ventilation is designed to rapidly dilute any design leakage. Therefore, high readings can be indicative of excessive compressor seal leakage or a fault in the mechanical ventilation. If a compressor seal leak is determined to be outside of the designed leakage rate, issue a deficiency requiring the cause of the leak to be rectified prior to departure – to the satisfaction of the Recognized Organization and/or attending USCG inspector.

CARGO COMPRESSOR ROOM ENTRY

Several FGCE's have posed questions regarding when a marine chemist is required for cargo compressor room entry on liquefied gas carriers, as procedures vary between CG units (some automatically require a gas free certificate for safety precautions, others do not). Cargo compressor rooms are not considered confined spaces. There is no CG-wide policy to automatically require marine chemist certificates prior to entering cargo compressor rooms. The self-risk assessment that is expected by all inspectors, in this case FGCE's, prior to entering a cargo compressor room is outlined in *CG message R191819Z MAR10- "Cargo Compressor Room Entries During PSC Exam on LPG Ships"* and *Marine Safety Manual Volume I, Chapter 10*. Both discuss the minimum risk assessment and countermeasures that must be considered. The importance of understanding the risks associated with the hazardous cargoes onboard cannot be overstated.

LIGHTERING/SHIP TO SHIP (STS) TRANSFER

We have noticed an increase in the number of LPG lightering requests both inland and offshore and thought it would be a good time to review and summarize the procedures Captain of the Ports (COTP's) should be aware of.

For lightering beyond the baseline, Commandant approval (Dr. Cyndi Znati at CG-ENG-5 is the POC) is required by 33 CFR 156.210 (b) if the hazardous material lightered is destined for a port or place subject to the jurisdiction of the U.S.

Lightering operations inside of the baseline are subject only to local COTP review.

In both cases, 33 CFR 156 requirements govern the review. In particular, the lightering procedures need to be reviewed for alignment with the transfer plans and operational/safety checklists in OCIMF/SIGTTO Ship to Ship Transfer Guide (Liquefied Gases), 1995" Appendix 1. Note that this replaces the 1988 version referred to in 33 CFR 156.330(b). Further note that a new edition "Ship to Ship Transfer Guide for Petroleum, Chemicals and Liquefied Gases" should be published in November 2013. The

LGCNCOE can assist COTP's with their review of inland lightering procedures, if necessary. Alternatively, we have copies of the above mentioned references that we can share.

SUBCHAPTER O ENDORSEMENT

During some exams, the SOE was found to not accurately reflect the current MARVS onboard. This was due to several possible reasons: administrative errors, the COF was updated and no request was made to the MSC for an updated SOE, or the new MARVS Policy Letter No. 04-12 was applied by the ship's crew and no new SOE was requested. One step to resolve this issue prior to heading out in the field is to request a copy of the COF when requesting the ships documents and review/compare it to the current SOE in MISLE. After a SOE is issued to a vessel, the owner/operator only needs to submit an updated COF to the *MSC* if the vessel's cargo containment system and/or list of authorized cargoes on the COF have changed.

FIXED GAS DETECTION SYSTEM (FGDS) EVALUATION

While witnessing the testing of the vessel's FGDS, it is important to observe the crew testing the system in accordance with the manufacturer's manual. Gas carriers typically have two types of FGDS; a sampling system that uses a vacuum pump to draw air through sampling tubes leading to a common detector area (usually in the control room), and/or a gas detection sensor/transmitter which provides separate detectors for each space relaying a signal to the control panel. It is important that the FGCE be aware of the system type being tested as gas readings between these systems can vary relative to the span gas used. The manufacturer usually gives the sampling system a +/-5% margin of error. When span gas is fed into the sampling pipe, the concentration is weakened by the atmospheric gas already present in the pipe so the reading may be less than the span gas. The longer the sampling point is from the central station, the more diluted the span gas can become. The gas detection sensor/transmitter will typically give a more precise reading, but could display a weaker % if the span gas fitting is not gas tight.

WARM SHIP COOL DOWN

As LNG exports increase, a greater variety of LNG carriers will be calling on U.S. ports. Some ships may arrive with tanks in an inert condition (warm) and require cool-down before loading cargo. This historically has not occurred very often in the U.S. but the practice is common within the industry. The procedures are already established within each vessel's cargo operations manual. Field units should be aware that there are no specific USCG approvals necessary prior to this operation. However, it is prudent for COTP's to be aware of the process and potential risks in order to maintain their maritime domain awareness.

Typically, the first step of the cool-down is adding warm natural gas to push out the inert gas through the ships vent. While this is being done, the warm natural gas/inert gas is displaced and routed up through the vent mast, cargo tank vents or to shore. The amount of natural gas in this mixture will be insignificant but it is likely that some natural gas will be vented to the atmosphere. The gas will also be relatively warm so any flammable mixture that leaves the vent mast will quickly rise and the mixture will rapidly lean out to where a flammable mixture cannot be supported, creating no risk to the port or facility.

Typically, the inert gas that is being displaced from the tanks will be monitored in three places from the time it exits the tank to when it leaves the top of the vent mast. Two of the three detectors will be located be around the cargo tank dome and the third will be at the lower part of the vent mast. The combustible gas monitoring detects when the inert/natural gas mixture reaches the combustible limit then directs the mixture to the gas combustion unit or boilers for burn off (at which point the venting is stopped).

LIQUEFIED GAS CARRIER CERTIFICATE OF COMPLIANCE

During a recent analysis of the tasks conducted during a COC examination, we discovered that no guidance exists to assist an examiner in properly filling out the COC. This, combined with the fact that the COC form (CG-3585) is not vessel specific and is used for all foreign tank ships, passenger vessels and MODUs, has led to some COCs being issued to liquefied gas carriers with mistakes.

In the near future, we will develop guidance to assist FGCEs with properly filling out COCs. In the meantime, the following is some guidance to help you avoid some common mistakes in the "For Tank Ships only" section when filling out a liquefied gas carrier COC.

- The block that states "Category Z Noxious Liquid Substances (NLS) as noted on the vessel's International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk" should <u>not</u> be checked. The governing document for issuing

a COC to a liquefied gas carrier is the COF. There will be no situation on a liquefied gas carrier where a cargo will not be authorized on the COF. This block is designed to be used for product carriers that have been issued an IPP NLS certificate authorizing the carriage of category Z NLS cargoes.

- The block that states "This vessel meets the U.S. double-hull design standards of 33 CFR 157.10d" should not be checked. 33 CFR 157 only applies to tank vessels that carry oil in bulk and does not apply to liquefied gas carriers.
- The block that states "the vessel's vapor collection system (VCS) meets the requirements of 46 CFR 39" should not be checked. Liquefied gas carriers are designed to manage and transfer vapors, however 46 CFR 39 applies to bulk liquid tank vessels that transfer vapors from crude oil, gasoline blends and benzene.
- The block that states "this vessel is equipped with an inert gas system that complies with the requirements of SOLAS 74 (amended) II-2/5.5 and 46 CFR 32" should not be checked. The IGC/GC codes specifically state that a liquefied gas carrier's IGS is not subject to the requirements in SOLAS. SOLAS and the FSS code address systems installed only on bulk liquid tank vessels. The vapor space of a cargo tank on a bulk liquid tank vessel is always required to be kept in an inert condition. The vapor space on cargo tanks in a liquefied gas carrier will always contain flammable or toxic vapors while in operation. The IGS on a liquefied gas carrier is only used during gas freeing operations or the changing of cargoes.

LNG as a Marine Fuel

There is a lot of activity associated with LNG fuel and there are two primary aspects that will be evolving simultaneously for the Coast Guard field units, the supply infrastructure and the ships using the LNG.

LNG SUPPLY INFRASTRUCTURE

We expect an eventual rise in the use of coastwise LNG vessels for distribution (LNG barges, ATB's, or small coastal tankers). In the meantime, bunkering will likely be from LNG trucks (for smaller applications) or shore side LNG storage tanks (which could incorporate small scale liquefaction). CG-OES has draft policy being considered for implementation that addresses the facilities and vessels that will provide the LNG as marine fuel. Until this is published, if you are aware of any planned LNG bunkering operations in your region, please ensure your unit is in contact with Mr. Ken Smith (CG-OES-2) (through normal chains of communication) as soon as possible to review the applicable requirements. We can assist if necessary but this communication will be critical.

Below are known supply infrastructure projects:

- Harvey Gulf is on track to build a LNG marine refueling facility on their property in Port Fourchon with two storage sites each capable of storing 270,000 gallons of LNG. The first site is expected to be operational in early 2014.
- Shell has announced plans to build two small scale liquefaction units, one in Geismar, LA, to service the Gulf Coast and the other in Sarnia, Ontario, to service the Great Lakes region. These units are expected to be operational in 2016.
- Waller Marine announced plans to construct a LNG liquefaction terminal in Cameron, LA and Baton Rouge, LA.

COMMERCIAL MARITIME USE OF LNG FUEL

CG-OES has a second draft policy under consideration to address training and operations on vessels that utilize LNG as a marine fuel. There are a number of well-publicized projects underway or projected. Below we've tried to summarize these and, where possible, what Officer in Charge, Marine Inspection (OCMI) zone we expect to be impacted, in order of the expected delivery and operation. FYI, one of the biggest lead times (and line item costs) for these projects is the LNG fuel tank.

- Harvey Gulf International Marine [HGIM] has ordered six dual-fuel, LNG burning OSV's from TY Offshore shipyard in Gulfport, MS, with the first vessel scheduled to be delivered by the end of March 2014. The first three vessels will initially operate out of Port Fourchon, LA. The 295 m^3 LNG storage tanks for the first three hulls were fabricated by Chart Industries, Inc. in New Prague, MN. Lockheed Martin will build the remaining three storage tanks at NASA's Michoud Assembly Facility near New Orleans. Sector Mobile is managing new vessel construction oversight and inspection, while MSU Morgan City will be the operating OCMI.

- The Interlake Steamship Company has plans to convert some of its fleet of ten vessels to use LNG as the main propulsion fuel. These ships are expected to be the first LNG powered ships on the Great Lakes. Their goal is to convert the first ship by the Spring of 2015.
- TOTE has contracted for two 3100 TEU dual fuel containerships to be built at NASSCO in San Diego, CA for operation by Sea Star Line in the Jacksonville to Puerto Rico liner trade, with options for three sister ships. These new boxships will be the first in the world that can use LNG as a fuel. These vessels are scheduled to be delivered and enter service in 2015 and 2016.
- Horizon Lines has expressed an interest in converting 2 existing steam powered ships to use LNG for fuel utilizing dual-fuel, medium speed diesel engines. Completion on both is expected in early 2016.
- TOTE has also committed to convert their two existing diesel powered Ro-Ro ships, the 2003-built MIDNIGHT SUN and NORTH STAR, to use LNG by converting the engines to dual fuel. These vessels currently trade from Tacoma to Anchorage. The engineering, design, installation of the engine kits, and construction of the LNG plants is expected to take five years and the work will be performed while the ships are in service.
- Staten Island Ferry, operated by New York City Department of Transportation [NYCDOT], is considering conversion of one of its ferries to use LNG as fuel. Sector New York is the operating OCMI.
- Washington State Ferries [WSF] is exploring the possibility of converting six of their vessels to use LNG as fuel. Sector Puget Sound is the operating OCMI.
- Waller Marine of Houston has developed plans for coastwise ATB's with capacities from 15,000 m^3 to 34,750 m^3 and smaller LNG vessels ranging from 2,000 m^3 to 10,000 m^3 for river transport and bunker barges.

There are countless other proposals and concepts being considered. As those become more firm and public, we will summarize them here.

How full is YOUR tank?

1. What type of system is represented in this photograph?
2. Before evaluating this system, what is the first thing you should witness?
3. How do you ensure that the sampling points of this system are located in the required spaces?
4. Would you find the sampling points located at the top or at the bottom of a particular space?
5. How do you ensure that the sampling pipe system is in satisfactory condition?

You can check your answers on the LGCNCOE website: *http://www.uscg.mil/hq/cg5/lgcncoe/*