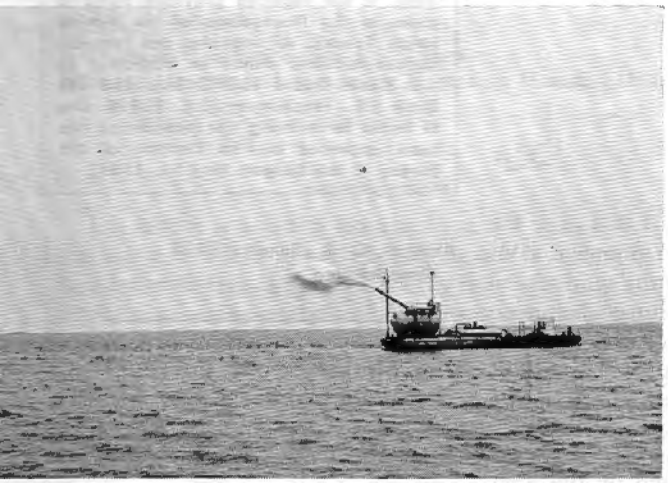
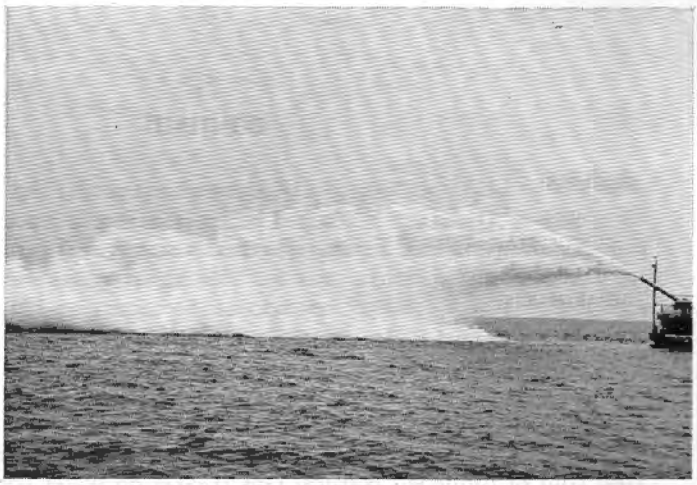
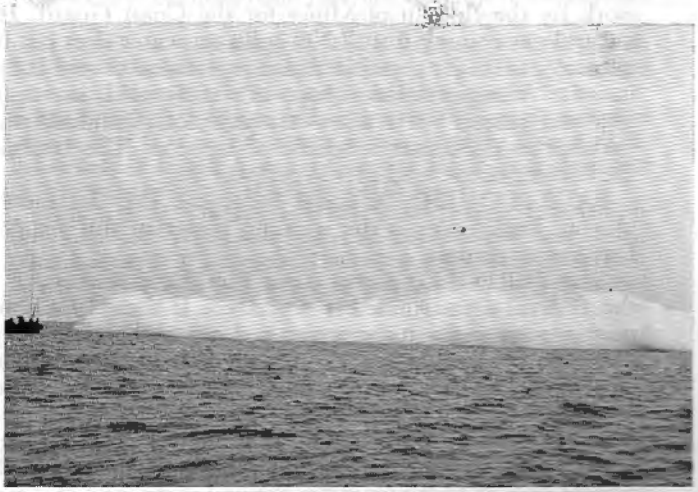
PROCEEDINGS
OF THE MARINE SAFETY COUNCIL







DEPARTMENT OF TRANSPORTATION UNITED STATES COAST GUARD

Vol. 30, No. 5 CG–129 May 1973

IN THIS ISSUE . . .

LNG in Transportation . . . .

PROCEEDINGS

OF THE

MARINE SAFETY COUNCIL

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CONTENTS

COVERS

FRONT COVER: This series of photographs depicts an experimental test spill of Liquefied Natural Gas (LNG) on water conducted by the Esso Research and Engineering Company. The experiment confirmed earlier work by the Bureau of Mines for the Coast Guard. It demonstrated that natural gas coming from LNG spills on water does not dissipate rapidly like natural gas in the condition used in residences and industry. Because LNG in water transportation is kept extremely cold, its vapors are heavier than air, and spread out in a low-hanging cloud that can travel great distances—perhaps to encounter a source of ignition. The transportation of LNG is the subject of the lead article on page 95.

BACK COVER: National Maritime Day is celebrated this May 22. On our back cover is the winning poster in this year's National Maritime Day poster contest.

CENTERFOLD: Know Your Fire Extinguishers, a chart published by the Federal Fire Council is reprinted. It should be noted that some of the portable fire extinguishers pictured are not presently approved for marine use. Those portable fire extinguishers bearing the "marine type" label of Underwriters' Laboratories, Inc. are approved for use on merchant vessels and motorboats. For current listings of marine type portable fire extinguishers, see the Fire Protection Equipment List published by Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago, IL 60611. Nonetheless, it is a good idea to know your fire extinguishers, and the centerfold chart is an excellent reference source for this purpose.

DIST. (SDL No. 96)
A: abcd (2), fhklmntuv
B: n(40); c(6); e(5); f(4); ghj(3); r(2); bkiq(1)
C: gp(1)
D: i(5); adgklm(1)
E: None
F: kp(1)
Lists TCG–06, CG–13, CG–20

Lieutenant (jg) A. W. Vander Meer, Jr., Editor

SAFETY ASPECTS OF LNG IN TRANSPORTATION

by W. E. McConnaughey and R. J. Lakey
Office of Merchant Marine Safety Hazardous Materials Division

INTRODUCTION

The transportation of liquefied natural gas (LNG) in the United States is rapidly becoming one of our more important industries. Predicted energy shortages have stimulated worldwide interest in LNG transportation resulting in major technological advances on methods for transporting this cryogen. For the maritime mode, the transportation of LNG will become one of the more important events in that industry's long history. Because LNG is having the greatest impact on the maritime transportation industry, that mode will be emphasized in this paper.

Liquefied natural gas is a colorless, clear liquid whose main constituent is methane. Depending upon the source, the methane content can vary from 65% by volume to greater than 99%, as is the case for Alaskan LNG. A typical analysis of Algerian LNG [1] follows:

methane	86% by volume
ethane	9.5%
propane	2.7%
iso-butane	0.4%
n-butane	0.7%
pentane+	0.1%
nitrogen	0.3%
caloric value	1148 BTU/FT^3
liquid specific gravity	0.46

Other important data relative to LNG are:

Boiling point of methane −258.68°F.
Ambient vapor pressure >2000 psi.
Critical Temperature of methane −116.5°F.
Flammable limits in air 5—14% by volume.
Vapor Density (Air=1) 0.55.

Examining the gas/liquid volumetric ratio points out the advantage of shipping natural gas as a liquid. Approximately 600 cubic feet of natural gas occupy only 1 cubic foot when condensed. However, because of its low critical temperature, LNG cannot be liquefied by pressure alone at ambient temperatures as is the case with propane, butane and other gases. Therefore, it has been necessary to develop systems which permit natural gas to be transported as a cryogen.

[1] Cooper, R. W., *Transport of Liquefied Natural Gas*, March 1971.

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INDUSTRY IN ITS INFANCY

While the techniques for liquefying natural gas are well known (G. L. Cabot applied for U.S. patent covering equipment for liquefying natural gas in 1914; U.S. patent 1,225,574 was issued in 1917.), the transportation of LNG is relatively new and can be thought of as still being in its infancy. The first large scale experiments with LNG transportation, conducted in the early fifties, led to the design and construction of a river barge on which five carbon steel, insulated, tanks were mounted. This barge, in turn, led to the *Methane Pioneer* and the successful transportation of LNG by ship from Lake Charles, Louisiana, to Canvey Island (U.K.) in 1959.

During the period between 1959 and 1969, most projects involving the transportation of LNG were conducted outside the United States. In 1964 the first large commercial scheme came into operation. This project involves transportation of liquefied natural gas from Arzew, Algeria, to Canvey Island near London and utilizes two ships built on the basis of knowledge gained from the *Methane Pioneer* (the *Methane Princess* and *Methane Progress*). Interestingly enough, this project also led to transportation of LNG by tank truck as LNG is further distributed within Great Britain by that mode.

Other LNG projects during the 1959–69 period involved shipments from Arzew to Le Havre, France, utilizing the specially constructed tanker *Jules Verne.*

In the 1960's, the feasibility of transporting LNG by motor carrier in this country in insulated tank trucks was demonstrated. The first long distance movement of LNG by motor carrier occurred in 1967 when LNG was transported from San Diego to Vancouver, British Columbia.

The United States became actively involved in LNG transportation by water again in 1969 when the Alaska to Japan trade began. This project utilizes two specially constructed LNG tankers, the *Polar Alaska* and the *Arctic Tokyo.* In the same period, spot movements of LNG to the East Coast began. Interestingly enough, the first LNG importation on the East Coast utilized the first LNG vessel *Methane Pioneer,* renamed the *Aristotle.* In a sense this LNG movement was inter-modal, in that LNG was off loaded into insulated tank trucks which had been mounted on a barge specifically for that purpose.

RAPID EXPANSION PREDICTED

In 1968, the demand for natural gas in the United States surpassed the year's discoveries for the first time. Since then consumption (demand) has continued to exceed discoveries. Because of this, the United States is viewed as one of the major potential markets for LNG in the seventies.

As can be imagined, the demand for LNG has also stimulated ship designers. An LNG ship is very special in that it must be designed to contain the cryogen in a hostile environment yet still conform to standards of naval architecture.

An impact on other transportation modes similar to that being experienced in the marine industry is to be expected. In 1971 there were approximately 40 highway vehicles approved (by Department of Transportation special permit) to carry LNG. There were a similar number of railroad tank cars so approved; however, LNG had not as yet moved by rail. The approved railroad tank cars were being used to transport another cryogen—ethylene.

SHIPPING REGULATIONS—MARINE

Prior to LNG, propane and butane were the principal liquefied flammable gases transported in bulk by water. These gases were transported at atmospheric temperature in pressure vessel tanks. The U.S. vessels (barges and ships) were designed and constructed in accordance with the Rules and Regulations for Tank Vessels, 46 CFR 38. These regulations required the cargo tank to be designed to a referenced pressure vessel code for a pressure equivalent to the cargo vapor pressure at 115° F but not less than 100 pounds per square inch gage.[2] The regulations did allow for transporting the cargo below normal atmospheric temperatures; however, a pressure vessel was required also in this instance.

With the onset of studies into the marine transportation of LNG, it was recognized that the cargo containment system required by the Rules and Regulations for Tank Vessels would not be practical. (It should be noted that design philosophy for LNG containment systems has now gone full circle as there are patented designs today which utilize pressure vessel type cargo tanks.) Hence, the regulations were amended to permit alternative method provided a degree of safety consistent with the minimum requirements of the regulations.[3] To provide guidance in reviewing and approving cargo systems permitted by the amendment, "Recommended Minimum Standards for the Transportation of Liquefied Flammable Gases At or Near Atmospheric Pressure"[4] were developed. These Recommended Minimum Standards were developed by the Coast Guard with the cooperation of the American Petroleum Institute Tank Vessel Committee.

The Recommended Minimum Standards, while developed in the mid-fifties, have formed the basis for most regulations and standards published since that time and they contained many important considerations for the design of LNG vessels. Among the more important concepts were:

a. Use of integral cargo tanks in lieu of pressure vessels
b. thermal protection of ships' structure (secondary barrier)
c. remote cotrol of cargo systems

[2] Rules & Regulations for Tank Vessels, 1956.
[3] Rules & Regulations for Tank Vessels, 1958.
[4] USCG Navigation & Vessel Inspection Circular 4–63, enclosure (4).

d. method of sizing relief valves for cargo tanks located in the hold of vessels.

The minimum standards have since been incorporated in the regulations.

The Coast Guard's interest in LNG has not been limited to requirements for United States flag vessels. The *Methane Pioneer*, a foreign flag vessel, was converted to carry LNG in Mobile, Alabama, under Coast Guard inspection to the minimum standards previously mentioned. While the vessel was not issued a Certificate of Inspection as would be the case for U.S. vessels, a Letter of Acceptance was issued in 1957 which stated that the *Methane Pioneer* met the applicable parts of the Rules and Regulations for Tank Vessels and the recommended minimum standards.

In 1965, the Coast Guard, because of concern for port safety, began a formal program of plan review and inspection of foreign flag vessels deemed to present potential unusual risks to United States ports.[5] Foreign flag LNG vessels fall into this category and prior to trading in the United States, they must have their designs and plans reviewed. However, only the cargo containment and handling section of the vessels are reviewed. The review is based upon the applicable U.S. regulations for similar vessels, using a guide [6] prepared for the purpose. An inspection which is conducted on the vessel's first entry into a U.S. port is also required. After satisfactory completion of both plan review and inspection, a Letter of Compliance is issued to the vessel.

BOIL-OFF CONTROL

Of particular concern to the Coast Guard is the disposition of cargo boil-off while the vessel is in port. The Coast Guard does not permit the release of LNG vapors to the atmosphere as a normal operating condition for the vessel. The reason for this prohibition is safety (fire and explosion) and environmental protection (air pollution). While at sea, disposition of boil-off is easily resolved as the LNG vapors are consumed in the boiler for propulsion. In port, consumption of boil-off becomes a more difficult problem as the boilers and associated equipment must be specially designed to consume the LNG vapor when the propulsion plant is idle. Therefore, alternative methods are being explored. These include reliquefaction, submerged combustion, combustion in special furnaces, catalytic burning, and other similar methods. The system for preventing vapor release must be highly reliable as it will be used infrequently but must remain operable and effective at any time.

It is noteworthy that the other modes of transportation, i.e., rail and highway, have adoped a similar philosophy—venting of cargo is not an acceptable operating condition.

[5] USCG Navigation & Vessel Inspection Circular 13–65.

[6] "Tentative Guide for the Review of Liquefied Flammable Gas Vessels," USCG, April 1971.

PORT REGULATIONS

Concern over vessels transporting LNG does not stop with plan review and vessel inspection. In some areas, local port authorities have imposed restrictions on vessel operation. Examples of the local port restrictions are:

a. The Captain of the Port, Boston, Massachusetts, authorized the discharge of LNG from vessels in the winter of 1970/1971 subject to the following conditions: [7]

1. That a "live tug" shall stand by the gas carrier during the discharge operation and shall maintain a radio guard on channel 16 (156.8 mhz).

2. That an adequate fire truck and crew be stationed at the discharge terminal during the discharge operation.

3. That a qualified cryogenics supervisor be in attendance during the discharge operation.

4. That appropriate lighting, security and safety procedures be observed during transfer operations.

5. That the Captain of the Port and Dorchester Fire Department be notified at least 72 hours in advance, and again immediately prior to the arrival of the gas carrier at the harbor entrance to permit co-ordination of operations and, *as necessary*, the establishment of a "restricted area" or broadcast of a Notice to Mariners. Verbal authority will be given by the Captain of the Port to enter the port provided safe conditions exist at that time, based on weather and the general harbor situation.

6. That the maximum draft of inbound gas carriers transiting Dorchester Bay is limited to 22 feet or combination of draft, tide conditions and arrival date/time is restricted to insure no less than one foot beneath the keel of the gas carrier (assuming channel depth of 14′ below MLW).

7. That at least one tug shall escort the gas carrier through Dorchester Bay.

8. That gas carriers transit Dorchester Bay within two hours of the predicted time of high tide and between sunrise and sunset.

9. That all necessary approvals and conditions imposed by state and local agencies or departments are adhered to and that all Coast Guard Marine Inspection requirements are met.

10. That the Captain of the Port reserves the right to promulgate additional conditions as required in the interest of safety.

b. The Port Authority in Tokyo has imposed the following restrictions [8] [9] on LNG vessels operating in that port.

1. LNG ships are not permitted to enter the port loaded during dark hours.

2. LNG ships are not permitted to vent cargo while in the bay.

[7] Private communication.

[8] Private communication.

[9] Emery, W. B., & Wheeler, R. S., "Operating Experience—LNG Tankers," Presented at 1971 API Tanker Conference.

3. LNG may not be used as ship's fuel while in the dock area.

4. LNG vessels are not permitted to exceed 12 knots in Tokyo Bay or 3½ knots in the port area.

5. LNG vessels are escorted by a guard vessel equipped with fire fighting equipment from the Bay entrance. A pilot must also be aboard the LNG vessel.

On the other hand, the Port Authority of London has not placed special restrictions on the operation of LNG vessels during normal weather and shipping traffic conditions nor has the Port Authority of London placed restrictions on the use of, or venting of, boil-off gas.

FUTURE REGULATIONS

The regulations for the safe transport of hazardous materials are continually under review and revision. This is particularly true for the regulations governing the transport of liquefied natural gas. Within the Department of Transportation the following activities are presently being conducted for marine transportation.

Domestic.—The Coast Guard has recently formed a Task Group to work under the auspices of the Chemical Transportation Industry Advisory Committee (CTIAC) to assist in the review and revision of the applicable regulations for the transportation of liquefied flammable gases. This review is of particular importance as there have been major advances in the design and operation of gas carriers in years since the last revision.

International.—The Inter-Governmental Maritime Consultative Organization (IMCO) is developing a Code for the Design, Construction and Equipment of Ships which carry compressed or liquefied gases. LNG will be one of the cargoes included in the IMCO work. It is envisioned the IMCO Gas Carrier Code will be similar to the recently completed IMCO Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.

HAZARD EVALUATION

Safety in the transportation of any hazardous material requires a good understanding of cargo properties and behavior under normal and abnormal conditions. In the case of LNG, this understanding is especially important if we are to rationally evaluate the hazards of its pending very large scale transportation which is not only new to this country but which is based on a new and rapidly advancing technology. From a regulatory standpoint, comprehensive information is essential to assure that present and future transportation regulations have a sound technical base and are free of both emotionalism and economic bias. While it is not possible to enumerate all of the past and on-going efforts to obtain an adequate understanding of LNG hazards, some of the significant transportation oriented work can be cited.

The disaster potential of LNG was clearly demonstrated in this country by the tragic consequences of a land storage tank failure in Cleveland in 1944 in which there were 130 deaths, 300 injuries, and over $8 million in property damage. While this event did not involve transportation and its causes were subsequently identified and rectified (improper structural material and lack of diking), it is mentioned because it represents the wrong way to learn about hazards. The right way is illustrated by the Bureau of Mines study [10] in 1961 on the behavior of LNG in land spills. This study utilized, in part, the results of open pit burning experiments sponsored by Conch International Methane, Ltd. at Lake Charles, La., and provided information on pool burning properties and fire extinguishment techniques as well as perspective on the comparative fire hazards of LNG and gasoline. Such information was of immediate interest to transportation because the first oceangoing ship (*Methane Pioneer*) was then under construction to demonstrate the feasibility of large water movements.

Important as this work was, it did not attempt to comprehensively evaluate the hazards of bulk LNG transportation. One of the aspects not contemplated was the behavior of LNG in a large spill on water—a subject of obvious interest to the Coast Guard. As a result, the Bureau of Mines undertook a study in 1968 under Coast Guard sponsorship to make a theoretical and experimental investigation of the hazards of large water spills. From this work,[11] came some very useful techniques for estimating pool size, vaporization rate, and downwind hazard distance for any given amount of spill. Some of the experimental findings were surprising. For instance, vaporization rates on water are much higher than predicted. Also, downwind vapor trails are much more heterogeneous than expected, with local concentrations being as much as 20 times the time averaged concentrations predicted by air pollution equations. However, the most surprising finding was that occasionally there are explosions when LNG contacts water. These occurred infrequently but they were quite violent. Furthermore, they did not involve combustion and could not be explained.

These "flameless explosions" were viewed by the Coast Guard as a phenomenon which required further investigation but they were not immediately assumed to be an established new hazard of major proportions. As a result, the Bureau of Mines was asked to make a follow-on study, again under Coast Guard sponsorship, to determine the cause of "flameless explosions" and to evaluate them as hazards. (For example, what is the type and amount of energy released, does the violence increase with quantity spilled, can they initiate a vapor cloud detonation, do they increase the downwind hazard distance by producing a colder vapor cloud, etc.) In addition, the Bureau was

[10] "Fire and Explosion Hazards Associated with Liquefied Natural Gas", Bureau of Mines report no. RI 6099 dtd 1962.

[11] "Hazards of LNG Spillage in Marine Transportation", Bureau of Mines final report to U.S. Coast Guard dtd February 1970 (NTIS Accession No. AD 705078).

asked to make additional spills to investigate (1) scale-up factors for downwind hazard estimates, (2) flame propagation characteristics of the heterogeneous vapor trails, and (3) heat flux from burning vapor trails. This work has now been completed [12] and it provides a good appraisal of the behavior and hazards of LNG in water spills based on industry studies [13 14] as well as those of the Bureau. The better understanding of the flameless explosion phenomenon indicates that it should be viewed as a secondary hazard compared to the primary hazard of large flammable gas cloud formation.

Since the start of the Bureau of Mines 1968 study, a rapidly increasing amount of work and study on LNG hazards has been carried out on a world-wide basis. In the United States, the American Gas Association (AGA) has served as a focal point for contract paper studies [15 16] of LNG flammability, vapor dispersion, and terminal hazards. A next phase of experimental work is now underway. The National Fire Protection Association (NFPA) has developed a consensus standard [17] for LNG handling which is based on current knowledge of LNG hazards. The American Petroleum Institute (API) has coordinated an experimental program carried out by member companies on LNG vapor formation and dispersion in large water spills.[18] (This complements the AGA program which is concerned with land hazards.) The Shell Pipeline Research Laboratory has made important studies of the flameless explosion phenomena.[19] In Japan, the Ministry of International Trade and Industry has established an Ad Hoc Committee on the Hazard of LNG Spillage. The Coast Guard sponsored an investigation [20] at the University of Maryland on one of the candidate explanations for the "flameless explosions" mentioned earlier. The Committee on Hazardous Materials, established by the National Academy of Sciences to advise the Coast Guard, held an important conference in 1972 to review the current state of knowledge of LNG safety.[21]

This is by no means a complete description of work underway on LNG hazards. However, it does give some indication of its magnitude and of the widespread interest in the subject. As an indication of the complexity of the work, consider the following list of theories that, at one time, were proposed to explain just one aspect, "flameless explosions":

I. Superheating Processes Induced by:
   A. Nucleate type heat transfer as influenced by traces of nitrogen in the LNG.
   B. Transitional heat transfer as influenced by the presence of higher hydrocarbons.
   C. Low interfacial tension and homogeneous nucleation.
II. Water Hammer.
III. Hydrate Formation.
IV. Encapsulation.

SUMMARY

In summary, the United States is about to see extremely large scale importation of LNG which, as a unique material, requires careful attention by safety regulatory agencies. The present status is that regulations and international standards for LNG are under active review, revision, and development on the basis of current knowledge of its properties, hazards, and technology. An intensive effort has been underway also to extend this knowledge, and, as it is acquired, it is being used as a technical basis for regulatory activity domestically and internationally. The combined efforts of industry and government should assure that the oncoming large scale transportation of LNG will be safe.

ED. NOTE: *The above article is based on a paper presented to the Cryogenic Society of America in 1971.*

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[12] "Hazards of Spillage of LNG Into Water", Bureau of Mines Final Report to U.S. Coast Guard, September 1972 (NTIS Accession No. AD 754498).

[13] "Spills of LNG on Water-Vaporization and Downwind Drift of Combustible Mixtures", ESSO Research and Engineering Co. Report No. EE61E–72, November 1972.

[14] "LNG Spillage on Water, II, Final Report on Rapid Phase Transformations", Shell Pipeline R & D Lab, Tech. Progress Report No. 1–72, dtd February 1972.

[15] "LNG Spills: To Burn or Not to Burn" by Welker, Wasson, and Sliepcevich, presented at the Distribution Conference Operating Section, American Gas Association, Philadelphia, Pa., May 1969.

[16] Reports dtd 1971 available from American Gas Association, 1515 Wilson Blvd., Arlington, Virginia, 22209·

Vols, I and II: "A Report on LNG Safety Research" (A. D. Little, Inc.).

Vol. III: "LNG Safety Program—Phase I" (Battelle Columbus Labs.).

Vol. IV: "Non-Gray Thermal Radiation from a Flame Above a Pool of Liquid Natural Gas" (TRW Systems Group).

Vol. V: "An Experimental Vapor Dispersion Law for an LNG Spill" (TRW Systems Group).

[17] "Storage and Handling—Liquefied Natural Gas" NFPA Standard No. 59A, dtd 1971.

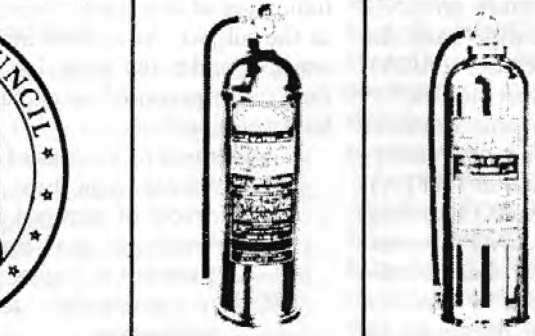
[18] See note 13.

[19] See note 14.

[20] "The Interaction of Liquid Hydrocarbons with Water", University of Maryland final report to U.S. Coast Guard dtd October 1971 (NTIS Accession No. AD 753561).

[21] "Conference Proceedings on LNG Importation and Terminal Safety", Report to U.S. Coast Guard from National Academy of Science Committee on Hazardous Materials, September 1972 (NTIS Accession No. AD 754326).

Know Your Fir

TYPE OF EXTINGUISHER		WATER			WATER SODA ACID
		STORED PRESSURE	CARTRIDGE OPERATED	PUMP TANK	
					
CLASS OF FIRE	A WOOD PAPER RUBBER PLASTICS	YES	YES	YES	YES
	B FLAMMABLE LIQUIDS GASES GREASES	NO	NO	NO	NO
	C ELECTRICAL EQUIPMENT	NO	NO	NO	NO
USUAL OPERATION		PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PUMP HANDLE	TURN UPSIDE DOWN
RANGE		30'–40'	30'–40'	30'–40'	30'–40'
DISCHARGE TIME		1 MINUTE	1 MINUTE	1 MINUTE	1 MINUTE
SIZES		2½ GAL.	2½ GAL.	2½ – 5 GAL.	2½ GAL.

e Extinguishers

FOAM	CARBON DIOXIDE	DRY CHEMICAL			
		SODIUM OR POTASSIUM BICARBONATE		MULTI-PURPOSE ABC	
		STORED PRESSURE	CARTRIDGE OPERATED	STORED PRESSURE	CARTRIDGE OPERATED
					
YES	NO	NO	NO	YES	YES
YES	YES	YES	YES	YES	YES
NO	YES	YES	YES	YES	YES
TURN UPSIDE DOWN	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE
30'–40'	3'–8'	5'–20'	5'–20'	5'–20'	5'–20'
1 MINUTE	8–30 SEC.	8–25 SEC.	8–25 SEC.	8–25 SEC.	8–25 SEC.
2½ GAL.	2–20 LBS.	1–30 LBS.	2½–30 LBS.	2½–30 LBS.	8½–30 LBS.

COAST GUARD RULEMAKING

(Status as of 1 May 1973)

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
1972 PUBLIC HEARING							
Tailshaft inspection and drawing (67–71, 4–71)	3–1–72	3–27–72	4–3–72	X			
Stability-wind heel criteria for cargo and miscellaneous vessels (43–71)	3–1–72	3–27–72	4–3–72	X			
Definition of international voyage (12–70)	3–1–72	3–27–72	4–3–72	X			
Portable foam firefighting equipment—tank vessels (17–71)	3–1–72	3–27–72	4–3–72	X			
Visual acuity requirements, original licenses (23–71)	3–1–72	3–27–72	4–3–72			3–5–73	4–4–73
Visual acuity supplement	12–8–72	On request	1–12–73			3–5–73	4–4–73
ANCHORAGE REGULATIONS							
Casco Bay, Maine	6–16–72		7–19–72	X			
Henderson Harbor, N.Y	6–28–72		8–1–72	X			
St. John's River, Fla. (CGFR 71–162)	12–22–71		1–31–72	X			
San Francisco Bay Area (CGD 72–78)	4–28–72	5–24–72 San Francisco	5–27–72			12–1–72 Corrected 1–3–73	1–1–73
San Juan Harbor, P.R. (CGFR 72–12)	2–1–72		3–4–72	X			
Willington River, Ga. (CGFR 71–153)	11–25–71		12–27–71	X			
San Diego Harbor (CGD 72–228)	12–5–72	None	1–8–73	X			
Hampton Roads, VA (CGD 72–232)	12–5–72		1–9–73	X			
Juan De Fuca, Wash. (CGD 72–233)	12–5–72		1–9–73	X			
Hampton Roads, VA (CGD 72–239)	12–10–72		1–11–73	X			
Chester River, Md. (CGD 73–10)	1–19–73		2–27–73				
San Luis Obispo Bay, Calif. (CGD 72–24)	2–9–72		3–10–72			1–19–73	2–23–73
Milwaukee Harbor WI (CGD 73–48)	3–19–73		4–16–73	X			
Barbers Point, Oahu, HI (CGD 73–59)	3–30–73		4–20–73	X			
Sodus Bay, NY (CGD 73–84)	4–27–73		5–29–73				
BOATING SAFETY (GENERAL)							
Numbering and casualty reporting (CGD 72–54) corrected; F.R. of 11–17–72	4–19–72	5–17–72	5–31–72			10–7–72	7–1–73
Personal Flotation Devices CGD 72–172, 120, 163)	10–6–72	11–20–72				3–28–73	10–1–73
Personal Flotation Devices, supplementary (CGD 72–120)	1–5–73		1–30–73			3–28–73	10–1–73
BRIDGE REGULATIONS							
Bear Creek, Md. (CGFR 72–17)	2–2–72		3–7–72	X			
Chattahoochee River (CGFR 71–166)	12–29–71	1–26–72 Florida	1–27–72	X			
Idaho State Memorial Bridge, Clearwater River, Lewiston, Idaho (CGFR 71–169)	12–29–71	2–1–72	2–1–72	X			
Interstate I–90 at Lake Washington (CGFR 71–168)	12–21–71	1–27–72 Washington	1–27–72	X			
Three Mile Creek (CGD 72–217)						11–4–72 Extended 2–15–73	11–15–72 through 4–1–73
North Fork, Mokelumne R., Calif. (CGD 72–218)	11–8–72		12–12–72			4–10–73	5–7–73
Raritan R., N.J. (CGD 72–219)	11–8–72	12–14–72	12–29–72	X			
Nansemond R., Va (CGD 72–244)	11–11–72		12–15–72	X			
Biscayne Bay, Fla. (CGD 72–230)	11–28–72		1–2–73			3–14–73	5–1–73
John Day R., Blind Slough, Clatskanie R., Oregon (CGD 72–231)	11–28–72		1–2–73	X			

Coast Guard Rulemaking—Continued

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
Oakland Inner Harbor Tidal Canal, Calif., (CGD 72-225)	11-17-72	.....	12-22-72	....	.....	4-12-73	5-16-73
Nanticoke, Del. (CGFR 71-142)	11-24-71	.....	12-24-71	X	.....	.....	.....
Ogden Slip, Chicago, Ill. (CGFR 72-16)	2-2-72	.....	3-7-72	X	.....	.....	.....
Sacramento River, Cal. (CGFR 71-165)	12-29-71	.....	2-7-72	X	.....	.....	.....
Union Pacific RR Co., Columbia River (CGFR 71-167)	12-29-71	2-23-72 Washington	1-27-72	X	.....	.....	.....
Mare Island, Cal	6-30-72	.....	8-7-72	....	.....	2-7-73	3-12-73
Ohio River at Huntington	6-10-72	7-13-72	7-27-72	X	.....	.....	.....
Ortega River, Fla	6-21-72	.....	7-25-72	X	.....	.....	.....
Alabama River, Ala. (CGD 72-159P)	8-22-72	.....	9-26-72	....	.....	2-23-73	3-26-73
Clear Creek, Tex. (CGD 72-165P)	8-26-72	.....	10-3-72	X	.....	.....	.....
New River, Fla. (CGD 72-170P)	8-30-72	.....	10-3-72	X	.....	.....	.....
Pompano Beach, Fla. (CGD 72-158P)	8-22-72	.....	9-26-72	X	.....	.....	.....
St. Lucie River, Fla. (CGD 72-168P)	8-26-72	.....	10-3-72	X	.....	.....	.....
West Palm Beach, Fla. (CGD 72-167P)	8-26-72	.....	10-3-72	X	.....	.....	.....
Back Bay of Biloxi, Miss. (CG 72-173R)	.....	.....	.....	.....	.....	9-7-72 Extended 4-2-73	10-2-72 through 73
Great Canal, Satellite Beach, Brevard County, Fla. (CGD 72-175PH)	9-13-72	10-30-72	11-13-72	X	.....	.....	.....
Debbies Creek, Manasquan, N.J. (CGD 72-178R)	9-14-72	.....	10-24-72	....	.....	3-9-73	4-15-73
Drawbridge Operations: AIWW, Mile 342, Fla.; Drawbridge Operations (CGD 72-190P)	9-30-72	.....	11-1-72	X	.....	.....	.....
Barnegat Bay, N.J. (CGD 72-211)	10-31-72	.....	12-5-72	X	.....	.....	.....
Middle Branch, Patapsco River, Md. (CGD 72-212)	10-31-72	.....	12-5-72	....	.....	2-23-73	3-26-73
Alabama River, Ala. (CGD 72-203)	10-14-72	.....	11-20-72	....	.....	4-10-73	5-21-73
Ewing Narrows, Harpswell, Me. (CGD 72-205)	10-17-72	11-21-72	12-6-72	X	.....	.....	.....
White River, Ark. (CGD 71-149R)	.....	.....	.....	.....	.....	12-2-72 Corrected 2-17-73	1-2-73 2-9-73
Richardson Bay, Ca. (CGD 72-30)	.....	.....	.....	....	.....	12-2-72	2-14-73 through 10-6-73
Hutchinson River, N.Y. (CGD 71-102)	10-14-71	.....	10-19-71	....	.....	1-26-73	2-26-73
St. Croix R., Minn. (CGD 72-246)	.....	.....	.....	....	.....	12-22-72	4-15-73
Doctors Pass, Naples, Fla. (CGD 72-242)	12-16-72	1-25-73	2-15-73	X	.....	.....	.....
Wabash R., Ill. (CGD 72-241)	12-16-72	None	1-23-73	....	.....	2-15-73	3-19-73
AIWW Vero Beach, FL (CGD 72-155)	3-2-73	.....	4-3-73	X	.....	.....	.....
Escatawpa and Pascagoula Rivers, MS (CGD 73-8)	1-15-73	.....	2-16-73	....	.....	3-16-73	4-23-73
Menominee River, WI (CGD 73-12)	1-26-73	.....	3-6-73	X	.....	.....	.....
Spa Creek, MD (CGD 73-13)	1-26-73	.....	3-6-73	X	.....	.....	.....
Long Island Inland Waterway (CGD 73-23)	2-12-73	.....	3-30-73	X	.....	.....	.....
Inner Harbor Navigation Canal, LA (CGD 73-65)	.....	.....	.....	....	.....	4-5-73	4-12-73
White River, AL (CGD 73-30)	.....	.....	.....	....	.....	2-23-73	2-23-73
Revocation of regulations for removed bridges (CGD 73-79)	.....	.....	.....	....	.....	4-24-73	4-24-73
Shaws Cove, CT (CGD 73-72)	4-18-73	.....	5-18-73	X	.....	.....	.....
HAZARDOUS MATERIALS							
Radioactive materials (CGFR 71-136)	11-20-71	2-22-72	2-29-72	....	.....	2-14-73	6-30-73
Radioactive materials packages (CGD 72-91)	5-24-72	6-20-72	6-27-72	....	.....	9-2-72	12-30-72
Compressed Gas Cylinders (CGD 72-115PH)	8-31-72	9-28-72	10-2-72	X	.....	.....	.....
Dangerous Cargoes—Dichlorobutene (CGD 72-162PH)	8-30-72	10-24-72	10-31-72	X	.....	.....	.....
Dichlorobutene, Corrected, F.R. 9-20-72, Hazardous Cargoes (CGD 72-162PH)	8-30-72	10-24-72	10-31-72	X	.....	.....	.....
Etiologic Agents—Supplemental Notice (CGD 72-148PH)	8-9-72	9-5-72	9-12-72	....	.....	6-29-73	6-30-73
Transportation of motor vehicles containing gasoline in closed containers prohibited (CGD 72-12)	3-20-71	6-8-71	6-15-71	....	.....	1-11-73	4-13-73

	Notice of proposed rulemaking	Public hearing	Deadline for comments	Awaiting final action	Withdrawn	Published as rule	Effective date
Dangerous Cargoes—Phosphorus Pentasulfide (CGD 72-171PH)	9-6-72	10-24-72	10-31-72	....	.....	2-9-73	5-11-73
Certification of Cargo Containers for Transport under Customs Seal (CGD 72-139)	11-17-72	.....	12-19-72	X	.....	.....	.....
Metal Borings, Shavings, Turnings & Cuttings (CGD 72-229)	12-5-72	1-11-73	3-1-73	X	.....	.....	.....
Exemption to Etiologic Agents Requirements (CGD 72-226)	12-13-72	1-23-73	1-30-73	....	.....	3-29-73	6-30-73
Shipment of DOD material sold to shipper (CGD 73-42)	3-22-73	4-17-73	4-24-73	X	.....	.....	.....
Miscellaneous Dangerous Cargoes (CGD 72-182)	11-11-72	12-12-72	12-19-72	X	.....	.....	.....
MARINE ENVIRONMENT AND SYSTEMS (GENERAL)							
Oil pollution prevention (CGFR 71-160, 161)	12-24-71	2-15-72	4-21-72	X	.....	12-21-72	7-1-74
Atlantic Intracoastal Waterway, Vero Beach, Fla. (CGD 72-155P)	8-16-72	.....	9-19-72	X	.....	.....	.....
Captain of the Port areas, 3rd CG Dist. (CGD 72-234)	.....	.....	.....	....	.....	1-5-73	1-5-73
St. Mary's River, Mich., speed limits (redefinition of reference points) (CGD 72-96)	.....	.....	.....	....	.....	1-29-73	1-26-73
St. Mary's River, MI (correction) (CGD 72-96)	.....	.....	.....	....	.....	1-16-73	1-16-73
MERCHANT MARINE SAFETY (GENERAL)							
Buoyant devices, special purpose water safety (CGFR 72-5)	1-29-72	.....	3-15-72	X	.....	.....	.....
Fire extinguishers, marine type portable (CGFR 72-36)	3-9-72	4-18-72	4-24-72	....	.....	3-14-73	6-18-73
Incombustible materials (CGFR 72-47)	3-9-72	4-18-72	4-24-72	....	.....	3-14-73	6-18-73
Oceanographic vessels, fire main systems (CGFR 72-20)	2-4-72	.....	3-19-72	X	.....	.....	.....
Washroom and toilet facilities (CGFR 72-4)	1-15-72	.....	3-20-72	X	.....	.....	.....
Water lights, floating electric (CGFR 72-48)	3-9-72	4-18-72	4-24-72	X	.....	.....	.....
Great Lakes Maritime Academy, List as a Nautical School-Ship (CGD 72-92P)	8-9-72	.....	9-15-72	X	.....	.....	.....
Ship's Maneuvering Characteristics Data (CGD 72-132PH)	8-22-72	9-28-72	10-13-72	X	.....	.....	.....
Disclosure of safety standards (CGD 72-187)	10-31-72	.....	12-4-72	....	.....	4-10-73	5-11-73
Unmanned Barges; hull construction (CGD 72-130)	10-31-72	12-19-72	12-29-72	X	.....	.....	.....
Marine Engineering Systems and Components (CGD 72-206)	11-17-72	12-12-72	12-20-72	X	.....	.....	.....
Remote Valve Controls (CGD 72-57)	11-17-72	.....	12-19-72	X	.....	.....	.....
Update of Examination Requirements for Second and Third Mate (CGD 72-151)	11-16-72	.....	1-1-73	X	.....	.....	.....
Light intensity standards for small passenger vessels and uninspected vessels (CGD 72-238)	.....	.....	.....	....	.....	1-8-73	1-10-73
Towboat operator licensing (CGD 72-132)	8-11-72	9-13, 20, 26, &27-72	1-15-73	....	.....	3-2-73	9-1-73
Construction requirements for tank ships (CGD 72-245)	Adv. Notice 1-26-73	.....	3-15-73	X	.....	.....	.....
Great Lakes load lines (CGD 73-49)	3-23-73	.....	4-15-73	X	.....	.....	.....
Wiring methods and materials for hazardous locations (CGD 73-6)	2-14-73	.....	3-16-73	X	.....	.....	.....
Oily ballast discharge requirements (CGD 72-179)	2-15-73	.....	3-19-73	X	.....	.....	.....
Emergency Position Indicating Radio Beacons (CGD 73-24)	3-5-73	4-18-73	4-30-73	X	.....	.....	.....
Change of nomenclature of "Hearing Examiner" (CGD 72-208, 73-68, 73-69)	.....	.....	.....	....	.....	4-24-73	4-30-73
Firemen's outfits on manned tank barges (CGD 73-11)	4-26-73	On request	5-28-73	....	.....	.....	.....

NOTE: This table which will be continued in future issues of the Proceedings is designed to provide the maritime public with better information on the status of changes to the Code of Federal Regulations made under authority granted the Coast Guard. Only those proposals which have appeared in the Federal Register as Notices of Proposed Rulemaking, and as rules will be recorded. Proposed changes which have not been placed formally before the public will not be included.

AMENDMENTS TO REGULATIONS

TITLE 46—SHIPPING

Chapter I—Coast Guard, Department of Transportation

[CGD 72-149R]

SUBCHAPTER B—MERCHANT MARINE OFFICERS AND SEAMEN

PART 10—LICENSING OF OFFICERS AND MOTORBOAT OPERATORS AND REGISTRATION OF STAFF OFFICERS

SUBCHAPTER T—SMALL PASSENGER VESSELS (UNDER 100 GROSS TONS)

PART 187—LICENSING

Requirements for Original Licenses

The purpose of the regulations in this document is to relax the visual acuity requirements for an original license as a deck engineer, or radio officer, or as an operator licensed under Part 10 or 187 of Title 46, Code of Federal Regulations. This change also affects the physical requirements for an endorsement as seaman because the visual acuity requirements for:

(1) An able seaman are the same as for an original license as a deck officer (46 CFR 12.05-5(b));

(2) A qualified member of the engine department are the same as for an original license as an engineer (46 CFR 12.15-5(b)); and

(3) A tankerman are the same as for an original license as an engineer, except the color vision test is the same as required for a deck officer (46 CFR 12.20-3(h)).

These amendments were proposed in a notice or proposed rule making published in the March 1, 1972, issue of the Federal Register (37 FR 4292) and in the Marine Safety Council Public Hearing Agenda, dated March 27, 1972. The proposed amendments were identified as item 7 in the notice and the agenda. A supplemental notice of proposed rule making was published in the December 8, 1972, issue of the Federal Register (37 FR 26124) to advise the public that the relaxation of the visual acuity requirements proposed on March 1, 1972, would, by cross reference, also affect the requirements for applicants for endorsements as able seaman, qualified member of the engine department, and tankerman. The public was given 30 additional days in which to submit written comments on the original notice and the supplemental notice. Interested persons were also given the opportunity to make oral statements at the public hearing which was held on March 27, 1972, in Washington, D.C.

Nine written comments were received. Seven of these comments supported the proposal, five of which suggested even further relaxation of the requirements. One comment opposed the proposal and suggested that there should be no standards for corrected vision but a stricter standard for uncorrected vision. The final commenter requested additional information. No oral comments were made at the public hearing.

An applicant for an original license must pass a physical examination that includes an eye test. Present regulations provide a visual acuity standard and allow a relaxation by the Commandant of the standard when the circumstances of the case so warrant. Coast Guard records indicate that such relaxations have been granted.

A comparison of the Coast Guard visual acuity standards with similar standards of other Government agencies discloses that in some cases the standards for merchant marine personnel are the most stringent. Such stringency was considered necessary because:

(1) After the original merchant marine license is issued, there is no subsequent examination for visual acuity; (2) the license qualifies the holder for service at sea that is comparable to line duty in the armed services; and (3) the license authorizes service on smaller vessels were, especially in bad weather, undue reliance on eye glasses would be undesirable. However, in view of the technological advances made in navigational aids and the lack of statistics to indicate that poor vision has materially contributed to any marine casualty, some relaxation of the visual acuity requirements is justified.

Seven of the comments received approved the proposal, five of which proposed that the corrected vision requirements in the present regulations be retained. These commenters pointed out that technical advances in navigational aids have made the dependence on normal eyesight less important than in the past. In addition, the commenters agree that operators and officers have proven themselves capable of performing satisfactorily under the present requirements.

In view of the comments received, the proposed uncorrected vision requirements have been adopted but the corrected requirements of the present regulations have been retained. The present corrected vision requirements are as follows:

License	One eye	Other eye
Deck	20/20	20/40
Engineer	20/30	20/50
Motorboat operator	20/20	20/40
Radio officer	20/30	20/50

In consideration of the foregoing, Chapter I of Title 46, Code of Federal Regulations, is amended as follows:

1. By amending § 10.02–5(e) by revising subparagraph (5) and the first and second sentences of subparagraph (3) to read as follows:

§ 10.02–5 Requirements for original licenses.

* * * * *

(e) *Physical examination* * * *.

(3) For an original license as master, mate, or pilot, the applicant must have uncorrected vision of at least 20/100 in both eyes correctable to at least 20/20 in one eye and 20/40 in the other. * * *

* * * * *

(5) For an original license as engineer, the applicant must have uncorrected vision of at least 20/100 in both eyes correctable to at least 20/30 in one eye and 20/50 in the other.

* * * * *

2. By revising § 10.13–15(c) to read as follows:

§ 10.13–15 Physical examinations for original licenses.

* * * * *

(c) For an original license as radio officer, the applicant must have uncorrected vision of at least 20/100 in both eyes correctable to at least 20/30 in one eye and 20/50 in the other. An applicant for an original license who has monocular vision and has served as a radio operator on merchant vessels of the United States with such vision may be issued a license if:

(1) He complies with the sections of this part that apply to the rating he seeks; and

(2) The vision in his remaining eye is at least 20/30 uncorrected.

* * * * *

3. By amending § 10.20–7(a) by revising the first and second sentences of subparagraph (2) to read as follows:

§ 10.20–7 Physical examination requirements.

(a) * * *

(2) For an original license as motorboat operator, the applicant must have uncorrected vision of at least 20/100 in both eyes correctable to at least 20/20 in one eye and 20/40 in the other. * * *

* * * * *

4. By amending § 187.10–15 by revising the first and second sentences of paragraph (c) to read as follows:

§ 187.10–15 Physical examination.

* * * * *

(c) For an original license as operator the applicant must have uncorrected vision of at least 20/100 in both eyes correctable to at least 20/20 in one eye and 20/40 in the other. * * *

* * * * *

(R.S. 4405, as amended, R.S. 4462, R.S. 4438, as amended; sec. 3, 70 Stat. 152, sec. 12, 85 Stat. 217, sec. 6(b)(1), 80 Stat. 937; 46 U.S.C. 375, 416, 224, 390(b), 1461(e), 49 U.S.C. 1655(b)(1); 49 CFR 1.46(b) and (o)(1)).

Effective date. These amendments become effective April 4, 1973.

Dated: February 27, 1973.

C. R. BENDER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.73–4083 Filed 3–2–73;8:45 am]

Approved Equipment

Commandant Issues Equipment Approvals; Terminates Others

U.S. Coast Guard approval was granted to certain items of lifesaving, and other miscellaneous equipment and materials. At the same time the Coast Guard terminated certain items of lifesaving, and other miscellaneous equipment and materials.

Those interested in these approvals and terminations should consult the Federal Register of March 27, 1973, for detailed itemization and identification.

Delay In Use of New Coast Guard Examinations

Development of the new examinations for Second and Third Mates and for Second and Third Assistant Engineer, both steam and motor, was originally scheduled for completion and introduction of the new examinations on 1 July 1973. Due to some difficulty experienced in the final assembly and printing of both the examinations and the specimen examination booklets, some delay in the implementation date became necessary. In addition, the passage of the legislation requiring licensing of the operators of uninspected towing vessels will result in an unusually heavy work load in many offices during this same period.

To avoid conflict with the large number of initial applicants for the Towing Vessel Operator License and to allow institutions engaged in training merchant marine personnel to properly plan their programs, introduction of the new examinations will be delayed until 1 January 1974. Specimen examination booklets should be available not later than October 1973.

Development of the complete examinations for the license as Operator of Uninspected Towing Vessels is also going forward. These will be used to qualify those applicants who are not eligible under the "Grandfather" provisions. It is anticipated that review of representative sections of these examinations, by industry panels, will begin in late April 1973.

The first completed examinations should be distributed and available for use in field offices by 1 September 1973.

MERCHANT MARINE SAFETY PUBLICATIONS

The following publications of marine safety rules and regulations may be obtained from the nearest marine inspection office of the U.S. Coast Guard. Because changes to the rules and regulations are made from time to time, these publications, between revisions, must be kept current by the individual consulting the latest applicable Federal Register. (Official changes to all Federal rules and regulations are published in the Federal Register, printed daily except Saturday, Sunday, and holidays.) The date of each Coast Guard publication in the table below is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

The Federal Register will be furnished by mail to subscribers, free of postage, for $2.50 per month or $25 per year, payable in advance. The charge for individual copies is 20 cents for each issue, or 20 cents for each group of pages as actually bound. Remit check or money order, made payable to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated October 1, 1972 are now available from the Superintendent of Documents price: $5.75

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7–1–63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (4–1–72). F.R. 7–21–72.
115	Marine Engineering Regulations (7–1–70) FR. 12–30–70, 3–25–72, 7–18–72.
123	Rules and Regulations for Tank Vessels (5–1–69) F.R. 10–29–69, 2–25–70, 6–17–70, 10–31–70, 12–30–70, 3–8–72, 3–9–72, 6–14–72, 7–18–72, 10–4–72, 10–14–72, 12–21–72.
129	Proceedings of the Marine Safety Council (Monthly).
169	Rules of the Road—International—Inland (8–1–72). F.R. 9–12–72.
172	Rules of the Road—Great Lakes (7–1–72). F.R. 10–6–72, 11–4–72, 1–16–73, 1–19–73.
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3–2–64).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3–1–65).
176	Load Line Regulations (2–1–71) F.R. 10–1–71.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7–1–63).
184	Rules of the Road—Western Rivers (8–1–72). F.R. 9–12–72.
190	Equipment List (8–1–72). F.R. 8–9–72, 8–11–72, 8–21–72, 9–14–72, 10–19–72, 11–8–72, 12–5–72, 1–15–73, 2–6–73, 2–26–73.
191	Rules and Regulations for Licensing and Certification of Merchant Marine Personnel (6–1–72). F.R. 12–21–72.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5–1–67). F.R. 3–30–68, 4–30–70, 10–20–70, 7–18–72.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4–1–57).
227	Laws Governing Marine Inspection (3–1–65).
239	Security of Vessels and Waterfront Facilities (3–1–72). F.R. 11–3–72.
249	Marine Safety Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (5–1–69). F.R. 10–29–69, 2–25–70, 4–30–70, 6–17–70, 10–31–70, 12–30–70, 3–9–72, 7–18–72, 10–4–72, 10–14–72, 12–21–72.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (8–1–69). F.R. 10–29–69, 2–25–70, 4–22–70, 4–30–70, 6–17–70, 10–31–70, 12–30–70, 9–30–71, 3–9–72, 7–18–72, 10–4–72, 10–14–72, 12–21–72.
258	Rules and Regulations for Uninspected Vessels (5–1–70). F.R. 1–8–73, 3–28–73.
259	Electrical Engineering Regulations (6–1–71). F.R. 3–8–72, 3–9–72, 8–16–72.
266	Rules and Regulations for Bulk Grain Cargoes (5–1–68). F.R. 12–4–69.
268	Rules and Regulations for Manning of Vessels (10–1–71). F.R. 1–13–72.
293	Miscellaneous Electrical Equipment List (9–3–68).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (7–1–72). F.R. 7–8–72.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (12–1–71). F.R. 3–8–72, 3–25–72, 6–24–72, 7–18–72, 12–8–72, 12–21–72, 1–8–73.
329	Fire Fighting Manual for Tank Vessels (7–1–68).
439	Bridge-to-Bridge Radiotelephone Communications (12–1–72).

CHANGES PUBLISHED DURING MARCH 1973

The following have been modified by Federal Registers:

CG–190, Federal Register of March 27, 1973.

CG–191, Federal Registers of March 2, and 5, 1973.

CG–258, Federal Register of March 28, 1973.

CG–323, Federal Register of March 5, 1973.


SHIP
AMERICAN