



MARINE ENGINEERS' BENEFICIAL ASSOCIATION

Hall of the States • 444 North Capitol Street, NW Suite 800 • Washington, D.C. • 20001



AMERICAN MARITIME CONGRESS

Hall of the States • 400 North Capitol Street, NW Suite G50 • Washington, D.C. • 20001

Department of Transportation Maritime Administration Docket No. MARAD-2007-26841

TABLE OF CONTENTS

Abstract	1
Introduction	2
Need for Shipboard Import of LNG to the United States	3
Need for U.S. Merchant Marine	3
Importance of Steam Propulsion/Steam Plants on LNG Tankers	4
Thorough Vetting of U.S. Merchant Mariners Provides Unmatched Shipboard and Deepwater Port Security	6
Widespread Retirement of LNG Officers Forecasted in Foreign Flag Fleet	6
Problems in Growth of Demand for LNG and with Incoming Generation of LNG Officers	8
Wide Scale Officer Shortage Resulting in Foreign Ship Operators "Poaching" LNG Officers; Poor Training; Steep Decline in Safety and Security; and Violations of International Law	9
International Consequence: Insurance Underwriters Deeply Concerned with Inexperienced Crews Aboard LNG Vessels	11
International Reaction: Responsible Shipping Ministries React to Manning Shortcuts and Abuse; Use of National Flag Vessels Promoted By Major Importers	11
Superior Domestic Maritime Resources: Calhoun MEBA Engineering School	12

ABSTRACT

The Marine Engineers' Beneficial Association and the American Maritime Congress appreciate the opportunity to comment on the record for *Utilization of U.S. Vessels and Mariners in the Marine Transportation of Liquefied Natural Gas*. We appreciate the Honorable Maritime Administrator Sean T. Connaughton's initiative in bringing the issue

of U.S. crews to the forefront of LNG transportation and securing agreements from responsible corporate LNG shippers to utilize U.S.-crews.

The following is a brief analysis of the complex issues surrounding the safe and secure import of liquefied natural gas (LNG) to the United States. Until recently, the United States had a very limited understanding of the severe shortage of shipboard Officers in the international maritime community. This shortage is only expected to get worse. In addition, the training standards and qualification process of the foreign Officers delivering cargo to the United States has generated enormous concern among shipowners, operators, classification societies and training entities.

The following facts in this comment are widely known in the international shipping community. However, in the United States, the points raised are often not spoken about or dangerously overlooked. With 97% of all cargo imported to United States being carried on vessels that are not registered under the American-Flag and not crewed by U.S. citizens, one would think that the safe and secure transportation of the cargo would be a serious concern. More to the point, at this time 100% of all Liquefied Natural Gas that enters the United States is carried on ships staffed by non-U.S. citizen mariners. The decision makers in the United States cannot afford to overlook this.

With this in mind, recently, some responsible corporate citizens in the LNG sector have agreed to expand their crewing practices to include U.S. citizen crews on LNG tankers. These companies, Suez LNG/Neptune; Excelerate/Northeast Gateway; and Freeport-McMoRan, must be commended.

I. Introduction

The Marine Engineers' Beneficial Association (MEBA) represents US Coast Guard licensed deck and engineering officers who work on freight, tanker and passenger vessels engaged in both the US domestic and international trade. The American Maritime Congress represents both the MEBA and the shipping companies that have collective bargaining agreements with the Union. MEBA has well over 20 years of experience in the safe and secure handling and transportation of liquefied LNG. Additionally, although we have been training LNG mariners since 1975, MEBA has invested in the most technically advanced training program in the world. MEBA's training entity is the Calhoun MEBA Engineering School which has also submitted comments on the federal docket.

Some of the international community comments regarding MARAD-2007-26841 have listed concerns regarding the qualifications of U.S. citizen officers who desire to serve in the international LNG tanker fleet. The comments in particular regarding "experience" and "certification and qualifications" are not germane to only U.S. merchant mariners. There is a worldwide shortage of LNG officers. To hint that U.S. citizen officers cannot gain experience or be recertified in the LNG trade because they only "generally sailed on the first generation of LNG vessels in the 1980's and 1990's" is not fair. Everyday, there is a need for new LNG officers. And, as discussed below, because of steam propulsion,

Americans have a distinct advantage over the international community of officers with respect to LNG vessels.

Finally, up until approximately three years ago, for the previous thirty (30) years, the international community did not think that U.S. – citizen mariners had the qualifications or experience to sail aboard modern-day large passenger vessels. That perception has been proven wrong with the advent of Norwegian Cruise Lines entering the U.S.-Flag shipping sector. MEBA represents all licensed deck and engine officers and non-licensed shipboard officers for NCL, America. There are three cruise ships in that fleet—and they are the most modern and technically sophisticated passenger vessels in the world. Indeed, U.S. citizen officers and crew staff the vessels productively with less manning than the international fleet. Therefore, there is no reason to suggest that U.S. merchant mariners cannot productively staff modern day LNG vessels.

II. Need for Shipboard Import of LNG to the United States

According to the Federal Energy Regulatory Commission, U.S. gas demand is expected to increase by 40% by 2025 to 30.7 trillion cubic feet (TCF).¹ However, domestic supply, which has not equaled demand for many years, will only increase by 14.5 %. Without intervention, our natural gas supply will not keep pace with industry and the public’s demand. Mr. Jeff Wright, Chief of the Energy Infrastructure Group, Office of Energy Project, Federal Energy Regulatory Commission cites the following reasons for this situation:

- Decline in the United States’ underground domestic gas reserves²;
- Canada’s problems with flattening gas production in the Western Canadian Sedimentary Basin (WCSB) and its need to fulfill its own demands;³ and
- Continuation of Mexico’s growing economy with Mexico keeping an increasing share of its natural gas to meet its future demands.⁴

This means the United States cannot rely solely on natural gas produced in North America. Therefore, LNG will need to be imported to the United States on oceangoing LNG tankships.

III. Need for U.S. Merchant Marine

The U.S. Merchant Marine should play an integral role in the importation of LNG in order to ensure the utmost in safety and security that all United States citizens deserve. American mariners, in particular members of the Marine Engineers’ Beneficial Association, are highly skilled in the operation of steam plants used on the majority of LNG vessels and are experts with respect to operating other marine power systems such as diesel, diesel electric and gas turbine. U.S. Merchant Mariners are also subjected to rigorous background checks and competency requirements. In addition, the MEBA continues to train its members to the highest industry standards in LNG technologies.

Importantly, it is the policy of Congress that priority should go to using U.S. crews for staffing purposes on LNG tankers that deliver cargo to the United States. After all, major

importing nations ensure the safe and secure importation of this vital energy source by utilizing citizen mariners from their respective nations -- the United States should do so as well.

In contrast, reliable crewing in the international LNG transportation market is reportedly in a tail-spin. It has been widely reported that international LNG ship operators are “poaching” qualified shipboard officers from each other through economic enticements. Constant crew changeover, poorly trained crewmembers and questionably qualified mariners undermine the efforts of an historically safety conscious LNG sector and pose an imminent threat to the safety and security of citizens located near or en route to LNG receiving facilities.

Transportation of LNG worldwide is a rapidly expanding marine service. This growth has never happened so quickly before, or in a segment of the maritime industry that is technically so different from other segments. From an historical perspective, there has never been a major catastrophe with respect to LNG cargo and waterborne transportation. That is due in large part because it took approximately 40 years to for the international LNG fleet to reach 200 vessels. It may only take 5 more years for the LNG fleet to increase by 100 more LNG tankers. Thus proper vetting and training are critical factors for consideration.

IV. Importance of Steam Propulsion/Steam Plants on LNG Tankers

International Fleet Discards Steam Ships

For reasons of thermal efficiency, the rest of the world began the rush to change over to diesel propulsion more than 40 years ago. The steam vessels the international community replaced were sent to scrap yards. As the foreign-flag steam vessel fleet disappeared, so did the international know-how to operate steam plants and the need to teach students steam technologies. The international foreign flag fleet certainly has succeeded with the changeover from steam to diesel. Other than LNG tankers, for the most part the foreign flag fleet does not operate steam ships. This is a very important point as will be explained below.

U.S. Merchant Marine—Abundance of Expert Steam Engineers

The United States began to change from steam to diesel during the 1970’s oil embargo as well, but more gradually than the international maritime industry. American-flag shipping companies did not scrap their steam vessels as quickly as international companies. A large portion of the steam vessels serve in the Jones Act U.S.-coastwise trade. Many U.S. shipping companies either built or purchased new vessels as additional tonnage and kept their steam vessels operating or in reserve. As a result, there are many U.S. steam vessels operating today. Moreover, the military has kept steamships in reserve for contract work and the Maritime Administration utilizes steamships in their Ready Reserve Force Program. In addition, maritime academies in America continue to teach their cadets steam engineering principles and as a result U.S. Merchant Mariners have an excellent hands-on, practical-working knowledge of steam plants.

International Trends: Shortage of Steam Engineers

As reported in the Coast Guard *Journal of Safety at Sea, Proceedings*, Fall 2005, Dr. Hisashi Yamamoto, Secretary of the International Association of Maritime Universities (IAMU), notes that there is a shortage of qualified seafarers for existing LNG carriers, as well as LNG vessels scheduled to be delivered over the next five years and beyond. He points out that there is not enough time to educate and train deck and engineering officers for delivery of new LNG ships on order or under construction. Moreover, Dr. Yamamoto articulates that there is a shortage of capacity for educating and training LNG mariners world-wide, in terms of facilities, training capabilities, and, above all having enough qualified instructors with sufficient experience of actual service onboard LNG carriers to train the next generation of LNG seafarers. See *Proceedings*, Fall 2005, p. 47. Please keep in mind that it is apparent that Dr. Yamamoto is basing his conclusions on the international foreign-flag LNG market and not on what the United States Merchant Marine has to offer by way of training, experience, facilities and the fortitude to protect the American people.

The overwhelming majority of LNG ships traversing the oceans today (and future newbuilds) are powered by steam turbines. LNG ships use steam turbines for the main propulsion system and the main and auxiliary generators because the boiler furnaces efficiently use the boil-off gas from the LNG cargo tanks as the source of fuel that converts distilled water to steam.

According to IAMU and Clarkson Research Services (Clarkson), demand for steam turbine engineers will increase significantly. The IAMU claims that LNG vessels are among the only type of commercial cargo ships that employ steam turbine engineers today. That is more or less true in the foreign flag fleet. However, U.S. Merchant Mariners, unlike their foreign counterparts, are highly skilled and well schooled when it comes to steam propulsion plants due to the Jones Act vessels and the U.S. Maritime Administration's fleet.

Dr. Hisashi Yamamoto reports that over the past 30 years, since the first oil crisis in the early 1970s, the world [meaning foreign flag] maritime community significantly reduced its capacity to educate and train steam plant engineers. This is no doubt a true statement for the international fleet, but the United States Merchant Marine is certainly the exception and extremely unique in that respect. Every maritime academy in the United States teaches steam engineering as a prerequisite whereby cadets can graduate with an Unlimited U.S. Coast Guard Third Assistant Engineer's Steam License.

To illustrate the point of steam vessels and the significant role they will play in the LNG world market, Clarkson Research has analyzed the estimated demand for steam vessels/engineers as of May 2005:

In 2004-	2 steam LNG vessels were launched;
In 2005-	20 steam LNG vessels were launched;
In 2006-	27 LNG vessels are expected to be launched;
In 2007-	30 LNG vessels are expected to be launched;

In 2008-2010- 86-101 LNG vessels expected to be built.

Tim Colton of Maritime Business Strategies⁵ itemizes that there are currently 198 steam propulsion LNG vessels operating in the world market and only five diesel⁶ LNG vessels. Mr. Colton estimates that there will be an additional 81 steam LNG vessels delivered over the next four years, bringing the steam LNG fleet to approximately 280 vessels. This means that there is and will continue to be a severe shortage of (1) qualified LNG officers and (2) competent LNG officers that can understand and successfully operate shipboard steam plants. It is worth noting, that like the marine engineers, LNG deck officers must be familiar with steam plants for the safe operation, navigation and cargo operations of LNG vessels.

There are new LNG propulsion systems that are anticipated to come on line but the fact remains that steam is the known and proven technology⁷.

For the aforementioned reasons of availability of steam deck and engine officers and the fact that the United States is one of the only nations in the world that teaches steam systems, U.S. Merchant Mariners must play an integral role in the shipboard importation of LNG.

V. Thorough Vetting of U.S. Merchant Mariners Provides Unmatched Shipboard and Deepwater Port Security

Most people in the United States do not realize that all LNG entering the U.S. is carried on foreign flag ships operated by either non-U.S. citizen mariners, or aliens who are not lawfully admitted to the United States for permanent residence. Unlike foreign seamen:

- U.S. Merchant Mariners receive their credentials to work from the U.S. Coast Guard;
- U.S. Merchant Mariners undergo extensive background checks performed by the Federal Bureau of Investigation;
- U.S. Merchant Mariners are background checked through a National Driver (vehicle) Record database;
- U.S. Merchant Mariners will also be subject to jurisdiction of the Transportation Safety Administration (TSA) where they will be vetted through a terrorist watch database in order to receive a Transportation Worker Identification Card (TWIC).
- U.S. Merchant Mariners are citizens of the United States or aliens lawfully admitted for permanent residence.

The question becomes whether the American people desire to have fully vetted U.S. citizens guarding their safety and security while LNG is being delivered to their regions.

VI. Widespread Retirement of LNG Officers Forecasted in Foreign Flag Fleet

The number of mariners with LNG experience is rapidly declining, mainly through attrition. The dearth of experienced LNG officers is expected to be a massive worldwide problem by 2010. The age structure of Japanese seafarers vividly illustrates the retirement problem. Japan is currently the largest purchaser of imported LNG in the

world consuming about 47% of the total ocean-borne LNG. Japan also has the most LNG ships in its national registry with 25 under its flag as of September 2004. Japanese senior officers are the core of the safe operation of the country's LNG fleet. As of October 1, 2002, there were a total of 2746 Japanese officers, out of that number 56.8% were older than 45, and 66.5% were over 40 years of age. According to the Japanese Ship Owners' Association, the retirement age for officers in the major Japanese shipping companies is 53, and it is expected that almost all of the senior officers in that age group will retire before 2010.⁸

The critical problem of the widespread retirement of marine officers is not unique to LNG but rather a reflection of the manpower crisis facing the global shipping industry. A maritime industry analyst lamented, "As employment conditions at sea deteriorate and seafarers face increasingly hostile regulatory authorities in ports and terminals they visit, old sea-hands with long experience at sea are coming ashore in growing numbers."⁹ That same article notes an unnamed London operator who believes that manning the world fleet tomorrow will become a "nightmare."

The Hellenic Chamber of Shipping, which advises the Greek government of shipping issues, recently reported that approximately 1000 deck and engineer officers retire every year but only 500 newly-qualified replacements join the industry.

In addition, The Financial Times reported Greece is not alone in lacking an adequate pool of merchant officers. A recent update of a global manpower review by the Baltic and International Maritime Council (BIMCO) and the International Shipping Federation (ISF) revealed a shortage of about 10,000 qualified officers worldwide. See Financial Times, Officer Cadre Shrinks as Fleet Grows, June 19, 2006. The BIMCO-ISF report also voiced concern about the high age profile of senior officers from the wealthy member-states of the Paris-based Organization for Economic Co-operation and Development, and a lack of qualified replacements available from other countries.

It is unclear where the next generation of experienced mariners will come from. "Throughout the long 1980s recession, few shipping companies bothered to run any officer recruitment programmes and there is now an imminent shortage of the experienced sea staff, above and below deck, needed to operate the world's ocean-going fleet." One estimate is that the industry will require 24,000 officers of the next three years to man ships due to join the fleet. This dire situation is only made worse for LNG operators given the unique skills necessary to safely crew this sophisticated vessels.¹⁰

Keep in mind that Officer Shortages had been kept in check during the late 1980's and throughout the 1990's due to the collapse of communism. Greek owners for instance, seized the opportunity to hire well trained officers who had served in the Soviet Union's merchant fleet. But that was then, now there are far fewer Russian and Ukrainian Officers available.

The aforementioned does not take into consideration the largely untapped pool of resources that can be obtained from the United States. America can supply a stable and

reliable group of mariners to safely and securely bring LNG to our shores. This must not be overlooked.

VII. Problems in Growth of Demand for LNG and with Incoming Generation of LNG Officers

On June 20, 2006, Reuters reported that a growing global demand for liquefied natural gas and tight supply of specialized tankers and crew create a risk of dangerous lapses in standards of security. See, Darwin (Reuters), *LNG Demand Growth Risks Fall in Shipping Standards, June 20, 2006*.

The United States must take into consideration the risks involved with poorly trained, insufficiently qualified and questionably vetted mariners who may deliver LNG to its shores. For instance, Yea Byeon-Deok, professor and LNG initiative coordinator of the International Association of Maritime Universities, recently stated at a conference in Australia: “Nobody knows what would happen if a significant accident occurred on a large LNG carrier. All we can say is that a 100,000 ton tanker has four times the energy potential of the atomic bomb used to hit Hiroshima. . . Many sub-standard vessels have begun to appear as demand for LNG increases, while there is a chronic shortage of experienced crew.”

New orders for construction of LNG vessels implied a need for 3,575 officers over the next three years, Professor Yea said, of which 60% would need to be at senior or experienced level. Yea warned that “recruitment and training were falling ***dangerously short of requirements to staff complicated vessels which could make dramatic targets for potential terror attacks.***” Reuters, *June 20, 2006*. Mr. Yea pointed out that the growth in “flag of convenience” ships which fly alternative flags to the country of ownership, allow the owners to avoid taxes, quality control and labor regulations which evidences deteriorating standards.

The younger generation of sea-going deck and engineering officers is withdrawing from the industry prematurely. These junior officers are showing less and less interest in continuing to go to sea and they are typically leaving for shore-side positions prior to taking on senior level seagoing positions. This has made it difficult for ship owners and operators to ensure a sustained supply of senior officers. There is as of yet no effective means to counter this tendency. Again, it must be pointed out that this data is based on a report in the U.S. Coast Guard *Journal of Safety at Sea, Proceedings* regarding the international (non-U.S. Merchant Mariner) pool of shipboard officers.

Greece has 10 officer training academies. The student body for at the academies totals 4,884 this year. However, the Hellenic Chamber of Shipping reports that applications for the 2006-2007 academic year stand at 1300. This is a major downward shift for the future worldwide officer pool of merchant mariners.

The U.S. Merchant Marine was not considered in any of the reports. Indeed, had the U.S. Merchant Marine been considered, the resulting report would have shown that there is a

vibrant and growing U.S. Merchant Mariner pool resulting in part by investments made in the passenger, freighter and tanker vessel maritime sectors. Moreover, it makes sense to staff LNG vessels delivering cargo to the United States with U.S. merchant mariners. U.S. merchant mariners are true patriots and care about their country-- they would not be “for hire” foreign personnel with little or no connection to America other than a job that provides a paycheck. U.S. Coast Guard licensed officers and crew provide answers and solutions to many of the safety and security concerns surrounding the importation of LNG.

VIII. Wide Scale Officer Shortage Resulting in Foreign Ship Operators “Poaching” LNG Officers; Poor Training; Steep Decline in Safety and Security; and Violations of International Law

As reported in numerous articles and studies conducted by leading international maritime trade publications including Tradewinds and Fairplay, LNG owners and operators are lashing out at each other with allegations of “poaching”, conducting insufficient training in violation of ISM Code as well as failing to properly check past employment references.

The sudden and sustained surge in global demand for liquefied natural gas and the worldwide shortage of mariners with LNG and steam experience is leading to predictable results. Shipmanagers seem willing to do whatever they can to get their ships fully crewed in the face of a growing wide-scale officer shortage. “The industry had previously grown slowly, so companies were able to train manpower and expand operations at a comfortable rate of two to three ships every two years,” Keith Bainbridge, director of LNG Shipping Solutions, told Fairplay magazine in 2005 “But where an industry experiences 40-50% growth within a couple of years, it will split at the seams,” he predicts.¹¹

This manpower crisis is made even worse by new shipmanagers entering the LNG trade. A Fairplay article titled, *Poaching War for Crew Erupts*, cited the “voracious appetite for scarce manning resources, both at sea and onshore. This has created severe competition among LNG owners.”¹²

The Society of International Gas Tanker and Terminal Operators LTD (SIGTTO) has recognized the acute shortage and the reaction by some. “A short-term answer for an LNG vessel operator is to “poach” crew from another such operator but, clearly, the long-term answer is training, training, and further training. SIGTTO members, as much as anyone, wish for the quite unique safety record of LNG shipping to be preserved. The influx of new personnel into the industry is of concern, especially if there is a temptation by a minority of operators to “cut corners” and put officers into positions of responsibility on a LNG carrier before they have been properly trained.”¹³

In an article titled *Officer Crunch Sparks Safety Alarm*, Anglo Eastern Ship Management’s training director Pradeep Chawla states that “intense pressure to promote more maritime officers is resulting in inexperienced officers making more mistakes and

more dangerous situations on board. The training director noted that, “shortages have made it harder to retain officers because manning agents use higher wages to lure away experienced seafarers, especially in LNG/LPG and other specialized trades.”¹⁴ Moreover, not all companies train officers, with many resorting to poaching.

The crewing crunch is giving rise to new and dangerous theories of crewing to meet the sustained demand. “Some operators are contemplating an airline-style approach, training their crew units to ever-higher standards and frequently rotating them among vessels. That would fly in the face of an industry that had, until last year, been characterized by its conservatism on crewing and had viewed rapid crew rotation as a threat to safety.” The article mentions that with the shortage, there is an “increasing incidence of crews of strangers being cobbled together with precious little time to develop mutual trust and overcome their natural fear of blame.”

In an article titled *Near Calamities in Cargo Operations*, Fairplay details two case studies, on international vessel crewing practices, to illustrate the dangers of new crew members who are unfamiliar with the vessel or on-board procedures. “In both incidents, one of the factors that contributed to the near calamities was the fact that one or more of the crewmembers involved were new to the ship and unfamiliar with all aspects of the vessel.” “The importance of learning the idiosyncrasies of a particular vessel cannot be overstressed, and even when crew are transferred to sister ships they should not assume that every feature of the ships will be the same.” As noted above, short cuts in manning and “inventive” solutions to crew shortages can prove to be a recipe for disaster.¹⁵

The consequences of crewing instability and poaching can also lead to serious deterioration of the relationship between mariner and management. “There has to be a management team in which officers can pick up the phone and discuss problems openly, rather than hiding them until it is too late” says Simon Pressly, GM of Dorchester Marine, an LNG vessel operator in a Fairplay article. The author continues with the observation that, “Unfortunately, with poaching so rampant, the dangerous lack of crew continuity is likely to continue until operators start making the requisite investments in manpower training.”¹⁶

Tradewinds states that the LNG-crewing shortage is giving rise to some serious shortcomings that are a direct threat to the industry’s safety record and are in violation of the International Safety Management (ISM) Code. Some operators and ship managers are employing senior-level ship’s officers that were terminated from employment by competing companies due to poor performance and substance abuse¹⁷.

On another front, big international shipping companies and ship management firms are feeling the LNG crewing pinch. Some operators are enticing LNG shipboard officers to switch companies by offering wages at 30%-40% higher than what has been paid in the past—and officers are switching companies and leaving their former employer in crisis. Some companies are offering over \$18,000 a month (in wages only, not including benefits) to attract qualified LNG officers¹⁸.

All decision makers and stakeholders involved with the importation of LNG to the United States must take notice of what is going on in the international market. With growing natural gas demands and some 50-plus applications on the books for LNG import terminals, the American people need to be assured that the most highly trained and experienced personnel are transporting security sensitive LNG to the United States. There is no room for error when it comes to liquefied natural gas. Like no other time in history, the economics are in place whereby the U.S. Merchant Marine can economically and safely deliver LNG cargo; provide a stable pool of mariners for the long term; provide the highest amount of training; and comply with all U.S. and international laws.

IX. International Consequence: Insurance Underwriters Deeply Concerned with Inexperienced Crews Aboard LNG Vessels

A recent article titled *LNG Ships Facing Premium Boost* details the nervousness of the insurance industry as the LNG fleet suffers through poorly managed growing pains. “Underwriters appear to be changing their view of LNG vessels, which have traditionally been regarded as particularly well managed, despite being costly and potentially hazardous.” Now, higher insurance premiums are the prospect for LNG vessel owners as a result of “a big deterioration in the claims record of the world gas fleet.” Marsh, the largest insurance brokering group issued a report concerning claims of more than \$400 million run up by the LNG fleet.¹⁹

Higher insurance premiums are in prospect for owners of LNG carriers after a spate of claims including operational incidents have left insurance underwriters facing big losses according to Marsh.²⁰ Marsh reports that risk profile is increasing due to a shortage of crew with LNG experience.²¹

With 200 LNG vessels in service and over 100 on order, Marsh identifies a number of factors associated with the rapid growth as adding to the risk profile of the gas-ship fleet including shortage of crews with LNG-carrier experience and new owners entering the market with the intention of trading vessels on the spot market rather than traditional long term charters.²²

The shortage of mariners in the international fleet is dire. It is abundantly clear, therefore, that the U.S. Merchant Marine must enter the market.

X. International Reaction: Responsible Shipping Ministries React to Manning Shortcuts and Abuse; Use of National Flag Vessels Promoted By Major Importers

The worldwide shortage of mariners and the severe competition among ship-owners is leading to drastic cuts in manning with sometimes fatal results. An article titled, *Modern Seafaring Can Kill You*, notes the rising rates of suicide, murder and poor health among Indian seafarers and details India’s response on behalf of its mariners. India’s director general of shipping, GS Sahni believes that severe competition has compelled international ship-owners to cut down on manning. “Crews that numbered 50-55 few

years ago have now come down to just 20 or less. Stress and fatigue has become a part of seafarer's tough life. With total strength of 15, there's no time for the floating staff to interact with each other since they are kept busy all the time and there is no peer sense." Captain MM Saggi, a nautical advisor to the government of India, says that stress and fatigue have led to several incidents of suicide, murder or seafarers going missing. "Ship-owners employ fewer seafarers, otherwise they feel they run the risk of going out of business. A situation develops where some employ fewer persons, yet keep whipping the crew and using them as slaves."

An official from the Indian shipping directorate notes that, "Indian ships do not face such problems because seafarers have their unions and as a result of the large manpower available, there is 20-25% more persons on board." A similar approach is taken in the U.S. by the Coast Guard in tightly regulating the minimum required number of mariners to safely operate a vessel under U.S. flag. The certificate of inspection (COI) ensures that proper manning of vessels for both the safety and security of the vessel and its cargo. However, in the international shipping business, the flag flown over the stern (registry) determines the wages paid and the minimum standards followed. As the Indian example shows, some registries promote a lowest common denominator where strict employment and environmental standards no longer apply. This underscores the importance of the choosing the right people, both shoreside and at sea, for the sensitive job of carrying LNG to the Massachusetts coast.²³

India's Shipping Ministry also took the lead in requiring Indian manning and Indian registry for LNG vessels importing to the Indian coastline. For the time being, the Indian Ministries of Commerce and Petroleum & Natural Gas has prevailed in the internal battle, handing India a set back in its efforts to build a domestic flagged LNG fleet. However, some of the world's largest importers of LNG, Japan and Korea, are an increasingly powerful consumer of LNG, have made registry of LNG ships a matter of national maritime policy. "Japan transported about 43% of its total LNG import of 59.1 million tons in 2003 on Japanese owned and controlled ships. Similarly, Korea transported about 61% of its LNG imports of 19.3 million tons in the same year on Korean controlled ships. In the combined import of Japan and Korea, third-party owned ships constituted only 8.3 percent," says a shipping industry representative.²⁴ It is notable that Japanese and Korean controlled vessels are in respectable registries and do not cut corners on crewing in order to compete on the world market.

If Japan and Korea utilize their citizens to ensure safe and secure importation of LNG to their countries, the United States should do so as well.

XI. Superior Domestic Maritime Resources: Calhoon MEBA Engineering School

The Marine Engineers' Beneficial Association operates a world renowned training facility, the Calhoon MEBA Engineering School (CMES), in Easton, Maryland. The school is fully accredited and certified by the U.S. Coast Guard and Det Norske Veritas (DNV). The MEBA School provides LNG training to organizations such as the U.S.

National Transportation Safety Board and Transportation Safety Board of Canada & Transport Canada.

The MEBA training facility trains both deck and engineering officers and has recently installed a cutting-edge Bridge Simulation System designed and built by TRANSAS USA. The simulator is one of the newest and most sophisticated systems in the world. The interactive program allows students to simultaneously control simulated ships utilizing any of 56 different types of vessels in over 20 different ports. In addition to the ten ships that can be controlled within one scenario, instructors can further intensify the simulation by implanting multiple computer-controlled ships into the scenario. Unlike many existing bridge simulators, each station, operating a different type of vessel (including LNG vessels), can interact with every other station simultaneously. The LNG cargo simulation program allows students to dock, load and discharge LNG vessels. Moreover, the computerized system even encompasses the terminal-side operations of an LNG facility. It accommodates upgrades to adapt to ever-evolving Coast Guard and International Maritime Organization training and testing requirements.

The Calhoun MEBA Engineering School (CMES) prides itself in developing and offering courses before the need becomes apparent in the US marine transportation industry. Relevant courses meeting today's LNG training needs include Tankship Liquefied Gases (LNG). This course has been part of the MEBA training core since 1975. It provides U.S. Coast Guard Licensed Deck and Engine Officers with the knowledge to safely and efficiently transport LNG. This LNG course is a USCG prerequisite for employment aboard LNG carriers. The class includes comprehensive lecture, lab work, and computer training as well as LNG science, engineering systems, cargo systems, stability, and safety. This course complies with the IMO Code for the LNG Vessels.

MEBA is willing to meet, discuss and cooperate with any and all interested parties in order to ensure that liquefied natural gas is safely, securely and economically transported to the United States. We can be reached at MEBA at 202-638-5355 or AMC at 202-347-8020.

Sincerely,

/s/
Ron Davis,
President,

William Van Loo,
Secretary-Treasurer,

William P. Doyle,
Deputy General Counsel and
Director of Government and Legislative Affairs,

/s/
Brian W. Schoeneman
Deputy Director,
American Maritime Congress

Marine Engineers' Beneficial Association

¹ Annual Energy Outlook 2005, Energy Information Administration, U.S. Department of Energy, February 2005, Table 13.

² Mr. Wright cites the Annual Energy Outlook 2005, Energy Information Administration, U.S. Department of Energy, Table 13, which reaches the conclusion that production from conventional underground gas deposits is projected to decline between now and 2025. This decline is somewhat offset by increased gas production from non-conventional domestic gas sources (most notably coal-bed methane), increased production from deep water sources (greater than 200 meters) in the Gulf of Mexico, and commencement of deliveries of Alaska gas to the lower 48 states. The Alaskan volumes are problematic according to Mr. Wright, because there has been no application to construct necessary infrastructure to transport the gas, and the timeline from application to first delivery is approximately 10 years.

³ The National Energy Board of Canada states, the Western Canadian Sedimentary Basin (WCSB) accounts for more than 90% of the gas production in Canada and for about 23% of North American natural gas production annually. In the last few years, gas production from the WCSB appears to have flattened after many years of growth, leading to increased uncertainty about the ability of industry to increase or even maintain current production levels from the basin over the longer term. See, Canada's Conventional Natural Gas Resources: A Status Report, National Energy Board, April 2004, pp. 9-10.

⁴ Exports of gas to Mexico have increased greatly in the last few years. These exports do not constitute a large out-flow of gas at present. However, the Mexican economy is growing and if it continues to grow, its demand for natural gas will increase and require the United States to import an increasing amount of gas to meet, not only domestic needs, but also the needs of Mexico. In other words, what Mexico imports and shares today by way of natural gas, Mexico may not be able share later. Jeff Wright, Chief, Energy Infrastructure Policy Group, Office of Energy Project, Federal Energy Regulatory Commission, Fall 2005.

⁵ See Maritime Business Strategies LNG fleet continuously updated at:

<http://www.coltoncompany.com/shipbldg/worldsbldg/gas/Ingactivefleet.htm>

⁶ There are only 5 diesel LNG vessels operating because straight diesel vessels do not have the capability to handle LNG boil-off gas. Therefore, the current diesel vessels are designed for short voyages of not more than three days. Indeed, the current LNG diesel vessels operate in the Japanese domestic trade; coastal Norway; and the Algeria-Greece trade route. The world LNG fleet is expected to reach approximately 350 vessels by the end of 2010.

⁷ Regardless of the future, steam propulsion LNG vessels will be the overwhelming majority of the fleet. Steam is the known and proven technology. LNG vessels have a life span like no other ships of up to 45-50 years. Straight diesel (D) vessels are rare because there is nowhere to store the boil-off gas from the LNG. Thus, the diesel vessels can only operate short distances (usually 2-3 day max journey) because there is not enough time for the LNG to start warming in significant enough amounts to worry about where to put the boil off gas. Diesel Re-liquefaction (DRL) LNG vessels are diesel propelled ships that encompass a re-liquefaction plant onboard the ship. There are no DRL vessels operating at this time. This is very new technology and the industry is having trouble with the DRL concept because the LNG carrying

capacity of the vessels has to be much larger than originally thought in order to recoup the costs of the system. The equipment needs to handle the boil off gas by re-cooling it to -261 degrees Fahrenheit and sending it back to the cargo tanks. This uses an enormous amount of energy. Dual Fuel Diesel Electric Engines (DFDE) is another source. These vessels operate partly on boil-off and partly on oil fuels. Dual Fuel Engines do not run well on heavy oil so MDO (expensive) is the second choice of fuel after boil-off. The first DFDE LNG carrier was supposed to be fully operational by now but it is having some troubles and not necessarily because of the propulsion system.

⁸ “*The Current State of Japanese Shipping*” March, 2004, PDF file at <http://www.jsanet.or.jp/e/shipping-e/index.html>, p.29

⁹ *Shaking the Tree*, Fairplay International Shipping Weekly, September 1, 2005,

¹⁰ Id

¹¹ *Poaching War for Crews Erupts*, Fairplay International Shipping Weekly, February 24, 2005.

¹² Id.

¹³ SIGTTO News, September 2005, p.5.

¹⁴ *Poaching War for Crews Erupts*, Fairplay International Shipping Weekly, February 24, 2005.

¹⁵ *Near Calamities in Cargo Operations*, Fairplay International Shipping Weekly, December 1, 2005.

¹⁶ *Poaching War for Crews Erupts*, Fairplay International Shipping Weekly, February 24, 2005.

¹⁷ *LNG Crewing Shock*, Tradewinds, February 25, 2005

¹⁸ *Philippines Dangles \$18,000 Carrot*, Tradewinds, January 9, 2006; See also, *LNG Wage Anger*, Tradewinds, November 4, 2005; *Officer on \$320,000 a year, claims Sigtto*, Tradewinds, November 4, 2005.

¹⁹ Tradewinds, *Insurers Get LNG Jitters, LNG Ships Facing Premiums Boost*, March 17, 2006

²⁰ Id.

²¹ Id.

²² Id.

²³ *Modern Seafaring Can Kill You*, Fairplay International Shipping Weekly, April 20, 2006

²⁴ *Foreign Flag Vessels May Bring Down LNG Import Costs*, The Hindu Business Line, December 13, 2005.