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A REPORT TO CONGRESS: ACTIVITIES RELATING TO TITLE II PORTS AND--ETC(U)
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A REPORT TO CONGRESS:

ACTIVITIES RELATING TO TITLE II PORTS AND WATERWAYS SAFETY ACT OF 1972.

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DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Partial CONTENTS:

INTRODUCTION

The Ports and Waterways Safety Act of 1972, Title II, Vessels Carrying Certain Cargoes in Bulk, which amended the Tank Vessel Act (46 U.S.C. 391a), states in Section 4417a(7)(A) of the Revised Statutes:

> "The Secretary shall begin publication as soon as practicable of proposed rules and regulations setting forth minimum standards of design, construction, alteration, and repair of the vessels to which this section applies for the purpose of protecting the marine environment. Such rules and regulations shall, to the extent possible, include but not be limited to standards to improve vessel maneuvering and stopping ability and otherwise reduce the possibility of collision, grounding, or other accident, to reduce cargo loss following collision, grounding, or other accident, and to reduce damage to the marine environment by normal vessel operations such as ballasting and deballasting, cargo handling, and other activities."

Section 203 of the Act requires an annual report to Congress. Section 203 states:

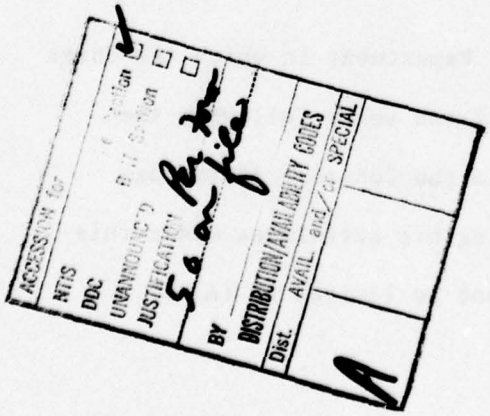
> "Section 203. The Secretary of the Department in which the Coast Guard is operating shall, for a period of ten years following the enactment of this title, make a report to the Congress at the beginning of each regular session, regarding his activities under this title. Such report shall include but not be limited to (A) a

description of the rules and regulations prescribed by the Secretary (i) to improve vessel maneuvering and stopping ability and otherwise reduce the risks of collisions, groundings, and other accidents, (ii) to reduce cargo loss in the event of collisions, groundings, and other accidents, and (iii) to reduce damage to the marine environment from the normal operation of the vessels to which this title applies, (B) the progress made with respect to the adoption of international standards for the design, construction, alteration, and repair of vessels to which this title applies for protection of the marine environment, and (C) to the extent that the Secretary finds standards with respect to the design, construction, alteration, and repair of vessels for the purposes set forth in (A)(i), (ii), or (iii) above not possible, an explanation of the reasons therefor."

The Secretary of Transportation has delegated authority to the Commandant of the U.S. Coast Guard to issue regulations to implement the provisions of the Act.

Additionally, Part D includes other activities relative to this Act.

This is the sixth report submitted pursuant to Section 203 of the Act.



EXECUTIVE SUMMARY

Worldwide, approximately 1.35 million tons of oil are released to the oceans from tank vessels every year. Eighty percent of the released oil is a result of cargo tank cleaning and ballasting operations. Four percent is caused by cleaning and bunkering operations while a relatively insignificant amount results from mishaps involving terminal operations. The remainder, fifteen percent, is caused by tank vessel accidents.

In the past, the Coast Guard has emphasized regulations that would reduce pollution due to operations. However, the series of tanker accidents in the winter of 1976-77 focused public attention on cargo loss as a result of vessel casualties. On December 15, 1976, the SS ARGO MERCHANT (Liberian Flag) ran aground 28 miles southeast of Nantucket Island in international waters of the Atlantic Ocean. The vessel grounded due to navigational error and the subsequent break-up of the vessel spilled all of its approximately 27,000 ton cargo of heavy heating oil. The winds and currents carried the oil away from the U.S. shoreline and it now appears that the rich fishing areas of Georges Bank were not seriously damaged. However, the long term effects of this spill cannot yet be assessed.

The ARGO MERCHANT accident, together with other foreign flag tank vessel casualties resulting in oil spills in the winter of 1976-77, drew attention to the need to further examine this problem area.

An Interagency Oil Pollution Task Force was appointed by President Carter to review the issues involved in tank vessel transport of bulk petroleum products. On March 17, 1977, following the Task Force's

report, President Carter, in a message to the Congress (Appendix 2), recommended measures to alleviate the problem of oil pollution. These Presidential initiatives have resulted in extensive Commercial Vessel Safety Program activity by the Coast Guard this year, both domestically and internationally.

Internationally, much has been done since passage of the "Ports and Waterways Safety Act of 1972." The "International Convention on the Prevention of Pollution from Ships, 1973," consisting of a series of articles and five technical annexes, was the first major advance. While the U.S. position at the 1973 Conference to seek achievement of a double bottom requirement was defeated, the Coast Guard agreed with most provisions of the Convention and has to date patterned certain U.S. rules on the provisions of the 1973 Convention.

Later, during development of regulations implementing Annex I of the 1973 Convention, it became apparent to the Coast Guard that there was value in selectively locating segregated ballast tanks in way of cargo spaces to provide a measure of protection in case of grounding or collision. There was no clear evidence or general agreement that double bottoms was the best or only satisfactory place to position segregated ballast. Requirements for the defensive placement of segregated ballast spaces on new tank vessels over 70,000 deadweight tons were thus developed and published in January 1976, becoming effective on January 8, 1976, for vessels contracted for after that date.

Many of the circumstances under which the 1973 Convention was negotiated changed in the intervening years. One of the most important of these changes is the great excess of tank vessel tonnage available on a worldwide basis. Approximately 80 percent of the tank vessels calling at U.S. ports are less than 70,000 deadweight tons

and this situation is likely to continue for some time, since our ports are not capable of accommodating larger tank vessels.

Domestically, the Annex I provisions of the 1973 Convention were placed into final regulations for the seagoing U.S. domestic tank vessel fleet in October of 1975. On December 13, 1976, the applicability of Annex I was extended to foreign tank vessels calling at U.S. ports.

At the same time as Annex I was being implemented, a separate rulemaking effort was being made in the form of an advance notice of proposed rulemaking setting forth certain concepts dealing with navigation safety requirements. In January 1977 the final rules with respect to navigation safety were published. Appendix 1 contains a listing of all rulemaking activities through December 1977 relating to the intent of the Ports and Waterways Safety Act.

Within the United States, many still advocated a mandatory requirement for double bottoms. Requirements for double bottoms were incorporated in proposed legislation by Congress, and, upon review of the situation, the Interagency Oil Pollution Task Force recommended to President Carter that a double bottom requirement for new construction be included in the proposed Presidential initiatives.

In accordance with the directive contained in the President's message to Congress on March 17, 1977, proposed regulations for tank vessels were published (see appendix 10). Intense Coast Guard efforts at the Intergovernmental Maritime Consultative Organization (IMCO) have been directed toward obtaining international agreement on requirements for tank vessels in conformance with the current U.S. position. The International Conference on Tanker Safety and Pollution Prevention is scheduled to be held in February, 1978, in London.

REPORT TO CONGRESS

Part A

A description of the rules and regulations prescribed by the Secretary (and related research and development work)	PL 92-340 Sec 203

The activities addressed below are divided into sections which are set forth in the Act. The regulations in Section i are designed to prevent collision, thus preventing possible pollution. The regulations in Section ii are designed to minimize possible pollution by reducing outflow of cargo after a collision. The regulations in Section iii are designed to prevent operational pollution that is not related to a vessel casualty. These classifications are used in the organization of this report.

Section i

To improve vessel maneuvering and stopping ability and otherwise reduce the possibility of collisions, groundings, and other accidents	PL 92-340 Sec 203

The tank vessel system's analysis for the purpose of reducing the probability of collisions, groundings, and other accidents and to improve tank vessel maneuvering capability has progressed along four areas involving tank vessel operations in the marine environment. These areas are:

1. Vessel System Performance in the Marine Domain
2. Human Performance Analysis in the Marine Domain
3. Analysis Methodology Development
4. Foreign Tank Vessel Examinations

Area 1

Vessel System Performance in the Marine Domain

The Coast Guard is continuing the task of acquiring the basic information needed to establish performance boundaries for the vessel subsystems in order to define acceptable accident involvement probabilities or risk levels in merchant vessel operations. Current efforts in this task are described below. These efforts are divided into two parts:

a. Regulations Relating to Vessel System Performance

b. Research Relating to Vessel System Performance

Part a. Regulations Relating to Vessel System Performance

(1) 33 CFR Part 164 - Navigation Safety Regulations

Final regulations were published on January 31,1977, and became effective on June 1, 1977. The purpose of these amendments to Title 33 of the Code of Federal Regulations is to add a new Part 164 prescribing rules for navigation procedures, minimum equipment requirements and essential test procedures to assure that all essential equipment is operating within acceptable performance levels. These rules apply to all vessels, both U.S. and foreign of 1,600 gross tons or over, when operating in the navigable waters of the U.S. except the Panama Canal and the St. Lawrence Seaway. A copy of these regulations is included in Appendix 7.

(2) 46 CFR Parts 32, 35, 77, 78, 96, 97, 167, 184, 185, 195, and 196 Vessel Inspection Regulations

On January 31, 1977, the Coast Guard published a rule interrelated with the Navigation Safety Regulations which are discussed above. The Vessel Inspection regulations require certain minimum pieces of equipment, such as magnetic compasses, gyrocompasses, radiotelephones and radar on U.S. vessels. A copy of this regulation is also in Appendix 7.

(3) 33 CFR Part 164 - Navigation Safety Requirements - Proposed Electronic Navigation Equipment for Vessels of 1,600 Gross Tons or More

A notice of proposed rulemaking was published in the Federal Register on November 14, 1977, proposing to amend the navigation safety requirements for vessels of 1,600 gross tons or more which were published on January 31, 1977. This proposed amendment, with certain exceptions, would require all vessels calling at ports in the continental U.S. or the Gulf of Alaska to have:

- A LORAN-C receiver that is warranted by the manufacturer as meeting specified requirements; or

- A continual update, satellite-based hybrid navigation receiver (i.e., satellite/doppler, satellite/inertial, or satellite/omega) that is warranted by the manufacturer as meeting specified requirements; or

- A receiver other than a LORAN-C or satellite hybrid receiver that the Commandant finds meets the intent of the statements of availability, coverage, and accuracy for the U.S. Coastal Confluence Zone

contained in the U.S. Department of Transportation National Plan for Navigation, as amended. A copy of this proposal is included as Appendix 15.

(4) 33 CFR Part 157 - Improved Emergency Steering Standards for Oil Tankers

On May 16, 1977, the Coast Guard published a notice of proposed rulemaking to amend the rules for protection of the marine environment relating to tank vessels carrying oil in bulk by requiring improved emergency steering standards for all tank vessels of 20,000 deadweight tons or more, both U.S. and foreign, that call at U.S. ports. This proposal implements the portion of the President's message of March 17, 1977, to Congress concerning measures for reducing pollution caused by tank vessel accidents.

Adoption of the regulations in this proposal would reduce the probability of collision and grounding of oil tank vessels caused by steering failure and would, therefore, reduce the risk of oil pollution as well as property damage, personal injury and death that could result from these accidents. A copy of these proposed rules is attached as Appendix 10.

(5) 33 CFR Part 164 - Vessels of 10,000 Gross Tons or More, Proposed Additional Equipment

The Coast Guard is considering amending the Navigation Safety Regulations by adding a requirement for vessels of 10,000 gross tons or more, both U.S. and foreign calling at U.S. ports, to have a second radar system and collision avoidance radar assisted equipment. This amendment was published as a notice of proposed rulemaking on May 16, 1977. This amendment implements that part of the President's message to Congress which considers a

requirement for back-up radar systems with collision avoidance radar assisted equipment on all tank vessels of 20,000 deadweight tons and over entering U.S. ports. A copy of these proposed regulations is included in Appendix 10.

(6) Other Regulations

Other rulemaking activity related to the Ports and Waterways Safety Act is listed in Appendix 1.

Part b. Research Relating to Vessel System Performance

The Coast Guard has initiated a study for the purpose of evaluating various devices proposed for improving maneuvering and stopping ability of large tank vessels. The possibility of using shiphandling simulators as a tool in evaluating these devices is under investigation.

This study is to be completed by August 1979. The problem areas to be investigated have been determined. Liaison with the Environmental Protection Agency (EPA) and the Maritime Administration (MARAD) have been established. Work on literature search and other information gathering is partially complete. Development of requirements for experiments and engineering studies are the next major tasks.

Another area of concern to the Coast Guard is the impact of the vessel navigating bridge design and configuration on the prevention of collision, ramming, and grounding accidents. Development of improved design standards in this area seems to offer a potential for accident reduction, but must be based on a better understanding of how information flow impacts on vessel control operations. Questions concerning what navigation equipment should

be provided, the characteristics of the equipment, and the location and arrangement of equipment within the ship's bridge area are under investigation by the Coast Guard.

Shallow water maneuvering trials of a very large crude carrier (VLCC), sponsored by the Maritime Administration, Coast Guard, and American Institute of Merchant Shipping, were held in the Gulf of Mexico southwest of Galveston, Texas from July 25 to August 3, 1977. The trials were performed aboard the 278,000 deadweight ton tanker ESSO OSAKA in water depths providing as little as 11 feet of clearance under the bottom of the ship which had a draft of 71.5 feet.

The Maritime Administration participation was directed by the Assistant Administrator for Commercial Development and included government contractual matters.

The Coast Guard participation was a joint financial and technical effort of the Headquarters Offices of Marine Environment and Systems, Merchant Marine Safety, and Research and Development. Local support was provided by the Coast Guard Cutters BLACKTHORN, DURABLE, and POINT MONROE as well as the Eighth Coast Guard District Staff, Coast Guard Base Galveston, and a HU-16 aircraft from Coast Guard Air Station Corpus Christi.

The American Institute of Merchant Shipping (AIMS) participation was delegated to and coordinated by Exxon Corporation. The following companies were contributors to the AIMS effort: Chevron Shipping; Gulf Transportation and Trading Company; El Paso LNG; Exxon Company, USA; Interstate Oil Transport Company; Mobil Shipping and Transport Company; SOHIO; Sun Transport Inc.; Shell; and Texaco.

The primary objective of the trials was to increase the understanding of how very large ships maneuver in shallow water. While some information on shallow water maneuvering (including model data) is available, the ESSO OSAKA trial was the first full-scale, shallow water maneuvering trial anywhere in the world of a very large crude carrier to obtain data under carefully planned and monitored conditions. This knowledge will be used to improve computer programs in ship handling simulators for the training of ships' officers and pilots. It will also assist in the research and design studies of ships, shipboard equipment, waterways, aids to navigation, and traffic controls.

In addition, the trial results will improve the data upon which the size and configuration of deepwater port safety zones are based. The trial results will also provide actual direct ship handling and maneuvering information for ships' officers and pilots under realistic shallow water conditions. They will help researchers better understand the effects of size when comparing model study results to the actual performance of ships.

Area 2.

Human Performance Analysis in the Marine Domain

The Coast Guard has continued to pursue its efforts in the development of further information and data on the interactions of the human controller, the complex vessel subsystems, people, training, equipment and the environment in ship navigation.

The Coast Guard, through Operations Research Incorporated, has completed a research project involving task analyses relative to vessel collisions, rammings, and groundings. A three volume report has been

published as a result of this project. The report describes the processes and results of analyses of tasks of bridge personnel on tankers, deep draft cargo vessels, and towboat-barge configurations. The report provides a data base of comparable and concise descriptions of tasks required for vessel control using currently available shipboard equipment and information, and external aids. The data base includes, for each shipboard task, the action required, the expected result, equipment/material sources of information, degree of discretion involved, performance standards, general educational background requirements, and job-related training requirements. These analyses were performed at a generalized level for applicability to a broad category of vessels. These analyses were based on three scenarios: mooring/unmooring; maneuvering in restricted waters; and coastal/open water navigation. This report is available from the National Technical Information Service (NTIS) under accession numbers AD A037316, AD A037317, and AD A037442.

This research project was to establish a baseline for systematic, continuing research into human factors in merchant vessel casualties. In addition, recommendations were made for actions that might be taken in the near future to improve the safety of vessel control operations.

On an international level, a Coast Guard officer serves as the U.S. delegate on the Intergovernmental Maritime Consultative Organization (IMCO) Subcommittee on Standards of Training and Watchkeeping. This subcommittee at its 10th session completed a draft, "Convention on Training and Certification of Seafarers," for presentation to a conference scheduled for June 14 to July 7, 1978. The Coast Guard has been directed by the President to review the entire draft convention and appendices to identify

those areas where additional requirements should be proposed for consideration. Future work programs of this subcommittee will include, most importantly, the development of minimum international standards for vessel manning.

Area 3.

Analysis Methodology Development

The Coast Guard has continued its efforts in the development of methods that will aid in the analysis and evaluation of alternatives for the reduction of accidents.

One study effort in this area is the investigation of the feasibility of developing a mathematical model of a river tow. Present activity is directed toward the modifications of existing mathematical models and programs to include effects needed to simulate river tow maneuvers. Also, efforts are directed toward obtaining hydrodynamic data that will aid in determining the feasibility of simulating the maneuvering performance of a tow.

A second study involves the simulation of maneuvering motion of an 80,000 deadweight ton tank vessel. Present efforts involve the refinement of the simulator by using scale model tests for verification. This mathematical model will be used to simulate a tanker entering New York harbor.

The Coast Guard is using the simulator at the Maritime Administration's Computer Aided Operations Research Facility (CAORF) to study mariner safety behavior. The first study explores mariners' understanding and use of changes to the rules of the road as a function of training and of ship type. The key change studied is the new freedom of stand-on vessels to avoid crossing collisions. Effects of traffic, sea room limitation, and situation ambiguity are considered. The next study will explore the feasibility of using bridge simulators in the licensing process.

Concurrently, the Coast Guard is improving its capability to identify problems and evaluate proposed and recent solutions on the basis of accident report histories. Quasi-experimental design theory holds demonstrated promise in this area. Efforts are now focused on distilling a maximum amount of information about "human error" problems in actual accidents. Operations Research, Inc. is attempting to use the recently completed task analysis (see above) to determine where training or equipment improvements would help most to improve task performance. This will require extension and improvement of the quasi-experimental approach.

Area 4.

Foreign Tank Vessel Examinations

As a result of the large number of tanker incidents during the winter of 1976-1977 and the conditions discovered during the course of a major casualty investigation aboard a foreign flag tank vessel, the U.S. Coast Guard began a foreign tank vessel examination program on January 21, 1977, aimed at eliminating possible dangerous cargo vapor emissions and likely sources of vapor ignition.

The initial scope of the examination program has been expanded as directed by the Presidential initiatives on tanker safety and marine pollution (Appendix 2) and domestic regulations that have been promulgated since the program began. The focus of the examination is upon the cargo venting, cargo handling, electrical and fire protection systems as well as life saving equipment. The minimum manning by licensed officers for the safe operation of the vessel is also verified.

The results of the program indicate that the overall level of safety aboard these foreign flag tank vessels has improved during the most recent three month period. Appendix 3 contains a safety analysis of the foreign tanker boarding program.

Section ii

To reduce loss in the event of collisions, groundings, and other accidents — PL 92-340 Sec 203

Activity in this section falls into two areas:

1. Rulemaking Activity; and
2. Research and Development

Area 1.

Rulemaking Activity

The President's message to Congress on March 17, 1977, included measures designed to reduce oil pollution caused by tank vessel accidents. The President informed Congress that the Secretary of Transportation would be instructed to develop, within 60 days, new proposed rules for all oil tankers, U.S. and foreign, of 20,000 deadweight tons or more, calling at U.S. ports. Proposed rules were published in the Federal Register of May 16, 1977 (Appendix 10).

The decision to require segregated ballast on vessels of 20,000 deadweight tons and over was made for several reasons. The most important of these was that most tank vessels involved in the U.S. trade were smaller than 70,000 deadweight tons. Therefore, the existing regulations which are applicable to new tank vessels of 70,000 deadweight tons and over would not be effective in protecting U.S. waters. The requirement for double bottoms on new tank vessels is designed to reduce pollution from grounding. A complete discussion of the segregated ballast and double bottom requirements is contained in the draft Environmental Impact Statement. A copy is attached as Appendix 4.

Final rulemaking procedures will be implemented following the International Conference on Tanker Safety and Pollution Prevention scheduled for Febuary of 1978.

In another area, final U.S. rules require all tank vessels over 150 gross tons, except tank barges that operate only on inland waters, to meet the stability testing and information requirements that currently apply to cargo and miscellaneous vessels in Subchapter I, Title 46 of the Code of Federal Regulations. These rules are required to implement the damage stability requirements of 33 CFR 157. Damage stability calculations require determination of the vessel's center of gravity. The regulations require either a conservative value of center of gravity be assumed or a stability test be performed to determine the actual center of gravity. A copy of these rules is attached as Appendix 14.

The Coast Guard will propose amending the regulations for U.S. vessels that are certified under Title 46 of the Code of Federal Regulations, Subchapter I (Cargo and Miscellaneous Vessels), Subchapter D (Tank Vessels), and Subchapter H (Passenger Vessels) to require each vessel that loads a bulk cargo to follow loading precautions which are similar to those contained in the Intergovernmental Maritime Consultative Organization's "Code of Safe Practice for Bulk Cargoes." Several vessel casualties have occurred in recent years as a result of cargo shifting during a voyage.

Area 2.

Research and Development

The liquefied natural gas (LNG) cargo tank design research project has been completed and a final report, "Summary of Development of LNG Tank Design Acceleration Rules," has been published. This report shows that vertical acceleration of the cargo was the single most important component which determines the design pressures. The predictions are considered to be conservative, but future developments should improve this. This highly technical and lengthy report is available from the National Technical Information Service under accession number AD A038647.

A full scale study of automated deck foam fire extinguishing systems for tank vessels was carried out at the Coast Guard Fire and Safety Test Facility, Mobile, Alabama. The effectiveness of various alternatives to the manually operated monitor in a deck foam fire extinguishing system was evaluated. These automated systems are still under development.

A study of tank barges is now underway and will be finished in early 1978. This study is attempting to consolidate the data in the Commercial Vessel Casualty Files and in the Pollution Incident Reporting System for a period of three years. This data will be used to determine the types and amounts of pollution that are occurring during barge operations. This, along with previous studies, and additional Coast Guard analysis, is intended to identify regulatory requirements necessary for minimizing pollution from tank barges.

A vapor cloud explosion study to determine the hazards from spills on water of liquefied natural gas (LNG) and liquefied petroleum gas (LPG) is underway. These studies are intended to determine the characteristics

of unconfined vapor cloud burning. Studies of several different gases to determine if flame acceleration can reach a level which might cause damaging explosions are of special interest.

The Coast Guard is using program models to assess the effects of certain toxic and dangerous chemicals accidentally released into the environment. There are three systems in operation: the Chemical Hazards Response Information System, the Hazards Assessment Computer System, and the Population Vulnerability Study. The first two systems mathematically simulate the behavior of accidentally released cargoes. Although they are still being refined, they can be used to formulate plans and other safety procedures to protect exposed populated areas. The third program, Population Vulnerability Study, is designed to mathematically predict casualties from a hypothetical marine hazardous materials release.

A program is continuing on wave group analysis and accidental capsizing simulations. This computer model, which is designed to simulate large scale motions of a vessel, will be used to predict the conditions under which a vessel may capsize. The results of this type simulation will be used to develop design standards to minimize the possibility of a vessel accidentally capsizing, thus causing possible loss of life and pollution.

The Coast Guard sponsored interagency Ship Structure Committee serves as a focal point for ship structure research conducted by the Navy, Maritime Administration, American Bureau of Shipping and the Coast Guard. This committee has several ongoing projects that will contribute to the general understanding of how vessels operate in the marine environment and the structural standards necessary to insure their safe design.

The Coast Guard is currently studying the design and performance of cargo venting systems. Three progress reports have been issued. The project is continuing and final conclusions are pending. Areas of interest are:

(1) vapor venting during high rate cargo transfers and abnormal external heating;

(2) liquid venting capability during accidental liquid overfill;

(3) blockage of flame control devices, design and maintenance criteria; and

(4) design criteria for preventing flame passage through vent piping, and detonation after passage.

A study of the actions of sulphuric acid and oleum, which are highly reactive with water, is being conducted. If a large release of these products occurs, an aerosol or mist formation is likely. The size and composition of the cloud and the conditions under which it forms are not precisely known. These properties are being investigated in this study. Once these factors are known, risk assessment and response procedures can be developed.

Section iii

Rules to reduce damage to the marine environment from the normal operation of vessels to which this title applies — PL 93-304 Sec 203

The actions discussed in this section are designed primarily to reduce pollution by regulating in two areas:

1. Equipment Requirements; and
2. Personnel Requirements

Area 1

Equipment Requirements

In the Fifth Annual Title II Report, dated January 1977, the Coast Guard reported on the preparation of proposed regulations concerning oil/water separators, oil content monitors, and oil content alarms. These proposed regulations, published in the Federal Register on June 27, 1977, are contained in Appendix 11 to this report.

Proposed regulations which would ultimately require the carriage and use of the above equipment aboard all sea-going U.S. and foreign tank vessels of 150 gross tons or more that enter U.S. waters were published in the Federal Register on June 27, 1977, and are also contained in Appendix 11 of this report.

Numerous written comments on both of the above proposed regulations have been received, and public hearings were held during November 1977 in New Orleans, Louisiana; Washington, D.C.; and St Louis, Missouri. The proposed equipment approval regulations are consistent with existing international regulations. Final rule promulgation is scheduled for the second quarter of 1978.

The proposed rules for Self-Propelled Vessels Carrying Bulk Liquefied Gases, which were published on October 4, 1976, are in the last stages of approval before publication in early 1978 as final rules. The proposed rules adopt the provisions of the IMCO Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk. They contain design, construction, equipment, operating, and inspection requirements for self-propelled vessels carrying bulk liquefied gases. The rules will

only apply to new gas ships contracted for after October 31, 1976. A copy of this proposal is attached as Appendix 5.

The Coast Guard published an advance notice of proposed rulemaking on June 30, 1977 that stated the intent to publish rules for existing gas ships carrying liquefied gases in bulk. It is proposed to upgrade some current U.S. regulations to meet IMCO standards. Where existing regulations exceed the standards of the Code, the existing regulations will be maintained. A copy of the advance notice is attached as Appendix 12.

A notice of proposed rulemaking requiring inert gas systems for tankers was published on May 16, 1977. This document proposed to extend the existing inerting system requirements from tank vessels of 100,000 deadweight tons or more to tank vessels of 20,000 deadweight tons or more. This proposal is in response to that part of the President's message to Congress on March 17, 1977, concerning a requirement for inert gas systems on all U.S. and foreign tank vessels of 20,000 deadweight tons or more calling at U.S. ports. The purpose of this gas inerting system is to maintain the liquid cargo tank atmosphere below the flammable range. A copy of the proposal is contained in Appendix 10.

On May 9, 1977, the Coast Guard published a proposed rule that would require tank vessels to carry a manual for cargo transfer procedures. Use of the manual could minimize the possibility of pollution spills and associated safety hazards resulting from incorrect cargo loading and unloading transfer procedures. The manual could be especially useful on a vessel that has a frequent turnover of personnel who may not be fully familiar with the operation of that vessel's cargo transfer system. A copy of this proposal is attached as Appendix 9.

Area 2.

Personnel Requirements

1. Regulations:

The Coast Guard is proposing to issue amending regulations governing various personnel licensing and certificating requirements. Among these is a notice of proposed rulemaking regarding the qualifications of personnel involved in the handling and transportation of dangerous cargoes in bulk aboard all vessels. This notice appeared on April 25, 1977, in the Federal Register (Appendix 8). The entire existing tankerman regulatory scheme, although workable in the past, is not responsive to present day operations. Tankerman certification is now required only for several grades of combustible or flammable products. Because of the increase in the kinds and physical properties of cargoes presently transported, it is necessary to extend such certification to dangerous liquids and compressed gases.

In addition, it was decided that licensed officers shall no longer be considered qualified as tankermen purely by virtue of holding a license. Accordingly, this proposal provides that deck and engineering officers, as well as unlicensed personnel, will have to show qualifying service and complete Coast Guard approved training courses, or pass a written Coast Guard examination, in order to qualify as tankermen for the purposes of transferring bulk liquid products. Included within these regulations is a proposal requiring firefighting training. A final rule will be published upon completion of the evaluation of the comments submitted in response to this proposal. A copy of this proposal is contained in Appendix 8.

The Coast Guard intends to propose amending regulations governing the qualifications of personnel involved in the piloting of vessels required to be under the control and direction of pilots licensed by the Coast Guard. The qualification standards for Coast Guard licensed pilots have, to date, provided qualified personnel to navigate vessels on routes requiring Federal pilots. It is considered, however, that with the increasing traffic of larger vessels and the attendant safety and environmental considerations resulting from this traffic, additional personnel training through practical experience or the use of appropriate operational simulators and recency of service are required to maintain the appropriate level of personnel capability. It is anticipated that the proposal to amend the regulations will be published for public comment in early 1978.

2. Research:

In the continuing effort to measure the area of critical skills required by today's seagoing personnel, the Coast Guard has published two studies relating to personnel technical qualifications.

The first is entitled "Recommendations for Qualifications of Engineering Personnel of Nuclear-Powered Ships" which presents summary recommendations concerning training and other qualification requirements appropriate for personnel serving on commercial nuclear ships. This report is available from the National Technical Information Service under accession number AD A029165.

Another report is entitled "Handbook for the Development of Qualifications for Personnel in New Technology Systems." This handbook describes procedures for specifying the qualifications that should be required of workers in the new shipboard work systems which come into

being because of newly developed technology. It also describes a method of determining what workers must do in order for the system to function properly and this knowledge will provide a rational basis for setting qualification requirements. This report is available from the NTIS under accession number AD A027526.

The method described above was used to develop recommendations for qualifications of cargo handlers on liquefied natural gas (LNG) ships and barges. The three volume report is available from the National Technical Information Service under accession numbers AD A026108, 109, and 110.

A similar study, not yet published, evaluates qualifications required for personnel in marine functions on mobile offshore drilling units.

An additional study is being undertaken by the Coast Guard to determine the feasibility of requiring shiphandling simulator training for those masters, mates and pilots who are serving on larger vessels whose size and maneuvering characteristics differ significantly from smaller vessels. The objective of this study is to determine the evaluation criteria for acceptable simulators and the extent to which simulator training can be substituted for certain types of experience. In addition, this study should point out any possible shortcomings of using simulators for training and evaluation.

Part B

The progress made with respect to the adoption of international standards for the design, construction, alteration and repair of vessels to which this title applies for protection of the marine environment — PL 92-340 Sec 203

Activity in this part falls into three areas:

1. Multilateral Initiatives
2. Bilateral Activity
3. Other Activity

1. Multilateral Initiatives:

This past year has been a period of greatly increased international activity. The Presidential initiatives (contained in the Presidential Proposal of March 17, 1977 to Congress) were presented to the IMCO Maritime Safety Committee (MSC), IMCO Marine Environmental Protection Committee (MEPC) and the IMCO Council during April through June 1977. The MSC established an Intersessional Working Group on Tanker Safety and Pollution Prevention (TSPP) and supported an accelerated schedule of committee meetings and conferences. The working group and schedule were approved by MEPC and the Council. Three meetings of the working group were held: May 1977 (Report TSPP I/9), June 1977 (Report TSPP II/2), and July 1977 (Report TSPP III/8). The following items were discussed and proposed alternatives developed where appropriate:

(a) Tanker Inspection and Certification.

(b) Construction and Equipment of Tankers to Improve Safety and Pollution Prevention.

(i) Segregated Ballast Tanks and Double Bottoms

(ii) Inert Gas System

(iii) Alternative and Interim Measures

(iv) Protective Disposition of Segregated Ballast

(c) Consideration of the United States proposal for Improved Emergency Steering Standards for all Tankers.

(d) Consideration of Legal Instruments.

The working group also agreed on the list of agenda items and the form in which these items should be included in the agenda of the planned joint MSC/MEPC session. Preliminary discussions were held regarding the ad hoc working groups which might be established at the joint session. The IMCO Subcommittee on Safety of Navigation met September 5-9, 1977. The U.S. proposal on back-up radar and collision avoidance radar assisted equipment was presented to the subcommittee. The report of this meeting served as a position for the joint MSC/MEPC meeting.

A meeting of the IMCO Subcommittee on Standards of Training and Watchkeeping was held September 19-23, 1977. The U.S. proposals concerning improved crew standards were presented for consideration. This meeting completed preparatory work for the June 1978 International Conference on Training and Certification of Seafarers. This conference will consider a new convention on crew standards.

The major IMCO multilateral meeting of the year was the Joint MSC/MEPC meeting of October 10-21, 1977. In areas (a), (b), and (c) listed above, the U.S. positions and alternatives proposed by other countries were presented. While this meeting did not reach conclusions on most points, it did provide an agenda for the International Conference on Tanker Safety and Pollution Prevention which is to be held in February, 1978.

2. Bilateral Activity:

While the multilateral discussions were being held under the auspices of IMCO, the U.S. participated in bilateral meetings with other countries. The procedure followed at each meeting was a presentation and explanation of the U.S. initiatives by the U.S. delegation, followed by a general discussion among those present. Attendance was controlled by each host government. The fundamental purpose of these discussions was to inform other governments of the character and scope of the U.S. Presidential initiatives (Appendix 2). The U.S. delegation did not seek commitments or advance information on the position these governments might take in multilateral conferences. The following contacts have been made:

Place/Date	U.S. Representatives Met With:
Paris, France May 31, 1977	Officials of Secretariat General of Merchant Marine, including Secretary General Chapon.
Oslo, Norway June 1, 1977	Officials of the Ministry of Shipping and Commerce, Ministry of Environment, and Maritime Directorate. Courtesy calls were made on Minister of Shipping and Commerce Bakke and Minister of Environment Bruntland. The general meeting at Maritime Directorate included representatives from several ministries, shipowners, shipbuilders, maritime unions, and the Norwegian classification society.
Moscow, USSR June 3, 1977	Officials of MORFLOT (Soviet Ministry of Merchant Marine) including Deputy Minister Kilesnitchenko. Officials responsible for ship building and tanker operations were included, as well as those responsible for policy and foreign relations.

Place/Date	U.S. Representatives Met With:
Tokyo, Japan June 6-8, 1977	In separate sessions, with representatives of Environmental Agency (Director General Nihei of Water Quality), Ministry of Transport (including Vice Minister Nakamura), ship builders, ship owners, and the Japanese classification society. Attendees from industry included chief executive officers of ship building and tanker operating companies.
Helsinki, Finland June 26-27, 1977	Officials of the National Board of Navigation and Ministry of Foreign Affairs and representatives of ship builders and tanker owners. The Delegations called on Minister of Trade and Industry, Rantala.
Washington, D.C. June 29, 1977	Canadian Commissioner of the Coast Guard O'Neil and senior members of his staff. At the request of the Canadians, discussions were limited to technical aspects of the U.S. initiatives.
Copenhagen, Denmark July 12, 1977	Deputy Under Secretary of Commerce Worm, senior members of his staff, Director of Government Inspection of Ships Madsen, and a representative of the Ministry of the Environment.
Hague, Netherlands July 14, 1977	Director General of Shipping Janssen, other senior members of the Ministry of Transportation and Waterways, and a representative of the Ministry of Health and Environmental Protection.
Stockholm, Sweden September 1, 1977	Per Jonsson, Deputy Under Secretary of State for Shipping; G.K.L. Lind of Hageby, Director, Ministry of Transport and Communications; Per Erikssen, Maritime Safety Director, National Administration of Shipping and Navigation; other government of Sweden officials; representatives of Swedish shipbuilders; and shipowners.
Abidjan, Ivory Coast September 8, 1977	Officials of the Ivorian government, including Minister of Maritime Affairs Lamine Fadiga. (The Ivory Coast, because of relatively shallow ports, experiences tanker traffic similar to that which serves the United States, i.e., smaller and in many cases older tankers rather than the very large and comparatively new ships being built today.)

In addition to the official discussions described above, U.S. delegations in London and elsewhere have engaged in informal discussions with other delegations (examples: Kuwait, Egypt, Poland, Brazil, UK, and Italy) and representatives of industry (examples: BP Tankers, Shell Tankers, Exxon, Texaco, and Shell U.S.). These discussions offered the opportunity for the U.S. to emphasize that we are vigorously pursuing the new initiatives made in IMCO. Our representatives have explained that where our proposals are deemed not fully acceptable, concrete counterproposals must be made. For example, proposals for alternatives which will provide at least the same degree of protection of the marine environment and enhancement of tanker safety will be expected.

3. Other Activity:

The second and third sessions of the new IMCO Subcommittee on Bulk Chemicals were held during the year. The Subcommittee is continuing work on the following items that must be resolved prior to the coming into force of the 1973 Marine Pollution Convention:

(a) Evaluation of noxious substances.

(b) Preparation of guidelines for the provision of reception facilities for noxious liquid substances required by Annex ii of the Convention.

(c) Development of procedures and arrangements for the discharge of noxious liquid substances.

In addition, the Subcommittee has developed the seventh set of amendments to the IMCO Chemical Code and is preparing the first set of amendments to the IMCO Gas Code. It has also begun work on harmonizing the requirements of the two codes, where possible, since many ships carry both liquid chemicals and gases.

Part C

To the extent that the Secretary finds standards with respect to the design, construction, alteration, and repair of vessels for the purposes set forth in (A)(i), (ii), or (iii) above not possible, an explanation of the reasons therefore. PL 92-340 Sec 203

There are no areas where action is mandated by the Act in which implementing rules and regulations cannot be made. However, it is realized that the progress of defining rules and regulations for maneuverability, along with groundings and other accidents, is moving slowly because of the complexity of the problem.

Part D

Other Coast Guard activities related to the Act

Activity in this part is in two areas:

1. Review of the status of six major Presidential initiatives, and
2. Other studies related to the Act.

1. Review of the Status of the Six Major Presidential Initiatives

(a) Ratification of the "International Convention for the Prevention of Pollution from Ships"

The Convention was transmitted to the Senate on March 22, 1977. Implementing legislation was transmitted to Congress on October 5, 1977. The Convention's standards for oil tankers have essentially been unilaterally implemented by the U.S. through Coast Guard regulations under the authority

of the Ports and Waterways Safety Act of 1972. The implementing legislation for the 1973 Convention contains stringent provisions regulating operational discharges and requiring port waste reception facilities that go far beyond the existing regulatory changes.

(b) Reform of ship construction and equipment standards

Appropriate regulations were published in the Federal Register as a notice of proposed rulemaking on May 16, 1977 (Appendix 10). These proposals address double bottoms, segregated ballast, inert gas systems, improved steering systems and dual radar.

Arrangements have been made by Coast Guard personnel to visit steering gear manufacturers, both U.S. and foreign. Additionally, a survey of U.S. and foreign flag ships is being conducted to determine the speed with which compliance can be attained.

The initiatives on ship construction and equipment standards have been presented to the international community and consideration of them is in progress at IMCO. As a result, the IMCO Council agreed that:

(1) In order to improve tanker safety on an international basis a Plenipotentiary Conference will be convened in February 1978.

(2) An intersessional working group will be established to consider the United States' proposals. Meetings of this working group were held in May, June, and July and preparatory work for the Plenipotentiary Conference is proceeding.

(3) A joint Maritime Safety Committee/Marine Environmental Protection Committee meeting would be held to formulate proposals on the basis of the working group's efforts for the Plenipotentiary Conference. This meeting was conducted in October 1977.

(c) Improvement of crew standards and training

The Coast Guard is intensifying its efforts to improve personnel qualifications. Ships' crews are reported to be a contributing factor in 80-85 percent of all tanker accidents. In addressing licensing and qualification standards, the status of actions taken is as follows:

(1) The planned IMCO International Conference on the Convention on Training and Certification of Seafarers has been scheduled for June 1978.

(2) New Tankerman Requirements were published as a notice of proposed rulemaking on April 25, 1977. Public hearings were held and public comments have been received.

(3) Revision of the licensing requirements for pilots is in the draft stages and will be issued as a proposed rulemaking in early 1978.

(4) The Coast Guard is presently considering the feasibility of requiring simulator training for those Masters and Chief Mates who are serving on very large vessels whose size and maneuvering characteristics differ significantly from smaller vessels. Revision of the licensing regulations to require such training is pending completion of the study to be conducted for the Maritime Administration to determine which simulator training may be substituted for shipboard experience. This subject has been addressed by the IMCO Subcommittee on the Standards of Training and Watchkeeping and will be on the agenda for consideration at the June 1978 conference.

(5) The Coast Guard published a notice of proposed rulemaking on January 17, 1977, (Appendix 6) which proposed to require all merchant

marine officers renewing a license as master, mate, or pilot on inspected vessels of 300 gross tons or over, to obtain a radar observer's endorsement if serving in any capacity under the authority of that license. Due to the numerous objections and emphasis on demonstrated skill instead of written examinations, this proposal is being withdrawn and a new proposal is being drafted. This revised proposal will amend regulations pertaining to the radar observer endorsement. A licensed deck officer in order to obtain a radar observer's endorsement will be required to attend a radar training facility approved by the Coast Guard and train on a simulator. It will also provide that a licensed deck officer can serve under authority of his license without a radar observer's endorsement if the type of service does not require a radar observer.

(d) Development of tanker boarding program and U.S. Marine Safety Information System

The tanker boarding program to examine annually each foreign tank vessel calling at U.S. ports is an expansion of a more limited existing boarding and examination program. The Coast Guard expanded the scope of this program in January 1977 with initial emphasis on the examination of cargo venting and handling systems and proper transfer procedures. In response to the Presidential initiatives, the scope of the program has been formalized and further expanded. The program now includes an examination for compliance with all safety and pollution standards presently applicable to foreign flag tankers under both domestic regulations and international agreements. To accomplish this the Coast Guard has requested or will request the following additional inspection personnel:

FY 1978 - 110 additional personnel

FY 1979 - 53 additional personnel

The long-range Marine Safety Information System (MSIS) begun in 1974 by the Coast Guard was not sufficiently advanced to meet the Presidential mandate. Therefore, the Coast Guard modified and enhanced the capabilities of the existing Port Safety Reporting System (PSRS) so that it meets the criteria established by the President for the U.S. Marine Safety Information System. The purpose of this interim MSIS is to maintain records of vessel casualties, pollution incidents, violations of Federal safety and pollution prevention regulations, and identify vessel owners. Marine Safety Offices, Captains of the Port, and Marine Inspection Offices, have the capability to obtain a vessel's history and to enter the results of boardings and inspections through remote terminals. Major coastal ports in the Continental U.S., Alaska, Hawaii, and Puerto Rico are presently included in the interim MSIS. These installations, at major ports on the inland rivers and Great Lakes, will be completed in early FY 1978.

In addition, each Coast Guard district office has a remote terminal to access the information so they are able to retrieve histories of responsible parties involved in repeated violations of Federal regulations. This information is considered by the Coast Guard district hearing officer in the civil penalty assessment process.

The Coast Guard has also loaded the system with some historical information on vessel casualties and pollution incidents to complement the established violation history of vessels calling at U.S. ports.

(e) Approval of "Comprehensive Oil Pollution Liability and Compensation" Legislation

The "Comprehensive Oil Pollution Liability and Compensation Bill" transmitted to Congress on March 17, 1977, was introduced as H.R. 6213 and S. 1187. On May 4, 1977, the House Merchant Marine and Fisheries Committee reported out H.R. 6803, a clean bill, adopting certain of the administration proposals. The bill was passed by the House on September 12, 1977, and sent to the Senate.

On the Senate side, Senator Magnuson, by Department of Transportation request, introduced the Administration bill as S. 1187, but there is a competing bill, S. 2083. The Senate Commerce, Science and Transportation Committee reported favorably on S. 2083, thereby leaving the Environment and Public Works Committee as the only Congressional Committee with substantive jurisdiction yet to act on this legislation. Substantive differences between the various bills, procedural delays, and delays in the passage of other legislation, make final passage of the bill unlikely until later in 1978.

(f) Improvement of Federal ability to respond to oil pollution emergencies

The following five studies are being conducted to determine if a six hour/100,000 ton spill response capability is attainable:

(1) An in-house inventory of the existing pollution response hardware is being made to determine the type, amount, and the geographical location of equipment in the custody of governmental agencies, oil cooperatives, oil companies, and private cleanup contractors. Final interagency clearance for collection of data has been approved. Data collection from testing has been completed and the implementing Commandant Instruction is being readied for publication.

(2) A study on the locations for siting response equipment will be used to predict the most probable locations for future major pollution incidents using historical spill data and other information. The best available information on the expected positions of deepwater ports, offshore exploration sites, and projected tanker traffic density data will be used to determine the locations at which equipment should be sited.

(3) An assessment of the requirements to respond to potential catastrophic spills of larger and larger proportions was needed. It is necessary to evaluate quantitatively the ability to cope with spills of significant proportions. A study is underway to determine the amount and types of equipment which should be kept in inventory to provide a capability to deal with a 100,000 ton spill. Information will be developed in such a way that the resources necessary for achieving various levels of the goal can be identified. The draft report on this effort will take into consideration the overall siting effort and is expected to be completed in 1978.

(4) A study to determine the feasibility of an open water, extreme weather response capability was awarded on November 8, 1977.

2. Other studies related to the Act

An evaluation is being made of the costs and benefits of a crude washing system which utilizes crude oil to clean cargo tanks. The evaluation will take into account information provided by other governments at IMCO and the preliminary drafts will be used in developing the U.S. position for negotiations at the February 1978 Plenipotentiary Conference. The study, along with recommendations on the possible use of crude washing as an alternative to segregated ballast, will be completed by April 1978. The results of the February 1978 IMCO Plenipotentiary Conference could impact on the study findings and will be included in a report which will be available by May 1, 1978. A related study being conducted for economic cooperation (partially funded by the State Department and the Coast Guard) seeks to determine the economic, political, and environmental implications of retrofitting segregated ballast in existing oil carriers. Completion of the study is contemplated prior to the February 1978 IMCO Conference.

A contract to evaluate the design, construction and equipment standards for tank barges carrying oil is underway and will consolidate pollution data and tank barge casualty data over a 3-year period to determine amounts of pollution from tank barges and contributing causal factors. A review of existing barge fleet design and cost data is underway with assistance from MARAD. Previous studies of tank barges will be reevaluated, and the costs and effectiveness of various alternative solutions to the pollution problem will be determined. The final report is expected in 1978.

The Offshore Vessel Traffic Management Study includes an evaluation of long-range surveillance and control systems and has been underway since August 1977 at the Transportation System Center (TSC), Cambridge, Mass. A detailed analysis of operational marine casualties within 200 miles of the U.S. coast is being made to identify causes and possible preventive action. The feasibility of applying various technological alternatives to this problem will be assessed and estimates of effectiveness developed. This evaluation is expected to identify the optimum approach to reducing offshore vessel casualties. Attention is also being given to statutory authority, jurisdictional, and international considerations associated with each alternative solution. Study completion is expected in June 1978.

A study of the fee collection mechanism for the Comprehensive Oil Pollution Fund will be conducted jointly with the Treasury Department. As background to the study, a meeting was held on September 23, 1977, with the Federal Energy Administration concerning FEA's mechanism for reporting oil imports. Another meeting was held with the Bureau of Mines on September 28, 1977, to discuss the recording of the volume of domestic crude being supplied to U.S. refineries. A report outlining the collection procedures will be available in time to meet the anticipated effective date of the legislation.

APPENDICES

1. Rulemaking Activity Through December 1977
2. President's Message to Congress on March 17, 1977
3. Safety Analysis of the Foreign Tanker Boarding Program
4. Draft Environmental Impact Statement on Double Bottoms
5. Federal Register of Oct. 04, 1976, Bulk Liquefied Gas Vessels (New)
6. Federal Register of Jan. 17, 1977, Radar Observer
7. Federal Register of Jan. 31, 1977, Navigation Safety Regulations
   Vessel Inspection Regulations
8. Federal Register of Apr. 25, 1977, Tankerman Requirements
9. Federal Register of May 09, 1977, Cargo Manual
10. Federal Register of May 16, 1977, Steering Systems
    Double Bottoms/Segregated Ballast
    Collision Avoidance Systems
    Inert Gas Regulations
11. Federal Register of Jun. 27, 1977, Oil Pollution Prevention
12. Federal Register of Jun. 30, 1977, Bulk Liquefied Gas Vessels (Existing)
13. Federal Register of Sep. 26, 1977, Vessels Carrying Hazardous Liquids
14. Federal Register of Sep. 29, 1977, Stability Requirements
15. Federal Register of Nov. 14, 1977, Proposed Electronic Navigation Equipment

APPENDIX 1

RULEMAKING ACTIVITY THROUGH DECEMBER 1977

RULEMAKING ACTIVITY RELATED TO THE PORTS & WATERWAYS SAFETY ACT OF 1972

Final Rules Published in 1977:

Navigation Safety Regs (74-77)	31 Jan 77
Vessel Inspection Regs (75-74)	31 Jan 77
Prince William Sound V.T.S (76-32)	25 July77
Unmanned Barges, Use of Copper Construction (75-226)	10 Feb 77
Metal Barges, Shavings & Turnings (75-133)	2 May 77
Certification of Seamen, Engine Dept. Rating (74-45)	16 May 77
Non-Hazardous Location for Air Compressors (75-17)	19 May 77
Loading Information for Tank Vessels (75-41)	6 Jun 77
Puget Sound V.T.S.	9 Jun 77
Tank Vessel Stability Requirements (75-104)	29 Sep 77

Published Notices of Proposed Rulemaking still being developed as Rules:

Inert Gas Systems for Tankers (77-57)	16 May 77
Emergency Steering Systems (77-63)	16 May 77
Double Bottom & Segregated Ballast for Tankers (77-58)	16 May 77
Collision Avoidance Equipment (77-16)	16 May 77
Revisions to the Electrical Requirements (74-125)	27 Jun 77
Tankerman Certification (74-44)	25 Apr 77
Required manifest for Foreign Vessels (76-81)	2 Sep 77
Radar Observer Endorsement (76-193)	17 Jan 77
Vessels Carrying Bulk Liquid Gases (77-69)	30 Jun 77
Oil Pollution Prevention, Vessel & Oil Transfer Facilities (75-124)	27 Jun 77
Tank Vessels Carrying Oil in Bulk, Cargo Monitors (77-88b)	27 Jun 77
Oil Pollution Prevention Equipment, Specifications (77-88a)	27 Jun 77
Electronic Navigations Equipment (77-168)	14 Nov 77

Published Notices cont'd.

Mobile Offshore Drilling Units (73-251)	2 May 77
Tank Vessel Manual of Operations (75-148)	9 May 77
Firehose Nozzle Requirements (76-86)	16 Jun 77
Standards for Liquefied Gas Carriers (74-289)	4 Oct 76
Benzene Carriage Requirements (75-75)	23 Dec 76

Final Rules Published 1976:

Rules and Regulations to Protect the Marine Environment (75-201) (Segregated Ballast)	8 Jan 76
Structural Fire Protection, Gas Inerting (74-127)	26 Jan 76
Rules for the Protection of the Marine Environment Relating to Tank Vessels Carrying Oil in Bulk (75-240)	13 Dec 76

Final Rules Published in 1975 .

Maneuvering Characteristic for Information to be posted in Pilothouse (73-78)	15 Jan 75
Fixed CO_2 Fire Extinguishing System (instructions) 74-100	10 Feb 75
PWSA Emergency Situations, Control of Port Traffic by District Commander (73-202)	13 Feb 75
Welding & Brazing (74-102)	30 Jun 75
Marine Engineering (73-254)	2 Sep 75
Tank Vessels in Domestic Trade (74-32)	14 Oct 75
Regulated Navigation Area - Mississippi River	2 Dec 75
Houston-Galveston V.T.S. (Manual) (74-296)	6 Jan 75
Vinyle Chloride Exposure Limits (1P pm Exposure limits)	16 Nov 75

Final Rules Published in 1974

Emergency Position Indicating Radio Beacon (73-24)	18 Mar 77
Deck Foam Firefighting Systems (72-138)	28 Feb 74
Transportation & Storage of Explosives & Combustible Liquids (73-173)	12 Apr 74

Final Rules Published in 1974 cont'd.

Oily Ballast Discharge Requirements (73-58)	30 May 74
Requirements for Marine Portable Tanks (73-172)	25 Jun 74
Tank Ships in Domestic Trade (74-32)	28 Jun 74
Puget Sound V.T.S. (73-158)	10 Jul 74
Cargo Tank Arrangement & Size Limitation (74-163)	21 Jul 74
Marine Engineering (Piping Systems) (73-248)1	26 Aug 74
Chesapeake Bay Entrance, Regulated Navigation Area (73-152)	5 Sep 74
Marking of Packages Containing Radioactive Materials (73-137)	13 Sep 74
Regulated Navigiation Area Delaware Bay	24 May 74

Final Rules Published in 1973

Fireman's Outfits Required in Barges (73-11)	3 Oct 73
Dry Chemical Fire Extinguishers (73-73)	3 Oct 73
Remote Valve Controls for Piping Systems (72-57)	1 May 73
Transverse Stability for Barges (72-130)	1 May 73
Licensing of Staff Officers (Exam Subjects) (72-151)	8 May 73
Letter of Compliance Program (72-80)	15 Jan 73
Stability, Wind Heel Criteria (73-120)	28 Jun 73
Transportation of Explosives (73-42)	7 Jul 73
Wiring Systems for Hazardous Locations (73-6)	24 Aug 73
Incombustible Materials for Merchant Vessels (72-215)	14 Mar 73
Marine Type Portable Fire Extinguishers (72-214)	14 Mar 73

APPENDIX 2

PRESIDENT'S MESSAGE TO CONGRESS
MARCH 17, 1977

Oil Pollution of the Oceans

The President's Message to the Congress Recommending Measures To Control the Problem. Dated March 17, 1977. Released March 18, 1977

To the Congress of the United States:

The recent series of oil tanker accidents in and near American waters is a grave reminder of the risks associated with marine transportation of oil. Though we can never entirely eliminate these risks, we can reduce them. Today I am announcing a diverse but interrelated group of measures designed to do so.

These measures are both international and domestic. Pollution of the oceans by oil is a global problem requiring global solutions. I intend to communicate directly with the leaders of a number of major maritime nations to solicit their support for international action. Oil pollution is also a serious domestic problem requiring prompt and effective action by the federal government to reduce the danger to American lives, the American economy, and American beaches and shorelines, and the steps I am taking will do this.

The following measures are designed to achieve three objectives: First, to reduce oil pollution caused by tanker accidents and by routine operational discharges from all vessels; Second, to improve our ability to deal swiftly and effectively with oil spills when they do occur; and Third, to provide full and dependable compensation to victims of oil pollution damage.

These are the measures I recommend:

• RATIFICATION of the International Convention for the Prevention of Pollution from Ships. I am transmitting this far-reaching and comprehensive treaty to the Senate for its advice and consent. This Convention, by imposing segregated ballast requirements for new large oil tankers and placing stringent controls on all oil discharges from ships, represents an important multilateral step toward reducing the risk of marine oil pollution. In the near future, I will submit implementing legislation to the Congress.

• REFORM of ship construction and equipment standards. I am instructing the Secretary of Transportation to develop new rules for oil tanker standards within 60 days. These regulations will apply to all oil tankers over 20,000 deadweight tons, U.S. and foreign, which call at American ports. These regulations will include:

—Double bottoms on all new tankers;

—Segregated ballast on all tankers;

—Inert gas systems on all tankers;

—Backup radar systems, including collision avoidance equipment, on all tankers; and

—Improved emergency steering standards for all tankers.

These requirements will be fully effective within five years. Where technological improvements and alternatives can be shown to achieve the same degree of protection against pollution, the rules will allow their use.

Experience has shown that ship construction and equipment standards are effective only if backed by a strong enforcement program. Because the quality of inspections by some nations falls short of U.S. practice, I have instructed the Department of State and the Coast Guard to begin diplomatic efforts to improve the present international system of inspection and certification. In addition, I recommend the immediate scheduling of a special international conference for late 1977 to consider these construction and inspection measures.

• IMPROVEMENT of crew standards and training. I am instructing the Secretary of Transportation to take immediate steps to raise the licensing and qualification standards for American crews.

The international requirements for crew qualifications, which are far from strict, will be dealt with by a major international conference we will participate in next year. I am instructing the Secretary of Transportation to identify additional requirements which should be discussed, and if not included, may be imposed by the United States after 1978 on the crews of all ships calling at American ports.

• DEVELOPMENT of Tanker Boarding Program and U.S. Marine Safety Information System. Starting immediately, the Coast Guard will board and examine each foreign flag tanker calling at American ports at least once a year and more often if necessary. This examination will insure that the ship meets all safety and environmental protection regulations. Those ships which fail to do so may be denied access to U.S. ports or, in some cases, denied the right to leave until the deficiencies have been corrected. The information gathered by this boarding program will permit the Coast Guard to identify individual tankers having histories of poor maintenance, accidents, and pollution violations. We will also require that the names of tanker owners, major stockholders, and changes in vessel names be disclosed and included in this Marine Safety Information System.

• APPROVAL of Comprehensive Oil Pollution Liability and Compensation Legislation. I am transmitting appropriate legislation to establish a single, national standard of strict liability for oil spills. This legislation is designed to replace the present fragmented, overlapping systems of federal and state liability laws and compensation funds. It will also create a $200 million fund to clean up oil spills and compensate victims for oil pollution damages.

• IMPROVEMENT of federal ability to respond to oil pollution emergencies. I have directed the appropriate federal agencies, particularly the Coast Guard and the Environmental Protection Agency, in cooperation with

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state and local governments to improve our ability to contain and minimize the damaging effects of oil spills. The goal is an ability to respond within six hours to a spill of 100,000 tons.

Oil pollution of the oceans is a serious problem that calls for concentrated, energetic, and prompt attention. I believe these measures constitute an effective program to control it. My Administration pledges its best efforts, in cooperation with the international community, the Congress, and the public, to preserve the earth's oceans and their resources.

JIMMY CARTER

The White House,
March 17, 1977.

EMBARGOED FOR USE AFTER BRIEFING MARCH 16, 1977

Office of the White House Press Secretary

THE WHITE HOUSE

FACT SHEET
ACTIONS TO REDUCE MARITIME OIL POLLUTION

The President is considering a series of possible Federal Government actions to deal with the problem of marine oil pollution caused by oil tankers. These include:

-- U. S. ratification of the International Convention for the Prevention of Pollution from Ships, 1973.

-- Regulatory action by the Department of Transportation to establish new U. S. standards for all tankers entering U. S. ports.

-- Submission to Congress of oil spill liability and compensation legislation.

-- The establishment of a U. S. Marine Safety Information System to identify tankers with long histories of poor maintenance, accidents and pollution violations.

BACKGROUND

The rash of oil tanker accidents which occurred this winter off our east and west coasts has brought home to us the serious risks which are involved in marine transportation of oil. Oil pollution threatens some of our most valuable natural resources -- the ocean, its living inhabitants, our beaches and our shorelines. Oil tanker accidents also endanger human lives, and oil pollution can jeopardize the economic security of millions of Americans who live in coastal communities.

In his Address to the Nation on February 2, the President recognized these risks and the need for timely government action to deal with the problem. In response to the President's concern, the Director of the Office of Management and Budget established an interagency Task Force to identify possible solutions.

The Task Force recommended to the President that he also consider action to reduce marine oil pollution caused by operational discharges from tankers. The Argo Merchant, the Sansinena and the Olympic Games have been the subject of much public concern. Such tanker groundings and collisions are a serious problem to the localities where they occur. However, they are not the major maritime source of ocean oil pollution. Operational discharges from oil tankers and other vessels cause a far greater total amount of oil pollution than accidents. Therefore, the actions which the President is considering deal with both problems.

THE INTERAGENCY OIL POLLUTION TASK FORCE

The Task Force was formed on February 3. The Office of Management and Budget chaired the group. The following agencies participated:

Department of State
Department of the Treasury
Department of Defense

more

Department of Justice
Department of the Interior
Department of Commerce
Department of Transportation
Federal Maritime Commission
Environmental Protection Agency
Council on Environmental Quality
Federal Energy Administration

Subgroups developed proposed initiatives in five areas:

1. Ships and ship systems
2. Crew standards and training
3. Oil pollution liability and compensation
4. International conventions
5. Oil spill response.

The Task Force contacted representatives of more than twenty interested public organizations and several States to solicit their views and suggestions. The organizations included environmental groups, the oil and transportation industries, oil spill cleanup companies and maritime unions. The States included Alaska, California, Florida, Louisiana, Maine, Massachusetts, Oregon and Washington. The suggestions and views of all of these groups are being carefully considered.

OBJECTIVES

The President's program is designed to meet four objectives:

1. reduce oil pollution resulting from oil tanker accidents and operational discharges;

2. improve our ability to deal with oil spills when they do occur;

3. assure that any citizens damaged by oil spills are fully compensated for their losses; and

4. reorganize Federal oil pollution programs to make them simpler and more responsive.

APPROACH

Pollution of the oceans by oil is a global problem. The United States is an active participant in the Inter-Governmental Maritime Consultative Organization, an international forum sponsored by the United Nations to formulate programs to reduce vessel pollution and to ensure safety of human life and vessels. The President's international initiatives will involve working through this international agency, as well as bilateral discussions with major shipping nations, our trading partners and our neighbors. The President plans to communicate directly with the leaders of a number of major maritime nations to seek their support in this effort.

On the domestic front, the President is considering strong administrative actions to upgrade U. S. standards on all oil tankers entering U. S. ports, as well as on the crews manning them. He is also considering action to upgrade several Federal programs designed to prevent accidents and respond to spills, including Coast Guard's tanker examination program and information systems and Federal oil spill response capability.

White House staff and the Office of Management and Budget spent yesterday on Capitol Hill discussing possible solutions with Members of Congress with a special interest in this area and with their staffs. That process is continuing. We hope to have their recommendations incorporated into a final proposal to be announced on Friday.

# # #

for all new tankers 70,000 deadweight tons and over, as well as oil discharge monitoring and control equipment, and sets requirements for cargo tank size and arrangement to limit oil spills in case of accident. In addition, the ports of signatories to the Convention will be required to have reception facilities for tankers' oily wastes.

2. Ship Construction and Equipment Standards

The President is directing the Secretary of Transportation to issue within 60 days proposed rules for a series of new oil tanker standards, and, as provided by law, to expedite the necessary regulatory procedures. The proposed regulations will apply to all oil tankers, U.S. and foreign, over 20,000 deadweight tons entering U.S. ports. They will include:

1. Double bottoms on all new tankers.

2. Segregated ballast on all tankers.

3. Inert gas systems on all crude tankers.

4. Backup radar systems with collision avoidance equipment on all tankers.

5. Improved emergency steering standards for all tankers.

These requirements would take full effect within five years. The rules should allow the adoption of technological improvements and alternatives which can be shown to accomplish equivalent pollution protection.

The President especially acknowledges the leadership of Senator Warren G. Magnuson and the Senate Commerce Committee on matters relating to tanker safety. All of the initiatives outlined above are the kinds of solutions the Committee has endorsed over a period of years.

Ship construction and equipment standards are not effective unless coupled with a strong enforcement program. Therefore, the President is directing the Department of State and the Coast Guard to begin diplomatic efforts to upgrade the present international system of inspection and certification. Construction and equipment inspections are carried out by all maritime nations. However, the quality of inspections by some nations falls far below U.S. practice.

In addition the United States will propose the immediate scheduling of a special international conference for the early fall to consider these construction and inspection measures. The U.S. will recommend that technical preparatory work be done by the Inter-Governmental Maritime Consultative Organization this spring and summer to ensure effective international action.

Authority for the domestic action is provided by the Ports and Waterways Safety Act of 1972 (Public Law 92-340) which provides the Department with a broad mandate to protect U.S. waters against pollution. These standards will reduce pollution through both accident prevention and reduction in operational discharges. A description of these requirements follows:

Double bottoms reduce oil spills caused by tanker groundings. Studies of groundings conclude that in 45 to 90 percent of cases no oil outflow would have occurred if the tank vessel had had a double bottom. The requirement will apply only to new vessels. Double bottoms can also be used for a part of the required segregated ballast space.

Segregated ballast provides tanks dedicated exclusively for the seawater which is carried by empty oil tankers for ballast. The use of separate clean tanks means that no oil is discharged along with ballast water. Deballasting and associated tank washing is the major source of operational oil pollution from tankers. Ballast tanks on new tankers can also be arranged to provide protection against oil outflow in case of accident.

MARCH 18, 1977

Office of the White House Press Secretary

THE WHITE HOUSE
FACT SHEET

Actions to Reduce Maritime Oil Protection

The President today announced a series of recommended Federal Government actions to deal with the problem of marine oil pollution caused by oil tankers. These include:

- A call for a special international conference to discuss stricter standards for oil tanker construction, equipment and inspections.
- Regulatory action by the Department of Transportation to establish new U.S. standards for all tankers entering U.S. ports.
- A Coast Guard program to board and examine all foreign flag oil tankers entering U.S. ports.
- U.S. ratification of the International Convention for the Prevention of Pollution from Ships, 1973.

BACKGROUND

As announced on March 16, these measures are designed to deal with the problem of oil tanker accidents and spills which occurred so frequently in and near U.S. waters this winter. The recommended actions will also serve to reduce oil pollution caused by operational discharges from tankers.

The President plans to communicate directly with the leaders of a number of major maritime nations to seek their support for strengthened international solutions to this world-wide environmental problem. The United States will also continue to participate actively in the Inter-Governmental Maritime Consultative Organization, a special United Nations agency, to formulate new programs to reduce vessel-source oil pollution.

The President's domestic program is strong and comprehensive. It includes both administrative and legislative actions and meets all four of the President's objectives - reduction in tanker pollution, improvements in oil spill response, assuring compensation of damaged citizens, and reorganization of government programs.

The recommended actions were formulated after consultation with environmental groups, the oil and transportation industries, oil spill cleanup companies and maritime unions. In addition, the suggestions and views of coastal States were solicited.

THE PRESIDENT'S PROPOSALS

1. The International Convention for the Prevention of Pollution from Ships, 1973

   The President will transmit this important International Convention to the Senate for its advice and consent and will submit implementing legislation next month for Congressional approval. The United States was a leader in the development of this Convention, commonly known as the 1973 Marine Pollution Convention. It is a far-reaching and comprehensive agreement which will have an important impact on marine oil pollution.

   The Convention places stringent controls on oil discharges from ships, including for the first time, discharges of light refined petroleum products. It requires segregated ballast

(OVER)

The 1973 Marine Pollution Convention marks the international community's acceptance of the concept of segregated ballast. Coast Guard regulations currently require the system on all new tankers over 70,000 deadweight tons, foreign and domestic. The rulemaking proposed today also covers existing tankers. These vessels can achieve segregated ballast capability by dedicating certain cargo tanks to ballast and modifying piping and pumps.

Inert gas systems reduce the danger of explosions which may occur at times when oil tanks are not full, primarily during tank washing, but also in loading and unloading, and during ballast voyage. The Sansinena, which exploded in Los Angeles harbor in December while taking on ballast, had no inert gas system.

Current U.S. regulations require the system for new U.S. tankers over 100,000 deadweight tons. The proposed rule will also apply to existing tankers and foreign flag vessels.

Backup radar systems provide redundant capacity in case of equipment failure. Collision avoidance equipment can be programmed to automatically process radar information and to trigger an alarm when dangerous situations arise. The equipment also provides information to the crew for maneuvering to avoid the potential danger. The systems are most effective in the coastal confluence zone where vessel traffic patterns converge toward U.S. ports. The requirement will apply to both new and existing vessels and would be effective for existing vessels within 2 years of final rulemaking.

Improved emergency steering standards will be drafted. Current regulations impose redundancy requirements for some components of tanker steering gear. Additional requirements which would further improve reliability have been identified.

3. Crew Standards and Training

The President is ordering several actions to improve the qualifications of crews that man oil tankers entering our ports. These actions are particularly crucial because human error is involved in 80-85 percent of all tanker accidents. The United States imposes relatively strict standards for the U.S. Merchant Marine, but stringent international requirements for crew qualifications do not exist. However, the Inter-Governmental Maritime Consultative Organization is developing a major draft convention on the subject for negotiation next year. The President views this effort as a major international opportunity to upgrade crew qualifications. The President is directing the Departments of Transportation and Commerce to review the agenda (the draft convention) for the 1978 Conference on Standards of Watchkeeping and Training to identify additional requirements which should be proposed for consideration. In addition, the Department will identify all requirements which, if not included in the 1978 Convention, the U.S. should impose on crews of all ships entering U.S. ports.

Nationally, the President is directing Transportation to take immediate regulatory action to improve standards for U.S. crews. Requirements will include experience by class and size of vessel, or training and demonstration of proficiency on ship simulators. These requirements will apply to both issuance and renewal of licenses to ships masters, mates and Federally licensed pilots. More emphasis will be placed on requiring deck officers to demonstrate important skills, such as radar operation and interpretation, instead of relying on written examinations. Finally, regulations will be issued to require that crew members in charge of cargo transfer operations be specially trained and examined.

4. Tanker Boarding Program and U.S. Marine Safety Information System

The President is directing that, starting immediately, each foreign flag tanker which enters U.S. ports will be boarded by the Coast Guard and examined to insure that the ship meets all safety and environmental protection regulations. Tankers will be boarded at least once a year and more often if necessary. Any deficiencies in the tanker's condition will be required to be corrected. This winter the Coast Guard began a limited foreign tanker boarding program. The President's revisions to the Budget for the next fiscal year requested additional funding for this program.

The information which is gathered from the boarding program will be fed into a U.S. Marine Safety Information System, which will be established to keep track of the accident and pollution records of all ships, U.S. and foreign, entering U.S. ports. Coast Guard information systems already contain some of this information for U.S. vessels. Since 94% of our imported oil enters the country in foreign tankers, it is important that information on these vessels also be available to Captains of the Port at all major U.S. ports. The President is also directing that the proper Federal agencies initiate action to require that the names of tanker owners, major stockholders, and changes in vessel names be disclosed and be made available for inclusion in the Marine Safety Information System. This system will enable the Coast Guard to promptly identify tankers which have long histories of poor maintenance, pollution violations and accidents. Once identified, such tankers can be excluded from U.S. ports, if necessary.

5. Comprehensive Oil Pollution Liability and Compensation Legislation

The Secretary of Transportation will submit to Congress on the President's behalf the Comprehensive Oil Pollution Liability and Compensation Act of 1977, which replaces the current fragmented and overlapping systems of Federal and State oil spill liability laws and compensation funds with a single nationwide framework. It establishes one national standard of strict liability for oil spills whether the source be vessels, pipelines, terminals or offshore facilities. It also establishes a $200 million fund to cover cleanup costs and to assure full compensation to victims for virtually all oil pollution damages. The fund consolidates three existing Federal oil pollution compensation funds, the Trans-Alaska Pipeline Fund, the Deepwater Ports Fund and part of the Federal Water Pollution Control Act Fund. The compensation provided under the legislation is extensive. For example, eligible claimants include fishermen whose usual fishing grounds are polluted and resort communities whose peak vacation seasons are ruined by oil-slicked beaches.

The Administration bill is based on legislation which has been introduced by Congressmen Murphy and Biaggi and is now under consideration by the House Merchant Marine and Fisheries Committee. The Administration bill raises the minimum liability for vessels carrying oil in bulk to $500,000 and removes the $30 million ceiling on liability for supertankers. It also proposes a mechanism for States to participate in the Federal compensation system. Another change will allow the Fund to provide compensation to Federal and State agencies which perform post-spill environmental damage assessments.

6. Federal Oil Pollution Response Capability

The President is directing the Coast Guard, the Environmental Protection Agency, and other responsible Federal agencies to begin plans for upgrading their capability to respond to, contain,

and mitigate the damaging effects of oil spills in cooperation with State and local governments. Special attention will be given to spills which occur under extreme weather conditions.

The framework for coordination of Federal pollution response activities is established by the National Contingency Plan (40 Federal Regulations 1510). The Coast Guard and the Environmental Protection Agency are the lead agencies under the plan. In their assigned areas of responsibility, each agency predesignates Federal on-scene coordinators who are responsible for directing the Federal response when oil spills occur. The National Plan is supplemented by Regional Response Plans, which provide for coordination of Federal, State and local government response efforts. This response system, particularly the Regional Plans, will be reviewed as part of the President's oil pollution program.

Presently the Coast Guard can deliver pollution containment and cleanup equipment to the scene of a spill within 24 hours. The Administration plans to evaluate the costs and feasibility of upgrading this capability to provide adequate response within six hours for a spill of up to 100,000 tons of oil.

ADDITIONAL INITIATIVES

Along with the major actions just discussed, the President is directing the Secretary of Transportation, in cooperation with the Environmental Protection Agency and other appropriate agencies, to undertake several studies of other promising programs and techniques for reducing marine oil pollution. These studies will include:

- An evaluation of the costs and benefits of crude washing, a system which utilizes crude oil to clean cargo tanks.
- An evaluation of design, construction and equipment standards for tank barges which carry oil.
- A study of long range vessel surveillance and control systems.
- An evaluation of devices to improve maneuvering and stopping ability of large tankers, with research to include the use of ship simulator.
- A study of the fee collection mechanism for the comprehensive oil pollution fund.

The Secretary of Transportation will report back to the President after 6 months on the status of these studies.

# # #

APPENDIX 3

SAFETY ANALYSIS OF THE FOREIGN TANKER BOARDING PROGRAM

NATIONAL SAFETY CONGRESS AND EXPOSITION

October 17-20, 1977

A SAFETY ANALYSIS OF THE FOREIGN TANKER BOARDING PROGRAM

COMMANDER WILLIAM J. ECKER, USCG

As a prelude to the discussion of the foreign tank vessel examination program, it is important to realize that there is a great deal of difference in the scope of involvment and control that the U. S. Coast Guard exerts over U. S. Flag tankers vs. that of the foreign flag tanker calling at a U. S. port. From the initial review of its plans before construction until it is scrapped or sold to a foreign owner, the U. S. flag tank vessel has continuous involvment with the U. S. Coast Guard to insure that it is in compliance with applicable federal regulations and international agreements. A foreign flag tanker, on the other hand, having the necessary certificates and being from a nation signatory to the international convention for vessel safety is largely exempt from domestic regulation. The primary exceptions to this are those vessels required to obtain a letter of compliance due to the carriage of hazardous cargoes in bulk, and those vessels examined for cause, such as involvment in a vessel casualty in U. S. waters. While there are other reasons for U. S. Coast Guard involvment with a foreign flag tanker such as examination for compliance with the pollution prevention regulations, essentially, from the standpoint of the Commercial Vessel Safety Program, reoccuring examination of a foreign flag vessel was out of the ordinary. That state of affairs changed dramatically this past winter.

The present expanded foreign tank vessel boarding program was born on the evening of 17 December 1976 in Los Angeles Harbor with the explosion of the SS SANSINENA resulting in six deaths plus three missing and presumed dead, injuries to 58 persons, release of approximately 20,000 gallons of bunker oil into the harbor, and loss of a vessel valued at twenty one point six (21.6) million dollars.

This casualty was one of a number of tragic incidents that began two days earlier (15 Dec) with the grounding of the ARGO MERCHANT twenty eight (28) miles southeast of Nantucket Island resulting in the spill of 7.3 million gallons of #6 fuel oil and the loss of the vessel. These two casualties were quickly followed by a pollution incident involving the tank vessel OSWEGO PEACE wherein 5000 gallons of bunker oil leaked through the skin of a tank into the Thames River in New London, Conn. on 24 December; the grounding of the SS OLYMPIC GAMES in the Delaware River on 27 December resulting in the spill of 133,000 gallons of crude oil with no loss of life; the grounding of the fully loaded ore/oil carrier, SS DAPHNE while approaching a harbor in Puerto Rico on 28 December; the explosion and fire on board the ore/oil carrier SS MARY ANN on 1 January in the Atlantic Ocean resulting in injuries to two crewmembers; the disappearance of the fully loaded (8.2 million gallons of #6 oil) tank vessel GRAND ZENITH in the North Atlantic ocean enroute Providence, R. I. around 2 January 1977; the grounding on 4 January 1977 of the tankship UNIVERSE LEADER in the Delaware River with no loss of cargo; the loss of the coastwise U. S. tanker CHESTER A. POLING on 10 January due to structural failure in the Atlantic Ocean with the loss of one life; the loss of the tanker IRENES CHALLENGER in the North Pacific Ocean on 17 January with three crewmembers missing; the explosion of the EXXON SAN FRANCISCO while in a U. S. port on 27 January with the loss of three lives; the striking of the Hopewell Bridge in Virginia on 24 February 1977 by the U. S. Flag chemical carrier SS MARINE FLORIDIAN as a result of a steering gear malfunction; and the explosion of the CLAUDE CONWAY in the Atlantic Ocean on 27 March 1977 resulting in the loss of twelve lives and the vessel itself.

The U. S. Coast Guard, in response to conditions found by the SS SANSINENA Marine Board of Investigation, on 21 January 1977 issued a Commandant Notice to Marine Safety Offices and Marine Inspection Offices to immediately assign qualified marine inspectors to examine the cargo venting and handling systems of foreign flag tankships calling at U. S. ports. Subsequent Commandant Notices were issued in the next several weeks in amplification of the original order detailing the goal of the program, i.e. the elimination of possible dangerous cargo vapor emissions and likely sources of ignition. Field offices were instructed to conduct the examination in accordance with the General Safety Control Premises of the Safety of Life at Sea (SOLAS) Convention.

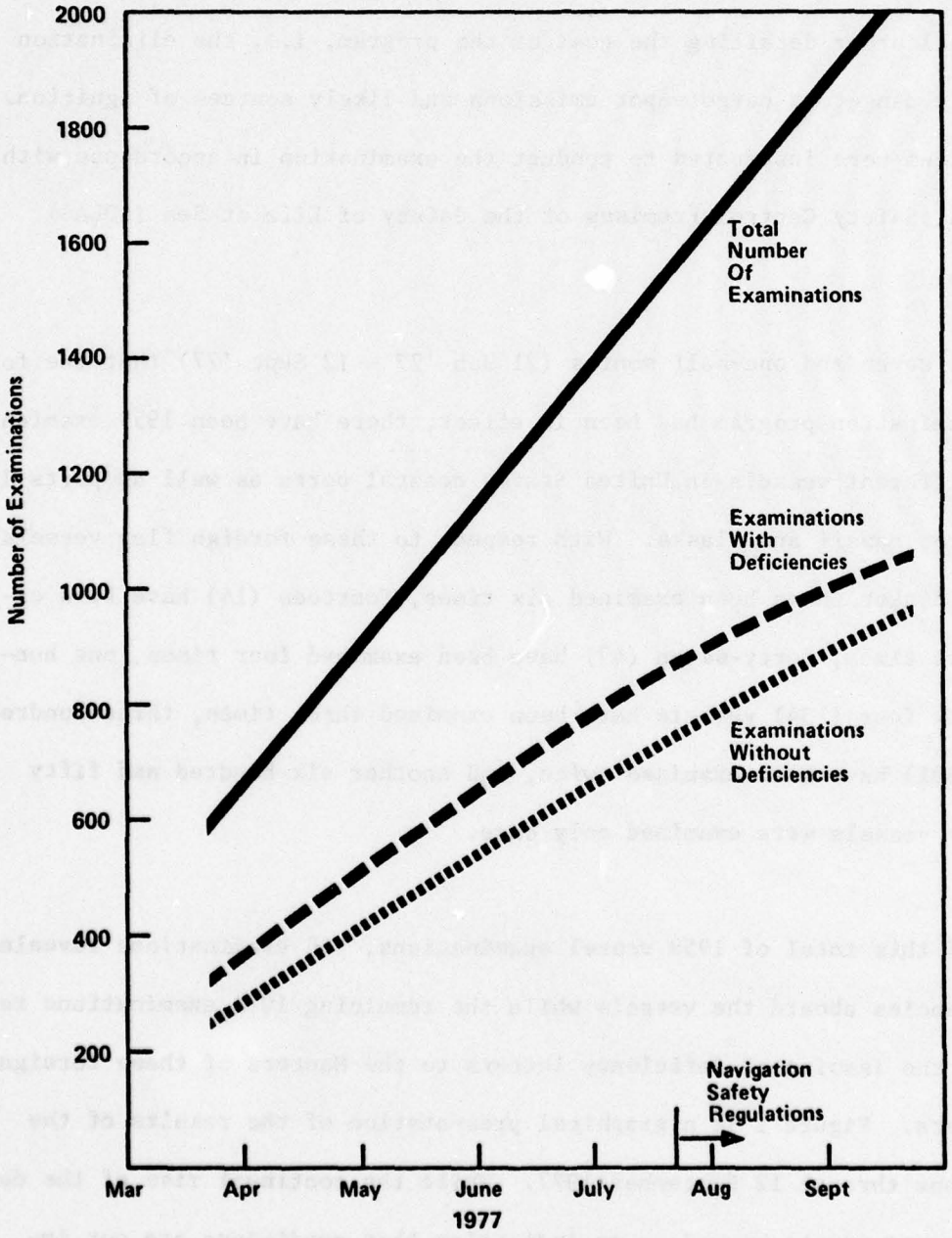
In the seven and one-half months (21 Jan '77 - 12 Sept '77) that the foreign tanker examination program has been in effect, there have been 1959 examinations of 1151 different vessels in United States coastal ports as well as ports in Puerto Rico, Hawaii and Alaska. With respect to these foreign flag vessels, seven (7) tankers have been examined six times, fourteen (14) have been examined five times, forty-seven (47) have been examined four times, one hundred thirty four (134) vessels have been examined three times, three hundred and one (301) have been examined twice, and another six hundred and fifty five (655) vessels were examined only once.

Out of this total of 1959 vessel examinations, 938 examinations revealed no deficiencies aboard the vessels while the remaining 1021 examinations resulted in the issuing of deficiency letters to the Masters of these foreign flag tankers. Figure 1 is a graphical presentation of the results of the examinations through 12 September 1977. While the continual rise of the deficiency curve can be viewed as an indication that conditions are not im-

Figure 1

Foreign Tank Vessel Examination Program

Examination Data



proving, the impact of the Navigation Safety Regulations, (33 CFR 164), which became effective on 1 June 1977, is considered to be the influencing factor in maintaining an upward slope to that line. Since that date, there have been 243 deficiencies found involving non-compliance with these regulations.

The number of foreign flag tanker examinations by country of registry, Figure 2, shows that tank vessels from Liberia have been examined almost 2.8 times as frequently as tank vessels from Greece, which in turn is followed closely by tank vessels from Norway, Great Britain, Panama, Japan, and vessels from thirty-nine other countries.

As early examination results were received in U. S. Coast Guard Headquarters, the year each vessel was built and its tonnage was researched in an effort to correlate vessel age, country of registry, dead weight tonnage range, and deficiency profile. It was found that the average age of foreign flag tank vessels being examined was slightly less than ten and one-half years. The age profile revealed that 27.6% were 1-5 years of age, 22% were 6-10 years of age, 24.2% were 11-15 years of age, 20.4% were 16-20 years of age, with the remaining 5.8% in excess of 20 years of age. The largest grouping of foreign flag tank vessels fell into the 20,000 to 40,000 DWT range (Figure 3). This sizing is quite comparible to active U. S. flag tank vessels of similar ocean service and relates, to a great extent, to the configuration and controlling depths in U. S. navigable waterways.

In the foreign tanker examination program thus far, 6076 deficiencies have been found and a comparison of the number of deficiencies by country of registry is shown in Figure 4. The ages written on the graphs for each coun-

Figure 2

Foreign Tank Vessel
Examination Program

Examinations By Country Of Registry

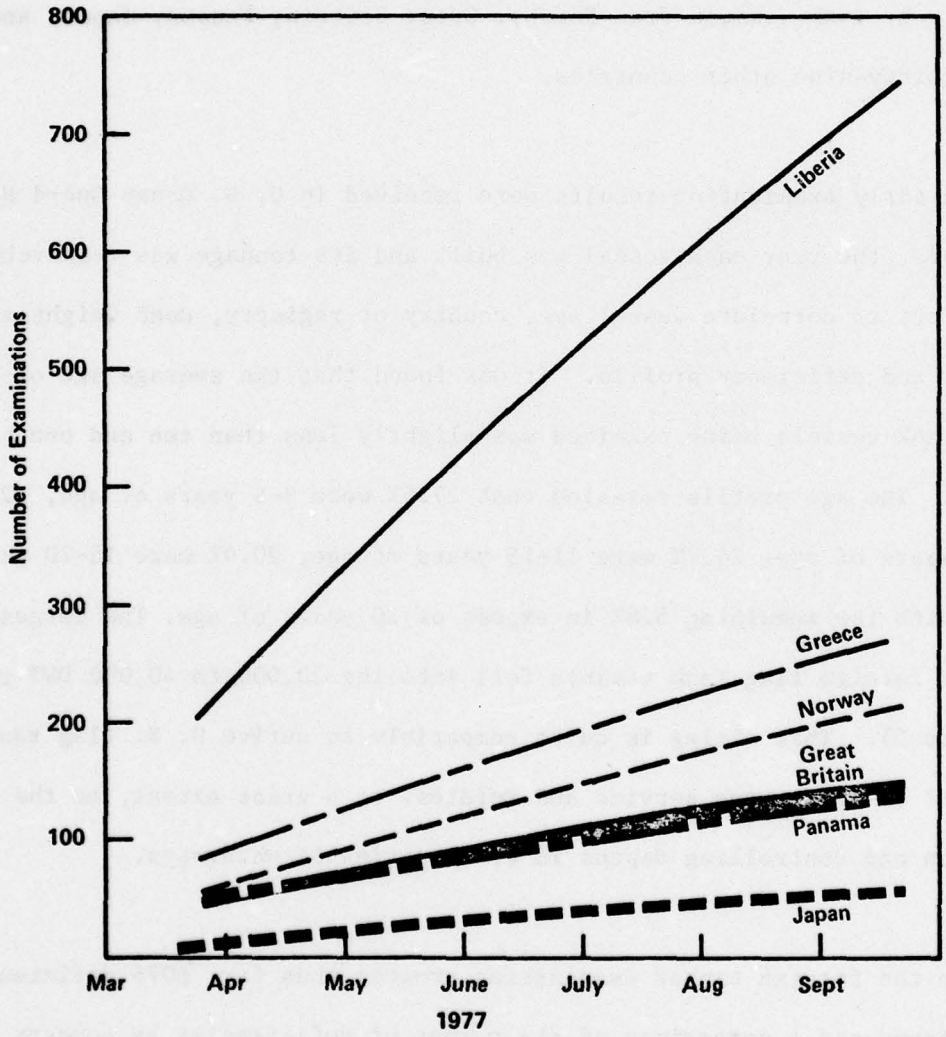
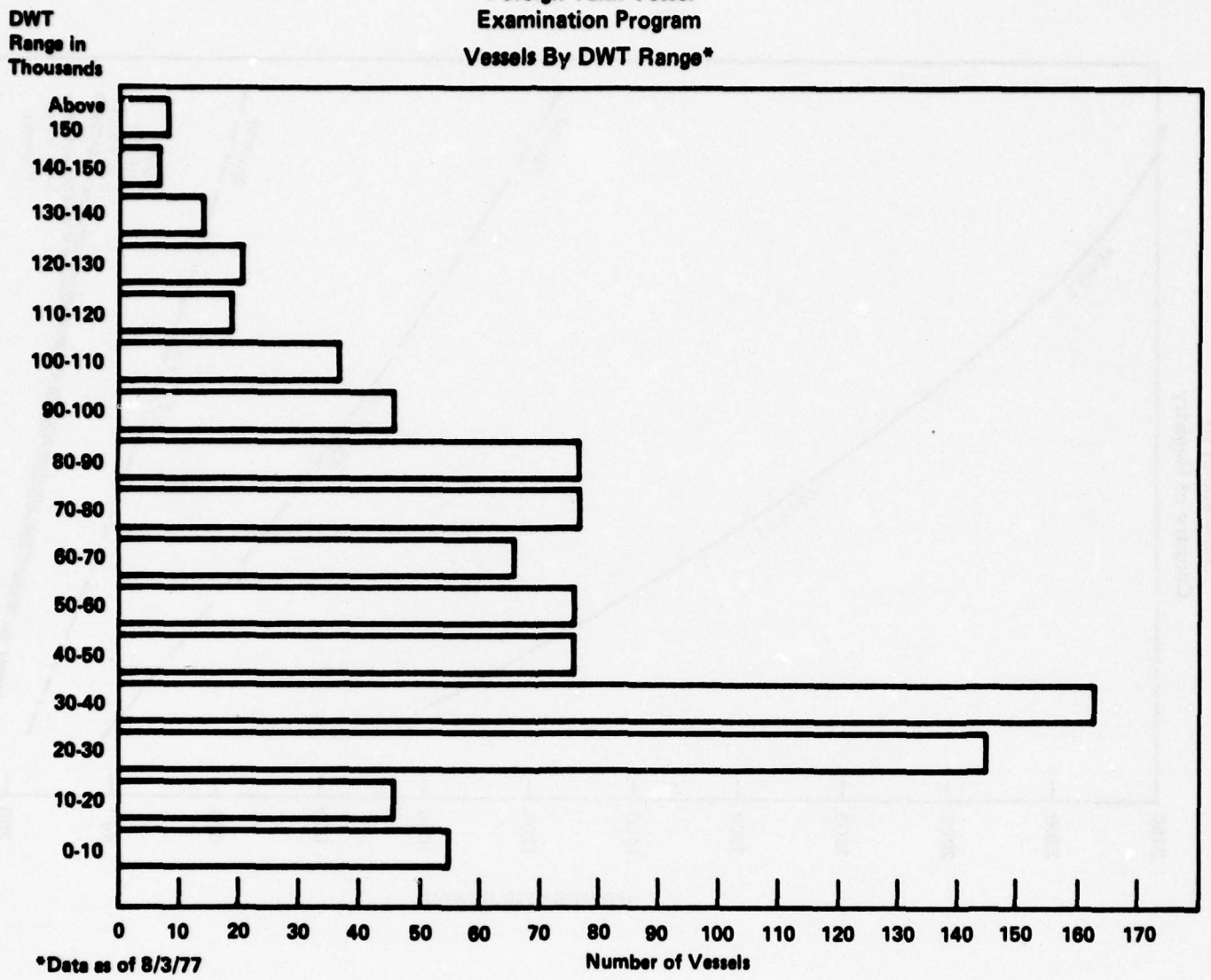


Figure 3

Foreign Tank Vessel
Examination Program
Vessels By DWT Range*

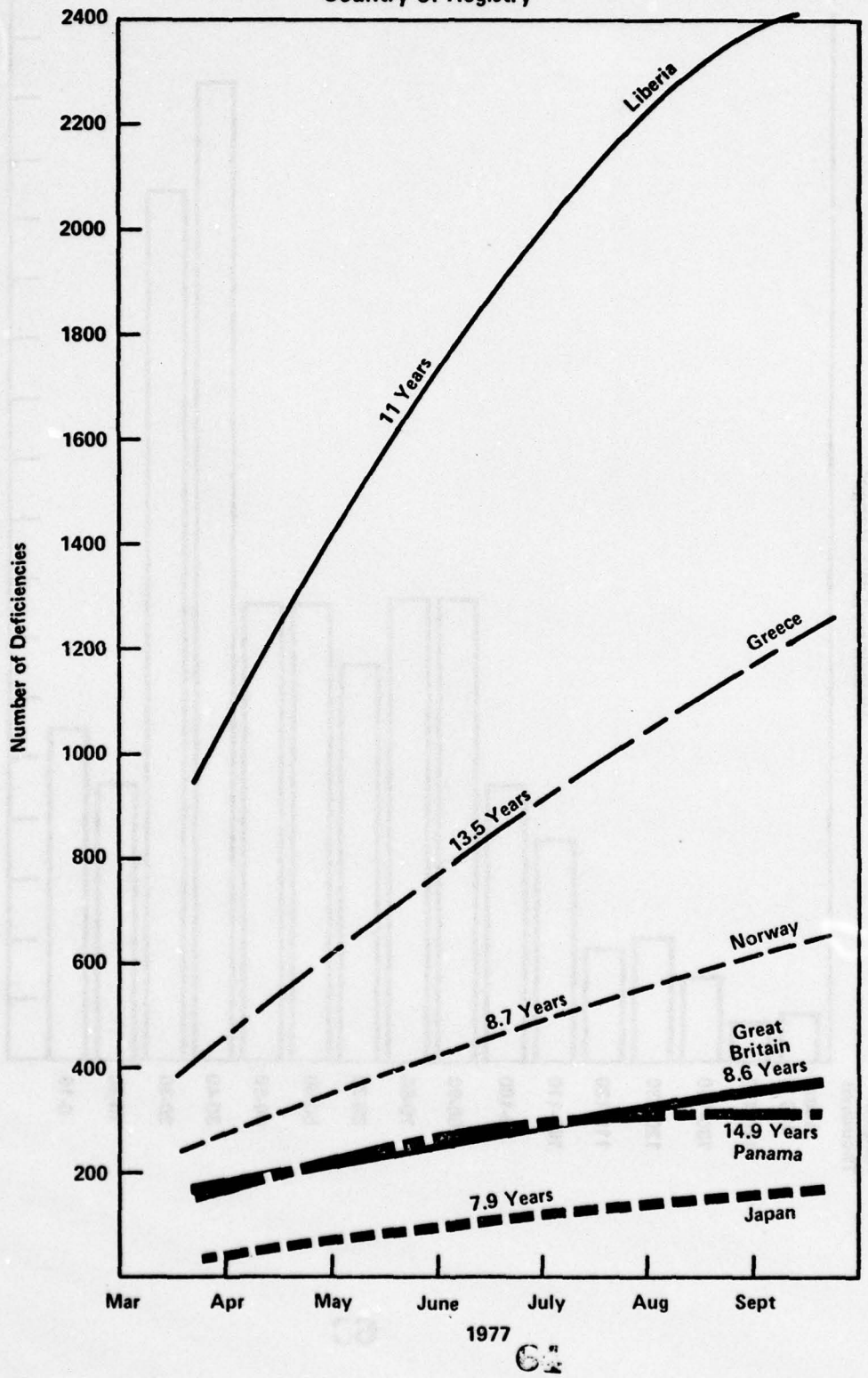


*Data as of 8/3/77

Figure 4

Foreign Tank Vessel Examination Program

Deficiencies By Country of Registry



try represent the average age of the tank vessels of that registry that have been examined under this program. Calculations involving the data on Figures 2 and 4 are presented in Table 1 where vessel examinations and deficiencies for each country are compared as a percentage of the total number of examinations and deficiencies. Among the vessels of the six most frequently examined countries, Greece shows the largest negative spread (a higher percentage of total deficiencies than percent of total examinations) with Liberia exhibiting a slight negative spread and the other four countries either being equal or showing a lesser deficiency to examination percentage.

A vessel's age grouping was contrasted with the overall number of deficiencies for that vessel to develop a deficiency distribution by age. Table 2 compares the age profile developed earlier with this deficiency distribution and reveals that the 50.4% of vessels in excess of ten years of age account for 75.5% of the deficiencies discovered in the administration of this program.

The deficiencies shown in Figure 5 reveal the relative frequency of major deficiency types with cargo ventilation system deficiencies discovered at a rate twice that of the next nearest deficiency type. Similar to the age grouping in the overall distribution of deficiencies, the individual deficiency types exhibit a similar percentage distribution again using vessel's age as a basis. For example, betweeen twenty to thirty percent of the deficiencies discovered in the ventilation system, cargo piping system, pump room, electrical system, and fire protection systems were found aboard vessels of less than ten years of age with the remaining seventy to eighty percent found on vessels older than ten years of age. The only one of the six

Table 1

Country	Vessel Examinations		Deficiencies*	
	No. & % Of Total		No. & % Of Total	
Liberia	728	*37.2*	2402	*39.5*
Panama	131	*6.7*	316	*5.2*
Greece	263	*13.4*	1225	*20.2*
Norway	210	*10.7*	648	*10.7*
Great Britain	149	*7.6*	361	*5.9*
Japan	58	*3.0*	165	*2.7*
Singapore	53	*2.7*	70	*1.2*
Netherlands	33	*1.7*	14	*0.2*
Italy	35	*1.8*	88	*1.4*
France	28	*1.4*	88	*1.4*
Finland	23	*1.2*	57	*0.9*
Denmark	25	*1.3*	15	*0.2*

*Data as of 9/12/77

Table 2

Comparisons By Vessel Age

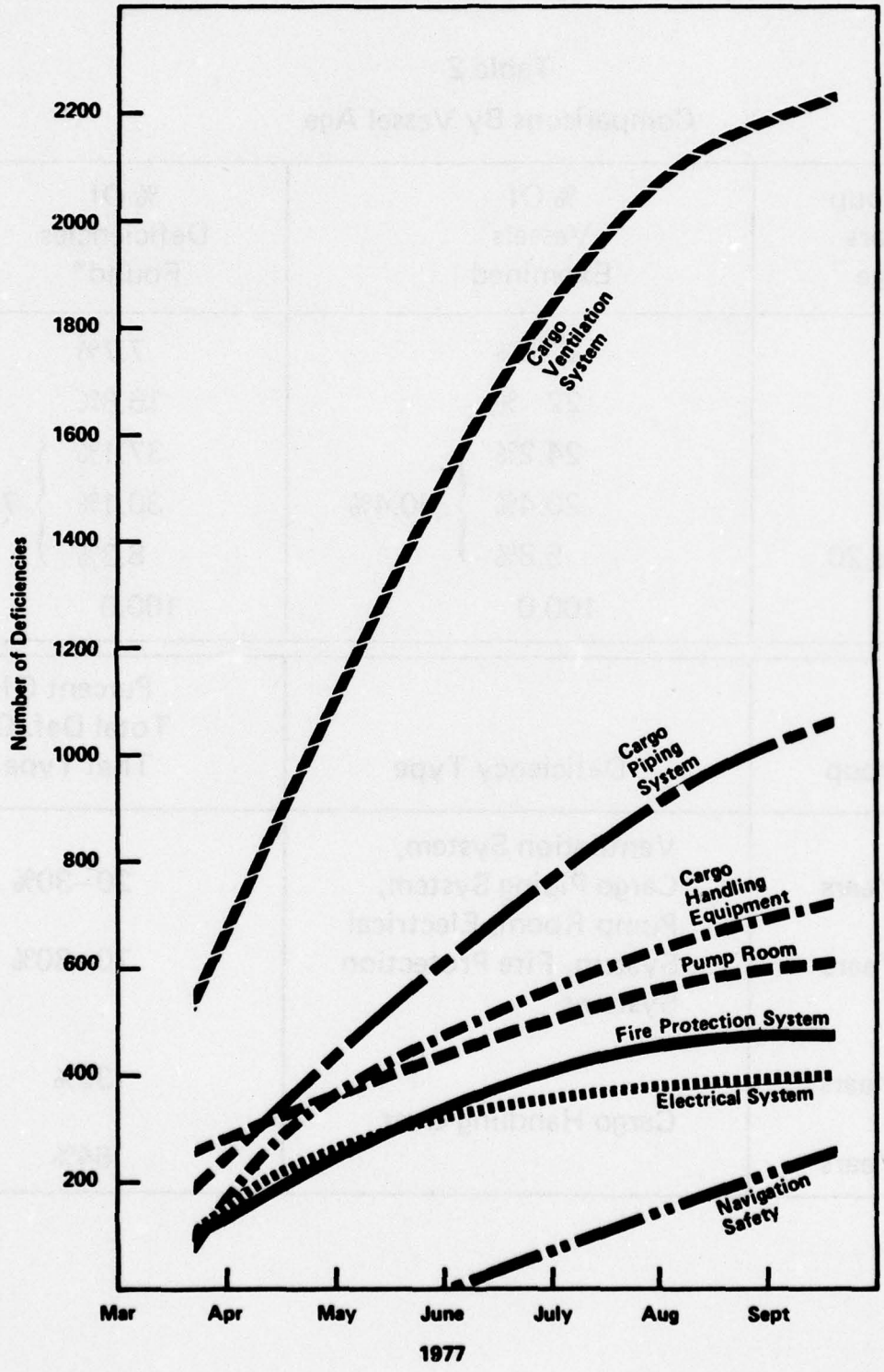
Age Group In Years Of Age	% Of Vessels Examined		% Of Deficiencies Found*	
1-5	27.6%		7.7%	
6-10	22 %		16.8%	
11-15	24.2%		37.1%	
16-20	20.4%	50.4%	30.1%	75.5%
Above 20	5.8%		8.3%	
	100.0		100.0	

Age Group	Deficiency Type	Percent Of Total Def. Of That Type
1–10 Years	Ventilation System, Cargo Piping System, Pump Room, Electrical System, Fire Protection Systems	20–30%
> 10 Years		70–80%
1–10 Years	Cargo Handling Gear	36%
> 10 Years		64%

Figure 5

Foreign Tank Vessel Examination Program

Deficiency Data



major deficiency categories that did not exhibit as high a percentage favoring older tank vessels was in the area of cargo handling gear deficiencies. The distribution for this category was thirty six percent for vessels one to ten years old with the remaining sixty-four percent attributable to tankers over ten years of age. This is logical considering the vital role that the cargo handling system plays in the daily operation of a tank vessel. It is the attention given to this system, vice the others, that accounts for the closer percentage distribution between age groupings. An evaluation and enumeration of the deficiency types is as follows:

Cargo Venting System (2206 deficiencies)- this singular area accounts for the largest number of deficiencies. The most common of these are (1) defective or missing flame screens, (2) defective or missing pressure/vacuum valves, (3) wasted and holed vent piping, and (4) wasted and holed vent masts and vent headers. The above four items have been reported with almost equal frequency.

Cargo Piping Systems (1052 deficiencies) - This includes both bunker fuel as well as cargo fuel piping systems with the main deficiency throughout the vessel being wasted, holed and leaking piping, flange, and spool piece connections.

Cargo Handling Equipment (706 deficiencies) - There are five discrepancies reported with equal frequency and a number of others of lesser frequency. The former include (1) inoperative cargo pumps or cargo pumps leaking excessively, (2) wasted and leaking steam piping to cargo pumps, (3) leaking, wasted or inoperative cargo valves, (4) inoperative stripping pumps and (5) cement boxes in way of wasted sea suction connections to ballast piping, while the latter group includes (1) inoperative cargo pump remote

shutdowns, (2) inoperative gauges and cargo monitoring equipment and (3) leaking or inoperative cargo heating coils.

Fire Protection Systems (476 deficiencies) - there has been a variety of discrepancies in this area with items numbered one through five below being reported most frequently. The deficiencies are (1) wasted, missing and holed steam smothering system piping, (2) inoperative valves in steam smothering system, (3) inoperative fire dampers in pump room ventilation systems, (4) wasted and holed firemain system piping, (5) inoperative fire pumps and firemain valves, (6) missing firehose, (7) portable fire extinguishers missing or requiring service, (8) semi-portable CO2 systems requiring service, and (9) inoperative sprinkler systems or foam monitors.

Pump Room (612 deficiencies) - the most frequently found pump room deficiencies consist of (1) the presence of excessive product in the bilges, (2) wasted and missing ventilation supply and exhaust ducting, and (3) missing or holed ventilation supply and exhaust duct flame screens. Other deficiencies found within the pump room areas include (1) inoperative bilge pumps and disconnected reach rods, (2) flammable materials and loose tools adrift, (3) defective pump room weather deck watertight doors, and (4) missing or broken ladder rungs.

Electrical Systems (401 deficiencies) - the electrical examination is concentrated mainly in the pump room areas and on the weather deck with the primary deficiencies being (1) defective explosion proof lights and junction boxes and (2) jury rigged wiring and installations. Other electrical deficiencies include (1) dead ended wiring, and (2) inadequate or non-approved lighting, such as, drop cords and fixtures with exposed light bulbs.

Structural Deficiency (136 deficiencies) - the most frequently reported structural deficiencies are (1) cracks in the pump room bulkheads between the cargo tanks and the pump room, causing cargo leakage into the pump room, and (2) cracks and holes between the pump room and the engine room. Other structural deficiencies include (1) defective main deck watertight doors leading into deck houses, (2) cement boxes on hull and sea suction valves, and (3) cracks in main deck and superstructure bulkheads.

Personnel Protective Equipment (74 deficiencies) - The three common deficiencies are (1) missing fireman's outfits, (2) missing or defective explosive meters, and (3) missing fresh air breathing apparatus.

Vital Machinery (22 deficiencies) - the noteworthy deficiencies include (1) defective emergency generator, (2) defective steering gear system, and (3) inoperative auxiliary generator.

Life Saving Equipment (18 deficiencies) - the deficiencies have centered about (1) missing liferings, (2) missing or inoperative lifering lights, and (3) defective lifeboats.

Ship's Ventilation System (11 deficiencies) - the primary discrepancy has been wasted and holed ventilation ducting thereby permitting the egress of explosive vapors into the living spaces of the vessel.

Navigation Safety Regulations (243 deficiencies) - the major deficiency reported has been the lack of posted vessel maneuvering information and to a much lesser extent the lack of U. S. navigation publications and updated charts of the areas to be transited.

The impact of this newly created program has caused considerable strain on existing U. S. Coast Guard personnel resources. Accordingly, the Coast Guard has requested and will receive during fiscal year 1978 approximately one-hundred additional inspectors for assignment to field offices for the foreign tanker examination program. The priorities for assignment of these personnel resources will primarily be determined by the level of activity of a particular Marine Safety Office or Marine Inspection Office. Table 3 indicates the frequencies of foreign tank vessel examinations at various ports throughout the United States, The list is not all inclusive and only shows the more active ports.

The major question to be answered is "Has this new program during its brief infancy increased the overall safety level aboard foreign flag tank vessels"? Every two weeks the U. S. Coast Guard transmits a message to field units containing the names of those foreign flag tank vessels having outstanding deficiencies. Figure 6 shows the trend of that deficiency listing as compared with the total number of different vessels examined during the same period. It is quite evident that the resurgence, around 1 July 1977, in the number of vessels with deficiencies is due to the influence of the navigation safety regulations. Also, the diverging nature of the slopes of both curves indicates that more foreign flag tankers are coming out of the examinations deficiency free and those with deficiencies tend to be repeaters. The differences between the percent of vessels with deficiencies from the beginning of the period to the present show an improving level of vessel safety. This argument is given further support by an evaluation of those vessels that have undergone multiple examinations since the program began in January. Table 4 shows the trend of the decreasing numbers of deficiencies,

Table 3

Foreign Tanker Traffic As Determined By Frequency Of Examinations* At U.S. Ports

Marine Safety Office/ Marine Inspection Office	# Of Exam.
Port Arthur, Texas	328
New Orleans, La.	287
Los Angeles, Ca.	158
New York, N. Y.	128
San Francisco, Ca.	93
Seattle, Wa.	91
Philadelphia, Pa.	88
Portland, Me.	86
Galveston, Texas	84
San Juan, P. R.	71
Houston, Texas	68
Hampton Roads, Va.	63
Baltimore	58
Boston	54
Honolulu	49

*Data from 1-21-77 to 9-12-77

Figure 6

Foreign Tank Vessel Examination Program

Vessels Having Outstanding Deficiencies

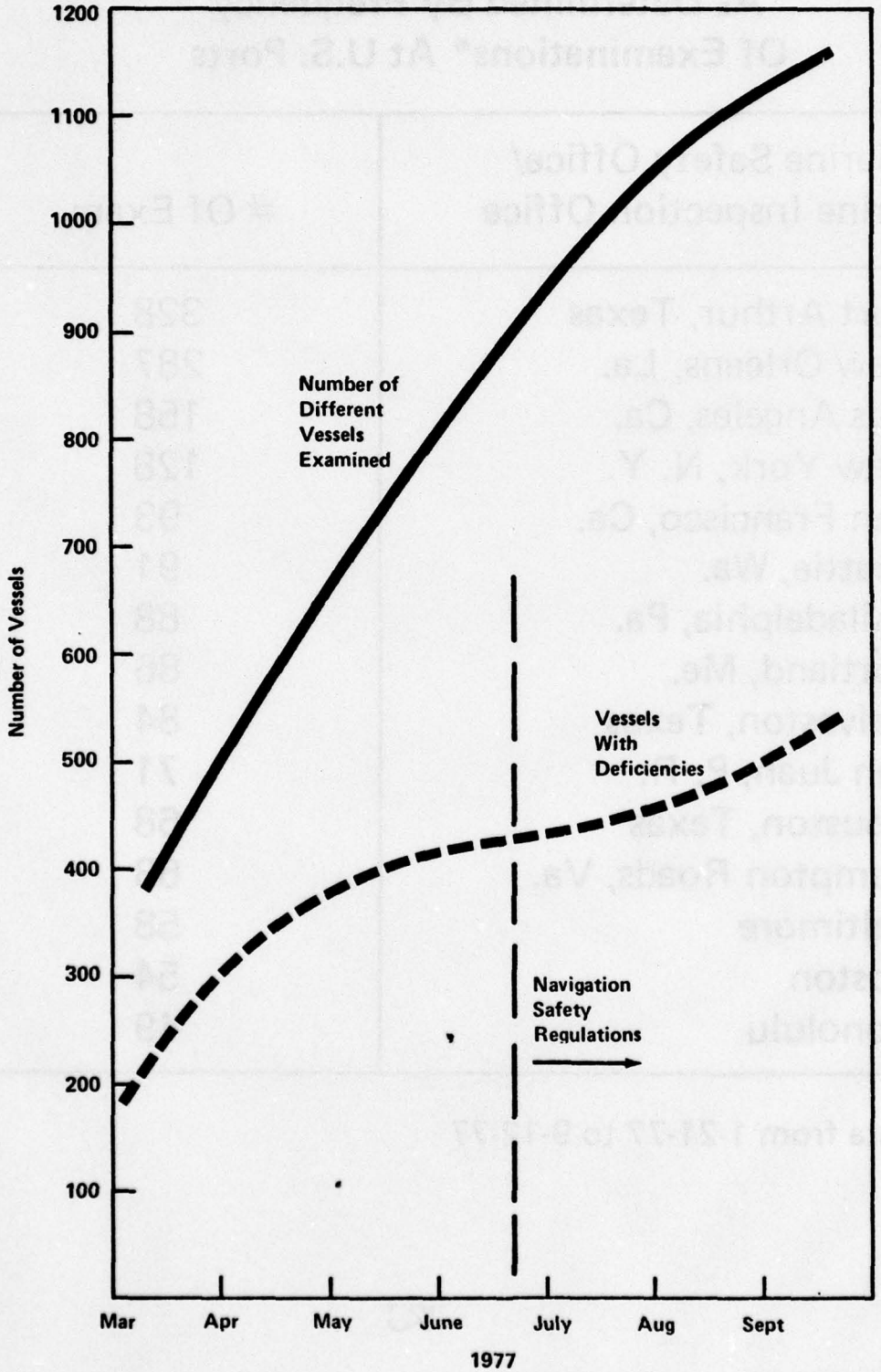


Table 4

Exaluation Of Vessels That Have Been Examined Several Times

Vessels Examined		Percent Of Vessels With A Decreasing Number Of Deficiencies At The Most Recent Exam.	Percent Of Vessels With Zero Deficiencies At The Most Recent Exam.
No. Of Times	No. Of Vessels		
6	7	100%	50%
5	14	93%	50%
4	47	79%	64%
3	134	71%	51%
2	301	13.6%	27.6%

mainly for those vessels that have been examined on three or more occasions.

Additional evidence of an improving level of safety can be shown by a comparison (Table 5) of conditions before and after a specific date, that date being 1 June 1977, the effective date of the Navigation Safety Regulations. When comparing the number of deficiencies per examination for the two periods using the six countries noted in earlier sections, the overall picture is a reduction in the number of deficiencies per examination for the most recent period. Likewise, a comparison of the percentage of examinations free of deficiencies also reveals that the most recent period had a higher percentage of deficiency free examinations.

Summarizing, the data developed thus far in the administration of this program shows that there has been a general improvement in the overall level of safety of that segment of the foreign flag fleet that have been involved in this safety program.

Since the commencment of this program, the Coast Guard has, under the authority of the Ports and Waterways Safety Act, denied entry to three vessels and has detained six additional vessels under the control provisions of SOLAS 60, Chapter 1, Regulation 19 which states that such steps shall be taken to insure that the ship shall not sail until it can proceed to sea without danger to the passengers or the crew.

On another level, the U. S. Coast Guard is vigorously pressing to have those tanker initiatives announced by President Carter in his 17 March 1977 message to Congress adopted by the International tanker community. This is being persued through established committees for Maritime Safety and Marine

Table 5

A Comparison Of Deficiencies/Examination and Percentage of Examinations Without Deficiencies For Several Countries Before and After 1 June 1977

Registry	Before 1 June			After 1 June		
	No. of Def.	No. of Exam	Def/Exam	No. of Def.	No. of Exam	Def/Exam
Liberia	1821	494	*3.7*	581	234	*2.5*
Panama	271	99	*2.7*	45	32	*1.4*
Greece	841	181	*4.6*	384	82	*4.7*
Norway	425	126	*3.4*	223	84	*2.7*
U. K.	262	95	*2.8*	99	54	*1.8*
Japan	91	40	*2.3*	74	18	*4.1*
Total	4393	1332	*3.3*	1658	619	*2.7*

Examinations Without Deficiencies

Registry	No. of Exam Without Def.	No. of Exam	No. of Exam Without Def.	No. of Exam Without Def.	No. of Exam	% of Exam Without Def.
Liberia	221	494	*44.7%*	127	234	*54.3%*
Panama	45	99	*45.5%*	18	32	*56.3%*
Greece	56	181	*30.9%*	35	82	*42.7%*
Norway	56	126	*44.4%*	44	84	*52.4%*
U. K.	53	95	*55.8%*	26	54	*48.1%*
Japan	19	40	*47.5%*	9	18	*50.0%*
Total	612	1332	*45.9%*	323	619	*52.2%*

Environmental Protection as well as special working groups at the International Maritime Consultative Organization (IMCO). At this time, it is too soon to predict the outcome of these endeavors.

In closing, it has been shown by an analysis of available data concerning the results of the examinations that the program has achieved a certain measure of success with respect to raising the overall level of safety of tankers calling at our ports. What remains now is the true test, that is, a period of time free of tanker casualties caused by those shipboard systems associated with the stowage and movement of the liquid cargo itself.

APPENDIX 4

DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON DOUBLE BOTTOMS

DEPARTMENT OF TRANSPORTATION

COAST GUARD

DRAFT ENVIRONMENTAL IMPACT STATEMENT

REGULATIONS REQUIRING DOUBLE BOTTOMS ON NEW TANKERS AND SEGREGATED BALLAST ON NEW AND EXISTING TANKERS

PROTECTION OF THE MARINE ENVIRONMENT

MAY 1977

DEPARTMENT OF TRANSPORTATION
U. S. COAST GUARD
DRAFT ENVIRONMENTAL IMPACT STATEMENT
PURSUANT TO SECTION 102(2)(C), P. L. 91-190

SUMMARY

(X) Draft ( ) Final Environmental Statement

Contact individual: Executive Secretary
Marine Safety Council
U. S. Coast Guard (G-CMC/81)
Washington, D. C. 20590
(202) 426-1477

1. Name of Action. (X) Administrative Action. ( ) Legislative Action.

2. Description of the Action

The Coast Guard is proposing an amendment of the pollution prevention regulations in Part 157, of Title 33, Code of Federal Regulations, to require segregated ballast spaces on existing tankers over 20,000 deadweight tons and to require double bottoms and segregated ballast on all new tankers over 20,000 deadweight tons. The proposed regulations would apply to U. S. seagoing tank vessels, both ships and barges, carrying oil, and to foreign tank vessels carrying oil that enter the navigable waters of the United States.

3. Environmental Impacts and adverse environmental effects of the action.

Requirements for segregated ballast on existing tank vessels over 20,000 deadweight tons will reduce operational oil outflows by reducing the volume of oily mixtures that must be treated either on board the vessel or at shore reception facilities. Double bottoms and segregated ballast on new tank vessels over 20,000 deadweight tons will reduce both operational and accidental oil outflows from these vessels. Segregated ballast on new tankers will produce same benefits as on existing tankers. Double bottoms will reduce oil outflows as a result of groundings.

4. List of alternatives considered.

In developing these rules and related earlier pollution prevention rules for tank vessels the following alternatives have been considered:

a. Publish no additional regulations (No Action)

b. Publish regulations less stringent than those proposed.

c. Publish regulations more stringent than those proposed, including regulations prohibiting any discharge of oily mixtures at sea and regulations requiring equipment or design features intended to improve maneuvering and stopping ability.

d. Reduction of oil consumption or reduction of oil imports.

e. Use of different mode of transportation for oil.

5. Comments on the draft statement were requested from the agencies and groups listed below:

Department of State
Department of Treasury
Department of Defense
Department of the Interior
Department of Commerce
Department of Transportation
Federal Maritime Commission
Environmental Protection Agency
Federal Energy Administration
Sierra Club
Connecticut Citizens Action Group
Center for Law and Social Policy
American Petroleum Institute
American Institute of Merchant Shipping
American Association of Port Authorities
American Maritime Association
American Waterways Operators, Inc.
Shipbuilders Council of America
Environmental Policy Center
Coalition Against Oil Pollution
National Audubon Society

6. Dates statements were made available to the Council on Environmental Quality and the public:

Draft statement May 13, 1977

Final Statement

CONTENTS

TABLES

FIGURES

I. INTRODUCTION

This statement is a Draft Environmental Impact Statement issued under the requirements of the National Environmental Policy Act of 1969, Section 102(2)(C), and implementing Guidelines issued by the Council on Environmental Quality, on a regulatory proposal for changes to the pollution prevention regulations in Title 33, Navigation and Navigable Waters, of the Code of Federal Regulations.

The proposed changes would apply to U. S. seagoing tank vessels carrying oil and to foreign tank vessels carrying oil that enter the navigable waters of the United States.[1]

Relationship of This Proposed Rulemaking to Previous Rulemakings

This proposed rulemaking is related to two earlier rulemakings that were issued under Title II of the Ports and Waterways Safety Act of 1972 (Pub.L. 92-340; 46 U.S.C. 391a). The intent, in part, of Title II is that the Coast Guard establish for oil tank vessels "comprehensive minimum standards of design, construction, alteration, repair, maintenance, and operation to prevent or mitigate the hazards to life, property, and the marine environment."

The first of the two earlier rulemakings, issued on October 14, 1975 (40 FR 48280), applies to U. S. seagoing tank vessels carrying oil in domestic trade. The purpose of those regulations was to control the discharge of oily mixtures from tank cleaning and deballasting operations and to require construction standards for new vessels for reducing spill size in future vessel accidents and for improving the survivability of tankers after damage. These earlier regulations require segregated ballast on new tank vessels of 70,000 deadweight tons and larger and impose stringent limitations on the quantities of oil which may be discharged at sea as a result of routine operations, such as tank cleaning and ballasting. These regulations were based on requirements in the International Convention for the Prevention of Pollution from Ships, 1973, commonly referred to as the "1973 Marine Pollution Convention." The regulations, their environmental effects, and the alternatives considered by the Coast Guard are discussed in the final environmental impact statement filed with the Council on Environmental Quality and made available to the public on August 15, 1975.[2]

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[1] "Oil" means petroleum in any form, including oil, sludge, oil refuse, and refined products. These regulations do not apply to vessels carrying only chemical cargoes regulated under Annex II of the 1973 Marine Pollution Convention and 46 CFR Subchapter O. Where the phrases "navigable waters of the United States" and "navigable waters" appear in this statement, their meanings are as in 33 CFR 2.05-2.5(a). These waters include territorial seas (a belt three miles wide adjacent to the U. S. coast), internal waters, and inland waters.

[2] Department of Transportation, U. S. Coast Guard, Final Environmental Impact Statement, Regulations for Tank Vessels Engaged in the Carriage of Oil in Domestic Trade, Washington, D. C. 1975, available from the National Technical Information Service, Springfield, VA. 22151, Government Accession No. AD A016769.

Application of segregated ballast requirements to new vessels smaller than 70,000 deadweight tons and to existing vessels and a requirement for double bottoms on new vessels were among the alternatives considered at the time these earlier regulations were proposed.

The Coast Guard issued the second of the earlier rulemakings on December 13, 1976 (41 FR 1479). This second rulemaking made the rules issued on October 14, 1975, which applied only to U. S. vessels in domestic trade, applicable to two additional groups of vessels:

- U. S. tank vessels carrying oil in foreign trade.
- Foreign tank vessels carrying oil that enter the navigable waters of the United States.

These changes to the regulations, their expected environmental effects, and the alternatives considered by the Coast Guard are discussed in the final environmental impact statement filed with the Council on Environmental Quality and made available to the public on November 12, 1976.[3]

The regulatory changes now being proposed would apply segregated ballast requirements to tank vessels both new and existing of 20,000 deadweight tons or greater and would require that all new tank vessels have double bottom spaces to achieve the required segregated ballast capacity. These regulations would apply to U. S. tankers and to foreign tankers entering U. S. waters.

These measures were considered as alternatives to the regulatory measures previously adopted, but were at that time rejected.

Relationship of this Environmental Impact Statement to Previous Statements and Studies

The concept, purpose, costs, and benefits of segregated ballast and double bottoms have been extensively discussed over the past five years in environmental impact statements, study reports, articles, and other documents cited in the REFERENCES section of this statement, which begins on page 26. Instead of repeating this information, conclusions are summarized and reference is made, where appropriate, to those documents. New material is discussed where necessary to help assess specific impacts of these proposed regulation changes. Reasons cited in previous impact statements for rejecting the alternatives now being proposed are also discussed.

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[3]Department of Transportation, U.S. Coast Guard, Final Environmental Impact Statement, Regulations for U.S. Tank Vessels Carrying Oil in Foreign Trade and Foreign Tank Vessels That Enter the Navigable Waters of the United States, Washington, D. C. 1976, available from the National Technical Information Service, Springfield, VA, 22151, Government Accession No. AD A036719.

Reasons for Additional Regulations

In the Ports and Waterways Safety Act of 1972, Congress declared:

> "That the carriage by vessels of certain cargoes in bulk creates substantial hazards to life, property, the navigable waters of the United States (including the quality thereof) and the resources contained therein and of the adjoining land, including but not limited to fish, shellfish, and wildlife, marine and coastal ecosystems and recreational and scenic values, which waters and resources are hereafter in this section referred to as the 'marine environment'.
>
> "That existing standards for the design, construction, alteration, repair, maintenance and operation of such vessels must be improved for the adequate protection of the marine environment.
>
> "That it is necessary that there be established for all such vessels documented under the laws of the United States or entering the navigable waters of the United States comprehensive minimum standards of design, construction, alteration, repair, maintenance, and operation to prevent or mitigate the hazards to life, property, and the marine environment."[4]

Since the Act was passed, the Coast Guard has taken a number of actions to implement it, including the rulemaking actions described on pages 1 and 2 of this statement.

There has been serious disagreement among Federal agencies, Congress, environmental groups, and industry representatives on the questions of (1) whether the actions taken by the Coast Guard go far enough in protecting the navigable waters of the United States and their resources, and (2) what additional measures should be taken. The Coast Guard has maintained that U. S. action, particularly vessel design and construction requirements, should be consistent with internationally-agreed-upon standards in this area and that unilateral U. S. action should be avoided if possible. Critics of the Coast Guard's approach have argued that U. S. regulations did not go far enough in protecting U. S. interests and that the U. S. must not be bound by what they considered to be weak and ineffective international standards, particularly construction standards affecting accidental oil outflow. Differences of opinion over adequacy of Coast Guard action lead to attempts to require segregated ballast and double bottoms through Federal legislation. Some states also attempted to set tanker construction standards for vessels entering their waters.

[redacted]

[4]Title II, Section 201, Ports and Waterways Safety Act of 1972, Section 4417a of the Revised Statutes of the United States (46 U.S.C. 391a).

[redacted]

On December 15, 1976, the SS ARGO MERHCHANT ran aground 28 miles southeast of Nantucket Island in international waters of the Atlantic Ocean. The vessel subsequently broke up in heavy seas, spilling most of its 7.3 million gallon cargo of heavy heating oil into the sea. This incident, plus a series of other accidents primarily involving foreign flag vessels in and near U. S. waters during the following month, prompted the Executive Branch of the Federal government and Congress to review the problem of oil pollution from tankers and the measures taken to date to reduce such pollution.

On January 1, 1977, Secretary of Transportation William T. Coleman, Jr., established a special Departmental Task Force for a comprehensive review of marine safety regulations and their effectiveness in preventing and containing oil spills. An interim report was delivered on January 11, 1977 (ref. 5).

On January 31, 1977, Secretary of Transportation Brock Adams established a task force to create maritime safety policy for the department. This Marine Safety Task Force is chaired by the Deputy Secretary of DOT, the department's second ranking official, and includes the Commandant of the Coast Guard.[5]

In his address to the nation of February 2, 1977, President Carter recognized the risks which are involved in marine transportation of oil and the need for timely government action to deal with the problem. In response to the President's concern, the Director of the Office of Management and Budget established the Interagency Oil Pollution Task Force to identify possible solutions.[6]

The Office of Management and Budget chaired the group. The following agencies participated:

Department of State
Department of Treasury
Department of Defense
Department of Justice
Department of the Interior
Department of Commerce
Department of Transportation
Federal Maritime Commission
Environmental Protection Agency
Council on Environmental Quality
Federal Energy Administration

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[5]Statement of Brock Adams, Secretary of Transportation, before the Senate Committee on Commerce, Science and Transportation, concerning marine oil pollution, Friday, March 18, 1977.

[6]The White House, "Fact Sheet--Actions to Reduce Maritime Oil Pollution," March 16, 1977.

Subgroups of the Task Force developed proposed initiatives in five areas:

1. Ships and ship systems

2. Crew standards and training

3. Oil pollution liability and compensation

4. International conventions

5. Oil spill response

The Task Force also recommended to the President that he also consider action to reduce marine oil pollution caused by operational discharges from tankers, as well as accidental discharges.

On March 18, 1977, as a result of the Interagency Oil Pollution Task Force's review and recommendations, the President announced a series of recommended Federal Government actions to deal with the problem of marine oil pollution caused by oil tankers. These include:

- A call for a special international conference to discuss stricter standards for oil tanker construction, equipment and inspections.

- Regulatory action by the Department of Transportation to establish new U. S. standards for all tankers entering U.S. ports.

- A Coast Guard program to board and examine all foreign flag oil tankers entering U. S. ports.

- U. S. ratification of the International Convention for the prevention of Pollution from Ships, 1973.[7]

The recommended regulatory action includes:

- Double bottoms on all new tankers;

- Segregated ballast on all tankers;

- Inert gas systems on all tankers;

- Backup radar systems, including collision avoidance equipment, on all tankers; and

  Improved emergency steering standards for all tankers.

These requirements will be fully effective within five years. Where technological improvements and alternatives can be shown to achieve the same degree of protection against pollution, the rules will allow their use.[8]

In his message to the Congress, the President said he was instructing the Secretary of Transportation to develop new rules for oil tanker standards within 60 days. These regulations will apply to all oil tankers over 20,000 deadweight tons, U. S. and foreign, which call at American ports.

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[7]The White House, "Fact Sheet--Actions to Reduce Maritime Oil Pollution," March 18, 1977.

[8]The complete text of the President's message to the Congress appears in Appendix A.

The proposed regulations covered by this impact statement are the requirements for double bottoms on new tankers and segregated ballast on both new and existing tankers referred to in the President's message. Requirements for inert gas systems, radar systems, and steering system improvements are separate regulatory proposals.

There are a number of factors which were important in reaching a decision on the actions announced in the President's message.

Perception of the problem of marine oil pollution by the United States was changed as a result of the series of accidents occurring during December, 1976, and January, 1977. These accidents and the resulting public attention emphasized the need for further government action.

The large surplus of existing tanker tonnage and the reduction in demand for new tankers means that it will be a long time before the 1973 Convention requirement for segregated ballast on new tankers over 70,000 deadweight tons has much impact on oil inputs to the oceans. These changes to the tanker market were not foreseen at the time of the October 1973 IMCO Conference. This change in the situation means that the only practical way of realizing the benefits of segregated ballast is to retrofit existing tankers with segregated ballast spaces.

Most of the tankers used in and near U. S. waters are smaller than 70,000 deadweight tons. Therefore, the 1973 Convention requirement for segregated ballast on vessels over 70,000 deadweight will not be effective for protecting U. S. waters.

These factors prompted the decision that the U. S. should take additional measures beyond those adopted in the 1973 Marine Pollution Convention. Conformity of U. S. standards with international standards is still of concern, but not of overriding concern as it has been during the development of earlier regulations. The review by the Interagency Oil Pollution Task Force and the President resulted in the two-fold initiative outlined in the President's message and the accompanying Fact Sheets, containing both international and domestic measures. The President's message and the Fact Sheets are included in Appendix A of this statement.

2. DESCRIPTION AND PURPOSE OF THE ACTION

Purpose of the Action

The purpose of these proposed changes to the regulations is to reduce oil pollution from tank vessels in two ways:

- To reduce operational outflows by requiring that all seagoing oil tank vessels of 20,000 deadweight tons or more have a segregated ballast capability by January 1, 1982.

- To reduce accidental oil outflows due to tanker accidents by requiring a double bottom beneath the cargo carrying portion of a seagoing oil tank vessel's hull if the vessel is 20,000 deadweight tons or more and is constructed under a contract awarded after December 31, 1979.

The need for reduction of oil inputs to the marine environment and the specific benefits of these two measures are discussed in Section 3 of this statement.

Description of the Proposed Regulations: Double Bottoms

The proposed regulations would require a double bottom beneath the cargo carrying portion of a seagoing oil tank vessel's hull if the vessel is 20,000 tons DWT or more and is constructed under a contract awarded after December 31, 1979. (Note: This requirement is commonly referred to throughout this impact statement as "double bottoms on new tankers." The reader should note that the term "new" has a different date attached to it than the definition of the term "new" in 33 CFR 157.03(i) which applies to the requirement for segregated ballast on tankers of 70,000 tons DWT or more.) The requirement would apply to U. S. tank vessels, both tank ships and tank barges, and to foreign tank vessels entering U. S. navigable waters in the course of trade into a U. S. port, including a deepwater port.[9]

The double bottom would be required to have a minimum height, i.e., separation between inner bottom plating and bottom shell plating, of at least the molded breadth divided by 15 (B/15) or two meters, whichever is less. The double bottom tanks could be used for segregated ballast, but could not be used for oil, either cargo or fuel.

Description of the Proposed Regulations: Segregated Ballast

The proposed regulations would require that all seagoing oil tank vessels of 20,000 tons DWT or more have a segregated ballast capability. Vessels would have to be equipped with segregated ballast tanks which are completely separated from the cargo oil and oil fuel systems and which are permanently

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[9] A double bottom is a cellular construction at a vessel's bottom in which a flat inner skin, or tank top, is placed above and parallel to the vessel' bottom, covering the bottom framing members. This construction results in a series of "double bottom" tanks underneath the vessel's cargo spaces. Reference (1), page 196.

allocated to the carriage of water ballast. Enough segregated ballast capacity must be provided to enable the vessel to meet specific minimum draft and maximum trim requirements in any ballast condition at any stage of a ballast voyage, including the condition of lightweight plus segregated ballast only. The propeller must also be fully immersed. The intent of this requirement is to provide vessels with enough segregated ballast capacity that the ship may be operated safely on ballast voyages without putting water ballast in oil tanks except in unusually severe weather. The vessel's master would be permitted to place additional ballast water in oil tanks in cases where he feels it must be done for the safety of the ship.

Effective Dates

The proposed regulations would require that tankers for which a construction contract is awarded after December 31, 1979, have double bottoms and that all tank vessels of 20,000 tons DWT or more have a segregated ballast capability by January 1, 1982.

Consideration of Technological Improvements and Alternatives

In the President's message to Congress, he states that "where technological improvements and alternatives can be shown to achieve the same degree of protection against pollution, the rules will allow their use."

The proposed regulations include a rule that the Coast Guard may accept, under established procedures in 46 CFR 30.15-1, technologically improved or alternate design or equipment as equivalent to a design or an equipment required by the proposed regulations.

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A REPORT TO CONGRESS: ACTIVITIES RELATING TO TITLE II PORTS AND--ETC(U)
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3. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE MARINE ENVIRONMENT

3.1 The Need for Regulations.

A discussion of the need for regulations for reducing oil pollution from tank vessels and information on oil inputs to the marine environment from both routine tank vessel operations and tank vessel accidents is on pages 23-41 of reference (1). The National Academy of Sciences Report, Petroleum in the Marine Environment (reference 6) excerpts of which are quoted in Appendix B of this statement, presents detailed information on the fates and effects of oil in the marine environment.

The "Tanker Oil Pollution Problem" is really two problems--operational and accidental, and there are fundamental differences between them. Figures 1 and 2 illustrate the sequence of causal factor-condition-effect in the problems of operational pollution and accidental pollution.

3.2 Estimated Effects on Oil Pollution

Table 1 summarizes the effects that requirements for segregated ballast on existing tankers and for double bottoms and segregated ballast on new tankers are expected to have on operational and accidental oil pollution.

Segregated Ballast on Existing Tankers

Segregated ballast reduces operational outflows by eliminating the oily mixtures generated during ballasting and deballasting operations, removing the first source category shown on Figure 1, but not affecting the other three sources shown. It thus reduces the volume of oily mixtures that must be treated, either on board the vessel or at a shore reception facility. Segregated ballast would benefit Alaskan oil loading ports by reducing the need to process ballast water at shore reception facilities. Segregated ballast is an easier pollution prevention measure to enforce than is the use of load-on-top or retention-on-board techniques (LOT/ROB). Furthermore, crew motivation and performance needed to make segregated ballast effective are much less than that needed to make LOT/ROB effective. Thus, segregated ballast should be a more effective measure than LOT/ROB.

A requirement for segregated ballast on vessels of 20,000 deadweight tons or more is more effective in reducing oil inputs to U. S. waters than a requirement for segregated ballast for vessels of 70,000 deadweight tons or more. Most of the tank vessels trading in U. S. waters are under 70,000 deadweight tons and a great amount of crude oil is transported by these vessels.

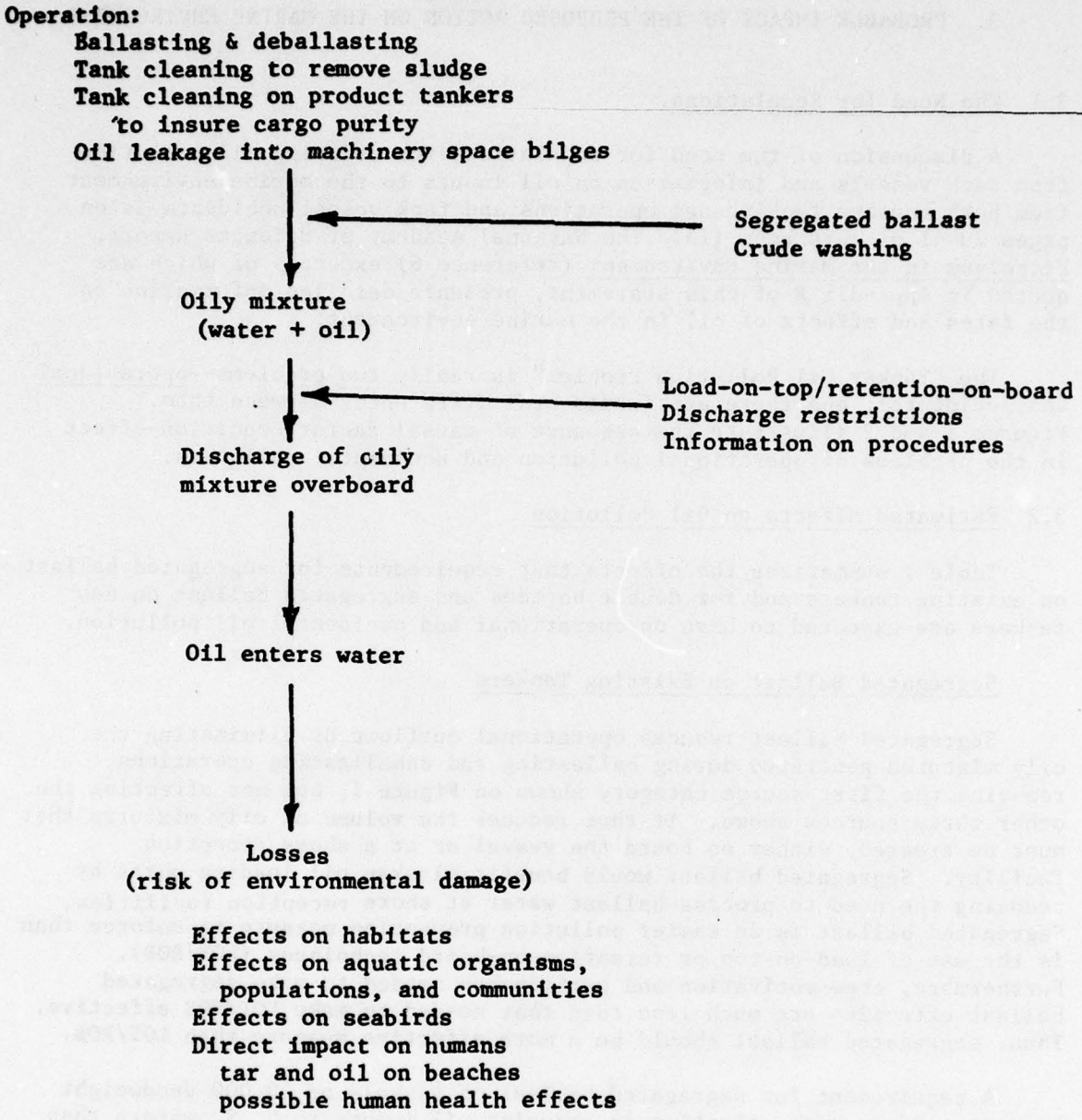

Figure 1 Tank Vessel Operational Oil Outflow Sequences

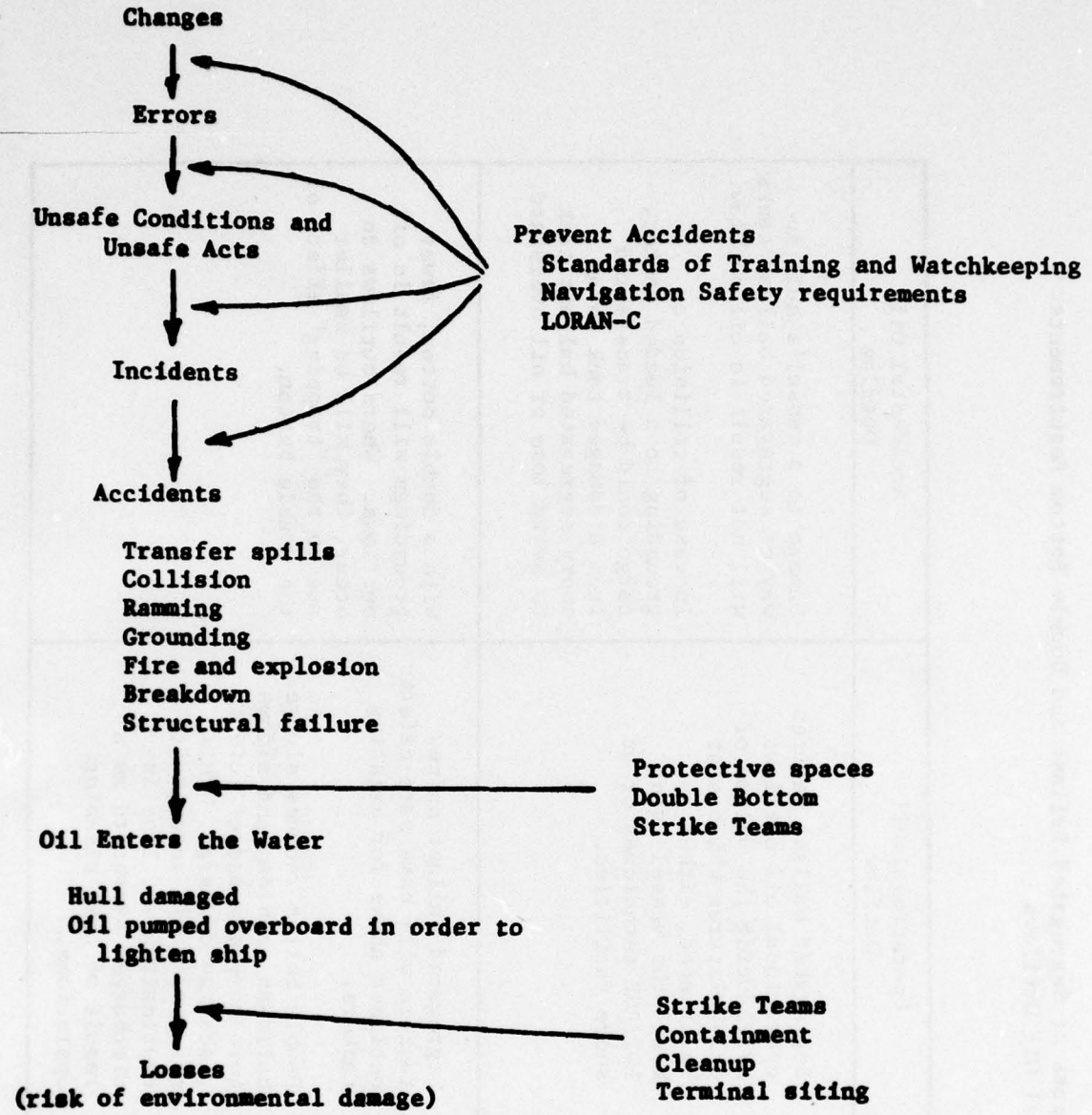

Figure 2 Tank Vessel Accidental Oil Outflow Sequences

Table 1 Expected Effects of Segregated Ballast and Double Bottom Requirements on Tank Vessel Oil Outflows

Measure	Operational Oil Outflow	Accidental Oil Outflow
Require segregated ballast on existing tankers over 20,000 deadweight tons	Segregated ballast reduces operational oil outflows by reducing the volume of oily mixtures which must be treated, either on board the vessel using LOT/ROB techniques or at shore facilities.	Damage to a vessel's hull in way of segregated ballast tanks will not result in oil outflow. In case of collision or grounding to a loaded tanker, cargo could be transferred from a damaged tank to an empty segregated ballast tank to avoid loss of oil overboard.
Require double bottoms and segregated ballast on all new tankers over 20,000 deadweight tons	Segregated ballast on new tankers will have same effects outlined above for existing tankers. Double bottom reduces sludge build-up problems and allows more complete and efficient discharge of cargo. This means more oil reaches its destination and less is discharged overboard as a result of tank cleaning operations.	With a double bottom, fewer groundings will result in oil outflows. Where outflows do occur, they will be smaller due to the "trapping" effect of the double bottom.

A requirement for segregated ballast spaces on existing tankers would also help prevent some accidental oil outflows. Damage to a tank vessel's hull that is in way of segregated ballast tanks generally will not result in oil outflow. Segregated ballast tanks may also be used to receive oil transferred from cargo tanks damaged as a result of an accident, such as a minor grounding with oil outflow. However, finding a place to put the oil is not usually as big a problem as determining which tank has been holed and rigging the ship's cargo transfer system or auxiliary equipment to make the transfer.

Double Bottoms and Segregated Ballast on New Tankers

The requirements for segregated ballast spaces, (most or all of which will be double bottom spaces) on new tank vessels will have the same effects on operational oil outflows as described above for existing tankers. In addition, double bottoms seem to offer potential for reducing sludge build-up problems and allowing more complete and efficient discharge of cargo because of the smooth tank bottom surface they make possible.[11] This means more oil reaches its destination and less is discharged overboard as a result of tank cleaning operations.

The main intent of the double bottom requirement is to raise the damage threshold of tank vessels by providing a barrier between grounding damage to the bottom shell plating and the vessel's oil cargo. The double bottom will allow a vessel to go aground and sustain damage to the bottom shell plating without release of cargo. The double bottom will be of no benefit in those cases where the vessel does not ground with sufficient energy to penetrate the bottom shell plating. The double bottom will not prevent oil outflow in those cases where the vessel grounds hard enough to penetrate both the shell plating and the inner bottom, although it is probable that the total amount of oil outflow will not be as great or occur as rapidly if the vessel does have a double bottom.[12] Double bottoms are not likely to affect the situation where a vessel grounds hard and is broken up due to the action of heavy seas (such as the case of the ARGO MERCHANT). The effect of double bottoms on the possibility of salvage of a grounded tanker is uncertain. If a vessel with empty double bottom tanks grounds with enough force to penetrate the bottom shell plating, these tanks will be flooded and the resulting loss in buoyancy will make the vessel harder to get off than if it did not have a double bottom. This may be a critical factor in salvage of the vessel if the weather worsens. On the other hand, the smaller volume of the double bottom tanks may reduce the overall loss of buoyancy if the inner bottom is not penetrated. There are so many variables which affect success of salvage operations (how and where the vessel grounded, the weather, sea conditions, availability of salvage assistance, loading of the vessel, etc.) that, in the Coast Guard's opinion, it is impossible

[11] See reference (4), page 46, for further discussion of this point.

[12] See reference (4) page 46, for further discussion of effect of double bottom on oil outflows after bottom damage.

to say with any degree of certainty what effect double bottoms may have on possible salvage of a tanker after grouding.

While double bottoms do provide some protection from grounding damage, they do not provide any improvement to a vessel's resistance to side damage resulting from a collision with another vessel or ramming of a pier, bridge or other similar object.

One other way that the segregated ballast requirement may affect hydrocarbons entering the environment is through avoiding hydrocarbon emissions in port areas resulting from ballasting of gassy cargo tanks. Although the amount of hydrocarbons released in these situations is generally believed to be fairly small, this factor may be important to Los Angeles and other areas with hydrocarbon air pollution problems.

3.3 Re-evaluation of Segregated Ballast and Double Bottom Alternatives

Regulations requiring segregated ballast on new tankers smaller than 70,000 deadweight tons, regulations requiring segregated ballast on existing tankers, and regulations requiring double bottoms on new tankers were all considered as alternatives by the Coast Guard in developing the tank vessel regulations published as final rules on October 15, 1975, and December 13, 1977. All were rejected for purposes of that earlier rulemaking, with the following reasons being cited.[13]

Requiring segregated ballast on new tankers smaller than 70,000 deadweight tons was rejected because:

a. it was not included in the standards contained in the 1973 Marine Pollution Convention; and

b. it would not be an effective pollution prevention measure on smaller tank vessels because most of these vessels carry petroleum products rather than crude oil and most wash tanks for cargo purity reasons rather than to provide space for clean ballast.

Requiring existing tankers to be modified to provide segregated ballast spaces was rejected because:

a. it was not required by international standards contained in the 1973 Marine Pollution Convention;

b. it must be done on a worldwide basis if adverse effects on the competative standing of U. S. vessels are to be avoided; and

c. there was a higher priority need to get the principle of segregated ballast for new vessels accepted worldwide before trying to extend segregated ballast requirements to existing vessels.

Requiring that new tankers be built with double bottoms was rejected because:

a. such a requirement was not included in the 1973 Marine Pollution Convention; and

b. double bottoms would be ineffective in reducing cargo loss during accidents other than groundings, and no particular type of vessel damage so dominated accidental outflow that a single design solution should, in the Coast Guard's view, be stipulated by law or regulation.

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[13] See reference (1), pages 60d, 60e, and 60f.

Segregated ballast and double bottom requirements have been re-evaluated as indicated above and are now being proposed for implementation. As stated on page 7, there were several factors which were important in reaching a decision on the actions announced in the President's message. Conformity of the U. S. standards with international standards is still of concern, but not of overriding concern as it had been in development of earlier regulations. Indications are that segregated ballast would be an effective pollution prevention measure on tank vessels between 20,000 tons and 70,000 tons because significant amounts of crude oil are carried in U. S. waters on such vessels and not all product tankers clean all their tanks each voyage for cargo purity reasons. Segregated ballast is being required on existing tankers because of its potential benefit in reducing operational pollution even though there may be some adverse effects on the competative standing of U. S. ships and the U. S. no longer considers it necessary to gain worldwide acceptance of segregated ballast on new vessels before proceeding to require it on existing vessels. Double bottoms are being required on new tankers because of the potential they have for reducing outflow in case of grounding.

3.4 Other Impacts of the Regulations

Cost and Economic Impacts

The initial cost of retrofitting segregated ballast has been estimated to range from $400,000 to $1 - $3 million.

Cargo-carrying capacity lost due to conversion of tanks to segregated ballast will average 20%, with a variation from a high of 35% for some smaller vessels to a low of 10% for some larger vessels depending primarily on the existing tank size and arrangement on each vessel.[14] This loss in cargo carrying capacity, really a loss in productivity, would result in increased transportation costs. A requirement to construct new tank vessels with double bottoms and segregated ballast would also increase the initial cost of these vessels, estimates varying between 3% and 10%.

In evaluating the economic impacts of the proposed regulations the Coast Guard estimates the cost increases to U. S. consumers would be as much as $100 million per year in the "peak cost" years, 1981 and 1982. But because of the large quantities of petroleum transported and consumed in this country and the relatively small portion of the cost of petroleum products that transportation costs represent, the additional cost per gallon of product is relatively small, approximately 0.2 - 0.6 cents per gallon.

Technical Feasibility

The Coast Guard considers requirements for retrofitting of segregated ballast on existing tank vessels and for double bottoms and segregated ballast on new tank vessels to be technically feasible. A study submitted to IMCO by Norway, Greece, and Italy (reference 11) examined options for providing segregated ballast on existing vessels. The necessary alterations to a vessel's cargo system and ballast system piping and pumps are estimated to take four to six weeks of shipyard time. An estimated additional two to four weeks may be necessary if tank bulkheads must be altered or relocated.

A number of double bottom tankers have been built in recent years and are in operation, indicating the technical feasibility of double bottoms. (Reference (4), pages 39-41 shows 34 tankers with double bottoms or double hulls were in operation, under construction, or contracted for in January, 1975.)

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[14] The average cost to retrofit segregated ballast with no restriction on placement and no structural modifications was estimated to be $400,000 for foreign vessels if done in a foreign ship yard and $500,000 for U. S. vessels modified in U. S. shipyards (reference 12). The study submitted to IMCO by Norway, Greece, and Italy (reference 8) estimated the cost of segregated ballast retrofit to be $1 - $3 million per vessel, but in extreme cases up to $5.2 million.

Safety impacts

No potential safety impacts have been identified for the requirement for segregated ballast.

Three potential safety impacts have been identified for the requirement for double bottoms on new vessels:

- Impact on possibility of salvage of a tanker after grounding.
- Potential for fire or explosion in double bottom space.
- Impact on safety of personnel entering double bottom spaces.

Salvage

The overall effect of double bottoms on the salvage of a grounded tanker is uncertain. There are so many variables which affect the success or failure of a salvage operation that, in the Coast Guard's opinion, it is not possible to say with certainty what effect double bottoms may have. Variable factors, such as how hard the vessel went aground, what kind of sea bottom there is, and the weather conditions, are probably much more significant than the presence or absence of double bottoms. The impact of double bottoms on the possibility of salvage of a tanker following grounding is discussed in reference (1), pages 76,202, and 251, and reference (4), page 47.

Fire or Explosion in Double Bottom Space

The potential for fire or explosion in tanker double bottom spaces is discussed in reference (1), pages 76, 202-203, 251, and reference (4) page 47. Fire or explosion risk arises due to the following sequence of events:

(1) Cargo leaks from cargo tanks into double bottom space through cracks or other openings in inner bottom plating.
(2) Flammable vapors accumulate within the double bottom space to within the explosive limits.
(3) A source of ignition ignites the vapors.
(4) A fire or explosion results.

In assessing the likelihood of fire or explosion in the double bottom there are questions that must be answered:

What is the likelihood that leakage from cargo tank into double bottom will occur?

Leaks in the bulkheads between adjacent cargo tanks have sometimes been

a problem on older conventional tankers. Bulkhead cracks are believed to result from inadequate structural design that results in "hard spots" and "crack initiators." The Coast Guard believes that problems with leakage of cargo into double bottoms through minor cracks and other structural failures can be controlled or eliminated through careful design of the double bottom structure. This belief is supported by information from the limited experience with existing double bottom tankers.

Corrosion of plating and framing within double bottom spaces used for saltwater ballast (segregated ballast) is also a potential problem. Available corrosion control techniques include cathodic protection through the use of sacrificial anodes, impressed current cathodic protection systems, and the use of protective coatings. The use of sacrificial anodes appears to be the most practical and effective of these. Impressed current cathodic protection would have to be designed to avoid spark ignition hazards. Application of effective coating systems to the interior of double bottom spaces seems to be difficult and expensive.

Redistribution of steel in single bottom structure between inner and outer bottom will result in the use of thinner plating for outer shell. This may result in smaller margins for exterior corrosion and erosion and require some additional plate renewals over the life of the vessel.

If there is leakage of cargo into double bottom spaces, will there be a hazardous accumulation of vapors?

As stated on page 47 of reference (4), in a discussion on this point, "moreover, on every ballast voyage, the double hull or double bottom will be gas-freed by the infusion of the ballast water to these spaces." Assuming this the primary concern is only with the vapors that may accumulate during a loaded voyage when the cargo tank is full and the double bottom tank is empty. The possibility of a hazardous vapor accumulation would depend on (1) how much cargo leaked into the double bottom, (2) the amount of vaporization that took place (volatility of cargo, temperature within the double bottom, and mixing within the double bottom), and (3) the presence of enough oxygen within the tank to provide a flammable mixture. It must be assumed that if cargo leakage into the double bottom occurs, a hazardous accumulation of vapors within the double bottom on a loaded voyage is likely to occur.

What is the likelihood of an ignition source igniting a hazardous accumulation of vapors in a double bottom tank?

As stated on page 47 of reference (4), in a discussion of the question, "if there were an accumulation of flammable vapors in the double hull or double bottom, there are much fewer ignition sources present to cause an explosion in cargo tanks." The likely sources of ignition appear to be (1) ignition of vapors at double bottom ballast tank vent and propagation of flame front back into the tank,

(2) ignition by welding or hot work on the exterior of the tank, (3) as ignition source introduced into the tank by men, such as welding and hot work within the tank, and (4) ignition as a result of collision or grounding. Source (1) could be controlled by flame screens on tank vents on deck. (Do we intend to require this? Do we require it already?) Sources (2) and (3) represent the same hazards as in cargo tanks, except that double bottom spaces would be harder to clean and gas free than conventional cargo tanks. These hazards would have to be controlled through the same procedures used for cargo tanks which include tests by a (marine chemist, gas free certification, and ventilation). Source (4) is considered to have a very low probability of occurrence and is considered an accepted risk.

How will entry of cargo into double bottom ballast tank be detected?

If leakage of cargo into double bottom tanks can be detected, special precautions can be taken to avoid fire or explosion and corrective action can be initiated. Possible leak detection methods include (1) discovery of cargo loss from tank through comparison of measurements at loading and discharge, (2) presence of oil in segregated ballast discovered by (a) visual monitoring of overboard discharge of segregated ballast, (b) sounding of double bottom tank, or (c) use of oil content monitoring device to monitor overboard discharge of segregated ballast, or (3) discovery of cargo liquid or vapors when double bottom tank is opened for testing and entry for inspection. Of these methods, (1) will probably work only if the leak is relatively large. Visual monitoring of segregated ballast overboard discharge (method 2a) and use of oil content monitoring device to monitor overboard discharge of segregated ballast (method 2c) are not required by current regulations in 33 CFR 157. Sounding of double bottom tanks with an oil/water interface detector (method 2b) prior to discharge of segregated ballast is required by 33 CFR 157.43(b) and depending on the size of the leak this may allow cargo leakage into the double bottom to be detected as ballast is being discharged. Interface detectors probably will not detect relatively small leaks. Discovery of cargo liquid or vapors during testing prior to entry of men into the tank (method 3) will check tank integrity whenever the tank is opened up for inspection. This will probably be at intervals of from 6 months to 2 years.

Should inerting of double bottom tanks be required?

Neither existing nor proposed regulations require inerting of double bottom spaces, although this has been proposed as a preventative measure to control risk of fire or explosion in double bottom spaces. The object of inerting double bottom spaces would be to avoid having a flammable mixture in the space by keeping oxygen levels below levels needed to support combustion, even if cargo did leak into the double bottoms. With the information available, the Coast Guard considers the best protection against double bottom explosions to be avoidance of cargo leakage into the double bottom space through careful design, construction, inspection, and maintenance of the double bottom structure. If vessel inspections show that cargo leakage into the double bottoms is a problem, further consideration would be given to requiring inerting systems for double bottoms. Time is also needed to resolve questions about the reliability and maintainability

of flue gas inerting systems now required for cargo tanks.

Impact on Personnel Safety

Persons would have to enter double bottom tanks occasionally for inspection of the tank interior for corrosion, deterioration due to corrosion and accumulation of sludge and silt deposits from ballast water for repair of weld cracks, piping, and for plate renewals due to grounding or other damage. There would have to be enough ventilation to carry away welding fumes and to provide air. This would be difficult beacuse of the long distances from tank access openings. Tank cleaning would also be a problem where cargo has leaked into the double bottom tank and the tank must be gas-freed to make it safe to enter and to do hot work. If double bottom tanks are inerted, routine entry for inspection by the vessel's crew would be more difficult and hazardous. Regulations about to be proposed by the Coast Guard would require that (1) a gas-free certificate be obtained from a marine chemist before the tank was entered, (2) persons entering tanks wear a self-contained breathing apparatus, or (3) the space being entered have a monitoring system to detect the presence of flammable vapors, enough oxygen to sustain life, and presence of toxic vapors.

4. ALTERNATIVES TO THE PROPOSED ACTION

The alternatives considered in developing the proposed requirements for segregated ballast and double bottoms are essentially the same ones considered in the earlier rulemakings referred to on page 1 and 2 of this statement. These are:

A. Publish no additional regulations. (No Action)

B. Publish regulations less stringent than those proposed. These could include:

   1. Less strict discharge criteria which would allow more oil to be discharged overboard from tank cleaning and ballasting operations.

   2. Discharge restrictions allowing discharges into waters less than 50 miles from U. S. coastlines.

C. Publish regulations more stringent than those proposed. These could include:

   1. Regulations prohibiting any discharge of oily mixtures to the sea.

   2. Regulations allowing oily mixtures to be discharged but limiting the concentration and total amount of oil discharged to quantities smaller than those in the proposed rules.

   3. Regulations requiring smaller tank size limits.

   4. Regulations requiring various construction features and equipment intended to improve vessel maneuvering and stopping ability. These include:

      a. Increased astern horsepower (greater backing power).

      b. Twin screws and twin rudders.

      c. Controllable pitch propeller(s).

      d. Bow thruster, or bow and stern thrusters.

      e. More rudder area.

      f. Faster rudder turning rate.

g. Flapped rudder.

h. Rotating cylinder rudder.

i. Auxiliary braking devices, such as flaps and parachutes.

5. Regulations requiring improved radar training for ship's officers.

6. Regulations setting higher standards for training and watchkeeping

D. Reduction of oil consumption or reduction of oil imports.

E. Use of a different mode of transportation for oil.

These alternatives are discussed on pages 58-81 of reference (1). Except as noted in section 3.3, these discussions remain valid.

5. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED.

The overall effect of these regulations would be to reduce the amount of oil entering the oceans as indicated in Section 3. No adverse environmental effects are anticipated as a result of this action.

6. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY.

This section is supposed to include "a brief discussion of the extent to which the proposed action involves tradeoffs between short-term environmental gains at the expense of long-term environmental losses, or vice versa." It should also include a "discussion of the extent to which the proposed action forecloses future options."[13]

So far as the Coast Guard can determine, these regulations do not involve any tradeoffs between short-term and long-term environmental gains and losses, nor does the proposed action foreclose any future options.

7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No irreversible and irretrievable commitments of resources are involved in this proposed action.

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[13]Preparation of Environmental Impact Statement: Guidelines, 40 CFR 1500.8(a)(6).

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2. Department of Transportation, U. S. Coast Guard, Final Environmental Impact Statement, Regulations for U. S. Tank Vessels Carrying Oil in Foreign Trade and Foreign Tank Vessel That Enter the Navigable Waters of the United States, Washington, D. C., 1976, available from the National Technical Information Service, Springfield, VA, 22151, Government Accession No. AD A036719.

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10. "Oil Pollution of the Oceans; The President's Message to the Congress Recommending Measures To Control the Problem ," dated March 17, 1977. Released March 18, 1977, Weekly Compilation of Presidential Documents, Monday, March 21, 1977, Volume 13, Number 12, page 408-409.

11. Office of the White House Press Secretary, "Fact Sheet: on the Presidents message to Congress recommending actions to reduce maritime oil pollution," Released March 18, 1977.

12. U. S. Coast Guard, "Inflation Impact Evaluation; Segregated Ballast Retrofit and Double Bottoms," 6 April 1977.

APPENDIX A

1. "Oil Pollution of the Oceans; The President's Message to the Congress Recommending Measures to Control the Problem," Dated March 17, 1977. Released March 18, 1977. Weekly Compilation of Presidential Documents, Volume 13, Number 12, March 21, 1977, pages 408-409.

2. White House Press Release, released March 16, 1977. Fact sheet: on possible Federal Government actions the President is considering to deal with the problem of marine oil pollution caused by oil tankers

3. White House Press Release, released March 18, 1977. Fact sheet: on the President's message to Congress recommending actions to reduce maritime oil pollution

Oil Pollution of the Oceans

The President's Message to the Congress Recommending Measures To Control the Problem. Dated March 17, 1977. Released March 18, 1977

To the Congress of the United States:

The recent series of oil tanker accidents in and near American waters is a grave reminder of the risks associated with marine transportation of oil. Though we can never entirely eliminate these risks, we can reduce them. Today I am announcing a diverse but interrelated group of measures designed to do so.

These measures are both international and domestic. Pollution of the oceans by oil is a global problem requiring global solutions. I intend to communicate directly with the leaders of a number of major maritime nations to solicit their support for international action. Oil pollution is also a serious domestic problem requiring prompt and effective action by the federal government to reduce the danger to American lives, the American economy, and American beaches and shorelines, and the steps I am taking will do this.

The following measures are designed to achieve three objectives: First, to reduce oil pollution caused by tanker accidents and by routine operational discharges from all vessels; Second, to improve our ability to deal swiftly and effectively with oil spills when they do occur; and Third, to provide full and dependable compensation to victims of oil pollution damage.

These are the measures I recommend:

• RATIFICATION of the International Convention for the Prevention of Pollution from Ships. I am transmitting this far-reaching and comprehensive treaty to the Senate for its advice and consent. This Convention, by imposing segregated ballast requirements for new large oil tankers and placing stringent controls on all oil discharges from ships, represents an important multilateral step toward reducing the risk of marine oil pollution. In the near future, I will submit implementing legislation to the Congress.

• REFORM of ship construction and equipment standards. I am instructing the Secretary of Transportation to develop new rules for oil tanker standards within 60 days. These regulations will apply to all oil tankers over 20,000 deadweight tons, U.S. and foreign, which call at American ports. These regulations will include:

—Double bottoms on all new tankers;

—Segregated ballast on all tankers;

—Inert gas systems on all tankers;

—Backup radar systems, including collision avoidance equipment, on all tankers; and

—Improved emergency steering standards for all tankers.

These requirements will be fully effective within five years. Where technological improvements and alternatives can be shown to achieve the same degree of protection against pollution, the rules will allow their use.

Experience has shown that ship construction and equipment standards are effective only if backed by a strong enforcement program. Because the quality of inspections by some nations falls short of U.S. practice, I have instructed the Department of State and the Coast Guard to begin diplomatic efforts to improve the present international system of inspection and certification. In addition, I recommend the immediate scheduling of a special international conference for late 1977 to consider these construction and inspection measures.

• IMPROVEMENT of crew standards and training. I am instructing the Secretary of Transportation to take immediate steps to raise the licensing and qualification standards for American crews.

The international requirements for crew qualifications, which are far from strict, will be dealt with by a major international conference we will participate in next year. I am instructing the Secretary of Transportation to identify additional requirements which should be discussed, and if not included, may be imposed by the United States after 1978 on the crews of all ships calling at American ports.

• DEVELOPMENT of Tanker Boarding Program and U.S. Marine Safety Information System. Starting immediately, the Coast Guard will board and examine each foreign flag tanker calling at American ports at least once a year and more often if necessary. This examination will insure that the ship meets all safety and environmental protection regulations. Those ships which fail to do so may be denied access to U.S. ports or, in some cases, denied the right to leave until the deficiencies have been corrected. The information gathered by this boarding program will permit the Coast Guard to identify individual tankers having histories of poor maintenance, accidents, and pollution violations. We will also require that the names of tanker owners, major stockholders, and changes in vessel names be disclosed and included in this Marine Safety Information System.

• APPROVAL of Comprehensive Oil Pollution Liability and Compensation Legislation. I am transmitting appropriate legislation to establish a single, national standard of strict liability for oil spills. This legislation is designed to replace the present fragmented, overlapping systems of federal and state liability laws and compensation funds. It will also create a $200 million fund to clean up oil spills and compensate victims for oil pollution damages.

• IMPROVEMENT of federal ability to respond to oil pollution emergencies. I have directed the appropriate federal agencies, particularly the Coast Guard and the Environmental Protection Agency, in cooperation with

state and local governments to improve our ability to contain and minimize the damaging effects of oil spills. The goal is an ability to respond within six hours to a spill of 100,000 tons.

Oil pollution of the oceans is a serious problem that calls for concentrated, energetic, and prompt attention. I believe these measures constitute an effective program to control it. My Administration pledges its best efforts, in cooperation with the international community, the Congress, and the public, to preserve the earth's oceans and their resources.

JIMMY CARTER

The White House,
March 17, 1977.

EMBARGOED FOR USE AFTER BRIEFING MARCH 16, 1977

Office of the White House Press Secretary

THE WHITE HOUSE

FACT SHEET
ACTIONS TO REDUCE MARITIME OIL POLLUTION

The President is considering a series of possible Federal Government actions to deal with the problem of marine oil pollution caused by oil tankers. These include:

-- U. S. ratification of the International Convention for the Prevention of Pollution from Ships, 1973.

-- Regulatory action by the Department of Transportation to establish new U. S. standards for all tankers entering U. S. ports.

-- Submission to Congress of oil spill liability and compensation legislation.

-- The establishment of a U. S. Marine Safety Information System to identify tankers with long histories of poor maintenance, accidents and pollution violations.

BACKGROUND

The rash of oil tanker accidents which occurred this winter off our east and west coasts has brought home to us the serious risks which are involved in marine transportation of oil. Oil pollution threatens some of our most valuable natural resources -- the ocean, its living inhabitants, our beaches and our shorelines. Oil tanker accidents also endanger human lives, and oil pollution can jeopardize the economic security of millions of Americans who live in coastal communities.

In his Address to the Nation on February 2, the President recognized these risks and the need for timely government action to deal with the problem. In response to the President's concern, the Director of the Office of Management and Budget established an interagency Task Force to identify possible solutions.

The Task Force recommended to the President that he also consider action to reduce marine oil pollution caused by operational discharges from tankers. The Argo Merchant, the Sansinena and the Olympic Games have been the subject of much public concern. Such tanker groundings and collisions are a serious problem to the localities where they occur. However, they are not the major maritime source of ocean oil pollution. Operational discharges from oil tankers and other vessels cause a far greater total amount of oil pollution than accidents. Therefore, the actions which the President is considering deal with both problems.

THE INTERAGENCY OIL POLLUTION TASK FORCE

The Task Force was formed on February 3. The Office of Management and Budget chaired the group. The following agencies participated:

Department of State
Department of the Treasury
Department of Defense

Department of Justice
Department of the Interior
Department of Commerce
Department of Transportation
Federal Maritime Commission
Environmental Protection Agency
Council on Environmental Quality
Federal Energy Administration

Subgroups developed proposed initiatives in five areas:

1. Ships and ship systems
2. Crew standards and training
3. Oil pollution liability and compensation
4. International conventions
5. Oil spill response.

The Task Force contacted representatives of more than twenty interested public organizations and several States to solicit their views and suggestions. The organizations included environmental groups, the oil and transportation industries, oil spill cleanup companies and maritime unions. The States included Alaska, California, Florida, Louisiana, Maine, Massachusetts, Oregon and Washington. The suggestions and views of all of these groups are being carefully considered.

OBJECTIVES

The President's program is designed to meet four objectives:

1. reduce oil pollution resulting from oil tanker accidents and operational discharges;

2. improve our ability to deal with oil spills when they do occur;

3. assure that any citizens damaged by oil spills are fully compensated for their losses; and

4. reorganize Federal oil pollution programs to make them simpler and more responsive.

APPROACH

Pollution of the oceans by oil is a global problem. The United States is an active participant in the Inter-Governmental Maritime Consultative Organization, an international forum sponsored by the United Nations to formulate programs to reduce vessel pollution and to ensure safety of human life and vessels. The President's international initiatives will involve working through this international agency, as well as bilateral discussions with major shipping nations, our trading partners and our neighbors. The President plans to communicate directly with the leaders of a number of major maritime nations to seek their support in this effort.

On the domestic front, the President is considering strong administrative actions to upgrade U. S. standards on all oil tankers entering U. S. ports, as well as on the crews manning them. He is also considering action to upgrade several Federal programs designed to prevent accidents and respond to spills, including Coast Guard's tanker examination program and information systems and Federal oil spill response capability.

White House staff and the Office of Management and Budget spent yesterday on Capitol Hill discussing possible solutions with Members of Congress with a special interest in this area and with their staffs. That process is continuing. We hope to have their recommendations incorporated into a final proposal to be announced on Friday.

for all new tankers 70,000 deadweight tons and over, as well as oil discharge monitoring and control equipment, and sets requirements for cargo tank size and arrangement to limit oil spills in case of accident. In addition, the ports of signatories to the Convention will be required to have reception facilities for tankers' oily wastes.

2. Ship Construction and Equipment Standards

The President is directing the Secretary of Transportation to issue within 60 days proposed rules for a series of new oil tanker standards, and, as provided by law, to expedite the necessary regulatory procedures. The proposed regulations will apply to all oil tankers, U.S. and foreign, over 20,000 deadweight tons entering U.S. ports. They will include:

1. Double bottoms on all new tankers.

2. Segregated ballast on all tankers.

3. Inert gas systems on all crude tankers.

4. Backup radar systems with collision avoidance equipment on all tankers.

5. Improved emergency steering standards for all tankers.

These requirements would take full effect within five years. The rules should allow the adoption of technological improvements and alternatives which can be shown to accomplish equivalent pollution protection.

The President especially acknowledges the leadership of Senator Warren G. Magnuson and the Senate Commerce Committee on matters relating to tanker safety. All of the initiatives outlined above are the kinds of solutions the Committee has endorsed over a period of years.

Ship construction and equipment standards are not effective unless coupled with a strong enforcement program. Therefore, the President is directing the Department of State and the Coast Guard to begin diplomatic efforts to upgrade the present international system of inspection and certification. Construction and equipment inspections are carried out by all maritime nations. However, the quality of inspections by some nations falls far below U.S. practice.

In addition the United States will propose the immediate scheduling of a special international conference for the early fall to consider these construction and inspection measures. The U.S. will recommend that technical preparatory work be done by the Inter-Governmental Maritime Consultative Organization this spring and summer to ensure effective international action.

Authority for the domestic action is provided by the Ports and Waterways Safety Act of 1972 (Public Law 92-340) which provides the Department with a broad mandate to protect U.S. waters against pollution. These standards will reduce pollution through both accident prevention and reduction in operational discharges. A description of these requirements follows:

Double bottoms reduce oil spills caused by tanker groundings. Studies of groundings conclude that in 45 to 90 percent of cases no oil outflow would have occurred if the tank vessel had had a double bottom. The requirement will apply only to new vessels. Double bottoms can also be used for a part of the required segregated ballast space.

Segregated ballast provides tanks dedicated exclusively for the seawater which is carried by empty oil tankers for ballast. The use of separate clean tanks means that no oil is discharged along with ballast water. Deballasting and associated tank washing is the major source of operational oil pollution from tankers. Ballast tanks on new tankers can also be arranged to provide protection against oil outflow in case of accident.

MARCH 18, 1977

Office of the White House Press Secretary

THE WHITE HOUSE
FACT SHEET

Actions to Reduce Maritime Oil Protection

The President today announced a series of recommended Federal Government actions to deal with the problem of marine oil pollution caused by oil tankers. These include:

- A call for a special international conference to discuss stricter standards for oil tanker construction, equipment and inspections.
- Regulatory action by the Department of Transportation to establish new U.S. standards for all tankers entering U.S. ports.
- A Coast Guard program to board and examine all foreign flag oil tankers entering U.S. ports.
- U.S. ratification of the International Convention for the Prevention of Pollution from Ships, 1973.

BACKGROUND

As announced on March 16, these measures are designed to deal with the problem of oil tanker accidents and spills which occurred so frequently in and near U.S. waters this winter. The recommended actions will also serve to reduce oil pollution caused by operational discharges from tankers.

The President plans to communicate directly with the leaders of a number of major maritime nations to seek their support for strengthened international solutions to this world-wide environmental problem. The United States will also continue to participate actively in the Inter-Governmental Maritime Consultative Organization, a special United Nations agency, to formulate new programs to reduce vessel-source oil pollution.

The President's domestic program is strong and comprehensive. It includes both administrative and legislative actions and meets all four of the President's objectives - reduction in tanker pollution, improvements in oil spill response, assuring compensation of damaged citizens, and reorganization of government programs.

The recommended actions were formulated after consultation with environmental groups, the oil and transportation industries, oil spill cleanup companies and maritime unions. In addition, the suggestions and views of coastal States were solicited.

THE PRESIDENT'S PROPOSALS

1. The International Convention for the Prevention of Pollution from Ships, 1973

   The President will transmit this important International Convention to the Senate for its advice and consent and will submit implementing legislation next month for Congressional approval. The United States was a leader in the development of this Convention, commonly known as the 1973 Marine Pollution Convention. It is a far-reaching and comprehensive agreement which will have an important impact on marine oil pollution.

   The Convention places stringent controls on oil discharges from ships, including for the first time, discharges of light refined petroleum products. It requires segregated ballast

(OVER)

The 1973 Marine Pollution Convention marks the international community's acceptance of the concept of segregated ballast. Coast Guard regulations currently require the system on all new tankers over 70,000 deadweight tons, foreign and domestic. The rulemaking proposed today also covers existing tankers. These vessels can achieve segregated ballast capability by dedicating certain cargo tanks to ballast and modifying piping and pumps.

Inert gas systems reduce the danger of explosions which may occur at times when oil tanks are not full, primarily during tank washing, but also in loading and unloading, and during ballast voyage. The Sansinena, which exploded in Los Angeles harbor in December while taking on ballast, had no inert gas system.

Current U.S. regulations require the system for new U.S. tankers over 100,000 deadweight tons. The proposed rule will also apply to existing tankers and foreign flag vessels.

Backup radar systems provide redundant capacity in case of equipment failure. Collision avoidance equipment can be programmed to automatically process radar information and to trigger an alarm when dangerous situations arise. The equipment also provides information to the crew for maneuvering to avoid the potential danger. The systems are most effective in the coastal confluence zone where vessel traffic patterns converge toward U.S. ports. The requirement will apply to both new and existing vessels and would be effective for existing vessels within 2 years of final rulemaking.

Improved emergency steering standards will be drafted. Current regulations impose redundancy requirements for some components of tanker steering gear. Additional requirements which would further improve reliability have been identified.

3. Crew Standards and Training

The President is ordering several actions to improve the qualifications of crews that man oil tankers entering our ports. These actions are particularly crucial because human error is involved in 80-85 percent of all tanker accidents. The United States imposes relatively strict standards for the U.S. Merchant Marine, but stringent international requirements for crew qualifications do not exist. However, the Inter-Governmental Maritime Consultative Organization is developing a major draft convention on the subject for negotiation next year. The President views this effort as a major international opportunity to upgrade crew qualifications. The President is directing the Departments of Transportation and Commerce to review the agenda (the draft convention) for the 1978 Conference on Standards of Watchkeeping and Training to identify additional requirements which should be proposed for consideration. In addition, the Department will identify all requirements which, if not included in the 1978 Convention, the U.S. should impose on crews of all ships entering U.S. ports.

Nationally, the President is directing Transportation to take immediate regulatory action to improve standards for U.S. crews. Requirements will include experience by class and size of vessel, or training and demonstration of proficiency on ship simulators. These requirements will apply to both issuance and renewal of licenses to ships masters, mates and Federally licensed pilots. More emphasis will be placed on requiring deck officers to demonstrate important skills, such as radar operation and interpretation, instead of relying on written examinations. Finally, regulations will be issued to require that crew members in charge of cargo transfer operations be specially trained and examined.

4. Tanker Boarding Program and U.S. Marine Safety Information System

The President is directing that, starting immediately, each foreign flag tanker which enters U.S. ports will be boarded by the Coast Guard and examined to insure that the ship meets all safety and environmental protection regulations. Tankers will be boarded at least once a year and more often if necessary. Any deficiencies in the tanker's condition will be required to be corrected. This winter the Coast Guard began a limited foreign tanker boarding program. The President's revisions to the Budget for the next fiscal year requested additional funding for this program.

The information which is gathered from the boarding program will be fed into a U.S. Marine Safety Information System, which will be established to keep track of the accident and pollution records of all ships, U.S. and foreign, entering U.S. ports. Coast Guard information systems already contain some of this information for U.S. vessels. Since 94% of our imported oil enters the country in foreign tankers, it is important that information on these vessels also be available to Captains of the Port at all major U.S. ports. The President is also directing that the proper Federal agencies initiate action to require that the names of tanker owners, major stockholders, and changes in vessel names be disclosed and be made available for inclusion in the Marine Safety Information System. This system will enable the Coast Guard to promptly identify tankers which have long histories of poor maintenance, pollution violations and accidents. Once identified, such tankers can be excluded from U.S. ports, if necessary.

5. Comprehensive Oil Pollution Liability and Compensation Legislation

The Secretary of Transportation will submit to Congress on the President's behalf the Comprehensive Oil Pollution Liability and Compensation Act of 1977, which replaces the current fragmented and overlapping systems of Federal and State oil spill liability laws and compensation funds with a single nationwide framework. It establishes one national standard of strict liability for oil spills whether the source be vessels, pipelines, terminals or offshore facilities. It also establishes a $200 million fund to cover cleanup costs and to assure full compensation to victims for virtually all oil pollution damages. The fund consolidates three existing Federal oil pollution compensation funds, the Trans-Alaska Pipeline Fund, the Deepwater Ports Fund and part of the Federal Water Pollution Control Act Fund. The compensation provided under the legislation is extensive. For example, eligible claimants include fishermen whose usual fishing grounds are polluted and resort communities whose peak vacation seasons are ruined by oil-slicked beaches.

The Administration bill is based on legislation which has been introduced by Congressmen Murphy and Biaggi and is now under consideration by the House Merchant Marine and Fisheries Committee. The Administration bill raises the minimum liability for vessels carrying oil in bulk to $500,000 and removes the $30 million ceiling on liability for supertankers. It also proposes a mechanism for States to participate in the Federal compensation system. Another change will allow the Fund to provide compensation to Federal and State agencies which perform post-spill environmental damage assessments.

6. Federal Oil Pollution Response Capability

The President is directing the Coast Guard, the Environmental Protection Agency, and other responsible Federal agencies to begin plans for upgrading their capability to respond to, contain,

and mitigate the damaging effects of oil spills in cooperation with State and local governments. Special attention will be given to spills which occur under extreme weather conditions.

The framework for coordination of Federal pollution response activities is established by the National Contingency Plan (40 Federal Regulations 1510). The Coast Guard and the Environmental Protection Agency are the lead agencies under the plan. In their assigned areas of responsibility, each agency predesignates Federal on-scene coordinators who are responsible for directing the Federal response when oil spills occur. The National Plan is supplemented by Regional Response Plans, which provide for coordination of Federal, State and local government response efforts. This response system, particularly the Regional Plans, will be reviewed as part of the President's oil pollution program.

Presently the Coast Guard can deliver pollution containment and cleanup equipment to the scene of a spill within 24 hours. The Administration plans to evaluate the costs and feasibility of upgrading this capability to provide adequate response within six hours for a spill of up to 100,000 tons of oil.

ADDITIONAL INITIATIVES

Along with the major actions just discussed, the President is directing the Secretary of Transportation, in cooperation with the Environmental Protection Agency and other appropriate agencies, to undertake several studies of other promising programs and techniques for reducing marine oil pollution. These studies will include:

- An evaluation of the costs and benefits of crude washing, a system which utilizes crude oil to clean cargo tanks.
- An evaluation of design, construction and equipment standards for tank barges which carry oil.
- A study of long range vessel surveillance and control systems.
- An evaluation of devices to improve maneuvering and stopping ability of large tankers, with research to include the use of ship simulator.
- A study of the fee collection mechanism for the comprehensive oil pollution fund.

The Secretary of Transportation will report back to the President after 6 months on the status of these studies.

# # #

APPENDIX B: Conclusions of a study by the Ocean Affairs Board of the National Academy of Sciences entitled Petroleum in the Marine Environment, pages 104 - 107

5 Conclusions

The quantity of petroleum hydrocarbons entering the ocean today has been variously estimated to range from 5 to 10 million metric tons per annum (mta). Our judgment, as shown in Table 5-1, is in the lower part of this range.

The first four estimates in Table 5-1 are based on data that can be at least partially documented. The last two estimates contain major uncertainties and untested assumptions.

The river runoff input was estimated from an unpublished value of 400 ppm petroleum hydrocarbons measured in sediments deposited in the mouth of the Mississippi River and supported by analyses of other rivers of the world. However, direct measurements of petroleum hydrocarbons dissolved and dispersed in river waters as well as those carried on the water surface and by suspended particles are still very limited.

TABLE 5-1 Petroleum Hydrocarbons in the Ocean

Input	Million Metric Tons per Annum
Transportation Tankers, dry docking, terminal operation, bilges, accidents	2.133
Coastal refineries, municipal and industrial waste	0.8
Offshore oil productions	0.08
River and urban runoff	1.9
Atmospheric fallout	0.6
Natural seeps	0.6
TOTAL	6.113

Petroleum hydrocarbon inputs from the atmosphere depend on the reaction kinetics of various compounds entering the atmosphere as well as the nature and fate of the volatile and particulate reaction products. Because very little of this information exists, our estimate was made from the known influx of petroleum hydrocarbons and our general knowledge of atmosphere residence times in global precipitation patterns.

The natural seeps input was estimated from a major extrapolation from a few known seeps. This involved estimating seeps from many areas where seeps have never been identified. No satisfactory method is available for measuring seepage rates, and our current inventory of seep areas is incomplete.

The best estimate in the table is for the input associated with transportation. It can be documented from data on tankers, terminal, and ship operations. This input represents the major source of visible accumulation of petroleum hydrocarbons both on open oceans and along coast lines.

The quantity of oil entering the oceans from transportation-related sources has been increasing every year; given future increases in production and transport, it is possible that transportation-related inputs will continue to increase despite the current interest and activity in control measures. Although the United States and a few other oil-carrying countries are adopting improved measures, such measures (e.g., Load On Top) have not been accepted as common practice by all of the major oil transporters. The capability of achieving a marked

reduction in the input of oil to the sea exists, but it is heavily dependent on a much wider adoption of known control measures by all countries. The immediate need is to improve the international operation, control, and surveillance of tanker and shipping operations to minimize oil spills. Emphasis should be directed toward achieving maximum Load On Top operation by all ocean-going tankers as well as the increased use of segregated ballast tankers.

Reducing inputs to coastal waters by coastal refineries, river runoff, etc., is a much more difficult problem. Progress here will require improved control of petroleum hydrocarbon sources in municipal and industrial waste water. The control of automobile emission may reduce atmospheric fallout.

There is a need for accurate, standardized techniques for chemical analysis and for biological studies so that a more reliable analysis can be made of the ultimate fate of and biological effects of petroleum hydrocarbons. Meeting this need is very difficult due to the exceedingly complex and varied nature of petroleum as well as the wide variety of biological species and environmental conditions involved.

Conflicting reports of the biological damage following coastal oil spills can be attributed in some instances to differences in sampling procedures and analytical techniques, rather than to different environmental factors. In other instances, reports of damage to biota have not been placed in the context of normal fluctuation of the biota caused by natural environmental changes. The design of laboratory experiments to evaluate biological impairment must be such as to provide reliable data without being excessively complicated or expensive.

It is particularly important that known techniques for distinguishing between petroleum and biogenic hydrocarbons be used to determine the petroleum concentration in sediments, organisms, and water. Natural hydrocarbons are widespread so that data on total hydrocarbon content are of little value without some criteria for differentiating the petroleum hydrocarbons from the natural hydrocarbons. Unfortunately, even with present techniques this distinction cannot be made for some types of sediments and the ability to distinguish petroleum from natural hydrocarbons is less reliable at low concentrations. A reliable estimate of total hydrocarbons now in the open ocean is not possible until more sensitive diagnostic methods for determining the quantities of hydrocarbons from petroleum and biogenic sources become available.

When petroleum is spilled into the ocean, it immediately begins to undergo changes through evaporation, solution, spreading, emulsification, air–sea interchange, biological degradation and uptake, and sedimentation. The composition of petroleum and characteristics of the environment—such as temperature, concentration of bacteria and nutrients, and sea state—determine the rate at which petroleum is altered. Because the fate of diffused sources is largely unknown, it is not possible to make a material balance of the input and ultimate fate of petroleum hydrocarbons in the oceans. The fate of point sources is only partially known, namely by the accumulation of lumps, tar balls, and large mats of tarry oil residues on the open ocean and beaches along tanker routes.

The fate of most petroleum spills on the sea appears to be a combination of evaporation and decomposition in the atmosphere plus oxidation by chemical and biological means to CO_2. The heavier fraction of petroleum forms pelagic tar. The total amount of petroleum on the open sea in the form of specks and floating lumps is estimated to be less than a year's input. Some fraction of this amount eventually becomes washed up on beaches and incorporated into coastal sediments. It is this portion of spilled oil that causes most public complaints. Tar masses are appearing in increased quantity in formerly unpolluted areas such as the East Coast of Africa, the beaches of Southern France, and many islands in both the Indian and Atlantic oceans. Recent reports clearly document the quantity and nature of these tar residues in areas such as Bermuda. The fact that these tars frequently have inclusions of paraffinic wax such as that originally formed on tanker compartment walls and that they have much higher iron contents than natural petroleum is evidence that most of these materials originate from tanker washings and bilge discharges, rather than diffused sources of petroleum input or seeps.

The documentation of visible tar on beaches only accounts for a fraction of the total input into the ocean. To construct a reliable model of the fate of petroleum in the marine environment surveys over large portions of the world's oceans combined with time series data at several individual stations are needed. Data on the rate of sedimentation of petroleum residues in both open ocean and coastal areas and its incorporation into marsh and tidal flat sediments where it has considerable ecological impact are particularly important.

When oil becomes incorporated in coastal sands protected from the weathering effects of sun and oxygen, its residence time may be measured in years or decades. Unless steps are taken to reduce the input to a level that can be assimilated through natural degradation processes, we will all have to reconcile ourselves to oil-contaminated beaches.

Microorganisms capable of oxidizing petroleum constituents under the right conditions have been found in virtually all parts of the marine environment that have been examined. However, reliable information on the

rates of biodegradation are not available. Both laboratory experiments and some field observations have shown that microorganisms consume the least toxic fraction of petroleum (normal alkanes) in a few days or months, depending on temperature and nutrient supply. The fraction containing aromatics and naphthenes is more toxic than the alkanes and also degrades more slowly.

Larger organisms take up hydrocarbons through the gills or from fluid passing through the gut. The quantity of petroleum hydrocarbons (excluding biogenic hydrocarbons) in the total body (wet weight) of various marine organisms reported in the literature ranges from 1 to 400 μg/g. These include organisms from clean, as well as polluted, environments. Fish and lobsters have been shown to metabolize most petroleum hydrocarbons within 2 weeks, but metabolism in lower organisms is slower and the pathways are poorly understood. There is no evidence, however, for food web magnification of petroleum hydrocarbons in marine organisms. Direct uptake of petroleum hydrocarbons from the water or sediments appears to be more important than uptake from the food chain, except in special cases. Some organisms such as mussels and oysters have been shown to eliminate most absorbed petroleum hydrocarbons when placed in clean water.

An accurate evaluation of the fate of petroleum through microbial degradation and biological uptake cannot be made until better designed and more rigorously conducted field studies are carried out. Laboratory experiments involve so many factors not encountered in the natural environment and vice versa, that few data have been useful in defining the biological fate of petroleum in the marine environment.

The most damaging, indisputable adverse effects of petroleum are the oiling and tarring of beaches, the endangering of seabird species, and the modification of benthic communities along polluted coastlines where petroleum is heavily incorporated in the sediments. The first two of these effects occur predominantly from discharges and spills of tanker and ship operations. The toxicity and smothering effect of oil caused mortality in all major spills studied, with pelagic diving birds and intertidal to subtidal benthic organisms being most affected. Mortality was greatest where oil spills were confined to inshore areas with abundant biota. The effects were generally quite localized, ranging from a few miles to tens of miles, depending on the quantity of petroleum involved.

Different petroleum products have different effects. Toxicity is greatest for refined distillates, particularly those high in aromatic hydrocarbons. Physical smothering is most severe with heavy crude oils and Bunker C fuel oil. The effects of oil in different environments may vary considerably due to synergistic interactions between oil and other environmental stresses. A single coating of fresh or weathered crude oil will cause mortality in certain bird species and plant seeds, whereas marsh plants are killed only after several coatings.

Fish do not appear to suffer from oil spills as much as seabirds and benthic organisms. Fish may acquire an oily flavor from feeding on oil-contaminated organisms, and widespread tainting of fish flesh may persist as long as significant quantities of oil are present. A long-range hazard exists for some birds such as auks and penguins because they have such slow reproductive rates that marked increases in mortality may be causing their gradual elimination.

Although our information is limited, the effect of oil contamination on human health appears not to be cause for alarm. From our calculation, we estimate that the carcinogen benzo[a]pyrene concentration on a dry weight basis arising from a high level of contamination by petroleum is comparable with that of common terrestrial foods. We, of course, do not recommend eating contaminated seafood, but in most cases, because of the taste factor, not many will be tempted to do so. It is clear that this is an area in which our knowledge is grossly inadequate and that the contamination of seafood by oil is clearly undesirable.

There are those who strongly urge the use of detergents to disperse point sources of petroleum input, such as tanker spills. This practice was not discussed in detail by the workshop, but an obvious argument in favor of detergents is that the conversion of an oil spill into a diffused and disseminated form will minimize the quantity of oil eventually reaching the beaches. Thus, the use of detergents is one way to eliminate the most visible evidence of petroleum spills. The difficulty with this practice is that we do not know what happens to the dispersed hydrocarbons. Are they truly degraded, or do they simply spread the toxic effects of oil over a larger area? Nevertheless, the use of detergents to disperse the oil at the surface where it is exposed to the weathering effects of oxygen and surface organisms is clearly preferable to the use of oleophilic sands to sink oil spills to the sea bottom. Experiments on the latter technique in the North Sea clearly resulted in oil-tainted finfish and shellfish from the area for several weeks following the experiment.

In general, much more research regarding the fates and effects of petroleum hydrocarbons in the marine environment is needed. We know that the quantity of floating tar in the open ocean and of tar along coastlines has been increasing, that major spills and localized continuous discharges of petroleum hydrocarbons have damaged various species of marine life, and that low levels of petroleum may affect the behavior patterns

of certain species. Studies to date indicate that areas polluted with petroleum hydrocarbons "recover" within weeks or years (depending on local conditions and the characteristics of the petroleum); however, composition of the local biological communities may be altered. The oceans have considerable ability to purify themselves by biological and chemical actions. A basic question that remains unanswered is, "At what level of petroleum hydrocarbon input to the ocean might we find irreversible damage occurring?" The sea is an enormously complex system about which our knowledge is very imperfect. The ocean may be able to accommodate petroleum hydrocarbon inputs far above those occurring today. On the other hand, the damage level may be within an order of magnitude of present inputs to the sea. Until we can come closer to answering this basic question, it seems wisest to continue our efforts in the international control of inputs and to push forward research to reduce our current level of uncertainty.

APPENDIX 5

FEDERAL REGISTER
OCT. 4, 1976

federal register

MONDAY, OCTOBER 4, 1976

PART II:

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

SELF-PROPELLED VESSELS CARRYING BULK LIQUEFIED GASES

Proposed Standards

DEPARTMENT OF TRANSPORTATION

Coast Guard

[46 CFR Parts 31, 34, 54, 98, 154]

[CGD 74-289]

SELF-PROPELLED VESSELS CARRYING BULK LIQUEFIED GASES

Proposed Standards

• *Purpose.* The Coast Guard is considering adding, to the rules concerned with tank vessels, design, inspection, construction, equipment, and operating requirements for self-propelled vessels carrying bulk liquefied gases. •

WRITTEN COMMENTS

Interested persons may participate in this rule making procedure by submitting written data, views, or arguments on the proposal contained in this document to the Executive Secretary, Marine Safety Council (G-CMC/81), Room 8117, U.S. Coast Guard, Washington, D.C. 20590. Each person submitting written comments should identify this notice (CGD 74-289), any specific wording recommended, reasons for any recommended change, and the name, address, and organization, if appropriate, of the commenter. Copies of the comments received will be available for examination by interested persons in Room 8117, Coast Guard Headquarters, Washington, D.C.

PUBLIC HEARING

The Coast Guard will hold a public hearing on November 15, 1976, beginning at 0900 in Room 2232, 400 Seventh Street, SW., Washington, D.C. Interested persons are invited to attend the hearing and present oral or written statements on this proposal. It is requested that anyone desiring to make oral comments at the hearing notify the Executive Secretary, Marine Safety Council (G-CMC/81), Room 8117, U.S. Coast Guard, Washington, D.C. 20590, at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the request.

CLOSING DATE FOR COMMENTS

All comments received before December 15, 1976, will be fully considered and evaluated before final action is taken on the proposal in this document. These proposed regulations may be changed in light of the comments received.

DISCUSSION OF PROPOSAL

Currently, design, construction, inspection and operating requirements for self-propelled vessels carrying bulk liquefied gases are contained in Subchapters D, I, and O of Title 46, Code of Federal Regulations. These regulations contain the standards that a U.S. vessel must meet for the issuance of a certificate of inspection, and the standards that a foreign vessel's cargo containment and transfer systems and related systems must meet for the issuance of a Letter of Compliance.

In 1971, the Coast Guard made a request to the Chemical Transportation Industry Advisory Committee (CTIAC) to review these existing regulations and to prepare a recommendation for the development of international standards for gas ships. This advisory group to the Commmandant consisted of representatives of the American Bureau of Shipping, the American Petroleum Institute, the Shipbuilders Council of America, the Manufacturing Chemists Association, the Society of Naval Architects and Marine Engineers, the Compressed Gas Association, and the American Gas Association.

During the same year, the Inter-Governmental Maritime Consultative Organization (IMCO) recognized the need for a code for liquefied gases carried in bulk. An ad hoc working group on bulk chemicals, under the Subcommittee on Design and Equipment of IMCO's Maritime Safety Committee, undertook the development of this code in 1972. Representatives of the Coast Guard and CTIAC were part of the ad hoc working group. By 1975, the Code for Construction and Equipment of Ships Carrying Liquified Gases in Bulk (the Code) was completed and adopted by Assembly Resolution A.328 (IX) (November 1975).

The proposed regulations in this document correspond to the Code. As in the Code, they would apply to the following self propelled new vessels that have on board bulk liquefied gases as a cargo, cargo residue, or vapor:

1. A vessel that is constructed under a building contract awarded after October 31, 1976.

2. In the absence of a building contract, a vessel that has the keel laid or is at a similar stage of construction after December 31, 1976.

3. A vessel that is delivered after June 30, 1980.

4. A vessel that has undergone a major conversion for which—

a. The building contract is awarded after October 31, 1976;

b. In the absence of a building contract, conversion is begun after December 31, 1976; or

c. Conversion is completed after June 30, 1980.

The proposed regulations for new vessels include definitions and requirements for vessel stability, cargo tank location, vessel arrangements, cargo containment systems, piping systems, materials of construction, cargo pressure and temperature control, cargo venting systems, filling limits for cargo tanks, evnironmental control in and around cargo tanks, fire protection, ventilation in the cargo area, instrumentation, crew protection, operating the vessel, and special carriage for particular gases. Implementation of the IMCO recommendations is necessary because the Code defers some matters to the discretion of each administration, and in other matters is not specific enough for Coast Guard regulatory purposes. The major changes from the Code are discussed in the following paragraphs.

"Liquefied gas" is changed from the Code's definition of "a product having a vapor pressure of 2.8 kp/cm² at 37.8° C" to the proposed definition of "a product having a vapor pressure of 1.76 kp/cm² at 37.8° C." This is a change in the definition from a Reid vapor pressure of 40 psia to 25 psia. The change in the Reid vapor pressure includes the "certain other substances" referred to in § 1.2 of the Code, but does not include any product in IMCO's Chemical Code except ethylamine, which is presently listed in the Code and the Chemical Code. The change in the Reid vapor pressure was proposed by the U.S. delegation to IMCO but the change was not adopted, although there was apparently no objection to it. The change, however, does not affect the list of regulated cargoes.

The rate of air change between the airlock doors is not specified in the Code (§ 3.6.1) but is proposed at 12 changes per hour.

It is proposed that leaked cargo from interbarrier spaces be pumped to an emergency dump. It is proposed as an alternative to the Code requirement that leaked cargo be returned to the cargo tanks.

Chapter 4 of the Code includes a provision for the evaluation of the insulation and hull steel assuming for the purpose of design calculations that the cargo tank and secondary barrier, if installed, are at the design temperature and the ambient outside air and sea design temperatures as follows:

GENERAL WORLDWIDE

Still Air: +5° C (41° F)
Sea Water: 0° C (32° F)

Chapter 4 also provides that each administration may set higher or lower ambient design temperatures. This document proposes the following temperatures:

ANY WATERS ... E WORLD, EXCEPT ALASKAN WATERS

Air (at 5 knots): —18° C (0° F)
Still sea water: 0° C (32° F)

ALASKAN WATERS

Air (at 5 knots): —29° C (—20° F)
Still sea water: —2° C (28° F)

The proposed regulations specify enhanced grades of steel for crack arresting purposes in the deck stringer, sheer strake, and bilge strake. The minimum acceptable grade for the deck stringer and the sheer strake is Grade E or an equivalent steel that is specially approved by the Commandant (G-MMT). The minimum acceptable grades for the bilge strake are Grade D or Grade E or an equivalent steel that is specially approved by the Commandant (G-MMT).

The proposed allowable stresses for membrane, semi-membrane, and independent tank type A is the same as the allowable stresses for these tanks in the Code. However, for independent tank types B and C, stress factors are not the same at the stress factor for these tanks in the Code.

In the Code, the stress factors listed for independent tank types B and C are

the minimum factors that may be used in calculations. The stress factors proposed in these regulations meet Section VIII of the ASME Code, 1974, are greater than the minimum listed in the Code, and must be used in independent tank type B and C calculations for vessels to which the regulations apply.

The Code allows pressure and temperature control of cargoes by venting cargo vapors to the atmosphere when the vessel is at sea and in port if accepted "by the receiving administration". It is proposed to prohibit normal venting of cargo vapor into the atmosphere in a U.S. port.

The Code requires the cargo system to be designed to withstand the full vapor pressure of the cargo under conditions of the upper ambient design temperature or have other means to maintain the cargo tank pressure below the maximum allowable relief valve setting (MARVS) of the tank. These regulations propose that when the cargo carried is a liquefied gas, the cargo tank pressure must be maintained below the design vapor pressure indefinitely, the pressure on a LNG tank would be maintained below the design pressure for a period of not less than 21 days. Cargo tank pressure may be maintained below the design pressure by several methods including refrigeration systems, burning boil-off gas in waste heat or catalytic furnaces, using boil-off gas as fuel, or a combination of these methods. Using the boil-off gas as a fuel for propulsion is limited to a vessel carrying LNG.

The proposed regulations also include the following:

1. Transfer requirements for vinyl chloride.
2. Loading requirements for methyl acetylene-propadiene mixture.
3. Additional operating requirements.
4. Requirements for inspection and reinspection of U.S. flag vessels at intervals that are the same as for vessels inspected under Subchapter D. Inspection for certification would be required every 2 years and reinspection would be required between the 10th and 14th month following issuance of a Certificate of Inspection.
5. Requirements for the initial and periodic inspections and tests of the cargo containment system, cargo and process piping, and hull heating and cold spots.

The following table contains a list of the proposed regulations and their source from the Code:

IMCO code:	*Proposed regulations or explanation of no regulation*
Ch. I	154.1 through 154.12.
1.1	154.1.
1.2.1	154.3(tt).
1.2.2(a)(i)	154.1(a).
1.2.2(a)(ii)	154.1(b).
1.2.2(a)(iii)	154.1(c).
1.2.2(a)(iv)	154.1 (d) and (e).
1.2.2(b)	Only applicable to code.
1.2.3	Do.
1.2.4	Do.
1.3	Information only.
1.4	154.3.
1.4.1	Information, included in 154.3 (q) and (oo).
1.4.2	154.3(qq).
1.4.3	154.3(d).
1.4.4	154.3(r).
1.4.5	154.3(pp).
1.4.6	154.3(f).
1.4.7	154.3(g).
1.4.8	154.3(ll).
1.4.9	154.3(ff).
1.4.10	154.3(gg).
1.4.11	154.3(u).
1.4.12	154.3(y).
1.4.13	154.3(x).
1.4.14	154.3(rr).
1.4.15	154.3(j).
1.4.16	154.3(s).
1.4.16(a)	154.3(s)(1).
1.4.16(b)	154.3(s)(2).
1.4.16(c)	154.3(s)(3).
1.4.16(d)(i)	154.3(s)(4).
1.4.16(d)(ii)	154.3(s)(5).
1.4.16(e)	154.3(s)(6).
1.4.16(f)	154.3(s)(7).
1.4.16(g)	154.3(s)(8).
1.4.16(h)	154.3(s)(9).
1.4.16(i)	154.3(s)(10).
1.4.16(j)	154.3(s)(11).
1.4.16(k)	154.3(s) (12).
1.4.16(l)	154.3(s)(13).
1.4.17	154.3(t).
1.4.18	154.3(mm).
1.4.19	154.3(nn).
1.4.20	154.3(b).
1.4.21	154.3(ii).
1.4.22	154.3(h).
1.4.23	154.3(m).
1.4.24	In existing 46 CFR 30.10–56.
1.4.25	154.3(aa).
1.4.26	154.3(e).
1.4.27	154.3(ee).
1.4.28	154.3(ss).
1.4.29	154.3(a).
1.4.30	154.3(cc).
1.4.31	Information only.
1.4.32	Do.
1.4.33	Do.
1.4.34	154.3(q).
1.4.35	154.3(oo).
1.5.1	154.8 (a), (b), and (c).
1.5.2	Only applicable to code.
1.6.1(a)	154.40 through 154.122.
1.6.1(b)	154.130 through 154.142.
1.6.1(c)	Do.
1.6.2	154.6.
1.6.3	154.6
1.6.4	154.6(b).
1.6.5	154.6(b).
1.6.6	Only applicable to code.
1.6.7	154.6.
1.6.8	154.6.
1.6.9	154.6.
1.6.10	154.6.
1.7.1	Only applicable to code.
1.7.2	Do.
1.7.3	Do.
Ch. II	154.200 through 154.235.
2.1.1	154.200.
2.1.2	154.210.
2.1.3	154.215.
2.1.4	Only applicable to code.
2.2.1	154.205.
2.2.2	154.205.
2.2.3	154.1809.
2.3	154.220(d).
2.3.1	154.225.
2.3.2	154.220.
2.3.2(a)(i)	154.220(1)(i).
2.3.2(a)(ii)	154.220(1)(ii).
2.3.2(a)(iii)	154.220(1)(iii).
2.3.2(b)(i)	154.220(2)(i).
2.3.2(b)(ii)	154.220(2)(ii).
2.3.2(b)(iii)	154.220(2)(iii).
2.3.2(c)	154.220(b).
2.4.1	154.230.
2.4.1(a)(i)	154.230(b).
2.4.1(a)(ii)	154.230(a).
2.4.1(a)(iii)	154.230(c).
2.4.1(b)(i)	154.230 (a) and (c).
2.4.1(b)(ii)	154.1455.
2.4.1(b)(iii)	154.1020.
2.4.2	154.230(d).
2.4.3	154.230(g).
2.4.4	154.230(h).
2.5	154.210.
2.5.1	154.215(a).
2.5.2(a)	154.215(b)(1).
2.5.2(b)	154.215 (b)(2) and (c).
2.5.3(a)	154.215(d)(1).
2.5.3(b)	154.215(d)(2).
2.5.4	154.215(e).
2.6.1(a)	154.235(a).
2.6.1(b)	154.235(b).
2.6.2	154.235(c).
2.6.3	154.235(d).
2.6.4	Information only.
2.7.1	Do.
2.7.2	Do.
Ch. III	154.300 through 154.355.
3.1	154.300.
3.1.1	154.300(a).
3.1.2	154.300(b).
3.1.3	154.300(c).
3.1.4(a)	154.305(a).
3.1.4(b)	154.305(b).
3.1.5(a)	154.310(a).
3.1.5(b)	154.310(b).
3.1.5(c)	154.310.
3.1.5(d)	154.310.
3.1.5(e)	154.310(f).
3.1.6	Information only.
3.2.1	154.325 (a) and (b).
3.2.2	Information only.
3.2.3	Do.
3.2.4	154.330 (a), (b), and (c).
3.2.5	154.330(d).
3.2.6	154.330(e).
3.3.1	154.315(a).
3.3.2	154.315(b).
3.3.3	154.340.
3.4.1	154.320(a).
3.4.1(a)	154.320(b)(1).
3.4.1(b)	154.320(b)(2).
3.4.2	154.320 (b)(3) and (c).
3.4.3	Information only.
3.5.1	154.132(a)(8), 154.136(e), 154.140, and 154.340(f).
3.5.2	154.132(a)(9) and 154.340 (g).
3.5.3	154.340(b).
3.5.3(a)(i)	154.340(a).
3.5.3(a)(ii)	154.340(b).
3.5.3(a)(iii)	154.340(c).
3.5.3(b)	Information only.
3.5.3(c)	Do.
3.5.4	154.340(e).
3.6.1	154.345 (a) and (b)(1).
3.6.2	154.345(b)(2).
3.6.3	154.345(b)(3).
3.6.4	154.345(c).
3.6.5	154.345(b) (4) and (5).
3.6.6	154.345(b)(7).
3.6.7	Information only.
3.7.1(a)	154.350 (a) and (b).
3.7.1(b)	154.350 (a) and (b).
3.7.2	154.350(c).
3.7.3	154.350(d).
3.8.1	Information only.
3.8.2	154.355(a) (1), (2), (3), and (4) and 154.1870 (a).
3.8.3	154.355(a) (5) and (6) and 154.1870(b).
3.8.4	154.355(b) and 154.1870 (c).
3.8.5	154.1110(c), 154.1145(a)(2), and 154.1150.
Ch. IV	154.401 through 154.476.
4.1	Information only.
4.2.1(a)	154.3(2).
4.2.1(b)	154.419.
4.2.1(c)	154.418.
4.2.2(a)	154.3(dd).
4.2.2(b)	154.426.
4.2.2(c)	154.425.
4.2.3(a)	154.3(hh).

IMCO code:	Proposed regulations or explanation of no regulation
4.2.3(b)	154.436.
4.2.4	154.3(w).
4.2.4(a)	154.437 and 154.438.
4.2.4(b)	154.445.
4.2.4(c)	154.451 and 154.453.
4.2.5	154.3(o).
4.2.5(a)	154.405(b).
4.2.5(b)	154.405(a).
4.2.5(c)	154.405(c).
4.2.6	154.3(n).
4.3.1(a)	154.406(a).
4.3.1(b)	154.406(c).
4.3.1(c)	154.406(a) (10) and (11).
4.3.1(d)	154.406(b).
EEE	
4.3.2(a)	154.407(a).
4.3.2(b)	154.407(b).
4.3.3	154.408.
4.3.4(a)	154.409(a).
4.3.4(b)	154.409(c).
4.3.4(c)	154.409(d).
4.3.4(d)	154.409(e).
4.3.4(e)	Information only.
4.3.4(f)	154.409(f).
4.3.5(a)	154.410(a).
4.3.5(b)	154.410(b).
4.3.6(a)	154.411(a).
4.3.6(b)	154.411(b).
4.3.7	154.470.
4.4.1	154.420 (a) and (b).
4.4.2(a)	154.427(a).
4.4.2(b)	154.430 and 154.431.
4.4.2(c)	154.429(b).
4.4.2(d)	154.427(c).
4.4.2(e)	154.188, 154.427(d), 154.428, and 154.429(b).
4.4.3	154.435.
4.4.4(a)	154.439 (a) and (b) and 154.440(c).
4.4.4(b)	154.439(b) (2).
4.4.5(a)	154.444 and 154.448 (e) and (f).
4.4.5(b)	154.448(b).
4.4.5(c)	154.448(c).
4.4.5(d)	154.448(d).
4.4.5(e)	154.449.
4.4.5(f)	154.448(g).
4.4.6(a) (i)	154.450.
4.4.6(a) (ii)	154.450.
4.4.6(a) (iii)	154.104.
4.4.6(b) (i)	154.450.
4.4.6(b) (ii)	154.452.
4.4.6(c) (i)	154.450.
4.4.6(c) (ii)	154.450(a).
4.4.6(c) (iii)	154.450.
4.4.6(d)	154.450(b).
4.4.6(e)	154.450(c).
4.5.1(a)	154.421.
4.5.1(b)	154.428.
4.5.1(c)	154.440.
4.5.1(d) (i)	154.447(a).
4.5.1(d) (ii)	154.447(b).
4.5.1(e)	154.450.
4.5.1(f) (i)	154.401 and 154.630 (b) and (c).
4.5.1(f) (ii)	App. A.
4.5.1(f) (iii)	Do.
4.5.1(g) (i)	154.630(a).
4.5.1(g) (ii)	154.409(b).
4.5.2(a)	154.412 (a) and (b).
4.5.2(b)	154.412.
4.6.1	154.470(a) (1) and (2).
4.6.2	154.471(a) (1) and (2).
4.6.3	154.471(a) (4).
4.6.4	154.471(a) (3).
4.6.5	154.471(b).
4.6.6	154.470(b).
4.6.7	154.470(c).
4.7.1	154.459(a).
4.7.2(a)	154.449(d) (1).
4.7.2(b)	154.459(d) (2).
4.7.3	154.459 (a) and (e).
4.7.4(a)	154.460(a).
4.7.4(b)	154.460(b).
4.7.4(c)	154.460(c).
4.7.5	154.460.
4.7.6(a)	154.460.
4.7.6(b)	154.460.
4.7.7	154.136(j).
4.8.1	154.465 and 154.466(a).
4.8.2	154.466(b).
4.8.3	154.174 and 154.176.
4.8.4	Do.
4.8.4(a)	154.178(a).
4.8.4(b)	154.178(b).
4.8.4(c)	154.178.
4.8.4(d)	154.178(c).
4.8.5	Information only.
4.9.1	154.170 (a) and (d).
4.9.2	154.615 and 154.620.
4.9.3	154.615.
4.9.4	154.172.
4.9.5	154.466(c).
4.9.6	154.466(d).
4.9.7	154.467(a) (1) through (14).
4.9.8	154.467(a) (15).
4.9.9	154.466(e).
4.10.1(a)	154.650(c) (1) and (2).
41.0(b) (i)	154.650(d).
4.10.1(b) (ii)	154.650(d).
4.10.2	Information only.
4.10.3	154.650(e).
4.10.4	154.50 and 154.650(f).
4.10.5	154.50.
4.10.6	154.52.
4.10.7(a)	154.102(a) and 154.104(a).
4.10.7(b) (i)	154.102 (b), (c), and (d).
4.10.7(b) (ii)	154.104 (b), (c), and (d).
4.10.8(a)	154.54.
4.10.8(b)	154.56.
4.10.8(c) (i)	154.58(a) (1).
4.10.8(c) (ii)	154.58(a) (2).
4.10.8(c) (iii)	154.58(a) (3).
4.10.8(c) (iv)	154.58(b).
4.10.8(c) (v)	Information only.
4.10.8(c) (vi)	154.60.
4.10.8(c) (vii)	154.58(c) (1) and (2).
4.10.9	154.60.
4.10.10	154.62.
4.10.11	154.64.
4.10.12	154.110.
4.10.13	154.120.
4.10.14	154.122.
4.10.15	154.450.
4.11(a)	154.655 and 154.655(b).
4.11(b) (i)	154.655(a).
4.11(b) (ii)	154.655(a).
4.11.(b) (iii)	154.655(a).
4.11.(b) (iv)	154.655(a).
4.12(a)	154.409(c) (2) (i).
4.12(b)	154.409(c) (2) (ii).
4.12(c)	154.409(c) (2) (iii).
4.12(d) (i)	154.409(c).
4.12(d) (ii)	154.409(c).
4.13	App. B.
Ch. V	154.500 through 154.562.
5.1.1	Information only.
5.1.2	Do.
5.2.1(a)	154.500.
5.2.1(b)	154.503, 154.506, and 154.508(a).
5.2.2	154.512 and 154.516.
5.2.3	154.514.
5.2.4	154.517.
5.2.5	154.519.
5.2.6(a)	154.500.
5.2.6(b) (i)	154.500.
5.2.6(b) (ii)	154.500.
5.2.6(c)	154.500.
5.2.6(d) (i)	154.500.
5.2.6(d) (ii)	154.500.
5.2.6(e)	154.500.
5.2.7	154.520.
5.2.8(a)	154.522(a) (1) and (2).
5.2.8(b)	154.522(b).
5.2.9(a)	154.66 (a) and (b).
5.2.9(b)	154.68(a).
5.2.9(b) (i)	154.68(a) (2).
5.2.9(b) (ii)	154.68(a) (3).
5.2.9(b) (iii)	154.68(a) (1).
5.2.9(b) (iv)	154.68(a) (4).
5.2.9(b) (v)	Information only.
5.2.10(a)	Do.
5.2.10(b) (i)	154.524(a) (1), (2), and (3).
5.2.10(b) (ii)	154.524(b).
5.2.10(b) (iii)	154.524(c).
5.2.10(c) (i)	154.528(a).
5.2.10(c) (ii) (1)	154.526 and 154.528(c).
5.2.10(c) (ii) (2)	154.526 and 154.528(b).
5.2.10(d)	Information only.
5.2.10(e) (i)	154.508(b).
5.2.10(e) (ii)	154.508(a).
5.2.10(f) (i)	154.660(a).
5.2.10(f) (ii)	154.660(b).
5.2.10(f) (iii) (1)	154.660(c) (1).
5.2.10(f) (iii) (2)	154.660(c) (3).
5.2.11(a)	154.70.
5.2.11(b) (i)	154.70 (a), (b), and (c).
5.2.11(b) (ii)	154.72.
5.2.11(c)	154.74.
5.3.1(a)	154.530 (a) and (b).
5.3.1(b)	154.532 (a), (b), and (c).
5.3.1(c)	154.534.
5.3.2	154.536.
5.3.3	154.538 and 154.1866.
5.3.4	154.540, 154.542, and 154.544.
5.3.5	154.546, 154.548, and 154.550.
5.4.1	154.552.
5.4.2	154.554
5.4.3	154.556 and 154.558.
5.5.1	154.476(a).
5.5.2	154.476(b).
Ch. VI	154.605 through 154.665.
6.1.1	Information only.
6.1.2	Only applicable to code.
6.1.3	Information only.
6.1.4(a)	154.605(a).
6.1.4(b)	154.605(b).
6.1.5	Information only.
6.1.6	Do.
6.1.7	Do.
6.1.8	Do
6.1.9	154.172(a).
6.2	Only applicable to code.
Table 6.1	154.610 (a) through (g).
Table 6.2	Amended 46 CFR 54.25-10 and 154.615.
Table 6.3	154.620
Table 6.4	154.625
Table 6.5	154.172
6.3.1	154.650(a).
6.3.2	154.650(b).
6.3.3	154.665.
6.3.3(a)	154.665.
6.3.3(b) (i)	154.665.
6.6.6(b) (ii)	154.665.
6.3.3(b) (iii)	154.665.
6.3.3(b) (iv)	154.665.
6.3.4(a)	154.665.
6.3.4(b)	154.665.
6.3.4(c)	154.665.
6.3.5	154.665.
6.3.6(a)	154.76, 154.78, and 154.84.
6.3.6(b) (i)	154.80 (a) and (b).
6.3.6(b) (ii)	154.80(c).
6.3.6(c)	154.82.
6.3.6(d)	154.76 and 154.78.
6.3.7(a) (i)	154.94(a) and 154.96.
6.3.7(a) (ii)	154.94(b).
6.3.7(a) (iii)	154.100.
6.3.7(b)	154.102 and 154.104.
6.3.7(c)	154.90 and 154.92.
6.3.7(d)	154.106.
6.3.7(e)	154.108.
Ch. VII	154.701 to 154.709.

IMCO code:	*Proposed regulations or explanation of no regulation*
7.1.1	154.701(a).
7.1.1(a)	154.701(a)(1) and 154.703 (b) and (c).
7.1.1(b)	154.701(a).
7.1.1(c)	154.701(a)(2).
7.1.1(d)	Information only.
7.1.1(e)	154.1836.
7.1.2	154.701(a)(2) and 154.702(a)(1).
7.1.3	Information only.
7.2.1	154.702(a)(1).
7.2.2(a)	154.701(b).
7.2.2(b)	154.701(b).
7.2.3	154.702(d).
7.2.4(a)	154.1735 and 154.1750.
7.2.4(b)	154.1720.
7.2.4(c)	154.1735 and 154.1750.
7.2.5	154.702(e).
Ch. VIII	154.801 through 154.806.
8.1	Information only.
8.2.1	154.801 (a) and (b).
8.2.2	154.912.
8.2.3	154.801(c)(2).
8.2.4	154.801(c)(4) and (5).
8.2.5	154.66 (a) and (b), 154.801(c) (1) and (3), and 154.1846.
8.2.6(a)	154.802(a).
8.2.6(b)	154.802(b).
8.2.7	154.1846.
8.2.8(a)	154.801(c)(8)(i).
8.2.8(b)	154.801(c)(8)(ii).
8.2.8(c)	154.801(c)(8)(iii).
8.2.9	154.801(c)(6) and 154.805 (a), (b), and (d).
8.2.10	154.805 (e) and (f).
8.2.11	Information only.
8.2.12	154.801(c)(7).
8.2.13	154.805 (f) and (g).
8.2.14	154.805(c).
8.2.15	Information only.
8.2.16	154.801(c)(6).
8.2.17	154.801(c)(5).
8.3.1 and 8.3.2	None — unnecessary alternative requirements.
8.4.1	154.804(c).
8.4.2(a)	154.804(a)(1).
8.4.2(b)	154.804(a)(2) (i) and (ii).
8.4.2(c)	Information only.
8.4.3	154.804(a)(2)(iii).
8.4.4	154.804(b).
8.5	154.806.
8.5(c)	154.806(a).
8.5(b)	154.806(b).
Ch. IX	154.901 through 154.912.
9.1.1	154.901 (a) and (b).
9.1.2	154.901(d).
9.1.3	154.901(c).
9.1.4	154.901(a)
9.1.5	154.1848(b).
9.2.1	154.902(a).
9.2.2(a)	154.902(b).
9.2.2(b)	154.902(b).
9.2.3	154.902(c).
9.3	154.902(d).
9.4.1	154.903 (a) and (b).
9.4.2	154.1145.
9.4.3	154.903(c).
9.4.4	154.904(a).
9.4.5	154.904 (b) and (c) and 154.912.
9.5.1	154.906.
9.5.2	154.904 (a), (b), and (c).
9.5.3	154.908 (a) and 154.910.
9.5.4	154.908(b).
Ch. X	154.1000 through 154.1020.
10.1.1	154.1000.
10.1.2	Information only.
10.1.3	Do.
10.1.4	Do.
10.1.5	154.1005.
10.2	154.1010(a).
10.2.1	154.1010(b).
10.2.2	154.1010(c).
10.2.3	154.1010(d).
10.2.4	154.1010 (e) and (f).
10.2.4(a)	154.1010 (e)(1) and (f)(1).
10.2.4(b)	154.1010 (e)(2) and (f)(2) and 154.1015.
10.2.4(c)	154.1010(f)(6).
10.2.4(d)	154.1010(e) (3), (4), and (5) and (f) (3), (4), and (5).
10.2.4(e)	154.1010(f)(7).
10.2.5	154.1010(g).
10.2.5(a)	154.1010(g)(1) and 154.1015.
10.2.5(b)	154.315(b).
10.2.5(c)	Information only.
10.2.5(d)	154.1010(g)(2).
10.2.6	154.1010(j).
10.2.6(a)	154.1010(j)(1).
10.2.6(b)	154.1010(j)(2).
10.2.7(a)	154.1010 (h) and (i).
10.2.7(b)	Do.
10.2.8	154.1010(k).
10.2.9	154.345(c)(2).
Ch. XI	154.1100 through 154.1170.
11.1.1	154.1100.
11.1.2	154.1100.
11.2.1	154.1100.
11.2.2	154.1100.
11.2.3	Amended 46 CFR 34.10–15.
11.2.4	154.1100.
11.2.5	154.1100.
11.3.1	154.1105.
11.3.1(a)	154.1110(a).
11.3.1(b)	154.1110(b).
11.3.1(c)	1554.1110 (c) and (d).
11.3.1(d)	154.1110 (e), (f), and (g).
11.3.2	154.1115 and 154.1130 (a) and (b).
11.3.3	154.1125(c) and 154.1135.
11.3.4	154.1135(a)(3).
11.3.5	154.1125(d).
11.4.1	154.1140.
11.4.2	154.1145 and 154.1150 (a) and (b).
11.4.3	154.1145 (a)(1) and (c), 154.1150 (c), (d), and (e), and 154.1165 (a) and (b).
11.4.4	154.11565(c).
11.4.5	154.1170.
11.4.6	154.1145(b), 154.1155, and 154.1160.
11.4.7	154.1145(a)(2) and 154.1150 (c), (d), and (e).
11.5.1	Existing 46 CFR.
11.5.2	Do.
11.6.1	154.1400 (a) and (b).
11.6.2	Do.
Ch. XII	154.1200 through 154.1210.
12.1.1	154.1200 (a) and (b), 154.1205(f), and 154.1850.
12.1.2	154.1205 (c) and (d).
12.1.3	154.1205(a).
12.1.4	154.1200(b).
12.1.5	154.1200(a).
12.1.6	154.1205(b).
12.1.7	154.1205(e).
12.1.8	154.1205(g).
12.1.9	154.1205 (h), (i), and (j).
12.1.10	Information only.
12.1.11	154.1205(k).
12.2	
Ch. XIII	154.1300 through 154.1375.
13.1.1	Information only.
13.1.2	154.1325(b), 154.1335(a)(2), and 154.1340(b).
13.1.3	Information only.
13.2.1	154.1305.
13.2.2	154.1300.
13.2.2(a)	Information only.
13.2.2(b)	Do.
13.2.2(c)	154.1310.
13.2.2(d)	154.1315.
13.2.3	154.1320(a).
13.2.4	154.1320 (b) and (c).
13.3.1	154.1325.
13.3.2	154.1330.
13.4.1	154.1335(a) and 154.1370.
13.4.2	154.1335(d) (3), (4), and (5).
13.4.3	154.1335(e).
13.4.4	154.1335(d) (1) and (2).
13.5.1	154.1340(a) and 154.1375.
13.5.2	154.1340(c).
13.5.3	154.1340 (d) and (e).
13.5.3(a)	154.1340(d).
13.5.3(b)	154.1340(e).
13.5.4	154.1340(d).
13.6.1	154.1345 (a) and (b).
13.6.2	Do.
13.6.3	154.1250(c).
13.6.4	154.1350(g).
13.6.5	154.1350(m).
13.6.5(a)	154.1350(m)(1).
13.6.5(b)	154.1350(m)(2).
13.6.6	154.13.
13.6.7	154.1350(a).
13.6.7(a)	154.1350(a)(1).
13.6.7(b)	154.1350(a)(2).
13.6.7(c)	154.1350(a)(3).
13.6.7(d)	154.1350(a)(4).
13.6.7(e)	154.1350(a)(5).
13.6.7(f)	154.709.
13.6.7(g)	154.1350(a)(6).
13.6.8	154.1350 (h) and (n).
13.6.9	154.1828.
13.6.10	154.1350(d).
13.6.11	154.1350 (u) and (n).
13.6.12	154.1345(b)(1) and 154.1828.
13.6.13	154.1345 (a)(2) and (b)(1).
13.6.14	154.1360.
Ch. XIV	154.1400 through 154.1445.
14.1	Information only.
14.2	154.1430.
14.3	154.1400 (a) and (b).
14.4	Do.
14.5	154.1400 (a)(2) and (b)(2) and 154.1415.
14.6	154.1430.
14.7	154.1852.
14.8	154.1420.
14.9	154.1425, 154.1435, and 154.1440.
Ch. XV	None—requirements located in other sections.
15.1.1	154.1844(a)(1).
15.1.2	154.1844(a)(2).
15.1.3	154.1844(a)(2).
15.1.4	None—unnecessary alternative requirements.
15.2	154.1810.
Ch. XVI	None—requirements located in other sections.
16.1	154.703.
16.2	154.706(a).
16.2(a)	154.706(a)(1).
16.2(b)	154.706(a)(2).
16.3	154.1854(b).
16.4	154.706(b).
16.5	154.707.
16.6	154.708 (a) and (b).
16.7	154.708(c).
16.8	154.705(b).
16.9	154.706(a)(2) and 154.707(b).
16.10	154.709.
16.11	Information only.
16.12	Do.
Ch. XVII	154.1700 through 154.1755.
17.1	Only applicable to code.
17.2.1	154.1405 (a) and (b).

IMCO code:	*Proposed regulations or explanation of no regulation*
17.2.2	154.1410 (a) and (b).
17.2.3	154.1400(c).
17.2.4	Information only.
17.2.5	Do.
17.3	154.1700.
17.4	154.1705.
17.5	154.1720, 154.1725, 154.1735, and 154.1750.
17.6	154.660(c)(2).
17.7	154.355(a)(2) and 154.1870(d).
17.8	154.1710.
17.9	154.1715.
17.10	154.1818.
17.11.1	154.1345(d).
17.11.2	154.1345(c).
17.12.1	154.1725 and 154.1730.
17.12.1(a)	154.1725(a)(1).
17.12.1(b)	154.1730(a)(2).
17.12.1(c)	154.1730(b).
17.12.1(d)	154.1725(c).
17.12.1(e)	154.1725(d).
17.12.1(f)	154.1725(e).
17.12.1(g)	154.1725(a) (2) and (3).
17.12.1(h)	154.1730(a).
17.12.2	154.1735.
17.12.3	154.1755.
17.12.4	154.1010.
17.12.5	Information only.
17.12.6	154.1740, 154.1745, and 154.1750.
Ch. XVIII	154.1800 through 154.1868.
18.1.1	154.1810 and 154.1814.
18.1.2	154.1818.
18.2	154.1820 and 154.1832.
18.3	Information only.
18.4	154.1850.
18.5	154.1810 and 154.1856.
18.6	154.1840.
18.7	154.1842.
18.8	154.1812, 154.1814, and 154.1822.
18.9	Only applicable to code.
Ch. XIX	Table 4.
Appendix	Standard Coast Guard form to be printed.

AMENDMENTS TO SUBCHAPTERS D AND F

Since Subchapters D and F are applicable to self propelled vessels that carry bulk liquefied gases, amendments are being proposed that would update those subchapters to conform to the Code.

LETTERS OF COMPLIANCE

An objective that the Coast Guard hoped to attain in the development of the Code was to terminate the plan review portion of the Letter of Compliance program for new foreign flag vessels.

The Code is substantially sufficient to ensure the Coast Guard that a new foreign flag gas vessel entering U.S. ports has been designed to the necessary standards. Therefore, the Coast Guard proposes that a new foreign flag vessel meet the proposed regulations or have an IMCO Certificate of Fitness, in addition to meeting the following design requirements in the proposed regulations, which differ from the Code:

1. Allowable stress in § 154.447 and § 154.450.
2. Crack arresting steels in § 154.170.
3. Ambient design temperatures in § 154.466.
4. Cargo temperature and pressure control in § 154.701 through § 154.709.

If the vessel has an IMCO Certificate of Fitness the Coast Guard would not require plan review. The Certificate of Fitness must be issued by or on behalf of the flag administration, and must have all information required in the Model Form of Certificate of Fitness for the Carriage of Liquefied Gases in Bulk, which is published in the Appendix to the Code. It is proposed to require submission of a copy of the Certificate of Fitness to the Coast Guard before the vessel arrives in a U.S. port.

It is also proposed that in addition to the IMCO Certificate of Fitness, the following plans and information, in English, must be submitted to the Coast Guard before a vessel arrives in a U.S. port with a bulk liquefied gas cargo. These plans and information would be retained in the Coast Guard's files for use during vessel examinations and in any emergency that the vessel may encounter while in a U.S. port:

1. Description of the vessel.
2. Specifications for the cargo containment system.
3. General arrangement of the vessel.
4. Midship section of the vessel.
5. Schematic plans of the liquid and vapor cargo piping.
6. Firefighting and safety plan.

A foreign flag vessel is examined at its first U.S. port of call under 46 CFR Part 154. A 2 week notification to the Coast Guard of the vessel's arrival at the first U.S. port of call is also required. The information for the notification must include the following:

1. The first part of call.
2. The cargoes carried.
3. The estimated arrival date.
4. The vessel's agent.
5. The berthing facilities for the vessel.

It is proposed that the following information, in English, be carried on board these foreign flag vessels for Coast Guard use during examinations:

1. A description and schematic plan of the arrangement for inerting cargo tanks, hold spaces, and interbarrier spaces.
2. A description of the tank gauging equipment.
3. A description and instruction manual for the calibration of the cargo leak detector equipment.
4. A schematic plan that shows the locations of leak detectors and sampling points.
5. A description of the systems for cargo temperature and pressure control for methane to meet proposed § 154.701 through § 154.709.

If the proposed regulations are adopted by the Coast Guard, there will be many gas vessels that do not have Letters of Compliance and cannot receive IMCO Certificates of Fitness as new vessels. Included in this group are 120 ships now under review by the Coast Guard for Letters of Compliance. Each gas vessel that has applied for a Letter of Compliance since March 11, 1975, has been required by the Coast Guard to meet the Code. Vessels that are under construction, but applied for a Letter of Compliance before March 11, 1975, are being required by the Coast Guard to meet the Code insofar as it is possible, taking into consideration the stage of each vessel's construction.

Existing foreign flag gas vessels (i.e., foreign flag vessels that are not new foreign flag gas vessels) that are now in service and have never undergone plan review for a Letter of Compliance will have to comply with the standards of the Letter of Compliance program in effect at the time of their construction, as well as any additional requirements that may be established by future regulations concerned with existing gas vessels.

Existing U.S. gas vessels (i.e., U.S. vessels that are not new U.S. gas vessels) would continue to meet the requirements in Subchapters D and I as well as any additional requirements established by future regulation concerned with existing ships.

The Coast Guard has determined that the proposed regulations would have no foreseeable significant impact on the quality of the human environment. An environmental assessment with a negative declaration has been prepared. Copies may be obtained in Room 8117, Coast Guard Headquarters, Washington, D.C. 20590.

The Coast Guard has determined that this proposal is not a major proposal in accordance with Department of Transportation Policies to Improve Analysis and Review of Regulations—Regulatory Reform, as published in the April 16, 1976 issue of the FEDERAL REGISTER (41 FR 16200) and DOT Order 2050.4 dated February 2, 1976. Therefore, an economic evaluation and a negative declaration of inflationary impact are required.

The economic evaluation for this proposal shows that for each of the next seven fiscal years the proposed regulations would result in the following:

(a) A decreased expenditure of about $0.2 million by the Federal government, and no significant impact on state and local governments.

(b) An increase cost of $21.6 million to consumers businesses and industry.

(c) No significant impact on energy consumption, important materials or employment.

The benefits to the public of the proposal include:

(1) A consolidation of design and equipment regulations for various liquefied gas ships in one part.

(2) Incorporation of an internationally agreed standard for liquefied gas ships with clarification, where possible, of portions of that standard (the IMCO Gas Code) that are left to the "satisfaction of the Administration." This phrase is used often in the IMCO Gas Code, and, in the case of the U.S., refers to the U.S. Coast Guard.

(3) Codification of existing and additional requirements for the design, construction, and operation of liquefied gas ships.

A quantitative analysis of benefit to the public is difficult to assess due to the excellent safety record of liquefied gas ships. However, it is clear that the adoption of an international standard that further increases the level of safety of gas ships is beneficial to the public in-

terest. U.S. gas ship owners and operators will benefit in having an internationally accepted Certificate to facilitate their vessels' operation in foreign ports.

Copies of the economic evaluation and negative declaration of inflationary impact are available upon request to the Executive Secretary (G-CMC/81), Coast Guard Headquarters, Washington, D.C. 20590.

The close cooperation with the Chemical Transportation Industry Advisory Committee, the acceptance of an international code containing similar provisions, and the fact that many liquefied gas ships throughout the world and in the United States are already being built to these standards ensures their technological and economic feasibility.

In consideration of the foregoing, it is proposed to amend Chapter I of Title 46, Code of Federal Regulations, as follows:

PART 31—INSPECTION AND CERTIFICATION

1. By amending Part 31 by adding § 31.10–18a to read as follows:

§ 31.10–18a Liquefied gas vessels: Additional firefighting equipment inspections.

(a) Once during each 12 month period after the month an original certificate of inspection is issued for a liquefied gas vessel under § 31.05–1, the master shall ensure that the firefighting systems required in Part 154 of this chapter for a liquefied gas vessel meets the following:

(1) The exterior water spray system must pass a water spray test.

(2) The dry chemical system must meet the manufacturer's specifications for—

(i) The amount of dry chemical powder; and

(ii) The pressure for nitrogen bottles.

(3) The piping, valves, and controls of the system must be operable.

(b) On the date that the requirements under paragraph (a) are met, the master shall record in the vessel's official logbook the following information:

(1) The date of the inspection.

(2) The identification of each device inspected.

(3) The name of the inspector.

PART 34—FIREFIGHTING EQUIPMENT

§ 34.10–15 [Amended]

2. By amending § 34.10–15 as follows:

a. In paragraph (b), by adding after the word "piping" the words ", except on self propelled vessels carrying bulk liquefied gases that must have stop valves—

(1) At cross connections;

(2) At the front of the after deck house; and

(3) In the cargo area spaced 40 m (131 ft.) or less between hydrants."

b. In paragraph (e), by adding after the word "approximately" the words "71 pounds per square inch on self propelled vessels that carry bulk liquefied gases and approximately", and by adding after "50 pounds per square inch" the words "on other tankships".

PART 40—SPECIAL CONSTRUCTION, ARRANGEMENT, AND OTHER PROVISIONS FOR CARRYING CERTAIN FLAMMABLE OR COMBUSTIBLE DANGEROUS CARGOES IN BULK

Subpart 40.05—[Revoked]

3. By revoking Subpart 40.05.

PART 54—PRESSURE VESSELS

4. By amending § 54.15–25 by revising paragraph (c) and adding paragraph (c–1) to follow paragraph (c) to read as follows:

§ 54.15–25 Minimum relief capacities for cargo tanks containing compressed or liquefied gas.

* * * * *

(c) The rate of discharge for heat input of fire must meet the following formula:

$$Q = FGA^{0.82}$$

Where:

Q = Minimum required rate of discharge in cubic meters (cubic feet) per minute of air at standard conditions of 0° C and 1.03 kp/cm² (60° F and 14.7 psia).

F = Fire exposure factor for the following tank types:

F = 1.0 for tanks without insulation located on the open deck.

F = 0.5 for tanks on the open deck having insulation that has approved fire proofing, thermal conductance, and stability under fire exposure.

F = 0.5 for uninsulated independent tanks installed in holds.

F = 0.2 for insulated independent tanks in holds or for uninsulated independent tanks in insulated holds.

F = 0.1 for insulated independent tanks in inerted holds or for uninsulated independent tanks in inerted, insulated holds.

F = 0.1 for membrane and semi-membrane tanks.

G = Gas factor of:

$$G = \frac{177}{LC}\sqrt{\frac{ZT}{M}} \left(G = \frac{633{,}000}{LC}\sqrt{\frac{ZT}{M}}\right)$$

Where:

L = Latent heat of the material being vaporized at relieving conditions, in Kcal/kg (Btu per pound).

C = Constant based on relation of specific heats (k) Table § 54.14–25(c) (if k is not known C = .606 (315) is used).

Z = Compressibility factor of the gas at relieving conditions (if not known, Z = 1.0 is used).

T = Temperature in degrees K = (273+ degrees C) (R = (460+ degrees F)) at the relieving conditions (120% of the pressure at which the pressure relief valve is set).

M = Molecular weight of the product.

A = External surface area of the tank in m² (sq. ft.) for the following tank types:

For a tank of a body of revolution shape:

A = External surface area.

For a tank other than a body of revolution shape.

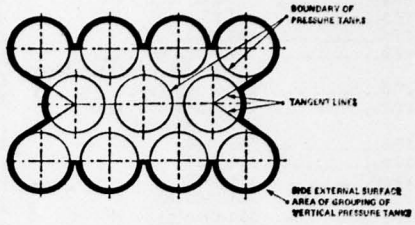
A = External surface area less the projected bottom surface area.

For a grouping of pressure vessel tanks having insulation on the vessel's structure:

A = External surface area of the hold without the projected bottom area.

For a grouping of pressure tanks having insulation on the tank:

A = External surface area of the pressure tanks excluding insulation, and without the projected bottom area.[1]



SIDE EXTERNAL SURFACE AREA OF GROUPING OF VERTICAL PRESSURE TANKS

Figure 54.15–25 (c)

TABLE 54.15–25(c).—*Constant C*

k	C
1.00	.606 (315)
1.02	.611 (318)
1.04	.615 (320)
1.06	.620 (322)
1.08	.624 (324)
1.10	.628 (327)
1.12	.633 (329)
1.14	.637 (331)
1.16	.641 (333)
1.18	.645 (335)
1.20	.649 (337)
1.22	.652 (339)
1.24	.656 (341)
1.26	.660 (343)
1.28	.664 (345)
1.30	.667 (347)
1.32	.671 (349)
1.34	.674 (351)
1.36	.677 (352)
1.38	.681 (354)
1.40	.685 (356)
1.42	.688 (358)
1.44	.691 (359)
1.46	.695 (361)
1.48	.698 (363)
1.50	.701 (364)
1.52	.704 (366)
1.54	.707 (368)
1.56	.710 (369)
1.58	.713 (371)
1.60	.716 (372)
1.62	.719 (374)
1.64	.722 (376)
1.66	.725 (377)
1.68	.728 (379)
1.70	.731 (380)
1.72	.734 (382)
1.74	.736 (383)
1.76	.739 (384)
1.78	.742 (386)
1.80	.745 (387)
1.82	.747 (388)
1.84	.750 (390)
1.86	.752 (391)
1.88	.755 (392)
1.90	.758 (394)
1.92	.760 (395)
1.94	.763 (397)
1.96	.765 (398)
1.98	.767 (399)
2.00	.770 (400)
2.02	.772 (401)
2.20	.792 (412)

[1] Figure 54.15–25(c) shows a method of determining the side external surface area of a grouping of vertical pressure tanks.

(c-1) For an independent tank that has a portion of the tank protruding above the open deck, the fire exposure factor must be calculated for the surface area above the deck and the surface area below the deck, and the calculation must be specially approved by the Commandant (G-MMT).

§ 54.25-10 [Amended]

5. By amending § 54.25-10 as follows:

a. In paragraph (a)(1), by striking the words "in Subchapter D (tank vessels)" and inserting the reference "and § 154.3" in place thereof after the reference "§ 38.05-4".

b. In paragraph (b)(1)(i) by striking "—70° F" and inserting "—67° F" in place thereof.

c. In table 54.25-10(b)(1) in the column entitled "Minimum service[1] temperature °F", by striking "—70" and inserting "—67" in place thereof, and in the column entitled "Manganese range[1] percent" by striking "0.90" and inserting "0.70" in place thereof, and by striking "1.65" and inserting "1.60" in place thereof,

d. By striking the columns following footnote 1 of Table 54.25-10(b)(1) and inserting the following two columns in place thereof:

	Range percent
Si	0.10-5.50
	Maximum
S	0.35
P	.35
Ni	.80
Cr	.25
Mo	.08
Cu	.35
Nb	.05
V	.08

e. In paragraph (b)(2), by striking "—70° F" and inserting "—67° F" in place thereof.

6. By striking in the second sentence in § 56.50-105(a) the words "Subchapter D (Tank Vessels) and I (Cargo and Miscellaneous Vessels)" and inserting "Subchapters D, I, and O" in place thereof.

PART 98—SPECIAL CONSTRUCTION, ARRANGEMENT, AND OTHER PROVISIONS FOR CERTAIN DANGEROUS CARGOES IN BULK

Subpart 98.25—[Revoked]

7. By revoking Subpart 98.25.

8. By redesignating Part 154—Special Interim Regulations for Issuance of Letters of Compliance as an appendix to Subchapter O.

9. By adding a new Part 154 to read as follows:

PART 154—SAFETY STANDARDS FOR SELF PROPELLED VESSELS CARRYING BULK LIQUEFIED GASES

Subpart A—General

Subpart B—Inspections and Tests

Subpart C—Design, Construction, and Equipment

AUTHORITY: Regulations for dangerous cargoes issued under R.S. 4472, as amended (46 U.S.C. 170) except those for flammable and combustible liquids issued under sec. 201, 86 Stat. 427, as amended (46 U.S.C. 391a); the functions, powers, and duties relating to the Coast Guard under R.S. 4472, as amended, transfered to the Department under sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1)); 46 U.S.C. 170 delegated to the Coast Guard under 49 CFR 1.46 (b) and (t), 46 U.S.C. 391a delegated to the Coast Guard under 49 CFR 1.46(n)(4).

Subpart A—General

§ 154.1 Applicability.

The regulations in this part apply to a self-propelled vessel that has on board bulk liquefied gases as a cargo, cargo residue, or vapor and that—

(a) Is constructed under a building contract awarded after October 31, 1976;

(b) In the absence of a building contract, has the keel laid or is at a similar stage of construction after December 31, 1976;

(c) Is delivered after June 30, 1980; or

(d) Has undergone a major conversion for which—

(1) The building contract is awarded after October 31, 1976;

(2) In the absence of a building contract, conversion is begun after December 31, 1976; or

(3) Conversion is completed after June 30, 1980.

§ 154.3 Definitions.

As used in this part:

(a) "'A' Class Division" means a division as defined in Regulation 3 of Chapter II-2 of the 1974 Safety Convention.

(b) "Accommodation spaces" means public spaces, corridors, lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms, pantries containing no cooking appliances, and similar spaces. Public spaces are those portions of the accommodations that are used as halls, dining rooms, lounges, and similar permanently enclosed spaces.

(c) [Reserved]

(d) "Boiling point" means the temperature at which a cargo exhibits a vapor pressure equal to the atmospheric barometric pressure.

(e) "Breadth (B)" means the maximum width of the vessel in meters measured admidships to the moulded line of the frame in a ship with a metal shell and to the outer surface of the hull in a ship with a shell of any other material.

(f) "Cargo area" means that part of the ship which contains the cargo containment system and includes the deck areas over the full beam and length of the ship above the foregoing. The cofferdams, ballast or void spaces at the after end of the aftermost hold space or the forward end of the forwardmost hold space are excluded from the cargo area.

(g) "Cargo containment system" means the arrangement for containment of cargo including a primary and secondary barrier, associated insulation and any intervening spaces, and adjacent structure if necessary for the support of these elements. If the secondary barrier is part of the hull structure it may be a boundary of the hold space.

(h) "Cargo service space" means a space within the cargo area used for work shops, lockers, and store rooms of more than 2 m^2 (21.8 $ft.^2$) in area.

(i) [Reserved]

(j) "Cofferdam" means the isolating space between two adjacent steel bulkheads or decks. This space may be a void space or ballast space.

(k) "Commandant" means the Commandant of the Coast Guard.

(l) "Contiguous hull structure" means hull srtucture that includes the inner bottom plating, longitudinal bulkhead plating, transverse bulkhead plating, floors, webs, stringers, and attached stiffeners.

(m) "Control space" means those spaces in which the vessel's radio or main navigating equipment or the emergency source of power is located or where the fire control equipment is centralized.

(n) "Design temperature" means the minimum temperature at which cargo may be loaded, unloaded, or carried.

(o) "Design vapor pressure (P_o)" means the maximum gauge pressure at the top of tank used in the design of the tank.

(p) "Essential auxiliary" means a piece of equipment or system that is vital to the safe operation of the vessel.

(q) "Flammable cargoes" means the following liquefied gases from Table I:

Acetaldehyde	Methane (LNG)
Butadiene	Methyl acetylene-propadiene mixture
Butane	
Butylene	
Dimethylamine	Methyl bromide
Ethane	Methyl chloride
Ethylamine	Propane
Ethyl chloride	Propeylene
Ethylene	Vinyl chloride
Ethylene oxide	

(r) "Flammable range" means the range between the minimum and maximum concentrations of vapor in air which form a flammable mixture.

(s) "Gas-dangerous space" means:

(1) A space in the cargo area that does not have approved arrangements to ensure that its atmosphere is at all times maintained in a safe condition.

(2) An enclosed space outside the cargo area through which any piping that may contain liquid or gaseous cargo passes, or within which such piping terminates, unless it has approved arrangements are installed to prevent any escape of gas into the atmosphere of that space.

(3) A cargo containment system and cargo piping.

(4) A hold space.

(5) A space separated from the hold space defined in paragraph (u) of this section by a single gastight steel boundary.

(6) A cargo pumproom and a cargo compressor room.

(7) A zone on the open deck, or semi-enclosed space on the open deck, within 3 m (10 ft.) of any cargo tank outlet, gas or vapor outlet, cargo pipe flange, cargo valve, or of entrances and ventilation openings to a cargo pump room and cargo compressor room.

(8) The open deck over the cargo area and 3m (10 ft.) forward and aft of the cargo area on the open deck up to a height of 2.4 m (8 ft.) above the weather deck.

(9) A zone within 2.4 m (8 ft.) of the outer surface of a cargo containment system where the surface is exposed to the weather.

(10) An enclosed or semi-enclosed space in which there are lines containing cargo except gas sampling lines led to gas detection equipment under § 154.1350(m) or a space that uses boil-off gas as fuel and complies with § 154.703.

(11) A space for cargo hoses.

(12) An enclosed or semi-enclosed space having a direct opening into any gas-dangerous space or zone, as defined in subparagraphs (1) through (11) of this paragraph.

(t) "Gas-safe space" means a space that is not a gas-dangerous space.

(u) "Hold space" means the space enclosed by the vessel's structure in which there is a cargo containment system.

(v) [Reserved]

(w) "Independent tank" means a self supporting tank that is not a part of the ship's hull and is not essential to the hull strength.

(x) "Insulation space" means a space that may or may not be an interbarrier space, occupied wholly or in part by insulation.

(y) "Interbarrier space" means the space between a primary and a secondary barrier, whether or not completely or partially occupied by insulation or other material.

(z) "Integral tank" means a tank that forms a structural part of the vessel's hull and is influenced in the same manner and by the same loads that stress the adjacent hull structure.

(aa) "Length (L)" means ninety-six percent of the total length in meters on a waterline at eighty-five percent of the least molded depth measured from the top of the keel, or the length from the foreside of the stem to the axis of the rudder stock on that waterline, whichever is greater. In vessels designed with a rake of keel the waterline on which this length is measured must be parallel to the designed waterline.

(bb) "Marine Inspector" means any person designated for the performance of duties with respect to the enforcement and administration of Title 52, R.S.,

17

acts amendatory thereof or supplemental thereto, rules and regulations thereunder, and the inspections required thereby.

(cc) "MARVS" means the Maximum Allowable Relief Valve Setting of a cargo tank.

(dd) "Membrane tank" means a tank that is non-self-supporting and consists of a thin layer (membrane) supported through insulation by the adjacent hull structure.

(ee) "Permeability of a space" means the ratio of the volume within that space that is assumed to be occupied by water to the total volume of the space.

(ff) "Primary barrier" means the inner element designed to contain the cargo when the cargo containment system included two boundaries.

(gg) "Secondary barrier" means the liquid resisting outer element of a cargo containment system designed to afford containment of any envisioned leakage of liquid cargo through the primary barrier for 15 days and to prevent the lowering of the temperature of the ship's structure to an unsafe level.

(hh) "Semi-membrane" tank means a tank that is non-self supporting in the loaded condition and consists of flat surfaces supported through insulation by the adjacent hull structure, and of shaped corners that connect the flat surfaces that can expand and contract due to thermal, hydrostatic, and pressure loadings.

(ii) "Service space" means a space outside the cargo area used for a galley, pantry containing cooking appliances, locker or store room, workshop other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces.

(jj) "Shut off valve" means a valve that fully closes a pipeline and provides nominal metal to metal contact between the valve operating parts, including the disc and gate, and the valve body.

(kk) "Specific gravity" means the ratio of the density of the cargo, at the lowest temperature at which it may be carried, to the density of water at 4° C (39° F).

(ll) "Tank" means the liquid tight shell designed to be the primary container of the cargo and includes all such containers whether or not associated with insulation or secondary barriers.

(mm) "Tank cover" means the protective structure intended to protect the cargo containment system against damage where it protrudes through the weather deck and to ensure the continuity and integrity of the deck structure.

(nn) "Tank dome" means the upward extension of a portion of the cargo tank. For below deck cargo containment systems the tank dome protrudes through the weather deck or through a tank cover.

(oo) "Toxic cargoes" means the following liquefied gases from Table 4:

Acetaldehyde	Ethylene oxide
Ammonia	Methyl bromide
Dimethylamine	Methyl chloride
Ethylamine	Sulfur dioxide
Ethyl chloride	Vinyl chloride

(pp) "Vapor density" means the relative weight of the vapor compared with the weight of an equal volume of dry air at standard conditions of temperature and pressure.

(qq) "Vapor pressure" means the absolute equilibrium pressure of the saturated vapor above the liquid expressed in kp/cm² (psia) at a specified temperature.

(rr) "Void space" means an enclosed space in the cargo area external to a cargo containment system, which is not a hold space, ballast space, fuel oil tank, cargo pump or compressor room, or any space used by personnel.

(ss) "1974 Safety Convention" means the International Convention on Safety of Life at Sea, 1974.

(tt) "Liquefied gas" means a cargo having a vapor pressure of 1.76 kp/cm² (25 psia) or more at 37.8° C (103° F).

(uu) "Recognized classification society" means a non-government association that has issued standards accepted by the Commandant.

§ 154.4 U.S. flag vessel endorsement application.

(a) A person who desires the endorsement required by § 154.6 for a U.S. flag vessel must submit an application described in § 91.55–15 of this chapter for an endorsement of the vessel's subchapter D Certificate of Inspection.

(b) The person requesting an endorsement under paragraph (a) of this section must submit to the Coast Guard when requested—

(1) Hull type calculations required by § 154.201;

(2) The plans and information listed in §§ 54.01–18, 56.01–10, 91.55–5 (a), (b), (d), (g), and (h); and 111.05–5(d) of this chapter; and

(3) Any other vessel information, such as plans, design calculations, test results, certificates, and manufacturer's data, that the Coast Guard needs to determine whether or not the vessel meets the standards of this part.

§ 154.5 Foreign flag vessel endorsement application.

(a) A person who desires an endorsement on the Letter of Compliance required by § 154.1802 for a foreign flag vessel must submit an application to the Commandant (G–MHM) that includes—

(1) A list of cargoes for which the endorsement is requested;

(2) The names of the U.S. ports in which the person anticipates operating the vessel;

(3) The vessel's country of registry;

(4) A copy of the Certificate of Fitness for the Carriage of Liquefied Gases in Bulk issued under the IMCO Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, if the vessel holds such a certificate;

(5) The name of the society that classes the vessel;

(6) A brief description of the vessel's cargo containment systems;

(7) Plans, calculations, or other information to show compliance under §§ 154.170, 154.447, 154.450, 154.466, and 154.701 through 154.709; and

(8) The following plans and information:

(i) Description of the vessel.

(ii) Specifications for the cargo containment system.

(iii) General arrangement of the vessel.

(iv) Midship section of the vessel.

(v) Schematic plans of the liquid and vapor cargo piping.

(vi) Firefighting and safety plan.

(b) All correspondence and vessel information must be in English.

(c) If the vessel does not have a Certificate of Fitness issued under the IMCO Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, adopted without amendments on November 12, 1975 by Assembly Resolution A.328(IX), the plans, calculations and information required by § 154.4(b) must be submitted to the Commandant (G–MHM).

§ 154.6 U.S. flag certificate endorsement.

(a) The Certificate of Inspction for a vessel intended to carry any liquefied gas is endorsed for each individual cargo as follows:

> Inspected and approved for the carriage of (enter the applicable cargo name) at a maximum allowable relief valve setting of _____ kp/cm² (_____ psig) with an F factor of _____, a maximum external pressure of _____ kp/cm² (_____ psig), a minimum service temperature of ____ °C (____ °F), and a maximum specific gravity of _____. Hull type _____.

(b) The Commandant (G–MVI) also issues an IMCO Certificate of Fitness showing compliance with the IMCO Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, Resolution A.328(ix), if requested by the vessel owner or operator.

§ 154.8 Equivalents.

(a) Where a vessel must have a particular fitting, material, appliance, apparatus, equipment, provision, procedure, or arrangement, including cargo segregation, the Commandant may accept any other fitting, material, appliance, apparatus, equipment, provision, procedure, or arrangement, that he determines to be as effective as that specified in this part.

(b) In any case where it is shown to the satisfaction of the Commandant (G–MMT) that the use of any particular equipment, apparatus, or arrangement not specifically required by statute, but prescribed by regulations is unreasonable or impracticable, the Commandant (G–MMT) may allow the use of alternate equipment, apparatus, or arrangement to such an extent and upon such conditions as will insure a degree of safety consistent with the minimum standards set forth in this part.

(c) Operational methods or procedures must not be substituted for a particular fitting, material, appliance, apparatus, item of equipment, or type thereof specified in this part.

§ 154.10 Conflict in regulations.

(a) When a specific requirement in another part of this schapter is in conflict with any requirement in this part, the regulations in this part take precedence.

(b) When a vessel carries cargoes regulated by this part and by another part, the requirements of both parts must be met.

Subpart B—Inspections and Tests

ORIGINAL CERTIFICATE OF INSPECTION REQUIREMENTS

§ 154.40 Purpose.

Sections 154.50 through 154.122 prescribe the original test and inspection requirements for the cargo containment system, process pressure vessels, cargo and process piping, hull heating, and cold spots on liquefied gas vessels for the issuance of an original certificate of inspection for the vessel.

§ 154.50 Integral tanks: Pressure test.

An integral tank must pass in the presence of a marine inspector, a hydrostatic or hydropneumatic test that—

(a) Approximates the design stresses; and

(b) Has a pressure at the top of the tank at least equal to the MARVS.

§ 154.52 Membrane or semi-membrane tanks: Pressure test.

(a) The following pressure test procedures for a membrane or semi-membrane tank must be specially approved by the Commandant (G-MMT):

(1) Hydrostatically, hydropneumatically, or pneumatically testing the tank and any space adjacent to the hull structure that supports the membrane and contains liquid.

(2) Pneumatically testing the hold structure, the pipe tunnel, and any space adjacent to the hull structure that supports the membrane and does not contain liquid.

(b) A membrane or semi-membrane tank must pass, in the presence of a marine inspector, the hydrostatic, hydropneumatic, or pneumatic test specially approved by the Commandant (G-MMT).

§ 154.54 Independent tank type A: Pressure test.

An independent tank type A must pass, in the presence of a marine inspector, one of the following:

(a) A hydrostatic test that—

(1) Approximates the design stresses; and

(2) Has a pressure at the top of the tank at least equal to the MARVS; or

(b) A hydropneumatic test that—

(1) Approximates the service loading of the tank and its supports;

(2) Approximates the design stresses; and

(3) Has a pressure at the top of the tank at least equal to the MARVS.

§ 154.56 Independent tank type B: Pressure test.

Each independent tank type B must pass, in the presence of a marine inspector, a hydrostatic, or a hydropneumatic test that—

(a) Approximates design stresses;

(b) Has a pressure at the top of the tank at least equal to the MARVS;

(c) Has maximum primary membrane stress and maximum bending stress in primary members of less than 90 percent of the yield strength of the fabricated material at the test temperature; and

(d) Has strain gauges or other equipment to monitor the prototype tank during the test if the calculated test stresses exceed 75 percent of the yield strength of the fabricated material.

§ 154.58 Independent tank type C: Pressure test.

(a) An independent tank type C and a process pressure vessel must pass, in the presence of a marine inspector, a hydrostatic test that meets the following requirements:

(1) Section 54.10-10 of this chapter.

(2) The water temperature for the test must be at least 30° C (54° F) warmer than the nil ductility transition temperature of the fabricated material.

(3) The test pressure must be applied for a period of at least—

(i) Two hours; and

(ii) Five minutes for each additional mm of thickness for tank plating greater than 25 mm (1 in.).

(b) If a tank cannot be safely filled with water to meet the requirements under paragraph (a) of this section, the tank must, pass, in the presence of a mine inspector, a hydropneumatic test that is specially approved by the Commandant (G-MMT).

(c) A process pressure vessel must pass, in the presence of a marine inspector, the pneumatic test under § 54.10-15 of this chapter if—

(1) The vessel cannot be safely filled with water to meet the requirements under paragraph (a) of this section; or

(2) The water for the test under paragraph (a) of this section cannot be removed and traces of this water cannot be tolerated during the service of the vessel.

§ 154.60 Cargo tanks: Weld tightness test.

A tank must pass, in the presence of a marine inspector, one of the following weld tightness tests:

(a) Soap bubble test.

(b) Vacuum box test.

(c) A tightness test specially approved by the Commandant (G-MMT).

§ 154.62 Secondary barrier: Weld tightness test.

A secondary barrier for a tank must pass, in the presence of a marine inspector, one of the following tightness tests:

(a) Soap bubble test.

(b) Vacuum box test.

(c) A tightness test specially approved by the Commandant (G-MMT).

§ 154.64 Independent tanks type B: Stress level test.

(a) One independent tank type B and its supports on the first vessel of a class of vessels must have strain gauges to record stress levels during the pressure test after the tank is in the vessel and for the 24 months of service.

(b) The records from the strain gauges required under paragraph (a) of this section must be maintained for the first 24 months that the vessel is in service.

(c) The strain gauge records required under paragraph (b) of this section must be analyzed and specially approved by the Commandant (G-MMT) after the first thirty months that the vessel is in service.

§ 154.66 Cargo and process piping valves: Tightness test.

(a) At least one of each size and type of value in the cargo and process piping systems used at a working temperature lower than −55° C (−67° F) must be tested, including actuation, to at least the minimum design temperature and the maximum design pressure.

(b) A report of the test under paragraph (a) of this section must be specially approved by the Commandant (G-MMT).

§ 154.68 Expansion bellows: Cycles and pressure tests.

(a) The expansion bellows in a cargo system must be approved under § 56.35-15(e) of this chapter or tested as follows:

(1) At least one of each type of expansion bellows in the system must be tested under § 56.35-10 and § 56.35-15 of this chapter;

(2) At least one of each type of element in the expansion bellows, not precompressed, must pass a pressure test of at least five times the design pressure for at least five minutes without bursting.

(3) At least one type of expansion joint with flanges, stays, articulations, and all other accessories, must pass a pressure test under § 56.97-5 of this chapter without permanent deformation at—

(i) Twice the design pressure;

(ii) The extreme displacement conditions recommended by the manufacturer; and

(iii) The minimum design temperature.

(4) If an expansion joint is subject to vessel deformation loads, the expansion joint must pass a cyclic fatigue test—

(i) For at least 2,000,000 cycles at a frequency not higher than five cycles/second;

(ii) By simulating a bellows movement equal to a compensated pipe length; and

(iii) Without internal pressure.

(b) A report of the tests under paragraph (a) of this section must be specially approved by the Commandant (G-MMT).

§ 154.70 Cargo and process piping systems: Hydrostatic test.

The cargo and process piping systems inside and outside a tank must pass, in the presence of a marine inspector—

(a) A hydrostatic test to at least 1.5 times the design pressure after installation on the vessel;

(b) If the systems or part of the systems are manufactured with fittings, a hydrostatic test to at least 1.5 times the design pressure before or after installation on the vessel, except joints welded on board must be tested after installation on the vessel; or

(c) If the water for the test under paragraphs (a) or (b) of this section cannot be removed and traces of the water cannot be tolerated during the service of the vessel, an alternate test that is specially approved by the Commandant (G-MMT).

§ 154.72 Cargo and process piping systems: Leak test.

After installation on the vessel and in the presence of a marine inspector, the cargo and proces piping systems must pass a leak test with air, halides, or another medium at a pressure specially approved by the Commandant (G-MMT).

§ 154.74 Cargo and process piping systems: Functional test.

Before or during the first loading operation and in the presence of a Coast Guard inspector, the cargo and process piping system, including valves, fittings, and associated equipment for loading and discharging cargo or vapor, must be tested to determine if they load and discharge cargo and vapor under operating conditions.

§ 154.76 Integral tank: Production weld test.

An integral tank must pass, in the presence of a marine inspector, the production weld test of a recognized classifcation society.

§ 154.78 Membrane tank: Production weld test.

A membrane tank must pass, in the presence of a marine inspector, a production weld test that is specially approved by the Commandant (G-MMT).

§ 154.80 Semi-membrane tank; independent tank type A or B: Production weld test.

If a semi-membrane tank or an independent tank type A or B has a service temperature colder than -18° C (0° F), each 50 m (164 ft.) of butt welded joints in the tank must pass, in the presence of a marine inspector, the following production weld tests in the position that the joint is welded:

(a) A bend test under § 57.06-4 of this chapter.

(b) A charpy V-notch test, under § 57.06-5 of this chapter, using 3 specimens with the notch alternately in the center of the weld and the most critical loaction in the heat affected zone.[1]

[1] The most critical location in the heat affected zone of the weld is based on procedure qualification results except austenitic stainless steel has notches only in the center of the weld.

(c) If a butt welded joint in the tank does not pas the test under paragraph (b) of this section, it must be retested following the procedures under § 54.05-5 (c) of this chapter.

§ 154.82 Independent tank type C and process pressure vessel: Production weld test.

An independent tank type C and process pressure vessel must pass, in the presence of a marine inspector, the production weld tests under Subpart 57.06 of this chapter.

§ 154.84 Secondary barrier: Production weld test.

If a secondary barrier has a service temperature lower than -18° C (0° F) each 50 m (164 ft.) of butt welded joints in the secondary barrier must pass, in the presence of a marine inspector, a production weld test in the position that the joint is welded under—

(a) Section 154.76;

(b) Section 154.78; or

(c) Section 154.80.

§ 154.90 Integral tank: Weld inspection standards.

An integral tank must meet the weld inspection standards of a recognized classification society.

§ 154.92 Membrane tank: Weld inspection standards.

A membrane tank must meet the weld standards specially approved under § 154.425.

§ 154.94 Independent tank type A; semi-membrance tank: Weld inspection standards for shell plating.

(a) For independent tanks type A and semi-membrane tanks with design temperatures of -20° C (-4° F) or colder, each full penetration butt weld of a tank's shell plating must pass a 100 percent radiographic test.

(b) For independent tanks type A and semi-membrane tanks with design temperatures warmer than -20° C (-4° F), each full penetration butt weld intersection of a tank's shell plating must pass a radiographic test and 10 percent of the remaining full penetration butt welds must pass a radiographic test.

§ 154.96 Independent tank type B: Weld inspection standards for shell plating.

For independent tanks type B each full penetration butt weld of a tank's shell plating must pass a—

(a) 100 percent radiographic test; and

(b) 100 percent ultrasonic test under Appendix U of Division 1 of Section VIII, ASME Code, 1974 edition.

§ 154.98 Radiographic inspection standards for welds.

(a) As used in this section:

(1) "t" means the thickness of the thinner portion of the weld.

(2) "Slag inclusion" means a nonmetallic solid material entrapped in weld metal or between weld metal and base metal including oxide and dirt.

(3) "l" means the length of the longest imperfection in a group of imperfections.

(b) A full penetration butt weld does not pass the test under § 154.94 or § 154.96 for the following types of imperfections:

(1) Any crack or zone of incomplete fusion or penetration.

(2) Any elongated slag inclusion that is longer than—

(i) 6.4 mm (¼ in.) for t less than 19.2 mm (¾ in.);

(ii) 8.5 mm (⅓ in.) for t of 19.2 mm (¾ in.) to 57.2 mm (2¼ in.); or

(iii) 19.2 mm (¾ in.) for t more than 57.2 mm (2¼ in.)

(3) Any group of aligned slag inclusions that together are longer than t in a length of 12 t, except when the distance between the successive imperfections exceeds 6*l*.

(4) Any stainless steel wire bristle that is longer than 9.5 mm (⅜ in.) or wider than 1.6 mm (1/16 in.).

(5) Tungsten inclusions in excess of 20 percent of t or 3.2 mm (⅛ in.), whichever is less in any dimension.

(6) Copper inclusions more than 3.2 mm (⅛ in.) in any dimension.

(7) Any dispersed cloud or diffused alloying of metals of higher density than aluminum more than 3.2 mm (⅛ in.) in any dimension.

(8) Metallic and non-metallic inclusions that are closer to each other than four times the length of the longest inclusion.

(9) The cumulative length of metallic inclusions, non-metallic inclusions, or both, that occur within a 3 t or 152.4 mm (6 in.) length of weld, whichever is less, and are greater than 38.1 mm (1½ in.) for nonaligned inclusions and 25.4 mm (1 in.) for aligned inclusions.

(10) The number of metallic inclusions, non-metallic inclusions, or both that occurs within 3 t or 152.4 mm (6 in.) length of weld, whichever is less, is more than seven for nonaligned inclusions and five for aligned inclusions.

(11) Any metallic inclusion lying on or penetrating the surface of the weld or heat affected zone of the weld.

(12) Porosity that exceeds the limits allowed in Appendix IV of Division 1 of Section VIII, of the ASME Code, 1974 edition.

§ 154.100 Semi-membrane tank; independent tank type A or B: Additional weld inspection standards.

The structure of the following tanks, except shell plating, must pass, in the presence of a marine inspector, a magnetic particle or dye penetrant method that is specially approved by the Commandant (G-MMT):

(a) An independent tank type A or a semi-membrane tank designed under § 154.435 as an independent tank type A.

(b) An independent tank type B or a semi-membrane tank designed under § 154.435 as an independent tank type B.

§ 154.102 Independent tank type C: Weld inspection standards.

An independent tank type C must, in the presence of a marine inspector—

(a) Meet the requirements under §§ 54.10–1 and 54.10–3 of this chapter;
(b) Pass a 100 percent radiographic test of each full penetration butt weld of the tank's shell plating;
(c) Pass a 10 percent ultrasonic test under Appendix U of Division 1 of Section VIII, ASME Code, 1974 edition, 10 percent magnetic particle, or 10 percent dye penetrant test of all tank welds; and
(d) Pass a 100 percent ultrasonic test under Appendix U of Division 1 of Section VIII, ASME Code, 1974 edition, 100 percent magnetic particle test, or 100 percent dye penetrant test of each weld on reinforcement rings around holes and nozzles.

§ 154.104 Process pressure vessels: Weld inspection standards.

A process pressure vessel must, in the presence of a marine inspector—
(a) Meet the requirements under §§ 54.10–1 and 54.10–3 of this chapter;
(b) Pass a radiographic test of each full penetration butt weld intersection of the tank's shell plating;
(c) Pass a 10 percent radiographic test of each of the remaining full penetration butt welds; and
(d) Pass a 100 percent ultransonic test under Appendix U of Division 1 of Section VIII, ASME Code, 1974 edition, 100 percent magnetic particle test, or 100 percent dye penetrant test of each weld on reinforcement rings around holes and nozzles.

§ 154.106 Cargo and process piping systems inspection standards.

The cargo and process piping systems must meet the inspection requirements under Subpart 56.95 of this chapter.

§ 154.108 Secondary barrier: Inspection standards.

(a) A secondary barrier must pass tests that are specially approved by the Commandant (G–MMT).
(b) If the outer hull of a vessel is part of the secondary barrier, the sheer strake butt welds and the intersections of all but and seam welds in the side of the hull must pass a 100 percent radiographic test.

§ 154.110 First loading and discharging records.

The master shall keep records of the operation of the following during the first loading and discharging of the cargo:
(a) Tanks.
(b) Cargo piping.
(c) Process pressure vessels.
(d) Cargo pumps.
(e) Cargo compressor.
(f) Hull structure heating system.
(g) Pressure and temperature control devices.

§ 154.120 Hull heating systems inspection.

During the first loading and discharge of the cargo, the master shall inspect the hull structure heating system and ensure that it meets the heat output and distribution requirements under §§ 154.174, 154.176, and 154.178.

§ 154.122 Hull cold spot inspection.

(a) A procedure for repairing the cargo containment system to correct hull cold spots must be specially approved by the Commandant (G–MMT).
(b) During the first loading and discharge of the cargo the master shall inspect the hull and ensure that each cold spot is corrected under the procedure required under paragraph (a) of this section.

CERTIFICATION OF INSPECTION RENEWAL REQUIREMENTS

§ 154.130 Purpose.

Sections 154.132 through 154.142 prescribe the requirements for the periodic inspections and tests of the cargo containment system, process pressure vessels cargo and process piping, and hull heating and cold spots for renewal of a liquefied gas vessel's certificate of inspection.

§ 154.132 First 12 month inspection.

During the twelfth month after the month an original certificate of inspection is issued for a liquefied gas vessel under § 31.05–1 of this chapter, the vessel must pass the following inspections in the presence of a marine inspector to retain the original certificate:
(a) An external visual inspection for defects of the following parts of a cargo containment system:
(1) Tank.
(2) Tank support structure, including foundations, chocks, islands, and saddles.
(3) Positioning structure, including keys and keyways.
(4) Equipment hatches.
(5) Personnel access, including hatches.
(6) Penetrations, including piping and electrical cable.
(7) Secondary barrier, except a test under § 154.62 may be substituted if the secondary barrier is inaccessible to the inspector.
(8) Adjacent hull structure.
(9) Insulation, without removing fixed insulation, tank structure, and hull structure.
(b) An internal visual inspection of at least one of each type of tank described in this part, including the cargo equipment and the cargo equipment mountings, for—
(1) Corrosion;
(2) Cracking of base metal;
(3) Weld defects; and
(4) Plating distortion, including buckling.
(c) An inspection of at least one of each type of tank relief valve that includes—
(1) Having defective parts repaired;
(2) The pressure setting test; and
(3) Sealing the pressure setting adjustment.
(d) An inspection for tank tightness by confirming the accuracy of—
(1) The gas detection system;
(2) Temperature measuring devices;
(3) Flow meters; and
(4) Log book entries for tanks.
(e) An external visual inspection of each interbarrier space venting system for—
(1) Corrosion;
(2) Piping distortion;
(3) Leaking piping joints;
(4) Loose piping supports; and
(5) Broken relief valve seals.
(f) An external inspection of each tank venting system for—
(1) Corrosion;
(2) Piping distortion;
(3) Leaking piping joints;
(4) Loose piping supports; and
(5) Broken relief valve seals.
(g) An inspection of the gas leak detection system by—
(1) Confirming the accuracy of the gas leak detection equipment, including indicators and alarms;
(2) A visual inspection of the gas leak detection piping for corrosion and piping distortion; and
(3) Confirming the log book entries for gas detection.
(h) An inspection of the inert gas system by a visual inspection of the—
(1) Inert gas equipment, including generator, storage tanks, indicators, and alarms to determine if they operate; and
(2) Inert gas piping for corrosion and piping distortion.
(i) An external visual inspection of cargo handling piping and machinery, including cargo and process piping, cargo heat exchanges, vaporizers, and compressors, for—
(1) Corrosion;
(2) Piping distortion;
(3) Leaking piping joints; and
(4) Loose piping supports.
(j) An external visual inspection of the hull heating piping coils for—
(1) Corrosion;
(2) Piping distortion;
(3) Leaking piping joints; and
(4) Loose piping supports.

§ 154.134 Each 12 month inspection.

Once during each 12 month period after the inspection under § 154.132 a vessel issued an endorsement under § 154.4 must pass, in the presence of a marine inspector, the inspections under §§ 154.132 (d) through (j) to retain the endorsement.

§ 154.136 Special 48 month and 96 month inspections.

During the 48th month and the 96th month after a vessel is issued an endorsement under § 154.4, the vessel must pass, in the presence of a marine inspector, the inspections under § 154.134 and the following inspections to retain the endorsement:
(a) An internal visual inspection of each tank, except independent tanks type C and process pressure vessels, including inspection of the cargo equipment, and cargo equipment mountings, for—
(1) Corrosion;
(2) Cracking of base metal;
(3) Weld defects; and
(4) Plating distortion, including buckling.
(b) Integral tanks and independent tanks types A and B must pass a hydrostatic or hydropneumatic test at a pressure at the top of the tank that is at least equal to the MARVS.
(c) Membrane and semi-membrane tanks must pass a hydrostatic, hydro-

pneumatic, or pneumatic test specially approved by the Commandant (G-MMT).

(d) An external visual inspection of the tank support structure, including foundations, chocks, islands, and saddles, and the positioning structure, including keys, keyways, sway braces, and antiflotation arrangements, for—

(1) Corrosion;
(2) Distortion;
(3) Cracking of base metal; and
(4) Weld defects.

(e) An external visual inspection of the hull structure that forms a secondary barrier and the contiguous hull structure for—

(1) Corrosion;
(2) Distortion;
(3) Cracking of base metal; and
(4) Weld defects.

(f) An inspection of each relief valve or other relieving device for each interbarrier space that includes—

(1) Having defective parts repaired;
(2) A pressure setting test; and
(3) Sealing the pressure setting adjustment.

(g) An inspection of each tank relief valve that includes—

(1) Having defective parts repaired;
(2) A pressure setting test; and
(3) Sealing the pressure setting adjustment.

(h) A visual inspection of the liquid level indicators for the tanks for—

(1) Corrosion;
(2) Distortion of mechanical parts, and
(3) Loose supports.

(i) An external inspection of each quick closing valve required under §§ 154.530, 154.532, and 154.538 for—

(1) Corrosion;
(2) Distortion;
(3) Leaking piping joints;
(4) Restricted movement of moving parts; and
(5) Failure to close in the time required under § 154.544.

(j) A visual inspection, a pressure vacuum test, or a test specially approved by the Commandant (G-MMT) of the secondary barrier to determine if it meets § 154.460.

§ 154.138 Ninety-six month inspection for independent tank type C and process pressure vessels.

During the 96th month after a vessel is issued an endorsement under § 154.4 each independent tank type C cargo tank and process pressure vessel, including the cargo equipment and the cargo equipment mountings must pass, in the presence of a marine inspector, the following to retain the endorsement:

(a) An internal and external visual inspection for—

(1) Corrosion;
(2) Cracking of base material;
(3) Weld defects; and
(4) Plating distortion, including buckling.

(b) A hydrostatic pressure test to a pressure of at least 1½ times the design vapor pressure, or if the tank cannot be safely filled with water, a test procedure specially approved by the Commandant (G-MMT).

§ 154.140 Special 144 month, 192 month, and 240 month inspections.

In the 144th month, the 192nd month, and the 240th month after a vessel is issued an endorsement under § 154.4, the vessel must pass, in the presence of a marine inspector, inspections under §§ 154.134 and 154.136 (d) through (j) and the following inspections to retain the endorsement:

(a) An internal visual inspection of each tank, except independent tanks type C and process pressure vessels, including inspections of the cargo equipment and the cargo equipment mountings, for—

(1) Corrosion;
(2) Cracking of base metal;
(3) Weld defects; and
(4) Plating distortion, including buckling.

(b) A hydrostatic or hydropneumatic test of each integral tank and independent tank types A and B to a pressure at the top of the tank that is at least equal to the MARVS.

(c) A hydrostatic, hydropneumatic, or pneumatic test specially approved by the Commandant (G-MMT) of each membrane and semi-membrane tank.

(d) A gauging of plating thickness of each tank.

(e) A gauging of plating thickness of each metal secondary barrier that provides structural support for the tank.

§ 154.142 192 month inspection for independent tanks type C and process pressure vessel.

During the 192nd month after a vessel is issued an endorsement under § 154.4, each independent type C cargo tank and process pressure vessel, including the cargo equipment and the cargo equipment mountings, must pass, in the presence of a marine inspector, the following to retain the endorsement:

(a) A visual inspection for—

(1) Corrosion;
(2) Cracking of base metal;
(3) Weld defects; and
(4) Plating distortion, including buckling.

(b) A hydrostatic pressure test to a pressure of at least 1½ times the design vapor pressure, or if the tank cannot be safely filled with water, a test specially approved by the Commandant (G-MMT).

HULL STRUCTURE

§ 154.170 Outer hull steel plating.

(a) Except as required in paragraphs (b), (c), and (d) of this section, the outer hull steel plating, including the shell and deck plating must meet the material standards of a recognized classification society.

(b) The deck stringer and sheer strake must be at least Grade E steel or a grade of steel that has equivalent chemical properties, mechanical properties, and heat treatment that is specially approved by the Commandant (G-MMT).

(c) The strake at the turn of the bilge must be Grade D, Grade E, or a grade of steel that has equivalent chemical properties, mechanical properties, and heat treatment that is specially approved by the Commandant (G-MMT).

(d) If the cargo carried causes the outer hull steel temperature to drop below 0° C (32° F), the outer hull steel must—

(1) Be designed for that temperature; and

(2) Meet the standards in § 154.172.

§ 154.172 Contiguous steel hull structure.

(a) Except as allowed in paragraphs (b) and (c) of this section, plates, forgings, forged and rolled fittings, rolled and forged bars and shapes, and castings used in the construction of the contiguous steel hull structure must meet the minimum design temperature, thickness, and steel grade in Table 1:

TABLE 1.—*Minimum design temperature, thickness, and steel grades in contiguous hull structures*

Minimum design temperature	Steel thickness	Steel [1] grade
0°C (32° F)	All	Standards of a recognized classification society.
−10°C (14°F)	12.5 < t≤25.5 mm (1 in).	B.
	t>25.5 mm (1 in).	D.
−25°C (−13°F)	t≤12.5 mm (½ in).	D.
	t>12.5 mm (½ in).	E.

[1] Steel grade of a recognized classification society.

(b) For a minimum design temperature below —25° C (—13° F), the contiguous steel hull structure must meet § 154.610, except the steel thickness limitation.

(c) If a steel grade that is not listed in Table 1 has the equivalent chemical properties, mechanical properties, and heat treatment of a steel grade that is listed, the steel grade not listed may be used if specially approved by the Commandant (G-MMT) for use in the contiguous hull structure.

§ 154.174 Transverse contiguous hull structure.

(a) The transverse contiguous hull structure of a vessel having tanks without secondary barriers must meet the standards of a recognized classification society.

(b) The transverse contiguous hull structure of a vessel having tanks with secondary barriers must have a minimum design temperature that is—

(1) Colder than the calculated temperature of this hull structure assuming the—

(i) Temperature of the secondary barrier to be the temperature of the cargo carried; and

(ii) Ambient cold condition required under § 154.176(b)(1) (ii) and (iii); or

(2) Temperature maintained by the heating system under § 154.178.

(c) A heat load calculation must show that the heating system meets paragraph (b) (2) of this section.

§ 154.176 Longitudinal contiguous hull structure.

(a) The longitudinal contiguous hull structure of a vessel having tanks without secondary barriers must meet the standards of a recognized classification society.

(b) The longitudinal contiguous hull structure of a vessel having tanks with secondary barriers must have a minimum design temperature that is—

(1) Colder than the calculated temperature of this hull structure assuming the—

(i) Temperature of the secondary barrier is the temperature of the cargo carried; and

(ii) For any waters in the world except Alaskan waters, ambient cold condition of—

(A) Five knots air at −18° C (0° F); and

(B) Still sea water at 0° C (32° F); or

(iii) For Alaskan waters the ambient cold condition of—

(A) Five knots air at 29° C (−20° F); and

(B) Still sea water at 2° C (28° F); or

(2) Maintained by the heating system under § 154.178, if, without heat, the contiguous hull structure has at least a minimum design temperature that is colder than the calculated temperature of the hull structure assuming the—

(i) Temperature of the secondary barrier is the temperature of the cargo carried; and

(ii) Ambient cold conditions of still air at 5° C (41° F) and still sea water at 0° C (32° F).

(c) A heat load calculation must show that the heating system meets pargraph (b) (2) of this section.

§ 154.178 Contiguous hull structure: Heating system.

The heating system for transverse and longitudinal contiguous hull structure is an essential auxiliary and must—

(a) Have the heating capacity to meet § 154.174 of § 154.176;

(b) Have stand-by heating to provide 100 percent of the required heat load and distribution determined under § 154.174 (c) and § 154.176(c); and

(c) Meet Parts 52, 53, and 54 of this chapter.

§ 154.180 Contiguous hull structure: Welding procedure.

Welding procedure tests for contiguous hull structure with a design temperature colder than −18° C (0° F) must meet § 54.05–15 and Part 57.03 of this chapter.

§ 154.182 Contiguous hull structure: Production weld test.

If the contiguous hull structure has a design temperature colder than −34° C (−30° F), each 50 m (164 ft.) of full penetration butt welded joints in the contiguous hull structure must pass, in the presence of a Coast Guard inspector, the following production weld tests in the position that the joint is welded:

(a) A bend test under § 57.06–4 of this chapter.

(b) A charpy V-notch test under § 57.06–5 of this chapter from 3 specimens with the notch alternately located in the center of the weld and the most critical location in the heat affected zone.[3]

(c) If the contiguous hull structure does not pass the test under paragraph (b) of this section, the retest procedures under § 54.05–5(c) must be used.

§ 154.188 Membrane tank: Inner hull steel.

For a vessel with membrane tanks, the inner hull plating thickness must meet the deep tank requirements of a recognized classification society.

§ 154.195 Aluminum tank: Steel enclosure.

(a) An aluminum tank and its dome must be enclosed by the vessel's hull structure or a separate steel cover.

(b) The steel cover for the aluminum tank must meet the steel structural standards of a recognized classification society.

(c) The steel cover for the aluminum tank dome must be—

(1) At least 3 mm (⅛ in.) thick;

(2) Separated from the tank dome, except at the support points; and

(3) Thermally isolated from the dome.

SHIP SURVIVAL CAPABILITY AND CARGO TANK LOCATION

§ 154.200 Stability requirements: General.

Each vessel must be stable for the full range of drafts taking into account any empty or partially filled tanks and the weight and volume of the cargoes carried.

§ 154.205 Intact stability requirements.

(a) Each vessel must meet Part 93 of this chapter.

(b) During loading and unloading the vessel must have at least 50 mm (2 in.) of positive metacentric height.

§ 154.210 Damage stability requirement.

Each vessel must be shown by design calculations to meet the survival presumptions in § 154.230 assuming the damage for the cargo it carries in the hull type specified in § 154.215.

154.215 Hull type calculation.

(a) Where Table 4 requires a type I G hull, design calculations must show that the vessel can survive damage at any location.

(b) Where Table 4 requires a type II G hull, design calculations must show that a vessel—

(1) Longer than 150 m (492.15 ft.) in length can survive damage at any location; and

(2) 150 m (492.15 ft.) long or shorter can survive damage at any location except the transverse bulkheads bounding an aft machinery space.

(c) If a vessel has independent tanks Type C with a MARVS of 7 kp/cm² (100 psig) and Table 4 allows a type II PG hull the design calculations must show that a 150 m (492.15 ft.) long or shorter vessel can survive damage at any location, except on transverse bulkheads spaced farther apart than the longitudinal extent of damage specified in § 154.220(a)(1).

(d) Where Table 4 requires a type III G hull, design calculations must show that a vessel—

(1) 125 m (410.13 ft.) or longer can survive damage at any location except on transverse bulkheads spaced farther apart than the longitudinal extent of damage specified in § 154.230(a)(1); and

(2) Shorter than 125 m (410.13 ft.) can survive damage at any location, except on transverse bulkheads spaced farther apart than the longitudinal extent of damage specified in § 154.220(a)(1) and except in the main machinery space.

(e) For the purposes of paragraphs (c) and (d) of this section, damage must be assumed to transverse bulkheads spaced closer than the longitudinal extent of damage specified in § 154.220(a)(1), and a main transverse bulkhead or a transverse bulkhead bounding side tanks or double bottom tanks must be assumed damaged if there is a step or a recess in a transverse bulkhead that is longer than 3 m (10 ft.) located within the extent of penetration of assumed damage. The step formed by the after peak bulkhead and after peak tank top is not a step for the purpose of this regulation.

§ 154.220 Damage calculations.

(a) For the purpose of § 154.210, design calculations must assume both side and bottom damage, applied separately.

(b) Damage must consist of the most disabling penetration up to and including penetrations having the following dimensions:

(1) *Side penetration.*

(i) Longitudinal extent: 1/3 $L^{2/3}$ or 14.5 m (0.495 $L^{2/3}$ or 47.6 ft.), whichever is shorter.

(ii) Transverse extent (inboard from the ship's side at right angles to the centerline at the level of the summer load line assigned under subchap. E): B/5 or 11.5 m (37.7 ft.), whichever is shorter.

(iii) Vertical extent: from the base line upward without limits:

(2) *Bottom penetration.*

At the forward end but excluding any damage aft of a point 0.3 L aft of forward perpendicular:

(i) Longitudinal: ⅓ $L^{2/3}$ or 14.5 m (.495 $L^{2/3}$ or 47.6 ft.), whichever is shorter.

(ii) Transverse: B/6 or 10 m (32.8 ft.), whichever is shorter.

(iii) Vertical extent from the molded line of the shell at the centerline: B/15 or 2 m (6.6 ft.), whichever is shorter.

[3] The most critical location in the heat affected zone of the weld is based on procedure qualification results, except austenitic stainless steel has notches only in the center of the weld.

At any longitudinal position aft of a point 0.3 L aft of the forward perpendicular:
(i) L/10 or 5 m (16.4 ft.), whichever is shorter.
(ii) B/6 or 5 m (16.4 ft.), whichever is shorter.
(iii) B/15 or 2 m (6.6 ft.), whichever is shorter.

(c) When the damage assumption excludes a transverse bulkhead bounding a machinery space, the machinery space must be assumed to be damaged as a case separate from the side and bottom peneration.

§ 154.225 Permeability of spaces and free surface effect.

(a) The free surface effect must be calculated at an angle of heel of 5° for each individual space or the effect of free liquid in a tank must be calculated by assessing the shift of liquids by moment of transference caluculations.

(b) In calculating the effect of free surfaces of consumable liquids, it must be assumed that, for each type of liquid, at least one transverse pair of wing tanks or a single center line tank has a free surface, and the tank or combination of tanks must be selected where the effect of free surfaces is the greatest.

(c) Calculations in which a machinery space is treated as a floodable space must be based on an assumed machinery space permeability of 0.85, unless the use of an asumed permeability of less than 0.85 is justified in detail.

(d) The assumed permeability of a floodable space other than a machinery space must be as follows:

(1) Storerooms, 0.60; (2) Accommodation spaces, 0.95; (3) void, 0.95; (4) consumable liquid tanks, 0.95 or 0, whichever results in the more disabling; (5) other liquid tanks, 0.95 or 0.[4]

Wherever damage penetrates a cargo tank it must be assumed that the cargo is completely lost from the compartment and replaced by salt water up to the level of the final plane of equilibrium.

§ 154.230 Damage survival.

A vessel is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(a) *Heel angle.* The maximum angle of heel must not exceed 30°.

(b) *Final waterline.* The waterline, taking into account sinkage, heel and trim, must be below the lower edge of openings such as air pipes and openings closed by weathertight doors or hatch covers, except openings closed by means of watertight manhole covers and watertight flush scuttles, small watertight cargo tank hatch covers that maintain the high integrity of the deck, remotely operated watertight sliding doors, and side scuttles of the non-opening type.

(c) *Range of stability.* (1) The righting lever curve must be positive and have a minimum range of 20° beyond the angle of equilibrium.

(2) The maximum righting lever within the range specified in paragraph (c)(1) of this section must be at least 100 mm (3.9 in.).

(3) Each opening within the 20° range beyond the angle of equilibrium must be at least weathertight.

(d) *Local damage.* The maximum angle of heel must not exceed the greater of 30° or the angle at which restoration of propulsion, steering engine power and use of the ballast system is precluded for local damage, extending 760 mm (29.9 in.) normal to the hull shell, that affects a—

(1) Longitudinal bulkhead; and

(2) Transverse bulkhead on type IG and IIG vessels.

(e) *Equalization arrangements.* Equalization arrangements requiring mechanical aids such as valves or cross-flooding lines may not be considered for reducing the angle of heel. Spaces joined by ducts of large cross sectional area are treated as common spaces.

(f) *Progressive flooding.* If pipes, ducts, or tunnels are within the assumed extent of damage, arrangements must be made to prevent progressive flooding in a space that is not assumed to be flooded in the damaged stability calculations. If an intermediate stage of flooding is more critical than the final stage, calculations for the intermediate stage must be submitted for special approval by Commandant (G-MMT).

§ 154.235 Tank location.

(a) For type IG hulls, cargo tanks must be located inboard of—

(1) The transverse damage specified in § 154.220(b)(1)(ii);

(2) The verticle damage specified in § 154.220(b)(2)(iii); and

(3) 760 mm (30 inches) from the shell planting.

(b) For type IIG, IIPG, and IIIG hulls cargo tanks must be located inboard of—

(1) The vertical extent of damage specified in § 154.220(b)(2)(iii); and

(2) 760 mm (30 inches) from the shell plating.

(c) In vessels having membrane and semi-membrane tanks, the vertical and transverse extents of damage must be measured to the inner hull.

(d) For type IIG, IIPG, and IIIG hulls, tank suction wells may penetrate into the area of bottom damage specified in § 154.220(b)(2)(iii) if the penetration is the lesser of 25 percent of the double bottom height or 350 mm (13.8 in.).

SHIP ARRANGEMENTS

§ 154.300 Segregation of hold spaces from other spaces.

Hold spaces must be segregated from machinery and boiler spaces, accommodation, service and control spaces, chain lockers, potable, domestic and feed water tanks, store rooms and spaces immediately below or outboard of hold spaces by a—

(a) Cofferdam, fuel oil tank, or single gastight A-60 Class Division of all welded construction in a cargo containment system not requiring a secondary barrier;

(b) Cofferdam or fuel oil tank in a cargo containment system requiring a secondary barrier; or

(c) If there are no sources of ignition or fire hazards in the adjoining space, single gastight A-O Class Division of all welded construction.

§ 154.305 Segregation of hold spaces from the sea.

In vessels having cargo containment systems requiring a secondary barrier, hold spaces must be segregated from the sea by—

(a) A double bottom if the cargo tanks are approved for temperatures colder than −10° C (14° F); and

(b) Wing tanks if the cargo tanks are approved for temperatures colder than −55° C (−67° F).

§ 154.310 Cargo piping systems.

Cargo liquid or vapor piping must—

(a) Be separated from other piping systems, except where an interconnection to inert gas or purge piping is required by § 154.901(a);

(b) Not enter or pass through any accommodation, service, or control space;

(c) Except as allowed under § 154.703, not enter or pass through a machinery space other than a cargo pump or compressor room;

(d) Be in the cargo area above the open deck, except for bow and stern loading and emergency dumping;

(e) Connect into the cargo containment system above the open deck except—

(1) Pipes in a trunk traversing void spaces above a cargo containment system; and

(2) Pipes in cofferdams for draining, venting, or purging interbarrier and hold spaces; and

(f) Be inboard of the transverse tank location required by § 154.206, except for thwartship shore connection manifolds not subject to internal pressure at sea.

§ 154.315 Cargo pump and compressor rooms.

(a) Cargo pump rooms and cargo compressor rooms must be above the open deck and within the cargo area.

(b) Where pumps and compressors are driven by a prime mover in an adjacent gas safe space—

(1) The bulkhead or deck must be gastight; and

(2) The shafting passing through the bulkhead or deck must be sealed by a fixed oil reservoir gland seal or other positive pressure seal specially approved by the Commandant (G-MMT).

§ 154.320 Cargo control stations.

(a) Cargo control stations must be above the open deck.

(b) If a cargo control station is in accommodation, service or control space or has access to such a space, the station must—

(1) Be a gas safe space;

(2) Have an access to the space that meets § 154.30; and

(3) Have indirect reading instrumentation, except for gas detectors.

(c) Cargo control stations, including a room or area, must contain all alarms, indicators, and remote controls associated with each tank that the station controls.

[4] The permeability of partially filled tanks must be consistent with actual density and amount of liquid carried.

§ 154.325 Accommodation, service, and control spaces.

(a) Accommodation, service, and control spaces must be outside the cargo area.

(b) If a hold space having a cargo containment system that requires a secondary barrier is separated from any accommodation, service, or control space by a cruciform joint, there must be a cofferdam on one side of the cruciform joint.

§ 154.330 Openings to accommodation, service, or control spaces.

(a) Entrances, forced or natural ventilation intakes and exhausts, and other openings, except as allowed in paragraph (c) of this section, must be—

(1) At least L/25 or 3 m (10 ft) from the athwartship bulkhead facing the cargo area, whichever is farther, except that the distance need not exceed 5 m (16.4 ft); and

(2) On a house athwartship bulkhead not facing the cargo area or on the outboard side of the house.

(b) Port lights located on the athwartship bulkhead of a house facing the cargo area, or the house sides within L/25 or 5 m (16.4 ft), whichever is less, must not open.

(c) Wheelhouse doors and windows that open may be within L/25 or 5 m (16.4 ft), whichever is less, of the athwartship bulkhead of a house facing the cargo area, if they have gaskets and dogs to make them watertight when tested with a fire hose at not less than 2.11 kp/cm² (30 psig).

(d) Port lights in the hull plating below the uppermost continuous deck and in the first tier of the superstructure must not open.

(e) Air intakes and openings into accommodation, service and control spaces must have—

(1) Gasketed metal covers; and

(2) On toxic cargo vessels, covers that can be closed from inside the space.

§ 154.340 Access to tanks and spaces in the cargo area.

In the cargo area—

(a) Each cargo tank must have a manhole from the open deck, the clear opening of which is at least 600 mm by 600 mm (23.6 in. by 23.6 in.);

(b) Each access to a hold space, void space, or other gas dangerous space must have a clear opening of at least 600 mm by 600 mm (23.6 in. by 23.6 in.);

(c) Each manhole through bulkheads, frames, or other vertical structural member must have a clear opening of at least 600 mm (23.6 in.) by 800 mm (31.5 in.) and be at most 600 mm (23.6 in.) from the deck or bottom plating unless there is a fixed ladder;

(d) Each access trunk must be at least 760 mm (30 in.) in diameter.

(e) The lower edge of each access from the open deck to gas safe spaces in the cargo area must be at least 2.4 mm (7.87 ft.) above the open deck or through an air lock that meets § 154.345;

(f) The inner hull must be accessible for inspection from at least one side without the removal of any fixed structure or fitting; and

(g) The hold space insulation must be accessible for inspection from at least one side from within the hold space while the tank is at the cargo temperature unless an inspection method from outside of the hold space is specially approved by the Commandant (G-MMT).

§ 154.345 Air locks.

(a) An air lock may be used for access from a gas dangerous zone on the open deck to a gas safe space in the cargo area.

(b) Each air lock must—

(1) Consist of two steel doors, at least 1.5 m (4.92 ft.) but not more than 2.5 m (8.20 ft.) apart each gasketed and dogged and watertight when tested with a fire hose at not less than 2.11 kp/cm² (30 psig);

(2) Have self-closing doors with no latches or other devices for holding them open;

(3) Have an audible and visual alarm on both sides actuated when the securing devices on both doors move from the fully closed position at any one time;

(4) Have mechanical ventilation in the space between the doors from a gas safe area;

(5) Have a pressure greater than that of the gas dangerous area on the open deck;

(6) Have the rate of air change in the space between the doors of at least 12 changes per hour;

(7) Have the space between the doors monitored for cargo vapor leaks under § 154.1350; and

(c) In addition to the requirements of paragraphs (a) and (b) of this section, no gas safe space on a liquefied flammable gas carrier may have an air lock unless the space—

(1) Is mechanically ventilated to make the pressure in the space greater than that in the air lock; and

(2) Has a means of automatically deenergizing all electrical equipment that is not explosion-proof in the space when the pressure in the space falls to or below the pressure in the air lock.

§ 154.350 Bilge and ballast systems in the cargo area.

(a) Hold, interbarrier, and insulation spaces must have a means of sounding the space or other means of detecting liquid leakage acceptable to the Commandant (G-MMT).

(b) Each hold and insulation space must have a bilge drainage system.

(c) Interbarrier spaces must have an educator or pump for removing liquid cargo and returning it to the cargo tanks or to an emergency dump.

(d) Spaces in the cargo containment portion of the vessel, except ballast spaces and gas safe spaces, must not connect to pumps in the main machinery space.

§ 154.355 Bow and stern loading piping.

(a) Bow and stern loading piping must—

(1) Meet § 154.310;

(2) Be installed in an area away from the accommodation, service, or control space on type I G hulls;

(3) Be clearly marked;

(4) Be segregated from the cargo piping by at least two shut off valves in the cargo area that has a means of locking to meet § 154.1870(a);

(5) Have a means for checking cargo vapor between the two valves required in paragraph (a)(3) of this section;

(6) Have fixed inert gas purging lines; and

(7) Have fixed vent lines for purging with inert gas to meet § 154.1870(b).

(b) Entrances, forced or natural ventilation intakes, exhaust, and other openings to accommodation, service, or control spaces that face the bow or stern loading area must meet §§ 154.330.

CARGO CONTAINMENT SYSTEMS

§ 154.401 Definitions.

As used §§ 154.440 and 154.447:

"σ_Y" means the minimum yield stress of the tank material, including weld metal, at room temperature.

"σB" means minimum tensile strength of the tank material, including weld metals at room temperature.

§ 154.405 P_o of a tank.

(a) The P_o of a tank must be equal to or greater than the MARVS.

(b) The P_o of a tank must be equal to or greater than the vapor pressure of the cargo at 45° C (113° F) if—

(1) The tank has no temperature control for the cargo; and

(2) The pressure of the cargo results from ambient temperature.

(c) The P_o of a tank may be less than the vapor pressure for harbor conditions if specially approved by the Commandant (G-MMT).

§ 154.406 Design loads for tanks and fixtures: General.

(a) It must be shown that a tank and its fixtures are designed for the following loads:

(1) Internal pressure head.

(2) External pressure load.

(3) Dynamic loads resulting from the motion of the vessel.

(4) Transient or stationary thermal loads if the cargo temperature is colder than −55° C (−67° F) or causes thermal stresses in tank support.

(5) Sloshing loads, if the tank is designed for partial loads.

(6) Loads resulting from vessel's deflection.

(7) Tank weight, cargo weight, and corresponding support reaction.

(8) Insulation weight.

(9) Loads of a tower and any other attachments to the tank.

(10) Vapor pressure loads in harbor conditions allowed under § 154.405.

(11) Gas pressurization for cargo transfer load.

(b) A tank must be designed for the most unfavorable static heel angle within a 0° to 30° range without exceeding the allowable stress of the material.

(c) A hydrostatic or hydropneumatic test design load must be specially approved by the Commandant (G-MMT).

§ 154.407 Tank internal pressure head.

(a) For the calculation required under § 154.406(a), the internal pressure head (h_{eq}), must be determined from the following formula:

$$h_{eq} = 10\,P_o + (h_{\beta d})\ \max$$

$h_{\beta d}$ (the value of internal pressure, in meters of fresh water, resulting from the combined effects of gravity and dynamical accelerations of a full tank) $= a_{\beta\beta} Z$;
where

a_β = Dimensionless acceleration relative to the acceleration of gravity, resulting from gravitational and dynamical loads in the β direction (see figure 1);

Z_β = Largest liquid height (m) above the point where the pressure is to be determined in the β direction (see figure 2);

λ = Maximum specific weight of the cargo (t/m³) at the design temperature.

(b) The $h_{\beta d}$ max must be determined from the β max direction on the ellipse in Figure 1 which gives the maximum value.

(c) When the longitudinal acceleration is considered in addition to the vertical and tranverse acceleration, an ellipsoid must be used in the calculations instead of the ellipse contained in Figure 1.

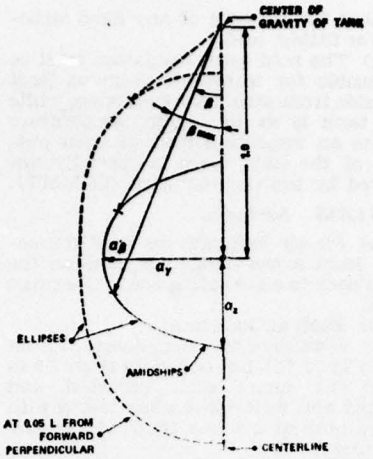
§ 154.408 Tank external pressure load.

For the calculation required under § 154.406(b), the external pressure load must be the difference between the minimum internal pressure (maximum vacuum), and the maximum external pressure to which any portion of the tank may be simultaneously subjected.

§ 154.409 Dynamic loads from vessel motion.

(a) For the calculation required under § 154.406(c), the dynamic loads must be determined from the long term distribution of vessel motions, including the effects of surge, sway, heave, roll, pitch, and yaw on irregular seas that the vessel may experience during 10^8 wave encounters. The speed used for this calculation may be reduced from the ship service speed if specially approved by the Commandant (G–MMT) and if that reduced speed is used in the hull strength calculation under § 31.10–5(c) of this chapter.

(b) If the loads determined under paragraph (c), (d), or (e) of this section results in a design stress that is lower than the allowable stress of the material under §§ 154.610, 154.615, or 154.620, reduce the allowable stress to that stress determined in paragraph (c), (d), or (e) of this section.

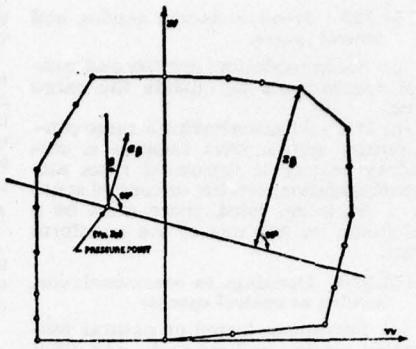


NOTE: RESULTING ACCELERATION (STATIC + DYNAMIC) = a_β IN ARBITRARY DIRECTION β.

a_y = TRANSVERSE COMPONENT OF ACCELERATION.

a_z = VERTICAL COMPONENT OF ACCELERATION.

Figure 1



NOTE: LARGEST LIQUID HEIGHT ABOVE THE POINT WHERE THE PRESSURE IS DETERMINED = Z_β

Figure 2

(c) If a tank is designed to avoid plastic deformation and buckling, then acceleration components of the dynamic loads are determined from one of the following methods:

(1) Method 1 is a detailed analysis of the vessels acceleration components.

2. Method 2 is an analysis by the following formulae:

(i) Vertical acceleration under § 154.409(f)(1):

$$a_z = \pm a_o \sqrt{1+\left(5.3-\frac{45}{L_o}\right)^2\left(\frac{x}{L_o}+0.05\right)^2\left(\frac{0.6}{C_B}\right)^{3/2}}$$

(ii) Transverse acceleration under § 154.409(f)(2):

$$a_y = \pm a_o \sqrt{0.6+2.5\left(\frac{x}{L_o}+0.05\right)^2+K\left(1+0.6K\,\frac{z}{B}\right)^2}$$

(iii) Longitudinal acceleration under § 154.409(f)(3):

$$a_x = \pm a_o\sqrt{0.06+A^2-0.25A}$$

where:

$$A=\left(0.7-\frac{L_o}{1200}+5\,\frac{z}{L_o}\right)\left(\frac{0.6}{C_B}\right)$$

L = Length of the vessel between perpendiculars, in meters.

C_B = Block coefficient.

B = Greatest moulded breadth, in meters.

x = Longitudinal distance, in meters, from amidships to the center of gravity of the tank with contents (positive forward of amidships, negative aft of amidships).

z = Vertical distance in meters, from the vessel's waterline, to center of gravity of tank with contents (positive above and negative below the waterline).

$$a_o = 0.2\,\frac{V}{\sqrt{L_o}}+\frac{34-\frac{600}{L_o}}{L_o}$$

V = Service speed in knots.

$K = 1.0$, or $\frac{13\,GM}{B}$, whichever is greater.

GM = Metacentric height in meters.

a_x = The maximum dimensionless acceleration in the x direction, acting separately for calculation purposes, and includes the component of the static weight in the longitudinal direction due to pitching.

a_y = Maximum dimensionless acceleration in the y direction, acting separately for calculation purposes, and includes the component of static weight in the transverse direction due to rolling.

a_z = Maximum dimensionless acceleration in the z direction, acting separately for calculation purposes, not including the static weight.

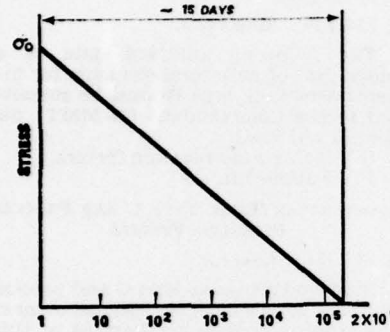
For Methods 1 and 2, acceleration components must be determined for the largest loads the vessel may experience during an operating life correspond to the probability level of 10^{-8}.

(d) If a tank is designed to avoid fatigue, the dynamic loads determined under paragraph (a) of this section must be used to develop the dynamic spectrum.

(e) If a tank is designed to avoid uncontrolled crack propogation, the dynamic loads are—

(1) determined under paragraph (a) of this section; and

(2) for a load distribution for a period of 15 days by the method in Figure 3.



NOTE: σ_0 = MOST PROBABLE MAXIMUM STRESS DURING THE LIFE OF THE VESSEL.

RESPONSE CYCLE SCALE IS LOGARITHMIC.

THE VALUE OF $2X10^5$ IS GIVEN AS AN EXAMPLE OF ESTIMATE.

Figure 3

(f) When determining the accelerations for dynamic loads under paragraph (a) of this section, the accelerations acting in a tank must be estimated for the tank's center of gravity and include the following component accelerations:

(1) Vertical accelerations, meaning the motion acceleration of heave and pitch, and of any roll normal to the vessel base that has an effect on the component acceleration.

(2) Transverse acceleration, meaning the motion acceleration of sway, yaw and roll, and gravity component of roll.

(3) Longitudinal acceleration, meaning the motion acceleration of surge and pitch and gravity component of pitch.

§ 154.410 Tank sloshing loads.

(a) For the calculation required under § 154.406(a)(5), the determined sloshing loads resulting from the accelerations under § 154.409(f) must be specially approved by the Commandant (G-MMT).

(b) If the sloshing loads affect the tank scantlings, an analysis of the effects of the sloshing loads in addition to the calculation under paragraph (a) of this section must be specially approved by the Commandant (G-MMT).

§ 154.411 Tank thermal loads.

For the calculations required under § 154.406(d), the following determined loads must be specially approved by the Commandant (G-MMT):

(a) Transient thermal loads for the cooling down periods of tanks carrying cargoes lower than −55° C (−67° F).

(b) Stationary thermal loads for tanks carrying cargoes lower than −55° C (−67° F) that cause high thermal stress.

§ 154.412 Tank corrosion allowance.

A tank must be designed with a corrosion allowance if the tank—

(a) Is located in a space that does not have inert gas or dry air; or

(b) Carries a cargo that corrodes the tank material.

NOTE.—Corrosion allowance for independent tank type C is contained in § 54.01-35 of this chapter.

INTEGRAL TANKS

§ 154.418 General.

Integral tanks must not carry cargo that is colder than −10°C (14°F), unless the tank is specially approved by the Commandant (G-MMT).

§ 154.419 Design vapor pressure.

The P_o of an integral tank must not exceed 0.25 kp/cm² (4 psig) except it may be as high as 0.7 kp/cm² (10 psig) if specially approved by the Commandant (G-MMT).

§ 154.420 Tank scantlings.

(a) The scantlings of an integral tank must meet the deep tank scantling standard of a recognized classification society.

(b) The scantlings of an integral tank must be designed and shown by calculation to withstand the internal pressure determined under § 154.407.

§ 154.421 Allowable stress.

The allowable stress for integral tank scantlings must meet a recognized classification society's allowable stress for the vessel's hull.

MEMBRANE TANKS

§ 154.425 General.

The design of the hull scantlings, the membrane tank and secondary barrier, including welds, and the supporting insulation must be specially approved by the Commandant (G-MMT).

§ 154.426 Design vapor pressure.

The P_o of a membrane tank must not exceed 0.25 kp/cm² (4 psig), except it may be as high as 0.7 kp/cm² (10 psig), if specially approved by the Commandant (G-MMT).

§ 154.427 Tank scantlings.

The scantlings of a membrane tank must have a membrane and supporting insulation that is designed for—

(a) Any static and dynamic loads with respect to plastic deformation and fatigue;

(b) Combined strains from static, dynamic, and thermal loads;

(c) Preventing collapse of the membrane from—

(1) Over-pressure in the interbarrier space;

(2) Vacuum in the cargo tank;

(3) Sloshing in a partially filled tank; and

(4) Hull vibrations; and

(d) The deflections of the vessel's hull.

§ 154.428 Allowable stress.

The membrane tank scantlings and the supporting insulation must have allowable stresses that are specially approved by the Commandant (G-MMT).

§ 154.429 Calculations.

For a membrane tank, the tank design load calculations must include the following:

(a) Plastic deformation and fatigue life resulting from static and dynamic loads in the membrane and the supporting insulation.

(b) The response of the membrane and its supporting insulation to vessel motion and acceleration under the worse weather conditions. Calculations from a similar vessel may be submitted.

(c) The combined strains from static, dynamic, and thermal loads.

§ 154.430 Material test.

The analyzed data of a material test must show that the membrane and the membrane supporting insulation are made of materials that withstand the combined strains calculated under § 154.429(c).

§ 154.431 Model test.

The analyzed data of a model test must show that the primary and secondary barrier of a membrane tank, including the corners and joints, withstand the combined strains from static, dynamic, and thermal loads calculated under § 154.429(c).

§ 154.432 Expansion and contraction.

The support system of a membrane tank must allow for thermal and physical expansion and contraction of the tank.

SEMI-MEMBRANE TANKS

§ 154.435 General.

(a) The design of the semi-membrane tank, the supporting insulation for the tank, and the supporting hull structure for the tank must be specially approved by the Commandant (G-MMT).

(b) A semi-membrane tank must be designed to meet the requirements under—

(1) Section 154.425 through § 154.432;

(2) Section 154.437 through § 154.441; or

(3) Section 154.444 through § 154.449.

§ 154.436 Design vapor pressure.

The P_o of a semi-membrane tank must not exceed 0.25 kp/cm² (4 psig), except it may be as high as 0.7 kp/cm² (10 psig), if specially approved by the Commandant (G-MMT).

INDEPENDENT TANK TYPE A

§ 154.437 General.

The tank scantlings of an independent tank type A must meet the standard of a recognized classification society.

§ 154.438 Design vapor pressure.

(a) If the surfaces of an independent tank type A are mostly flat surfaces, the P_o must not exceed 0.7 kp/cm² (10 psig).

(b) If the surfaces of an independent type A are formed by bodies of revolution, the design calculation of the P_o must be specially approved by the Commandant (G–MMT)

§ 154.439 Tank scantlings.

(a) The scantlings of an independent tank type A must meet the deep tank standard of a recognized classification society.

(b) The scantlings of an independent tank type A must—

(1) Withstand the internal pressure determined under § 154.407;

(2) Withstand loads from tank supports calculated under §§ 154.470 and 154.471; and

(3) Have a corrosion allowance that meets § 154.412.

§ 154.440 Allowable stress.

(a) The allowable stresses for an independent tank type A are—

(1) For tank web frames, stringers, or girders of carbon maganese steel or aluminimum alloys must meet $\frac{\sigma_B}{2.66}$ or, $\frac{\sigma_Y}{1.33}$ whichever is smaller; and

(2) For other materials, specially approved by the Commandant (G–MMT).

(b) A larger allowable stress than required in paragraph (a)(1) of this section may be specially approved by the Commandant (G–MMT) if the aquivalent stress (σ_e) is calculated from the formula in Appendix A to this part.

(c) Tank plating must meet the requirements of a recognized classification society for deep tanks having an internal pressure head that meets § 154.439 (b)(1).

INDEPENDENT TANK TYPE B

§ 154.444 General.

An independent tank type B must be designed—

(a) For the effect of static and dynamic loads on—

(1) Plastic deformation; (2) Fatigue life; (3) Buckling; and (4) Crack propagation; and

(b) From the results of the calculations under § 154.448.

§ 154.445 Design vapor pressure.

If the surfaces of an independent tank type B are mostly flat surfaces, the P_o must not exceed 0.7 kp/cm² (10 psig).

§ 154.446 Tank scantlings.

The tank scantlings of an independent tank type B must meet the calculations under § 154.448.

§ 154.447 Allowable stress.

(a) An independent tank type B designed from bodies of revolution must have allowable stresses[6] determined by the following formulae:

$$\sigma_m \leq f$$
$$\sigma_L \leq 1.5f$$
$$\sigma_b \leq 1.5F$$
$$\sigma_L + \sigma_b \leq 1.5F$$
$$\sigma_m + \sigma_b \leq 1.5F$$

where:

σ_m = Equivalent primary general membrane stress [5]
σ_L = Equivalent primary local membrane stress [6]
σ_b = Equivalent primary bending stress [6]

f = The lesser of $\frac{\sigma_B}{A}$ or $\frac{\sigma_Y}{B}$

F = The lesser of $\frac{\sigma_B}{C}$ or $\frac{\sigma_Y}{D}$

A, B, C, and D = Stress factors in table 2

[5] See app. B for stress analyses definition
[6] See app. A for equivalent stress.

TABLE 2.—*Values for stress factors*

Stress factors	Nickel steel and carbon manganese steel values	Austenitic steel values	Aluminum alloy values
A	0.4	0.4	0.4
B	.2	1.6	1.5
C	.3	.3	.3
D	1.5	1.5	1.5

(b) An independent tank type B designed from plane surfaces must have allowable stresses specially approved by the Commandant (G–MMT)

§ 154.448 Calculations.

The following calculations for an independent tank type B must be specially approved by the Commandant (G–MMT):

(a) Plastic deformation, fatigue life, buckling, and crack propogation resulting from static and dynamic loads on the tank and its support.

(b) A three-dimensional analysis of the stress exerted on the tank, its support, and its keys by the hull.

(c) The response of the tank and its support to the vessel's motion and acceleration in irregular waves or calculations from a similar vessel.

(d) A tank buckling analysis considering the maximum construction tolerance.

(e) A finite element analysis using the loads determined under § 154.406.

(f) A fracture mechanics analysis using the loads determined under § 154.406.

(g) The cumulative effects of the fatigue load from the following formula:

$$\Sigma \frac{n_i}{N_i} + \frac{10^3}{N_j} \leq C_w$$

where:

n_i = The number of stress cycles at each stress level during the life of the vessel;
N_i = The number of cycles to failure for corresponding stress levels from the Wohler (S–N) curve;
N_j = The number of cycles to failure from the fatigue load by loading and unloading the tank; and
C_w = 0.5 or less.

§ 154.449 Model test.

The following analyzed data of a model test of structural elements for independent tank type B must be submitted to the Commandant (G–MMT) for special approval:

(a) Stress concentration factors.

(b) Fatigue life.

INDEPENDENT TANK TYPE C AND PROCESS PRESSURE VESSELS

§ 154.450 General.

Independent tanks type C and process pressure vessels must be designed to meet the requirements under Part 54 of this chapter, except § 54.01–40(b) and

(a) The calculation under § 54.01–18 (b)(1) must also include th design loads determined under § 154.406;

(b) The calculated tank plating thickness, including any corrosion allowance, must be the minimum thickness without a negative plate tolerance; and

(c) The minimum tank plating thickness must not be less than—

(1) 5 mm (3/16 in.) for carbon-manganese steel and nickel steel:

(2) 3 mm (1/8 in.) for austenitic steels; or

(3) 7 mm (9/32 in.) for aluminum alloys.

§ 154.451 Design vapor pressure.

The P_o of an independent tank type C must be calculated by the following formula:

$$P_o = 2 + AC(\rho)^{3/2} (kp/cm^2)$$

where:

$$A = 0.0185 \left(\frac{\sigma m}{\Delta \sigma_A}\right)^2$$

σ_m = Design primary stress;
$\Delta\sigma_A$ = (Allowable dynamic membrane stress for double amplitude at probability level $Q = 10^{-8}$) 5.5 kp/mm² (7160 psi) for ferritic and martensitic steels and 2.5 kp/mm² (3580 psi) for 5083–0 aluminum.
C = A characteristic tank dimension that is the greater of h when h is the height of the tank or the dimension in vessel's vertical direction, in meters; $0.75b$ when b is the width of the tank or the dimension in vessel's transverse direction, in meters; or $0.45l$ when l is the length of the tank or the dimension in vessel's longitudinal direction, in meters;
ρ = The specific gravity of cargo.

§ 154.452 External pressure.

The design external pressure for an independent tank type C must be calculated by the following formula:

$$P_e = P_1 + P_2 + P_3 + P_4 (kp/cm^2)$$

where:

P_1=the vacuum relief valve setting for tanks with a vacuum relief valve, or 0.25kp/cm² for tanks without a vacuum relief valve.

P_2=0, or the pressure relief valve setting for an enclosed space containing any portion of a pressure vessel.

P_3=total compressive load in the tank shell from the weight of the tank, including corrosion allowance, weight of insulation, weight of dome, weight of tower and piping, the effect of the partially filled tank, the effect of acceleration and hull deflection, and the local effect of external and internal pressure.

P_4=0, or the external pressure from the head of water from any portion of the pressure vessel on exposed decks.

§ 154.453 Failure to meet independent tank type C standards.

If the Commandant (G-MMT) determines during plan review, that a tank designed as an independent tank type C fails to meet the standards under §§ 154.450, 154.451, and 154.452 and can not be redesigned to meet those standards, the tank may be redesigned as an independent tank type A or B.

SECONDARY BARRIER

§ 154.459 General.

(a) Each tank must have a secondary barrier that meets Table 3.

TABLE 3.—*Secondary barriers for tanks*

Tank type	Cargo temperature at atmospheric pressure		
	−10°C (14°f) and warmer	Colder than −10°C (14°F) to −55°C (−67°F)	Colder than −55°C (−67°F)
Integral	No Secondary barrier required.	Tank type not usually allowed.[1]	Tan type not allowed.
Membrane	do	Complete secondary barrier [1]	Complete secondary barrier.[2]
Semimembrane	do	do [1]	Do.[2]
Independent:			
Type A	do	do [1]	Do.[2]
Type B	do	Partial secondary barrier [1]	Partial secondary barrier.[2]
Type C	do	No secondary barrier required	No secondary barrier required.

[1] The hull may be used as a secondary barrier.
[2] A separate secondary barrier is required.

(b) If the Commandant (G-MNT) specially approves an integral tank for cargoes with a temperature at atmospheric pressures lower than -10° C (14° F), the tank must have a complete secondary barrier that meets § 154.460.

(c) If the Commandant (G-MNT) specially approves a semi-membrane tank under the requirements of an independent tank type B, the semi-membrane tank may have a partial secondary barrier specially approved by the Commandant (G-NMT).

(d) If Table 3 allows the hull to be a secondary barrier, the vessel's hull must—

(1) Meet § 154.600; and

(2) Be designed for the stresses resulting from cargo temperature.

(e) A tank type that is not included in Table 3 must have a secondary barrier that is specially approved by the Commandant (G-NMT).

§ 154.460 Design criteria.

At static angles of heel up through 30°, a secondary barrier must—

(a) Hold any leakage of liquid cargo from the tank for at least 15 days under the loading requirements in § 154.409(e);

(b) If the primary barrier fails, prevent the vessel's structure temperature from falling below the minimum allowable service temperature of the steel; and

(c) Prevent the tank failure from causing a failure in the secondary barrier.

INSULATION

§ 154.465 General.

If the cargo that a vessel carries is below -10° C (14° F), the tank insulation must prevent the temperature of the vessel's hull from cooling below the minimum design temperature allowed under § 154.172.

§ 154.466 Design criteria.

(a) The insulation for a tank without a secondary barrier must be designed for the tank at the temperature of the cargo carried and for a vessel operating in—

(1) Any waters in the world except Alaskan waters for the ambient cold condition of—

(i) Five knots air at -18° C (0° F); and

(ii) Still sea water at 0° C (32° F); or

(2) Alaskan waters for the ambient cold condition of—

(i) Five knots air at 29° C (-20° F); and

(ii) Still sea water at 2° C (28° F).

(b) The insulation for a tank with a secondary barrier must be designed for the secondary barrier at the temperature of the cargo carried and the ambient cold conditions listed under paragraph (a)(1) or paragraph (a)(2) of this section.

(c) The insulation material must be designed for any loads transmitted from adjacent hull structure.

(d) Insulation for tank and piping must meet § 38.05-20 of this chapter.

(e) Powder or granulated insulation must—

(1) Not compact from vibrations of the vessel;

(2) Maintain the thermal conductivity specially approved under § 154.467; and

(3) Not exert a static pressure greater than the external design pressure of the tank under § 154.408.

§ 154.467 Submission of insulation information.

(a) The following insulation information must be submitted to the Commandant (G-MMT):

(1) Compatibility with the cargo.

(2) Solubility in the cargo.

(3) Absorption of the cargo.

(4) Shrinkage.

(5) Aging.

(6) Closed cell content.

(7) Density.

(8) Mechanical properties.

(9) Thermal expansion.

(10) Abrasion.

(11) Cohesion.

(12) Thermal conductivity.

(13) Resistance to vibrations.

(14) Resistance to fire and flame spread.

(15) The manufacturing and installation details of the insulation that includes—

(i) Fabrication; (ii) Storage; (iii) Handling; (iv) Erection; and (v) Quality control.

SUPPORT SYSTEM

§ 154.470 General.

(a) A tank must have a support system that—

(1) Prevents movement of the tank under static and dynamic loads in § 154.406; and

(2) Allows the tank to contract and expand from temperature variation and hull deflection without exceeding the design stress of the tank and the hull.

(b) The tank support system must have a key that prevents rotation of the tank.

(c) An independent tank must have supports with an antiflotation system that withstands the upward force of the tank without deformation of the hull when the tank is—

(1) Empty; and

(2) In a hold space flooded to the summer load draft of the vessel.

§ 154.471 Design criteria.

(a) The tank support system must be designed—

(1) For the loads in § 154.406(a);

(2) To not exceed the allowable stress at a static angle of heel of 30°;

(3) To withstand a collision force equal to at least one-half the weight of the tank and cargo from forward and one-quarter the weight of the tank and cargo from aft; and

(4) For the largest resulting acceleration in Figure 1, including rotational and translation effects.

(b) The tank support design loads in paragraph (a) of this section may be analyzed separately.

§ 154.476 Cargo transfer devices and means.

(a) If a cargo pump in a tank is not accessible for repair when the tank is in use, the tank must have an additional means of cargo transfer, such as another pump or gas pressurization.

(b) If cargo is transferred by gas pressurization, the pressurizing line must have a safety relief valve that is set at less than 90 percent of the tank relief valve setting.

CARGO AND PROCESS PIPING SYSTEMS

§ 154.500 Cargo and process piping standards.

The cargo liquid and vapor piping and process piping systems must meet the

requirements in this subpart and the following subparts and sections in this chapter:

56.01	56.50–105
56.04	56.60
56.07	56.65
56.10	56.70
56.15	56.75
56.20	56.80
56.25	56.85
56.30	56.90
56.35	56.95
56.50–20	56.97

§ 154.503 Piping and piping system components: Protection from movement.

The piping and piping system components and cargo tanks must be protected, where thermal movement and movements of the tank and the hull structure may cause stresses, that exceed the design stresses by—

(a) Offsets; (b) Loops; (c) Bends; (d) Mechanical expansion joints including—

(1) Bellows; (2) Slip joints; or (3) Ball joints; or (e) Other means specially approved by the Commandant (G–MMT).

§ 154.506 Mechanical expansion joint: Limits in a piping system.

The number of mechanical expansion joints in a piping system must be specially approved by the Commandant (G–MMT).

§ 154.508 Mechanical expansion joint: Bellows type.

(a) Mechanical expansion joints in a piping system outside of a cargo tank must be a bellows type.

(b) A bellow expansion joint in a piping system outside of a cargo tank must be protected from icing by—

(1) Insulation;

(2) A cover; or

(3) Other means specially approved by the Commandant (G–MMT).

§ 154.512 Piping: Thermal isolation.

Low temperature piping must be thermally isolated from any adjacent hull structure to prevent the temperature of that structure from dropping below the design temperature of the hull material.

§ 154.514 Piping: Electrical bonding.

(a) Tanks or piping that are separated from the hull structure by thermal isolation must be electrically bonded to the hull structure.

(b) A pipe joint or a hose connection that has a gasket must have an electrical bond.

§ 154.516 Piping: Hull protection.

A vessel's hull must be protected from low temperature liquid leakage by a drip pan, or other means specially approved by the Commandant (G–MMT), at—

(a) Any piping connection dismantled on a routine basis;

(b) Cargo discharge and loading manifold; and

(c) Pump seals.

§ 154.517 Piping: Liquid pressure relief.

The cargo loading and discharge crossover headers, cargo hoses, and cargo loading arms must have means to relieve cargo pressure and to remove liquid cargo.

§ 154.519 Piping relief valves.

(a) The liquid relief valve that protects the cargo piping system from liquid pressure exceeding the design pressure must discharge into a tank.

(b) A liquid relief valve may discharge into a cargo vent mast if that vent mast has a means for the detection and removal of the liquid cargo that is specially approved by the Commandant (G–MMT).

(c) A relief valve on a cargo pump that protects the cargo piping system must discharge into the pump suction.

§ 154.520 Piping calculations.

A piping system must be designed to meet the allowable stress values under § 56.07–10 of this chapter and, if the design temperature is −110° C (−166° F) or lower, the stress analysis must include—

(a) Pipe weight loads;

(b) Acceleration loads;

(c) Internal pressure loads;

(d) Thermal loads; and

(e) Loads from the hull.

§ 154.522 Materials for piping.

(a) The materials for piping systems must meet § 154.625 for the minimum design temperature of the piping, except the material for open ended vent piping may be specially approved by the Commandant (G–MMT) if—

(1) The temperature of the cargo at the pressure relief valve setting is −55° C (−67° F) or warmer; and

(2) Liquid can not discharge to the vent piping.

(b) Materials for piping outside the cargo tanks must have a melting point of at least 925° C (1697° F), except for such short lengths of pipes with fire resisting insulation that are attached to the cargo tanks.

§ 154.524 Piping joints: Welded and screwed couplings.

Pipe lengths without flanges must be joined by a—

(a) Butt welded joint with complete penetration at the weld root, except that for design temperatures colder than −10° C (14° F) the butt weld must be double welded or must have an equivalent to a double welded butt joint by use of—

(1) A backing ring that for design pressures greater than 10 kp/cm² (142 psig) must be removed after the weld is completed;

(2) A consumable insert; or

(3) An inert gas back-up on the first weld pass;

(b) Slip on welded joint with sleeves and attachment welds allowed for an open ended pipe with an external diameter of 50 mm (2 in.) or less and a design temperatures at −55° C (−67° F) or warmer; or

(c) Screwed coupling that meets §§ 56.30–20 and 56.50–105 (a)(4) and (b)(4) of this chapter.

§ 154.526 Piping joints: Flange connection.

Flange connections for pipe joints must meet §§ 56.30–10 and 56.60–105 (a)(4) and (b)(4) of this chapter.

§ 154.528 Piping joints: Flange type.

(a) A flange must be one of the following types:

(1) Welding neck.

(2) Slip-on.

(3) Socket weld.

(b) If the design temperature of the piping is between −10° C (14° F) and −55° C (−67° F), the pipe flange may be a—

(1) Slip-on type, if the nominal pipe size is less than 100 mm (4 in.);

(2) Socket weld, if the nominal pipe size is less than 50 mm (2 in.); or

(3) Welding neck.

(c) If the design temperature of the piping is lower than −55° C (−67° F), the pipe flange must be a welding neck type.

§ 154.530 Valves: Cargo tank MARVS 0.7 kp/cm² (10 psig) or lower.

(a) Liquid and vapor connections on a cargo tank with a MARVS of 0.7 kp/cm² (10 psig) or lower, except connections for safety relief valves and liquid level gauging devices, must have shut-off valves that—

(1) Close;

(2) Are located as close to the tank as practicable; and

(3) Have manual control at the valve.

(b) The cargo piping system for a cargo tank with a MARVS of 0.7 kp/cm² (10 psig) or lower must have at least one remotely controlled quick closing shut-off valve for closing liquid and vapor piping between vessel and shore that meets §§ 154.540, 154.542, and 154.544.

§ 154.532 Valves: Cargo tank MARVS greater than 0.7 kp/cm² (10 psig).

(a) Liquid and vapor connections on a cargo tank with a MARVS greater than 0.7 kp/cm² (10 psig), except connections for safety relief valves and liquid level gauging devices, must have as close to the tank as practicable, a—

(1) Manual controlled stop valve; and

(2) Remotely controlled quick-closing shut-off valve.

(b) If the nominal pipe size of a liquid or vapor connection is less than 50 mm (2 in.), an excess flow valve may be substituted for the quick closing valve required under paragraph (a) of this section.

(c) A single valve may be substituted for the manual controlled stop valve and the remotely controlled quick-closing shut-off valve required under paragraph (a) of the section if that single valve—

(1) Meets §§ 154.540, 154.542, and 154.544; and

(2) Is also manually controlled.

§ 154.534 Cargo pumps and compressors.

Cargo pumps and compressors must shut down automatcially when the quick-closing shunt-off valves required under §§ 154.530 and 154.532 are closed by the

150

emergency shut-down system required under § 154.540.

§ 154.536 Tank gauging and measuring connections.

Unless the outward flow from a tank is less than the flow through a circular hole of 1.4 mm (.055 in.), in diameter, tank connections for gauging or measuring devices must have excess flow or quick-closing shut-off valves.

§ 154.538 Cargo transfer connection.

A cargo transfer connection must have a—

(a) Remotely controlled quick-closing shut-off valve; or

(b) Blank flange.

§ 154.540 Quick-closing shut-off valves: Emergency control system.

(a) The remotely controlled quick-closing shut-off valve required under §§ 154.530, 154.532, and 154.538 must have an emergency control system to operate the valve.

(b) The control system required under paragraph (a) of this section must be in—

(1) The cargo control station; and

(2) At least one other remote location on the vessel.

(c) The quick-closing shut-off valve required under §§ 154.530, 154.532, and 154.538 must—

(1) Be the fail-closed type; and

(2) Have manual control.

§ 154.542 Quick-closing shut-off valves: Emergency control system fusible elements.

The control system required under § 154.540 must have fusible elements at each tank dome and cargo loading and discharge manifold that melt between 98° C (208° F) and 104° C (220° F) and close the quick-closing shut-off valves.

§ 154.544 Quick-closing shut-off valves: Closing time.

A quick-closing shut-off valve in liquid cargo piping must close from the open position in at least 30 seconds or less.

§ 154.546 Excess flow valve: Closing flow.

(a) The rated closing flow of vapor or liquid cargo for an excess flow valve must be specially approved by the Commandant (G-MMT).

(b) An excess flow valve allowed under § 154.532 must close automatically at the rated closing flow.

§ 154.548 Cargo piping: Flow capacity.

Piping with an excess flow valve must have a vapor or liquid flow capacity that is greater than the rated closing flow required under § 154.546.

§ 154.550 Excess flow valve: Bypass.

An excess flow valve allowed under § 154.532(b) may have a bypass of 1.0 mm (.0394 in.) or less in diameter.

§ 154.552 Liquid and vapor cargo hose: Compatibility.

Liquid and vapor cargo hoses must—

(a) Not chemically react with the cargo; and

(b) Withstand cargo temperature.

§ 154.554 Cargo hose: Bursting pressure.

Cargo hose that can be pressurized by the tank, the cargo pump discharge, or the vapor compressor discharge must have a bursting pressure of at least five times the maximum working pressure on the hose during cargo transfer.

§ 154.556 Cargo hose: Maximum working pressure.

A cargo hose must have a maximum working pressure not less than the maximum pressure to which it may be subjected and at least 10.5 kp/cm^2 (150 psig).

§ 154.558 Cargo hose: Marking.

Each cargo hose must be marked with the—

(a) Maximum working pressure; and

(b) Minimum service temperature for service at other than ambient temperature.

§ 154.560 Cargo hose: Prototype test.

Each cargo hose must be of a type that passes a prototype test at a pressure of at least five times its maximum working pressure to at least the service temperature.

§ 154.562 Cargo hose: Hydrostatic test.

Each cargo hose must pass a hydrostatic pressure test of at least 1.5 times its specified maximum working pressure but not more than two-fifths its bursting pressure and at ambient temperature.

MATERIALS

§ 154.605 Toughness test.

(a) Each toughness test for material used to meet the requirements of §§ 154.610 through 154.625 must meet Subpart 54.05 of this chapter.

(b) The Charpy V-notch energy for subsize toughness test specimens must meet Table 56.50-105(a) of this chapter.

§ 154.610 Design temperature not colder than 0° C (32° F).

(a) Plates, pipes, tubes, forgings, forged and rolled fiittings, rolled and forged bars and shapes, and castings used in the construction of tanks and process pressure vessels for a desgin temperature not colder than 0° C (32° F) must be carbon manganese steel, made with fine grain practice, austenitic grain size of five or finer where the thickness exceeds 20 mm (.787 in.), and normalized or quenched and tempered. A control rolling procedure may be substituted for normalizing if specially approved by the Commandant (G-MMT). Plate for an independent tank type C and process pressure vessel must also meet the requirements of ASTM A-20 and § 54.01-18 (b) (5) of this chapter.

(b) A recognized classification society's grades D, up to 20 mm (.787 in.), and E hull structural steel may be used for an independent type A tank if the steel is tested under § 54.05-10 of this chapter.

(c) A tensile test must be made for—

(i) Each plate as rolled; and

(ii) Each five short ton batch of forgings, forged or rolled fittings, rolled or forged bars and shapes, and castings.

(d) The minimum specified yield stress must not exceed 65 kp/mm^2 (92.43 Ksi) and when it exceeds 50 kp/mm^2 (71.10 Ksi) the hardness of the weld and heat affected zone must be specially approved by the Commandant (G-MMT).

(e) A Charpy V-notch test must be made for—

(1) Each plate as rolled; and

(2) Each five short ton batch of forgings, forged or rolled fittings, rolled or forged bars and shapes, and castings.

(f) The orientation and required impact energy of a 10 mm x 10 mm (.394 in. x .394 in.) Charpy V-notch specimen is as follows:

(1) Plate, transverse specimen, 2.8 kpm (20 ft-lbs).

(2) Forgings, forged and rolled fittings, rolled and forged bars and castings, longitudinal specimen, 4.2 kpm (30 ft-lbs).

(g) The test temperature of the Charpy V-notch specimens is as follows:

MATERIAL THICKNESS AND TEST TEMPERATURE

$t \leq 20$ mm (.788 in.), 0° C (32° F)
$20 < t \leq 30$ mm (1.182 in.), −20° C (−4° F)
$30 < t \leq 40$ mm (1..576 in.) −40° C (−40° F)

§ 154.615 Design temperature below 0° C (32° F) and down to −55° C (−67° F).

Plates, forgings, forged or rolled fittings, rolled or forged bars and shapes, and castings for tanks, secondary barriers, and process pressure vessels with a design temperature below 0° C (32° F) and down to −55° C (−67° F) must meet the material requirements in § 54.25-10 of this chapter.

§ 154.620 Design temperature below −55° C (−67° F) and down to −165° C (−265° F).

Plates, forgings and forged or rolled fittings, rolled or forged bars and shapes, and castings for tanks, secondary barriers, and process pressure vessels with a design temperature below −55° C (−67° F) and down to −165° C (−265° F) must meet § 54.25-10(b)(2), § 54.25-15, or § 54.25-20 of this chapter.

§ 154.625 Design temperature below 0° C (32° F) and down to −165° C (−265° F).

Pipes, tubes, forgings, castings, bolting, and nuts for cargo process piping with a design temperature below 0° C (32° F) and down to −165° C (−265° F) must meet § 56.50-105 of this chapter.

§ 154.630 Tank material.

(a) If a material of a tank is not listed in §§ 154.610, 154.615 or 154.620, the allowable stress of that material must be specially approved by the Commandant (G-MMT).

(b) Material in the area of welded connections in aluminum alloys must have the tensile strength of the annealed condition.

(c) Increased yield stress and tensile strength of a material at low tempera-

152

ture for independent tanks type A, B and C must be specially approved by the Commandant (G-MMT).

CONSTRUCTION

§ 154.650 Tank and process pressure vessel welding.

(a) Tank and process pressure vessel welding must meet Subpart 54.05 and Part 57 of this chapter.

(b) Welding consumables for welding tanks must meet §57.02-4 of this chapter.

(c) For independent tanks—

(1) Each welded joint of the shells must be a full penetration butt weld, except that full penetration tee welds may be used for dome to shell connections; and

(2) Each nozzle weld must be of the full penetration type, except for small penetrations on domes.

(d) For independent tanks type C and process pressure vessels, each welded joint must meet Part 54 of this chapter, except that any backing rings must be removed unless specially approved by the Commandant (G-MMT).

(e) For each welded joint in a membrane tank, the quality assurance measures, weld procedure qualification, design details, materials, construction, inspection, and production testing of components must meet the standards developed during the prototype testing program that are specially approved by the Commandant (G-MMT).

(f) For semi-membrane tanks, each welded joint must meet paragraph (c) or (e) of this section.

§ 154.655 Stress relief for independent tanks type C.

For a design temperature colder than −10° C (14° F), an independent tank type C of —

(a) Carbon and carbon-manganese steel must be stress relieved by post-weld heat treatment under § 54.25-7 of this chapter or mechanical stress relief under Subpart 54.30; or

(b) Materials other than carbon and carbon manganese steel must be stress relieved using a procedure specially approved by the Commandant (G-MMT).

§ 154.660 Pipe welding.

(a) Pipe welding must meet Part 57 of this chapter.

(b) Butt welds of pipes made from carbon, carbon manganese, or low alloy steels must be post-weld heat treated and must meet § 56.50-105 and Subpart 56.85 of this chapter.

(c) In addition to normal controls before and during the welding and to the visual inspection of the finished welds, the following tests are required as necessary for proving that the welding has been carried out correctly:

(1) A piping system with a service temperature lower than −10° C (14° F) and a wall thickness greater than 10 mm (.394 in.) or with an inside diameter greater than 100 mm (4 in.) must have 100 percent radiographic testing for butt welded joints.

(2) When Table 4 references this section, butt welded joints for deck cargo piping exceeding 75 mm (3 in.) in diameter must be 100 percent radiographic tested.

(3) For other butt welded joints of pipes, the non-destructive testing must meet Subpart 56.95 of this chapter.

§ 156.665 Welding procedures.

Welding procedure tests for tanks with a design temperature colder than 0° C (32° F), process pressure vessels, and piping must meet § 54.05-15 and Subpart 57.06 of this chapter.

CARGO PRESSURE AND TEMPERATURE CONTROL

§ 154.701 Cargo pressure and temperature control: General.

(a) Each refrigeration system must—(LNG) tank, must—

(1) Have a refrigeration system that meets § 154.702; or

(2) Be an independent tank type C having a P_o greater than the vapor pressure of the cargo at 45° C (113° F).

(b) The vessel must have a separate refrigeration system for each refrigerated incompatible cargo.

§ 154.702 Refrigerated carriage.

(a) Each refrigerated system must—

(1) Have enough capacity to maintain the cargo pressure below P_o under ambient design temperatures of 45° C (113° F) still air and 32° C (89.6° F) still water with the largest unit in the system inoperative; or

(2) Have a standby unit with a capacity at least equal to the capacity of the largest refrigeration unit operating in the system.

(b) For the purpose of this section, a "refrigeration unit" includes a compressor and its motors and controls.

(c) Each refrigeration system must—

(1) Have a heat exchanger with an excess capacity of 25 percent; or

(2) A standby heat exchanger.

(d) Where cooling water is used in a refrigeration system—

(1) The cooling water pump or pumps must be used exclusively for the system;

(2) Each pump must have suction lines from seachests on the port and starboard sides of the vessel; and

(3) The vessel must have a standby pump, which may be a pump that is used for other, non-essential purposes.

(e) Each refrigeration system must use refrigerants that are compatible with the cargo and, for cascade units, with each other.

(f) Each refrigeration system must have automatic and manual cargo temperature controls.

(g) The pressure of the heat transfer fluid in each cooling coil in a tank must be greater than the pressure of the cargo.

§ 154.703 Methane (LNG).

Unless a tank carrying methane (LNG) can withstand the pressure build up due to boil-off for 21 days, the pressure in the tank must be maintained below P_o for at least 21 days by—

(a) A refrigeration system that meets § 154.702;

(b) Burning boil-off gas in a waste heat or catalytic furnace that—

(1) Maintains the stack exhaust temperature below 535° C (995° F);

(2) Exhibits no visible flame; and

(3) Is specially approved by the Commandant (G-MMT); or

(c) Using the boil-off gas as fuel in boilers, inert gas generators, and combustion engines in the main propelling machinery space or for other services and in other spaces specifically approved by the Commandant (G-MMT).

§ 154.705 Cargo boil-off as fuel: General.

(a) Each cargo boil-off fuel system used to meet § 154.703(c) must meet §§ 154.706 through 154.709.

(b) The piping must have a connection for introducing inert gas and gas freeing the piping in the machinery space.

(c) A gas fired main propulsion boiler or combustion engine must have a fuel oil fired pilot to maintain fuel flow if gas fuel supply is cut off.

§ 154.706 Cargo boil-off as fuel: Fuel lines.

(a) Gas fuel lines must not pass through accommodation service, or control spaces. A gas line passing through other spaces must meet one of the following:

(1) The fuel line must be a double-walled piping system with the annular space containing an inert gas at a pressure greater than the fuel pressure. Visual and audible alarms must be installed at the machinery control station to indicate loss of inert gas pressure.

(2) The fuel line must be installed in a mechanically exhaust ventilated pipe or duct, having a rate of air change of at least 30 changes per hour. The pressure in the space between the inner pipe and outer pipe or duct must be maintained at less than atmospheric pressure. If the required air flow is not established or maintained, the gas fuel supply must be automatically shut off. Continuous gas detection must be installed in the ventilated space to detect leaks and to automatically shut off the gas fuel supply to meet § 154.708(c). The ventilation system must meet the requirements of § 154.1205.

(b) Each double wall pipe or vent duct must terminate in the ventilation hood or casing required under § 154.707(a). Continuous gas detection must be installed in the hood or casing to indicate leaks and to shut off the gas fuel supply to meet paragraph (a)(2) of this section.

§ 154.707 Cargo boil-off as fuel: Ventilation.

(a) A ventilation hood or casing must be installed in areas occupied by flanges, valves, and piping at the fuel burner to cause air to sweep across them and be exhausted at the top of the hood or casing.

(b) The hood or casing must be mechanically exhaust ventilated and meet § 154.1205.

(c) If the air flow in the ventilated hood or casing falls below the rate specially approved by the Commandant (G-MMT), the gas fuel supply must be shut off.

§ 154.708 Cargo boil-off as fuel: Valves.

(a) Gas fuel lines to the gas consuming equipment must have two fail-closed automatic valves in series. A third valve, designed to fail-open, must vent that portion of pipe between the two series valves to the open atmosphere.

(b) These valves must be arranged so that loss of boiler forced draft, flame failure, or abnormal gas fuel supply pressure automatically causes the two series valves to close and the vent valve to open. The function of one of the series valves and the vent valve may be performed by a single three-way valve.

(c) A master gas fuel valve must be outside the machinery space, but be operable from inside the machinery space and at the valve. The valve must automatically close if leakage of gas or loss of ventilation is detected.

§ 154.709 Cargo boil-off as fuel: Gas detection equipment.

(a) The continuous gas detection system required under § 154.706 (a) (2) and (b) must—

(1) Meet § 154.1350 of this part; and

(2) Have a device that activates an audible and visual alarm at the machinery control station and in the wheelhouse if the concentration reaches 1.5 percent by volume of methane and closes the master gas fuel valve required under § 154.708(c) if the concentration reaches 3 percent by volume.

(b) The number and arrangement of gas sampling points must be specially approved by the Commandant (G-MMT).

CARGO VENT SYSTEMS

§ 154.801 Pressure relief systems.

(a) Each tank that has a volume of 20 m³ (706 ft.³) or less must have at least one pressure relief valve.

(b) Each tank that has a volume of greater than 20 m³ (706 ft.³) must have at least two pressure relief valves of equal relieving capacity.

(c) Each pressure relief valve must—

(1) Meet 46 CFR 162.018 or, if the MARVS is 0.7 kp/cm² (10 psig) or less, 46 CFR 162.017, and have at least the capacity required under § 154.806;

(2) Not be set for a higher pressure than the MARVS;

(3) Have a fitting for sealing wire that prevents the set relieving pressure from being changed without breaking the sealing wire;

(4) Be insulated from the tank if the temperature of the cargo carried is below 0° C (32° F);

(5) Be fitted on the tank to remain in the vapor phase under conditions of 15° list and 0.015 L trim;

(6) Vent to a vent mast under § 154.805, except a relief valve may vent to a common tank relief valve header if the back pressure is taken into account in determining the required capacity in § 154.806;

(7) Not vent to a common header or common vent mast if the relief valves are connected to tanks carrying chemically incompatible cargoes; and

(8) Not have any stop valves or other means of isolating the tank from its relief valve unless—

(i) The stop valves are interlocked or arranged so that only one pressure relief valve is out of service at any one time;

(ii) The interlock arrangement automatically shows the relief valve that is out of service; and

(iii) The remaining valves have the relieving capacity required under § 154.806, or all valves on the tank are the same size and a spare is carried, or a spare is carried for each valve on a tank.

§ 154.802 Alternate pressure relief settings.

Tanks specially approved for more than one relief valve setting must have one of the following valve arrangements:

(a) Valves that—

(1) Are set and sealed under § 154.801(c);

(2) Have the capacity required under § 154.806; and

(3) Are interlocked so that all relief valves cannot be isolated from the tank at any time.

(b) Valves that have spacer pieces or springs that—

(1) Change the set pressure without pressure testing to verify the new setting; and

(2) Can be installed without breaking the sealing wire required under § 154.801(c)(3).

§ 154.804 Vacuum protection.

(a) Each cargo tank must have—

(1) A pressure switch that operates an audible and visual alarm in the wheelhouse and cargo control station at or below 80 percent of the maximum external design pressure differential of the cargo tanks and a second, independent pressure switch that automatically shuts off all suction of cargo liquid or vapor from the cargo tank and secures any refrigeration of that tank at or below the maximum external designed pressure differential; or

(2) A vacuum relief valve that—

(i) Has a gas flow capacity at least equal to the maximum cargo discharge rate per tank;

(ii) Is set to open at or below the maximum external designed pressure differential;

(iii) Admits inert gas, cargo vapor from a source other than a cargo vapor header, or air except as prohibited under § 154.1710.

(b) Each vacuum protection system must have a means to test its operation.

(c) Tanks designed to withstand a maximum external pressure differential exceeding 0.25 kp/cm² (3.55 psig) and to withstand the maximum external pressure differential that can be attained at maximum discharge rates with no vapor return to the cargo tanks, by operation of a cargo refrigeration system, or by drawing off vapors for use in accordance with § 154.703(c), are not required to have vacuum protection.

§ 154.805 Vent masts.

Relief vents or common vent headers from relief valves must discharge to a vent mast that—

(a) Discharges vertically upward;

(b) Has a rain cap or other means of preventing the entrance of rain or snow;

(c) Has a screen or bars not more than 25 mm (1 in.) apart;

(d) Extends at least to a height of B/3 or 6 m (19.7 ft.), whichever is greater, above the weather deck and 6 m (19.7 ft.) above the working level;

(e) On a tank, does not exhaust within a radius of *B* or 25 m (82 ft.), whichever is less, from any forced or natural ventilation intake or other opening to an accommodation, service, control station, or other gas-safe space;

(f) On a containment system, except a tank, does not exhaust within a radius of 10 m (32.8 ft.) or less from any forced or natural ventilation intake or other opening to an accommodation, service, control station, or other gas-safe space;

(g) Has drains to remove any liquid that may accumulate; and

(h) That prevents accumulations of liquid at the relief valves.

§ 154.806 Capacity of pressure relief valves.

Pressure relief valves for each tank must have a combined relief capacity, considering back pressure from vent piping, headers, and masts, to discharge the greater of the following with not more than a 20 percent rise in cargo tank pressure above the MARVS:

(a) The maximum capacity of an installed tank inerting system.

(b) Quantity of vapors generated from fire exposure that is calculated under § 54.15-25 of this chapter.

ATMOSPHERIC CONTROL IN CARGO CONTAINMENT SYSTEMS

§ 154.901 Atmospheric control within cargo tanks and cargo piping systems.

(a) Each vessel must have a piping system for gas freeing and purging of each tank and all cargo piping.

(b) The piping system must minimize the pocketing of gas or air remaining after purging.

(c) For tanks certificated to carry flammable gases, the piping system must allow purging the tank of flammable vapors before air is introduced and purging the tank of air before the tank is filled with cargo.

(d) Each cargo tank must have—

(1) Gas sampling points at the top, middle, and bottom of the tanks; and

(2) Gas sampling line connections that are valved and capped above the deck.

§ 154.902 Atmospheric control within hold and interbarrier spaces.

(a) Vessels certificated to carry flammable cargo in cargo containment systems with full secondary barriers must have an inert gas system or onboard storage of inert gas that provides enough inert gas to meet the requirements of § 154.1848 for 30 days consumption.

(b) Vessels certificated to carry flammable cargo in cargo containment systems with partial secondary barriers must—

(1) Have an inert gas system or onboard inert gas storage that can inert the largest hold and interbarrier space;

(2) Have a gas detection system for each hold and interbarrier space; and

(3) Meet the requirements of § 154.902(a) or § 154.902(c)(2).

(c) Vessels certificated to carry only non-flammable cargo in cargo containment systems with secondary barriers must—

(1) Meet the requirements of § 154.902(a); or

(2) Have air drying systems that reduce the dewpoint of any air admitted to hold or interbarrier spaces below the temperature of any surface in those spaces.

(d) Vessels with refrigerated independent tanks type C must have inert gas or air drying systems that reduce the dewpoint of any inert gas or air admitted to the hold spaces below the temperature of any surface in the hold spaces.

§ 154.903 Inert gas systems: general.

(a) Inert gas carried or generated to meet §§ 154.901, 154.902, and 154.1848 must be non-flammable and non-reactive with the cargoes that the vessel is certificated to carry and the materials of construction of the tanks, hold and interbarrier spaces, and insulation.

(b) The boiling point and dewpoint at atmospheric pressure of the inert gas must be lower than the temperature of any surface in the spaces that the gas inerts.

(c) Storage vessels and inert gas piping must meet §§ 154.400 and 154.500 for the temperatures and pressures at which the gas is stored and used.

§ 154.904 Inert gas system: Controls.

The inert gas system must have—

(a) At least two check valves, or other means specially approved by the Commandant (G-MMT), in the cargo area to prevent the back flow of cargo vapor into the inert gas system;

(b) Automatic and manual inert gas pressure controls; and

(c) Valves to isolate each inerted space.

§ 154.906 Inert gas generators.

The inert gas generator must—

(a) Produce an inert gas containing less than 5 percent oxygen;

(b) Have a device to continuously sample the discharge of the generator for oxygen content; and

(c) An audible and visual alarm in the cargo control station set at or below 5 percent oxygen by volume.

§ 154.908 Inert gas generator: Location.

(a) Except as allowed in paragraph (b) of this section, an inert gas generator must be located in a space that is not in the cargo area and does not have direct access to any accommodation, service, or control space.

(b) An inert gas generator that does not use flame burning equipment may be located in the cargo area if specially approved by the Commandant (G-MMT).

§ 154.910 Inert gas piping: Location.

Inert gas piping must not pass through or terminate in an accommodation, service, or control space.

§ 154.912 Inerted spaces: Relief devices.

Inerted spaces must be fitted with relief valves, rupture discs, or other devices specially approved by the Commandant (G-MMT).

ELECTRICAL

§ 154.1000 Applicability.

(a) Sections 154.1005 through 154.1020 apply to flammable cargo and ammonia carriers.

(b) For the purposes of §§ 154.1005 through 154.1020, an ammonia carrier is not gas-dangerous on the open deck.

§ 154.1005 Equipment approval.

(a) All electrical equipment that is required to be intrinsically safe or explosion-proof under § 154.1010 must be approved or listed by an independent laboratory that is specially approved by the Commandant (G-MMT), such as Underwriters' Laboratories, Inc. or Factory Mutual Systems, for Class I Division I locations and the Group that is specified in Table 4 for the cargo carried.

(b) Each submerged cargo pump motor installation must be specially approved by the Commandant (G-MMT).

(c) All electrical equipment that must be intrinsically safe to meet § 154.1010 must meet the definition in § 110.15-100 (i) of this chapter.

(d) All electrical equipment that must be explosion-proof to meet § 154.1010 must meet § 110.15-65(e) of this chapter.

§ 154.1010 Electrical equipment in gas dangerous space or zone.

(a) Except as allowed in this section, electrical equipment must not be installed in a gas dangerous space or zone.

(b) Intrinsically safe electrical equipment and wiring may be in a gas dangerous space or zone.

(c) A submerged cargo pump motor may be in any tank if—

(1) Low liquid level, motor current, or pump discharge pressure automatically shuts down power to the pump motor if the pump loses suction;

(2) There is an audible and visual alarm at the cargo control station that actuates if the motor shuts down under the requirements of subparagraph (1) of this paragraph; and

(3) There is a lockable circuit breaker or lockable switch that disconnects the power to the motor.

(d) A supply cable for a submerged cargo pump motor may be in a hold space.

(e) A hold space that has a tank that is not required to have a secondary barrier under § 154.459 may have—

(1) Through runs of cable;

(2) Explosion-proof lighting fixtures;

(3) Depth sounding devices in gas tight enclosures;

(4) Log devices in gas tight enclosures; and

(5) Impressed current cathodic protection system electrodes in gas tight enclosures.

(f) A space that is separated by a gas tight steel boundary from a hold space that has a tank that must have a secondary barrier under the requirements of § 154.459 may have—

(1) Through runs of cable;

(2) Explosion-proof lighting fixtures;

(3) Depth sounding devices in gas tight enclosures;

(4) Log devices in gastight enclosures;

(5) Impressed current cathodic protection system electrodes in gastight enclosures;

(6) Explosion-proof motors that operate cargo system valves or ballast system valves; and

(7) Explosion-proof bells for general alarm systems.

(g) A cargo handling room may have—

(1) Explosion-proof lighting fixtures; and

(2) Explosion-proof bells for general alarm systems.

(h) A space for cargo hose storage may have—

(1) Explosion-proof lighting fixtures; and

(2) Through runs of cable.

(i) A space that has cargo piping may have—

(1) Explosion-proof lighting fixtures; and

(2) Through runs of cable.

(j) A zone on the open deck may have—

(1) Explosion-proof equipment that is necessary for the operation of the vessel; and

(2) Through runs of cable.

(k) A space, except those named in paragraph (e) through (j) of this section, that has a direct opening to gas-dangerous space or zone may only have the electrical equipment allowed in the gas-dangerous space or zone.

§ 154.1015 Lighting in gas-dangerous space.

(a) Each gas-dangerous space that has lighting fixtures must have at least two branch circuits for lighting.

(b) Each switch and each overcurrent protective device for any lighting circuit that is in a gas-dangerous space must open each conductor of the circuit simultaneously.

(c) Each switch and each overcurrent protective device for lighting in a gas-

dangerous space must be in a gas safe space.

§ 154.1020 Emergency power.

The emergency generator must be designed to allow operation at the final angle of heel under § 154.230(a).

FIREFIGHTING

§ 154.1100 Firefighting: General.

Each vessel must meet Parts 32 and 34 of this chapter.

FIREFIGHTING SYSTEM: EXTERIOR WATER SPRAY

§ 154.1105 Exterior water spray system: General.

Each flammable liquefied gas carrier and each toxic liquefied gas carrier must have an exterior water spray system that meets §§ 154.1110 through 154.1135.

§ 154.1110 Areas protected by system.

Each water spray system must protect the following:

(a) All parts of each tank that are not covered by the vessel's hull structure or a steel cover, including the dome.

(b) Each on-deck storage vessel for flammable or toxic liquefied gases.

(c) Each cargo discharge and loading manifold.

(d) Each quick closing valve required by §§ 154.530, 154.532, and 154.538, and other control valves.

(e) Each boundary facing the cargo area of each superstructure that contains accommodation, service, or control spaces.

(f) Each boundary facing the cargo area of each deckhouse that contains accommodation, service, or control spaces.

(g) Each boundary of each deckhouse that is within the cargo area and that is manned during navigation of the vessel or during cargo transfer operations, except the deckhouse roof if it is 2.4 m (8 ft.) or higher above the main deck.

§ 154.1115 Discharge.

(a) Each water spray system must discharge at least—

(1) 10 l/m^2/min. (.25 gpm/ft.^{2}) over each horizontal surface; and

(2) 4 l/m^2/min. (.10 gpm/ft.^{2}) against each vertical surface, including water rundown if the vertical distance from the nozzles to the protected area does not exceed 3.7 m (12 ft.).

(b) The area of water spray coverage required under § 154.1110(c) and (d) for fittings and valves must be an area in a horizontal plane extending at least .5 m (19 in.) in each direction from the pipes, fittings, and valves, or the area of the drip tray, whichever is greater.

§ 154.1120 Nozzles.

Nozzles for the water spray system must be spaced to discharge the minimum density required under § 154.1115 over each part of the protected area.

§ 154.1125 Pipes, fittings, and valves.

(a) Each pipe, fitting, and valve for each water spray system must meet Part 56 of this chapter.

(b) Each water spray main that protects more than one area listed in § 154.1110 must have at least one isolation valve at each branch connection and at least one isolation valve downstream of each branch connection.

(c) Each valved cross-connection from the water spray system to the fire main must be outside of the cargo area.

(d) Each distribution piping system must be made of fire resistant and corrosion resistant materials, such as galvanized steel or galvanized iron pipe.

(e) Each water spray system must have drains, strainers, and dirt traps.

§ 154.1130 Sections.

(a) If a water spray system is divided into sections, each section must at least include all of the area of an athwartship tank grouping.

(b) If a water spray system is divided into sections, the control valves must be at a single manifold that is aft of the cargo area.

§ 154.1135 Pumps.

(a) Water to the water spray system must be supplied by—

(1) A pump that is only for use on the system;

(2) A fire pump; or

(3) Another pump specially approved by the Commandant (G-MMT).

(b) Operation of a water spray system must not interfere with simultaneous operation of the fire main system at its required capacity.

(c) Except as allowed under paragraph (d) of this section, each pump for each water spray system must have the capacity to simultaneously supply all areas named in § 154.1110.

(d) If the water spray system is divided into sections, the pump must have the capacity to simultaneously supply—

(1) All the areas in § 154.1110(c) through (g); and

(2) The largest section that includes any area listed in § 154.1110(a) and (b).

FIREFIGHTING SYSTEM: DRY CHEMICAL

§ 154.1140 Dry chemical system: General.

(a) Each liquefied flammable gas carrier must have a dry chemical firefighting system that meets §§ 154.1145 through 154.1170 and Part 56 and § 162.039 of this chapter.

(b) The plans for the dry chemical supply and distribution systems, including all controls, must be submitted under Subpart 50.20 of this chapter.

§ 154.1145 Dry chemical supply.

(a) A vessel with a cargo carrying capacity less than 1000 m^3 (35,300 ft.^{3}) must have at least one self-contained dry chemical unit for the cargo area with independent inert gas pressuring sources adjacent to the unit.

(b) A vessel with a cargo carrying capacity of 1000 m^3 (35,300 ft.^{3}) or more must have at least two self-contained dry chemical storage units for the cargo area with independent inert gas pressurizing sources adjacent to each unit.

(c) Each dry chemical system must have at least one self-contained dry chemical storage unit and independent inert gas pressurizing source for each bow and stern loading and discharge area.

(d) Each hose line and monitor of each dry chemical system that is attached to a single storage unit must operate sequentially for 45 seconds each and simultaneously for 45 seconds.

§ 154.1150 Distribution of dry chemical.

(a) All of the above deck cargo area and all cargo piping outside that cargo area must be protected by—

(1) At least two dry chemical hand hose lines that have separate dry chemical supplies; or

(2) At least one dry chemical hand hose line and one dry chemical monitor that have separate dry chemical supplies.

(b) At least one dry chemical storage unit and hand hose line or monitor must be at the after end of the cargo area and all other gas dangerous areas except stern loading areas.

(c) Each part of the cargo area must be protected by at least one dry chemical hand hose line that is aft of that part or at least one dry chemical monitor that is aft of that part.

(d) Each cargo loading and discharge manifold must be protected by at least one dry chemical monitor.

(e) Each bow loading area and each stern loading area must also be protected by at least one hand hose line.

§ 154.1155 Hand hose line coverage.

For the purposes of § 154.1150, the coverage for an area protected by each hand hose line is equal to its length, except the coverage for the protection of areas that are inaccessible to personnel is equal to one-half the projection of the hose at its rated discharge, or 10 m (33 ft.), whichever is less.

§ 154.1160 Monitor coverage of system.

For the purposes of § 154.1150, the allowed coverage of each dry chemical system monitor must not exceed—

(a) 10 m (32.8 ft.) at 10 kg/sec (22 lb/sec);

(b) 30 m (984 ft.) at 25 kg/sec (55 lb/sec);

(c) 40 m (131.2 ft.) at 45 kg/sec (99/lb sec);

(d) An interpolation between 10 m (32.8 ft.) at 10 kg/sec (22 lb/sec) and 30 m (98.4 ft.) at 25 kg/sec (55 lb/sec);

(e) An interpolation between 30 m (98.4 ft.) at 25 kg/sec (55 lb/sec) and 40 m (131.2 ft.) at 45 kg/sec (99 lb/sec); or

(f) An extrapolation of 40 m (131.2 ft.) at 45 kg/sec (99 lb/sec).

§ 154.1165 Controls.

(a) Each dry chemical hand hose line must be one that can be actuated at its hose reel.

(b) Each dry chemical monitor must be one that can be—

(1) Actuated and controlled at the monitor; and

(2) Actuated and controlled at a location away from the monitor and the protected area, except a monitor that is pre-aimed at the manifold does not have to be controlled at a location away from the monitor and the protected area.

(c) Each dry chemical storage unit that has more than one hand hose line, monitor, or combination of hand hose line and monitor must have independent piping with a stop valve for each hand hose line or monitor, where it connects to the storage container.

(d) Each stop valve for a hose reel or monitor must have a remote control at the hose reel or monitor.

(e) Damage to any dry chemical system hose reel, monitor, pipe or control circuit must not prevent the operation of other hose reels, monitors, or control circuits that are connected to the same storage unit.

§ 154.1170 Hand hose line: General.

Each dry chemical hand hose line must—

(a) Be 33 m (108 ft.) long or less;

(b) Be operable whether or not it is unwound from a hose reel or removed from a hose cabinet;

(c) Be without kinks;

(d) Have a nozzle with a valve to start and stop the flow of chemical;

(e) Have a capacity of at least 3.5 kg/sec (7.7 lb./sec); and

(f) Be one that can be operated by one person.

CARGO AREA: MECHANICAL VENTILATION SYSTEM

§ 154.1200 Mechanical ventilation system: General.

(a) Each cargo compressor room, pump room, gas dangerous cargo control station, and space that contains cargo handling equipment must have a fixed, exhaust type, mechanical ventilation system.

(b) The following spaces must have a supply type mechanical ventilation system:

(1) Each space that contains electric motors for cargo handling equipment.

(2) Each gas-safe cargo control station.

(3) Each gas-safe space in the cargo area.

(4) Each space that contains inert gas generators, except main machinery spaces.

§ 154.1205 Mechanical ventilation system: Standards.

(a) Each exhaust type mechanical ventilation system required under § 154.1200(a) must have ducts for vapors from the following.

(1) The deck level.

(2) Bilges.

(3) If the vapors are lighter than air, the top of each space that personnel enter during cargo handling operations.

(b) The discharge end of each duct must be at least 10 m (32.8 ft.) from ventilation intakes and openings to accommodation, service, control station, and other gas-safe spaces.

(c) Each ventilation system for any cargo handling space must change all the air in that space and its adjoining trunks at least 30 times each hour.

(d) Each ventilation system for gas-safe cargo control station must be one that can change all the air in that space at least eight times each hour.

(e) A ventilation system must not recycle vapor from ventilation discharges.

(f) Each ventilation system must have operation controls outside the ventilated space.

(g) No ventilation duct for a gas-dangerous space may pass through any machinery, accommodation, service, or control space, except as allowed under § 154.703.

(h) Each electric motor that drives a ventilation fan must be outside ducts for any space that may contain flammable cargo vapors.

(i) Ventilation impellers and the housing in way of these impellers on flammable cargo carrier must meet one of the following:

(1) The impeller, housing, or both must be made of non-metallic material that does not generate static electricity.

(2) The impeller and housing must be made of non-ferrous material.

(3) The impeller and housing must be made of austenitic stainless steel.

(4) The impeller and housing must be made of ferrous material and have at least 13mm (.512 in.) of tip clearance.

(j) No ventilation fan may have any combination of fixed or rotating components made of an aluminum or magnesium alloy and ferrous fixed or rotating components.

(k) Each ventilation intake and exhaust must have a protective metal screen of not more than 13mm (.512 in.) square mesh.

§ 154.1210 Hold space, void space, cofferdam, and space that contains cargo piping.

(a) Each hold space, void space, cofferdam, and space that contains cargo piping must have—

(1) A fixed mechanical ventilation system; or

(2) A fixed ducting system that has a portable blower that meets § 154.1205(1) and (j).

(b) A portable blower in any personnel access opening must not reduce the area of that opening so that the opening does not meet § 154.308.

INSTRUMENTATION

§ 154.1300 Liquid level gauges: General.

(a) If Table 4 lists a closed gauge for a cargo, the liquid level gauges required by § 154.1305 must be closed gauges that do not have any opening through which cargo liquid or vapor could escape, such as an ultrasonic device, float type device, electronic or magnetic probe, or bubble tube indicator.

(b) If Table 4 lists a restricted gauge for a cargo, the liquid level gauges required by § 154.1305 must be closed gauges that meet paragraph (a) of this section or restricted gauges that do not vent the tank's vapor space, such as a fixed tube, slip tube, or rotary tube.

§ 154.1305 Liquid level gauges: Standards.

(a) Each tank must have at least one liquid level gauge that operates—

(1) At pressures that are equal to or greater than the MARVS of that tank; and

(2) At temperatures that are within the cargo handling temperature range for all cargoes carried.

(b) Each tank must have at least two liquid level gauges, unless the tank has one liquid level gauge that can be repaired and maintained while the tank contains cargo.

(c) Each required liquid level gauge must measure liquid levels from 100 mm (4 in.) or less of the tank bottom to 100 percent full.

§ 154.1310 Closed gauge shutoff valve.

Each closed gauge that is not mounted directly on the tank must have a shutoff valve that is as close as practicable to the tank.

§ 154.1315 Restricted gauge excess flow valve.

Each restricted gauge that penetrates a tank must have an excess flow valve, unless the gauge has no opening greater than 1.5 mm (.059 in.) in diameter through which liquid or vapor can escape.

§ 154.1320 Sighting ports, tubular gauge glasses, and flat plate type gauge glasses.

(a) Tanks may have sighting ports or a secondary means of liquid level gauging in addition to the gauges required under § 154.1305 if —

(1) The tank has a MARVS that is less than 0.7 kp/cm² (10 psig);

(2) The port has a protective cover and an internal scale; and

(3) The port is above the liquid level.

(b) Tubular gauge glasses must not be used as liquid level gauges for tanks.

(c) The plate type gauge glasses must not be used as liquid level gauges for tanks, except deck tanks if the glasses have excess flow valves.

§ 154.1325 Liquid level alarm: All tanks.

Except as allowed under § 154.1330, each cargo tank must have a high liquid level alarm that—

(a) Is independent of the liquid level gauge required under § 154.1305;

(b) Actuates an audible and visual alarm at the cargo control station before the liquid level in the tank reaches the maximum filling limit allowed under § 154.1844; and

(c) Actuates the quick closing valves required under §§ 154.530, 154.532, and 154.538 before the tank becomes liquid full and without causing the pressure in the loading lines to exceed the design pressure.

§ 154.1330 Liquid level alarm: Independent tank type C.

Independent tank type C need not have the high liquid level alarm required under § 154.1325 if—

(a) The tank volume is less than 200 m^3 (17,060 $ft.^3$); or

(b) The tank can withstand the maximum possible pressures during loading, that pressure is below the relief valve setting, and overflow of the tank cannot occur.

§ 154.1335 Pressure and vacuum gauge.

(a) The vapor space of each tank must have a pressure gauge and, if vacuum protection is required under § 154.804, a vacuum gauge that—

(1) Can be read at the tank; and

(2) Have the remote readouts at the cargo control station.

(b) The vessel must have at least one high pressure alarm that—

(1) Actuates before the pressure in any tank exceeds the maximum pressure specially approved by the Commandant (G-MMT); and

(2) Actuates an audible and visual alarm in the wheelhouse and at the cargo control station.

(c) If vacuum protection is required under § 154.804, each vessel must have at least one low pressure alarm that—

(1) Actuates before the pressure in any tank falls below the minimum pressure specially approved by the Commandant (G-MMT); and

(2) Actuates an audible and visual alarm in the wheelhouse and the cargo control station.

(d) At least one pressure gauge must be fitted on each—

(1) Enclosed hold;

(2) Enclosed interbarrier space;

(3) Cargo pump discharge line;

(4) Liquid cargo manifold; and

(5) Vapor cargo manifold.

(e) There must be a local manifold presssure gauge between each manifold stop valve and each hose connection to the shore.

§ 154.1340 Temperature measuring devices.

(a) Each tank must have at least two devices that measure the temperature—

(1) At the bottom of the tank; and

(2) Near the top of the tank and below the maximum liquid level allowed under § 154.1844.

(b) Each device required by paragraph (a) must have a read-out at the cargo control station.

(c) Except independent tanks type C, each cargo containment system that carries cargo at temperatures colder than −55° C (—67° F) must have temperature measuring devices as follows:

(1) the number and location of the devices must be specially approved by the Commandant (G-MMT).

(2) The devices must be within the tank's insulation or on the adjacent hull structure.

(3) Each device must show the temperature continuously or at regular intervals of one hour or less.

(4) Each device must actuate an audible and visual alarm at the cargo control station before the temperature of the steel of the adjacent hull structure goes below the lowest temperature allowed for the steel under § 154.172.

(d) Each tank that carries cargo at temperatures colder than −55° C (−67° F) must have the number and arrangement of the devices that show the temperature of the tank during cool down procedures specially approved by the Commandant (G-MMT).

(e) One tank on the first vessel of a class of vessels must have in addition to the devices required by paragraph (d) of this section, devices that show the temperature of the boundary for verification of the cool down procedure.

§ 154.1345 Gas detection.

(a) For a vessel that carries a cargo that has an "I" or "I and T" in Table 4, the vessel must have—

(1) A fixed flammable gas detection system that meets § 154.1350; and

(2) Two portable gas detectors that can each measure 0 to 100 percent of the lower flammable limit of the cargo carried.

(b) For a vessel that carries a cargo that has a "T" or "I and T" in Table 4, the vessel must have—

(1) Two portable gas detectors that show if the concentration of cargo is above or below the threshold limit value listed in 29 CFR Part 1910 for that cargo; and

(2) Fixed gas sampling tubes in each hold space and interbarrier space as follows:

(i) The number of tubes must be specially approved by the Commandant (G-MMT).

(ii) Each tube must be valved and caped above the main deck unless it is connected to a fixed toxic gas detector.

(iii) If the vessel carries cargo that is heavier than the atmosphere of the space, each tube must have its open and in the lower part of the space.

(iv) If the vessel carries cargo that is lighter than the atmosphere of the space, each tube must have its open end in the upper part of the space.

(v) If the vessel carries cargo that is heavier than the atmosphere of the space and cargo that is lighter than the atmosphere of the space, each space must have tubes with their open ends in the lower part of the space and tubes with their open ends in the upper part of the space.

(vi) If the vessel carries cargo that can be both heavier and lighter than the atmosphere of the space, each space must have tubes with their open ends in the lower part of the space and tubes with their open ends in the upper part of the space.

(c) A vessel that carries methyl bromide or sulphur dioxide must have a fixed gas detection system that meets § 154.1350, except paragraph (l), and be in a gas safe cargo control station.

(d) Each alarm required by § 154.1350(d) on a vessel that carries methyl bromide and sulphur dioxide must be set or below the threshold limit value listed in 29 CFR Part 1910 for the cargo carried.

§ 154.1350 Flammable gas detection system.

(a) The vessel must have a fixed flammable gas detection system that has sampling points in—

(1) Each cargo pump room;

(2) Each cargo compressor room;

(3) Each motor room for cargo handling machinery;

(4) Each cargo control station that is not gas-safe;

(5) Each hold space, interbarrier space, and other enclosed space in the cargo area if the vessel has tanks other than independent tanks Type C; and

(6) Each space between the doors of an air lock required under § 154.345.

(b) The sampling points required under paragraph (a) of this section must meet § 154.1345(b)(2)(iii) through (vi).

(c) Gas sampling lines for the flammable gas detection system must not pass through any gas safe spaces, except gas safe cargo control rooms.

(d) Each flammable gas detection system must have audible and visual alarms that are actuated before or when the cargo is at a concentration that is equivalent to 30 percent of the lower flammable limit in air of the cargo carried.

(e) The visual alarm required by paragraph (d) of this section that is at a gas detector readout location must visually identify the space in which there is an alarm condition.

(f) Each flammable gas detection system must have an audible and a visual alarm for power failure and loss of gas sampling flow.

(g) Audible and visual alarms required under paragraphs (d) and (f) of this section must be—

(1) In each wheelhouse;

(2) In each cargo control station; and

(3) At each gas detection readout location.

(h) Each flammable gas detection system must monitor each sampling point at 30 minute or shorter intervals.

(i) All electrical equipment for each flammable gas detection system that is in a gas dangerous space or area must meet §§ 154.1000 through 154.1015.

(j) Each flammable gas detection system must have enough flame arrestors to protect all gas sampling lines.

(k) Each flammable gas detection system must have a filter that removes particulate matter in each gas sampling line.

(l) Each filter required by paragraph (k) of this section must be where it is removable during vessel operation unless it can be freed by back pressure.

(m) Each flammable gas detection system in a gas-safe cargo control station or wheelhouse must—

(1) Have a shut-off valve in each sampling line from an enclosed space, such as a hold or interbarrier space; and

(2) Exhaust gas to a safe location in the open atmosphere and away from all ignition sources.

(n) Each flammable gas detection system must not have common sampling lines, except sampling lines may be manifolded at the gas detector location if each line has an automatic valve that prevents cross-communication between sampling points.

(o) [Reserved]

(p) Each flammable gas detection system must have at least one connection for injecting zero gas and span gas into the system for testing and calibration.

(q) Each flammable gas detection system must have span gas for testing and calibration that is a known concentration of the cargo carried or the span gas recommended by the manufacturer of the flammable gas analyzer.

(r) The calibration test procedure and recommendation for type and concentration of span gas of the manufacturer of the flammable gas analyzer for each flammable gas detection system must be posted on or in the gas analyzer cabinet.

(s) Each flammable gas detection system must have a flow meter in each gas sampling line.

(t) Each flammable gas detection system must measure concentrations of 0 to 100 percent of the lower flammable limit of the cargo carried.

(u) In each hold and each interbarrier space that contains tanks other than independent tanks Type A, B, or C, the flammable gas detection system must measure concentrations of 0 to 100 percent by volume of the cargo carried by—

(1) An analyzer other than the one required under paragraph (t) of this section; or

(2) The analyzer required by paragraph (t) of this section with a scale switch that automatically returns the analyzer to 0 to 100 percent of the lower flammable limit scale when released.

§ 154.1360 Oxygen analyzer.

The vessel must have a portable analyzer that measures oxygen levels of 10 to 20 percent by volume in an inert atmosphere.

§ 154.1365 Audible and visual alarms.

(a) Each audible alarm must be one that can be turned off after sounding an alarm.

(b) Each visual alarm must be one that only can be turned off after the fault that actuated it is cleared.

(c) Each visual alarm must be marked to show the type and location of each fault that can actuate it.

(d) Each vessel must have means for testing each alarm.

§ 154.1370 Pressure gauge and vacuum gauge marking.

Each pressure gauge and vacuum gauge required by § 154.1335(a) must be marked with the maximum and minimum pressures that are specified on the vessel's certificate for the cargo carried.

§ 154.1375 Read-out for temperature measuring device marking.

Each read-out required by § 154.1340 for a device that measures temperature in a tank must be marked with the lowest temperature specified for the tank on the vessel's certificate.

SAFETY EQUIPMENT

§ 154.1400 Safety equipment: All vessels.

(a) A vessel of less than 25,000 m^3 cargo capacity must have the following personnel safety equipment:

(1) Six self-contained air-breathing apparatus each having a capacity of at least 1200 liters (42.36 ft^3).

(2) Nine spare bottles of air for the self-contained air-breathing apparatus on board.

(3) Six steel-cored lifelines.

(4) Six three-cell, explosive proof flashlights with the Underwriters' Laboratories, Inc., label for Class I Division I and the Group listed in Table 4 for the cargoes carried.

(5) Three fire axes.

(6) Six helmets that meet the specifications of ANSI Safety Requirements for Industrial Head Protection, Z-89.1 (1969).

(7) Six sets of boots and gloves that are made of rubber or other electrically non-conductive material.

(8) Six sets of goggles that meet the specifications of ANSI Practice for Occupational and Educational Eye and Face Protection, Z-87.1 (1968).

(9) Three outfits that protect the skin from scalding steam and the heat of fire, and that have a water resistant outer surface.

(10) Three chemical protective outfits.

(b) A vessel of 25,000 m^3 cargo capacity or more must have the following personnel safety equipment:

(1) Eight self-contained air-breathing apparatus that each have a capacity of at least 1200 liters (42.36 ft^3).

(2) Nine spare bottles of air for the self-contained air-breathing apparatus on board.

(3) Eight steel-cored lifelines.

(4) Eight three-cell, explosive proof flashlights with the Underwriters' Laboratories, Inc., label for the Group listed in Table 4 for the cargoes carried.

(5) Five fire axes.

(6) Eight helmets that meet the specifications of ANSI Safety Requirements for Industrial Head Protection, Z-89.1 (1969).

(7) Eight sets of boots and gloves that are made of rubber or other electrically non-conductive material.

(8) Eight sets of goggles that meet the specifications of ANSI Practice for Occupational and Educational Eye and Face Protection, Z-87.1 (1968).

(9) Five outfits that protect the skin from scalding steam and the heat of fire, and that have a water resistant outer surface.

(10) Three chemical protective outfits.

(c) When Table 4 references this section, a vessel carrying the referenced cargo must have the following additional personnel protection equipment:

(1) Three self-contained air-breathing apparatus that each have a capacity of at least 1200 liters (42.36 ft^3).

(2) Nine spare bottles of air for the self-contained air-breathing apparatus on board.

(3) Three steel-cored lifelines.

(4) Three three-cell, explosive proof flashlights with the Underwriters' Laboratories, Inc., label for the Group listed in Table 4 for the cargoes carried.

(5) Three helmets that meet the specifications of ANSI Safety Requirements for Industrial Head Protection, Z-89.1 (1969).

(6) Three sets of boots and gloves that are made of other electrically non-conductive material.

(7) Three sets of goggles that meet the specifications of ANSI Practice for Occupational and Educational Eye and Face Protection, Z-87.1 (1968).

(8) Three chemical protective outfits.

§ 154.1405 Respiratory protection.

When Table 4 references this section, a vessel carrying the referenced cargo must have—

(a) Respiratory protection equipment for the cargoes carried for every person on board; and

(b) Two additional sets of respiratory protection equipment for the cargoes stowed in the wheelhouse

§ 154.1410 Decontamination shower.

When Table 4 references this section, a vessel carrying the referenced cargo must have a decontamination shower and an eye wash that are—

(a) On the weatherdeck; and

(b) Marked EMERGENCY SHOWER in letters—

(1) 7.6 cm (3 in.) high; and

(2) 5.1 cm (2 in.) wide.

§ 154.1415 Air compressor.

A vessel must have an air compressor to recharge the bottles for breathing apparatus.

§ 154.1420 Stretchers and equipment.

A vessel must have—

(a) Two stretchers or wire baskets; and

(b) Equipment for lifting an injured person from a cargo tank, hold, or void space.

§ 154.1425 Oxygen resuscitation.

A vessel must have an oxygen resuscitator.

§ 154.1430 Equipment locker.

One of each item listed in §§ 154.1400 and 154.1420 must be stowed in a marked locker—

(a) On the open deck in or adjacent to the cargo area; or

(b) In the accommodation house near to a door opening onto the main deck.

§ 154.1435 Medical first aid guide.

Each vessel must have a copy of the IMCO Medical First Aid Guide for Use in Accidents Involving Dangerous Goods.

§ 154.1440 Antidotes.

A vessel must have the antidotes prescribed in the IMCO Medical First Aid

Guide for Use in Accidents Involving Dangerous Goods for the cargoes being carried.

§ 154.1445 Lifesaving devices.

The design of the lifeboats and liferafts must allow for launching at the final angle of heel from the lower side of the vessel.

Subpart D—Special Requirements

§ 154.1700 Materials of construction.

When Table 4 references one of the following paragraphs in this section, the materials in the referenced paragraph must not be used in components that contact the cargo liquid or vapor:

(a) Aluminum and aluminum bearing alloys.

(b) Copper and copper bearing alloys.

(c) Zinc or galvanized steel.

(d) Magnesium.

(e) Mercury.

(f) Acetylide forming materials, such as copper, silver, and mercury.

§ 154.1705 Independent tank type C.

The following cargoes must be carried in an independent tank type C that meets § 154.701(a)(2):

(a) Ethylene oxide.

(b) Methyl bromide.

(c) Sulphur dioxide.

§ 154.1710 Exclusion of air from cargo tank vapor spaces.

When a vessel is carrying acetaldehyde, butadiene, ethylene oxide, or vinyl chloride, air must be—

(a) Purged from the cargo tanks and associated piping before the cargo is loaded; and

(b) Excluded after the cargo is loaded by maintaining a positive pressure of at least 0.14 kp/cm² (2 psig) by—

(1) Introducing a gas that—

(i) Is not reactive;

(ii) Is not flammable; and

(iii) Does not contain more than 0.2 percent oxygen by volume; or

(2) Controlling the cargo temperature.

§ 154.1715 Moisture control.

When a vessel is carrying sulphur dioxide, the master shall ensure that—

(a) A cargo tank is dry before it is loaded with sulphur dioxide; and

(b) Air or inert gas admitted into a tank carrying sulphur dioxide during discharging or tank breathing has a moisture content equal to or less than the moisture content of air with a dewpoint of −45° C (−49° F) at atmospheric pressure.

§ 154.1720 Indirect refrigeration.

A refrigeration system that is used to cool acetaldehyde, ethylene oxide, or methyl bromide, must be an indirect refrigeration system that does not use vapor compression.

§ 154.1725 Ethylene oxide.

(a) A vessel carrying ethylene oxide must—

(1) Have cargo piping, vent piping, and refrigeration equipment that have no connections to other systems;

(2) Have valves, flanges, fittings, and accessory equipment made of steel, stainless steel, except types 416 and 442, or other material specially approved by the Commandant (G-MHM);

(3) Have valve disk faces, and other wearing parts of valves made of stainless steel containing not less than 11 percent chromium;

(4) Have gaskets constructed of spirally wound stainless steel with teflon or other material specially approved by the Commandant (G-MHM);

(5) Not have asbestos, rubber, or cast iron components in the cargo containment system and piping; and

(6) Not have threaded joints in cargo piping.

(b) Cargo hose used for ethylene oxide must—

(1) Be specially approved by the Commandant (G-MMT); and

(2) Be marked "For (Alkylene or Ethylene) Oxide Transfer Only."

(c) Ethylene oxide must be maintained at less than 30° C (88° F).

(d) Cargo tank relief valves for tanks containing ethylene oxide must be set at 5.5 kp/cm² (78.2 psig) or higher.

(e) A vessel must have a method specially approved by the Commandant (G-MHM) of jettisoning ethylene oxide.

§ 154.1730 Ethylene oxide: Loading and off loading.

(a) The master shall ensure that before ethylene oxide is loaded into a tank—

(1) The tank is thoroughly clean, dry, and free of rust; and

(2) The tank vapor spaces and hold spaces are inerted with an inert gas that meets § 154.1710(b)(1).

(b) Ethylene oxide must be off loaded by a deepwell pump or inert gas displacement.

(c) Ethylene oxide must not be carried in deck tanks.

§ 154.1735 Methyl acetylene-propadiene mixture.

(a) The composition of the methyl acetylene-propadiene mixture at loading must be within the following limits:

(1) Maximum methyl acetylene and propadiene molar ratio of 3 to 1.

(2) Maximum combined concentration of methyl acetylene and propadiene of 65 mole percent.

(3) Minimum combined concentration of propane, butane, and isobutane is 24 mole percent, of which at least one third must be butanes and one third propane.

(4) Maximum propylene concentration of 10 mole percent.

(5) Maximum butadiene concentration of 2 mole percent.

(b) A vessel carrying a methyl acetylene-propadiene mixture must have a refrigeration system that does not use vapor compression or a refrigeration system that has the following features:

(1) Uses vapor compression so that the temperature to which the vapor may be subjected is 60° C (140° F) or less and the pressure is 17.6 kp/cm² (250 psig) or less.

(2) Discharge piping that has—

(i) Two temperature actuated shutdown switches set to operate at 60° C (140° F) or less;

(ii) A pressure actuated shutdown switch set to operate at 17.6 kp/cm² (250 psig) or less; and

(iii) A safety relief valve set to relieve at 18.0 kp/cm² (256 psig) or less.

(3) A relief valve that vents to a mast that meets § 154.805 and does not relieve into the compressor suction line.

(4) An alarm that sounds in the cargo control station and in the wheelhouse when the high pressure switch, high temperature switch, or relief valve operates.

(c) A vessel carrying a methyl acetylene-propadiene mixture must have cargo piping, vent piping, and refrigeration equipment that have no connections to other systems.

§ 154.1740 Vinyl chloride: Inhibiting and inerting.

When a vessel is carrying vinyl chloride, the master shall ensure that—

(a) Vinyl chloride is inhibited under the requirements of § 154.1818; or

(b) The requirements in § 154.1710 are met, and the oxygen content of inert gas is less than 0.1 percent by volume.

§ 154.1745 Vinyl chloride: Transferring operations.

A vessel carrying vinyl chloride must meet the requirements under § 40.15-1 of this chapter.

§ 154.1750 Butadiene or vinyl chloride: Refrigeration system.

A refrigeration system for butadiene or vinyl chloride must not use vapor compression unless it—

(a) Avoids any stagnation points where uninhibited liquid can accumulate; or

(b) Has inhibited liquid from the tank added to the vapor upstream of the condenser.

§ 154.1755 Nitrogen.

Cargo containment systems other than deck tanks on vessels carrying nitrogen must be specially approved by the Commandant (G-MMT).

Subpart E—Operations

§ 154.1800 Special operating requirements under Part 35 of this chapter.

A vessel must meet the requirements of Part 35 of this chapter.

§ 154.1802 Certificates, letters, and endorsements required.

(a) No person may operate a U.S. flag vessel unless the vessel's Certificate of Inspection issued under Subchapter D of this chapter is endorsed with the name of the cargo that it is allowed to carry.

(b) No person may operate a foreign flag vessel on the navigable waters of the United States unless the vessel has—

(1) A Certificate of Fitness for Carriage of Liquefied Gases in Bulk issued by the country of registry and a Letter of Compliance issued by the Commandant (G-MHM) endorsed under this part with the name of the cargo that it is allowed to carry; or

(2) A Letter of Compliance issued by the Commandant (G-MHM) endorsed with the name of the cargo that it is allowed to carry.

(3) The following plans and information are carried aboard:

(i) A description and schematic plan of the arrangement for inerting cargo tanks, hold spaces, and interbarrier spaces.

(ii) A description of the tank gauging equipment.

(iii) A description and instruction manual for the calibration of the cargo leak detector equipment.

(iv) A schematic plan that shows the locations of leak detectors and sampling points.

(v) A description of the systems for cargo temperature and pressure control for methane to meet proposed §§ 154.701 through 154.709.

§ 154.1804 Document posted in wheelhouse.

No person may operate a vessel unless the endorsed document required under § 154.1802 is under glass in the wheelhouse.

§ 154.1806 Copy of this subchapter on board.

No person may operate a U.S. flag vessel unless a copy of this part and a copy of Part 35 of this chapter are on board.

§ 154.1808 Limitations in the endorsement.

No person may operate a vessel unless that person complies with all limitations in the endorsement on the vessel's Certificate of Inspection or Letter of Compliance.

§ 154.1809 Loading and stability manual.

(a) No person may operate a vessel unless the vessel has on board a loading and stability manual.

(b) The loading and stability manual must contain—

(1) Information that enables the master to load and ballast the vessel while keeping structural stresses within design limits and positive metacentric height;

(2) Damage stability information, including all loading restrictions; and

(3) Trim information.

§ 154.1810 Cargo manual.

(a) No person may operate a vessel unless the vessel has on board a cargo manual.

(b) The cargo manual must contain the following information:

(1) A description of each cargo and its handling hazards as a liquid and as a gas, including accidents involving frostbite and asphyxiation, safety equipment, and first aid measures.

(2) A description of the dangers of asphyxiation from the inerting gases used on the vessel.

(3) The measures necessary to mitigate embrittlement of steel structure in way of cargo leakage.

(4) The use of the firefighting systems on the vessel.

(5) The features of the cargo containment system that effect operation and maintenance, including pressure and temperature ranges and relief valve setting.

(6) Pressures, temperatures, and liquid levels for all operations.

(7) General information derived from the first loading of the vessel.

(8) All alarm settings.

(9) A description of the components of the cargo system, including the following:

(i) Liquid cargo system.

(ii) Liquid recirculating or condensate return system.

(iii) Cargo tank cool-down system.

(iv) Cargo tank warm-up or vaporization system.

(v) Gas main system.

(vi) Cargo tank or compressor relief system and blocked liquid or gas relief system.

(vii) Inerting system.

(viii) Boil-off gas compressor or reliquefaction system.

(ix) Vapor leak detection systems.

(x) Alarm or safety indication systems.

(xi) Cargo jettisoning system.

(xii) Gas or fuel to engine room system.

(10) A description of cargo loading and discharge operations, including simultaneous handling of multigrades of cargo and ballast.

(11) A description of cargo operations during the voyage.

(12) A description of cargo tank cool-down and warm-up operations including purging and gasfreeing.

(13) A description of hull and cargo tank temperature monitoring systems.

(14) A description of vapor leak detection and alarm or safety systems.

(15) A description of the following conditions and their symptoms, including emergency measures and corrective actions:

(i) Cargo or ballast valve malfunction.

(ii) Low cargo tank gas pressure.

(iii) High fill level shutdown.

(iv) Gas compressor shutdown.

(v) Hull cold spots.

(vi) Cargo piping leaks.

(vii) Primary or secondary barrier failure.

(viii) Hold boundary structural failure.

(ix) Fire in vent mast head.

(x) Reliquefaction plant failure.

(xi) Vaporizer malfunction or failure.

(xii) Piping or cargo valve freeze-up.

(16) Any other matters relating to operation of the cargo systems.

(17) Operational means necessary to maintain the vessel in a condition of positive stability through all conditions of—

(i) loading and deballasting; and

(ii) unloading and ballasting.

(c) The master shall ensure that the cargo manual is kept up-to-date.

§ 154.1812 Operational limitation information.

The master shall ensure that terminal personnel are told the operational limitation information required by § 154.1810 (b) (17).

§ 154.1814 Cargo information cards.

(a) No person may operate a vessel unless a cargo information card for each cargo being transported is carried either in the wheelhouse, in the ship's office, or in another location easily accessible to the person in charge of the watch.

(b) When a vessel is moored at a terminal, the master shall ensure that a set of information cards is in the possession of the terminal's person in charge of cargo transfer operations.

(c) Each card must be at least 17 cm x 24 cm (7 in. x 9½ in.), have printing on one side only, and must contain the following information about the cargo:

(1) Name as listed in Table 4.

(2) Appearance.

(3) Odor.

(4) The hazards involved in handling procedures for safe handling, including any special handling instructions.

(5) Procedures to follow in the event of spills, leaks, equipment breakdown, or uncontrolled cargo release.

(6) Procedures to be followed if a person is exposed to the cargo.

(7) Firefighting procedures and media.

§ 154.1816 Cargo location plan.

The master shall ensure that—

(a) A cargo location plan is prepared that gives—

(1) The location and number of each cargo tank; and

(2) The name of the cargo in each tank;

(b) One cargo location plan is kept with the sets of cargo information cards required under § 154.1814; and

(c) The cargo names in the cargo location plan do not differ from the names of the cargoes listed in Table 4.

§ 154.1818 Certificate of inhibition.

(a) Except as provided in § 154.1740 (b), no person may operate a vessel carrying butadiene or vinyl chloride without carrying in the wheelhouse written certification from the shipper that the product is inhibited.

(b) The certification required by this section must contain the following information:

(1) The name and concentration of the inhibitor.

(2) The date the inhibitor was added.

(3) The expected duration of the inhibitor's effectiveness.

(4) Any temperature limitations qualifying the inhibitor's effective lifetime.

(5) The action to be taken if the time of the voyage exceeds the inhibitor's lifetime.

§ 154.1820 Shipping document.

No person may operate a vessel without carrying a shipping document in the wheelhouse that lists for each cargo on board—

(a) The tank in which the cargo is stowed;

(b) The name of the shipper;

(c) The location of the loading terminal;

(d) The cargo name as listed in Table 4; and

(e) The approximate quantity of the cargo.

§ 154.1822 Shipping document: Copy furnished the transfer terminal.

While a vessel is moored at a transfer terminal, the master shall ensure that at least one copy of the shipping document is given to the terminal's person in charge of cargo transfer.

§ 154.1824 Obstruction of pumproom ladderways.

The master shall ensure that each cargo pumproom access is unobstructed.

§ 154.1826 Opening of tanks and cargo sampling.

(a) The master shall ensure that each tank opening is fully closed at all times.

(b) The master may authorize the opening of a tank—

(1) During tank cleaning; and

(2) To sample a cargo that Table 4 allows to be carried in a containment system having a restricted gauging system if—

(i) The tank is not being filled during sampling;

(ii) The vent system has relieved any pressure in the tank; and

(iii) The person sampling the cargo wears the protective clothing required under § 154.1840.

(c) The master shall ensure that cargoes requiring closed gauging as listed in Table 4 are sampled only through the controlled sampling arrangement of the tank.

§ 154.1828 Spaces containing cargo vapor: Entry.

(a) No person may enter a cargo handling space without the permission of the master.

(b) Before allowing anyone to enter a cargo handling space, the master shall ensure that—

(1) The space is free of toxic vapors and has enough oxygen to support life; or

(2) Those entering the space wear protective equipment with breathing apparatus and an officer closely supervises the entire operation.

§ 154.1830 Warning sign.

(a) The master shall ensure that a vessel transferring cargo while fast to a dock or while at anchor in port, displays a warning sign—

(1) At the gangway facing the shore so that the sign may be seen from the shore; and

(2) Facing outboard towards the water so that the sign may be seen from the water.

(b) Except as provided in paragraph (f) of this section, each warning sign must have the following legends:

(1) Warning.

(2) Dangerous Cargo.

(3) No Visitors.

(4) No Smoking.

(5) No Open Lights.

(c) Each letter on the sign must—

(1) Be block style;

(2) Be black on a white background;

(3) Be 7.6 cm (3 in.) high;

(4) Be 5.1 cm (2 in.) wide, except for "M" and "W" which must be 7.6 cm (3 in.) wide, and the letter "I" which may be 1.3 cm (½ in.) wide; and

(5) Have 1.3 cm (½ in.) stroke width.

(d) The spacing between letters must be—

(1) 1.3 cm (½ in.) between letters on the sign of the same word;

(2) 5.1 cm (2 in.) between words;

(3) 5.1 cm (2 in.) between lines; and

(4) 5.1 cm (2 in.) at the borders of the sign.

(e) The legends "No Smoking" and "No Open Lights" are not required when the cargoes on board a vessel are not flammable.

§ 154.1832 Incompatible cargo.

(a) The person in charge of cargo transfer may not authorize the loading of incompatible[7] cargoes into cargo containment systems unless the cargo containment systems are separated by—

(1) Cofferdams, other than the spaces between primary and secondary barriers;

(2) Empty tanks;

(3) Tanks containing mutually compatible cargo; or

(4) Piping tunnels.

(b) The person in charge of cargo transfer may not authorize loading of incompatible[7] cargoes into cargo containment systems that have common piping or venting systems.

(c) The person in charge of cargo transfer may not authorize loading of a cargo that is incompatible[7] with residue left in a tank from a previous cargo.

§ 154.1834 Cargo transfer piping.

The person in charge of cargo transfer shall ensure that cargo is transferred to or from a tank only through the cargo piping system.

§ 154.1836 Venting.

The person in charge of cargo transfer shall ensure that no cargo vapor is vented into the atmosphere.

§ 154.1838 Discharge by gas pressurization.

The person in charge of cargo transfer may not authorize cargo discharge by gas pressurization unless—

(a) The tank to be offloaded is an independent tank type B or C;

(b) The pressurizing medium is either the cargo vapor or a nonflammable, nontoxic gas that is inert with the cargo; and

(c) The pressurizing line has—

(1) A pressure reducing valve that has a setting that is 90 percent or less of the tank's MARVS; and

(2) A manual control valve between the pressure reducing valve and the tank.

[7] Incompatible cargoes are listed in Navigation and Vessel Inspection Circular 4-75 and is available from the Commandant (G-MHM-3/83) U.S. Coast Guard, Washington, D.C. 20590.

§ 154.1840 Protective clothing.

The person in charge of cargo transfer shall ensure that every person involved in cargo transfer wears the protective clothing, boots, gloves, and goggles required under § 154.1400.

§ 154.1842 Cargo systems controls and alarms.

The master shall ensure that each cargo emergency shutdown and alarm system used in cargo transfer is tested before cargo transfer begins.

§ 154.1844 Cargo tanks: Filling limits.

(a) The master shall ensure that a cargo tank is not loaded—

(1) More than 98 percent full; or

(2) In excess of the volume determined under the following formula, unless a higher limit is specified on the Certificate:

$$V_L = 0.98\,V\,\frac{d_r}{d_L}$$

where:

V_L = Maximum volume to which the tank may be loaded.

V = Volume of the tank.

d_r = Density at the reference temperature specified in (b).

d_L = Density of the cargo at the loading temperature and pressure.

(b) The reference temperature to be used in paragraph (a) of this section is the temperature corresponding to the vapor pressure of the cargo at the set pressure of the pressure relief valves.

§ 154.1846 Relief valves: Changing set pressure.

The master shall—

(a) Supervise the changing of the set pressure of relief valves under the requirements of § 154.802(b);

(b) Enter the change of set pressure in the vessel's log; and

(c) Ensure that a sign showing the set pressure is posted—

(1) In the cargo control room or station; and

(2) At each relief valve.

§ 154.1848 Inerting.

(a) A master shall ensure that—

(1) Hold and interbarrier spaces on vessels with full secondary barriers are inerted when flammable cargoes are carried;

(2) Hold and interbarrier spaces are maintained full of dry air or inerted gas on—

(i) Vessels with partial secondary barriers;

(ii) Vessels with full secondary barriers when non-flammable cargoes are carried; and

(iii) Vessels with refrigerated independent tanks type C;

(3) When tanks containing flammable vapor are to be gas freed, the flammable vapors are purged from the tank by inert gas before air is admitted; and

(4) When gas free tanks are to be filled with a flammable cargo, air is purged from the tank by inert gas before cargo liquid or vapor is introduced.

(b) Inert gas must be supplied from the shore or from the vessel's inert gas system.

§ 154.1850 Entering cargo handling spaces.

(a) The master shall ensure that the ventilation system required under § 154.1205 is in operation for 30 minutes before a person enters one of the following:

(1) Spaces containing cargo pumps, compressors, and compressor motors.

(2) Gas dangerous cargo control spaces.

(3) Other spaces containing cargo handling equipment.

(b) The master shall ensure that a warning sign is posted outside of each space listed in paragraph (a) of this section which sets out the requirement for use of the ventilation system.

(c) The master shall ensure that no sources of ignition are put in a cargo handling space on a vessel carrying flammable cargo unless the space is gas free.

§ 154.1852 Air breathing equipment.

(a) The master shall ensure that a licensed officer inspects the compressed air breathing equipment at least once each month.

(b) The master shall enter in the vessel's log a record of the inspection required under paragraph (a) of this section that includes—

(1) The date of the inspection; and

(2) The condition of the equipment at the time of the inspection.

§ 154.1854 Methane (LNG) as fuel.

(a) If methane (LNG) vapors are used as fuel in the main propulsion system of a vessel, the master shall ensure that the pilot fuel oil burner required under § 154.703(c)(7) is used when the vessel is on the navigable waters of the United States.

(b) When the methane (LNG) fuel supply is shut down due to loss of ventilation or detection of gas, the master shall ensure that the methane (LNG) fuel supply is not used until the leak or other cause of the shutdown is found and corrected.

(c) The master shall ensure that the requirements in paragraph (b) of this section are posed in the main machinery space.

§ 154.1856 Correction of cold spots in the hull.

No person may operate a vessel unless cold spots in the hull are corrected under the requirements of § 154.122.

§ 154.1858 Cargo hose used in prototype testing.

The master shall ensure that a cargo hose used in prototype testing is not used for cargo transfer service.

§ 154.1860 Integral tanks: Cargo colder than −10°C(14°F).

The master shall ensure that no integral tank is used to carry a cargo colder than −10° C (14° F) unless specially approved by the Commandant (G-MMT).

§ 154.1862 Posting of speed reduction.

If a speed reduction is specially approved by the Commandant under § 154.409, the master shall ensure that the speed reduction is posted in the wheelhouse.

§ 154.1864 Vessel speed within speed reduction.

The master shall ensure that the speed of the vessel is not greater than the posted speed reduction.

§ 154.1866 Cargo hose connection: Transferring cargo.

No person may transfer cargo through a cargo hose connection unless the connection has a remotely controlled quick closing shut-off valve.

§ 154.1868 Portable blowers in personnel access openings.

The master shall ensure that a portable blower in a personnel access opening does not reduce the area of the opening so that it does not meet § 154.308.

§ 154.1870 Bow and stern loading.

(a) The master shall lock closed shut-off valves required under § 154.355(a)(3) when the bow or stern loading piping is not in use.

(b) The person in charge of cargo transfer shall ensure that after the bow or stern loading piping is used it is purged of cargo vapors with inert gas.

(c) The person in charge of cargo transfer shall ensure that entrances, forced or natural ventilation intakes, exhausts, and other openings to any deck house alongside the bow or stern loading piping are closed when this piping is in use.

(d) The person in charge of cargo transfer shall ensure that bow or stern loading piping installed in the area of the accommodation, service, or control space is not used for the following:

(1) Acetaldehyde.
(2) Ammonia, anhydrous.
(3) Dimethylamine.
(4) Ethylamine.
(5) Methyl Chloride.
(6) Vinyl Chloride.

TABLE 4.—*Summary of minimum requirements*

Cargo name	Ship type	Independent tank type C required	Control of cargo tank vapor space	Vapor detection	Gaging	Electrical hazard group and class	Special requirements
Acetaldehyde	IIG/IIPG		Inert	I. & T.	C	I-C	154.1400(c), 154.1410; 154.1710; 154.1720; 154.1870.
Ammonia, anhydrous	IIG/IIPG			T	C	I-D	154.1000, 154.1400(c); 154.1405, 154.1410; 154.1700(b)(c)(e), 154.1870.
Butadiene	IIG/IIPG		Inert	I	R	I-B	154.1700(b)(d)(f), 154.1710; 154.1740, 154.1750; 154.1818.
Butane	IIG/IIPG			I	R	I-D	None.
Butylene	IIG/IIPG			I	R	1-D	Do.
Dimethylamine	IIG/IIPG			I. & T.	C	I-C	154.1400(c), 154.1405; 154.1410, 154.1700(b)(c)(e); 154.1870.
Ethane	IIG			I	R	I-D	None.
Ethylamine	IIG/IIPG			I. & T.	C	I-C	154.1400(c), 154.1405; 154.1410, 154.1700(b)(c)(e); 154.1870.
Ethyl chloride	IIG/IIPG			I. & T.	R	I-D	154.1870.
Ethylene	IIG			I	R	I-C	None.
Ethylene oxide	IG	Yes	Inert	I. & T.	C	I-B	154.1400(c), 154.1405; 154.1410, 154.1700(b)(d)(f); 154.705, 154.1710; 154.1720, 154.1725; 154.1730, 154.1870; 154.660(c)(2).
Methane (LNG)	IIG			I	C	I-D	154.703–709; 154.1854.
Methyl acetylene propadiene mix.	IIG/IIPG			I	R	I-	154.1735.
Methyl bromide	IG	Yes		I. & T.	C	I-D	154.660(c)(2), 154.1345(c)(d), 154.1400(c); 154.1405, 154.1410; 154.1700(g), 154.1705; 154.1720, 154.1870.
Methyl chloride	IIG/IIPG			I. & T.	C	I-D	154.1700(a), 154.1870.
Nitrogen	IIIG			O	C		154.1755.
Propane	IIG/IIPG			I	R	I-D	None.
Propylene	IIG/IIPG			I	R	I-D	Do.
Refrigerant gases [1]	IIIG				R		Do.
Sulfur dioxide	IG	Yes	Dry	T	C		154.660(c)(2), 154.1345(c)(d), 154.1400(c); 154.1405, 154.1410; 154.1705, 154.1715; 154.1720, 154.1870.
Vinyl chloride	IIG/IIPG			I. & T.	C	I-D	154.1405, 154.1410; 154.1700(a), 154.1700(b)(d)(f), 154.1710; 154.1704, 154.1745; 154.1750, 154.1818, 154.1870.

[1] Regrigerant gases include nontoxic, nonflammable gases, such as: dichlorodifluoromethane, dichloromonofluoromethane ,dichlorotetrafluoroethane, monochlorodifluoromethane, monochlorotetrafluoroethane, monochlorotrifluoromethane.

APPENDIX A—EQUIVALENT STRESS

The Coast Guard only accepts equivalent stress (σ_e) calculated under the following or a formula specially approved by the Commandant (G-MMT) as equivalent to the following:

I.

$$\sigma_e = \sqrt{\sigma_x^2 + \sigma_y^2 - \sigma_x\sigma_y + 3\tau_{xy}^2}$$

where:

σ_x = Total normal stress in "x" direction.

σ_y = Total normal stress in "y" direction.

τ_{xy} = Total shear stress in "xy" plane.

II. When the static and dynamic stresses are calculated separately, the total stresses in paargraph I are calculated from the following or equivalent formulae specially approved by the Commandant (G-MMT):

$$\sigma_x = \sigma_x(\text{static}) \pm \sqrt{\sum(\sigma_x(\text{dynamic}))^2}$$

$$\sigma_y = \sigma_y(\text{static}) \pm \sqrt{\sum(\sigma_y(\text{dynamic}))^2}$$

$$\tau_{xy} = \tau_{xy}(\text{static}) \pm \sqrt{\sum(\tau_{xy}(\text{dynamic}))^2}$$

III. Each dynamic and static stress is determined from its acceleration component and its hull strain component from hull deflection and torsion.

APPENDIX B—STRESS ANALYSES DEFINITIONS

The following are the standard definitions of stresses for the analysis of independent tank type B:

I. "Normal stress" means the component of stress normal to the plane of reference.

II. "Membrane stress" means the component of normal stress that is uniformly distributed and equal to the average value of the stress across the thickness of the section under consideration.

III. "Bending stress" means the variable stress across the thickness of the section under consideration, after the subtraction of the membrane stress.

IV. "Shear stress" means the component of the stress acting in the plane of reference.

V. "Primary stress" means the stress produced by the imposed loading that is necessary to balance the external forces and moments. (The basic characteristic of a primary stress is that it is not self-limiting. Primary stresses that considerably exceed the yield strength results in failure or at least in gross deformations.)

VI. "Primary general membrane stress" means the primary membrane stress that is so distributed in the structure that no redistribution of load occurs as a result of yielding.

VII. "Primary local membrane stress" means the resulting stress from both a membrane stress, caused by pressure or other mechanical loading, and a primary or a discontinuity effect that produces excessive distortion in the transfer of loads to other portions of the structure. (The resulting stress is defined as a primary local membrane stress although it has some characteristics of a secondary stress. A stress region is local if—

$$S_1 \leq .05\sqrt{Rt};$$

and

$$S_2 \leq 2.5\sqrt{Rt}$$

Where:

S_1 = distance in the meridional direction over which the equivalent stress exceeds 1.1 f.

S_2 = distance in the meridional direction to another region where the limits for primary general membrane stress are exceeded.

R = means radius of the vessel.

t = wall thickness of the vessel at the location where the primary general membrane stress limit is exceeded.

f = allowable primary general membrane stress.

VIII. "Secondary stress" means a normal stress or shear stress caused by constraints of adjacent parts or by self-constraint of a structure. (The basic characteristic of a secondary stress is that it is self-limiting. Local yielding and minor distortions can satisfy the conditions that cause the stress to occur.)

(R.S. 4472, as amended (46 U.S.C. 170); sec. 201, 86 Stat. 427, as amended (46 U.S.C. 391a); sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1)); 49 CFR 1.46 (b), (t), (n)(4).)

Dated: September 25, 1976.

W. M. BENKERT,
Rear Admiral, U.S. Coast Guard, Chief, Office of Merchant Marine Safety.

[FR Doc.76-28693 Filed 10-1-76;8:45 am]

APPENDIX 6

FEDERAL REGISTER
JAN 17, 1977

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-CMC/81)
WASHINGTON, D.C. 20590
PHONE: 202 426 1477

proposed rules

5991/2
24 Jan 1977
Serial 3-P-77

Interested persons are invited to participate in this rulemaking by submitting written data, views, or arguments to the Executive Secretary Marine Safety Council, U.S. Coast Guard (G-CMC/81) Washington, D.C. 20590, prior to 3 March 1977

DEPARTMENT OF TRANSPORTATION

Coast Guard

[46 CFR Part 10]

[CGD 76-193]

RENEWAL OF MERCHANT MARINE OFFICERS LICENSE WITH RADAR OBSERVER ENDORSEMENT

Proposed Clarification of Requirements for Demonstration of Skills

The Coast Guard is considering amending the regulations for the renewal of a merchant marine officer's license with a radar observer endorsement. This proposed change would clarify the requirements for demonstration of radar observer skills during license renewal.

Interested persons are invited to participate in this rulemaking by submitting written comments, data, views, or arguments to the Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Each person or organization submitting a comment should include his name and address, identify this notice (CGD 76-193), and give reasons for any recommendations made.

Comments received before March 3, 1977, will be considered before final action is taken on this proposal. Copies of comments received will be available for examination in Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. This proposal may be changed in the light of comments received.

No hearing is contemplated, but one may be held at a time and place set out in a later notice in the FEDERAL REGISTER, if requested by a person or organization desiring to comment orally at a public hearing and raising a genuine issue.

Present regulations for the licensing of merchant marine officers require certain qualification skill endorsements to be stated on the individual's license. At the time of license renewal requalification, these skills must be demonstrated. The Coast Guard has allowed the holder of a license with a radar observer endorsement to renew the license without the radar observer endorsement if the individual does not choose to demonstrate proficiency for the endorsement. However, the Coast Guard feels that an individual who serves in any capacity under the authority of his license must be qualified in all skill aspects commensrate with the tonnage of his license. These amendments are proposed in order to clarify and reflect this policy.

In consideration of the foregoing, it is proposed that Part 10 of Title 46 of the Code of Federal Regulations be amended as follows:

By adding paragraphs (e) (7) and (8) to § 10.02-9 to read as follows:

§ 10.02-9 Requirements for renewal of license.

• • • • •

(e) • • •

(7) Except as required in paragraph (e)(8) of this section, an applicant who has obtained a radar observer's endorsement may renew an existing license without the radar observer's endorsement.

(8) A master, mate, or pilot whose license is for service in vessels of 300 gross tons and over must have a radar observer's endorsement if he is to ser in any capacity under the authority of his license.

• • • • •

(R.S. 4405, as amended (46 U.S.C. 375), R.S. 4462, as amended (46 U.S.C. 416), Sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1)); 49 CFR 1.46(b).)

NOTE.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A-107.

Dated: January 10, 1977.

W. M. BENKERT,
Rear Admiral, U.S. Coast Guard, Chief, Office of Merchant Marine Safety.

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APPENDIX 7

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PART XII

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

NAVIGATION SAFETY AND VESSEL INSPECTION REGULATIONS

Title 33—Navigation and Navigable Waters

CHAPTER I—COAST GUARD, DEPARTMENT OF TRANSPORTATION

[CGD 74-77]

PART 164—NAVIGATION SAFETY REGULATIONS

Navigation Procedures, Testing, and Equipment Requirements

The purpose of these amendments to Title 33 of the Code of Federal Regulations is to add a new Part 164 prescribing rules for navigation procedures, preliminary tests, and minimum equipment for vessels of 1600 gross tons or more when operating on the navigable waters of the United States, except the Panama Canal and St. Lawrence Seaway.

On page 18766 of the FEDERAL REGISTER of May 6, 1976, the Coast Guard published a notice of proposed rulemaking for these amendments. Operation of vessels that are as large as 1600 gross tons or more within coastal and harbor regions, where 80 percent of vessel casualties occur, regularly creates hazardous conditions with risks to persons, property, and the environment, especially if proper navigation procedures are not followed, essential vessel equipment is not operating properly, or a vessel does not have necessary equipment. As discussed in the preamble of the proposal, most vessels follow proper procedures, have the necessary equipment, and keep that equipment operating properly. It is those vessels that do not follow proper procedures or do not have properly operating, necessary equipment that aggravate the hazard. The hazard is compounded not only by the recrurring problems of reduced visibility, adverse weather, and vessel congestion, but by the increasing speed and size of vessels, especially when carrying hazardous cargoes or other cargoes that can adversely affect the environment. The number of vessels involved in reported collisions, rammings, and groundings is increasing. Vessel casualties, such as those involving the *Torrey Canyon*, the *Tamano*, the *Oregon Standard*, and certain of those that have occurred in December of 1976 and January of 1977, might not have occurred if proper navigation procedures had been followed or if the vessels had had properly operating essential equipment. The purpose of these amendments is to prevent future casualties by requiring, for those larger vessels, that proper navigation procedures are followed, that necessary equipment is on board, and that all essential equipment is operating when those vessels are navigating in the coastal waters and harbors of the United States.

The public was invited to comment in writing on the proposed rules from May 6, 1976, through August 6, 1976, and at public hearings in Washington, D.C. on June 11, 1976, and in San Francisco, California on June 17, 1976. A discussion of comments received and changes in the proposed rules follows.

General comments: Fifteen commenters suggested that more and better training, not regulation, is needed. More and better training is desirable and the Coast Guard is considering many ways to help improve it; however, that training would not preclude the need for the proper navigational procedures and vessel equipment that these amendments address. Furthermore, these rules do apply to the large number of foreign flag vessels operating within our navigable waters, while licensing and certification requirements, including training, promulgated by the Coast Guard now do not. Five commenters recommended increasing the difficulty of license exams or establishing a higher license, such as the United Kingdom's "Extra Master". The Coast Guard is considering these recommendations for possible future action.

Ten commenters stated that the proposal includes nothing that is not already addressed in statute or regulation. The rules in this new part require navigation procedures that are not included in the statutory "rules of the road." The rules also require equipment for all U.S. and foreign vessels of 1600 gross tons or more that is not required under statute or other regulations for all those vessels and under all the operating conditions to which this part applies. Some of the proposed rules, such as those for lights, day signals, and fog signals, were duplicative and have not been included in these final rules.

One commenter stated that the proposed operating procedures would restrict a master's use of good judgment. The operating procedures in these amendments are safe operating procedures that most masters follow. If these rules are restrictive, the restriction applies to those few masters who in the past have not followed these minimally safe practices.

As one commenter observed, most vessels that operate exclusively upon rivers will not be affected by these rules because they are smaller than 1600 gross tons.

One commenter suggested that the Coast Guard should require, instead of the rules in this part, that shipping companies issue an operating manual. Although an operating manual consistent with these rules might be desirable, a rule requiring it could be applicable only to U.S. companies and would not be as comprehensive as these amendments, especially the equipment requirements, nor have the force of regulations.

Several commenters stated that some of the rules were vague. Some of the rules do not include detailed standards because all of the practical variables are not quantifiable. Those rules that could be more detailed have been changed, such as a detailed description of the maneuvering information that is required under paragraph (g) of § 164.35, paragraph (f) of the proposal.

Section 164.01 Applicability. Nine commenters requested a definition of "navigable waters of the United States." "Navigable waters of the United States" is defined in 33 CFR 2.05-25.

Applicability to tug and barge combinations that have large aggregate tonnages was suggested by seven commenters, to tugs and towing vessels by five commenters, to all vessels by one commenter, and to small passenger vessels by one commenter. These regulations are not appropriate for all of the vessels in each of those classifications. The Coast Guard is considering regulations for these vessels that would be the subject of separate rulemaking actions.

Section 164.11 Navigation underway: general. Ten commenters stated that the proposed operating procedures would create a heavy workload that would require additional manning. Changes in this section, which are discussed later in this preamble, should eliminate the need for any unnecessary manning in addition to that normally required upon vessels to which these rules apply.

Two commenters suggested that the rules be published as a code of navigational practices and not as mandatory regulations. As stated at the beginning of this preamble, the navigation procedures in these rules are followed by most masters. The Coast Guard is making them mandatory, instead of publishing a voluntary code, to reach those who now do not follow good navigation procedures.

One commenter stated that the regulation requires the master or person in charge to be guarantor of compliance and that he could not always, in his capacity, ensure compliance. The Coast Guard agrees that this would be especially true for equipment requirements. Therefore, the final rule is changed to include the "owner" of the vessel as an ensurer of compliance. Although this change is included in these amendments, any interested person may submit written comments on this particular change to the Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Each person submitting a comment should include his name, address, identify the notice (CGD 74-77), and give reasons in support of his comments. The Coast Guard will consider comments received before May 2, 1977 and may change the requirement in light of them. Copies of the comments received will be available for examination in Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C.

Section 164.11(a). Six commenters requested a definition of "adequate number" of persons required to constantly man the wheelhouse to direct and control the movement of the vessel and fix the vessel's position. The intent of the paragraph is that the wheelhouse be "constantly manned" and that those functions be performed. Because of the variety of vessels to which this part applies, quantitative definition of "adequate number" is not practical. Therefore, to avoid confusion, the phrase "adequate number" is deleted.

Section 164.11(b). This paragraph requires the owner, master, or person in charge to ensure that persons performing the duties required under paragraph (a) be competent. Six commenters stated that the Coast Guard is responsible for ensuring competency through licensing and certification. "Competent" means more than qualified through licensing and certification. It also means physical

and mental capacity to do the job at the time the person assumes the duty.

Section 164.11(c) in the proposal. This paragraph would have required the vessel's position to be fixed every 15 minutes. After further consideration, the Coast Guard has determined that this would not be practicable in all navigable waters. Therefore, it is not included in this final rule.

Section 164.11(c). This was paragraph (d) of the proposal which would have required the plotting of the vessel's position at each fix and the revised track on a chart of the area and that the person directing the movement of the vessel is informed of the vessel's position. Ten commenters stated that compliance would not be possible at present manning levels. Ten more commenters stated that the requirement is superfluous on rivers and in channels. Four others said this plotting would distract watch officers who are performing other duties. It is necessary for safety that the appropriate vessel's officers be aware of the vessel's position to supplement the functioning of a pilot; however, the Coast Guard has determined that the plotting of the track is unnecessarily burdensome in consideration of practical manning levels and the necessities of other duties. Therefore, the track plotting requirement is not included in the final rule.

Section 164.11(d). This was paragraph (e) in the proposal. This paragraph does not require specific navigation equipment, but requires the use of the electronic and other navigational equipment that is on a vessel plus geographic reference points and hydrographic contours for fixing positions. It should be read with the next paragraph which prohibits sole reliance on buoys.

Section 164.11(e). This was paragraph (f) in the proposal. Eight commenters suggested that buoys should be used to fix a position if no other aids are available. Buoys may be used to establish an estimated position if no other aids are available; however, they cannot be relied upon to establish a fix. Four commenters suggested that the Coast Guard spend more money on buoy maintenance. Three more stated that several buoys could be used to establish a fix. As stated in the note to this paragraph (e), strong currents, heavy seas, ice, and collisions with vessels can move, sink, or set adrift a buoy. "Spending more money" would not solve these problems. It is also not likely under these circumstances that several buoys could be used to establish a fix, but could only be used to establish an estimated position. The charted position of a buoy is approximate.

Section 164.11(g) in the proposal This proposed requirement, to maintain a proper lookout, is included in the Federal "rules of the road", which are applicable to all vessels. Since it is therefore redundant, it is not included in the final rule.

Section 164.11(f). This was paragraph (h) in the proposal. Four commenters stated that the requirement to evaluate each closing radar contact conflicts with the radar Annex to the International Regulations for Preventing Collisions at Sea, 1960. That Annex cautions against reliance solely upon "scanty information" such as radar contacts and states what actions should be taken under certain circumstances. Paragraph (f) of these rules requires that each closing radar contact be evaluated, but does not require sole reliance upon radar and does not suggest what action should be taken once a contact is evaluated. One commenter stated that the rule was "pointless" in rivers and channels. The rule does not require plotting of course, speed, and closest point of approach of closing visual or radar contacts, which might not be effective in rivers and channels. The rule does require that the person directing the vessel's movement be aware of the actions of those contacts and the evaluation of how they may affect the navigation of that person's vessel.

Section 164.11 (g) and (h). These were paragraph (i) and (j) in the proposal. These rules require that rudder, engine speed, and direction orders be executed as given. One commenter stated that these rules would not prevent errors. Another commenter suggested that the requirement should be that the person directing the vessel's movement have a "positive indication" of proper execution. The intent of the rule is that the person directing the vessel's movement does what is necessary to ensure that these orders are being executed correctly, such as watching the direction the helmsman turns the wheel, the rudder angle indicator, and the engine order telegraph, so that person can respond immediately to correct any error being made. Some "positive indications," such as the movement of the vessel's head or change in vessel speed or engine vibrations, may not occur in time for correction of an error, especially on "very large" vessels.

One commenter suggested that the engine speed and direction orders be given using terms such as "ahead one-third" instead of terms such as "slow ahead," because there is less chance that the orders would be heard incorrectly. Application to foreign vessels to which this part applies of a rule requiring the use of this specific terminology would not be practicable.

Section 164.11(i). This was paragraph (k) in the proposal. One commenter stated the requirement that magnetic variation and deviation be known and correctly applied was "ridiculous" because the deviation changes can be so frequent. A survey of 300 randomly selected vessels showed that the deviation tables on many of these vessels were so out of date that the tables were of little use. The intent of this requirement is that a person directing the movement of a vessel be aware of the vessel's deviation. If that person has reasonably up to date tables or acts to verify deviation, such as by gyrocompass or celestial comparison, the requirement of this paragraph would be met and the safe navigation of the vessel enhanced.

Section 164.11(j). This was paragraph (l) in the proposal which would have required a qualified person to be at the steering position at all times. Six commenters stated that requiring the person to be at the steering position when a vessel was on automatic pilot was unreasonable. In light of this comment, the final rule requires only that the person be in the wheelhouse at all times. "Qualified person" has been changed to "competent" for the same reasons discussed earlier in this preamble for paragraph (a) of this section.

Section 164.11(k). This was paragraph (m) in the proposal. This paragraph requires a master and pilot conference to familiarize the pilot with the vessel because, although a pilot may be familiar with the type of vessel, each vessel has its own characteristics that often change with draft, trim, and speed. Furthermore, the pilot may not be familiar with the bridge layout and equipment and it would be too late to learn these things when risk of collision exists. Two commenters thought that the requirement was too vague. The paragraph is a clear expression of the intent of the requirement as just discussed. Further detail would be impractical because of the great variety of vessels to which this part applies. Three commenters asked about possible language barrier problems. If the pilot is unable to communicate somehow with the master, the Captain of the Port should be contacted under § 164.53 of this new part.

Paragraph (m)(2) in the proposal, which would have required the pilot to inform the master of abnormal characteristics of the area, is not included in this final rule. It may be the subject of a separate rulemaking at another time.

Section 164.11(l). This was paragraph (n) in the proposal. This paragraph requires the person directing the movement of the vessel to know the current velocity and direction for the area. One commenter stated that river current predictions are often inaccurate. The intent of the paragraph is that the person directing the movement of the vessel know as much about current velocity and direction as is possible.

Section 164.11(m). This was paragraph (o) in the proposal. One commenter stated that the predicted set and drift are unpredictable upon rivers. The intent of this paragraph is that the person directing the movement of the vessel use whatever data on current that is available to predict set and drift.

Section 164.11(n). This was paragraph (p) in the proposal. The words "tidal value" are replaced by "tidal state," as used in tide tables, to clarify the intent of the paragraph.

Section 164.11(q) in the proposal. This was to be a requirement for minimum net bottom clearance. It is not included in this final rule, but is to be the subject of a future rulemaking action.

Section 164.11(o). This was paragraph (r) in the proposal. It requires that the vessel's anchors be ready for letting go. Seven commenters suggested that application of the rule be limited to waters that are shallow enough for anchor use. Trying to narrowly define areas where the rule should apply would be impractical.

The intent of the rule is that the anchor be ready for use if necessary, such as when a vessel sheers suddenly into an area where it may ground. Nor should the rule be limited to confined or congested waters, as three commenters suggested, for the same reason. Six persons asked what "ready for letting go" means. "Ready for letting go" means that stoppers, covers, jackasses, and similar items are removed from the ground tackle and that the chain be rigged for quick release. It does not mean that the anchor should be walked out.

Section 164.11 (s) and (t) in the proposal. These proposed requirements were for the proper display of lights and day signals and the sounding of proper fog signals. These are included under the Federal "rules of the road," which are applicable to all vessels, and are therefore not included in this final rule.

Section 164.11(p). This was paragraph (u) in the proposal. Five commenters suggested that the Coast Guard coordinate this rule for setting a vessel's speed with the new Rule 6 of the International Regulations for Preventing Collisions at Sea, 1972. The Coast Guard has done so and the rules are consistent. Since Rule 6 applies to international waters, it is supplemented by this paragraph (p), which is more appropriate for the coastal and inland waters to which it applies.

Section 164.11(q). This was paragraph (v) in the proposal. The proposed paragraph, in part, required that the results of the tests required under § 164.25 be recorded in the vessel's "pilot house log." Two commenters suggested that the entry be in the "deck log." The intent of the rule is simply that the results be recorded in an official log of the vessel. To avoid confusion, the words "pilot house" are not included in the final rule.

Section 164.11(r). This was paragraph (w) in the proposal. This paragraph is the requirement that equipment required by this new part be maintained in operable condition. Four commenters suggested a "best effort" criterion. Two others stated that compliance is not always possible because of lack of parts and available technical ability. One commenter stated that radar, gyro, or depth finder malfunction should not be a reason to delay departure from a port where there are inadequate repair facilities. Notwithstanding these considerations, the intent of the rule is that this necessary equipment should be operating.

Section 164.15 Navigation underway: confined or congested waters and *Section 164.16 List of confined or congested waters.* These are special rules for the hazards of navigation in confined or congested waters. The substantive rules in § 164.15 are promulgated in this final rule as discussed in this preamble. The practical application of § 164.15, however, will not occur until specific geographic areas in which they would apply are included under § 164.16. The definition of "confined or congested waters," as requested by nine commenters, would be implicit in the naming of those waters. Those waters would be particularly hazardous because of restricted maneuvering room or a high volume of vessel traffic. The Coast Guard will conduct separate rulemaking actions for the listing of specific waters under § 164.16. A discussion of the rules in § 164.15 follows.

Section 164.15(a). The proposed rule stated that propulsion machinery is to be in the "maneuvering mode". One commenter requested a definition of "manuevering mode." To clarify the intent of the requirement, the final rule requires propulsion machinery to be ready to "respond immediately through its full operating range."

Section 164.15(b). This paragraph requires that the engine room be manned to operate the propulsion machinery as required under paragraph (a) of the section. Four commenters suggested that vessels that are designed for "unmanned" engine rooms be exempted. The intent of the paragraph is to require no more manning than is necessary to meet paragraph (a) of this section. "Engine room" also includes the main engine control station, even if it is not physically in the "engine room."

Section 164.15(c). This paragraph requires the availability of persons to anchor the vessel rapidly in an emergency. One commenter suggested that vessels with remote control of anchors be exempted. If there is remote control of anchors, the requirement is met by having persons at the remote control.

Section 164.15 (d) and (e) in the proposal. Paragraph (d) would have required the manning of the steering engine room to shift steering control from the pilot house to the steering engine room. Seventeen commenters stated that the requirement would be ineffective because a steering casualty cannot be so remedied quickly enough. In light of these comments, the requirement is not included in these final rules but will be considered further. Because of this, paragraph (e) of the proposal, which would have required communication between the pilot house and the person manning the steering engine room, is also deleted.

Section 164.15(d). This was paragraph (f) in the proposal. This paragraph prohibits the use of the automatic pilot device in confined or congested waters. Two commenters stated that automatic pilot is better than manual steering in certain situations. One suggested that the requirement be for use of the safest steering mode for a particular situation. One commenter stated that component failure in an auto pilot often causes a sudden sheer and that in confined or congested waters, there may be no time to shift. Furthermore, he stated that many companies have standing orders to use hand steering in "tight quarters." The last commenter's statements are consistent with the intent of the rule and the concept of the confined or congested waters in which it would apply. The paragraph is included in this final rule.

Section 164.17 of the proposal. The proposal stated that a rule for tug assistance in confined waters would be developed. This is to be the subject of a future rulemaking action.

Section 164.19 Requirements for vessels at anchor. To be chronologically consistent, paragraphs (a) and (b) of the proposal are interchanged in this final rule.

Section 164.19(a). This was paragraph (b) in the proposal. This paragraph requires the maintenance of a proper anchor watch. The proposed wording was "lookout". "Anchor watch" replaces it in this final rule in agreement with a comment, which stated that "anchor watch" was more appropriate.

Section 164.19(c). This paragraph combines paragraphs (c) and (d) in the notice. One commenter stated that veering chain or dropping a second anchor may solve the problem and that if repairs are being made to the vessel at anchor, it may not be able to get underway. Depending upon the severity of conditions, veering chain or dropping a second anchor may solve an anchor dragging problem; however, if conditions warrant, the vessel should be ready for getting underway if the other actions do not solve the problem. If the vessel has no propulsion, standby tug assistance may be appropriate.

Section 164.19 (e) and (f) in the proposal. These paragraphs would have required the display of proper light and day signals and sounding fog signals while at anchor. Since these are already required under the Federal "rules of the road", which are applicable to all vessels, they are not included in this final rule.

Section 164.23 in the proposal. This section would have required notification to the Captain of the Port or the Vessel Traffic Service of an area before getting underway under conditions that may abnormally affect vessel movement. There were 27 comments about the impracticality of this requirement. After consideration of these comments, the Coast Guard has determined that the practical value of this requirement is outweighed by its impractical aspects and it is not included in this final rule.

Section 164.25 Tests before entering or getting underway. Five commenters stated that the equipment tests required by this section are normal practice on "well-run" vessels and one commenter stated that the requirements are already included in parts of 46 CFR. The intent of the section is that these tests also be made on all those vessels to which this new part applies and not just the vessels to which the requirements in 46 CFR apply. 46 CFR is being amended to be consistent with this new rule. One commenter stated that compliance with this requirement is "impossible" for short inland or coastal voyages. These tests are as necessary for vessels of 1,600 or more gross tons that make short inland or coastal voyages, such as between Philadelphia and Baltimore, as they are for vessels that make longer voyages. If this seems impractical for a particular vessel, the Captain of the Port should be contacted under the requirements of § 164.55 of this new part.

Section 164.25(a). This paragraph requires the testing of primary and secondary steering gear. One commenter stated that careful inspection by a chief

engineer or other qualified person would be sufficient. Visual inspection does not always disclose whether the system will fail and is less reliable than actual testing. One commenter suggested that testing a "trick wheel" is not practical while a vessel is underway. If this system is the only backup steering system, the test is necessary. Vessels to which this new part applies usually have at least two means of steering. To enhance safe navigation, both should be tested to ensure that they are operable.

Section 164.25(b). This paragraph requires the testing of internal vessel control communications and vessel control alarms. One commenter suggested that this apply only when necessary for safe maneuvering. These systems should be ready for all circumstances, including the unforeseen, for the purposes of safe navigation. One commenter stated that "all" of these systems on a highly automated vessel is a large number. Nevertheless, it is necessary for the purposes of safe navigation that these systems operate properly.

Section 164.25(c). The proposed paragraph (c) required the testing of "each emergency generator for at least fifteen minutes." Four commenters stated that once a week is sufficient. These are critical systems and whether or not they are working should be known at the time of actual vessel operation. Since the intent of the section is that there be a second working electrical power source, the final rule allows a standby or emergency generator. One commenter correctly suggested that, instead of a fifteen minute requirement, the test be as long as necessary to show proper functioning, including steady state temperature and pressure readings. The final wording has been changed accordingly.

Section 164.25(d). One commenter suggested that this requirement for the testing of storage batteries for emergency lighting and power systems to vessel control and propulsion machinery spaces not apply to vessels for which there is a regular testing program. The necessity of testing these critical systems at the time of entering or getting underway in the navigable waters of the United States is as discussed for the systems required under paragraphs (a) through (c) of this section.

Section 164.25(e). This paragraph requires the testing of main propulsion machinery, ahead and astern. Five commenters stated that backing engines in coastal waters might be dangerous. The Coast Guard assumes that reasonable masters would not do this test where it might be dangerous, such as in close proximity to other vessels. Two commenters suggested that the machinery be required to be tested only as is necessary to show that it will respond. That would meet the paragraph's requirement. One commenter suggested that the backing test of the engines be made when the vessel slows to pick up a pilot. This machinery must be tested, both ahead and astern, before entering the navigable waters of the United States, which is consistent with the intent of all the regulations in this new part as discussed in the beginning of this preamble.

Section 164.30 Charts, publications, and equipment: general. This section prohibits the operation of a vessel by any person unless the vessel has the charts, publications, and equipment as required by §§ 164.33 through 164.37 of this new part. Six commenters suggested a "due diligence" criterion for this requirement. That concept is reasonably included under the charts and publication requirements in § 164.33 as this section is rewritten in this final rule.

Section 164 33 Charts and publications. Seven commenters stated that the requirement to have the "most recently published" charts under paragraph (a)(1) is unreasonable under the present distribution system. Three commenters stated the same for the requirement under paragraph (a)(2) to have the "current" copy of the listed publications. Accordingly, the requirements are changed to require the "most recently published and available" charts and the "most recent, available * * *" copy of the publications.

Section 164.35 Equipment: all vessels. Seventeen commenters suggested that there be a requirement for "collision avoidance" device. Five commenters suggested a Loran C requirement for "large" vessels. Both will be the subject of a rulemaking action in the near future. Two commenters suggested that radio direction finding equipment be required. This equipment is now required for certain U.S. vessels. The Coast Guard is considering requiring it for all vessels of 1600 or more gross tons operating on the navigable waters of the United States.

Four commenters suggested that the burden of compliance for these equipment requirements be affirmatively placed upon vessel owners. Under the requirement of § 164.30 of this new part, if the owner, through his action or general policy, can reasonably be expected to ensure that the requirements of this equipment section are met, then the burden of compliance would be upon the owner.

Section 164.35(a). This paragraph requires a marine radar system for surface navigation. Four commenters suggested the requirement of gyro stabilization with north up capability. Three commenters suggested the requirement of reflection plotters. One comment suggested the requirement of a minimum 16 inch Plan Position Indicator (PPI) scope with moveable range rings. The Coast Guard has determined that these types of specifications are unnecessary at this time and that the usual radars that are available are sufficient for basic navigational safety. If further experience shows that more specification is necessary, the Coast Guard would conduct appropriate rulemaking actions.

Section 164.35(b). This paragraph requires an illuminated magnetic steering compass. Two commenters stated that many inland vessels do not use a compass. As stated earlier in this preamble, this part does not apply to most inland vessels because they are not 1600 gross tons or more. If an inland vessel is of 1600 gross tons or more and the compass is unnecessary for that vessel, a deviation may be requested under the requirements of § 164 55 of this new part.

Section 164.35(c). This paragraph requires a current magnetic compass deviation table or graph or compass comparison record for the steering compass. The comments on this requirement are discussed earlier in this preamble for § 164.11(i).

Section 164.35 (d) and (e). These were paragraph (d) in the proposal. For clarity, the two requirements, that there be a gyrocompass and that it or a repeater be illuminated and be at the main steering stand, are divided into two paragraphs.

Section 164.35(g). This was paragraph (f) in the proposal. It requires the display of maneuvering information on a fact sheet in the wheelhouse. To be consistent with a similar requirement in 46 CFR 35.20–40 and to clarify the intent of the requirement, the specific information required is stated in the paragraph in this final rule.

Section 164 35(h). This was paragraph (g) in the proposal. It requires an echo sounding device. Two commenters stated that the requirement was unnecessary in pilot waters and two other commenters stated that it was unnecessary for the Great Lakes. It is as important to know the depth of water in these waters as it is in any others. The requirement is unchanged.

Section 164.35(i). This was paragraph (h) in the proposal. It requires a device that can continuously record the depth readings of a vessel's echo sounding device. Nine commenters stated that the device serves no navigational purpose. The recorder is useful for navigational purposes as a valuable positioning device. One commenter stated that the requirement conflicted with IMCO Resolution A.224, which recommends a 15 minute recording capability. The requirement is that the device be one that can record continuously and not a requirement that it run continuously.

Section 164.35(j) in the proposal. This paragraph would have required an illuminated device that displays vessel speed, such as a pitometer log, revolutions-per-minute counter with speed equivalent table, or a direct read out device, such as a doppler indicator. Two commenters stated that such a device would not be useful on rivers. One commenter suggested that direct reading indicators, such as dopplers, be required on "large" vessels. After consideration of these comments and the facts that pitometer log swords would not be extended in shallow waters and revolutions-per-minute counters and speed equivalent tables are only valid in a steady state situation, the Coast Guard has determined that the requirement is insufficient as proposed. Because of the potential value of a direct speed indicating device, the Coast Guard is considering it as the subject of a future rulemaking action after more study; however, the requirement is not included in this final rule.

Section 164.37 in the proposal. This proposed section would have required two marine radar systems on vessels of 10,000 or more gross tons. As stated in the discussion of § 164.35 in this preamble, "collision avoidance" devices for vessels of 10,000 or more gross tons will be the subject of a rulemaking action in the near future. Since a radar system is a component part of some "collision avoidance" devices, this proposed requirement for a second radar is not included in this final rule; however, if after rulemaking procedures a requirement for collision avoidance devices is not promulgated as a final rule, the proposed requirement for a second radar would be reinstated.

Section 164.39 in the proposal. This proposed section would have required an illuminated rate of turn indicator on vessels of 35,000 gross tons or more. Two commenters stated that the device was not necessary on vessels of 100,000 gross tons or more. One commenter stated that the device was designed for use on rivers and was not appropriate for seagoing vessels. One commenter stated that the device had been insufficiently accurate when used on several of his vessels. The Coast Guard has determined that, although the rate of turn indicator may be useful on vessels of this size, further study is necessary and there is insufficient basis for requiring it in these rules.

Section 164.51 Deviatio s from rules: emergency. This section allows emergency deviations from these rules to avoid endangering persons, property, or the environment. Five commenters stated that this section only repeats the substance of Rule 29 of the International Regulations for Preventing Collisions at Sea, 1960, and Article 29 of the statutory inland "rules of the road" (33 U.S.C. 221). Although this section is consistent with those provisions, it applies specifically to the rules in this new part and not just to general navigation practices governed by the international regulations and inland "rules of the road." Proposed paragraph (b) of this section would have required a report of any deviation under this section to the Captain of the Port or Coast Guard District Commander. Two commenters stated this is unnecessary for brief emergency deviations. In light of these comments, the final rule is changed to require this report for only the failure of critical navigation equipment: the radar, gyrocompass, echo sounding device, or primary steering gear. This requirement is in paragraph (b) of new § 164.53. Paragraph (a) of this new section allows the person directing the movement of the vessel to continue a voyage if any equipment required by this new part stops operating properly, subject to the directions of the Captain of the Port under Part 160 of this chapter.

Section 164.55 Deviations from rules: continuing operation or period of time. This was § 164.53 in the proposal. Under this section, the Captain of the Port may authorize a deviation from these rules, if safe navigation is not impaired or the rules for preventing collisions at sea are not violated, for a vessel operating in the waters under his jurisdiction, for a continuing operation or for a period of time that he specifies. Two commenters stated that there would be "uneven enforcement" because Captains of the Port may interpret the rules differently. One commenter suggested that the section include a requirement that authorizations not be "unreasonably withheld." Another commenter suggested an internal procedure for informing Captains of the Port of the different deviations that have been authorized. The Coast Guard intends to issue internal guidelines so that this deviation authorization would be as consistent as is practicable. The intent of this section is to allow reasonable deviations from these rules if safe navigation of the vessel is not impaired and the rules for preventing collisions at sea are not violated. If a vessel operates in waters that include the jurisdiction of two or more Captains of the Port, an authorization from each is necessary. Deviation from the rules because of equipment failure on a particular voyage is covered under new § 164.53(a).

Section 164.61 Marine Casualty record retentio . Two commenters stated that this requirement for record retention when a vessel is involved in a marine casualty is unreasonable. One commenter stated that the requirement is already included in 46 CFR. This section cross references the record retention requirement in 46 CFR 4.05-15 for the convenience of those persons using these rules, which will be in 33 CFR. That requirement in Title 46 is necessary for the purposes of the marine casualty investigations that the Coast Guard is required to conduct.

This rule has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). Because the operational rules in this new part are followed already on most vessels and can be met with most existing manning levels, there should be no cost increase due to increased manning. The Coast Guard estimates that there should be no more than 1,100 U.S. flag vessels and 5,000 foreign flag vessels of 1,600 or more gross tons navigating in the navigable waters of the United States in any year. The following is based, in part, on a 1975 random survey of 300 vessels. Where appropriate, annual cost is based upon a 10 year amortization period. All of the vessels had radar. Adding a good marine radar to 5% of the 6,100 vessels for approximately $15,000 each would result in a cost of $1,282,500 in the first year and $457,500 in each of the following nine years. All the vessels had a magnetic compass. Adding the compass to 5% of the 6,100 vessels for $2,000 each would result in a cost of $496,000 in the first year and $61,000 in each of the following nine years. One vessel did not have a rudder angle indicator. Adding this indicator to 5% of the 6,100 vessels for approximately $4,000 each would result in a cost of $342,000 for the first year and $122,000 in each of the following nine years. Two vessels did not have a gyrocompass. Adding a gyrocompass to 10% of the 6,100 vessels for approximately $60,000 each would result in a cost of $10,260,000 in the first year and $3,660,000 in each of the following nine years. One hundred and seventy-nine vessels did not have their maneuvering characteristics posted. All U.S. vessels, approximately 1,100, are required to have it posted. If all 5,000 foreign vessels did not have it posted, testing for the information would cost approximately $5,000 each resulting in an amortized cost of $2,500,000 each year for ten years. Two vessels did not have a recording fathometer. Adding the fathometer to 10% of the vessels for $20,000 each would result in a cost of $2,420,000 in the first year and $1,000,000 in each of the following nine years.

The economic impact on the U.S. economy from U.S. vessels is the total cost of compliance in the first year plus 10% passed to the consumer in each of the ten years. The cost of foreign vessel compliance will be passed to the U.S. consumer evenly over the 10 year amortization period. The estimated first year cost from compliance to the U.S. shipping industry is $6,979,500. The estimated cost to the U.S. economy is $17,300,500 in the first year and $7,800,500 in each of the following nine years. The benefits from having this equipment and following the proper operating procedures would result not only in tangible savings, including less vessel damage or loss, less post vessel casualty costs, including investigation costs, and search and rescue costs, and less pollution clean up costs of which spill clean up costs alone are estimated at $30,000,000 to $35,000,000 per year, but significant intangible benefits, including less loss of life or injury, less pollution and resulting harm to the environment, and less hazards to navigation caused by abandoned vessels.

In consideration of the foregoing, Chapter I of Title 33, Code of Federal Regulations, is amended by adding a new Part 164 to read as follows:

Sec.

AUTHORITY: Sec. 104, 86 Stat. 427 (33 U.S.C. 1224); 49 CFR 1.46 (m) and (n)(4).

§ 164.01 Applicability.

This part applies to each self-propelled vessel of 1600 or more gross tons when

it is operating in or on the navigable waters of the United States, except the Panama Canal and the St. Lawrence Seaway.

§ 164.11 Navigation underway: general.

The owner, master, or person in charge of each vessel underway shall ensure that:

(a) The wheelhouse is constantly manned by persons who—

(1) Direct and control the movement of the vessel; and

(2) Fix the vessel's position;

(b) Each person performing a duty described in paragraph (a) of this section is competent to perform that duty;

(c) The position of the vessel at each fix is plotted on a chart of the area and the person directing the movement of the vessel is informed of the vessel's position.

(d) Electronic and other navigational equipment, external fixed aids to navigation, geographic reference points, and hydrographic contours are used when fixing the vessel's position;

(e) Buoys alone are not used to fix the vessel's position;

NOTE.—Buoys are aids to navigation placed in approximate positions to alert the mariner to hazards to navigation or to indicate the orientation of a channel. Bouys may not maintain an exact position because strong or varying currents, heavy seas, ice, and collisions with vessels can move or sink them or set them adrift. Although buoys may corroborate a position fixed by other means, buoys cannot be used to fix a position; however, if no other aids are available, buoys alone may be used to establish an estimated position.

(f) The danger of each closing visual or each closing radar contact is evaluated and the person directing the movement of the vessel knows the evaluation;

(g) Rudder orders are executed as given;

(h) Engine speed and direction orders are executed as given;

(i) Magnetic variation and deviation and gyrocompass errors are known and correctly applied by the person directing the movement of the vessel;

(j) A person whom he has determined is competent to steer the vessel is in the wheelhouse at all times; [1]

(k) If a pilot other than a member of the vessel's crew is employed, the pilot is informed of the draft, maneuvering characteristics, and peculiarities of the vessel and of any abnormal circumstances on the vessel that may affect its safe navigation;

(l) Current velocity and direction for the area to be transited are known by the person directing the movement of the vessel;

(m) Predicted set and drift are known by the person directing movement of the vessel;

(n) Tidal state for the area to be transited is known by the person directing movement of the vessel;

(o) The vessel's anchors are ready for letting go;

(p) The person directing the movement of the vessel sets the vessel's speed with consideration for—

(1) The prevailing visibility and weather conditions;

(2) The proximity of the vessel to fixed shore and marine structures;

(3) The tendency of the vessel underway to squat and suffer impairment of maneuverability when there is small underkeel clearance;

(4) The comparative proportions of the vessel and the channel;

(5) The density of marine traffic;

(6) The damage that might be caused by the vessel's wake;

(7) The strength and direction of the current; and

(8) Any local vessel speed limit;

(q) The tests required by § 164.25 are made and recorded in the vessel's log; and

(r) The equipment required by this part is maintained in operable condition.

§ 164.15 Navigation underway: confined or congested waters.

In the confined or congested waters described in § 164.16, the master or person in charge of each vessel underway shall ensure that—

(a) Propulsion machinery can respond immediately through its full operating range;

(b) The engine room, including the main engine control station even if it is not in the engine room, is manned to operate the propulsion machinery as required by paragraph (a) of this section;

(c) Persons are available to rapidly anchor the vessel in an emergency; and

(d) The automatic pilot device is not in use.

§ 164.16 List of confined or congested waters. [Reserved]

§ 164.19 Requirements for vessels at anchor.

The master or person in charge of each vessel that is anchored shall ensure that—

(a) A proper anchor watch is maintained;

(b) Procedures are followed to detect a dragging anchor; and

(c) Whenever weather, tide, or current conditions are likely to cause the vessel's anchor to drag, action is taken to ensure the safety of the vessel, structures, and other vessels, such as being ready to veer chain, let go a second anchor, or get underway using the vessel's own propulsion or tug assistance.

§ 164.25 Tests before entering or getting underway.

No person may cause a vessel to enter into or get underway on the navigable waters of the United States unless, no more than 12 hours before entering or getting underway, the following equipment has been tested:

(a) Primary and secondary steering gear.

(b) All internal vessel control communications and vessel control alarms.

(c) Standby or emergency generator for as long as necessary to show proper functioning, including steady state temperature and pressure readings.

(d) Storage batteries for emergency lighting and power systems in vessel control and propulsion machinery spaces.

(e) Main propulsion machinery, ahead and astern.

§ 164.30 Charts, publications, and equipment: general.

No person may operate or cause the operation of a vessel unless the vessel has the charts, publications, and equipment as required by §§ 164.33 through 164.35 of this part.

§ 164.33 Charts and publications.

(a) Each vessel must have the following:

(1) Except as provided by paragraph (b) of this section, charts of the area to be transited published by the National Ocean Survey, U.S. Army Corps of Engineers, or a river authority that—

(i) are of a large enough scale and have enough detail to enable safe navigation of the area; and

(ii) are the most recently published and available for the area and currently corrected.

(2) Except as provided by paragraph (b) of this section, the most recent, available, and currently corrected copy of, or applicable extract from, each of the following publications, if it includes the area to be transited:

(i) U.S. Coast Pilot.

(ii) Coast Guard Light List.

(iii) Notices to Mariners published by Defense Mapping Agency Hydrographic Center and local Coast Guard Notice to Mariners.

(iv) Tide Tables published by the National Ocean Survey.

(v) Tidal Current Tables published by the National Ocean Survey, or river current publication issued by the U.S. Army, Corps of Engineers, or a river authority.

(b) A vessel may have a chart or publication published by a foreign government instead of a chart or publication required by this section if the chart or publication contains similar information to the U.S. Government publication or chart. A vessel bound from a foreign port to a port in the United States may have the latest charts and publications that were available at previous ports of call.

§ 164.35 Equipment: all vessels.

Each vessel must have the following:

(a) A marine radar system for surface navigation.

(b) An illuminated magnetic steering compass, mounted in a binnacle, that can be read at the vessel's main steering stand.

(c) A current magnetic compass deviation table or graph or compass comparison record for the steering compass, in the wheelhouse.

(d) A gyrocompass.

(e) An illuminated repeater for the gyrocompass required by paragraph (d) of this section that is at the main steering stand, unless that gyrocompass is il-

[1] See also 46 U.S.C. 672, which requires an able seaman at the wheel on U.S. vessels of 100 gross tons or more in narrow or crowded waters or during low visibility.

luminated and is at the main steering stand.

(f) An illuminated rudder angle indicator in the wheelhouse.

(g) The following maneuvering information prominently displayed on a fact sheet in the wheelhouse:

(1) For full and half speed, a turning circle diagram to port and starboard that shows the time and the distance of advance and transfer required to alter the course 90 degrees with maximum rudder angle and constant power settings.

(2) The time and distance to stop the vessel from full and half speed while maintaining approximately the initial heading with minimum application of rudder.

(3) For each vessel with a fixed propeller, a table of shaft revolutions per minute for a representative range of speeds.

(4) For each vessel with a controllable pitch propeller, a table of control settings for a representative range of speeds.

(5) For each vessel that is fitted with an auxiliary device to assist in maneuvering, such as a bow thruster, a table of vessel speeds at which the auxiliary device is effective in maneuvering the vessel.

(6) The maneuvering information for the normal load and normal ballast condition for—

(i) Calm weather—wind 10 knots or less, calm sea;

(ii) No current;

(iii) Deep water conditions—water depth twice the vessel's draft or greater; and

(iv) Clean hull.

(7) At the bottom of the fact sheet, the following statement:

WARNING

The response of the (name of the vessel) may be different from that listed above if any of the following conditions, upon which the maneuvering information is based, are varied:

(1) Calm weather—wind 10 knots or less, calm sea;

(2) No current;

(3) Water depth twice the vessel's draft or greater;

(4) Clean hull; and

(5) Intermediate drafts or unusual trim.

(h) An echo depth sounding device.

(i) A device that can continuously record the depth readings of the vessel's echo depth sounding device.

(j) Equipment on the bridge for plotting relative motion.

§ 164.51 Deviations from rules: emergency.

Except for the requirements of § 164.53 (b), in an emergency, any person may deviate from any rule in this part to the extent necessary to avoid endangering persons, property, or the environment.

§ 164.53 Deviations from rules and reporting: non-operating equipment.

(a) If during a voyage any equipment required by this part stops operating properly, the person directing the movement of the vessel may complete the voyage subject to the requirements in Part 160 of this chapter.

(b) If the vessel's radar, gyrocompass, echo depth sounding device, or primary steering gear stops operating properly, the person directing the movement of the vessel must report or cause to be reported that it is not operating properly to the nearest Captain of the Port or Coast Guard District Commander as soon as possible.

§ 164.55 Deviations from rules: continuing operation or period of time.

The Captain of the Port, upon written application, may authorize a deviation from any rule in this part if he determines that the deviation does not impair the safe navigation of the vessel under anticipated conditions and will not result in a violation of the rules for preventing collisions at sea. The authorization may be issued for vessels operating in the waters under the jurisdiction of the Captain of the Port for any continuing operation or period of time the Captain of the Port specifies.

§ 164.61 Marine casualty reporting and record retention.

When a vessel is involved in a marine casualty as defined in 46 CFR 4.03–1, the master or person in charge of the vessel shall—

(a) Ensure compliance with 46 CFR Subpart 4.05, "Notice of Marine Casualty and Voyage Records;" and

(b) Ensure that the voyage records required by 46 CFR 4.05–15 are retained for—

(1) 30 days after the casualty if the vessel remains in the navigable waters of the United States; or

(2) 30 days after the return of the vessel to a United States port if the vessel departs the navigable waters of the United States within 30 days after the marine casualty.

Effective date: This rule becomes effective on June 1, 1977.

The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A–107.

Dated: January 26, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard Commandant.

[FR Doc.77–2994 Filed 1–28–77;8:45 am]

Title 46—Shipping

CHAPTER I—COAST GUARD, DEPARTMENT OF TRANSPORTATION

[CGD 75–074]

Vessel Inspection Regulations

On September 16, 1975, a document was published in the FEDERAL REGISTER (40 FR 24585) proposing to amend the vessel inspection regulations in Chapter I of Title 46 of the Code of Federal Regulations. Interested parties were given an opportunity to submit, not later than October 31, 1975, data, views and recommendations regarding the proposed amendments. These regulations are interrelated with and therefore must be read together with the Navigation Safety Regulations (33 CFR 164) published in this FEDERAL REGISTER.

Several comments were received in response to this proposal. One commentor felt that the proposed rules concerning nautical publications should apply only to vessels on the high seas and international waters and should not apply to tankships operating exclusively on bays, sounds, and lakes other than the Great Lakes. Current rules require that these vessels meet the same navigation requirements as other tankships in ocean, coastwise, and Great Lakes service. There are sufficient hazards to safe navigation in all waters to warrant the required carriage of nautical publications for the intended voyage in addition to the presently required charts. For this reason, the comment has not been adopted.

One commentor expressed concern about the effect of the proposed rules regarding radar, gyrocompass, and radio directional finders on vessels solely navigating the Great Lakes. The requirements of these regulations for radar and gyrocompasses apply only to vessels operating in ocean or coastwise service and are not applicable to vessels navigating solely on the Great Lakes. However, the regulations in 33 CFR Part 164, which require radar and gyrocompasses, apply to vessels navigating on the Great Lakes. The proposed rules did not address radio directional finders. The Coast Guard did not intend to extend the requirements for radar, magnetic compasses, and gyrocompasses to barges. This was not clear in the proposed regulations. To clarify this, the following changes are made in the final regulations. The words "mechanically propelled" are added to §§ 77.09–1(a), 77.11–1 (a) and (b), 96.17–1 (a) and (b), 96.25–1(a), 167.40–40(a), 167.40–45 (a) and (b), 195.17(a), 195.19–1 (a) and (b), as appropriate. One commentor suggested that the term "helmsman" could be interpreted as limited to a specific position rather than a specific function and suggested the use of the term "qualified person". The Coast Guard agrees that the term "helmsman" could possibly be misinterpreted as the commentor suggested. For this reason, the term "qualified helmsman" has been changed to "competent person".

The references to Federal Communications Commission regulations for radar have been deleted to make these regulations consistent with the Navigation Safety Regulations in 33 CFR Part 164 which require marine radars.

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

PART 32—SPECIAL EQUIPMENT MACHINERY AND HULL REQUIREMENTS

§ 32.15–10 [Amended]

1. In 32.15–10, by deleting the words "mechanical or" in the first sentence.

2. By adding a new sentence at the end of § 32.15–20(a) to read as follows:

§ 32.15–20 Radiotelegraph and Radiotelephone—T/ALL.

(a) * * * All vessels on an international voyage that are required to carry a radiotelegraph or radiotelephone in accordance with Chapter IV of the Safety of Life at Sea Convention, 1960, must carry the International Code of Signals.

3. By adding a new § 32.15–30 to read as follows:

§ 32.15–30 Radar—T/OC.

All tankships of 1,600 gross tons and over in ocean or coastwise service must be fitted with a marine radar system for surface navigation. Facilities for plotting radar readings must be provided on the bridge.

4. By adding a new § 32.15–35 to read as follows:

§ 32.15–35 Magnetic Compass and Gyrocompass—T/OC.

(a) All tankships in ocean or coastwise service must be fitted with a magnetic compass.

(b) All tankships of 1,600 gross tons and over in ocean or coastwise service must be fitted with a gyrocompass in addition to the magnetic compass.

(c) Each tankship must have an illuminated repeater for the gyrocompass required under paragraph (b) that is at the main steering stand unless the gyrocompass is illuminated and is at the main steering stand.

PART 35—OPERATIONS

5. By revising § 35.20–1(d) to read as follows:

§ 35.20–1 Notice to Mariners; aids to navigation—T/OCLB.

* * * * *

(d) As appropriate for the intended voyage, all vessels must carry adequate and up-to-date—

(1) Charts;
(2) Sailing directions;
(3) Coast pilots;
(4) Light lists;
(5) Notices to mariners;
(6) Tide tables;
(7) Current tables; and
(8) All other nautical publications necessary.[1]

6. By adding a new § 35.20–45 to read as follows:

§ 35.20–45 Use of Auto Pilot—T/ALL.

Except as provided in 33 CFR 164.15, when the automatic pilot is used in—

(a) Areas of high traffic density;
(b) Conditions of restricted visibility; and
(c) All other hazardous navigational situations, the master shall ensure that—
(1) It is possible to immediately establish manual control of the ship's steering;
(2) A competent person is ready at all times to take over steering control; and
(3) The changeover from automatic to manual steering and vice versa is made by, or under, the supervision of the officer of the watch.

7. By revising the first sentence of § 35.30–20 to read as follows:

§ 35.30–20 Emergency Equipment—TB/ALL.

(a) Two emergency outfits, stored for use in widely separated, accessibe locations, are required for the following:

* * * * *

PART 77—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

8. By adding a new Subpart 77.09 to read as follows:

Subpart 77.09—Radar

§ 77.09–1 When required.

All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a marine radar system for surface navigation. Facilities for plotting radar readings must be provided on the bridge.

9. By adding a new Subpart 77.11 to read as follows:

Subpart 77.11—Magnetic Compass and Gyrocompass

§ 77.11–1 When required.

(a) All mechanically propelled vessels in ocean, coastwise or Great Lakes service must be fitted with a magnetic compass.

(b) All mechanically propelled vessels 1,600 gross tons and over in ocean or coastwise service must be fitted with a gyrocompass in addition to the magnetic compass.

(c) Each vessel must have an illuminated repeater for the gyrocompass required under paragraph (b) that is at the main steering stand unless the gyrocompass is illuminated and is at the main steering stand.

10. By adding a new paragraph (b) to § 77.13–1 to read as follows:

Subpart 77.13—Radiotelegraph and Radiotelephone

§ 77.13–1 Required by Federal Communications Commission.

* * * * *

(b) All vessels on an international voyage which are required to carry a radiotelegraph or radiotelephone installation in accordance with Chapter IV of the Safety of Life at Sea Convention, 1960, must carry the International Code of Signals.

§ 77.27–1 [Amended]

11. In 77.27–1, by deleting the words "mechanical or" from the first sentence.

PART 78—OPERATIONS

12. By revising § 78.05–5 to read as follows:

§ 78.05–5 Charts and Nautical Publications.

As appropriate for the intended voyage, all vessels except barges, ferryboats and vessels operating exclusively on rivers, must carry adequate and up-to-date—

(a) Charts;
(b) Sailing directions;
(c) Coast pilots;
(d) Light lists;
(e) Notices to mariners;
(f) Tide tables;
(g) Current tables; and
(h) All other nautical publications necessary.[1]

13. By adding a new Subpart 78.19 to read as follows:

Subpart 78.19—Auto Pilot

§ 78.19–1 Use of Auto Pilot.

Except as provided in 33 CFR 164.15, when the automatic pilot is used in—

(a) Areas of high traffic-density;
(b) Conditions of restricted visibility; and
(c) All other hazardous navigational situations, the master shall ensure that—
(1) It is possible to immediately establish manual control of the ship's steering;
(2) A competent person is ready at all times to take over steering control; and
(3) The changeover from automatic to manual steering and vice versa is made by, or under, the supervision of the officer of the watch.

PART 96—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

14. By adding a new paragraph (b) to § 96.13–1 to read as follows:

Subpart 96.13—Radiotelegraph and Radiotelephone

§ 96.13–1 Required by Federal Communications Commission.

* * * * *

(b) All vessels on an international voyage which are required to carry a radiotelegraph or radiotelephone installation in accordance with Chapter IV of the Safety of Life at Sea Convention, 1960, must carry the International Code of Signals.

15. By adding a new Subpart 96.17 to read as follows:

Subpart 96.17—Magnetic Compass and Gyrocompass

§ 96.17–1 When required.

(a) All mechanically propelled vessels in ocean or coastwise service must be fitted with a magnetic compass.

(b) All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a gyrocompass in addition to the magnetic compass.

(c) Each vessel must have an illuminated repeater for the gyrocompass required under paragraph (b) that is at the main steering stand unless the gyrocompass is illuminated and is at the main steering stand.

16. By adding a new Subpart 96.25 to read as follows:

[1] For United States vessels in or on the navigable waters of the United States, see 33 CFR 164.33.

[1] For United States vessels in or on the navigable waters of the United States, see 33 CFR 164.33.

Subpart 96.25—Radar

§ 96.25–1 When required.

All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a marine radar system for surface navigation. Facilities for plotting radar readings must be provided on the bridge.

§ 96.27–1 [Amended]

17. In 96.27–1, by deleting the words "mechanical or" in the first sentence of paragraph (a).

18. By revising § 96.35–15 to read as follows:

§ 96.35–15 Stowage.

The fireman's outfits must be stored in widely separated, accessible locations.

PART 97—OPERATIONS

19. By revising § 97.05–5(a) to read as follows:

§ 97.05–5 Charts and nautical publications.

As appropriate for the intended voyage, all vessels except barges, vessels operating exclusively on rivers, and motorboats other than those certificated for ocean or coastwise route, must carry adequate and up-to-date—

(a) Charts;
(b) Sailing directions;
(c) Coast pilots;
(d) Light lists;
(e) Notices to mariners;
(f) Tide tables;
(g) Current tables; and
(h) All other nautical publications necessary.[1]

20. By adding a new Subpart 97.16 to read as follows:

Subpart 97.16—Auto Pilot

§ 97.16–1 Use of auto pilot.

Except as provided in 33 CFR 164.15, when the automatic pilot is used in—

(a) Areas of high traffic density;
(b) Conditions of restricted visibility; and
(c) All other hazardous navigational situations, the master shall ensure that—

(1) It is possible to immediately establish manual control of the ship's steering;

(2) A competent person is ready at all times to take over steering control;

(3) The changeover from automatic to manual steering and vice versa is made by, or under, the supervision of the officer of the watch.

PART 167—PUBLIC NAUTICAL SCHOOL SHIPS

§ 167.40–20 [Amended]

21. In § 167.40–20, by deleting the words "mechanical or" from the first and second sentences.

22. By adding a new § 167.40–40 to read as follows:

§ 167.40–40 Radar.

All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a marine radar system for surface navigation. Facilities for plotting radar readings must be provided on the bridge.

23. By adding a new § 167.40–45 to read as follows:

§ 167.40–45 Magnetic compass and gyrocompass.

(a) All mechanically propelled vessels in ocean or coastwise service must be fitted with a magnetic compass.

(b) All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a gyrocompass in addition to the magnetic compass.

(c) Each vessel must have an illuminated repeater for the gyrocompass required under paragraph (b) that is at the main steering stand unless the gyrocompass is illuminated and is at the main steering stand.

24. By adding a new § 167.65–35 to read as follows:

§ 167.65–35 Use of auto pilot.

Except as provided in 33 CFR 164.15, when the automatic pilot is used in—

(a) Areas of high traffic density;
(b) Conditions of restricted visibility; and
(c) All other hazardous navigational situations, the master shall ensure that—

(1) It is possible to immediately establish human control of the ship's steering;

(2) A competent person is ready at all times to take over steering control; and

(3) The changeover from automatic to manual steering and vice versa is made by, or under, the supervision of the officer of the watch.

25. By revising § 167.65–45(d) to read as follows:

§167.65–45 Notice to mariners; aids to navigation.

* * * * *

(d) As appropriate for the intended voyage, all nautical school ships must carry adequate and up-to-date—

(1) Charts;
(2) Sailing directions;
(3) Coast pilots;
(4) Light lists;
(5) Notices to mariners;
(6) Tide tables;
(7) Current tables; and
(8) All other nautical publications necessary.[1]

PART 184—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

26. By adding a new paragraph (c) to § 184.25–1 to read as follows:

Subpart 184.25—Radio

§ 184.25–1 Requirements of the Federal Communications Commission.

* * * * *

(c) All vessels on an international voyages which are required to carry a radiotelegraph or radiotelephone installation in accordance with Chapter IV of the Safety of Life at Sea Convention, 1960, must carry the International Code of Signals.

PART 185—OPERATIONS

27. By adding a new § 185.20–30 to read as follows:

Subpart 185.20—Miscellaneous Operating Requirements

§ 185.20–30 Use of auto pilot.

Except as provided in 33 CFR 164.15, when the automatic pilot is used in—

(a) Areas of high traffic density;
(b) Conditions of restricted visibility; and
(c) All other hazardous navigational situations, the operator shall ensure that—

(1) It is possible to immediately establish manual control of the ship's steering;

(2) That a competent person is ready at all times to take over steering control; and

(3) The changeover from automatic to manual steering and vice versa is made by, or under, the supervision of the operator.

28. By adding a new § 185.20–35 to read as follows:

Subpart 185.20—Miscellaneous Operating Requirements

§ 185.20–35 Charts and nautical publications.

As appropriate for the intended voyage, all vessels must carry adequate and up-to-date—

(a) Charts;
(b) Sailing directions;
(c) Coast pilots;
(d) Light lists;
(e) Notices to mariners;
(f) Tide tables;
(g) Current tables; and
(h) All other nautical publications necessary.[1]

PART 195—VESSEL CONTROL AND MISCELLANEOUS SYSTEMS AND EQUIPMENT

29. By adding a new paragraph (b) to § 195.13–1 to read as follows:

Subpart 195.13—Radiotelegraph and Radiotelephone

§ 195.13–1 Required by Federal Communications Commission.

* * * * *

(b) All mechanically propelled vessels on an international voyage which are required to carry a radiotelegraph or radio telephone installation in accordance with Chapter IV of the Safety of Life at Sea Convention, 1960, must carry the International Code of Signals.

30. By adding a new Subpart 195.17 to read as follows:

[1] For United States vessels in or on the navigable waters of the United States, see CFR 164.33.

[1] For United States vessels in or on the navigable waters of the United States, see 33 CFR 164.33.

[1] For United States vessels in or on the navigable waters of the United States, see 33 CFR 164.33.

176

Subpart 195.17—Radar

§ 195.17–1 When required.

All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a marine radar system for surface navigation. Facilities for plotting radar readings must be provided on the bridge.

31. By adding a new Subpart 195.19 to read as follows:

Subpart 195.19—Magnetic Compass and Gyrocompass

§ 195.19–1 When required.

(a) All mechanically propelled vessels in ocean or coastwise service must be fitted with a magnetic compass.

(b) All mechanically propelled vessels of 1,600 gross tons and over in ocean or coastwise service must be fitted with a gyrocompass in addition to the magnetic compass.

(c) Each vessel must have an illuminated repeater for the gyrocompass required under paragraph (b) that is at the main steering stand unless the gyrocompass is illuminated and is at the main steering stand.

§ 195.27–1 [Amended]

32. In 195.27–1, by deleting the words "mechanical or" in the first sentence.

33. By adding a new sentence at the end of § 195.35–10(b) to read as follows:

§ 195.35–10 Fireman's outfit.

* * * * *

(b) * * * The fireman's outfits must be stored in widely separated, accessible locations.

PART 196—OPERATIONS

34. By revising § 196.05–5 to read as follows:

§ 196.05–5 Charts and nautical publications.

As appropriate for the intended voyage, all vessels except barges, and vessels operating exclusively on rivers, must carry adequate and up-to-date—

(a) Charts;
(b) Sailing directions;
(c) Coast pilots;
(d) Light lists;
(e) Notices to mariners;
(f) Tide tables;
(g) Current tables; and
(h) All other nautical publications necessary.[1]

(46 U.S.C. 375, 416, 49 U.S.C. 1655(b)(1); 49 CFR 1.46(b))

Effective date: These amendments are effective on June 1, 1977.

The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Inflation Impact Statement under Executive Order 11821 and OMB Circular A–107.

Dated: January 26, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77–2995 Filed 1–28–77;8:45 am]

[1] For United States vessels in or on the navigable waters of the United States, see 33 CFR 164.33.

DEPARTMENT OF TRANSPORTATION

Coast Guard

[33 CFR Part 164]

[CGD 77-002]

PROPOSED NAVIGATION SAFETY REQUIREMENTS

LORAN-C on Vessels of 1600 Gross Tons or More

• *Purpose.* The Coast Guard is considering amending the navigation safety requirements by adding LORAN-C to the list of required equipment for vessels of 1600 gross tons or more. •

Written comments. Interested persons are invited to participate in this proposed rulemaking by submitting written data, views, or arguments to the Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C., 20590. Each person submitting a comment should include his name and address, identify this notice (CGD 77-002), and give reasons for support of his comment. Comments received before April 1, 1977 will be considered before final action is taken on this proposal. Copies of all written comments received will be available for examination by interested persons in Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. The proposal may be changed in light of the comments received.

Public Hearing. The Coast Guard will hold a public hearing on March 4, 1977, beginning at 10:00 a.m., in Room 2232, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. An additional public hearing will be held on March 16, 1977, beginning at 9:30 a.m., in the Marine Room, Travel Lodge at The Wharf, 250 Beach Street, San Francisco, California. Interested persons are invited to attend the hearing and present oral or written statements on this proposal. It is requested that anyone desiring to make oral comments at either hearing notify the Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590, at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the request.

Summary of Proposal. [illegible]

been making use of the best navigational tools available.

The Department of Transportation maintains a National Plan for Navigation. It is the official source of navigation policy and plans for the Department. The April, 1972, edition of the National Plan for Navigation was amended by an Annex published as a Notice in the July 19, 1974, issue of the FEDERAL REGISTER (39 FR 26468). The amendment announced the designation and implementation of LORAN-C as the government-provided radionavigation system for the U.S. maritime coastal confluence zone. The coastal confluence zone is defined as the seaward approaches to land, the inner boundary of which is the harbor entrance, and the outer boundary of which is 50 nautical miles offshore or the edge of the continental shelf (100 fathom curve), whichever is greater.

The July, 1974, Annex describes in detail how LORAN-C was selected after consideration of the alternative systems, LORAN-A, Differential Omega, and Decca.

The LORAN-C service in the coastal confluence zone is designed to provide 95% assurance that a vessel can fix its position to an accuracy of ¼ mile. The navigation system accuracy requirement has been established so that a vessel could be navigated safely along a track to its destination or within its designated shipping lane.

The existing LORAN-C system is being expanded to provide coverage for the entire U.S. coastal confluence zone and the Great Lakes. Overseas stations will continue to be operated by the Coast Guard in response to the requirements of the Department of Defense. Existing system coverage and new Pacific Coast service, which will become available by mid-1977, is depicted in the LORAN-C Coverage Diagram, Defense Mapping Agency Hydrographic Center Chart No. 5130. Basically, LORAN-C presently provides ¼ nautical mile accuracy over about two-thirds of the U.S. East Coast waters, throughout the Bering Sea, and in parts of the Hawaiian Islands and surrounding waters.

The expanded system is to provide coverage, with a fix accuracy of ¼ nautical mile or better, throughout the Great Lakes and in all U.S. coastal waters (out to 200 miles or more) except northern Alaskan waters and some Hawaiian areas. Scheduled dates for the availability of expanded service are approximately:

[illegible]

progress along a track, the Coast Guard has concluded that the use of LORAN-C should be a requirement for certain vessels entering U.S. waters. While this rule, of course, only applies on the navigable waters of the United States, the Coast Guard feels that operators of vessels with LORAN-C receivers installed will avail themselves of the benefits of the system in the offshore approaches, as well as in the overseas coverage areas. An incidental benefit will be the ability to navigate with greater confidence through areas of outer continental shelf resource exploration and production.

The Coast Guard randomly sampled navigation practice and equipment in mid-1975. Of the vessels boarded, 40% were equipped with LORAN-C receivers. Vessels under U.S. flag comprised 21% of the sample; 70% of these were equipped with LORAN-C. This 70% figure included both tankers and freighters. With respect to vessels sailing under foreign flag, 39% of foreign freighters were equipped with LORAN-C, and only 24% of foreign tankers were so equipped. Considering the reasonable marketing costs of receivers, it would not appear that adequate use is being made of this navigational aid.

While the Coast Guard proposes to require LORAN-C receivers on all vessels of 1600 or more gross tons that enter U.S. waters, it recognizes that a requirement of this nature would place a sudden surge on manufacturers' capabilities and would cause a severe backlog problem for those manufacturers. Accordingly, the Coast Guard proposes that if the amendment is adopted, it will become effective for each category of vessel at a staggered interval. Because the tank vessel segment of the industry is somewhat smaller than the freighter segment, and because the ability to accurately navigate tankers has assumed much greater importance of late, it is proposed that this segment of the industry would be required to comply with the regulation at the earliest time, such as 120 days after publication of the rule. It is proposed to require the remaining vessels to comply one year after publication of the rule.

In consideration of the foregoing, it is proposed to revise § 164.35 of Title 33 Code of Federal Regulations, by adding a new paragraph (k) to read as follows:

§ 164.35 Equipment: all vessels.

* * * * *

(k) A LORAN-C receiver.

[illegible]

APPENDIX 8

FEDERAL REGISTER
APR. 25, 1977

federal register

MONDAY, APRIL 25, 1977

PART II

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

TANKERMAN REQUIREMENTS; QUALIFICATIONS OF PERSONS IN CHARGE OF OIL TRANSFER OPERATIONS

DEPARTMENT OF TRANSPORTATION

Coast Guard

[33 CFR Part 155]

[CGD 74-44a]

QUALIFICATIONS OF THE PERSON IN CHARGE OF OIL TRANSFER OPERATIONS

AGENCY: Coast Guard, DOT.

ACTION: Proposed Rules.

SUMMARY: The Coast Guard is proposing to revise the regulations governing the qualifications of the person in charge of oil transfer operations. This change is proposed in order to bring the regulations in line with the proposed regulations governing the qualifications of personnel involved in the handling, transfer, and transportation of dangerous cargoes in bulk aboard ships and barges.

DATES: (1) Comments must be received on or before: July 7, 1977. (2) Public Hearing: The Coast Guard will hold a public hearing on June 21 and 22, 1977, beginning at 9 a.m. in room 2230, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C.

ADDRESSES: Comments should be submitted to and are available for examination at the Marine Safety Council (G-CMC/81), room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590. Copies of studies referenced in this document are available for examination at the above address.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), room 8117, Department of Transportation, Nassif Buliding, 400 Seventh Street SW., Washington, D.C. 20590. (202-426-1477).

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this rulemaking by submitting written data, views, or arguments. Written comments should include the docket number (CGD 74-44a), the name and address of the person submitting the comments, and the specific section of the proposal to which each comment is addressed. The proposal may be changed in light of comments received before final action on this proposal. Interested persons are invited to attend the hearing and present oral or written statements on this proposal. It is requested that anyone desiring to make comments notify Captain Greiner at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the request.

[DRAFTING] INFORMATION. The principal persons involved in drafting this proposal are Captain Nelson Emory, Project Manager, and Lieutenant Richard J. Gill, Jr., Project Attorney.

DISCUSSION OF THE PROPOSED REGULATIOS

The qualifications of the person in charge of an oil transfer operation are being revised to reflect the proposed requirements for a tankerman published in this issue of the FEDERAL REGISTER (42 FR 21190).

In consideration of the foregoing, it is proposed to amend Part 155 of Title 33 of the Code of Federal Regulations as follows:

By revising § 155.710 to read as follows:

§ 155.710 Qualifications of person in charge.

(a) The person in charge of oil transfer operations on a tankship, as defined in § 30.10-67 of Title 46 of the Code of Federal Regulation, must:

(1) Be designated as person in charge by the master;

(2) Hold a license authorizing service as a deck officer aboard the tankship;

(3) Hold the appropriate endorsement under Subpart 10.11 of Title 46 of the Code of Federal Regulations for the grade of product being transferred; and

(4) Have served during the preceding 12 months aboard the tankship or another tankship built to the same basic plans and having the same cargo containment, control, and monitoring systems.

(b) The service required in paragraph (a)(4) of this section includes:

(1) Assisting the person in charge of the cargo transfer operation during at least two transfers of cargo; or

(2) Equivalent experience acceptable to the Officer in Charge, Marine Inspection.

(c) The person in charge of tank cleaning operations conducted at a tank cleaning facility must be a tankerman certificated for the grade of cargo last carried.

(d) The person in charge of oil transfer operations on a tank barge must be:

(1) A properly certified tankerman for the cargo being transferred; or

(2) A licensed officer with a tankerman endorsement for the cargo being transferred.

(e) The person in charge of oil transfer operations on a cargo and miscellaneous or passenger vessel must:

(1) Be designated as person in charge by the master;

(2) Hold a license authorizing service as an officer aboard the vessel; and

(3) Hold any tankerman endorsement including the "tankerman—flam. (restricted)" endorsement.

(f) The person in charge of bunker fuel oil transfer operations on cargo and miscellaneous, tank, and passenger vessels must have a valid license authorizing service as master, mate, or engineer on the vessel.

(g) The operator of an uninspected vessel of 100 gross tons or more shall instruct the person in charge of oil transfer operations in:

(1) The duties of the person in charge; and

(2) The federal water pollution laws and regulations that apply to the vessel.

(h) The person in charge of oil transfer operations on a foreign flag tankship, tank barge, cargo and miscellaneous vessel, or passenger vessel must have a license or certificate authorizing service as a master, mate, pilot, engineer, or operator on the vessel.

(86 Stat. 427, as amended (46 U.S.C. 391a); sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1); 49 CFR 1.46(n)(4)).)

NOTE: The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: April 19, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77-11872 Filed 4-22-77;8:45 am]

[46 CFR Parts 10, 12, 30, 31, 35, 70, 90, 98, 105, 151, and 157]

[CGD 74-44]

TANKERMAN REQUIREMENTS

AGENCY: Coast Guard, DOT.

ACTION: Proposed Rules.

SUMMARY: The Coast Guard is proposing to issue regulations governing the qualifications of personnel involved in the handling, transfer, and transportation of dangerous cargoes in bulk aboard ships and barges. Human error and lack of awareness of the hazards involved on the part of personnel engaged in these operations has resulted in several, recent, marine casualties. Better qualified personnel in charge of these operations should lead to a reduction in similar casualties.

DATES: (1) Comments must be received on or before: July 7, 1977. (2) Public Hearing: The Coast Guard will hold a public hearing on June 21 and 22, 1977, beginning at 9 a.m. in room 2230, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C.

ADDRESSES: Comments should be submitted to Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G-CMC/81), room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590. Copies of studies referenced in this document are available for examination at the above address.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590. (202-426-1477).

SUPPLEMENTARY INFORMATION Interested persons are invited to participate in this rulemaking by submitting written data, views, or arguments. Writ-

ten comments should include the docket number (CGD 74-44), the name and address of the person submitting the comments, and the specific section of the proposal to which each comment is addressed. The proposal may be changed in light of comments received before final action on this proposal. Interested persons are invited to attend the hearing and present oral or written statements on this proposal. It is requested that anyone desiring to make comments notify Captain Greiner at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the request.

DISCUSSION OF THE PROPOSED REGULATIONS

A new dimension has been added to the Coast Guard's traditional responsibility of protecting lives and property at sea. The protection of the marine environment now constitutes an integral part of its overall statutory mission. This is the culmination of worldwide concern about the continuing pollution of territorial waters as well as the open seas.

The potential for water pollution, insofar as marine transportation is concerned, stems primarily from the release of dangerous or noxious cargoes from either ships or barges. Loading and discharging accidents, along with vessel groundings, collisions, and fires have all contributed to creating a situation of national concern.

The passage of the Ports and Waterways Safety Act of 1972 in the United States and the drafting of the International Marine Pollution Convention of 1973, provided the impetus and authority for the proposed regulations. Other recent regulatory proposals have been directed at vessel design, construction, repair and operational factors whose modification could result in reduction of pollution. This document addresses personnel requirements. Specifically, changes are being proposed to 46 CFR Parts 10, 12, 30, 31, 35, 70, 90, 98, 105, 151, and 157.

The proposal redefines and establishes more satisfactory qualifying criteria for certifying individuals engaged in the carriage and transfer of the various categories of dangerous cargoes in bulk.

A study sponsored by the Maritime Administration entitled, "A Model Economic and Safety Analysis of the Transportation of Hazardous Substances in Bulk," which was completed in July 1974, concluded that the marine mode was the safest method of transporting such products. If this safety position is to be maintained and improved, and if the Coast Guard's pollution prevention efforts are to be successful, more attention must be devoted to the capabilities of those who will operate the increasingly complex equipment being designed for increasingly hazardous substances. The importance of personnel is emphasized by data collected on those marine casualties which indicates that human error is the contributing factor in 80% of all casualties. For example, in 1974 and 1975 over 2,200 polluting incidents, resulting in the accidental discharge of 1,813,171 gallons of oil and other hazardous substances, were attributable to human error. Examples of human error include; allowing tank overflow, improper valve handling, and improper hose connections. The lack of awareness of the hazards involved on the part of personnel engaged in transfer further compounds the problem. Better qualified personnel in charge of such operations should lead to a reduction of similar incidents.

Recognition of the need for personnel qualification improvement is also documented in the report released August 16, 1974 by the National Transportation Safety Board (NTSB) on the fatal explosion and fire on the *M/V Venus*. In this report, it was stated that the third mate, who was in charge of tank cleaning operations at the time of the explosion, had never worked on board a tankship prior to joining the vessel shortly before the casualty. He had received no training in tankship operations nor was any required. Basically, he qualified for the assignment solely on the strength of his deck officer's license. The Board recommended that the Coast Guard eliminate this defect in the regulations by requiring tankerman endorsements on such licenses before granting eligibility for this type of service. A "tankerman" is an individual who has been trained in, and is capable of performing efficiently, the necessary operations on tank vessels which relate to the handling of cargo. It is recognized that the person in charge of cargo transfer operations on tankships must be an experienced individual who is knowledgeable in vessel stability, cargo loading, weather, tide conditions, port operations and vessel mooring, in addition to having formal shoreside and practical training in the handling of cargo. Since these qualifications are primarily requirements for a deck license, it is proposed that a licensed deck officer be required to perform this function.

Additionally, it was recommended by the NTSB that continuing eligibility (upon renewal of certificates or licenses) be contingent upon recency of service and training exercises or other demonstrations of current knowledge.

The Coast Guard's on-going reviews of existing regulations have disclosed the validity of the NTSB's findings. The entire existing "tankerman" regulatory scheme, although workable in the past, is not responsive to present day operations. Moreover, because of the increase in the kinds and physical properties of cargoes, and since tankerman certification is now required only for combustible or flammable products in the several grades, it is proper now to propose to extend such certification to all dangerous liquids and compressed gases. For example, an obvious deficiency exists in the case of cargoes of those products regulated by Title 46, Subchapter O, Part 151, of the Code of Federal Regulations, which an individual may now be authorized to handle simply upon the attestation of an employer that he is so qualified. No exemption, type of training or amount of experience is stipulated. Resolution of this situation is achieved by the new categories and standards in this proposal.

The basic endorsement will be "tankerman—flammable." A restricted form of the basic endorsement, "tankerman—flammable (restricted)", is provided for those persons who are not engaged in transfer operations, such as a tankerman on a towing vessel which is towing a tank barge; or a tankerman on a freight vessel or a Seabee/Lash vessel which is transporting bulk liquid cargo in deep tanks or portable tanks.

Separate endorsements as "tankerman—Liquefied Gas" and "tankerman—bulk dangerous liquids" will be required for those persons engaged in the transfer of bulk dangerous chemicals and liquefied gases. Certain cargoes within these two categories will require a "special" endorsement naming the specific cargo the tankerman is authorized to transfer, when this cargo is of an extremely hazardous nature or requires special handling.

A "limited" endorsement is also authorized for a tankerman involved in the transfer of a specific cargo in a dedicated service, where the cargo is both non-flammable and non-toxic, and would ordinarily require a bulk dangerous liquid endorsement.

No tankerman endorsement will be required for the transfer of inert gases such as nitrogen or non-flammable, non-toxic refrigerant gases, such as dichlorodifluoromethane.

The Inter-Governmental Maritime Consultative Organization (IMCO), through its Subcommittee on the Standards of Training and Watchkeeping, has developed detailed recommendations covering the proposed regulations. Recommednations concerning the training and qualification of personnel aboard dangerous cargo carriers have been circulated to all member governments. These suggestions speak to the different levels of compulsory training necessary for the officers and crew having primary responsibility for the cargo, as well as to the general training of all others aboard in the hazards involved, and in firefighting and other appropriate emergency procedures. These proposed regulations seek to put the IMCO recommendations into effect.

Although the ideas expressed above seem fairly straightforward and simple, some difficulty is envisioned in the actual mechanics of implementation. It is hoped that commentors will provide helpful suggestions in this subject area. A "phase-in" approach may be desirable in the case of those regulations concerning, for example, the carriage and transfer of certain flammable and combustible liquids and bulk dangerous liquids which are already being transported by the marine mode within the United States. However, in the case of shipment of hazardous substances such as liquefied natural gas, which is a new cargo for United States flag vessels, the proposed regulations will become effective

without a "phasing in" period. This is because of the identified hazards presented by the transport of such cargoes and the immediate need for personnel who are trained in and capable of handling these cargoes.

Where approval of mandatory training courses might present a problem, the Coast Guard is prepared to demonstrate flexibility during the development phases of satisfactory courses of instruction. As examples, where formal training in "chemical cargo" handling might not be available to all, a group within the marine industry could develop an acceptable curriculum paralleling an already approved course. For firefighting, operators could prepare their personnel in the basics with an approved classroom course, and then augment this with an approved field facility course.

DRAFTING INFORMATION: The principal persons involved in drafting this proposal are Captain Nelson Emory, Project Manager, and Lieutenant Edward J. Gill, Jr., Project Attorney.

In consideration of the foregoing, it is proposed to amend Chapter I of Title 46 of the Code of Federal Regulations as follows:

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

1. By adding a new Subpart 10.11 to read as follows:

Subpart 10.11—Cargo Transfer

Sec.

AUTHORITY: 86 Stat. 427, as amended (46 U.S.C. 391a); sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1); 49 CFR 1.46(n)(4).

§ 10.11–1 Purpose.

This subpart prescribes the requirements for issuing a license endorsement as tankerman, and describes the various tankerman endorsements that authorize a licensed officer to serve as a tankerman or as the person in charge of the transfer and transport of liquid or liquefied gas cargo carried in bulk on a vessel.

§ 10.11–3 Definitions.

As used in this Subpart:

"Bulk Cargo"—means liquid or liquefied gas cargo of more than 250 barrels in a vessel's tanks which is pumped on and off the vessel, including liquid or liquefied gas cargo in a portable tank having a capacity greater than 110 U.S. gallons.

"Bulk Flammable Cargo"—means certain bulk liquids listed in § 12.20–5(a) of this Subchapter whose primary hazard is flammability or combustibility.

"Bulk Dangerous Cargo" means certain bulk dangerous liquids or liquefied gases listed in § 12.20–5(a) (2) and (3) of this Subchapter which have hazards other than, or in addition to, the conventional flammability and combustibility of petroleum products.

"Bulk Dangerous Cargo—Special" means certain bulk dangerous cargoes that are designated as special and require an endorsement on a license specifically naming the cargo or cargoes he is qualified to transfer. These special cargoes are the following:

LIQUEFIED GAS

Methane (LNG)
Ethane
Ethylene
Chlorine
Ethylene Oxide
Methyl Acetylene-Propadiene Mixture
Sulfur Dioxide
Propylene Oxide

BULK DANGEROUS LIQUIDS

Allyl Chloride
Carbon Disulphide
Chlorosulfonic Acid
Epichlorohydrin
Motor Fuel Antiknock Compounds
Oleum
Phosphorus
Propylene Oxide
Sulfur (liquid)
Sulfuric Acid

"Bulk Dangerous Cargo—Limited"—means certain bulk dangerous liquid cargoes which are non-flammable and non-toxic, and are transported in a dedicated service. These limited cargoes are the following:

Caustic Potash Solution
Caustic Soda Solution
Hydrochloric Acid
Nitric Acid (70% or less)
Phosphoric Acid
Sodium Hypochlorite Solution (15% or less)

"Liquefied Gas (LG)"—means bulk liquid cargo which has a vapor pressure of at least 1.76 kp/cm² (25 psi) at 37.8° C (103° F).

"Person in Charge" means a person who:

(a) Holds a license authorizing service as a deck officer aboard a vessel; and

(b) Is designated as person in charge by the master. A tankerman required on vessels under § 31.15–1(b) of this Chapter may serve as the person in charge of the vessel.

"Tankerman"—means a person holding a license endorsement issued by the Coast Guard that attests to his competency in the handling and transfer on tankships and tank barges of:

(a) Flammable or combustible liquid cargo in bulk; or

(b) Dangerous liquid or liquefied gas cargo in bulk.

"Tankerman — flam. (restricted)" — means a person holding a license endorsement issued by the Coast Guard that attests to his competency and authorizes him to serve aboard cargo, passenger, and towing vessels that are required to carry a tankerman.

"Tankerman (barge)"—means a person holding a license endorsement issued by the Coast Guard that attests to his competency in the handling and transfer on tank barges of:

(a) Flammable or combustible liquid cargo in bulk; or

(b) Dangerous liquid or liquefied gas cargo in bulk.

§ 10.11–5 Privileges and limitations.

(a) The holder of a license endorsement as "tankerman" is qualified to handle and transfer on tankships and tank barges bulk liquid or liquefied gas cargoes endorsed on his license as follows:

Endorsement:	*Cargoes authorized to handle and Transfer*
(1) Tankerman—flammable	Those cargoes listed in 12.20–5(a)(1).
(2) Tankerman—bulk dangerous liquids.	Those cargoes listed in 12.20–5(a)(2) and 12.20–5(a)(1).
(3) Tankerman—liquefied gas	Those cargoes listed in 12.20–5(a)(3).
(4) Tankerman—liquefied gas (plus specifically named cargo).	Specifically named "Special" Bulk Dangerous Cargo listed in 10.11–3; and those liquefied gas cargoes listed in 12.20–5(a)(3).
(5) Tankerman—bulk dangerous liquids (plus specifically named cargo).	Specifically named "Special" Bulk Dangerous Cargo listed in 10.11–3 and those bulk dangerous liquid cargoes listed in 12.20–5(a)(2), and those flammable and combustible Liquid Cargoes listed in 12.20–5(a)(1).
(6) Tankerman (limited to specifically named cargo).	Specifically named Bulk Dangerous Liquid Cargo listed in 10.11–3.
(7) *No* tankerman endorsement required.	Nitrogen, carbon dioxide, dichlorodifluoromethane, dichlormonofluoromethane, dichlorotetrafluoroethane, monochlorodifluoremethane, monochlorotetrafluoroethane, monochlorotrifluoromethane.

TABLE 10.11-5.—*Training/Service Requirements for Endorsements*

Tankerman endorsement [1]	Documented service	Firefighting course	Coast Guard examination	Training course required		
				Liquified gas	Bulk dangerous liquid	Special
Flammable	×	×	×[2]			
Flammable (restricted)		×	×[2]			
Liquified gas	×	×		×		
Bulk dangerous liquid	×	×			×	
Liquified gas (plus specifically named cargo)	×	×				×
Bulk dangerous liquid (plus specifically named cargo)	×	×				×
Bulk dangerous liquid (limited to specially named cargo)	×	×			×	

[1] Each tankerman endorsement will be further restricted by the addition of the word (barge) if an individual's qualifications were obtained for (in) barges.
[2] An approved training course may be substituted for the Coast Guard examination.

(b) A licensed officer authorized to serve as a tankerman under previous regulations remains authorized to serve in that same capacity for a period of five years from the effective date of these regulations or until the reissuance of his license, whichever occurs first, except that a person serving on a tankship or tank barge transporting liquefied natural gas cargo must have a "tankerman-LG-methane" endorsement issued under this Subpart.

(c) At any time during the five year period provided for in paragraph (b) of this section, a licensed officer may make application for and receive an endorsement authorizing service as tankerman under this section if he meets the eligibility requirements.

§ 10.11-6 Expiration date.

The expiration date to a tankerman endorsement is the same as the expiration date of the license on which it is placed.

§ 10.11-7 Eligibility requirements; experience.

To be eligible for an original endorsement as tankerman, a licensed officer must meet the requirements in § 12.20-11 of this Subchapter within three years.

§ 10.11-8 Eligibility requirements: training/examination.

To be eligible for an original endorsement as tankerman, a licensed officer must comply with the requirements of § 12.20-13 of this Subchapter.

§ 10.11-9 Renewal of endorsement as tankerman.

(a) A "tankerman" endorsement is not renewed unless an applicant for renewal passes all of the qualifications necessary for the endorsement.

(b) Each applicant for renewal must comply with § 10.02-9(a) through (d).

(c) An applicant for renewal of a tankerman endorsement must meet the requirements in § 12.20-15 (f) through (i) of this Subchapter.

(d) An applicant who does not qualify for renewal of his tankerman endorsement at the time of renewal of his license may, if he requests in writing on his application, renew his license without renewing the endorsement.

§ 10.11-11 Verification of experience.

(a) Service and experience must be verified by—

(1) Certificates of discharge; and

(2) A letter attesting to the applicant's overall service and qualifications, including—

(i) The grades of products transferred by the vessel on which the applicant served; and

(ii) A statement as to the grades of products for which the applicant is considered to be the person in charge.

(b) The letter required in paragraph (a)(2) of this section must be signed by the deck officer directly responsible for training and supervising the applicant.

(c) If the certificate of discharge required in paragraph (a)(1) of this section is not issued, a letter from the master or other representative of management is required in addition to the letter from the deck officer.

2. By adding a new § 10.30-10 to read as follows:

§ 10.30-10 Firefighting qualifying courses.

(a) A student who takes an approved course of training and successfully completes the course, including the written or practical examination required under § 10.30-3(c), is entitled to a firefighting certificate—

(1) In a form prescribed by the school that is acceptable to the Coast Guard; and

(2) Signed by the head of the school and the local Officer in Charge, Marine Inspection or a designated representative of either or both.

(b) The following firefighting certificates are issued under this section:

(1) "Firefighting (ship)"—no limitation as to vessels.

(2) "Firefighting (barge)"—limited to barges.

(c) A student is issued a "Firefighting (ship)" certificate if he completes the following curriculum:

(1) A total of at least 24 classroom hours covering:

(i) The fire hazards of all dangerous cargoes.

(ii) Fire prevention.

(iii) Fire chemistry.

(iv) Fire extinguishing agents and equipment.

(v) Firefighting procedures.

(vi) Emergency equipment.

(vii) Fire detecting systems.

(viii) First aid.

(2) A field exercise program of at least eight hours individual "hands on" training in firefighting procedures including class A, B, C, and D fires and extinguishing agents on vessels and covering:

(i) The following concerning fire mains:

(A) Nozzle and hose handling.

(B) Types of fire mains.

(C) Inspection of fire mains.

(D) Team work.

(E) Low and high velocity fog.

(F) Use of the fire main on the following fires:

(*1*) Machinery space bilge fire.

(*2*) In-process tank fire.

(*3*) Cabin fire.

(*4*) Drip pan fire.

(*5*) Manifold flange fire.

(*6*) Tank hatch (ullage cover) fire.

(ii) Pickup and use of foam on an in-process tank fire and an oil spill fire.

(iii) The following concerning portable extinguishers:

(A) Limitations.

(B) Inspection.

(C) Recharging.

(D) Use of extinguishers on the following fires:

(*1*) Galley fire.

(*2*) Cabin fire.

(*3*) Electrical fire.

(*4*) Flammable liquid fire.

(*5*) Drip pan fire.

(iv) The limitations and use of fresh air, self-contained (air-pac) and oxygen breathing apparatus in a smoke house and during rescue operations.

(d) A student is issued a "firefighting (barge)" certificate if he completes the following curriculum:

(1) A total of at least ten classroom hours covering:

(i) The fire hazards of all dangerous cargoes.

(ii) Fire prevention.

(iii) Fire chemistry.

(iv) Fire extinguishing agents and equipment.

(v) Firefighting procedures.

(vi) Emergency equipment.

(vii) First aid.

(2) A field exercise program of at least four hours individual "hands on training" in firefighting procedures including class A, B, and C fires and extinguishing agents on tank barges covering:

(i) The following concerning portable and semi-portable extinguishers:

(A) Limitations.

(B) Inspection.

(C) Recharging.

(D) Use of extinguishers on the following fires:

(*1*) Flammable liquid fire.

(*2*) Electrical fire.

(*3*) Cabin fire.

(*4*) Galley fire.

(*5*) Drip pan fire.

(ii) The following concerning nozzle and hose handling:

(A) Types.
(B) Inspection.
(C) Team work.
(D) Low and high velocity fog.
(E) Use of a nozzle and hose on the following fires:
(*1*) In-process tank fire.
(*2*) Manifold flange fire.
(*3*) Drip pan fire.
(*4*) Tank hatch (ullage cover) fire.
(iii) The pickup and use of foam on oil spill fires.

(e) A school which provides classroom instruction only is granted approval to issue letters of completion for the classroom portion of the required firefighting training.

(f) An individual who completes a classroom course only must—

(1) Present the letter of completion of the classroom course to an approved field exercise training facility; and

(2) Successfully complete the necessary field training at the field training facility within—

(i) Six months of completing the classroom instruction; or

(ii) Within the time specified by the field training facility.

(g) A school which provides field training only is granted approval to issue firefighting certificates when the student has successfully completed the required field training.

(h) Each instructor of an approved firefighter training course must possess qualifications acceptable to the Coast Guard.

(i) The following training schools have approved firefighting courses:

CLASSROOM INSTRUCTIONS ONLY

* * * * *

FIELD EXERCISE TRAINING ONLY

* * * * *

CLASSROOM INSTRUCTION AND FIELD EXERCISE TRAINING

* * * * *

3. By adding a new § 10.30–15 to read as follows:

§ 10.30–15 Qualifying courses for specific tankerman endorsements.

(a) A student who takes an approved course of training and successfully completes the course, including the written or practical examination required under § 10.30–3(c) of this Part, is entitled to an appropriate certificate for a specific tankerman endorsement—

(1) In a form prescribed by the school that is acceptable to the Coast Guard; and

(2) Signed by the head of the school and the local Officer in Charge, Marine Inspection or a designated representative of either or both.

(b) The following certificates for specific tankerman endorsements are issued under this section:

(1) "Tankerman—Flam."—qualifying course for flammable and combustible liquid cargoes.

(2) "Tankerman — *LG*" — qualifying course for liquefied gas cargoes.

(3) "Tankerman—Blk. Dang. Liquids"—qualifying course for bulk dangerous liquid cargoes having hazards other than or in addition to combustibility or flammability.

(4) "Tankerman — LG (Special)" — qualifying course for a specially named liquefied gas cargo which is designated as special and listed in §§ 10.13–3 and 12.20–3 of this Subchapter.

(5) "Tankerman—Blk. Dang. Liquids (Special)"—qualifying course for a specifically named bulk dangerous liquid cargo which is designated as special and listed in §§ 10.11–3 and 12.20–3 of this Subchapter.

(6) "Tankerman (Renewal)"—qualifying course for renewal of a "Tankerman — Flam.", "Tankerman — LG", "Tankerman — Blk. Dang. Liquids," "Tankerman—*LG* (Special)", or "Tankerman—Blk. Dang. Liquids (Special)" endorsement.

(c) Except as provided in paragraph (d), a student is issued a certificate listed in paragraph (b) if he completes at least 35 hours of instruction in the following subjects:

(1) Characteristics of the grade of cargo involved.

(2) General arrangement of cargo tanks.

(3) Suction and discharge pipelines and valves, cargo pumps, and cargo hose.

(4) Operation of cargo pumps.

(5) Operations connected with the loading and discharging of the cargo.

(6) Rules and regulations pertaining to the specific tankerman endorsement.

(d) A student is issued a certificate for completion of a "tankerman flam," course if he completes at least 21 hours of instruction in the subjects listed in paragraph (c).

(e) A school with an approved course for a specific tankerman endorsement may establish a refresher training course which will be accepted for renewal of the endorsement. The refresher course must include at least 6 hours of instruction in the subjects listed in paragraph (c).

(f) Each instructor of an approved tankerman course must—

(1) Hold a license or merchant mariner's document endorsed for the specific tankerman endorsement the course is intended for; or

(2) Possess other appropriate qualifications acceptable to the Coast Guard.

(g) The following training schools have approved courses for specific tankerman endorsements:

* * * * *

PART 12—CERTIFICATION OF SEAMEN

4. By revising Subpart 12.20 to read as follows:

Subpart 12.20—Tankerman

Sec.

AUTHORITY: 86 Stat. 427, as amended (46 U.S.C. 391a); sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1); 49 CFR 1.46(n)(4)).

§ 12.20–1 Purpose.

This subpart prescribes the requirements for issuing a certificate as tankerman as required by 46 U.S.C. 391(a) and describes the endorsements that authorize the tankerman to transfer and transport various liquid or liquefied gas cargoes carried in bulk on a vessel.

§ 12.20–3 Definitions.

As used in this subpart:

"Bulk Cargo" means liquid or liquefied gas cargo of more than 250 barrels in a vessel's tanks which is pumped on and off the vessel, including liquid or liquefied gas cargo transported in a portable tank having a capacity greater than 110 U.S. gallons.

"Bulk Flammable Cargo" means certain bulk liquids listed in § 12.20–5(a) of this Subchapter whose primary hazard is flammabiilty or combustibility.

"Bulk Dangerous Cargo" means certain bulk liquids or liquefied gases listed in § 12.20–5(a) (2) and (3) of this Subchapter which have hazards other than, or in addition to the conventional flammability and combustibility of petroleum products.

"Bulk Dangerous Cargo—Special" means certain bulk dangerous cargoes that are designated as special and require an endorsement on a tankerman's document specifically naming the cargo or cargoes he is qualified to transfer. These special cargoes are the following:

LIQUEFIED GAS

Methane (LNG)
Ethane
Ethylene
Chlorine
Ethylene Oxide
Methyl Acetylene-Propadiene Mixture
Sulfur Dioxide
Propylene Oxide

BULK DANGEROUS LIQUIDS

Allyl Chloride
Carbon Disulphide
Chlorosulfonic Acid
Epichlorohydrin
Motor Fuel Antiknock Compounds
Oleum
Phosphorus
Propylene Oxide

"Bulk Dangerous Cargo—Limited"—means certain bulk dangerous liquid cargoes which are non-flammable and non-toxic, and are transported in a dedicated service. These limited cargoes are the following:

Caustic Potash Solution
Caustic Soda Solution
Hydrochloric Acid
Nitric Acid (70 pct or less)
Phosphoric Acid
Sodium Hypochlorite Solution (15 pct or less)
Sulfur (liquid)
Sulfuric Acid

"Liquified Gas (LG)"—means a bulk cargo which has a vapor pressure of at least 1.76 kp/cm² (25 psi) at 37.8° C (103° F).

"Person in Charge" means a person who—

(a) Is certified as a tankerman;

(b) Has been designated as responsible for the transfer of bulk cargo to or from a tank barge; and

(c) Has the authority to sign the declaration of inspection required by § 35.35–30 of this Chapter, and 33 CFR 156.150.

"Tankerman"—means a person holding a certificate issued by the Coast Guard that attests to his competency in the handling and transfer on tankships and tank barges of—

(a) Flammable or combustible liquid in bulk; or

(b) Dangerous liquid or liquefied gas cargo in bulk.

"Tankerman—flam. (restricted)"—means a person holding a certificate issued by the Coast Guard that attests to his competency and authorizes him to serve aboard cargo, passenger, and towing vessels that are required to carry a tankerman.

"Tankerman (barge)"—means a person holding certificate issued by the Coast Guard that attests to his competency in the handling and transfer on tank barges of—

(a) Flammable or combustible liquid cargo in bulk; or

(b) Dangerous liquid or liquefied gas cargo in bulk.

§ 12.20–5 Privileges and limitations.

(a) The holder of a certificate as "tankerman" or "tankerman (barge)" is qualified to be in charge of the transfer on tank barges of bulk liquid or liquefied gas cargoes endorsed on his document as follows:

Cargoes authorized to handle and Transfer

Endorsement:

(1) Tankerman—Flam:
- Acetone
- Amyl actate (iso-, n-)
- Amyl alcohol (n-)
- Amyl tallate
- Asphalt
- Asphalt blending stocks:
  - Roofers flux
  - Straight run residue
- Butyl acetate (iso-, n-, sec-)
- Butyl alcohol (iso-, n-, sec-, tert-)
- Butyl benzyl phthalate
- 1,3-butylene glycol
- Cumene
- Cycloaliphatic resins
- Cyclohexane
- Cyclohexanol
- Cymene (para-)
- Decyl alcohol (iso-, n-)
- Decyl benzene (-n)
- Decyl benzene (n-)
- Decaldehyde (iso-, n-)
- Decene
- Diacetone alcohol
- Dibutyl phthalate (ortho-)
- Diethylbenzene
- Diethylene glycol
- Diethylene glycol monobutyl ether (methyl carbitol)
- Diethylene glycol monobutyl ether acetate

Endorsement—Continued
- Diethylene glycol monoethyl ether
- Diethylene glycol monomethyl ether
- Diglycidal ether of bisphenyl-A
- Diheptyl phthalate
- Diisobutylene
- Diisobutyl carbinol
- Diisobutyl ketone
- Diisodecyl phthalate
- Dinonyl phthalate
- Dioctyl phthalate
- Diphenyl-diphenyl oxide
- Dipropylene glycol
- Distillates:
  - Straight run
  - Flashed feed stocks
- Diundecyl phthalate
- Dodecanol
- Dodecylbenzene (commercial)
- Epoxylated linear alcohols, C11–C15
- Ethoxylated alcohols, C12–C15
- Ethoxy trigylcol (crude)
- Ethyl acetate
- Ethyl alcohol
- Ethyl benzene
- Ethyl butanol
- Ethylene glycol
- Ethylene glycol monobutyl ether
- Ethylene glycol monobutyl ether acetate
- Ethylene glycol monoethyl ether
- Ethylene glycol monoethyl ether acetate
- Ethylhexaldehyde
- 2-Ethyl hexanol
- Ethyl hexyl tallate
- Farfuryl alcohol
- Gas oil: cracked
- Gasoline blending stocks:
  - Alkylates
  - Reformates
- Gasolines:
  - Casinghead (natural)
  - Automotive, (containing not over 4.23 grams lead per gallon)
  - Aviation (containing not over 4.86 grams lead per gallon)
  - Polymer
  - Straight run
- Glycerine
- Glycol diacetate
- Glyoxal (40%)
- Heptane
- Heptanol
- Hexane (iso-, n-)
- Hexanol
- Hexene
- Hexylene glycol
- Isphorone
- Jet fuels:
  - JP–1 (kerosene)
  - JP–3
  - JP–4
  - JP–5 (kerosene, heavy)
- Kerosene
- Latex, liquid synthetic
- Methyl acetate
- Methyl alcohol
- Methyl amyl acetate
- Methyl amyl alcohol
- Methyi ethyi ketone
- Methyl formal (dimethyl formal)
- [redacted]
- Methyl isobutyl carbinol
- Mineral spirits
- Naphtha:
  - Solvent
  - Stoddard solvent
  - Varnish makers' and painters' (75 pct.)
- Nonane
- Nonene
- Nonyl alcohol
- Nonyl phenol
- Nonyl phenol (ethoxylated,
- Octene
- Octyl alcohol (iso-, n-)

Endorsement—Continued
- Octyl aldehyde (iso-)
- Octyl epoxytallate
- Oils:
  - Absorption
  - Aromatic
  - Clarified
  - Coal oil
  - Coal tar
  - Croton
  - Crude oil
  - Diesel oil
  - Fuel oils:
    - No. 1 (Kerosene)
    - No. 1–D
    - No. 2
    - No. 2–D
    - No. 4
    - No. 5
    - No. 6
  - Heartcut distillate
  - Lubricating
- Mineral seal
- Mineral
- Motor
- Neatsfoot
- Linseed
- Penetrating
- Range
- Residual
- Resin
- Resinous petroleum
- Road
- Rosin
- Sperm
- Spindle
- Spray
- Tall
- Tanner's
- Transformer
- Turbine
- Edible oils, including:
  - Castor
  - Coconut
  - Cotton seed
  - Fish
  - Lard
  - Olive
  - Palm
  - Peanut
  - Safflower
  - Soya bean
  - Tucum
  - Vegetable
- Pentadecanol
- Pentane (iso-, n-)
- 1-Petene
- Petrolatum
- Petroleum naphtha
- Phosphorized bicyclic terpine
- Phthalate plasticizers
- Polybutene
- Polyethylene glycols
- Polymerized esters
- Polypropylene
- Polypropylene glycol methyl ether
- Polypropylene glycols
- Propyl acetate (iso-, n-)
- Propyl alcohol (iso-, n-)
- Propylene butylene polymer
- Propyl ether (iso-)
- Propylene gly[illegible]
- Propyler[illegible]er
- [illegible]
- [illegible]bean oil (epoxidized)
- Sulfolane
- Tallow
- Tetradecanol
- Tetradecene
- Tetradecyl benzene
- Tetraethylene glycol
- Tetrahydronaphthalene
- Toluene
- Tridecanol
- Tridecene
- Tridecyl benzene
- Triethyl benzene
- Triethylene glycol

[redacted]

Endorsement—Continued
Triethylene glycol diethyl butyrate
Tripropylene glycol
Turpentine
Undecanol
Undecene
Undecylbenzene
Waxes:
Carnauba
Paraffin
Xylene (meta-, para-, ortho-)
Zinc Dialkyldithiophosphate
(2) Tankerman—Blk. dang. liquids:
Acetic acid
Acetic anhydride
Acetone cyanohydrin
Acetonitrile
Acrylic acid
Acrylonitrile
Adiponitrile
Allyl alcohol
Allyl chloride
Aminoethylethanolamine
Ammonium hydroxide (28 pct or less NH3)
Aniline
Benzene
Benzyl chloride
(Iso-, n-) butyl acrylate
(Iso-, n-, sec-, tert-) butylamine
(N-) butyl ether
Butyl methacrylate
(Iso-, n-, crude) butyraldehyde
Camphor oil
Carbolic oil
Carbon tetrachloride
Caustic potash solution
Caustic soda solution
(Mono-) chlorobenzene
Chloroform
(Crude) chlorohydrins
Chloroprene
Coal tar naphtha
Creosote
Cresols
Crotonaldehyde
Cyclohexanone
Cyclohexylamine
(Iso-, n-) decyl acrylate
Dibutylamine
Dichlorobenzene
1,1-Dichloroethane
2,2'-Dichloroethyl ether
Dichloromethane
1,1- or 1,2-dichloropropane
1,3-dichloropropene
Diethanolamine
Diethylamine
Diethylenetriamine
Diethylethanolamine
Diisopropanolamine
Diisopropylamine
Dimethylethanolamine
Dimethylformamide
1,4-dioxane
Ethanolamine
Ethyl acrylate
Ethylene chlorohydrin
Ethylene cyanohydrine
Ethylenediamine
Ethylene dibromide
Ethylene dichloride
Ethyl ether
2-ethylhexyl acrylate
Ethyl methacrylate
2-ethyl-3-propyl acrolein
Formaldehyde solution (37 to 50 pct)
Formic acid
Furfural
Hydrochloric acid
2-hydroxyethyl acrylate
Isoprene
Mesityl oxide
Methyl acrylate
2-methyl-5-ethyl pyridine
Methyl methacrylate

Endorsement—Continued
(Alpha-) methyl styrene
Morpholine
Naphthalene (liquid)
Nitric acid (70 pct or less)
(Mono-) nitrobenzene
1- or 2-nitropropane
(Ortho-, para-) nitrotoluene
Paraldehyde
Pentachloroethane
Phenol
Phosphoric acid
Phthalic anhydride (liquid)
(Iso-, n-) propanolamine
Propionic acid
Propionic anhydride
(Iso-, n-) propylamine
Pyridine
Sodium hydrosulfide solution (45 pct or less)
Sodium hypochlorite solution (15 pct or less)
Styrene
Sulfur (liquid)
Sulfuric acid
1,1,2,2-tetrachloroethane
Tetraethylenepentamine
Tetrahydrofuran
Toluene diisocyanate
Tricresyl phosphate (containing 1 pct or more of the ortho isomer)
Triethanolamine
Triethylamine
Triethylenetetramine
Urea, ammonium nitrate solution (containing more than 2 pct NH3)
(Iso-, n-) valeraldehyde
Vinyl acetate
Vinylidene chloride
Vinyl ethyl ether
Vinyl toluene; and
Table 151.05 of 46 CFR Part 151, except:
Acetaldehyde
Ammonia
Butadiene
Carbon disulphide
Chlorine
Chlorosulfonic acid
Dimethylamine
Epichlorohydrin
Ethyl chloride

Endorsement—Continued
Methyl bromide
Motor fuel antiknock compounds
Oleum
Phosphorus
Propylene oxide
Sulfur dioxide; and those flammable or combustible liquid cargoes listed in 12.20–5(a)(1).
(3) Tankerman—LG:
Acetaldehyde
Ammonia
Butadiene
Butane
Butylene
Dimethylamine
Ethylamine
Ethyl chloride
Methyl bromide
Methyl chloride
Propane
Propylene
Vinyl chloride
(4) Tankerman—LG (plus specifically named cargo):
Specifically named "special" bulk dangerous cargo listed in 12.20–3; and those liquefied gas cargoes listed in 12.20–5(a)(3)
(5) Tankerman—bulk. dangerous liquids (plus specifically named cargo):
Specifically named "special" bulk dangerous cargo listed in 12.20–3; and those bulk dangerous liquid cargoes listed in 12.20–5(a)(2), and those flammable or combustible liquid cargoes listed in 12.20–5(a)(1)
(6) Tankerman (limited to specifically named cargo):
Specifically named bulk dangerous liquid cargo listed in 12.20–3
(7) No tankerman endorsement required:
Nitrogen
Carbon dioxide
Dichlorodifluoromethane
Dichlormonofluoromethane
Dichlorotetrafluoroethane
Monochlorodifluoremethane
Monochlorotetrafluoroethane
Monochlorotrifluoromethane

QUALIFICATION TABLE 12.20–5(b).—*Training/Service Requirements for Endorsements*

Tankerman endorsement [1]	Documented service	Firefighting course	Coast Guard examination	Training course required: Liquified gas	Bulk dangerous liquid	Special
Flammable	×	×	× [2]			
Flammable (restricted)		×	× [2]			
Liquified gas	×	×		×		
Bulk dangerous liquid	×	×			×	
Liquefied gas (plus specifically named cargo)	×	×				×
Bulk dangerous liquid (plus specifically named cargo)	×	×				×
Bulk dangerous liquid (limited to specically named cargo)	×	×			×	

[1] Each tankerman endorsement will be further restricted by the addition of the word (barge) if an individual's qualifications were obtained for (in) barges.
[2] An approved training course may be substituted for the Coast Guard examination.

(b) A person authorized to serve as tankerman or to transfer products under previous regulations shall remain authorized to serve in that same capacity for a period of five years from the effective date of these regulations, or until the reissuance of his merchant mariner's document, whichever occurs first, except that a person serving on a tankship or tank barge transporting liquefied natural gas cargo must have a "tankerman-LG-methane" endorsement issued under this Subpart.

(c) A person authorized to serve as a tankerman under previous regulations may, at any time during the five year period provided for in paragraph (b), make application for and be issued a certificate as tankerman endorsed under this subpart if he:

(1) Presents a certificate of completion of an approved firefighting training

course from a school which is listed in § 10.30–10 of this Subchapter, that is dated within 24 months before the month of application for endorsement; [1] and

(2) Meets the requirements for renewal of certificates contained in § 12.20–15(e) of this Subpart for recent service.

§ 12.20–7 Application and issue.

(a) Applicants who meet the requirements in this subchapter are issued a certificate endorsed for the products they are qualified to transfer.

(b) The certificate is valid for five years.

§ 12.20–9 Eligibility requirements: general.

To be eligible for an original certificate as tankerman issued under this Subpart, a person must:

(a) Be at least 18 years of age;

(b) Be able to speak, read, and understand the English language; and

(c) Pass the medical examination and an engineer officer in § 10.05(e) of this Subchapter, except that an applicant for a "tankerman (barge)" endorsement must have uncorrected vision of at least 20/200 in each eye correctable to at least 20/30 in one eye and 20/50 in the other eye.

§ 12.20–11 Eligibility requirements: experience.

(a) In determining the service requirements of this section, credit for one transfer operation is given for one complete work shift during the transfer operation, or a partial work shift if the shift includes either the hooking up and commencement of transfer or the shutting down of transfer operations and disconnecting. Credit is not given for more than one transfer during a single operation even if work is performed in excess of one normal shift.

(b) Each applicant for a "tankerman——flammable liquids" endorsement must have service as an assistant to a certificated tankerman including:

(1) At least 10 transfers of flammable or combustible liquid cargoes during the 12 months prior to application for certification; or

(2) At least 5 transfers of combustible or flammable products if the applicant has a valid tankerman's certificate for liquefied gas.

(c) An applicant for a "tankerman—flam. (restricted)" endorsement is not required to meet the experience requirement in paragraph (b).

(d) Each applicant for a "tankerman—LG" endorsement must have service as an assistant to a LG tankerman including:

(1) At least 10 transfers of LG cargoes during the 12 months prior to application for certification; or

(2) At least five transfers of LG cargoes if the applicant has a valid tankerman's certificate for any other grade of product.

(e) Each applicant for a "tankerman—bulk dangerous liquids" endorsement must have service as an assistant to a bulk dangerous liquids tankerman including:

(1) At least 10 transfers of bulk dangerous liquid cargoes during the 12 months prior to the application for certification; or

(2) At least five transfers of bulk dangerous liquid cargoes if the applicant has a valid certificate as tankerman for any other grade of product.

(f) Each applicant for a "tankerman (special)" endorsement must have service as an assistant to a person with a "tankerman (special)" endorsement including:

(1) At least 10 transfers of the specifically named special cargo during the 12 months prior to the application for certification; or

(2) At least five transfers of the specifically named special cargo if the applicant has a valid certificate as tankerman.

(g) If a new chemical product is developed and added to the list in § 12.20–3(c) of this Subpart, the service requirements of paragraph (e)(1) need not be met during the first 12 months after publication of the product in the list if the applicant:

(1) Meets the training requirements of § 12.2013(f) of this Subpart; and

(2) Submits documentary evidence that he is trained in, and competent to safely handle the new product.

(h) Required service must be documented and substantiated to the satisfaction of the Officer in Charge, Marine Inspection.

§ 12.20–13 Eligibility requirements: training/examination.

(a) To be eligible for an original endorsement as "tankerman" each applicant must present a certificate of completion from an approved firefighting training course, which is listed in § 10.30–10 (d)(1) or (d)(2) of this Subchapter, for tankerman or tankerman (barge) that is dated within 24 months before the month af application for endorsement.[2]

(b) Each applicant for a "tankerman flammable" or "tankerman—flam. (restricted)" endorsement must:

(1) Pass a written examination administered by the Coast Guard covering:

(i) Cargo tanks and tank venting; (ii) Cargo pipelines and valves; (iii) Cargo pumps and hose/loading arms; (iv) Loading and discharging procedures; and (v) Pollution prevention and control; or

(2) Satisfactorily complete an approved training course for flammable cargoes, listed in § 10.30–15 of this Subchapter, within 24 months before the month of application for endorsement.

(c) An applicant for a "tankerman—flam. (barge)" endorsement may be examined orally and is not required to take the written examination required in paragraph (a).

(d) Each applicant for a "tankerman—LG" endorsement must satisfactorily complete an approved training course for LG, listed in § 10.30–15 of this Subchapter, within 24 months before the month of application for endorsement.

(e) Each applicant for a "tankerman—bulk dangerous liquids" endorsement must satisfactorily complete an approved training course for bulk dangerous liquids, listed in § 10.30–15 of this Subchapter, within 24 months before the month of application for endorsement.

(f) Each applicant for a "tankerman (special)" endorsement must satisfactorily complete an approved training course for the specifically named special cargo, listed in § 10.30–15 of this Subchapter, within 24 months before the month of application for endorsement.

§ 12.20–15 Requirements for renewing a tankerman's endorsement.

(a) An endorsement is not renewed unless an applicant for renewal possesses all of the qualifications necessary for the endorsement.

(b) An applicant must make written application for renewal of an endorsement on Coast Guard Form CG–719B, Seaman's Certificate Application.

(c) An applicant must appear, in person, before an Officer in Charge, Marine Inspection.

(d) A tankerman's endorsement will be renewed within 12 months after the date of expiration of the endorsement, except if the endorsement expired beyond the 12 month period during which time the applicant was serving in the Armed Forces or the Merchant Marine and there was no reasonable opportunity for renewal. The period of service in the Armed Forces or the Merchant Marine following the date of expiration is added to the 12 month period.

(e) No endorsement will be renewed more than 90 days before its expiration date, unless there are extraordinary circumstances that justify an early renewal. The reasons for the early renewal must appear, in detail, in the records of the Officer in Charge, Marine Inspection renewing the document.

(f) An applicant for renewal of a "tankerman—flam." endorsement must:

(1) Have served under the authority of the endorsement within the three years immediately preceding the date of the application for renewal; and

(2) Complete an approved firefighting course within 24 months before the month of application for renewal.

(g) An applicant for renewal of a "tankerman—flam. (restricted)" endorsement must complete an approved firefighting course within 24 months

[1] During a one year period from the effective date of these regulations, completion of a recognized marine firefighting training course since January 1, 1974, will be accepted as meeting the requirement of this paragraph.

[2] During a one year period from the effective date of these regulations, completion of a recognized marine firefighting training course since January 1, 1974, will be accepted as meeting the requirement of this paragraph.

before the month of application for renewal.

(h) An applicant for renewal of a "tankerman" endorsement other than "tankerman flam." must:

(1) Meet the requirements for renewal of the "tankerman flam." endorsement; and

(2) Complete an approved training course or refresher course listed in § 10.-30-15 of this Subchapter for the specific endorsement to be renewed, within 24 months before the month of application for renewal.

(i) An applicant for renewal of a "tankerman" endorsement other than "tankerman—flam. (restricted)" who has not served under the authority of the endorsement within the three years immediately preceding the date of application for renewal must meet the requirements for an original endorsement as "tankerman".

§ 12.20–17 Verification of experience.

(a) Service acquired on tank barges or shore facilities must be documented by a representative of management and the qualified person directly training and supervising the applicant.

(b) Service acquired on a vessel must be documented by—

(1) Certificates of discharge; and

(2) A letter from the qualified person directly training and supervising the applicant.

(c) If a certificate of discharge required in paragraph (b) is not issued, a letter from the master or other representative of management is required in addition to the letter from the person supervising the applicant.

(d) The letters of service required in paragraphs (b) and (c) must verify the applicant's overall service and qualifications, including the grades of products transferred.

§ 12.20–19 Increase in scope.

An applicant who has previously qualified for a specific tankerman endorsement may obtain additional endorsements by completing the service or training requirements under § 12.20–11 (c) of this Subpart for the endorsement desired.

PART 30—GENERAL PROVISIONS

5. By revising § 30.10–71 to read as follows:

§ 30.10–71 Tankerman—TB/ALL.

(a) The term "tankerman" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency in the handling and transfer on tankships and tank barges of:

(1) Flammable or combustible liquid cargo in bulk; or

(2) Dangerous liquid or liquefied gas cargo in bulk.

(b) The term "tankerman—flam. (restricted)" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency and authorizes him to serve aboard cargo, passenger, and towing vessels that are required to carry a tankerman.

PART 31—INSPECTION AND CERTIFICATION

6. By amending § 31.15–1 as follows:

§ 31.15–1 Licensed officers and crew—TB/ALL.

* * * * *

(c) The person in charge of a cargo transfer operation for a tankship shall:

(1) Be designated as person in charge by the master;

(2) Hold a license authorizing service as a deck officer aboard the tankship;

(3) Hold the appropriate endorsement under Subpart 10.11 of this Chapter for the grade of product being transferred, except that if a tankerman is required on the Certificate of Inspection under paragraph (b) of this Section, the tankerman may serve as the person in charge; and

(4) Have served during the preceding 12 months aboard the tankship or another tankship built to the same basic plans and having the same cargo containment, control, and monitoring systems.

(d) The service required in paragraph (c) must include:

(1) Assisting the person in charge of the cargo transfer operation during at least two transfers of cargo; or

(2) Equivalent experience acceptable to the Officer in Charge, Marine Inspection.

(e) The person in charge of a cargo transfer operation is responsible for the safe loading, transport, and discharge of the cargo.

(f) On a vessel with a Certificate of Inspection that requires only one licensed officer other than the master, the master may be the person in charge of the cargo transfer operation if his license is endorsed as tankerman for the grade of cargo being transferred.

7. By revising § 31.15–5 as follows:

§ 31.15–5 Tank barges—B/ALL.

(a) A tank barge under this subchapter is not required to be manned unless the Officer in Charge, Marine Inspection determines that manning is necessary for the protection of life and property, and the safe operation of the vessel.

(a–1) A towing vessel towing a barge which is not required to be manned must have on board, while towing, at least one certificated tankerman of any endorsement, including the "tankerman—flam. (restricted)" endorsement.

(a–2) If cargo transfer (other than in an emergency) or tank cleaning is carried out, it must be supervised by certificated tankerman endorse for the cargo involved.

* * * * *

§ 31.15–6 [Deleted]

8. By deleting § 31.15–6.

PART 35—OPERATIONS

9. By amending § 35.35–1 to read as follows:

§ 35.35–1 Men on duty—TB/ALL.

(a) The owner, master, or person in charge shall ensure that a sufficient number of crew, with license endorsements or certificates as tankerman for the grade of cargo being transferred, are on duty to perform cargo transfer operations.

(b) The owner, master, or person in charge of a tank barge shall ensure that a certificated tankerman is on duty to perform cargo transfer operations. The licensed or certificated tankerman is the person in charge of the tank barge.

(b–1) The owner, master, or person in charge shall ensure that the tankerman required in paragraph (b) is certificated for the cargo being transferred. A licensed officer, as described in Subpart 10.11 of this Chapter, who is authorized to serve as a tankerman, may serve as a tankerman on a tank barge.

* * * * *

(d) The person in charge of a cargo transfer operation for a tankship shall:

(1) Be designated as person in charge by the master;

(2) Hold a license authorizing service as a deck officer aboard the tankship;

(3) Hold the appropriate endorsement under Subpart 10.11 of this Chapter for the grade of product being transferred, except that if a tankerman is required on the Certificate of Inspection under § 31.15–1(b) of this Part, the tankerman may serve as the person in charge; and

(4) Have served during the preceding 12 months aboard the tankship or another tankship built to the same basic plans and having the same cargo containment, control, and monitoring systems.

(e) The service required in paragraph (d) must include:

(1) Assisting the person in charge of the cargo transfer operation during at least two transfers of cargo; or

(2) Equivalent experience acceptable to the Officer in Charge, Marine Inspection.

PART 70—GENERAL PROVISIONS

10. By amending § 70.05–30 to read as follows:

§ 70.05–30 Combustible liquid cargo in bulk.

* * * * *

(b) Each vessel to which this section applies must have on board a person holding a license authorizing service aboard the vessel, with a tankerman's endorsement, including the "tankerman—flam. (restricted)" endorsement.

(c) The person designated as the person in charge of the transfer from a passenger vessel's integral tanks must:

(1) Be qualified as a tankerman under paragraph (b); and

(2) Have authority to sign the declaration of inspection required by § 35.35–30 of this Chapter and 33 CFR Part 156.150.

(d) The person designated as the person in charge of the transfer from a passenger vessel's portable tanks must:

(1) Be qualified as a tankerman under § 98.30–19 of this Chapter; and

(2) Have authority to sign the declaration of inspection required in § 35.35–30 of this Chapter and 33 CFR 156.150.

11. By adding a new § 70.10–49 to read as follows:

§ 70.10–49 Tankerman.

(a) The term "tankerman" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency in the handling and transfer on tankships, as defined in § 30.10–67 of this Chapter, and tank barges of:

(1) Flammable or combustible liquid cargo in bulk; or

(2) Dangerous liquid or liquefied gas cargo in bulk.

(b) The term "tankerman—flam. (restricted)" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency and authorizes him to serve aboard cargo, passenger, and towing vessels that are required to carry a tankerman.

PART 90—GENERAL PROVISIONS

12. By amending § 90.05–35 to read as follows:

§ 90.05–35 Flammable and combustible liquid cargo in bulk.

* * * * *

(b) Each vessel to which this section applies must have onboard a person holding a license authorizing service aboard the vessel, with a tankerman's endorsement, including the "tankerman—flam. (restricted)" endorsement.

(c) The person designated as the person in charge of the transfer from a cargo or miscellaneous vessel's integral tanks must:

(1) Be qualified as a tankerman under paragraph (b); and

(2) Have authority to sign the declaration of inspection required by § 35.35–30 of this Chapter and 33 CFR 156.150.

(d) The person designated as the person in charge of the transfer from a cargo or miscellaneous vessel's portable tanks must:

(1) Be qualified as a tankerman under § 98.30–19 of this Chapter; and

(2) Have authority to sign the declaration of inspection required in § 35.35–30 of this Chapter and 33 CFR 156.150.

13. By adding a new § 90.10–40 to [redacted] as follows:

§ 90.10–40 Tankerman.

(a) The term "tankerman" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency in the handling and transfer on tankships, as defined in § 30.10–67 of this Chapter, and tank barges of:

(1) Flammable or combustible liquid cargo in bulk; or

(2) Dangerous liquid or liquefied gas cargo in bulk.

(b) The term "tankerman—flam. (restricted)" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency and authorizes him to serve aboard cargo, passenger, and towing vessels that are required to carry a tankerman.

PART 98—SPECIAL CONSTRUCTION, ARRANGEMENT, AND OTHER PROVISIONS FOR CERTAIN DANGEROUS CARGOES IN BULK

14. By revising § 98.30–17 to read as follows:

§ 98.30–17 Qualifications of person in charge.

No person may serve, and the operator of a vessel may not use the services of a person, as a person in charge of the transfer of a product to or from a portable tank unless:

(a) On tank barges, the person holds a valid tankerman's certificate for the grade of cargo carried;

(b) On self-propelled tank, cargo and miscellaneous, or passenger vessels, the person holds:

(1) A valid license authorizing service on the vessel; and

(2) A suitable endorsement for the grade of cargo being transferred; and

(c) On vessels not covered by paragraphs (a) or (b), the person meets the requirements for tank barges in paragraph (a).

PART 105—COMMERCIAL FISHING VESSELS DISPENSING PETROLEUM PRODUCTS

15. By revising § 105.50–5 to read as follows:

§ 105.50–5 Tankerman.

(a) Except as provided in paragraph (b), each commercial fishing vessel dispensing petroleum products must have on board a person holding a:

(1) License with a "tankerman—flam." endorsement; or

(2) Certificate issued by the Coast Guard attesting to his competency as a tankerman.

(b) Each commercial fishing vessel dispensing grade "D" or lower petroleum products must have on board a person holding:

(1) A license with a "tankerman—flam. (restricted)" endorsement; or

(2) A "tankerman flam. (restricted)" certificate.

(c) The requirements for a license endorsement as tankerman are in Subpart 10.11 of this Chapter.

(d) The requirements for a certificate attesting to a person's competency as a tankerman are in Subpart 12.20 of this Chapter.

Subpart 105.60 [Deleted]

16. By deleting Subpart 105.60.

PART 151—UNMANNED BRIDGES CARRYING CERTAIN BULK DANGEROUS CARGOES

17. By revising § 151.30–53 to read as follows:

§ 151.30–53 Tankerman.

(a) The term "tankerman" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency in the handling and transfer on tankships, as defined in § 30.10–67 of this Chapter and tank barges of:

(1) Flammable or combustible liquid cargo in bulk; or

(2) Dangerous liquid or liquefied gas cargo in bulk.

(b) The term "tankerman—flam. (restricted)" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency and authorizes him to serve aboard cargo, passenger, and towing vessels that are required to carry a tankerman.

18. By revising § 151.45–3 to read as follows:

§ 151.45–3 Manning.

(a) A barge is not required to be manned unless the Officer in charge, Marine Inspection determines that manning is necessary for the protection of life and property, and the safe operation of the vessel. Each vessel that requires manning for safe operation may be subject to additional requirements as determined by the Commandant.

(b) A towing vessel towing a barge which is not required to be manned must have on board, while towing, at least one certificated tankerman of any endorsement, including the "tankerman—flam. (restricted)" endorsement.

(c) If cargo transfer (other than in an emergency) or tank cleaning is carried out, it must be supervised by a certificated tankerman endorsed for the cargo involved.

19. By revising § 151.45–4 to read as follows:

§ 151.45–4 Cargo handling.

(a) The owner, master, or person in charge shall ensure that a sufficient number of persons are on duty to perform cargo transfer operations.

(a–1) The owner, master, or person in charge of a tank barge shall ensure that a person holding a license endorsement or certificate as a tankerman is on duty to perform transfer operations. The licensed or certificated tankerman is the person in charge of the tank barge.

(a–2) The owner, master, or person in charge shall ensure that the tankerman required in paragraph (a–1) is certificated for the cargo being transferred.

[redacted]

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A REPORT TO CONGRESS: ACTIVITIES RELATING TO TITLE II PORTS AND--ETC(U)
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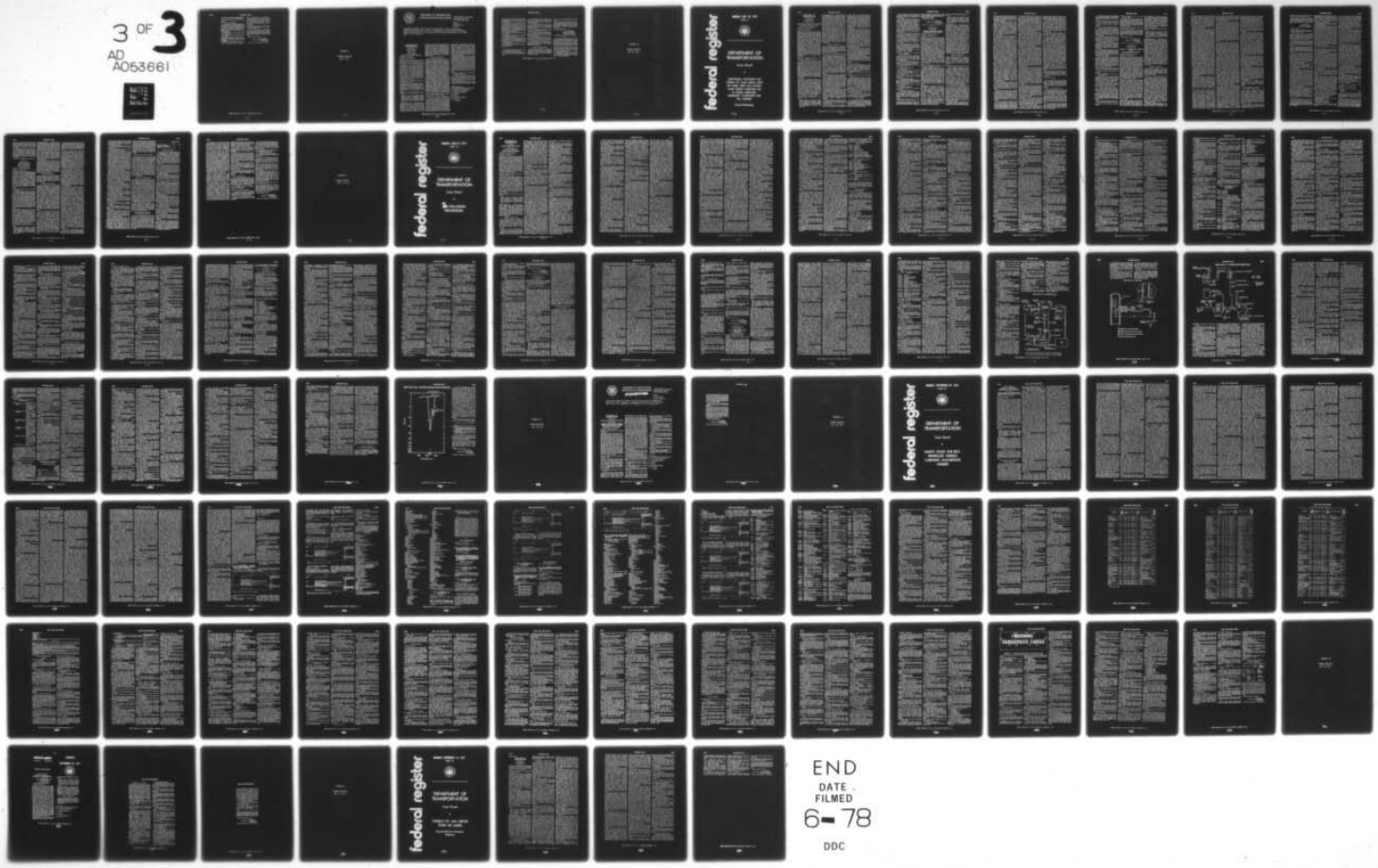

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PART 157—MANNING REQUIREMENTS

20. By revising § 157.10–80 to read as follows:

§ 157.10–80 Tankerman.

(a) The term "tankerman" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency in the handling and transfer on tankships, as defined in § 30.10–67 of this Chapter, and tank barges of:

(1) Flammable or combustible liquid cargo in bulk; or

(2) Dangerous liquid or liquefied gas cargo in bulk.

(b) Each tankerman endorsement is restricted by the word "barge" if the individual's qualifications were obtained for barges.

(c) The term "tankerman—flam. (restricted)" means any person holding a license endorsement or a certificate issued by the Coast Guard that attests to his competency and authorizes him to serve aboard cargo, passenger, and towing vessels that are required to carry a tankerman.

(86 Stat. 427, as amended (46 U.S.C. 391a); sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1); 49 CFR 1.46(n)(4)).)

NOTE: The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A–107.

Dated: April 19, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard
Commandant.

[FR Doc.77–11871 Filed 4–22–77;8:45 am]

APPENDIX 9

FEDERAL REGISTER
MAY 9, 1977

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-CMC/81)
WASHINGTON, D.C. 20590
PHONE: 202 426 1477

5991/2
11 May 1977
16-P-77

Interested persons are invited to participate in this rulemaking by submitting written data, views, or arguments to the Executive Secretary Marine Safety Council, U.S. Coast Guard (G-CMC/81) Washington, D.C. 20590 prior to 20 June 1977

DEPARTMENT OF TRANSPORTATION

Coast Guard

[46 CFR Part 35]

[CGD 75-148]

TANK VESSELS

Manual of Cargo Transfer Procedures

AGENCY: Coast Guard.

ACTION: Proposed rule.

SUMMARY: The Coast Guard is considering an amendment to the tank vessel regulations to require carriage and use of a manual of cargo transfer procedures on board tank vessels. The amendment is proposed to implement recommendation M-74-31 of the action of the National Transportation Safety Board on the Coast Guard investigation of the *SS William T. Steele* casualty. Recommendation M-74-31 calls for a preventive safety measure requiring tank vessels to carry a current manual of cargo transfer procedures that shows the operation of cargo transfer piping systems during cargo transfer operations.

DATES: Comments must be received on or before: June 20, 1977.

ADDRESSES: Comments should be submitted to and will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590, 202-426-1477.

SUPPLEMENTARY INFORMATION: Interested persons are invited to comment on this notice of proposed rule making by submitting written data, views, or arguments. Each person submitting comments should include his name and address, identify the notice (CGD 75-148), and give reasons for any recommendations. The proposal may be changed in light of the comments received. No hearing is contemplated but one may be held at a time and place set in a later notice in the FEDERAL REGISTER if requested by an interested person desiring an opportunity to comment orally at a public hearing and raising a genuine issue.

NEED FOR REGULATIONS

Three persons were killed in the *SS William T. Steele* casualty which occurred during a cargo transfer operation on board the vessel. During the transfer operation a cargo of benzene was mistakenly loaded into a tank reserved for xylene. The attempt to blank off the tank after removing the benzene caused a series of events to occur that resulted in the deaths. The National Transportation Safety Board determined that the probable cause of the deaths was prolonged inhalation of benzene vapors.

Mistakes in loading can result in various hazards on a vessel, including the mixing of incompatible cargoes in tanks or the placement of cargo in tanks that are not properly vented to carry the cargo, and can lead to similar mishaps of the kind that occurred in the *SS William T. Steele* casualty. Use of the manual of cargo transfer procedures proposed in this notice can minimize the possibility of these hazards to the vessel and its personnel. The use of the manual is especially important on a vessel that has a constant turnover of personnel who may not be familiar with the operation of the vessel's cargo transfer system when initially reporting aboard.

DISCUSSION OF PROPOSED AMENDMENT

Most of the information required to be in the manual proposed in this notice would also be contained in the oil transfer manual of an oil tanker. (§§ 155.720-155.750 of Title 33, Code of Federal Regulations, require vessels transferring oil to have an oil transfer manual containing the information required by those sections.) An oil tanker that carries incompatible cargoes will comply with the regulations proposed in this notice if it adds procedures for transferring cargo in a manner that prevents mixing of incompatible cargoes to the transfer procedures it already has on board as required by Title 33. An oil tanker that does not carry incompatible cargoes can comply with the regulations proposed in this notice if it adds to the transfer procedures it already has on board a list of cargoes that it carries.

The rules in this notice would not apply to unmanned tank barges that carry only one product and that do not have equipment on board to transfer cargo from one tank to another. The likelihood of occurrence of the hazards that the proposed manual is designed to prevent is minimal in the case of these single product barges.

In consideration of the foregoing, it is proposed to amend Chapter I of Title 46 of the Code of Federal Regulations by adding a new § 35.01-42 to read as follows:

§ 35.01-42 Manual of cargo transfer procedures TB/ALL.

(a) This section applies to all tank vessels, except unmanned barges that carry only one product and that do not have equipment on board to transfer cargo from one tank to another.

(b) No person may operate a cargo transfer system on a tank vessel unless

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B: bce(3)gj(2)dhpq(1)
C: o(6)g(3)dhpq(1)
D: bdk(1)
E: ao(4)
F: k(25)b(5)cmp(1)
List CG-10
CG-26

the vessel has a manual of cargo transfer procedures that meets the requirements of this section.

(c) The owner of a tank vessel shall update the manual required by this section whenever necessary to maintain it in current condition on the vessel. The master or person in charge of the vessel shall require the vessel's personnel to use the procedures in the manual in each cargo transfer operation.

(d) The manual required by this section must be:

(1) Legibly printed in a language understood by the crew; and

(2) Permanently posted or available at the vessel's cargo control station or at a place where it can be easily seen and used by vessel personnel who engage in cargo transfer operations.

(e) The manual required by this section must contain: [1]

(1) A list of the products to which the cargo transfer procedures apply;

(2) A description of each cargo transfer system installed on the vessel including:

(i) A line diagram of the vessel's cargo transfer piping showing the location of each valve, pump, control device, vent, and overflow; and

(ii) The location of the shut-off valve or other isolation device that separates any bilge or ballast system from the cargo transfer system;

(3) The number of persons on duty during cargo transfer operations;

(4) The duties by title of each officer, person in charge, tankerman, deckhand, and other person who engages in cargo transfer operations;

(5) Procedures for operating the emergency shutdown means if the vessel has an emergency shutdown means; and

(6) Procedures for transferring cargo in a manner that prevents mixing of incompatible cargoes if the vessel carries incompatible cargoes.[2]

Drafting Information

The principal persons involved in drafting this proposal are Lieutenant Commander Paul K. Anderson, Project Manager, and Mr. William R. Register, Project Attorney.

(46 U.S.C. 391a; 49 U.S.C. 1655(b); 49 CFR 1.46).

Note.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: May 2, 1977.

O. W. Siler,
Admiral, U.S. Coast Guard Commandant.

[FR Doc.77-13030 Filed 5-6-77;8:45 am]

[1] Vessels that carry cargoes of oil are required by 33 CFR 155.720 to have oil transfer procedures that meet the requirements of 33 CFR 155.750. An oil tanker that carries incompatible cargoes complies with paragraph (e) of this section if it adds to its oil transfer procedures the information required in paragraph (e)(6). An oil tanker that does not carry incompatible cargoes complies with paragraph (e) of this section if it adds to its oil transfer procedures the information required by paragraph (e)(1).

[2] Incompatible cargoes are listed in NVC 4-75, available Commandant (G-MHM-3/83), United States Coast Guard, Washington, D.C. 20590, 202-426-2559.

APPENDIX 10

FEDERAL REGISTER
MAY 16, 1977

federal register

MONDAY, MAY 16, 1977

PART II

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

ADDITIONAL EQUIPMENT FOR VESSELS OF 10,000 GROSS TONS OR MORE; INERT GAS SYSTEM; TANK VESSELS CARRYING OIL IN TRADE; IMPROVED EMERGENCY STANDARDS FOR OIL TANKERS

Proposed Rulemaking

DEPARTMENT OF TRANSPORTATION

Coast Guard

[33 CFR Part 157]

[CCG 77-058]

TANK VESSELS CARRYING OIL IN TRADE

Protection of Marine Environment

AGENCY: Coast Guard, DOT.

ACTION: Proposed rule.

SUMMARY: The Coast Guard is considering amending the rules for the protection of the marine environment relating to tank vessels carrying oil in bulk by requiring all oil tankers of 20,000 tons deadweight (DWT) or more, U.S. and foreign, that call at American ports to have segregated ballast capabilities and that those built under a contract awarded after [December 31, 1979], or delivered after [December 31, 1981], have double bottoms. This amendment is in response to that portion of the President's March 17, 1977, message to Congress relating to double bottoms and segregated ballast on tankers over 20,000 tons DWT entering U.S. ports. The adoption of this amendment would result in reduced amounts of oil spillage into the navigable waters of the United States and oceans.

DATES: 1. Comments must be received on or before: September 1, 1977.

2. Public hearings: The Coast Guard will hold two public hearings on this proposal. The first will be held commencing at 9:00 a.m. on June 16, 1977, and continuing until all commentors have been heard, in the Santa Fe Helix del Mar Room, Town and Country Hotel, 500 Hotel Circle North, San Diego, California 92138. The second will be held commencing at 9:00 a.m. on June 21, 1977, and continuing until all commentors have been heard, in Room 2230, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590.

ADDRESSES: Comments should be submitted to Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590 (202 426-1477). A copy of the economic evaluation from which the economic summary in this document is taken and the draft environmental impact statement are also available for examination at the above address.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590 (202 426-1477).

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this proposed rulemaking by submitting written data, views, or arguments. Written comments should include the docket number (GCD 77-058), the name and address of the person submitting the comments, the specific section of the proposal to which the comment applies, and the reason for the comment.

All comments received will be considered before final action is taken on this proposal. Interested persons are invited to attend the hearing and present oral or written statements on the proposal. It is requested that anyone desiring to make comments notify Captain Greiner at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the notification.

Drafting Information

The principal persons involved in drafting this proposal are: Commander Richard A. Sutherland, Project Manager, Office of Merchant Marine Safety, and Mr. Stanley Colby, Project Attorney, Office of the Chief Counsel.

Discussion of the Proposed Regulations

The President's message of March 17, 1977, to Congress included measures designed to reduce oil pollution caused by tanker accidents and by routine operational discharges from all vessels. The President informed Congress that the Secretary of Transportation would be instructed to develop new rules within 60 days for all oil tankers 20,000 tons DWT or more, U.S. and foreign, that call at American ports. Included were rules for double bottoms in tankers built in the future and segregated ballast on all tankers. The proposal in this document is in response to the President's initiative.

The regulations would require a double bottom beneath the cargo carrying portion of a seagoing vessel's hull if the vessel is 20,000 tons DWT or more and is constructed under a contract awarded after [December 31, 1979] or if it is to be delivered after [December 31, 1981]. As authorized in the President's message, the Coast Guard may accept technological improvements or alternatives which will result in equivalent pollution protection in grounding accidents.

The regulations would also require that all seagoing vessels of 20,000 tons DWT or more have a segregated ballast capability by [January 1, 1982]. Again, provision is made for acceptance of technological improvements or alternatives which will result in equivalent pollution protection against operational discharges.

The regulations would apply to vessels over 20,000 tons DWT which enter the navigable waters of the United States to engage in trade.

It will be noted that implementation dates in this proposal are enclosed in brackets. This is to indicate that the dates are tentative and may be advanced or delayed by as much as one year, depending upon comments received and the outcome of current international negotiations directed at developing international standards of comparable scope.

This proposal has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200).

The analysis shows that allowing for some market compression, approximately 1250 foreign tank vessels and 220 U.S. seagoing tank vessels would be affected by the segregated ballast retrofit requirement. In addition, approximately 25 new double bottom tankers will have to be built in the United States to meet domestic shipping demands. The projected costs of the requirements to the U.S. seagoing transportation industry is estimated to be $77 million in the 2 year period, 1981 and 1982. Total added costs to be passed on to the U.S. consumer by way of higher freight rates is estimated to be $125 million annually.

The expected benefits of the requirements are reduced amounts of spillage of oil into the navigable water of the U.S. as a result of vessel groundings, reduced amounts of operational discharge to the oceans from deballasting and tank cleaning, and conservation of oil.

In consideration of the foregoing, it is proposed to amend Part 157 of Title 33, Code of Federal Regulations, as follows:

1. Section 157.07 is revised to read as follows:

§ 157.07 Equivalents.

The Coast Guard may accept, in accordance with the procedure in 46 CFR Part 30.15-1, techologically improved or alternate design or equipment as equivalent to a design or any equipment required under this part.

2. Section 157.10 is added to read as follows:

§ 157.10 Segregated ballast and double bottoms.

(a) After [December 31, 1981,] a vessel of 20,000 tons DWT or more must have segregated ballast tanks that have a total capacity to allow the vessel to meet the draft and trim requirements in paragraph (b) of this section without recourse to the use of oil tanks for water ballast.

(b) In any ballast condition during any part of a voyage, including that of lightweight with only segregated ballast, the vessel's drafts and trim must have the capability of meeting each of the following requirements.

(1) The molded draft amidship (dm) in meters without vessel deformation must not be less than dm in the following mathematical relationship:

$$dm = 2.0 + 0.02L$$

(2) The drafts at the forward and after perpendiculars must correspond to those determined by the draft amidship as specified in paragraph (b)(1) of this section, in association with trim by the stern of no more than 0.015L.

497

(3) The minimum allowable draft at the after perpendicular is that which is necessary to obtain full immersion of the propeller.

(c) A vessel may have pollution protection against operational discharges equivalent to paragraph (b) of this section that is accepted under §157.07.

(d) The vessel may be designed to carry ballast water in cargo tanks during the condition described in § 157.35.

(e) A vessel of 20,000 tons DWT or more for which the construction contract is awarded after [December 31, 1979] or which is delivered after [December 31, 1981] must—

(1) Have a double bottom that does not carry oil and that is at least the molded breadth divided by fifteen ($^{B}/_{15}$) or two meters in height, whichever is less, under each oil cargo tank; or

(2) Have pollution protection against groundings equivalent to paragraph (e) (1) of this section that is accepted under § 157.07.

(f) Any excess capacity of segregated ballast under paragraph (b) of this section that exceeds the double bottom capacity must be distributed adjacent to the side shell of the vessel.

3. Subpart B is amended by adding § 157.24a to read as follows:

§ 157.24a Submission of segregated ballast calculations.

After [December 31, 1981,] the owner of a vessel under § 157.10(b) shall submit the following to the Coast Guard before that vessel enters the navigable waters of the United States:

(a) Calculations to substantiate compliance with the segregated ballast distribution requirements in § 157.10(b).

(b) Plans and specifications for the vessel that include—

(1) Design characteristics;
(2) A lines plan;
(3) Curves of form (hydrostatic curves) or hydrostatic tables;
(4) A general arrangement plan of each deck and level;
(5) Inboard and outboard profile plans showing oiltight and watertight bulkheads;
(6) A midship section plan;
(7) A capacity plan showing the capacity and the vertical and longitudinal centers of gravity of each cargo space, tank, and similar space;
(8) Tank sounding tables or tank capacity tables;
(9) Draft mark locations;
(10) Detailed plans of watertight doors; and
(11) Detailed plans of vents.

(c) A certified statement accepting the design of the vessel by the classification society that oversees the vessel if that design meets the classification society's rules and the requirements of § 157.10.

(Title II, Sec. 201, 86 Stat. 427, as amended (46 U.S.C. 391a); 49 CFR 1.46(n)(4))

NOTE.—The Coast Guard has determined that this document contains a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107 and certifies that an Economic Impact Statement has been prepared.

Dated: May 6, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77-13896 Filed 5-13-77;8:45 am]

[33 CFR Part 157]

[CGD 77-063]

IMPROVED EMERGENCY STEERING STANDARDS FOR OIL TANKERS

AGENCY: Coast Guard, DOT.

ACTION: Proposed Rules.

SUMMARY: The Coast Guard is proposing to amend the rules for the protection of the marine environment relating to tank vessels carrying oil in bulk by requiring improved emergency steering standards for all oil tankers of 20,000 deadweight tons or more, both U.S. and foreign, that call at U.S. ports. This proposal implements the portion of the President's message of March 17, 1977, to Congress concerning measures for reducing pollution caused by tanker accident. The President's message directed that the standards in this proposal and other regulations would be developed. Adoption of the regulations in this proposal would reduce the probability of collision and grounding of oil tankers caused by steering failure and would, therefore, reduce the risk of oil pollution as well as property damage, personal injury, and death that could result from these accidents.

DATES: 1. Comments must be received on or before: September 1, 1977.

2. Public hearings: The Coast Guard will hold two public hearings on this proposal. The first will be held commencing at 9:00 a.m. on June 16, 1977, and continuing until all commenters have been heard, in the Santa Fe Helix del Mar Room, Town and Country Hotel, 500 Hotel Circle North, San Diego, California 92138. The second will be held commencing at 9:00 a.m. on June 21, 1977, and continuing until all commenters have been heard, in Room 2230, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590.

ADDRESSES: Comments should be submitted to Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590. Copies of the economic evaluation from which the economic summary in this document is taken are available for examination at the above address. Copies of the environmental impact declaration are also available at the above address.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590. (202-426-1477).

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this proposed rule making by submitting written data, views, or arguments. Written comments should include the docket number (CGD 77-063), the name and address of the person submiting the comments, the specific section of the proposal to which the comment applies, and the reason for the comment. The proposal may be changed in light of comments received. All comments received will be considered before final action is taken on this proposal.

Interested persons are invited to attend the hearing and present oral or written statements on this proposal. It is requested that anyone desiring to make comments notify Captain Greiner at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the notification.

DRAFTING INFORMATON

The principal persons involved in drafting this proposal are: Commander Robert G. Williams, Project Manager for the Office of Merchant Marine Safety, and Mr. William R. Register, Project Attorney for the Office of Chief Counsel.

DISCUSSION OF THE PROPOSED REGULATIONS

1. The President's message of March 17, 1977, to Congress included initiatives designed to reduce oil pollution caused by tanker accidents and by routine operational discharges from all vessels. The President informed Congress that the Secretary of Transportation would be instructed to develop new rules within 60 days for all oil tankers of 20,000 deadweight tons or more, both U.S. and foreign, that call at U.S. ports. Included were rules to improve emergency steering standards on oil tankers. The proposal in this document is in response to the President's initiative.

2. As provided in the President's message, acceptance of technological improvements or alternatives which will result in equivalent pollution protection will be allowed in lieu of the equipment proposed in this notice. Procedures for acceptance of equivalents are currently contained in § 157.07 of Part 157. Section 157.07 is being revised in accordance with the President's commitment and is contained as a proposal in the "Proposed Rules for Tank Vessels Carrying Oil in Trade", which appears in this issue of the FEDERAL REGISTER.

3. Sufficient time is needed for existing and new vessels to comply with the equipment requirements in these propos-

als and to develop operating procedures with respect to using the equipment. Accordingly, the effective date proposed for the regulations is one year after they are published as final rules.

4. The proposed regulations would apply to all oil tankers of 20,000 deadweight tons or more that call at U.S. ports. The purpose of the proposed regulations is to reduce the probability of collision or grounding of oil tankers caused by a steering failure. A reduction in the probability of these accidents would reduce the risk of oil pollution as well as property damage, personal injury, and death that could result from these accidents.

A Coast Guard review of vessel casualty reports shows that 87 casualties involving failure of steering gear or a steering gear control system were reported between 1963 and 1976 on tank vessels of 20,000 deadweight tons and over. Forty of these casualties occurred on foreign vessels operating in U.S. navigable waters and the remaining casualties occurred on U.S. vessels. Though no deaths or pollution incidents were reported as a result of these casualties, vessel damage and other property damage occurred and the potential of pollution resulting from collision or grounding was present in each casualty. The potential for collision or grounding and subsequent pollution as a result of steering failure cannot be ignored when considering the increasing number of vessels being used to transport oil in bulk.

5. In addition to the proposals in this notice, the Coast Guard is preparing proposed amendments to Subchapter J of Title 46, Code of Federal Regulations, that in part contain provisions for steering gear power and control systems on new U.S. vessels. The proposals in Subchapter J are based upon the recommendations for steering gear power and control systems contained in International Maritime Consultative Organization (IMCO) Resolution A.325 (IX) entitled "Recommendations Concerning Regulations for Machinery and Electrical Installations in Passenger and Cargo Ships." IMCO Resolution A.325 (IX) was adopted by the IMCO Assembly on November 12, 1975.

6. The Coast Guard recognizes that problems of steering failure are not limited to oil tankers and in the future will be considering proposals to make the rules in this notice applicable to other tank vessels as well as to other types of vessels.

7. The proposals in this notice contain requirements for steering failure alarms, requirements for recovering rudder control after failure of a steering gear control system, and requirements for submitting steering control information to the Coast Guard and in certain cases for retaining the information on board the vessel.

8. Section 157.03(aa) contains a definition of "steering gear control system" as the term is used in the proposed regulations. This definition will also appear in the proposed amendments to Subchapter J of Title 46 that are currently being prepared. The definition would include a differential control unit as a component of a steering gear control system. Accordingly, on an existing vessel that utilizes a common differential control unit for its steering gear control systems, an additional differential control unit would be required in order to comply with the requirement in § 157.20(a), which requires the capability to recover rudder control after a failure in the steering gear control system in use. If the failure occurred in the differential control unit, a second unit would be needed in order to assure recovery of rudder control.

9. Proposed § 157.20 requires each oil tanker of 20,000 deadweight tons or more to have a steering failure alarm that would provide an audible and visible warning in the pilothouse in the event of loss of rudder control from the pilothouse. The 5 degree position variation and 30 second time period proposed in this requirement are necessary to prevent nuisance alarms caused by normal variation between the rudder position ordered and the actual rudder position.

Proposed § 157.20 applies only to a vessel that has a steering gear control system of the type required by 46 CFR 58.25–45(a). Section 58.25–45(a) of Title 46 in part requires that the arrangement of the steering gear control system and the steering gear components must provide full follow-up control of the rudder. If the vessel is steered by other means, constant use of a rudder angle indicator is necessary; or, if automatic steering gear control equipment is used, alarms are built into the equipment. In either event, early warning of a steering failure is provided when using these other means of steering without the need of an additional warning.

Proposed § 157.20 also requires the proposed alarm system to be separate from and independent of each steering gear control system on the vessel. The purpose of providing separate arrangement of the alarm system is to minimize the probability of simultaneous damage to both the alarm system and a steering gear control system from a source external to these systems. The alarm system must be independent of each steering gear control system so that failure of a component of a steering gear control system will not result in failure of the alarm.

10. Proposed § 157.20a requires that a means be provided to recover control of the rudder within 45 seconds after detection of a failure of the steering gear control system in use. The proposed 45 second time limit is needed to perform necessary operations to regain steering control such as transferring control switches, shifting hydraulic systems, and engaging a trick wheel.

Paragraph (b) of § 157.20a describes the measure of rudder control that must be recovered after failure of a steering gear control system. This capability is the same as the capability recommended in IMCO Resolution A.325 (IX) for operation of auxiliary steering gear.

In order to comply with proposed § 157.20a, equipment modifications to present steering gear control systems on vessels may be necessary though in many instances vessel operators could elect to provide manning of steering stations in lieu of making equipment modifications.

11. Proposed § 157.24b provides that in the case of a U.S. vessel information showing compliance with the proposed alarm and rudder control requirements must be submitted to the Coast Guard. The proposal also provides that in the case of a foreign vessel this information must be on board whenever the vessel operates in the navigable waters of the United States.

12. Proposed § 157.51 contains a requirement to follow the procedure in § 157.20a for recovering rudder control.

13. This proposal has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). Approximately 1800 oil tankers of 20,000 deadweight tons or more call at U.S. ports. The total costs for these vessels to comply with the requirements proposed in this notice during the first two years after they become effective are expected to be approximately $16,575,000. The estimated costs to U.S. vessels during the first two years are expected to be $820,000 to install steering failure alarm systems and $3,100,000 to comply with the requirement to recover steering control. The remaining costs would be associated with foreign vessels. The total, estimated costs assume that approximately 50 percent of the affected vessels would comply with the requirements by means of manning of steering stations other than the pilothouse.

Compliance with the proposed requirements should result in fewer groundings and collisions and in a corresponding reduction in probability of pollution, property damage, injury, and death.

In consideration of the foregoing, it is proposed to amend Part 157 of Title 33, Code of Federal Regulations, as follows:

1. Section 157.03(aa) is added to read as follows:

§ 157.03 Definitions.

* * * * *

(aa) "Steering gear control system" means a group of devices and cables forming a network that regulates and guides the operation of a steering gear.

2. Section 157.20 is added to read as follows:

§ 157.20 Steering failure alarm.

(a) This section applies to each vessel of 20,000 deadweight tons or more that has a steering gear control system of the type required by 46 CFR 58.25–45.

(b) Each vessel must have an alarm system that activates an alarm in the pilothouse whenever the actual rudder position differs for thirty or more seconds by more than five degrees from the rudder position selected by the helmsman.

(c) The alarm system must be separate from and independent of each steering gear control system, except that the alarm system may receive input from the steering wheel shaft.

(d) The alarm must be both audible and visual and must be of a type distinctive from each other alarm in the pilothouse.

NOTE.—This section becomes effective one year after the final regulations are published.

3. Section 157.20a is added to read as follows:

§ 157.20a Recovery of rudder control.

(a) Each vessel of 20,000 deadweight tons or more that calls at a U.S. port must have equipment and procedures to recover adequate control of the rudder within 45 seconds after a failure in the steering gear control system in use has been detected.

(b) A vessel meets the requirements in paragraph (a) of this section if it has either of the following combinations of procedures and equipment, although other combinations are possible:

(1) Two separate and independent steering gear control systems, associated equipment in the pilothouse for switching from one system to another, and procedures for operating the associated equipment.

(2) Procedures and associated equipment for manning steering gear spaces and emergency steering stations, as necessary, which ensure compliance with the requirement in paragraph (a) for recovering rudder control.

(c) For the purposes of this section, adequate control of the rudder is recovered if the vessel regains the capability to move the rudder from 15 degrees on one side to 15 degrees on the other side in not more than 60 seconds when the vessel is underway at its deepest draft and at one half of its maximum speed ahead or 7 knots, whichever is greater.

NOTE.—This section becomes effective one year after the final regulations are published.

4. Section 157.24b is added to read as follows:

§ 157.24b Submission of steering control information.

(a) The owner of a U.S. vessel of 20,000 deadweight tons or more shall submit the following information to the Coast Guard before the vessel operates in the navigable waters of the United States.

(1) Plans and specifications of the steering failure alarm system required by § 157.20 that contain enough detail to show compliance with that section.

(2) Plans, specifications, and procedures that contain enough detail to show compliance with the requirements in § 157.20a for regaining rudder control.

(b) The owner of each foreign vessel of 20,000 deadweight tons or more that calls at a U.S. port shall have on board the information described in paragraph (a) of this section whenever operating in the navigable waters of the United States.

NOTE.—This section becomes effective one year after the final regulations are published.

5. Section 157.51 is added to read as follows:

§ 157.51 Procedures for recovery of rudder control.

The master of a vessel of 20,000 deadweight tons or more that calls at a U.S. port must ensure that the procedures required by 157.20a for recovering rudder control are followed whenever the vessel is operating on the navigable waters of the United States.

(Title II, sec. 201, 86 Stat. 427, as amended (46 U.S.C. 391a); 49 CFR 1.46.)

NOTE.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: May 9, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77-13897 Filed 5-13-77;8:45 am]

[33 CFR Part 164]

[CGD 77-016]

VESSELS OF 10,000 GROSS TONS OR MORE

Proposed Additional Equipment

AGENCY: Coast Guard, DOT.

ACTION: Proposed rule.

SUMMARY: The Coast Guard is considering amending the Navigation Safety Regulations by adding a requirement for vessels of 10,000 gross tons or more, both U.S. and foreign vessels calling at United States ports, to have a second radar system and collision avoidance equipment. This amendment could implement that part of the President's March 17, 1977, message to Congress concerning a requirement for backup radar systems with collision avoidance equipment on all tankers over 20,000 deadweight tons (dwt) entering U.S. ports. The adoption of this amendment could result in tangible savings for industry and government including less vessel damage or loss, and lower investigation, search and rescue, and pollution clean-up costs.

DATES: 1. Comments must be received on or before September 1, 1977. 2. Public Hearings: The Coast Guard will hold public hearings on this proposal. The first hearing will be held commencing at 9:00 a.m. on June 16, 1977, and continuing until all commentors have been heard, in the Santa Fe Helix del Mar Room, Town and Country Hotel, 500 Hotel Circle North, San Diego, California 92138. The second will be held commencing at 9:00 a.m. on June 21, 1977, and continuing until all commentors have been heard, in Room 2230, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590.

ADDRESSES: Comments should be submitted to Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW, Washington, D.C. Copies of studies referred to in this document are available for examination at the above address. A copy of the economic evaluation from which the economic summary in this document is taken is also available for examination at the above address.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW, Washington, D.C. 20590, 202-426-1477.

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this rulemaking by submitting written data, views, or arguments. Written comments should include the docket number (CGD 77-016), the name and address of the person submitting the comments and the specific section of the proposal to which each comment is addressed. All comments received will be considered before final action is taken on this proposal. Interested persons are invited to attend the hearings and present oral or written statements on this proposal. It is requested that anyone desiring to make oral comments notify Captain Greiner at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the request.

DRAFTING INFORMATION

The principal persons involved in drafting this proposal are Mr. Fred Schwer, Project Manager, Office of Marine Environment and Systems, and Mr. Stanley Colby, Project Attorney, Office of the Chief Counsel.

DISCUSSION OF THE PROPOSED REGULATIONS

An advance notice of proposed rulemaking entitled "Marine Traffic Requirements" was published in the FEDERAL REGISTER on June 28, 1974 (39 FR 24157). Among the many concepts advanced were proposals to require a second radar and an "anti collision device" on all vessels of more than 10,000 gross tons operating on the navigable waters of the U.S. Three commenters responded negatively regarding the second radar, primarily because of the retrofit costs. Four commenters responded negatively concerning the "anti collision device". They stated that: (1) the variety of such devices is so great as to make compliance difficult without "tighter" specifications; and (2) the collision avoidance capability of those devices is based on a presumed steady state of relative motion between vessels—a condition which rarely prevails on inland waters.

Navigation Safety Regulations were proposed in the May 6, 1976, issue of the FEDERAL REGISTER (41 FR 18766). The

proposed requirement for a second marine radar system was retained despite the three negative comments. In the Coast Guard's view, loss of radar capability on a vessel of 10,000 gross tons or more imposes an unacceptable risk factor. Redundancy was deemed necessary for safety. However, the proposed requirement for a collision avoidance system was dropped in light of the comments mentioned above.

Fifteen commenters responded to the proposed second radar requirement. Five suggested that we further specify one 3-cm and one 10-cm radar. Four requested additional specifications, such as stabilization, PPI scope size, mode of presentation, and reflection plotter. Six comments were negative, again citing retrofit costs, limited usefulness in confined waters, and complaining of "useless" redundancy. The June 30, 1974, Advance Notice of Proposed Rulemaking proposed a requirement for both 3-cm and 10-cm radars. The Notice of Proposed Rulemaking of May 6, 1976, did not specify wavelengths. Generally speaking, the longer wavelength radar gives better adverse-weather performance because of its ability to penetrate water droplets. This advantage is gained at the cost of resolution. The signal of the shorter wavelength radar is attenuated more by moisture, but it gives better resolution in good weather. A requirement for a second radar could be based either on a perceived need for operational flexibility or on a need for redundancy. Operational flexibility, the Coast Guard feels, is best left to the vessel operator. The objective of this proposal is to provide, for certain vessels, a degree of radar redundancy and to provide for installation of a collision avoidance device on those vessels.

Seventeen commenters objected to the removal of the proposed requirement for a collision avoidance system. For the most part, the arguments advanced were not persuasive. However, the volume of comments suggested that further study was warranted.

Navigation Safety Regulations (33 CFR 164) were published in the FEDERAL REGISTER (42 FR 5956) as a final rule on January 31, 1977. The regulation did not include a requirement for collision avoidance systems, citing instead the planned issuance of this notice. The proposed requirement for a second radar system was not included pending resolution of the question of collision avoidance system.

On March 17, 1977, President Carter conveyed to Congress a message concerning oil spill risk. In it he directed several initiatives, including the development within 60 days of certain regulations, including "Backup radar systems, including collision avoidance equipment, on all tankers [over 20,000 deadweight tons]". This notice is directly responsive to that mandate. The 10,000 gross ton criteria listed in the advance and proposed notices of rulemaking is (as to tankers) roughly comparable to the 20,000 deadweight tons specified in the President's initiatives of March 17, 1977. As collisions between vessels are not related to their cargo or trade, it was determined that the proposed requirement for a second marine radar and a collision avoidance system should apply to all vessels of 10,000 gross tons or more.

As noted above, the May 6, 1976, notice proposed a requirement for a second marine radar system on all vessels of 10,000 gross tons or more. That requirement was withheld from the final rulemaking in anticipation of this proposal that a collision avoidance system be installed on those same vessels. Some collision avoidance systems have a radar display, actual or synthetic, integrated into the system. Others "add on" to the basic radar system. Delaying implementation of the second radar requirement until a decision is made on possible requirement of a collision avoidance system will allow the ship owner maximum flexibility in compliance.

A collision avoidance system is designed basically to aid mariners in identifying and resolving vessel relative motion problems. Just as a pocket calculator replaces paper and pencil in arithmetic computations, the basic collision avoidance system replaces manual maneuvering board solutions. Experience and good judgment are still the determining factors in safe navigation, with or without a collision avoidance system.

As has been pointed out by several commenters, electronic resolution of the threat posed by closing contacts is far faster than manual methods and does not distract the "conning" officer from other functions. Moreover, an electronic system can handle simultaneously more contacts than a manual system, thus to a point eliminating the problem of saturation by multiple contacts. Additionally, the system can be designed to give warning of closing contacts and to operate in a "trial maneuver" mode to predict the outcome of various responses. This "trial maneuver" capability is entirely dependent upon a steady state of relative motion between vessels. This predicted outcome can be negated by a change of target course or speed. Single or few contacts may be adequately handled by manual methods using a plotter. However, these manual methods do not favorably compare in speed of solution or convenience of data presentation with the computer assisted systems.

The U.S. Maritime Administration requires that collision avoidance systems be installed on all new construction tankers subsidized by that agency and recommends that they be installed on all subsidized vessels engaged in foreign trade. A study by the National Research Council, entitled "Human Error in Merchant Marine Safety", published in June 1976, recommends that the systems be required on oceangoing merchant vessels to reduce human error casualties stemming from lack of vigilance. A report of recent British investigations indicates that collision avoidance systems decrease workload and increase operator understanding of the situation around his ship. Conversely, a recent study by Operations Research, Inc., of Silver Spring, Md., commissioned by the Coast Guard, concludes in part that requiring the systems would not appear to be cost-beneficial in preventing vessel casualties on the navigable waters of the U.S.

The Coast Guard has determined that a collision avoidance system in each vessel of 10,000 gross tons or more could contribute positively to the safety of that vessel and to the protection of the environment, particularly in waters in which vessels are not closely confined and are not making repeated course changes dictated by geographic or other conditions.

Economic impact. This proposal has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). It is estimated that 2,000 foreign and 400 U.S. vessels might be affected if the proposal is adopted. Basic collision avoidance systems range in price from $90,000 to $150,000. At an average cost of $120,000 per vessel, installed, the projected first year cost to the U.S. shipping industry would be $43,200,000 and the impact on the U.S. economy would approximate $76,800,000. Assuming a 10 year amortization period, the second through tenth year impacts would be about $28,800,000 per year. Impact on the U.S. economy would total $307,200,000 over the 10 year period.

The benefits from having this equipment could result in tangible savings, including less vessel damage or loss, less post-vessel-casualty costs, including investigation costs, and search and rescue costs, and less pollution clean up costs. Significant intangible benefits could accrue, including less loss of life or injury and less pollution and resulting harm to the environment.

If adopted, the final regulations would contain a specific effective date on which collision avoidance systems would be required to be onboard vessels of 10,000 gross tons or more while operating on the navigable waters of the U.S. This effective date would follow by one year the publication of the final regulations in order to allow sufficient time for the procurement and installation of the required equipment.

Accordingly, it is proposed to add § 164.37, to Part 164, published in the January 31, 1977, issue of the FEDERAL REGISTER (42 FR 5969), to read as follows:

§ 164.37 Additional Equipment: vessels of 10,000 gross tons or more.

Each vessel of 10,000 gross tons or more must have, in addition to the radar system required in § 164.35(a), a second marine radar system with a computer aided collision avoidance system meeting the specification entitled "Performance Specification For a Computer Aided Collision Avoidance Sytem For Merchant Ships", published by the Radio Technical Commission for Marine Services (RTCM Paper 171-76/EC 205/SC 65-226, Revised January 19, 1977).

NOTE.—Performance Specification For a Computer Aided Collision Avoidance System For Merchant Ships is published in Appendix A for reader's convenience.

(Titles I and II, 86 Stat. 426, 427 (33 USC 1224; 46 USC 391a); 49 CFR 1.46(n)(4)).

NOTE.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

O. W. SILER,
Admiral, U.S. Coast Guard, Commandant.

MAY 9, 1977.

APPENDIX A—PERFORMANCE SPECIFICATION FOR COMPUTER AIDED COLLISION AVOIDANCE SYSTEM FOR MERCHANT SHIPS

NOTE: Published by the Radio Technical Commission for Marine Services (RTCM), under the Federal Communications Commission, as RTCM Paper 171-76/EC-205/SC 65-226 (revised as of January 19, 1977 and superseding Paper 145-76/SC 65-220).

1. Purpose. The purpose of this document is to specify *minimum performance standards* for a computer-aided collision avoidance system to assist in correctly interpreting radar data in a manner that will help avoid collisions.

2. Scope. This document provides specifications for the capabilities, data presentation, warning features and necessary inputs of a shipboard computer-aided collision avoidance system, suitable for use on board merchant ships.

3. Inputs to the system. The system shall be capable of accepting signals from the ship's radar(s), gyro compass, speed log (or equivalent speed input), and from a manual speed input. The system shall clearly indicate the speed source selected. The system, whether operating normally or having failed, must not introduce any spurious signals or otherwise degrade the performance of the equipments providing inputs.

4. PPI display. The effective size of the PPI display shall be equivalent to or greater than that provided by a 16" diameter CRT.

The display may be separate or it may be a ship's radar PPI with the collision avoidance data superimposed.

The system shall have both true and relative[1] presentation modes. As a minimum, a capability for relative motion display shall be provided. Projected target track lines should be selectable in either true or relative motion.[2] In addition, the system may provide for true motion. If true motion is provided, the operator shall be able to select for his display either true or relative motion.

Computer generated data for each displayed target shall be in the form of a vector or line indicating target true course or relative motion, with a length proportional to speed, giving both present and extrapolated future positions. The capability to cancel the line or vector presentation of non-threatening targets shall be provided.

The display presentation may be entirely synthetic or synthetics superimposed on the radar video. If the display is superimposed on radar video, means shall be provided to independently adjust the brilliance of the synthetic presentation and of the radar video, including their complete elimination.

Own ship's heading indicator shall be presented on the display in all modes. The indicator shall appear on the display either as a heading line or as a heading marker on the periphery, and shall be accurate within 0.5 degree exclusive of sensor errors. Provision shall be made for adjusting its brilliance and for momentary extinguishing of the heading line. A bearing ring which may be movable shall also be provided.

The system shall be capable of simultaneously representing fixed targets, moving targets and land masses.

The equipment should be provided with at least four range scales, the smallest of which is not more than 3 nautical miles (nm) and the greatest of which is not less than 24 nm.

The brilliance of the display shall be adjustable to the level where it is sufficiently bright to be observed in the normal ambient sunlight expected in a wheelhouse, without the use of a hood, except that a shield may be provided to block direct rays of the sun. The display shall be usable without destroying night vision on a darkened bridge. To enable night vision protection, the display phosphor shall include wavelengths within the band 600 to 750 nanometers, in order to permit the use, where desired, of a red filter. A red phosphor that emits solely within the 600 to 750 nanometer band is an acceptable alternative to the red filter.

For targets having a range of less than 10 miles, within one minute after the moment that:

(a) The target appears on the radar display and is within the acquisition range of the collision avoidance system (for automatic acquisition systems), or

(b) The operator initiates acquisition (for manual acquisition systems), the system should present, as a minimum, an indication of target motion trend. Within 3 minutes a fully accurate target course and speed should be presented on the display and/or in alpha-numeric form, assuming the associated radar has a scanning rate of at least once in three seconds. If more than two targets on the same bearing are required, the above presentation times may be degraded. This degradation factor must be restricted to a maximum of two times the above limits for a quantity of four targets on the same bearing and three times for a quantity of six targets on the same bearing, etc.

5. Target acquisition. Target acquisition may be manual or automatic. The system shall be able to track at least (20) targets automatically. The tracked targets shall be marked on the display by distinct tracking symbols.

6. Warning alarms. For a manual acquisition system, audio and visual alarms shall be initiated by any target closing to a preset minimum range, or guard ring. After target acquisition, similar alarms shall be initiated in all systems by any target that is predicted to close to less than a preset minimum range. The target causing the alarms to be initiated shall be clearly identifiable on the display.

For both manual and automatic acquisition systems, means shall be provided to silence the audio alarm for a given threat but the alarm shall resound upon a subsequent threat. A visual indication shall continue until all threats have been eliminated.

7. Alpha-numeric information presentation. For any acquired target, where alpha-numeric information is provided, the following shall, as a minimum, be included:

Present range to the target;
Present bearing of the target;
Predicted target range at the closest point of approach (CPA);
Predicted time to CPA (TCPA);
Present course of the target;
Present speed of the target.

This information may be presented on the system display or on a separate display device.

When steady-state tracking conditions have been obtained for a non-maneuvering target, the computational errors introduced by the collision avoidance device shall be no greater, for the parameter under consideration, than the unit value of the least significant digit displayed of that parameter.

8. Accuracy. Operationally the equipment is required to present data on a target of interest with adequate accuracy in a reasonable time. Equipment which can satisfy the following test condition will be deemed to meet this requirement.

For a vessel on a constant collision course at a range of 4 nm, with a relative speed of 20 knots, the equipment shall determine the relative speed to within 10 percent within 3 minutes from the time of acquisition. Further, for a vessel passing 1 nm ahead with a relative speed of 10 knots and a constant direction of relative motion (DRM) of 090°, the equipment shall determine its DRM to within 3 degrees in the same time period.

The above requirements pertain to computational accuracy of the system and do not encompass the inaccuracies of the input sensors.

9. Trial maneuver. The system is to provide necessary information regarding possible maneuvers in order to avoid collisions. The system shall have the capability of simulating possible future situations and presenting such situations on the display. The trial maneuver shall indicate the results of a simulated course change. It may indicate, in addition, the result of a simulated speed change or of a speed change in conjunction with a course change. The simulation shall be initiated by the depression either of a spring-loaded switch or of a function key with a positive identification on the display. The indication of the simulation shall be deleted and the display shall revert to normal operation either by the release of the spring-loaded switch, or after the lapse of a present time not to exceed one minute in the case of the function key. During a simulation the system shall activate warning alarms related to the real traffic situation.

10. Environmental conditions. The Collision Avoidance System, including all components shall be capable of operating in the environment normally found on the bridge and/or associated areas. Requirements as specified in Appendix A shall be used as the minimum required to meet the intent of this specification.

11. Compass-Safe Distances. System units must operate with no effect on the standard magnetic or steering magnetic compass when positioned no closer than the manufacturers specified "Compass Safe Distance".

12. Power supply. The system shall be capable of normal operation when encountering the following variations:

	Percent
AC variations from nameplate voltage	±10
Variations from nameplate frequency	±6
DC variations from nameplate voltage:	
110–250V	−20+10
24–32V	−10+25

The equipment shall have impulse voltage transient protection from pulse transients with amplitudes of ±1200 peak volts, rise times of 2 usec to 10 usec, and durations up to 20 usec.

13. Failure alarms. Suitable visual and audio alarms shall be provided to alert the operator in the event of overall system failure, loss of incoming sensor signals (radar, gyro and speed log) or any other failure detected by the system's self-test capabilities. These alarms shall be in the form of flashing lights, repeating sound signals or some other

[1] A course-up presentation is an acceptable variation of the relative presentation.

[2] For those Collision Avoidance Systems utilizing a combination vector/predicted area of danger (PAD) assessment presentation, projected target track lines may be either true or relative.

method to alert the watch officer when the equipment is unattended. Provision shall be made to silence the audio alarm but visual signals shall remain until the failure is corrected, reset by the operator, or the system shut down.

14. Recording capability. Continuous recording capability of not less than one half hour, of the collision avoidance data to reproduce the display(s) may be provided. Such recording shall be capable of being started and stopped "at will" at the display. Provision shall be made to save the data, when desired, for playback through a suitable device.

[FR Doc.77-13894 Filed 5-13-77;8:45 am]

[CGD 77-057]

[46 CFR Parts 30, 32]

INERT GAS SYSTEM

Proposed Amendment

AGENCY: Coast Guard, DOT.

ACTION: Proposed rule.

SUMMARY: This document proposes to extend the inerting system requirements from tank vessels of 100,000 deadweight tons (dwt) or more to tank vessels of 20,000 dwt or more. This proposal is in response to that part of the President's March 17, 1977, message to Congress concerning a requirement for inert gas systems on all U.S. and foreign flag oil tankers of 20,000 dwt calling at American ports. If the systems are installed, there should be a reduction in the number of in-tank explosions on board tankers.

DATES: 1. Comments must be received on or before:

2. Public Hearings: The Coast Guard will hold two public hearings on this proposal. The first will be held commencing at 9:00 a.m. on June 16, 1977, and continuing until all commenters have been heard, in the Santa Fe Helix del Mar Room, Town and Country Hotel, 500 Hotel Circle North, San Diego, California 92138. The second will be held commencing at 9:00 a.m. on June 21, 1977, and continuing until all commenters have been heard, in Room 2230, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590.

ADDRESSES: Comments should be submitted to the Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590. A copy of the economic evaluation from which the economic summary in this document is taken is available for examination at the above address.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590 (202-426-1477).

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this proposed rulemaking by submitting written views, data, or arguments. Each person submitting a written comment should include his name and address, identify this notice (CGD 77-057), and give the reason for the comment. This proposal may be changed in light of the comments received. All comments received will be considered before final action is taken on this proposal. Copies of all written comments received will be available for examination by interested persons.

Interested persons are invited to attend the hearing and present oral or written statements on this proposal. It is requested that anyone desiring to make comments notify Captain Greiner at least 10 days before the scheduled date of the public hearing and specify the approximate length of time needed for the presentation. It is urged that a written summary or copy of the oral presentation be included with the request.

Drafting Information

The principal persons involved in drafting this proposal are: Mr. Daniel F. Sheehan, Project Manager, Office of Merchant Marine Safety, and Mr. Stanley Colby, Project Attorney, Office of the Chief Counsel.

Discussion of Proposal

On January 26, 1976, the Coast Guard published regulations in the Federal Register (41 FR 3838) concerning tank vessel fire protection that incorporated the substance of IMCO Resolution A.271 (VIII), adopted by the Assembly of the Inter-Governmental Maritime Consultative Organization on November 20, 1973. These regulations contain provisions that increase the overall level of safety of tank vessels. One of the provisions of this rulemaking was the requirement that inert gas systems be fitted on new tank vessels of 100,000 dwt or more and combination carriers of 50,000 dwt or more. In the preamble of that document, the Coast Guard made a commitment to reexamine the international recommendations concerning the implementation limits for inert gas systems. That reexamination is reflected in this proposal.

In order to detail the rationale for this proposal, it is necessary to review the history and development of the original decision, the intervening events which have influenced that decision, and the action taken in the international forum.

In 1968, a working group was formed as part of the IMCO Subcommittee on Fire Protection. The purpose of this group was to develop a series of international recommendations to improve tank vessel fire safety. This effort was initiated by the United States through both formal and informal channels within the IMCO forum. The work was divided into two primary areas of concern: protection for the cargo tank area; and protection for the accommodation and service spaces.

After considerable debate, the working group accepted the premise that the accommodations and service spaces should utilize the concept of non-combustible construction, a practice successfully employed in U.S.-flag tank vessels for many years.

During the deliberations concerning the recommendations for cargo tank protection, three very large crude carriers (VLCC's), the *Mactra*, *Marpessa*, and the *Hong Haakong* suffered tank explosions, adding a new dimension to the considerations. The similarity between the casualties led several countries to propose requirements related only to the potential problem of in-tank fires and explosions. U.S. requirements protected against in-tank explosions by preventive techniques and required the fitting of a deck foam firefighting system to mitigate on deck or in-tank fires. This position was the basis for the deliberations.

Owners, operators, and assurers were deeply concerned about the unexplained loss of the VLCC's. This concern resulted in a collective research effort which attempted to determine the causative factors involved in the explosions. The area of greatest concentration centered around tank cleaning methods and techniques. The investigation produced significant results in that tank cleaning methods were found to cause an increase in static electricity generation within the tank itself, thereby serving as a potential source of ignition.

As a result of the inability to determine the exact causes of the problem, several steps were taken to attempt to minimize the possibility of reccurence. On a voluntary basis, owners and operators were invited to utilize the International Chamber of Shipping, "Guidelines for Tank Washing," which were operational steps taken to minimize static electricity generation. The IMCO Assembly proposed a convention amendment (IMCO Res. A.271 (VIII)), "Fire Safety Measures for New Tank Vessels," which until adopted was issued as an interim recommendation. Emphasizing its high priority, all countries were urged by the Assembly to bring the recommendation into force on July 1, 1974 on a voluntary basis. In the intervening time period, an additional Assembly recommendation (IMCO Res. A.326 (IX)), was developed which requires cargo tank protection for vessels that was not as stringent as the previous document. The new recommendation required the fitting of a deck foam system with an augmented foam storage supply if an inert gas system was not fitted. During subsequent deliberations, numerous proposals were presented to require the fitting of inert gas systems for vessels of different sizes under IMCO Res. A.271 (VIII). Proposals ranged from a different tonnage cutoff point to a proposal that concerned the capacity of fixed tank vessel washing machines.

As a result of the explosions aboard the VLCC's, the use of inert gas systems on these vessels increased significantly throughout the world. During this time

period, detailed experience was gained concerning the operation, maintenance and reliability of the system. This information indicated that—

1. There were certain hazards associated with the fitting and use of inert gas systems; and

2. Their reliability had a direct link to the maintenance of the system.

It was found that the inert gas systems (IGS) which were designed to provide protection during the hazardous tank washing process were, in fact, generators of static electricity themselves. In fact, the IGS systems were capable of generating more static electricity than the tank washing machines. In the second instance, the Norwegian Classification Society, Det Norske Veritas determined that approximately 70% of the systems inspected had major maintenance problems that could have seriously affected their use and reliability. Detailed maintenance and operation requirements for this type of system will be the subject of a future proposal in the FEDERAL REGISTER.

After the publication of the substance of IMCO Res. A.271 (VIII) into Subpart 32.53, the problem of tank vessel explosions caused by external sources of ignition was examined in further detail by the Coast Guard which noted that normal tank vessel operation would permit the tank of a vessel to be within the explosive range during loading, transit, and off loading in some cases.

The fact that this condition exists or can exist is known by both designers and operators. In order to prevent ignition of the flammable atmopshere, a U.S.-flag tank vessel must meet specific design and operational requirements:

1. The cargo tank block is classed as a hazardous area and sources of ignition are controlled by mandating explosion proof equipment, prohibition of smoking, and no open flaming devices.

2. Flame screens are required to be fitted in openings into cargo storage tanks and specific operational procedures are prescribed to protect the vessel from ignition sources.

3. Vents are required to be equipped with pressure vacuum valves for Grades A–C cargoes.

4. Cargo discharge and loading is required to be conducted under the supervision of ships' officers and certificated tankermen.

All of these provisions are directed at minimizing the potential for tank vessel fire and explosion. The casualties summarized in the following paragraphs indicate that casualties will occur despite the required safety systems.

For a variety of reasons design and operational requirements have not proven completely successful. The *Corinthos* and *Elias* were conventional tank vessels. For fire safety in the cargo area, they depended basically on identification of, and protection from, potential ignition sources. This protection, however, was not sufficiently comprehensive and when an ignition source, which was not provided for, ignited flammable vapors in the cargo tank, an explosion was initiated. In each case, this explosion then progressed unchecked through the entire cargo tank area. Due to the fact that each vessel was unloading or had just completed off loading, some portion of the vapor space of all cargo tanks was in the flammable range and was, therefore, vulnerable to explosion, when an ignition source developed.

LOSS OF THE TANKER "CORINTHOS"

On January 31, 1975, the U.S.-flag chemical tanker *Edgar M. Queeny* struck the outboard side of the moored 54,000 dwt Liberian flag crude carrier *Corinthos*. A low order explosion immediately resulted within the breached cargo tank and was followed within seconds by a series of increasingly more violent explosions. The explosions spread from tank to tank and the entire deck area of *Corinthos* was soon engulfed in flames and as a result, the vessel broke and sank alongside the British Petroleum dock No. 1, Marcus Hook, PA. Twenty-six persons were killed. Intense firefighting efforts were required for at least 12 hours after the first explosion.

LOSS OF THE TANKER "ELIAS"

On April 9, 1974, the 30,000 dwt Greek flag tanker *Elias* suffered massive multiple explosions, burned, and sank in the Delaware River alongside the Atlantic Richfield Oil Terminal, Fort Mifflin, PA. At the time of accident, the vessel was in the last stages of off loading a cargo of crude oil from the Bachaquero field in Venzuela. A total of 13 persons aboard the vessel (including all principals involved in cargo transfer) were killed. The hull of the vessel came to rest in an upright position on the river bottom. The ensuing fire was fought from the shore by units of the Philadelphia Fire Department and from the water side by units of the U.S. Navy, U.S. Coast Guard, and commercial tugs. Over 30 firefighting and support units were involved at the height of the fire.

In both cases the exact ignition source remains unknown. An ignition source somehow reached the flammable vapors within the cargo tanks. The explosion then progressed through the other cargo tanks on the vessel. Total losses will probably exceed $25,000,000.

TANKERS 20,000 DWT OR MORE: WORLDWIDE CASUALTIES

In the period between 1950 and 1973, there were an estimated 515 fires and explosions on board vessels that occurred either in the cargo tanks or outside the tanks. This figure excludes fires and explosions in the engine spaces. Of that 515, approximately 243 (47%) occurred inside the cargo tanks. Those vessels that were 20,000 dwt or more had over 50% of the intank fires and explosions. The following table is for the period 1950–1973.

	Total number	Percentage
Vessel fires and explosions	515	100
Cargo tank fire and explosions	243	47
Casualties on tankers 20,000 dwt or more	130	53

BENEFITS ACCRUED

As indicated in a preceding paragraph, the requirement for inert gas systems, as recommended in IMCO Resolution A.271 (VIII), developed as a result of the necessity to protect tank vessels of certain sizes during tank cleaning operations. This represents a relatively small portion of a tank vessel's life cycle. The benefits derived from inert gas systems are not limited to this time period. For example:

1. A tank which is inerted cannot sustain an intank explosion if the boundaries of the tank are intact. This provides assurance against intank explosions during other periods when the vessel is not undergoing tank cleaning.

2. Good quality inert gas reduces internal tank corrosion.

3. Higher discharge rates may be obtained by utilizing inert gas system pressure to aid the cargo pumps, thereby reducing tank vessel turn around time.

BACKGROUND OF PROPOSED AMENDMENTS

The President's March 17, 1977 message to Congress included direction that certain ship construction and equipment standards be reformed. Included in the direction was instructions to the Secretary of Transportation to develop new rules within 60 days for inert gas systems on all oil tankers of 20,000 dwt or more, U.S. and foreign, that call at American ports. The proposal in this document is in response to the President's instructions.

Subpart 32.53 currently applies to each tankship of 100,000 dwt or more (metric) and each combination carrier of 50,000 dwt or more (metric) that has a keel laying date after December 31, 1974. The following are excepted from the subpart:

1. Vessels that carry Grade E cargo at a temperature that is 5° C (9° F) or more below its flashpoint or that carry only liquefied gas cargo.

2. Foreign flag tankships of a nation signatory to the International Convention for the Safety of Life at Sea, 1960 that have on board a current valid Safety Equipment Certificate.

It is proposed to retain the substance of this applicability but withdraw the exception to foreign tankships having on board a current valid Safety Equipment Certificate.

U.S.-flag vessels required to fit inert gas systems under 46 CFR Subpart 32.53, which was effective on February 26, 1976 (published in the January 26, 1976 FEDERAL REGISTER (41 FR 3838)) would not be allowed to extend the application of the subpart to the new effective date of this proposed amendment.

In addition, it is proposed to add to the applicability of the subpart tankships and combination carriers of 20,000 dwt or more. In order to allow orderly implementation by industry, it is proposed that those U.S. and foreign tankships or combination carriers that are constructed or converted under a contract awarded before [a date would be inserted that is 6 months after publication of the rule] would have to comply with the inert gas systems requirements within five years after the effective date of the amendment. U.S. tankships or combination carriers contracted for after [a date would be inserted that is 6 months after publication of the rule] would be required to fit an inert gas system on or after the effective date of the amendment. Foreign tankships or combination carriers contracted for after [a date would be inserted that is 6 months after publication of the rule] would have to comply with the inert gas system requirements within five years after the effective date of the amendment.

Since the proposal applies to foreign vessels, in addition to the U.S. vessels currently being regulated, the terms flammable or combustible cargo are used in Subpart 32.53 in lieu of grade classifications to aid comprehension by any reader not familiar with the United States classification of oil cargoes.

Proposed Exceptions. The President's message stated that all oil tankers would be required to be fitted with the provisions outlined in his message. In this proposal, the present exception to the requirement for fitting of an inert gas system on a tankship if it carries Grade E cargoes is continued since in context the President's direction was to extend applicability to smaller vessels rather than to bring low risks substances under regulations. Grade E cargo is by definition a high flashpoint cargo of relatively low risk. Both the international recommendation, IMCO Res. A.271 (VIII), and Coast Guard regulations in 46 CFR 32.53, recognize this and incorporate an exception for high flashpoint liquids.

This proposal has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200).

The analysis shows that approximately 1000 foreign flag and 250 U.S.-flag tank vessels would be affected by the requirement for the fitting of inert gas systems. The projected costs of the requirements to the U.S. consumer over a 9 year period is estimated at one billion seven hundred million dollars.

The expected benefit of the requirement is a reduction in the number of in-tank explosions. These explosions in the past have not only endangered the ship and its crew but port facilities and related waterways.

In accordance with the preceding, it is proposed to amend Subchapter D of Title 46, Code of Federal Regulations, as follows:

§ 30.01–5 [Amended]

1. By amending § 30.01–5(e)(1) of Subpart 30.01 by striking the words "and the safety and cargo handling requirements in Subparts 35.30 and 35.35 of this subchapter" and inserting "Subpart 32.53, Subpart 35.30, and Subpart 35.35 of this subchapter" in place thereof.

2. By revising § 32.53–1 of Subpart 32.53 to read as follows:

§ 32.53–1 *Application*—T/All.

(a) Except as provided in paragraph (b) of this section, this Subpart applies to tankships or combination carriers of 20,000 dwt tons or more as follows:

(1) Each U.S. Flag tankship that is certificated to carry Grades A, B, C, and D liquids.

(2) Each foreign flag tank vessel engaged in the trade of carrying flammable or combustible liquids to or from a U.S. port, or place, or any such vessel destined from one port or place in the United States to another port or place in the United States.

(b) This Subpart does not apply to vessels designed to carry only—

(1) Liquefied gas cargo; or

(2) Cargo that has a flashpoint of 65.5°C (150°F) or higher by an open cup test (Grade E).

NOTE.—(1) A U.S. tankship of 100,000 dwt tons or more or a U.S. combination carrier of 50,000 dwt tons or more, with a keel laying date on or after January 1, 1975, must comply with Subpart 32.53 after February 25, 1976.

(2) U.S. and foreign flag vessels under § 32.53–1, except those vessels described in note 1, that are constructed or converted under a contract awarded before the effective date of the rule must comply with Subpart 32.53 within 60 months after the effective date of the rule.

(3) A foreign flag vessel under § 32.53–1 that is constructed or converted under a contract awarded after the effective date of rule must comply with Subpart 32.53 within 60 months after the effective date of the rule.

(4) A U.S. vessel under § 32.53–1 that is constructed or converted under a contract awarded after the effective date of the rule must comply with Subpart 32.53 at the time of building or conversion.

(Sec. 201, 86 Stat. 427, as amended (46 U.S.C. 391a); 49 CFR 1.46(n)(4)).

NOTE.—The Coast Guard has determined that this document contains a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A–107 and certifies that an Economic Impact Statement has been prepared.

Dated: May 9, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77–13895 Filed 5–13–77;8:45 am]

APPENDIX 11

FEDERAL REGISTER

JUN. 27, 1977

federal register

MONDAY, JUNE 27, 1977

PART III

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

Oil POLLUTION PREVENTION

DEPARTMENT OF TRANSPORTATION

Coast Guard

[33 CFR Parts 154, 155, and 156]

[CGD 75-124]

POLLUTION PREVENTION

Vessel and Oil Transfer Facilities

AGENCY: Coast Guard, DOT.

ACTION: Proposed rule.

SUMMARY: The Coast Guard proposes to amend the pollution prevention regulations for vessels and oil transfer facilities to reduce accidental discharges of oil or oily wastes during vessel operations and during the transfer of oil or oily wastes to or from vessels. The proposed changes also clarify certain existing rules. Public and industry comments, the Coast Guard's operational experience, and new requirements under the International Convention for the Prevention of Pollution from Ships, 1973, make these proposed changes necessary.

DATES: Comments must be received on or before: August 11, 1977.

ADDRESSES: Comments should be submitted to Commandant (G-CMC/81) U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590. A copy of the economic evaluation from which the economic summary in this document is taken and a copy of the environmental analysis are also available for examination at the above address.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590, 202-426-1477.

SUPPLEMENTARY INFORMATION: Each person submitting a comment should include his name, address, and organization, if any, identify this notice (CGD 75-124), and give reasons for his comments. No public hearing is planned. If the Coast Guard determines that a public hearing is necessary the time and place will be set in a later notice in the FEDERAL REGISTER.

DRAFTING INFORMATION

The principal persons involved in drafting this proposal are: Lieutenant Commander Harvey G. Knuth, Project Manager, Office of Marine Environment and Systems, and Mr. Stephen D. Jackson, Project Attorney, Office of Chief Counsel.

DISCUSSION OF PROPOSED AMENDMENTS

Parts 154, 155, and 156 were published December 21, 1972 (37 FR 28250), effective July 1, 1974, and were amended September 11, 1975 (40 FR 42189). Since being published, many comments have been received, showing that some changes are needed. The Coast Guard's operational experience leads to the same conclusion. Additionally, in November 1973 the International Conference on Marine Pollution, under the auspices of the Inter-Governmental Maritime Consultative Organization (IMCO), adopted the International Convention for the Prevention of Pollution from Ships, 1973. This Convention, when it enters into force, will require oil-water separators, and bilge oil content monitors or alarms. The Coast Guard has decided that the Convention establishes a reasonable and environmentally effective set of standards on which certain vessel requirements for the discharge of oily mixtures can be based.

A discussion of the proposed amendments that significantly alter the regulations follows:

1. The heading of Part 154, Large Oil Transfer Facilities, is misleading as the application of this part is not a function of facility size, but rather vessel capacity. Therefore, "large" is deleted.

2. The wording in § 154.100 has been misconstrued generally to mean that this part applies only when a transfer is being conducted. Proposed § 154.100(a) is changed to show that Part 154 applies at all times during which a facility is in an operationally ready status and is capable of conducting oil transfer operations.

Although public vessels are exempt from compliance with these regulations, facilities that transfer oil to or from public vessels are not. Therefore, "public vessel" is added to proposed § 154.100.

The specific exemption of lube oil and non-petroleum based oil is deleted. If lube oil is transferred in bulk to or from a vessel with a capacity of at least 250 barrels of lube oil, regardless of the use of the lube oil, it should be regulated. If non-petroleum based oil is transferred in bulk to or from a vessel it will be regulated when the vessel capacity for non-petroleum based oil reaches 250 barrels.

The Coast Guard is considering expanding the applicability of § 154.500 to all facilities, regardless of the capacity of the vessel served, to ensure that all hose assemblies used to transfer oil meet the design standards. Upon determining the need, regulations may be published.

3. Several definitions are added or reworded in proposed § 154.105.

4. Proposed §§ 154.107 and 154.108 replace § 154.330 (waivers) and are similar to proposed §§ 155.107, 155.110, 156.107, and 156.110. The Captain of the Port (COTP) and the Officer in Charge, Marine Inspection (OCMI) need the authority to allow alternatives to the requirements in these regulations that provide an equivalent level of protection for the environment, without having to grant an exemption. Proposed § 154.108 sets out the conditions for granting an exemption. An exemption does not require an equivalent level of protection of the environment; therefore, the procedures for obtaining an exemption are more stringent than those in proposed § 154.107.

5. The notification requirement in § 154.110(b)(3) is moved to proposed § 156.120(a) because it is an operational oil transfer requirement.

6. Proposed § 154.120(b) provides for the COTP to give a written report of inspection results to the facility operator for the record required by § 154.740(e).

7. Section 154.140 is moved to proposed § 156.112 because it is an operational oil transfer requirement.

8. Update and COTP review of the operations manual is incomplete. To improve control over the quality of the operations manual, new §§ 154.300(c) and (e) are added. No provision is made for facilities where English is not the predominant language.

Therefore, new § 154.300(a)(3) is added to require a bilingual operations manual when needed. Sections 154.760 and 154.770 are moved to new §§ 154.300 (b) and (f) and 154.320(b) to consolidate general operations manual requirements. Section 154.300(b) is moved to new § 154.300(d).

9. Review of the operations manual by operating and inspecting personnel is difficult because of the variety of formats. Proposed § 154.310 requires that the contents of the operations manual be listed in the order specified. The list of contents is expanded to include the proposed changes in Part 154.

10. New §§ 154.320(b) and (c) are added to allow the facility operator to initiate amendments to the operations manual.

11. New § 154.325 describes the letter of adequacy issued under new § 154.300 (e). A letter of adequacy is the means proposed by the Coast Guard to improve control over the quality of the operations manual by ensuring that the manual meets the requirements of this part and Part 156.

12. Proposed § 154.500 applies to all hoses because hoses of three inches inside diameter and less are often used to transfer oil and should meet design standards. Proposed § 154.500 also applies to all hoses regardless of the date of manufacture. By the time the proposed regulations are final most hoses manufactured before 1973 will be out of service. If a facility operator has an unused pre-1973 hose, then he may apply for an alternative under proposed § 154.107.

Sections 154.500(f) and (g) are changed by proposed §§ 154.500(e), (f), and (g). Proposed § 154.500(e) requires that the products for which the hose may be used and the maximum allowable working pressure (MAWP) must be marked on the hose. Proposed § 154.500 (g) requires that the burst pressure not be marked on the hose because the potential exists to mistake the burst pressure for the MAWP.

New § 154.500(h) is added to require that each hose used to transfer oil for fuel to a vessel that has a fill pipe for which containment is impractical must be equipped with an automatic back-pressure shutoff nozzle.

A note is added at the end of § 154.500 to inform readers of the availability of the American National Standards Institute (ANSI) standards mentioned in these regulations.

13. New § 154.510(b), requiring that manufacturers certify that a loading arm meets ANSI standards, is added to assist Coast Guard enforcement personnel in inspecting the facility.

14. Proposed § 154.520 requires closure devices for all hoses not in use to prevent oil spills resulting from residual oil in unblanked hoses.

15. When these regulations were first published, monitoring devices were in the developmental stage. Now, there are a number of devices on the market, and new § 154.525 is added to require installation of monitoring devices when the COTP determines that certain conditions exist.

16. Proposed § 154.530(a)(1) replaces § 154.530(b) and shows that the definition of hose handling and loading arm area applies whether the facility or the vessel is providing the hose.

The discharge containment sizes in § 154.530 are changed by proposed § 154.530(b) to correspond with the sizes now required in proposed § 155.310 for vessels, except that containment of less than 2 barrels is not allowed even for hoses of less than 6 inches inside diameter because fixed containment of less than 2 barrels at a facility is impractical.

Section 154.530(d) is changed by proposed § 154.530(c) to require that portable containment be at least ½ barrel capacity.

New § 154.530(d) is added to provide for portable containment for mobile facilities, because fixed containment of any size is impractical for a mobile facility.

17. In § 154.545, "ready access" is a vague term that causes unnecessary response delays. Therefore, new § 154.545(c) is added to require each facility to establish time delays for deployment of containment equipment, subject to approval by the COTP.

New § 154.545(d) is added to require the installation of oil containment material around vessels when the COTP determines that certain conditions exist.

18. Proposed § 154.550(a) deletes the requirement that the emergency shutdown communications system be separate from the routine communications system.

Proposed § 154.550(b) adds a requirement that the emergency shutdown means must be other than the valve at the dock manifold connection, to prevent the inadvertent release of a significant amount of oil if the valve at the dock manifold connection is damaged.

New § 154.550(c) sets time limits for emergency shutdown.

19. New paragraphs (c), (d), and (e) are added to § 154.560 to provide that the communications system must be usable at all times, may be the same as the system permitted for emergency shutdown, and must use intrinsically safe portable radio devices.

20. Proposed § 154.570 deletes the requirement for specific illumination intensities except when the illumination is apparently inadequate. When the illumination is apparently adequate, specific illumination intensities are required and the illumination levels prescribed in proposed § 154.570(b) must be met. New § 154.570(d) is added to require that lighting not interfere with navigation.

21. New § 154.740(f) is added to require that the declaration of inspection be available for inspection by the COTP.

22. Sections 154.760 and 154.770 are moved to proposed §§ 154.300 and 154.320 (see item 8), and § 154.780 is moved to proposed § 156.113 because they are operational oil transfer requirements.

23. The date in proposed § 155.100 is deleted since these regulations are already in effect.

24. Several definitions are added or reworded in proposed § 155.105.

25. New § 155.107 is added and § 155.110 is changed for the reasons stated in item 4.

26. Section 155.130 is moved to proposed § 156.112 because it is an operational oil transfer requirement.

27. Proposed § 155.310(a) reduces the overall size of containment on vessels and provides a further breakdown of containment sizes for hoses of less than 6 inches inside diameter.

New § 155.310(b) is added to allow portable containment on tank barges with coamings surrounding the cargo hatches.

28. The Notice of Proposed Rule Making for the existing Part 155, published 24 December 1971, proposed that a fixed or portable container of at least 14 U.S. gallons be installed on vessels. Section 155.320 was extensively modified in its final form in response to a request for relief for smaller vessels. However, instead of permitting the use of a smaller container on smaller vessels, the final rule switched to requiring a two barrel fixed container on new vessels and a five gallon portable container on existing vessels. The two barrel fixed containment in § 155.320 has proven to be excessively large. Accordingly, proposed § 155.320 reduces the size of fixed containment, differentiates between sizes of new vessels above 300 gross tons, and provides for small portable containers on new vessels under 300 gross tons while retaining small portable containers for all existing vessels (under § 155.320, an existing vessel is one constructed before 1 July 1974). Extending the requirement for fuel oil discharge containment to vessels under 100 gross tons is being considered, and regulations may be published upon determining the need.

29. Proposed §§ 155.330 through 155.410 require installation of 15 parts per million (p.p.m.) oil-water separators and bilge oil content alarms or bilge oil content monitors aboard all vessels of 100 gross tons or more operating in the navigable waters and contiguous zone of the United States.

Sections 155.330 through 155.410 require that vessels of 100 or more gross tons be fitted with fixed piping systems for discharge to reception facilities of oily residues from main and auxiliary machinery spaces and fuel oil tanks that carry ballast. An exception is allowed for those vessels installing oil-water separating equipment acceptable to the Commandant of the Coast Guard. This approach encourages installation of the fixed piping system for discharge to reception facilities, but does little to promote installation and use of oil-water separating equipment. The net result is that oily mixtures containing large volumes of water and small amounts of oil are retained onboard for discharge to reception facilities. Very few ports have adequate facilities for receiving and processing large volumes of mixtures containing little oil and vessel operators have discharged the untreated oily mixtures overboard in violation of the law.

These proposed regulations, by requiring installation and use of oil-water separating equipment would reduce the total volume of oily mixtures retained onboard and would also increase the oil content of the mixtures. Thus, much smaller storage and handling capacity would be sufficient at reception facilities. Processing to recover reusable oil would also be simplified. All of this would reduce the overall cost of reception facilities and would stimulate their construction. In some cases a vessel could combine the residue from an oil-water separator with fuel for use in the propulsion plant and not need to use reception facilities.

To facilitate the availability of acceptable 15 p.p.m. oil-water separators, bilge oil content monitors and alarms, the Coast Guard is proposing approval regulations for that equipment in 46 CFR 162.050 elsewhere in this assue of the FEDERAL REGISTER. Those proposed regulations are based on the specifications adopted at the Sixth Session of the Marine Environment Protection Committee (MEPC) of the Intergovernmental Maritime Consultative Organization (IMCO).

30. Proposed §§ 155.330(b)(2), (b)(3) and (b)(5)(ii) combine and clarify the requirements on a vessel's fixed piping system contained in §§ 155.340, 155.350, 155.370, and 155.380. Proposed §§ 155.330(b)(1) and 155.330(b)(4) specify requirements for the oily waste and slop retention system required in § 155.330. Proposed § 155.330(b)(5)(i) adds a requirement for sample points in the fixed piping system. Proposed §§ 155.330(b)(6), (b)(7) and (b)(8) require installation of 15 p.p.m. oil-water separators and oil-content monitors or alarms and set out the piping system design requirements. Proposed §§ 155.330(b)(1) and (b)(4) through (b)(8) are effective 2 years after the effective date of the final rule or at the vessel's first shipyard maintenance and repair availability after 6 months after publication of the final rule, whichever is earlier. This is done to allow vessel owners and operators to schedule the design work and equipment procurement necessary to comply with those requirements.

Several sources have indicated to the Coast Guard that a well designed oily mixture settling system might be capable of producing an effluent containing 15

p.p.m. of oil in water or less at significantly less cost than the purchase and installation of a 15 p.p.m. oil-water separator. Proposed § 155.330(c) allows substitution of an installed oily mixture settling system for the 15 p.p.m. oil-water separator required by proposed § 155.330(b)(6) if the settling system meets the design requirements in proposed §§ 155.330(c) (1) and (2) and if, after installation aboard the vessel, the settling system is acceptable to the Commandant (acceptance procedures to be proposed).

Proposed § 155.330(d) requires that each 15 p.p.m. oil-water separator, monitor, and alarm installed aboard a vessel after April 1, 1980 be approved by the Coast Guard under 46 CFR 162.050. (Elsewhere in this issue of the FEDERAL REGISTER.) The April 1, 1980, effective date for this requirement is proposed to allow time for approval testing of oil-water separating, monitoring, and alarm equipment.

Proposed § 155.330(d) does not apply to oil-water separators, bilge monitors, and bilge alarms installed on vessels before April 1, 1980. The question of whether separators, monitors, and alarms installed before April 1, 1980, should be required to meet the Coast Guard's applicable approval specifications is currently under study. Related questions, of whether separators, monitors, and alarms should be allowed to continue in service and, if so, under what conditions, are the subject of current discussion by the IMCO Marine Environment Protection Committee. The Coast Guard intends to issue regulations concerning existing installations after completion of its studies and the current IMCO discussions.

31. Proposed § 155.340 replaces and clarifies the requirements for oily waste and slop retention contained in § 155.330.

32. Proposed § 155.350 combines the requirements for bilge and fuel ballast residue pumping arrangements aboard vessels of less than 100 gross tons contained in §§ 155.360 and 155.390. Nothing in these proposed regulations requires installation of oil-water separating equipment aboard vessels of less than 100 gross tons; however, such vessels may, if they wish, install this equipment if it is installed and operated in accordance with proposed §§ 155.330(d) and 155.410.

33. The requirements for reception facility discharge points for vessels of less than 1600 gross tons in §§ 155.340(b)(2) and 155.370(b)(2) are moved to proposed § 155.360.

34. The requirements for shore connections applicable to uninspected U.S. vessels and all other vessels not in ocean or coastwise service in §§ 155.350(c) and 155.380(c) are moved to proposed § 155.370. Additionally, the requirement in § 155.350(c) that vessels not in ocean or coastwise service have shore connections meeting the specifications in appendix A to Part 155 or conforming to standard B16.5, Steel Pipe Flanges and Flanged Fittings or B16.31, Nonferrous Pipe Flanges, of the American National Standards Institute for a 4 inch standard flange has been deleted and replaced with a requirement that each shore connection or portable adapter on the vessel must fit the connections at each reception facility to which the vessel transfers oily residues.

35. Proposed § 155.380 exempts any vessel, that has a means onboard to burn as fuel, incinerate, or otherwise consume all oil residues, from the requirements for fixed reception facility discharge points and installed discharge pumps contained in proposed §§ 155.330(b)(2) and (b)(3) if the vessel has any means to transfer oil residues to a reception facility.

36. Proposed § 155.390 exempts any tank vessel, that combines all other oily mixtures with oily cargo residues for transfer and discharge in accordance with the requirements of Part 157 of this chapter, from the requirements in proposed § 155.330.

37. Proposed § 155.400 requires that a vessel operator have on board, and use, the instruction manual for the fixed piping system and each oil-water separator, oily mixture settling system, and bilge oil content monitor or alarm. This requirement is proposed to ensure that vessel operators have available and use the information necessary to operate in compliance with the discharge regulations contained in proposed § 155.410.

38. Proposed § 155.410 contains requirements for overboard discharges of oily mixtures. Proposed § 155.410(a) requires that each overboard discharge of an oily mixture into the navigable waters, or the contiguous zone, that is not combined with oily cargo residues, be made through a properly operating 15 p.p.m. separator and bilge monitor or alarm (as noted in item 30, § 155.330 (c) provides that an oily mixture settling system acceptable to the Coast Guard may be substituted for the 15 p.p.m. separator). The 15 p.p.m. oil in water standard is contained in Annex I to the International Convention for the Prevention of Pollution from Ships, 1973. Proposed § 155.410(a)(2) notes the requirement that any overboard discharge of an oily mixture must conform to the limit prescribed by the Environmental Protection Agency (EPA) in 40 CFR 110.

That limit provides that a discharge may not create a sludge or emulsion or produce visible traces of oil in the water or along adjoining shorelines. The Coast Guard is currently having discussions with the EPA on the question of whether a discharge concentration of 15 p.p.m. oil in water is within the discharge limit prescribed by EPA regulations.

Proposed § 155.410(b) requires that each discharge of an oily mixture, that is not combined with an oily cargo residue, made from a U.S. vessel beyond twelve miles from the nearest land be made while the vessel is proceeding en route and at a concentration of 100 p.p.m. or less of oil in water. The 100 p.p.m. standard is contained in Annex I to the International Convention for the Prevention of Pollution from Ships, 1973.

Proposed § 155.410(c) requires that discharges of oily cargo residues and of oily mixtures combined with oily cargo residues meet Part 157 of this chapter.

Proposed § 155.410(d) establishes an effective date 2 years after the effective date of the final rule for the requirements in proposed §§ 155.410(a) and 155.410(b). This is intended to allow time for vessel owners and operators to accomplish the design, procurement and installation work necessary to comply with the discharge requirements.

39. The purpose of § 155.440 is to inform operating personnel of the prohibition against and the penalty for oil discharges. Proposed § 155.440 deletes the exception for foreign vessels and adds a requirement for the placard to be printed in the language(s) of the crew.

40. Section 155.480 is deleted since it duplicates regulations in 46 CFR 61.

41. Proposed changes to § 155.710 were recently published in the FEDERAL REGISTER at 42 FR 21190. Proposed § 155.710 in this document reflects those proposed changes. Comments on this proposed section should reference docket number CGD 74-044a.

42. Proposed § 155.720 clarifies that the requirement for oil transfer procedures also applies to transfers from tank to tank within a vessel because they are a potential spill source.

43. New § 155.740(c) is added to require that the vessel operator makes the oil transfer procedures available for inspection by the COTP or OCMI.

44. Proposed § 155.750 reflects proposed changes to Part 155. New § 155.750(o) requires cargo information for vessels, similar to the requirement for facilities in § 154.310(a)(6).

45. Sections 155.760, 155.770, and 155.780 are reworded for clarity, and the term U.S. is deleted from proposed § 155.770 to prohibit the draining of oil into bilges on all vessels.

46. New § 155.785, which is similar to proposed § 154.770, is added to regulate communications during vessel to vessel oil transfers (see item 19).

47. Proposed § 155.790 changes the lighting requirements for the same reasons as § 154.570 (see item 20).

48. The oil transfer hose use requirements in § 155.800 are moved to proposed § 156.120(k).

49. New § 155.805 is added to require that vessels have the means to blank off their hoses when not in use, which is similar to proposed § 154.520.

50. New § 155.815 is added to require that all vessel openings that could let water in or oil out are properly secured when the vessel is underway.

51. Section 155.820(d) is deleted because the requirement for valve inspection (§ 155.480) is deleted (see item 40). Proposed § 155.820(d) requires that the declaration of inspection be available for inspection by the COTP or OCMI.

52. Proposed § 156.100 includes public vessels and deletes the exceptions for lube oil and non petroleum based oil for the same reasons as proposed § 154.100 (see item 2).

210

The exception for the transfer operation on a public vessel is added because public vessels are exempt from compliance with the regulations, even though the transfer operation on a facility or other vessel transferring oil to or from a public vessel is not exempt.

53. Several definitions are added or reworded in proposed § 156.105.

54. Section 156.107 is changed and new § 156.110 is added for the reasons stated in item 4.

55. Sections 154.140, 154.780, and 155.130 are moved to new §§ 156.112 and 156.113 because they are operational oil transfer requirements.

56. Proposed § 156.115, presently § 156.110 deletes the specific conditions for serving as a person in charge of more than one vessel, which are unnecessarily restrictive, and replaces them with COTP authorization.

57. Generally, § 156.120 is changed for clarity. Some new requirements are added, and some paragraphs are moved within the section. A discussion of the specific changes follows:

a. The requirement to notify the COTP of oil transfer operations is moved from § 154.110(b) to proposed § 156.120(a) for the reasons stated in item 5. It is expanded to cover all transfers, instead of just mobile facility transfers, because the Coast Guard is unaware of numerous transfers that occur.

b. Proposed § 156.120(d) requires that hose should be supported to prevent kinking, as well as strain on the coupling.

c. New § 156.120(g) is added to require the use of the closure devices required by proposed §§ 154.520 and 155.805.

d. Proposed § 156.120(h) adds an exception for loading and unloading of deep tanks from the fixed connection requirement.

e. Proposed § 156.120(i) prevents simultaneous cargo transfer and ballasting or deballasting of cargo tanks, and still permits ballasting or deballasting of segregated ballast tanks while transferring cargo, because the piping and pumps are separate systems. The provisions requiring locking of valves is deleted because it is an unsafe practice and is prohibited under 46 CFR 35.35–10.

f. Proposed § 156.120(j) adds a definition of reinforcement.

g. New § 156.120(k) is added to replace the portion of § 155.800 regarding oil transfer hose use requirements.

h. New § 156.120(m) is added to ensure that monitoring devices required by proposed § 154.525 are being used.

1 Proposed § 156.120(n) requires that any liquid be drained from containment to prevent any reduction in the capacity of containment.

j. Proposed § 156.120(p) prohibits any leaking connections except components of the oil transfer system that are inherently leaky, such as the packing glands of a pump.

k. New §§ 156.120 (s) and (t) are added and § 156.120(o) is reworded and moved to proposed § 156.120(u) to describe the responsibilities of the person in charge and other personnel on duty during oil transfers.

1. Proposed § 156.120(z) applies only to transfers between tank barges, because lighting for any other vessel to vessel transfer, involving at least one self-propelled vessel, is required by proposed § 155.790.

58. New § 156.125 requires that, whenever an oil discharge occurs, the oil transfer operation must be stopped and clean up started before the oil transfer operation may be resumed.

59. Section 156.130 is reworded for clarity.

60. Proposed §§ 156.150 (a) and (b) require each person in charge to inspect his own area of responsibility and to fill out the declaration of inspection.

Sections 156.150 (e) and (f) are combined in proposed § 156.150(f). Proposed § 156.150(f) requires that the vessel operator retain the declaration of inspection for all transfers, not just vessel to vessel transfers.

New § 156.150(e) is added to require the persons in charge to have signed copies of the declaration of inspection available for inspection by the COPT during the oil transfer operation.

61. Section 156.160(a) is reworded for clarity.

62. Section 156.170(a) is reworded for clarity. Proposed § 156.170(b) deletes the requirement that hose be tested in a straight and horizontal position, which will allow the hose to be tested in place and connections to be tested with the hose. Proposed § 156.170(c) changes the pressure to which equipment must be tested to 1½ times the maximum allowable working pressure (MAWP). This corresponds to 33 CFR 126.15(o) and is safer because it would prevent the present situation that allows testing of a hose at a low relief valve setting and use at a higher relief valve setting. New § 156.170(e) is added to allow the use of any liquid in testing of equipment.

This proposal has been reviewed for economic and inflationary impact under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). The proposed regulation would affect approximately 6703 U.S. vessels and 3500–5500 foreign vessels. Cost for purchase and installation of the equipment would vary from $19,500 to $26,000 per vessel. Assuming that all U.S. vessel costs and one half foreign vessel costs would be passed to U.S. consumers dollar for dollar and the cost would be amortized over 10 years, the annual cost to the U.S. consumer would be $23.2 million. The increased cost for U.S. vessels would be divided among the different services as listed by the Merchant Vessel Documentation Division of the Coast Guard. The greatest cost, $65,364,000, would be to the towing service, over a two year period.

The proposed amendment would benefit the U.S. by reducing accidental discharges of oil or oily wastes during vessel operations and during the transfer of oil or oily wastes to or from vessels. Certain proposed changes would also facilitate enforcement of the regulations by the Coast Guard.

In consideration of the foregoing, the Coast Guard proposes to revise Parts 154, 155, and 156 of Title 33, Code of Federal Regulations to read as follows:

PART 154—OIL TRANSFER FACILITIES

Subpart A—General

Sec.

Subpart B—Operations Manual

Subpart C—Equipment Requirements

Subpart D—Facility Operations

AUTHORITY: The provisions of this Part 154 issued under section 311(j)(1)(C) of the Federal Water Pollution Control Act (86 Stat. 816, 868); 33 U.S.C. 1321(j)(1)(C); E.O. 11735, 3 CFR, 1966–1970 COMP., p. 949; 49 CFR 1.46(m).

Subpart A—General

§ 154.100 Applicability.

(a) Except as provided in paragraphs (b) and (c), this part applies to each facility that transfers oil in bulk to or from any vessel or public vessel with a capacity of 250 or more barrels of that oil.

(b) This part does not apply to a facility in a caretaker status (one that is not operational or not capable of conducting transfer operations).

(c) This part does not apply to a marina (a facility that servicse primarily pleasure craft) unless it is transferring oil in bulk to or from any vessel or public vessel with a capacity of 250 or more barrels of that oil.

§ 154.105 Definitions.

As used in this part:

"Barrel" means the unit of liquid measure equivalent to 42 U.S. gallons at 60° Fahrenheit.

"Captain of the Port" (COTP) means the U.S. Coast Guard officer commanding a Captain of the Port Area described in Part 3 of this chapter, or his authorized representative, or where there is no Captain of the Port Area, a District Commander of a Coast Guard District described in Part 3 of this Chapter, or his authorized representative.

"Commandant" means the Commandant of the Coast Guard or his authorized representative.

"Discharge" includes but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping.

"District Commander" means the officer of the Coast Guard designated by the Commandant to command a Coast Guard District, as described in Part 3 of this chapter or his authorized representative.

"Facility" means either an onshore facility or an offshore facility and includes, but is not limited to, structures, equipment, and appurtenances thereto, used or capable of being used to transfer oil to or from a vessel or a public vessel. A facility includes federal, state, municipal, and private facilities.

"Facility operator" means the person who owns, operates, or is responsible for the operation of the facility.

"Incompatible products" means products that, when mixed, create a hazard, such as spontaneous combustion or energy release or form a product that is hazardous to health.

"Mobile facility" means any facility that can readily change location, such as a tank truck or tank car, other than a vessel or public vessel.

"Monitoring device" means any sensing device used to monitor the waters for a discharge of oil, within or around a facility, and designed to notify operating personnel of a discharge of oil.

"Officer in Charge, Marine Inspection" (OCMI) means the U.S. Coast Guard officer commanding a Marine Inspection Zone described in Part 3 of this chapter, or his authorized representative.

"Offshore facility" means any facility of any kind located in, on, or under any of the navigable waters of the United States other than a vessel or a public vessel.

"Oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil. For the purposes of this part liquefied natural gas and liquefied petroleum gas (LNG and LPG) are excluded.

"Onshore facility" means any facility (including, but not limited to, mobile facilities) of any kind located in, on, or under any land within the United States, other than submerged land.

"Person" includes an individual, firm, corporation, association, and partnership.

"Person in charge" means an individual designated as a person in charge of oil transfer operations under § 154.710 or 155.700 of this chapter.

"Public vessel" means a vessel owned or bare-boat chartered and operated by the United States, or by a state or political subdivision thereof, or by a foreign nation, except when such a vessel is engaged in commerce.

"Tank vessel" means any vessel that carries or is capable of carrying liquid bulk cargo in tanks.

"Vessel" means every description of watercraft or other artificial contrivance, whether U.S. or foreign, used or capable of being used as a means of transportation on water, other than a public vessel.

§ 154.107 Alternatives.

(a) The COTP may consider and approve alternative procedures, methods, or equipment standards to be used by a facility operator in lieu of any requirements in this part if—

(1) The facility operator submits a written request for the alternative at least 30 days before operations under the alternative are proposed, unless the COTP authorizes a shorter time; and

(2) The alternative provides an equivalent level of protection from pollution by oil.

(b) The COTP approves or disapproves any alternative requested, either in writing, or orally followed up in writing.

§ 154.108 Exemptions.

(a) The Commandant may grant an exemption or partial exemption from compliance with any requirement in this part if—

(1) The facility operator submits an application for the exemption to the Commandant via the COTP at least 30 days before operations under the exemption are proposed, unless the COTP authorizes a shorter time; and

(2) The Commandant determines from the application that—

(i) Compliance with the requirement is economically or physically impractical;

(ii) No alternative procedures, methods, or equipment standards exist that would provide an equivalent level of protection from pollution by oil; and

(iii) The likelihood of oil being discharged as a result of the exemption is minimal.

(b) In making the determinations in paragraph (a), the Commandant may require—

(1) Any appropriate information, including an environmental and economic assessment of the effects of and reasons for the exemption; and

(2) Procedures, methods, or equipment standards, even though they may provide less than an equivalent level of protection from pollution by oil.

(c) The Commandant grants or denies an exemption in writing.

§ 154.110 Letter of intent.

(a) The facility operator of any facility to which this part applies must submit a letter of intent to operate a facility or to conduct mobile facility operations to the COTP not less than 60 days before the intended operations unless a shorter period is allowed by the COTP.

(b) The letter of intent required by paragraph (a) may be in any form but must contain—

(1) The name, address, and telephone number of the facility operator;

(2) The name, address, and telephone number of the facility or, in the case of a mobile facility, the dispatching office; and

(3) Except for a mobile facility, the geographical location of the facility in relation to the associated body of navigable waters.

(c) The facility operator of any facility for which a letter of intent has been submitted, shall immediately advise the COTP in writing of any changes of information that are different from the letter and shall cancel, in writing, the letter for any facility at which oil transfer operations are no longer conducted.

§ 154.120 Facility inspections.

(a) The facility operator shall allow the Commandant, at any time, to make any inspection and shall perform, upon request, any test to determine compliance with the Federal Water Pollution Control Act and this part. The facility operator shall conduct all required testing of facility equipment in a manner acceptable to the Commandant.

(b) The COTP provides the facility operator with a written report of the results of the inspection for the record required by §154.740(e) and lists the deficiencies in the report when the facility is not in compliance with the requirements in this part and Part 156 of this chapter.

Subpart B—Operations Manual

§ 154.300 Operations manual: general.

(a) The facility operator of each facility to which this part applies must submit, with his letter of intent, an operations manual that:

(1) Describes how the applicant meets the operating rules and equipment requirements prescribed by this part and Part 156 of this chapter;

(2) Describes the responsibilities of personnel under this part and Part 156 of this chapter in conducting oil transfer operations; and

(3) Includes translations into a language or languages understood by facility personnel on duty for transfer operations.

(b) The facility operator shall maintain the operations manual so that it is:

(1) Current; and

(2) Readily available for inspection by the COTP.

(c) The COTP reviews the operations manual when submitted and biennially thereafter.

(d) In determining whether the manual meets the requirements of this part and part 156 of this chapter the COTP considers the size, complexity, and capacity of the facility.

(e) If the manual meets the requirements of this part and part 156 of this chapter, the COTP issues a "letter of adequacy" as described in § 154.325.

(f) The facility operator shall ensure that a sufficient number of copies of the operations manual, including a sufficient number of the translations required by paragraph (a)(3), are available so that each person in charge has a copy when he is conducting an oil transfer operation.

NOTE.—The facility operator may request that the contents of the operations manual be considered commercial or financial information that is privileged or confidential. Under the Freedom of Information Act, the Coast Guard would withhold any part of the

contents of the operations manual from public disclosure upon determining that it is commercial or financial information that is privileged or confidential.

§ 154.310 Operations manual: contents.

(a) Each operations manual required by § 154.300 must contain, in the order listed:

(1) The geographic location of the facility;

(2) A physical description of the facility including a plan of the facility showing mooring areas, transfer locations, control stations, and locations of safety equipment;

(3) The hours of operation of the facility;

(4) The sizes, types, and number of vessels that the facility can transfer oil to or from simultaneously;

(5) The number and location of operations manuals for use by transfer personnel;

(6) For each product transferred at the facility:

(i) Grade and trade name; and

(ii) Cargo information as described in 46 CFR 151.45–2(e)(3);

(7) The grade and trade name of each product transferred at the facility that is incompatible with oil;

(8) The minimum number of persons on duty during transfer operations and their duties;

(9) The names and telephone numbers of facility, Coast Guard, and other personnel who may be called by the employees of the facility in an emergency;

(10) The duties of watchmen, required by § 155.810 of this chapter and 46 CFR 35.05–15, for unmanned vessels moored at the facility;

(11) A description of each communication system required by this part;

(12) The location and facilities of each personnel shelter, if any;

(13) A description and instructions for the use of drip and discharge collection and vessel slop reception facilities, if any;

(14) A description and the location of each emergency shutdown system;

(15) Quantity, types, locations, and instructions for use of monitoring devices required by § 154.525;

(16) Quantity, type, location, and instructions for use of the containment equipment required by § 154.545;

(17) Quantity, type, location, and instructions for use of fire extinguishing equipment required by § 126.15(j) of this chapter;

(18) The maximum relief valve setting (or maximum system pressure when relief valves are not provided) for each oil transfer system;

(19) Procedures for:

(i) Operating each loading arm including the limitations of each loading arm;

(ii) Transferring oil;

(iii) Completion of pumping; and

(iv) Emergencies;

(20) A contingency plan for reporting and containing oil discharges;

(21) A brief summary of applicable federal, state, and local oil pollution laws and regulations;

(22) The time limits for gaining access to containment material and equipment established by § 154.545; and

(23) Procedures for shielding portable lighting authorized by the COTP under § 154.570(c); and

(24) A description of the training and qualification program for persons in charge.

(b) The facility operator shall place the letter of adequacy when issued in the front of the operations manual and shall place exemptions or alternatives granted immediately after it.

(c) The facility operator shall incorporate each amendment to the operations manual under § 154.320 in the manual with the related existing requirement, or add the amendment at the end of the manual if not related to an existing requirement.

§ 154.320 Operations manual: amendment.

(a) The COTP requires the facility operator to amend the operations manual if the COTP finds that the operations manual does not meet the requirements in this part using the following procedures:

(1) The COTP notifies the facility operator in writing of the proposed amendment and a date not less than 14 days after the notification, on or before which the facility operator may submit written information, views, and arguments on the proposed amendment. After considering all relevent material presented, the COTP notifies the facility operator of any amendment required or of his decision to rescind the notice. The amendment becomes effective 30 days after the date of that notice unless the facility operator petitions the Commandant to reconsider the notice, in which case its effective date is stayed pending a decision by the Commandant. Petitions to the Commandant must be submitted in writing to the COTP.

(2) If the COTP finds that there is a condition requiring immediate action to prevent the discharge or risk of discharge of oil that makes the procedure in paragraph (a)(1) of this section impractical or contrary to the public interest, he may issue an amendment effective on the date the facility operator receives notice of it. In such a case, the COTP includes a brief statement of the reasons for his findings in the notice, and the owner or operator may petition the Commandant to reconsider the amendment. The petition does not stay the amendment.

(b) The facility operator may amend the operations manual by:

(1) Submitting proposed amendments and reasons for the amendments to the COTP not less than 30 days before the requested date of the proposed amendment; or

(2) If an immediate amendment is needed, requesting the COTP to approve the amendment immediately.

(c) The COTP responds to proposed amendments submitted under paragraph (b) of this section by:

(1) Approving or disapproving the proposed amendments;

(2) Advising the facility operator whether the request is approved in writing before the requested date of the amendments;

(3) Including any reasons in the written response if the request is disapproved; and

(4) If the request is made under paragraph (b)(2) of this section, immediately approving or rejecting the request.

§ 154.325 Operations manual: letter of adequacy.

(a) The letter of adequacy is a letter, from the COTP to the facility operator, certifying that the operations manual meets the requirements of this part.

(b) No person may use an operations manual for oil transfer operations, as required by § 156.120(t)(2), (t)(3), and (u)(2) of this chapter, unless the facility operator has a valid letter of adequacy for the operations manual.

(c) The requirement in paragraph (b) for a valid letter of adequacy is effective on (date two years after effective date of the final rule) or upon issuance to a facility operator of his first letter of adequacy, whichever is earlier.

(d) The letter of adequacy is invalid if the facility operator:

(1) Amends the operations manual without following the procedures in § 154.320; or

(2) Fails to amend the operations manual when required by the COTP.

Subpart C—Equipment Requirements

§ 154.500 Hose assemblies.

Each hose assembly used for transferring oil must meet the following requirements:

(a) The minimum bursting pressure for each hose assembly must be:

(1) 600 pounds or more per square inch; and

(2) At least four times the pressure of the relief valve setting (or four times the maximum pump pressure when no relief valve is installed) plus the static head pressure of the oil transfer system at the point where the hose is installed.

(b) The maximum allowable working pressure for each hose assembly must be:

(1) 150 pounds or more per square inch; and

(2) More than the pressure of the relief valve setting (or the maximum pump pressure when no valve is installed) plus the static head pressure of the oil transfer system at the point where the hose is installed.

(c) Each nonmetallic hose must be usable for oil service.

(d) Each hose assembly must have:

(1) Full threated connections;

(2) Flanges that meet standard B16.5, *Steel Pipe Flanges and Flange Fittings*, or standard B16.24, *Brass or Bronze Pipe Flanges*, of the American National Standards Institute (ANSI) [1], or

(3) Quick-connect couplings that are acceptable to the Commandant.

(e) Except as provided in paragraph (f) of this section, each hose must be marked with—

(1) Product and grade for which the hose may be used;

(2) Maximum allowable working pressure;
(3) Date of manufacture;
(4) Date of the latest test required by § 156.170 of this chapter; and
(5) The pressure used for that test.

(f) The information required by paragraphs (e)(3) through (e)(5) of this section need not be marked on the hose if it is recorded elsewhere at the facility and the hose is marked to idenify it with that information.

(g) The hose burst pressure may not be marked on the hose and must be recorded elsewhere at the facility as described in paragraph (f) of this section.

(h) Each hose used to transfer oil for fuel to a vessel that has a fill pipe for which containment can not practically be provided must be equipped with an automatic back pressure shutoff nozzle.

NOTE.—American National Standards Institute (ANSI) standards are published by and may be obtained from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017.

§ 154.510 Loading arms.

(a) Each mechanical loading arm used for transferring oil must meet the design, fabrication, material, inspection, and testing requirements in ANSI Standard B31.3, *Petroleum Refinery Piping* (see Note § 154.500).

(b) The manufacturer's certification that the standard in paragraph (a) of this section has been met must be permanently marked on the loading arm or recorded elsewhere at the facility with the loading arm marked to identify it with that information

(c) Each mechanical loading arm used for transferring oil must have a means of being drained or closed before disconnecting after transfer of oil.

§ 154.520 Closure devices.

The facility must have enough butterfly valves, wafer-type resilient seated valves, blank flanges, or other means acceptable to the COTP to blank off each end of each hose or loading arm that is not connected for the transfer of oil.

§ 154.525 Monitoring devices.

The COTP may require the facility to install monitoring devices if—

(a) The environmental sensitivity of the area requires added protection;

(b) The products transferred at the facility pose a significant threat to the environment;

(c) The size or complexity of the transfer operation poses a significant potential for a discharge of oil; or

(d) The installation of monitoring devices at the facility would significantly decrease the likelihood or the size of a discharge of oil.

§ 154.530 Small discharge containment.

(a) Except as provided in paragraphs (c) and (d) of this section, the facility must have fixed catchments, curbing, or other fixed means to contain oil discharged in at least—

(1) Each hose handling and loading arm area, (that area on the facility that is within the area traversed by the free end of the hose or loading arm when moved from its normal stowed or idle position into a position for connection); and

(2) Each hose connection manifold area.

(b) The discharge containment means required by paragraph (a) of this section must hold at least—

(1) Two barrels if it serves one or more hoses of 6-inch inside diameter or smaller, or loading arms of 6-inch nominal pipe size diameter or smaller;

(2) Three barrels if it serves one or more hoses larger than 6-inch inside diameter, or loading arms larger than 6-inch nominal pipe size diameter, but less than 12-inch diameter; or

(3) Four barrels if it serves one or more hoses of 12-inch inside diameter or larger, or loading arms of 12-inch nominal pipe size diameter or larger.

(c) The facility may use portable means of not less than ½ barrel capacity each to meet the requirements of paragraph (a) of this section for part or all of the facility if the COTP finds that fixed means to contain oil discharges are not feasible.

(d) A mobile facility may have portable means of not less than five gallons capacity to meet the requirements of paragraph (a) of this section.

§ 154.540 Discharge removal.

The facility must have a means to safely and quickly remove discharged oil from the containment means required by § 154.530 without mixing incompatible products or discharging the oil into the water.

§ 154.545 Discharge containment equipment.

(a) Each facility must have ready access to enough oil containment material and equipment to contain any oil discharged on the water.

(b) For the purpose of this section, "access" may be by direct ownership, joint ownership, cooperative venture, or contractual agreement.

(c) Each facility must establish time limits, subject to approval by the COTP, for deployment of the containment material and equipment required by paragraph (a) of this section considering—

(1) Oil handling rates;

(2) Oil capacity susceptible to being spilled;

(3) Frequency of facility operations;

(4) Tidal and current conditions;

(5) Facility age, and configuration; and

(6) Past record of discharges.

(d) The COTP may require the facility to surround each vessel conducting an oil transfer operation with oil containment material before commencing the oil transfer operation if—

(1) The environmental sensitivity of the area requires the added protection;

(2) The products transferred at the facility pose a significant threat to the environment;

(3) The past record of discharges at the facility is poor;

(4) The size or complexity of the transfer operation poses a significant potential for a discharge of oil; or

(5) The current in the area is such that this action would provide the only chance of containing any oil discharged.

§ 154.550 Emergency shutdown.

(a) The facility must have an emergency means to enable the person-in-charge of the transfer of oil on board the vessel, at his usual operating station, to stop the flow of oil from the facility to the vessel. This means must be—

(1) An electrical, pneumatic, or mechanical linkage to the facility; or

(2) An electronic voice commuications system continuously manned by a person on the facility who can remotely stop the flow of oil immediately.

(b) The point in the oil transfer system at which the emergency means stops the flow of oil on the facility must be located near the dock manifold connection to minimize the loss of oil in the event of the rupture or failure of the—

(1) Hose;

(2) Loading arm; or

(3) Manifold valve.

(c) The means required by paragraph (a) of this section must be able to stop the flow of oil in—

(1) 60 seconds on a facility constructed before (date one day after effective date of the final rule); and

(2) 30 seconds on a facility constructed after (effective date of the final rule).

§ 154.560 Communications.

(a) Each facility must have a means that enables continuous two-way voice communication between the person in charge of the vessel transfer operation and the person in charge of the facility transfer operation.

(b) Each facility must have a means, which may be the communications system itself, that enables a person on board a vessel or on the facility to effectively indicate his desire to use the means of communication required by paragraph (a) of this section.

(c) The means required by paragraph (a) of this section must be usable and effective in all phases of the transfer operation and all conditions of weather at the facility.

(d) The facility may use the system in § 154.550(a)(2) to meet the requirement of paragraph (a) of this section.

(e) Portable radio devices used to comply with paragraph (a) of this section must meet U.L. Class I, Group D requirements or their equivalent (intrinsically safe, as defined in 46 CFR 111.80) during transfers of flammable liquids, as defined in 46 CFR 30.10.

§ 154.570 Lighting.

(a) Except as provided in paragraph (c) of this section, for operations between sunset and sunrise, the facility

must have fixed lighting that adequately illuminates—

(1) Each transfer connection point on the facility;

(2) Each transfer connection point in use on any barge moored at the facility to or from which oil is being transferred;

(3) Each oil transfer operations work area on the facility; and

(4) Each oil transfer operations work area on any barge moored at the facility to or from which oil is being transferred.

(b) Where the illumination is apparently inadequate, the COTP may require verification by instrument of the levels of illumination. On a horizontal plane 3 feet above the barge deck or walking surface, illumination must measure at least—

(1) 2.5 foot candles at transfer connection points; and

(2) 0.5 foot candles in oil transfer operations work areas.

(c) For small or remote facilities, the COTP may authorize operations with an adequate level of illumination provided by the vessel or by portable means.

(d) Lighting must be located or shielded so as not to interfere with navigation on the adjacent waterways.

Subpart D—Facility Operations

§ 154.700 General.

No person may operate a facility unless the equipment, personnel, and operating procedures of that facility meet the requirements of this part.

§ 154.710 Persons in charge: designation and qualification.

No person may serve, and no facility operator may use the services of a person, as person in charge of any facility oil transfer operation unless—

(a) The facility operator has designated that person as a person in charge and has advised the COTP in writing of his designation;

(b) The person has had at least 48 hours of experience at a facility in oil transfer operations to which this part applies;

(c) The person has enough experience at the facility for which qualification is desired to enable the facility operator to determine that this experience is adequate and that he can operate the oil transfer equipment of the facility, except that, for new facilities, the COTP may authorize alternative experience requirements; and

(d) The facility operator has determined that the person knows—

(1) The hazards of each product transferred;

(2) The rules in this part and in Part 156 of this chapter;

(3) The facility operating procedures as described in the operations manual;

(4) Vessel oil transfer systems; in general;

(5) Vessel oil transfer control systems, in general;

(6) Each facility oil transfer control system used;

(7) Local discharge reporting procedures; and

(8) The facility's contingency plan for discharge reporting and containment.

§ 154.730 Person in charge: evidence of designation.

Each person in charge must carry evidence of his designation as a person in charge when he is engaged in transfer operations unless such evidence is immediately available at the facility.

§ 154.740 Records.

Each facility operator must keep at the facility and make available for inspection by the COTP—

(a) A copy of the letter of intent for the facility;

(b) The name of each person currently designated as a person in charge of oil transfer operations at the facility;

(c) The date and result of the most recent test or inspection of each item tested or inspected under § 156.170 of this chapter;

(d) The hose information required by § 154.500 (e) and (g) except that marked on the hose;

(e) The record of each inspection of the facility by the COTP; and

(f) The Declaration of Inspection required by § 156.150(f) of this chapter.

§ 154.750 Compliance with operations manual.

The facility operator must use and require facility personnel to use the procedures in the operations manual prescribed by § 154.300 for operations under this part.

PART 155—VESSEL DESIGN AND OPERATIONS

AUTHORITY: The provisions of this Part 155 issued under section 311(j)(1) (C) and (D) of the Federal Water Pollution Control Act (86 Stat. 816,868); 33 U.S.C. 1321(j)(1) (C) and (D); E.O. 11735, 3 CFR, 1966–1970 COMP., p. 949; 49 CFR 1.46(m).

Subpart A—General

§ 155.100 Applicability.

This part prescribes rules that apply to the operation of vessels on the navigable waters and contiguous zone of the United States for the purpose of preventing the discharge of oil into or upon the navigable waters or contiguous zone of the United States. U.S. vessels must meet the vessel design and equipment requirements in this part to be eligible for the issuance of a Certificate of Inspection under 46 CFR Ch. I.

§ 155.105 Definitions.

As used in this part:

"Barrel" means the unit of liquid measure equivalent to 42 U.S. gallons at 60° Fahrenheit.

"Captain of the Port" (COTP) means the U.S. Coast Guard officer commanding a Captain of the Port area described in Part 3 of this chapter, or his authorized representative or, where there is no Captain of the Port area, a District Commander of a Coast Guard District described in Part 3 of this chapter, or his authorized representative.

"Commandant" means the Commandant of the U.S. Coast Guard or his authorized representative.

"Contiguous zone" means the entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone, but not extending beyond 12 miles from the baseline from which the breadth of the territorial sea is measured.

"Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping.

"District Commander" means the officer of the Coast Guard designated by the Commandant to command a Coast Guard District as described in Part 3, of this chapter or his authorized representative.

"Facility" means either an onshore facility or an offshore facility and includes, but is not limited to, structures, equipment and appurtenances thereto, used or capable of being used to transfer oil to or from a vessel or a public vessel. A facility includes federal, state, municipal, and private facilities.

"Incompatible products" means products that, when mixed, create a hazard such as spontaneous combustion or energy release or form a product that is hazardous to health.

"Mobile facility" means any facility that can readily change location, such as a tank car or tank truck, other than a vessel or public vessel.

"Officer in Charge, Marine Inspection" (OCMI) means the U.S. Coast Guard officer commanding a Marine Inspection Zone described in Part 3 of this chapter, or his authorized representative.

"Offshore facility" means any facility of ayn kind located in, on, or under any of the navigable waters of the United States other than a vessel or a public vessel.

"Oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil. For the purpose of this part liquefied natural gas and liquefied petroleum gas (LNG and LPG) are excluded.

"Onshore facility" means any facility (including but not limited to, a mobile facility) of any kind located in, on, or under any land within the United States other than submerged land.

"Person" includes an individual, firm, corporation, association, and partnership.

"Person in Charge" means an individual designated as a person in charge of oil transfer operation under §§ 154.710 or 155.700 of this chapter.

"Public vessel" means a vessel owned or bare-boat chartered and operated by the United States, or by a State or political subdivision thereof, or by a foreign nation, except when such a vessel is engaged in commerce.

"Tank vessel" means any vessel that carries or is capable of carrying liquid bulk cargo in tanks.

"Tank barge" means any tank vessel not equipped with a means of self-propulsion.

"U.S. vessel" means a vessel that is owned, documented, or registered in the United States and that is not a public vessel.

"Vessel" means every description of watercraft or other artificial contrivance, whether U.S. or foreign, used or capable of being used as a means of transportation on water, other than a public vessel.

"Vessel operator" means a person who owns, operates, or is responsible for the operation of a vessel.

§ 155.107 Alternatives.

(a) The COTP or OCMI may consider and approve alternative procedures, methods, or equipment standards to be used by a vessel operator in lieu of any requirements in this part if—

(1) The vessel operator submits a written request for the alternative to be considered at least 30 days before operations under the alternative are proposed, unless the COTP authorizes a shorter time; and

(2) The alternative provides an equivalent level of protection from pollution by oil.

(b) The COTP or OCMI approves or disapproves any alternative requested, either in writing, or orally followed up in writing.

§ 155.110 Exemptions.

(a) The Commandant may grant an exemption or partial exemption from compliance with any requirement in this part if—

(1) The vessel operator submits an application for exemption to the Commandant via the COTP or OCMI 30 days before operations under the exemption are proposed unless the COTP or OCMI authorizes a shorter time; and

(2) The Commandant determines from the application that—

(i) Compliance with a specific requirement is economically or physically impractical;

(ii) No alternative procedures, methods, or equipment standards exist that would provide an equivalent level of protection from pollution by oil; and

(iii) The likelihood of oil being discharged as a result of the exemption is minimal.

(b) In making the determinations in paragraph (a) of this section, the Commandant may require—

(1) Any appropriate information, including an environmental and economic assessment of the effects of and reasons for the exemption; and

(2) Procedures, methods, or equipment standards, even though they may provide less than an equivalent level of protection from pollution by oil.

(c) The Commandant grants or denies an exemption in writing.

Subpart B—Vessel Design and Equipment

§ 155.310 *Cargo oil discharge containment.*

(a) No person may operate a tank vessel with a capacity of 250 or more barrels of oil as cargo that is carrying oil unless the vessel has—

(1) Under or around each oil loading manifold and each oil transfer connection point, a fixed container or enclosed deck area that holds, in all conditions of vessel list or trim encountered during the loading operation, at least—

(i) One half barrel if it serves one or more hoses of 2-inch inside diameter or smaller, or loading arms of 2-inch nominal pipe size diameter or smaller;

(ii) One barrel if it serves one or more hoses larger than 2-inch inside diameter, or loading arms larger than 2-inch nominal pipe size diameter, but less than 4-inch diameter;

(iii) Two barrels if it serves one or more hoses of 4-inch inside diameter or larger, or loading arms of 4-inch nominal pipe size diameter or larger, but less than 6-inch diameter;

(iv) Three barrels if it serves one or mores hoses of 6-inch inside diameter or larger, or loading arms of 6-inch nominal pipe size diameter or larger, but less than 12-inch diameter; or

(v) Four barrels if it serves one or more hoses of 12-inch inside diameter or larger or loading arms of 12-inch nominal pipe size diameter or larger.

(2) A means of draining or removing discharged oil from each container or enclosed deck area without mixing incompatible products or discharging the oil into the water; and

(3) A mechanical means of closing each drain and scupper in the container or enclosed deck area required by this section.

(b) No person may operate a tank barge with a capacity of 250 or more barrels of oil as cargo that is carrying oil unless the vessel meets paragraph (a) of this section or is equipped with—

(1) A coaming, at least 4 inches high but not more than 8 inches high, enclosing the immediate area of the cargo hatches, oil loading manifolds, and transfer connections, that holds at least one-half barrel per hatch, manifold, and connection within the enclosed area; and

(2) A container, under each oil loading manifold and each oil transfer connection within the coaming, that holds at least one-half barrel.

§ 155.320 Fuel oil discharge containment.

No person on a vessel of 100 or more gross tons may transfer oil for fuel to that vessel unless—

(a) For a vessel of 300 gross tons or more constructed after June 30, 1974, the vessel has a fixed container or enclosed deck area under or around each fuel tank vent, overflow, and fill pipe, that holds at *least*—

(1) One-half barrel for a vessel of 300 gross tons but less than 1600 gross tons; or

(2) One barrel for a vessel of 1600 gross tons or more.

(b) For a vessel of 100 gross tons but less than 300 gross tons constructed after June 30, 1974, and for any vessel of 100 or more gross tons constructed before July 1, 1974—

(1) The vessel meets paragraph (a) (1) of this section;

(2) Each fuel tank vent, overflow, and fill pipe is equipped with a container that has at least a 5 U.S. gallon capacity; or

(3) If the vessel has a fill fitting for which containment can not practically be provided, an automatic back pressure shut-off nozzle is used.

§ 155.330 Bilge and fuel ballast pumping, piping, separation and discharge arrangements: Vessels of 100 or more gross tons.

(a) No person may operate a vessel of 100 or more gross tons that has main or auxiliary machinery spaces or that ballasts fuel oil tanks unless the vessel has a fixed piping system.

(b) The fixed piping system must have the following:

(1) Piping through which oily residues, from the separation of oily mixtures from machinery space bilges and fuel and lubricating oil tanks, can be

transferred to the oil residue tank required by § 155.340.

(2) Discharge points through which oily residues can be discharged to a facility. These discharge points must—

(i) Be on each side of the weather deck;

(ii) Each have a shore connection or portable adapter meeting the specifications in appendix A to this part;

(iii) Each have a stop valve; and

(iv) Each have a means on the weather deck adjacent to them to stop the pump required by paragraph (b)(3) of this section.

(3) An installed pump and piping that can transfer oily residues from the oil residue tank required by § 155.340 to the discharge points required by paragraph (b)(2) of this section.

(4) For each bilge pump, the means to discharge to the oil residue tank required by § 155.340.

(5) For each discharge point through which oily mixtures are discharged overboard—

(i) A sample point as described in 46 CFR 162.050–17(e) that is located in a vertical section of piping inboard of the discharge point; and

(ii) A stop valve.

(6) An installed 15 parts per million (p.p.m.) oil-water separator, approved under paragraph (d) of this section, that has its separated oil outlet connected to the oil residue tank required by § 155.340, except as otherwise provided by paragraph (c) of this section.

(7) An installed bilge alarm or bilge monitor, approved under paragraph (d) of this section, that can actuate the stop valve required by paragraph (b)(5)(ii) of this section, to prevent an oily mixture from the oil-water separator exceeding 15 p.p.m. from being discharged overboard.

(8) For each pump that supplies influent to an oil-water separator in the piping system, a maximum delivery capacity equal to or less than the maximum design throughput of the separator, except that the maximum delivery capacity may be one-and-one-half times the maximum design throughput of the separator if the pump has an orifice plate that permanently restricts its flow rate to the maximum design throughput of the separator.

(c) A person may operate a vessel of 100 or more gross tons equipped with an installed oily mixture settling system instead of the 15 p.p.m. oil-water separator required by paragraph (b)(6) of this section if—

(1) The vessel has a tank that can receive all oily mixtures from machinery space bilges and fuel and lubricating oil tanks;

(2) The tank is equipped with an oil-water interface detector; and

(3) The system is acceptable to the Commandant (procedures to be proposed).

(d) Each separator, bilge alarm and bilge monitor installed on a vessel after April 1, 1980, must be approved by the Coast Guard under 46 CFR 162.050.

(e) Paragraphs (b)(1) and (b)(4) through (b)(8) of this section are effective on (date 2 years after effective date of the final rule), or at the vessel's first shipyard maintenance and repair availability after (date 6 months after effective date of the final rule), whichever is earlier.

§ 155.340 Oil residue tank: vessels of 100 or more gross tons.

No person may operate a vessel of 100 or more gross tons that has main or auxiliary machinery spaces or that ballasts fuel oil tanks unless the vessel has a tank that can receive and hold all oily residues resulting from separation of oily mixtures from machinery space bilges and fuel and lubricating oil tanks.

§ 155.350 Bilge and ballast pumping arrangements: vessels of less than 100 gross tons.

(a) No person may operate a vessel of less than 100 gross tons that has main or auxiliary machinery spaces or that ballasts fuel oil tanks unless it can transfer oily bilge slops and oily ballast to a reception facility.

(b) Paragraph (a) of this section does not prohibit the discharge of an oily mixture in accordance with § 155.410.

§ 155.360 Exception for vessels of less than 1600 gross tons.

Paragraph 155.330(b)(2)(i) does not apply to a vessel of less than 1600 gross tons that has at least one discharge point accessible from the weather deck.

§ 155.370 Exception for uninspected U.S. vessels and all other vessels not in ocean or coastwise service.

Paragraph 155.330(b)(2)(ii) does not apply to a vessel that has shore connections or portable adapters that fit the connections at any facility to which the vessel transfers oily residues if the vessel is—

(a) An uninspected U.S. vessel; or

(b) A vessel not in ocean or coastwise service.

§ 155.380 Exception for vessels that have a means onboard to consume all oily residues.

Paragraphs 155.330 (b)(2) and (b)(3) do not apply to a vessel that has an installed means to consume all oily residues and that can transfer oily residues to a facility by any means.

§ 155.390 Exception for tank vessels: oily waste transfer equipment.

Section 155.330 does not apply to tank vessels that combine all other oily mixtures with oily cargo residues for transfer and discharge in accordance with the requirements of Part 157 of this chapter.

§ 155.400 Fixed piping system information.

(a) No person may operate a vessel unless the instruction manual for the automatic and manual operation of the fixed piping system required by § 155.330 and the instruction manual for each oil-water separator, oily mixture settling system, bilge alarm and bilge monitor are on board the vessel.

(b) Each oil-water separator, oily mixture settling system, bilge monitor, and bilge alarm on board a vessel must be maintained and operated in accordance with its instruction manual.

§ 155.410 Discharge of oily mixtures.

(a) No vessel operator may discharge an oily mixture, from a machinery space bilge or a fuel oil tank that carries ballast, into the water unless—

(1) The discharge is through a properly operating—

(i) 15 p.p.m. oil-water separator and bilge alarm;

(ii) 15 p.p.m. oil-water separator and bilge monitor; or

(iii) Oily mixture settling system acceptable to the Commandant under § 155.330(c) with bilge alarm or bilge monitor; and

(2) The discharge meets the requirements of 40 CFR 110.3 and 110.4.

(b) No vessel operator of a U.S. vessel may discharge an oily mixture, from a machinery space bilge or a fuel oil tank that carries ballast, into any waters more than 12 miles from the nearest land unless—

(1) The discharge is through a properly operating—

(i) 100 p.p.m. oil-water separator and bilge monitor;

(ii) 15 p.p.m. oil-water separator and bilge alarm;

(iii) 15 p.p.m. oil-water separator and bilge monitor; or

(iv) Oily mixture settling system acceptable to the Commandant under § 155.330(c) with bilge alarm or bilge monitor;

(2) The vessel is proceeding en route; and

(3) The discharge has an oil content of 100 p.p.m. or less.

(c) No vessel operator may discharge an oily mixture, from a cargo pump room bilge or a cargo tank, into the water except as permitted under Part 157 of this chapter.

(d) Paragraphs (a) and (b) of this section become effective on (date two years after effective date of the final rule), or upon compliance with § 155.330 (b)(1) and (b)(4) through (b)(8), whichever is earlier.

§ 155.440 Placard.

(a) No person may operate a vessel, except a vessel less than 26 feet in length, unless it has a placard at least 5 by 8 inches, made of durable material, fixed in a conspicuous place in each machinery space, or at the bilge and ballast pump control station, stating the following:

DISCHARGE OF OIL PROHIBITED

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States or the waters of the contiguous zone if such discharge causes a film or sheen upon or discoloration of the surface of the water or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of $5,000.

(b) The placard required by paragraph (a) of this section must be printed in a language or languages understood by the crew.

§ 155.470 Prohibited oil spaces.

(a) Except as provided in paragraphs (b) and (c) of this section, no person may operate a self-propelled vessel of 300 or more gross tons carrying bulk oil or oily waste in any space forward of a collision bulkhead.

(b) Fuel for use on a vessel constructed after June 30, 1974, may be carried in tanks forward of a collision bulkhead if such tanks are at least 24 inches inboard of the hull structure.

(c) Fuel for use on a vessel constructed before July 1, 1974, may be carried in tanks forward of a collision bulkhead if those tanks were designated, installed, or constructed for fuel oil carriage before July 1, 1974.

Subpart C—Oil Transfer Personnel Procedures, Equipment, and Records

§ 155.700 Designation of person in charge.

The vessel operator, or his agent, of each vessel that has a capacity for 250 or more barrels of oil shall designate the person or persons in charge of each transfer of oil to or from the vessel, and of each tank cleaning operation.

§ 155.710 Qualifications of person in charge.

(a) The person in charge of oil transfer operations on a tank ship, as defined in 46 CFR 30.10–67, must—

(1) Be designated as person in charge by the master;

(2) Hold a license authorizing service as a deck officer aboard the tankship;

(3) Hold the appropriate endorsement under 46 CFR 10.11 for the grade of product being transferred; and

(4) Have served during the preceding 12 months aboard the tankship or another tankship built to the same basic plans and having the same cargo containment, control, and monitoring systems.

(b) The service required in paragraph (a)(4) includes—

(1) Assisting the person in charge of the cargo transfer operation during at least two transfers of cargo; or

(2) Equivalent experience acceptable to the Officer in Charge, Marine Inspection.

(c) The person in charge of tank cleaning operations conducted at a tank cleaning facility must be a tankerman certificated for the grade of cargo last carried.

(d) The person in charge of oil transfer operations on a tank barge must be—

(1) A properly certified tankerman for the cargo being transferred; or

(2) A licensed officer with a tankerman endorsement for the cargo being transferred.

(e) The person in charge of oil transfer operations on a cargo and miscellaneous or passenger vessel must—

(1) Be designated as person in charge by the master;

(2) Hold a license authorizing service as an officer aboard the vessel; and

(3) Hold any tankerman endorsement including the "tankerman—flam. (restricted)" endorsement.

(f) The person in charge of bunker fuel oil transfer operations on cargo and miscellaneous, tank, and passenger vessels must have a valid license authorizing service as master, mate, or engineer on the vessel.

(g) The operator of an uninspected vessel of 100 gross tons or more shall instruct the person in charge of oil transfer operations in—

(1) The duties of the person in charge; and

(2) The federal water pollution laws and regulations that apply to the vessel.

(h) The person in charge of oil transfer operations on a foreign flag tankship, tank barge, cargo and miscellaneous vessel, or passenger vessel must have a license or certificate authorizing service as a master, mate, pilot, engineer, or operator on the vessel.

§ 155.720 Oil transfer procedures.

No person may operate a vessel that has a capacity for 250 or more barrels of oil unless the vessel has oil transfer procedures that meet the requirements of this part and Part 156 for—

(a) Transfers of oil to or from the vessel; and

(b) Transfers of oil from tank to tank within the vessel.

§ 155.730 Compliance with oil transfer procedures.

The vessel operator of each vessel required by § 155.720 to have oil transfer procedures shall maintain them current and shall use and require vessel personnel to use the oil transfer procedures for each oil transfer operation.

§ 155.740 Availability of oil transfer procedures.

The oil transfer procedures required by § 155.720 must be—

(a) Legibly printed in a language or languages understood by the crew;

(b) Permanently posted or available at a place where the procedures can be easily seen and used by members of the crew when engaged in oil transfer operations; and

(c) Available for inspection by the COTP or OCMI.

§ 155.750 Contents of oil transfer procedures.

(a) The oil transfer procedures required by § 155.720 must contain, in the order listed—

(1) A list of any incompatible products carried;

(2) A list of the products carried to which the oil transfer procedures apply, unless the procedures apply to all the products;

(3) A description of each oil transfer system on the vessel including—

(i) A line diagram of the vessel's oil transfer piping, including the location of each valve, pump, control device, vent, and overflow; and

(ii) The location of the shutoff valve or other isolation device that separates any bilge or ballast system from the oil transfer system;

(4) The number of persons required to be on duty during oil transfer operations;

(5) The duties by title of each officer, person in charge, tankerman, deckhand, and any other person required for each oil transfer operation;

(6) Procedures and duty assignments for tending the vessel's moorings during the transfer of oil;

(7) Procedures for operating the emergency shutdown and communications means required by §§ 155.780 and 155.785, respectively;

(8) Procedures for topping off tanks;

(9) Procedures for ensuring that all valves used during the oil transfer operations are closed upon completion of transfer;

(10) A description of the discharge containment system required by §§ 155.310 and 155.320;

(11) Procedures for emptying the discharge containment system required by §§ 155.310 and 155.320;

(12) Procedures for reporting oil discharges into the water;

(13) Procedures for shielding of portable lighting permitted by § 154.570(c) of this chapter;

(14) Procedures for securing the vessel openings required to be secured by § 155.815; and

(15) For each product transferred to or from the vessel:

(i) Grade and trade name; and

(ii) Cargo information as described in 46 CFR 151.45–2(e)(3).

(b) The vessel operator shall place exemptions or alternatives granted in the front of the oil transfer procedures.

(c) The vessel operator shall incorporate each amendment to the oil transfer procedures under § 155.760 in the procedures with the related existing requirement, or at the end of the procedures if not related to an existing requirement.

§ 155.760 Amendment of oil transfer procedures.

(a) The COTP or OCMI requires the vessel operator of any vessel that is required to have oil transfer procedures under § 155.720 to amend those procedures if the COTP or OCMI finds that the oil transfer procedures do not meet the requirements of this part.

(b) To require an amendment of an oil transfer procedure, the COTP or OCMI notifies the vessel operator in writing, of the proposed amendment and of a date not less than 14 days after the notification on or before which the vessel operator may submit written information, views, and arguments on the proposed amendment. After considering all relevant material presented, the COTP or OCMI notifies the operator of any amendment required or of his decision to rescind the notice. The amendment becomes effective 30 days after the date of that notice unless the operator petitions the Commandant to reconsider the notice, in which case its effective date is stayed pending a decision by the Commandant. Petitions to the Commandant must be submitted in writing to the COTP or OCMI.

(c) If the COTP or OCMI finds that there is a condition requiring immediate action to prevent the discharge or risk

of discharge of oil that makes the procedure in paragraph (b) of this section impractical or contrary to the public interest, he may issue an amendment effective on the date the vessel operator receives notice of it. In such a case, the COTP or OCMI includes a brief statement of the reasons for his finding in the notice, and the vessel operator may petition the Commandant, in any manner, to reconsider the amendment. The petition does not stay the amendment.

§ 155.770 Draining of oil.

No person may drain oil or oily waste from any source into the bilge of any vessel.

§ 155.780 Emergency shutdown.

(a) No person may operate a tank vessel with a capacity of 250 or more barrels of cargo oil that is carrying oil unless it has on board an emergency means to enable a person in charge of an oil transfer operation to stop the flow of oil to a facility, other vessel, or within the vessel.

(b) The means required in paragraph (a) of this section must be a pump control or a quick-acting, power actuated valve. If an emergency pump control is used, it must stop the flow of oil if oil could siphon through the stopped pump.

(c) The means required in paragraph (a) must be operable from the cargo deck, cargo control room, or the usual operating station of the person in charge of the oil transfer operation.

§ 155.785 Communications.

(a) During vessel to vessel oil transfers, each tank vessel with a capacity of 250 or more barrels of cargo oil that is carrying oil must have a means that enables continuous two-way voice communication between the persons in charge of the transfer operations on both vessels.

(b) Each vessel must have a means, which may be the communication system itself, that enables a person on board each vessel to effectively indicate his desire to use the means of communication required by paragraph (a) of this section.

(c) The means required by paragraph (a) of this section must be usable and effective in all phases of the transfer operation and all conditions of weather.

(d) Portable radio devices used to comply with paragraph (a) of this section must meet U.L. Class I, Group D requirements or their equivalent (intrinsically safe, as defined in 46 CFR 111.80) during transfers of flammable liquids, as defined in 46 CFR 30.10.

§ 155.790 Deck lighting.

(a) No person may operate a self-propelled vessel with a capacity of 250 or more barrels of oil that is transferring oil between sunset and sunrise unless the self-propelled vessel has installed deck lighting that adequately illuminates—

(1) Each transfer connection point on the vessel;

(2) Each transfer connection point in use on any barge moored to the vessel to or from which oil is being transferred;

(3) Each oil transfer operations work area on the vessel; and

(4) Each oil transfer operations work area on any barge moored to the vessel to or from which oil is being transferred.

(b) Where the illumination is apparently inadequate the OCMI or COTP may require verification by instrument of the levels of illumination. On a horizontal plane 3 feet above the deck the illumination must measure at least—

(1) 2.5 foot candles at transfer connection points; and

(2) 0.5 foot candle in oil transfer operations work areas.

(c) Lighting must be located or shielded so as not to interfere with navigation on the adjacent waterways.

§ 155.800 Oil transfer hoses.

No person may operate a U.S. vessel that carries hose used to transfer oil unless the hose meets the requirements of § 154.500 of this chapter.

§ 155.805 Closure devices.

Each vessel must have enough butterfly valves, wafer-type resilient seated valves, blank flanges, or other means acceptable to the COTP or the OCMI to blank off each end of each oil transfer hose that is not connected for the transfer of oil.

§ 155.810 Tank vessel security.

The vessel operator of each tank vessel that contains more oil than the normal clingage and unpumpable bilge or sump residues in any cargo tank shall maintain surveillance of that vessel by using a person who is responsible for the security of the vessel and for keeping unauthorized persons off the vessel.

§ 155.815 Vessel integrity.

No person may operate a vessel underway unless all closure mechanisms on the following openings are properly secured:

(a) Cargo hatches.

(b) Ullage openings.

(c) Sounding ports.

(d) Tank cleaning openings.

(e) Any other vessel openings that should be closed to maintain a seaworthy condition and to prevent the inadvertent release of oil in the event of a vessel accident.

§ 155.820 Records.

The vessel operator shall keep a written record available for inspection by the COTP or OCMI of—

(a) The name of each person currently designated as a person in charge of oil transfer operations as required by § 155.700;

(b) The date and result of the most recent test and inspection of each item tested or inspected as required by § 156.170 of this chapter;

(c) The hose information required by § 154.500 (e) and (g) of this chapter unless that information is marked on the hose; and

(d) The Declaration of Inspection as required by § 156.150(f) of this chapter.

APPENDIX A

SPECIFICATIONS FOR SHORE CONNECTION

[See § 155.330]

Item, Description, and Dimension

1—Outside diameter: 215 mm. (8½ in.).
2—Inside diameter: According to pipe outside diameter.
3—Bolt circle diameter: 183 mm. (7⅛ in.).
4—Slots in flange: 6 holes 22 mm. (⅞ in.) in diameter shall be equidistantly placed on a bolt circle of the above diameter, slotted to the flange periphery. The slot width is to be 22 mm. (⅞ in.).
5—Flange thickness: 20 mm. (¾ in.).
6—Bolts and nuts: 6, each of 20 mm. (¾ in.) in diameter and of suitable length.

The flange must be of steel having a flat face, with a gasket of oilproof material, and must be suitable for a service pressure of 6 kg./cm.2 (85 p.s.i.).

The steel materials used must meet the material specifications of standard B16.5, Steel Pipe Flanges and Flanged Fittings of the American National Standards Institute. (see NOTE § 154.500 of this chapter).

PART 156—OIL TRANSFER OPERATIONS

SEC.

AUTHORITY: The provisions of this Part 156 issued under section 311(j)(1)(C) and (D) of the Federal Water Pollution Control Act (86 Stat. 816, 868); 33 U.S.C. 1321(j)(1)(C) and (D); E.O. 11735, 3 CFR 1966–1970 COMP., p. 949; 49 CFR 1.46(m).

§ 156.170 Applicability.

This part applies to the transfer of oil on the navigable waters or contiguous zone of the U.S. to or from any vessel or public vessel with a capacity of 250 or more barrels of that oil except that this part does not apply to the transfer operation on a public vessel.

§ 156.105 Definitions.

As used in this part:

"Barrel" means the unit of fluid measure equivalent to 42 U.S. gallons at 60° F.

"Captain of the Port" (COTP) means the U.S. Coast Guard Officer commanding a Captain of the Port area described in Part 3 of this chapter or his authorized representative or, where there is no Captain of the Port area, a District Commander of a Coast Guard district described in Part 3 of this chapter or his authorized representative.

"Commandant" means the Commandant of the Coast Guard or his authorized representative.

"District Commander" means the officer of the Coast Guard designated by the

Commandant to command a Coast Guard District as described in Part 3 of this chapter or his authorized representative.

"Facility" means either an onshore facility or an offshore facility and includes, but is not limited to, structures, equipment and appurtenances thereto, used or capable of being used to transfer oil to or from a vessel or public vessel. A facility includes federal, state, municipal, and private facilities.

"Facility operator" means the person who owns, operates, or is responsible for the operation of the facility.

"Mobile facility" means any facility that can readily change locations, such as a tank truck or tank car, other than a vessel or public vessel.

"Monitoring device" means any fixed or portable sensing device used to monitor the waters within or around a facility and designed to notify operating personnel of a discharge of oil.

"Officer in Charge, Marine Inspection" (OCMI) means the U.S. Coast Guard officer commanding a Marine Inspection Zone described in Part 3 of this chapter, or his authorized representative.

"Offshore facility" means any facility of any kind located in, on, or under any of the navigable waters of the United States other than a vessel or a public vessel.

"Oil" means oil of any kind or in any form including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil. For the purpose of this part liquefied natural gas and liquefied petroleum gas (LNG and LPG) are excluded.

"Onshore facility" means any facility (including, but not limited to, a mobile facility) of any kind located in, on or under any land within the United States other than submerged land.

"Person" includes an individual, firm, corporation, association, and partnership.

"Person in charge" means an individual designated as a person in charge of oil transfer operations under § 154.710 or § 155.700 of this chapter.

"Public vessel" means a vessel owned or bare-boat chartered and operated by the United States, or by a State or political subdivision thereof, or by a foreign nation, except when such a vessel is engaged in commerce.

"Tank vessel" means any vessel that carries or is capable of carrying liquid bulk cargo in tanks.

"Tank barge" means any tank vessel not equipped with a means of self propulsion.

"Vessel" means every description of watercraft or other artificial contrivance, whether U.S. or foreign, used or capable of being used as a means of transportation on water, other than a public vessel.

"Vessel operator" means the person who owns, operates, or is responsible for the operation of the vessel.

§ 156.107 Alternatives.

(a) The COTP may consider and approve alternative procedures, methods or equipment standards to be used by a vessel or facility operator in lieu of any requirements in this part if—

(1) The vessel or facility operator submits a written request for the alternative at least 30 days before operations under the alternative are proposed, unless the COTP authorizes a shorter time; and

(2) The alternative provides an equivalent level of protection from pollution by oil.

(b) The COTP apprpves or disapproves any alternative requested, either in writing, or orally followed up in writing.

§ 156.110 Exemptions.

(a) The Commandant may grant an exemption or partial exemption from compliance with any requirement in this part if—

(1) The vessel or facility operator submits an application for exemption to the Commandant via the COTP at least 30 days before operations under the exemption are proposed, unless the COTP authorizes a shorter time; and

(2) The Commandant determines from the application that—

(i) Compliance with the requirement is economically or physically impractical;

(ii) No alternative procedures, methods, or equipment standards exist that would provide an equivalent level of protection from pollution by oil; and

(iii) The likelihood of oil being discharged as a result of the exemption is minimal.

(b) In making the determinations in paragraph (a) of this section, the Commandant may require—

(1) Any appropriate information, including an environmental and economic assessment of the effects of and reasons for the exemption; and

(2) Procedures, methods, and equipment, even though they may provide less than an equivalent level of protection from pollution by oil.

(c) The Commandant grants or denies an exemption in writing.

§ 156.112 Suspension order.

The COTP or OCMI may issue a suspension order to suspend oil transfer operations to the vessel or facility operator when the COTP or OCMI finds there is a condition requiring action to prevent the discharge or threat of discharge of oil. A suspension order—

(a) May be effective immediately;

(b) Is issued in writing unless it is effective immediately and then it may be issued orally and followed up in writing;

(c) Includes a statement of each condition requiring action to prevent the discharge of oil; and

(d) Is withdrawn when the COTP, OCMI, or District Commander determines that the condition requiring action to prevent the discharge or threat of discharge of oil has been corrected or no longer exists.

§ 156.113 Compliance with suspension order.

(a) No vessel or facility operator to whom a suspension order has been issued may conduct oil transfer operations until that order is withdrawn by the COTP, OCMI, or District Commander.

(b) The vessel or facility operator may petition the District Commander in writing, or in any manner when the order is effective immediately, to withdraw the suspension order. The petition does not stay the order. The decision of the District Commander is the final administrative decision.

§ 156.115 Person in charge: limitations.

(a) No person may serve as the person in charge of oil transfer operations on more than one vessel at a time during oil transfers between vessels or between two or more vessels and a facility unless authorized by the COTP.

(b) No person may serve as the person in charge of both a vessel and a facility during oil transfer operations except when agreed upon by both the vessel and facility operators and authorized by the COTP.

§ 156.120 Requirements for oil transfer.

No person may conduct an oil transfer operation unless—

(a) The facility operator or, in the case of a vessel to vessel transfer, the vessel operator of the lightering or the fueling vessel notifies the COTP of the time and place of each oil transfer operation at least 4 hours before it begins;

NOTE: The notification may be accomplished by submitting a written schedule, periodically updated to be current.

(b) The vessel's moorings are strong enough to hold during all expected conditions of surge, current, and weather and are long enough to allow adjustment for changes in draft, drift, and tide during the transfer operation;

(c) Oil transfer hoses and loading arms are long enough to allow the vessel to move to the limits of its moorings without placing strain on the hose, loading arm, or oil transfer piping system;

(d) Each hose is supported to prevent kinking and strain on its coupling;

(e) Each part of the oil transfer system is aligned to allow the flow of oil;

(f) Each part of the oil transfer system not necessary for the transfer operation is securely blanked or shut off;

(g) The end of each hose and loading arm that is not connected for the transfer of oil is blanked off using the closure devices required by §§ 154.520 and 155.805 of this chapter;

(h) The transfer system is attached to a fixed connection on the vessel and the facility except that—

(1) When a vessel is receiving fuel, an automatic back pressure shutoff nozzle may be use; or

(2) When a vessel is loading or unloading deep tanks in a cargo hold where there is no access to the water for any oil that might be discharged into the cargo hold, a loose hose may be used at the deep tank opening for combustible liquids only (as defined in 46 CFR 30.10).

(i) Each overboard discharge or sea suction valve that is connected to the

vessel's oil transfer or cargo tank system is sealed or lashed in the closed position;

(j) Each oil transfer hose has no loose covers, kinks, bulges, soft spots, and no gouges, cuts, or slashes that penetrate the first layer of hose reinforcement ("reinforcement" means the strength members, consisting of fabric, cord and/or metal, of the hose);

(k) Each hose or loading arm in use meeets § 154.500 of this chapter;

(l) Each connection meets § 156.130;

(m) Any monitoring devices required by § 154.525 of this chapter are installed and operating properly;

(n) The discharge containment required by §§ 154.530, 155.310, and 155.320 of this chapter, as applicable, is in place and completely drained of any liquid;

(o) Each scupper and drain required by § 155.310 of this chapter is closed;

(p) All connections in the oil transfer system are leak free except that a component in an oil transfer system, such as the packing glands of a pump, may leak at a rate that does not exceed the capacity of the discharge containment provided;

(q) The communications required by §§ 154.560 and 155.785 of this chapter are operable for the transfer operation;

(r) The emergency means of shutdown required by §§ 154.550 and 155.780 of this chapter, as applicable, is in position and operable;

(s) There is a person in charge on the transferring vessel or facility and the receiving vessel or facility except as otherwise authorized under § 156.115;

(t) Each person in charge required by paragraph (s) of this section—

(1) Is at the site of the oil transfer operation;

(2) Has in his possession a copy of the facility operations manual or vessel transfer procedures, as appropriate; and

(3) Conducts the transfer operation in accordance with the facility operations manual or vessel oil transfer procedures, as appropriate;

(u) The personnel required, under the facility operations manual and the vessel oil transfer procedures, to conduct the oil transfer operation—

(1) Are on duty; and

(2) Conduct the transfer operation in accordance with the facility operations manual or vessel oil transfer procedures, as appropriate;

(v) At least one person is present who fluently speaks the language or languages spoken by both persons in charge;

(w) The person in charge of oil transfer operations on the transferring vessel or facility and the person in charge of oil transfer operations on the receiving vessel or facility have held a conference, to ensure that each person in charge understands the following details of the transfer operation:

(1) The identity of the product to be transferred.

(2) The sequence of transfer operations.

(3) The transfer rate.

(4) The name or title and location of each person participating in the transfer operation.

(5) Details of the transferring and receiving systems.

(6) Critical stages of the transfer operation.

(7) Federal, state, and local rules that apply to the transfer of oil.

(8) Emergency procedures.

(9) Discharge containment procedures.

(10) Discharge reporting procedures.

(11) Watch or shift arrangement.

(12) Transfer shutdown procedures.

(x) The person in charge of oil transfer operations on the transferring vessel or facility and the person in charge of oil transfer operations on the receiving vessel or facility agree to begin the transfer operation;

(y) Between sunset and sunrise the lighting required by §§ 154.570 and 155.790 of this chapter is provided; and

(z) For transfer operations between tank barges from sunset to sunrise, lighting is provided as described in § 155.790 of this chapter.

§ 156.125 Oil discharge clean-up.

(a) Each person conducting an oil transfer operation shall stop the transfer operation whenever any oil is discharged—

(1) In the transfer operation work area; or

(2) Into the water or upon the adjoining shoreline.

(b) Except as permitted under paragraph (c) of this section, no person may resume an oil transfer operation after it has been stopped under paragraph (a) of this section, unless—

(1) Oil discharged in the oil transfer operation work area is cleaned up; and

(2) Oil discharged into the water or upon the adjoining shoreline is cleaned up, or is contained and being cleaned up.

(c) The COTP may authorize resuming the oil transfer operation if he determines that it will decrease the likelihood of the further discharge of oil.

§ 156.130 Connections.

(a) Each person who makes a connection for oil transfer operations shall—

(1) Use suitable material in joints and couplings to ensure a leak-free seal;

(2) Use a bolt in at least every other hole, and in no case less than four bolts, in each temporary bolted connection that uses a flange that meets American National Standards Institute (ANSI) standard flange requirements under § 154.500(d)(2) of this chapter;

(3) Use a bolt in each hol in each

(3) Use a bolt in each hole in each temporary bolted connection that uses a flange other than one that meets ANSI standards;

(4) Use a bolt in each hole of each permanently connected flange;

(5) Use bolts of the correct size in each bolted connection; and

(6) Tighten each bolt and nut uniformly to distribute the load and sufficiently to ensure a leak free seal.

(b) No person who makes a connection for oil transfer operations may use any bolt that shows signs of strain or is elongated or deteriorated.

(c) Except as provided in paragraph (d) of this section, no person may use a connection for oil transfer operations unless it is—

(1) A bolted or full threaded connection; or (2) a quick-connect coupling acceptable to the Commandant.

(d) No person may transfer oil to a vessel that has a fill pipe for which containment can not practically be provided unless an automatic back pressure shutoff nozzle is used.

§ 156.150 Declaration of inspection.

(a) No person may transfer oil to or from a vessel unless each person in charge, designated under §§ 154.710 and 155.700 of this chapter, has filled out and signed the declaration of inspection form described in paragraph (c) of this section.

(b) No person in charge may sign the declaration of inspection unless he has determined by inspection, and indicated by initialling in the appropriate space on the declaration of inpection form, that the facility or vessel, as appropriate, meets § 156.120.

(c) The declaration of inspection may be in any form but must contain at least—

(1) The name or other identificaion of the transferring vessel or facility and the receiving vessel or facility;

(2) The address of the facility or location of the transfer operation if not at a facility;

(3) The date the transfer operation is started;

(4) A list of the requirements in § 156.120 with spaces on the form following each requirement for the person in charge of the vessel or facility to indicate by initialling that the requirement is met for the transfer operation; and

(5) A space for the date, time of signing, signature, and title of each person in charge during oil transfer operations on the transferring vessel or facility and space for the date, time of signing, signature, and title of each person in charge during oil transfer operations on the receiving facility or vessel.

(d) The form for the declaration of inspection may incorporate the declaration-of-inspection requirements under 46 CFR 35.35–30.

(e) The vessel and facility persons in charge shall each have a signed copy of the declaration of inspection available for inspection by the COTP during the oil transfer operation.

(f) The operators of each vessel and facility engaged in an oil transfer operation shall retain, for at least 1 month from the date of signature, a signed copy of the declaration of inspection.

§ 156.160 Supervision by person in charge.

(a) No person may connect or disconnect a hose, top off a tank, or engage in any other critical procedures during an oil transfer operation unless the person

in charge, required by § 156.120(s), supervises that procedure.

(b) No person may start the flow of oil to or from a vessel unless instructed to do so by either person in charge.

(c) No person may transfer oil to or from a vessel unless each person in charge is in the immediate vicinity and immediately available to the oil transfer personnel.

§ 156.170 Equipment tests and inspections.

(a) Except as provided in paragraph (d) of this section, no person may use any equipment listed in paragraph (c) of this section for oil transfer operations unless the vessel or facility operator, as appropriate, tests and insects the equipment annually in accordance with paragraphs (b) and (c) of this section and the equipment is in the condition specified in paragraph (c) of this section.

(b) During any test or inspection required by this section, the entire external surface of the hose must be accessible.

(c) For the purpose of paragraph (a) of this section—

(1) Each nonmetallic oil transfer hose must—

(i) Have no loose covers, kinks, bulges, soft spots, and no gouges, cuts, or slashes that penetrate the first layer of hose reinforcement, as defined in § 156.120(j).

(ii) Have no external deterioration and, to the extent internal inspection is possible wih both ends of the hose open, no internal deterioration; and

(iii) Not burst, bulge, leak, or abnormally distort under static liquid pressure at least 1½ times the maximum allowable working pressure;

(2) Each transfer system relief valve must open at or below the pressure at which it is set to open;

(3) Each pressure gauge must show pressure within 10 percent of the actual pressure;

(4) Each loading arm and each oil transfer pipe system, including each metallic hose, must not leak under static liquid pressure at least 1½ times the maximum allowable working pressure; and

(5) Each item of remote operating or indicating equipment, such as a remotely operated valve, tank level alarm, or emergency shutdown device, must perform its intended function.

(d) No person may use any hose in underwater service for oil transfer operations unless the operator of the vessel or facility has tested and inspected it biennially in accordance with paragraph (c)(1) or (c)(4) of this section, as applicable.

(e) Any liquid may be used for the testing required by this section.

(Sec. 311(j)(1)(C) and (D), Pub. L 92-500, as amended, § 2, 86 Stat. 868, as amended, (33 U.S.C. 1321(j)(1)(C) and (D); E.O. 11735, 3 CFR, 1966—1970 COMP., p. 949; (49 CFR 1.46(m).))

NOTE: The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended; and OMB Circular A-107

Dated: June 17, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77-18087 Filed 6-24-77;8:45 am]

[33 CFR, Part 157]

[CGD 76-088b]

TANK VESSELS CARRYING OIL IN BULK

Miscellaneous Rules Providing for Protection of the Marine Environment

AGENCY: Coast Guard, DOT.

ACTION: Notice of proposed rule making.

SUMMARY: The Coast Guard proposes requirements for installation and use of approved cargo monitors on board tank vessels carrying oil in bulk, both U.S. and foreign that are of 150 gross tons or more and call at U.S. ports. Specifications for this equipment have been developed by the Marine Environment Protection Committee of the Intergovernmental Maritime Consultative Organization, and approval regulations based upon them have been proposed elsewhere in this issue of the FEDERAL REGISTER. Editorial revisions and clarifications to the intent of the existing regulations for tank vessels carrying oil in bulk are also proposed. The intended effect of these amendments is to reduce pollution from operational oil discharges.

DATES: Comments must be received on or before August 11, 1977.

ADDRESSES: (a) *Written comments.* Written comments on this proposed rule making should be submitted to and will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590.

(b) *Economic evaluation.* A copy of the economic evaluation from which the economic summary in this document is taken is available for examination at the address listed in paragraph (a).

(c) *Environmental impact declaration.* A copy of the negative declaration of environmental impact, which has been prepared for this proposal, is available for examination at the address listed in paragraph (a).

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, SW., Washington, D.C. 25090 (202-426-1477).

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this proposed rule making by submitting written data, views, or arguments. Each person submitting a comment should include his name and address, identify this notice (CGD 76-088b), and give reasons for his comment. The proposal may be changed in the light of comments received. No public hearing is planned but one may be held at a time and place to be set in a later notice in the FEDERAL REGISTER if requested in writing by an interested person raising a genuine issue and desiring to comment orally at a public hearing.

Part 157 of Title 33 contains regulations for the protection of the marine environment that pertain to tank vessels carrying oil in bulk. These regulations were issued in the FEDERAL REGISTER of October 14, 1975, (40 FR 48280-48290), and have been subsequently amended in the FEDERAL REGISTER of December 13, 1976 (41 FR 54180). These regulations require in part that fixed piping systems on most tank vessels meet the design requirements prescribed in Part 157 and that oil-water separating and monitoring equipment used on tank vessels be approved by the Coast Guard in accordance with approval specifications to be proposed at a later date. This notice proposes to amend these regulations.

DRAFTING INFORMATION: The principal persons involved in drafting this proposal are: Lowell F. Martin, Project Manager, Office of Merchant Marine Safety, and William R. Register, Project Attorney, Office of the Chief Counsel.

DISCUSSION OF THE PROPOSED REGULATIONS

1. Proposed § 157.11(b) requires in part that each fixed piping system used for transferring and discharging cargo residues and other oily mixtures combined with cargo residues have one or more cargo monitors and that each monitor be equipped with a recording device meeting the requirements of 46 CFR 162.050-25(j). See FR Doc. 77-18089 in this issue of the FEDERAL REGISTER which proposes 46 CFR 162.050-25(j) as a requirement.) A recording device provides a means for determining the amount of oil in a discharge being measured by a cargo monitor and for detecting any malfunction of the signaling device on a monitor used to actuate stop valves in a vessel's fixed piping system. The requirement to have a recording device is essentially the same as the requirement for recording devices in Regulation 15 of Annex I to the International Convention for the Prevention of Pollution from Ships, 1973. The requirement to have a cargo monitor is contained in the current regulations in Part 157.

2. Proposed § 157.11(c) requires that cargo monitors installed on board tank vessels on and after April 1, 1980, meet the applicable Coast Guard approval specifications for the equipment. (The applicable specifications are proposed elsewhere in this issue of the FEDERAL REGISTER.) These specifications are similar to the specifications for monitoring equipment that have been prepared by the Marine Environment Protection Committee of the Intergovernmental Maritime Consultative Organization. The April 1, 1980, compliance date for this

requirement is proposed to allow enough time for approval testing of monitoring equipment.

Proposed § 157.11(c) does not apply to cargo monitors installed on tank vessels before April 1, 1980. The question of whether monitors installed before April 1, 1980, should be required to meet the Coast Guard's applicable approval specifications or other equivalent specifications is currently under study. Related questions of whether existing monitor installations should be allowed to continue in service and, if so, under what conditions are the subject of current discussion by the IMCO Marine Environment Protection Committee. The Coast Guard intends to issue regulations concerning existing installations after completion of its studies and the current IMCO discussions.

3. Proposed § 157.11(d)(3)(ii) contains design requirements for sample points. These requirements are also contained in the IMCO specifications for monitoring equipment. The April 1, 1980, compliance date for these requirements is proposed to allow sufficient time for accomplishing necessary alterations to pumping, piping, and discharge arrangements on tank vessels.

4. Proposed § 157.11(a), § 157.11(d), and § 157.17(a), with the exception of § 157.11(d)(3)(ii), clarify the current provisions in § 157.11 and § 157.17. These clarifications are necessary since experience gained in using the regulations has shown that their intent is somewhat unclear.

5. The proposed revision to paragraph (d) of § 157.19 would allow the valves currently required by that paragraph for piping branch lines that have openings into certain cargo tanks to be located either inside or immediately outside the tanks. The current § 157.19(d) requires the valves to be located inside the tanks. The purpose of a branch line valve is to prevent spillage of oil from a tank into which the branch line opens if the piping outside the tank breaks. A branch line valve that is located immediately outside a tank into which the line opens can perform its function of preventing spillage from the tank as effectively as a valve that is located inside the tank.

6. Proposed § 157.37(c) requires that each cargo monitor be maintained and operated in accordance with the instructions manual required by proposed § 157.23(a). Compliance with this requirement is necessary to ensure proper functioning of the monitor.

7. Proposed § 157.37(d) requires that all discharge data recorded by a cargo monitor be kept on board for three years. This provision is contained in Regulation 15 of Annex I to the International Convention for the Prevention of Pollution from Ships, 1973.

8. The proposed amendment to § 157.39(b) transfers the substance of the requirements for separators and bilge monitors in the current paragraph 157.39(b) to § 155.410(b) of Title 33. The proposed amendments to § 155.410(b) appear elsewhere in this issue of the FEDERAL REGISTER.

9. Proposed § 157.43(a) adds a requirement that clean ballast be discharged in accordance with the requirement in proposed § 157.37(a)(5). Proposed § 157.37(a)(5) in effect provides that oily mixtures may not be discharged overboard, except above the waterline through a discharge point of the type described in proposed § 157.11(d)(3). The proposed addition to § 157.43(a) was originally contained in § 157.43 of the Coast Guard notice of proposed rule making published on June 28, 1974 (39 FR 24152–24157), which proposed to adopt the regulations now contained in Part 157. However, the requirement was inadvertently omitted from the final regulations published on October 14, 1975 (40 FR 48280–48287). Section 157.43(a) is proposed again in this notice to correct the prior omission.

Proposed § 157.43(a), as it was first proposed in 1974, applied only to seagoing U.S. tank vessels of 150 gross tons or more engaged in domestic trade. However, the current § 157.43 applies additionally to U.S. vessels of 150 gross tons or more engaged in foreign trade and to foreign flag vessels of 150 gross tons or more that enter the navigable waters of the United States to engage in commercial service at a U.S. port. Accordingly, the applicability statement in § 157.25 has been revised to make the proposed addition to § 157.43(a) likewise applicable to these additional vessels.

10. The proposed rules would apply to both new and existing vessels, both of which terms are defined in the current Part 157 regulations.

11. The rules in this proposal would become effective 90 days after their promulgation as final rules, except that compliance with §§ 157.11(c) and 157.11(d)(3)(ii) would not be required before April 1, 1980.

This proposal has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). If all vessels that would be subject to the requirements proposed in this notice installed approved cargo monitors and sample points before April 1, 1980, the annual cost during this period would be approximately six million dollars. The incremental annual cost to obtain Coast Guard approval of this equipment would be approximately $89,000. Additional costs, which have been determined to be minimal in amount, would include those associated with operation and maintenance of monitors. Economic benefits resulting from use of the equipment would be reduced economic losses associated with oil pollution damage to the marine environment and savings from increased conservation of oil.

In consideration of the foregoing, the Coast Guard proposes to amend Part 157 of Title 33, Code of Federal Regulations, as follows:

1. By revising § 157.11 to read as follows:

§ 157.11 Fixed piping systems: cargo residues and other oily mixtures combined with cargo residues.

(a) Each tank vessel must have a fixed piping system for transferring cargo residues and other oily mixtures combined with cargo residues from cargo tanks to slop tanks and for discharging these oily mixtures overboard and to reception facilities.

(b) Each fixed piping system required by paragraph (a) of this section must have one or more cargo monitors. Each monitor must have its own recording device that meets the requirements of 46 CFR 162.050–25(j). For each type of oil that a vessel is designed to carry, at least one of the monitors must be designed for use with that oil.

(c) Each cargo monitor installed on a tank vessel on and after April 1, 1980, must be approved under 46 CFR 162.050.

(d) Each fixed piping system required by paragraph (a) of this section must be designed so that—

(1) It has piping to transfer dirty ballast residues and tank washings from each cargo tank on the vessel to a slop tank;

(2) It has a manifold on the weather deck that connects the piping required by paragraph (d)(1) of this section with at least two discharge points—

(i) Through which oily mixtures can be discharged to reception facilities; and

(ii) One of which is on the port side of the weather deck and one of which is on the starboard side of the weather deck;

(3) Each discharge point through which oily mixtures are discharged overboard from a slop tank, cargo tank, or a cargo pump room bilge—

(i) Is located on the port or starboard side of the vessel above the waterline when it is in its deepest ballast condition;

(ii) Has a sample point that is located in a vertical section of piping inboard of the dischrge point and that is of the type described in Figure 162.050–17(e) of 46 CFR 162.050–17(e); and

(iii) Has a stop valve that is actuated by each of the system's cargo monitors; and

(4) When valves in the system are actuated by one of the system's cargo monitors none of the oily mixture causing actuation can be discharged overboard.

NOTE.—Effective date of § 157.11. (a) Each existing vessel that is a U.S. vessel in domestic trade must comply with §§ 157.11 (a), (b), (d)(1), (d)(2), (d)(3) (i) and (iii), and (d)(4) before December 31, 1977.

(b) Each existing vessel that is a foreign vessel or a U.S. vessel in foreign trade must comply with §§ 157.11 (a), (b), (d)(1), (d)(2), (d)(3) (i) and (iii), and (d)(4) before December 31, 1979.

(c) Each vessel to which this subpart applies must comply with § 157.11(d)(3)(ii) before April 1, 1980. Compliance with § 157.11(c) is required on and after April 1, 1980.

2. By amending § 157.13 to read as follows:

§ 157.13 Designated observation area.

Each new vessel must have a designated observation area on the weather deck or above that is—

(a) Located where the effluent from each discharge point and manifold described in § 157.11 can be visually observed; and

* * * * *

3. By adding a sentence to the end of paragraph (a) of § 157.17 to read as follows:

§ 157.17 Oily residue tank.

(a) * * * The oily residue tank must have piping that connects it with the discharge point of each machinery space bilge pump.

* * * * *

4. By revising § 157.19(d) to read as follows:

§ 157.19 Cargo tank arrangement and size.

* * * * *

(d) If a line of piping that runs through a cargo tank in a position less than t_v from the vessel's side or less than v_v from the vessel's bottom, as defined in Appendix A of this part, has a branch, that branch must have a valve—

(1) Within each cargo tank into which the branch opens; or

(2) Outside each tank into which the branch opens in a location that is immediately adjacent to the point at which the branch enters the tank.

* * * * *

5. By revising § 157.23 to read as follows:

§ 157.23 Cargo and ballast system information.

(a) Each tank vessel must have on board an instructions manual that describes the automatic and manual operation of the cargo and ballast system on the vessel and an instructions manual for each cargo monitor on the vessel.

(b) The format and information contained in the instructions manual for operation of the cargo and ballast system must be similar to the manual entitled "Clean Seas Guide for Oil Tankers" which can be obtained from the International Chamber of Shipping, 30–32 St. Mary Axe, London, United Kingdom EC3A 8ET.

6. By revising § 157.25 to read as follows:

§ 157.25 Exceptions to applicability.

(a) Sections 157.29, 157.31, 157.37(a)(5), 157.37(a)(6), and 157.43 apply to foreign vessels when they discharge into the navigable waters of the United States.

(b) Sections 157.35, 157.37, except paragraphs (a)(5) and (a)(6), 157.39, 157.45, and 157.47 do not apply to foreign vessels.

7. By amending § 157.37 to read as follows:

§ 157.37 Discharge of cargo residue.

(a) * * *

(5) Discharges above the waterline through a discharge point described in §157.11(d)(3); and

(6) Has in operation a cargo monitor required by § 157.11(b) that is designed for use with the oil mixture being discharged, except that the system may be operated manually if—

* * * * *

(c) Each cargo monitor must be maintained and operated in accordance with its instructions manual.

(d) All discharge data recorded by a cargo monitor must be retained on board the vessel for three years.

8. By revising § 157.39(b) to read as follows:

§ 157.39 Machinery space bilges.

* * * * *

(b) Each tank vessel must comply with the requirements in § 155.410(b) concerning the use of oil-water separating and monitoring equipment in discharging oily mixtures that are not combined with cargo residues.

9. By revising § 157.43(a) to read as follows:

§ 157.43 Discharges: clean and segregated ballast.

(a) Clean ballast may not be discharged except in accordance with §§ 157.37(a)(5) and 157.37(a)(6).

* * * * *

(46 U.S.C. 391a; 49 U.S.C. 1655(b); 49 CFR 1.46.)

NOTE.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: June 17, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[Doc.77-18088 Filed 6-24-77;8:45 am]

[46 CFR, Part 162]

[CGD 76-088a]

OIL POLLUTION PREVENTION EQUIPMENT

Approval Requirements

AGENCY: Coast Guard, DOT.

ACTION: Notice of Proposed Rulemaking.

SUMMARY: The Coast Guard proposes to add approval procedures and specifications for oil-water separators, cargo monitors, bilge monitors, and bilge alarms to the existing approval requirements for engineering equipment used on merchant vessels. International design and test specifications for this equipment were recently adopted by the Marine Environment Protection Committee (MEPC) of the Intergovernmental Maritime Consultative Organization (IMCO). This action incorporates the MEPC specifications, and the effect of this action will be to ensure use of pollution prevention equipment that is representative of the best technology presently available.

DATES: Comments must be received on or before: August 11, 1977.

ADDRESSES: (a) *Written comments.* Written comments on this proposed rule making should be submitted to and will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590.

(b) *Economic Evaluation.* A copy of the economic evaluation from which the economic summary in this document is taken is available for examination at the address listed in paragraph (a).

(c) *Environmental Impact Declaration.* Copies of the negative declaration of environmental impact, which has been prepared for this proposal, is available upon request to the Marine Safety Council at the address listed in paragraph (a).

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590, 202-426-1477.

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this proposed rule making by submitting written data, views, or arguments. Each person submitting a comment should include his name and address, identity this notice (CGD 76-088a) and the specific section of the proposal to which his comment refers, and give reasons for his comment. The proposal may be changed in the light of comments received. No public hearing is planned but one may be held at a time and place to be set in a later notice in the FEDERAL REGISTER if requested in writing by an interested person raising a genuine issue and desiring to comment orally at a public hearing.

DRAFTING INFORMATION: The principal persons involved in drafting this proposal are: Lowell F. Martin, Project Manager, Office of Merchant Marine Safety, and William R. Register, Project Attorney, Office of the Chief Counsel.

DISCUSSION OF THE PROPOSED REGULATIONS

In November 1973, the International Conference on Marine Pollution convened by IMCO adopted the International Convention for the Prevention of Pollution from Ships, 1973. Annex I to this convention sets forth several pollution requirements applicable to vessels including requirements.

Coast Guard regulations in §§ 155.400, 157.37, and 157.39 of Title 33 of the Code of Federal Regulations currently

allow the use of Coast Guard approved pollution equipment under operating conditions prescribed in those regulations. The regulations proposed in this notice contain the procedures for obtaining Coast Guard approval of the equipment and the design and testing specification applicable to the equipment. A notice of proposed rule making appears elsewhere in this issue of the FEDERAL REGISTER proposing to revise Part 155 of Title 33 to require use of bilge alarms, bilge monitors, and separators approved under the regulations proposed in this notice. A notice of proposed rule making appears elsewhere in this issue of the FEDERAL REGISTER that proposes to revise § 157.37 to require the use of cargo monitors approved under the regulations proposed in this notice.

The technology pertaining to shipboard oil-water separation and to monitoring of overboard discharges of oily mixtures is in a state of continuing development. Accordingly, technology advancements occurring after adoption of the design and testing specifications in this proposal would be reviewed on an ongoing basis to determine the need for any revision of the specifications.

A discussion of the proposed regulations is contained in the following paragraphs:

Section 162.050–5 lists the information that must be contained in an application for approval of an item of equipment. The section in effect provides that each item for which approval is sought must be the subject of a separate application. However, paragraph 162.050–5(b) provides that an application may reference information contained in a previously submitted application so that excess paperwork can be avoided.

Section 162.050–7 describes the procedures for obtaining approval of an item of pollution equipment. Paragraph 162.050–7(b) of these procedures describes the initial processing of an application. When the application is received, it is examined to determine whether the item complies with the applicable requirements of the Coast Guard marine engineering regulations (Subchapter F) and electrical engineering regulations (Subchapter J) and with the other design requirements proposed in this notice. Examination is also made to determine the probability that the item will pass the approval tests. Paragraphs 162.050–7 (c) through (g) prescribe the procedures for submitting an item for testing, conducting the tests, preparing and reviewing test reports, and issuing approval certificates. Paragraphs 162.050–7 (h), (i), (j), and (k) contain the approval criteria for each item of equipment.

The approval criteria in paragraph 162.050–7 (h) and (k) for a bilge alarm and 15 p.p.m. separator adopt the IMCO standard on oil content of overboard discharges through a 15 p.p.m. separator. This standard is contained in Annex I to the International Convention for the Prevention of Pollution from Ships, 1973. The standard prescribes a concentration limit of 15 parts per million (p.p.m.) of oil in water for overboard discharges through a 15 p.p.m. separator that has an alarm to indicate when this concentration is exceeded. The current overboard discharge limit prescribed by the Environmental Protection Agency in Part 110 of Title 40, Code of Federal Regulations, in pertinent part essentially provides that oil discharges into the navigable waters or contiguous zone must not create a sludge or emulsion or produce visible traces of oil in water or along adjoining shorelines. The Coast Guard is currently having discussions with EPA on the question of whether a discharge concentration of less than 15 p.p.m. oil in water is within the discharge limit prescribed by EPA regulations. Changes to the regulations in Part 157 of Title 33 that prescribe discharge limitations for separating and monitoring equipment may be proposed after resolution of this question.

Section 162.050–9 prescribes the contents of the test report to be submitted by a testing facility upon completion of approval testing. Sections 162.050–11 and 162.050–13 contain marking requirements for approved equipment and Coast Guard factory inspection procedures.

Section 162.050–15 prescribes procedures for obtaining designation as a facility authorized to perform approval tests. The Coast Guard is making an inquiry to determine what commercial facilities have an interest in conducting approval tests. Facilities that are considering submitting requests to be designated as testing facilities are specifically requested to comment on this notice of proposed rule making.

Sections 162.050–17 and 162.050–19 describe the test rigs that must be used in conducting approval tests on separators, monitors, and alarms.

Sections 162.050–21, 162.050–25, 162.050–29, and 162.050–33 propose design requirements for oil-water separators, cargo monitors, bilge monitors, and bilge alarms. The requirements are based upon those contained in the MEPC specifications. They also incorporate the applicable safety requirements in the Coast Guard marine and electrical engineering regulations published in Subchapters F and J of Title 46, Code of Federal Regulations. The requirements in paragraphs 162.050–25(j) and 162.050–29(d) for each cargo monitor and each bilge monitor to have a recording device are also contained in the International Convention for the Prevention of Pollution from Ships, 1973.

Section 162.050–23 contains approval tests for separators. The tests assess the performance capability of a separator using both low and high concentrations of oil in the influent to the separator as well as with a pure oil influent. The tests also evaluate performance when influent suction is lost and when the separator is operated for an extended period in the automatic mode.

Section 162.050–27 contains approval tests for cargo monitors. The tests assess the performance capability of a cargo monitor using a variety of crude oils or refined products, or both, depending upon which oils the monitor is designed to use. The tests also determine cargo monitor response time and assess performance under variable operating conditions and after an extended shutdown period.

Section 162.050–31 contains approval tests for bilge monitors. These tests are similar to those for cargo monitors, except that the oils specified for separator tests are used in lieu of the cargo oils specified for cargo monitor tests. Section 162.050–31 contains, in addition, tests that assess the capability of the devices required by §§ 162.050–20 (c)(1) and (c)(2) to produce the signals prescribed by those regulations.

Section 162.050–35 contains approval tests for bilge alarms. These tests assess the capability of an alarm to actuate at an oil concentration of 15 parts per million of oil in water when the power supply to the alarm is higher or lower than design ratings. The tests also assess the alarm's capability to operate properly for extended periods and after extended shutdown periods.

Section 162.050–37 requires that a vibration test be conducted for each monitor and bilge alarm and each separator control component submitted for approval. This test must be performed for an applicant by an independent laboratory. A laboratory report describing the results of the testing must be submitted with the application for approval.

Section 162.050–39 prescribes the method for measuring oil content of samples taken during approval testing of separators. The method consists of carbon tetrachloride solvent extraction and infrared spectrophotometry. This method has been developed by the Environmental Protection Agency after extensive consideration of alternative methods. The EPA method is specified in detail in this proposal to ensure that a high level of accuracy is maintained in measuring the oil content of the samples taken during testing. This method was selected for inclusion in the MEPC specifications.

This proposal has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). The costs to pollution equipment manufacturers will be those related to obtaining Coast Guard approval. It is estimated that approximately sixty devices may require approval at a cost per approval of $5,000 resulting in total industry costs of $300,000. The impact of administering the proposed approval program would be absorbed with existing Coast Guard resources; and, therefore, there would be no significant costs to the Coast Guard. The proposed approval program provides for the availability of equipment that has been developed on the basis of the best technology presently available and will, thus, reduce economic losses associated with oil pollution damage to the marine environment.

These regulations are proposed under the authority of 33 U.S.C. 1321(j), 46 U.S.C. 391a, 49 U.S.C. 1655(b)(1), and 49 CFR 1.46.

In consideration of the foregoing, the Coast Guard proposes to amend Part 162 of Title 46, Code of Federal Regulations, by adding a new Subpart 162.050 to read as follows:

Subpart 162.050—Pollution Prevention Equipment

Sec.

AUTHORITY: This subpart is issued under the authority of 33 U.S.C. 1321(j), 46 U.S.C. 391a, 49 U.S.C. 1655(b)(1), and 49 CFR 1.46

§ 162.050–1 Scope.

This subpart contains—

(a) Procedures for approval of 100 p.p.m. separators, 15 p.p.m. separators, cargo monitors, bilge monitors, and bilge alarms;

(b) Design specifications for this equipment;

(c) Tests required for approval;

(d) Procedures for obtaining designation as a facility authorized to conduct approval tests; and

(e) Marking requirements and factory inspection procedures.

§ 162.050–3 Definitions.

As used in this subpart—

(a) "p.p.m." means parts per million of oil in water;

(b) "100 p.p.m. separator" means a separator that is designed to produce an effluent to be discharged overboard containing an oil concentration in water of 100 p.p.m. or less; and

(c) "15 p.p.m. separator" means a separator that is designed to produce an effluent to be discharged overboard containing an oil concentration in water of 15 p.p.m. or less.

§ 162.050–5 Contents of application.

(a) An application for approval of an item of equipment under this subpart must contain the following information:

(1) The type of item including, if the item is a separator, a statement of what effluent oil content the separator is designed to produce.

(2) The name and address of the applicant and manufacturing facility.

(3) A detailed description of the quality control procedures, the in-process and final inspections and tests followed in manufacturing the item, and the construction and sales record keeping systems maintained.

(4) Arrangement drawings and piping diagrams of the item that give the information prescribed by § 56.01–10(d) of this chapter.

(5) Detailed electrical plans of the type described in § 111.05–5(d) of this chapter.

(6) An instructions manual containing detailed installation, operation calibration and zeroing, and maintenance instructions for the item.

(7) For each monitor and bilge alarm and each control on a separator, the vibration test report described in § 162.050–37 of this subpart.

(8) For each cargo monitor, a statement of whether it is to be used with crude oils, refined products, or both.

(9) A list of the substances used in operating the item that require certification under Part 147 of this chapter as articles of ships' stores and supplies.

(10) The name of the facility at which approval testing is planned.

(b) An applicant may incorporate by reference in his application information that he has submitted in a previous application.

§ 162.050–7 Approval procedures.

(a) An application for approval of an item of equipment under this subpart must be sent to the Commandant (G-MNT-3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) The application is examined by the Coast Guard to determine whether the item complies with the design requirements and vibration standard prescribed in this subpart and to determine the probability that the item will pass the approval tests. If the application is incomplete it is returned to the applicant with a statement of reasons why it is incomplete.

(c) The Coast Guard notifies the applicant of the results of the examination. The applicant must make arrangements for approval testing directly with the facility at which testing is planned.

(d) Each item submitted to a facility for approval testing must be accompanied by a copy of its instructions manual.

(e) If the item to be tested is a separator that is manufactured in more than one size and applications for approval have been made for each size, the applicant, in lieu of submitting each size for testing, may submit each size that has a capacity exceeding fifty (50) cubic meters per hour throughput, if any, and two additional sizes that have a capacity of fifty (50) cubic meters per hour throughput or less. One of the additional sizes must have a capacity that is in the highest quartile of capacities manufactured in the 0–50 cubic meters per hour throughput range and the other must be from the lowest quartile.

(f) Each approval test must be performed by one of the facilities designated by the Commandant. The facility must perform each test in accordance with the test conditions prescribed in this subpart for the test, prepare a test report for the item if it completes all of the tests, and send the report with four copies to the Commandant (G-MMT). The applicant may observe the tests. If an item does not complete testing, a new application must be submitted before retesting.

(g) The Commandant (G-MMT) sends a copy of the test report to the applicant and advises him whether the item is approved. If the item is approved, an approval certificate is sent to the applicant.

(h) A separator is approved under this subpart if—

(1) It meets the design requirements in § 162.050–21;

(2) In the case of a 100 p.p.m. separator, the oil content of each sample taken during approval testing is 100 p.p.m. or less;

(3) In the case of a 15 p.p.m. separator, the oil content of each sample taken during approval testing is 15 p.p.m. or less;

(4) During Test No. 4S an oily mixture is not detected at the separated water outlet of the separator;

(5) During Test No. 6S its operation is continuous; and

(6) Any substance used in operating the separator that requires certification under Part 147 of this chapter as an article of ships' stores or supplies has been certified.

(i) A cargo monitor is approved under this subpart if—

(1) It meets the design requirements in § 162.050–25;

(2) Each oil content reading recorded during approval testing is within ±10 p.p.m. or ±20 percent of the oil content of the mixture used in the testing;

(3) Its response time is twenty (20) seconds or less in Test No. 3CM;

(4) The time intervals between successive readings recorded in Test No. 4CM are twenty (20) seconds or less; and

(5) Any substance used in operating the monitor that requires certification under Part 147 of this chapter as an article of ships' stores or supplies has been certified.

(j) A bilge monitor is approved under this subpart if—

(1) It meets the design requirements in § 162.050–29;

(2) Except as provided in § 162.050–7(j)(5), each oil content reading recorded during approval testing is within ±10 p.p.m. or ±20 percent of the oil content of the mixture used in testing;

(3) The time intervals between successive readings recorded in test No. 3BM are twenty (20) seconds or less;

(4) The time intervals between successive readings recorded in Test No. 4BM are twenty (20) seconds or less;

(5) Each oil content that is recorded during the testing when the device required by § 162.050–29(c)(1) actuates is 15 p.p.m. ±5 p.p.m.;

(6) Each oil content that is recorded during testing when the device required by § 162.050–29(c)(2) actuates is 100 p.p.m. ±20 p.p.m.; and

(7) Any substance used in operating the monitor that requires certification under Part 147 of this chapter as an

article of ships' stores or supplies has been certified.

(k) A bilge alarm is approved under this subpart if—

(1) It meets the design requirements in § 162.050–33;

(2) Each oil content recorded during approval testing is 15 p.p.m. ±5 p.p.m.; and

(3) Any substance used in operating the alarm that requires certification under Part 147 of this chapter as an article of ships' stores or supplies has been certified.

§ 162.050–9 Test report.

A test report of approval testing must contain the following:

(a) Name of the testing facility.

(b) Name of the applicant.

(c) Date of receiving the item for testing and the dates of the tests conducted.

(d) Trade name and brief description of the item.

(e) A listing of the following properties of the test oils used:

(1) Relative density at 15°C.

(2) Viscosity in centistokes at 37.8°C.

(3) Flashpoint.

(4) Weight of ash content.

(5) Weight of water content.

(f) Relative density at 15°C. of the water used during testing and the weight of solid content in the water.

(g) The data recorded during each test.

§ 162.050–11 Marking.

(a) Each separator, monitor, or bilge alarm manufactured in accordance with the provisions of a certificate of approval must be plainly marked by the manufacturer with the information listed in paragraph (b) of this section. The marking must be securely fastened to the item.

(b) Each marking must include the following information:

(1) Name of the manufacturer.

(2) Name or model number of the item.

(3) If the item is a separator, the maximum throughput at which the separator is designed to operate.

(4) The month and year of completion of manufacture.

(5) The manufacturer's serial number for the item.

(6) The Coast Guard approval number assigned to the item in the certificate of approval.

(7) Each restriction, if any, on the use of bilge cleaners, solvents, and other chemical compounds that could impair operation of the equipment.

(8) If the item is a cargo monitor, the oils with which it is approved for use.

§ 162.050–13 Factory inspection.

The Coast Guard does not inspect equipment approved under this subpart on a regular schedule at the place of manufacture. However, the Commandant may detail Coast Guard personnel at any time to visit a factory where the equipment is manufactured to conduct an inspection of the manufacturing procedures. The manufacturer is advised in advance of any planned factory inspection.

§ 162.050–15 Designation of facilities.

(a) Each request for designation as a facility authorized to perform approval tests must be submitted to the Commandant (G–MMT–3/83), U.S. Coast Guard, Washington, D.C. 20590.

(b) Each request must include the following:

(1) Name and address of the facility.

(2) The type of equipment the facility proposes to test.

(3) A description of the facility's capability to perform approval tests including detailed information on the following:

(i) Management organization including personnel qualifications.

(ii) Equipment available for measuring oil content of samples.

(iii) Materials available for use in approval testing.

(iv) Each test rig to be used.

(c) To obtain authorization to conduct approval tests—

(1) A facility must have the management organization, equipment for measuring the oil content of samples, and material necessary to perform the tests;

(2) Each of its test rigs must be of a type described in §§ 162.050–17 or 162.050–19 of this subpart;

(3) The loss or award of a specific contract to test equipment must not be a substantial factor in the facility's financial well being; and

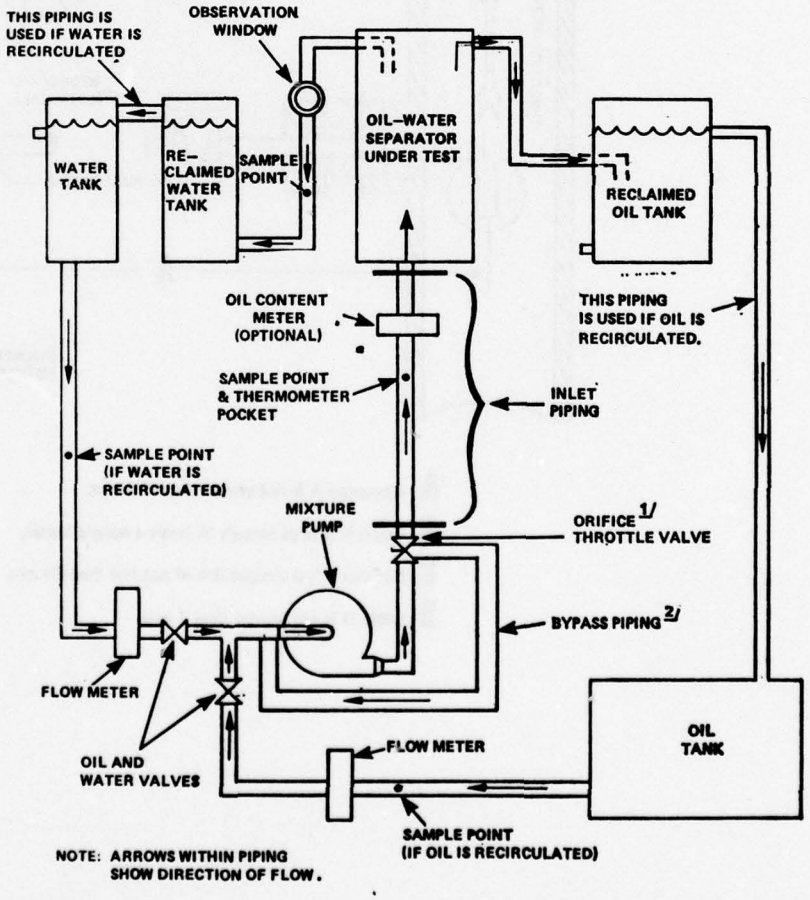
(4) The facility must be free of influence and control of the manufacturers, suppliers, and vendors of the equipment.

(d) A facility may not subcontract for approval testing unless previously authorized by the Coast Guard. A request for authorization to subcontract must be sent to the Commandant (G–MMT–3/83), U.S. Coast Guard, Washington, D.C. 20590.

§ 162.050–17 Separator test rig.

(a) This section describes the test rig to be used in approval testing of separators. A diagram of the test rig is shown in figure 162.050–17(a).

FIGURE 162.050—17(a) - SEPARATOR TEST RIG



1/ NOT REQUIRED IF MIXTURE PUMP HAS BYPASS PIPING. SEE § 162.050–23(a)(4).

2/ NOT REQUIRED IF MIXTURE PUMP PIPING HAS ORIFICE. SEE § 162.050–23(a)(4).

(b) The mixture pump shown in figure 162.050–17(a) is used if a separator does not have a supply pump. (Section 162.050–23(a)(4) of this subpart contains requirements for a mixture pump.)

(c) The inlet piping of the test rig is sized so that—

(1) Influent water flows at a Reynolds Number of at least ten thousand;

(2) The influent flow rate is between one and three meters per second; and

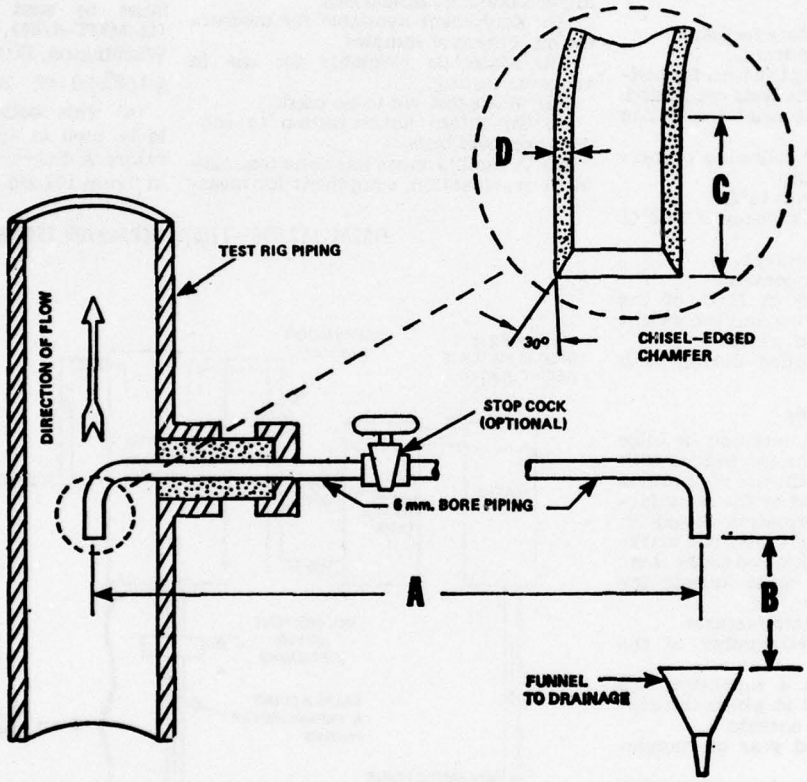
(3) Its length is at least twenty (20) times its inside diameter.

(d) Each sample point on a test rig is of the type described in figure 162.050–17(e). Each sample point is in a vertical portion of the test rig piping.

§ 162.050–19 Monitor and bilge alarm test rig.

The test rig to be used in approval testing of monitors and bilge alarms is described in figure 162.050–19. Each sample point on the test rig is of the type described in figure 162.050–17(e). Each sample point is in a vertical portion of the test rig piping.

FIGURE 162.050—17(e) - SAMPLE POINT



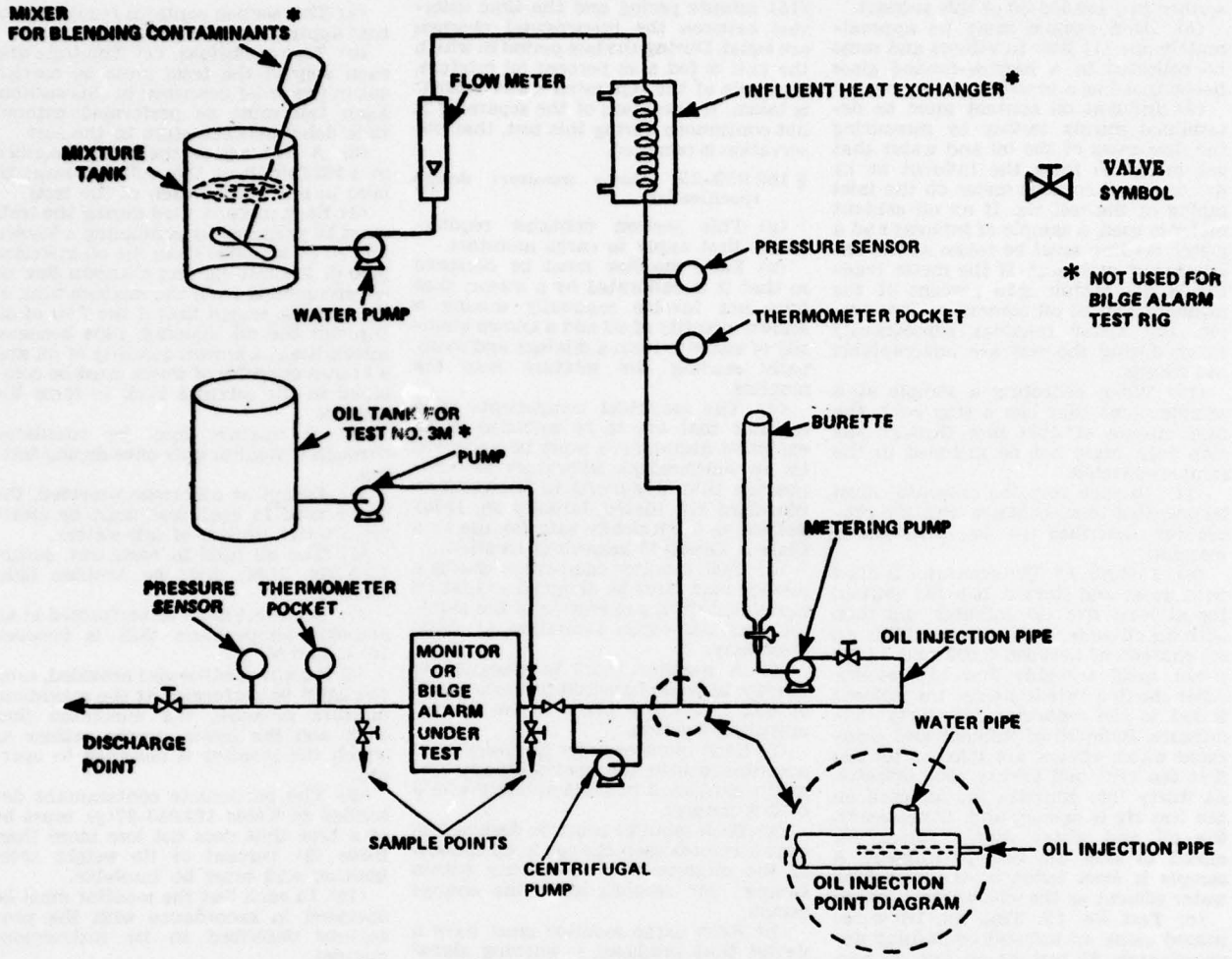
A dimension A is not greater than 400 mm.

B height B is large enough to insert a sample bottle.

C distance C is a straight line of not less than 60 mm.

D width D is not greater than 2 mm.

FIGURE 162.050—19 - MONITOR AND BILGE ALARM TEST RIG



§ 162.050–21 Separator design specification.

(a) A separator must be designed to operate in each plane that forms an angle of 22.5° with the plane of its normal operating position.

(b) The electrical components of a separator that are to be installed in an explosive atmosphere must be approved by an independent laboratory as components that Underwriters Laboratories Standard 913 (dated January 20, 1976) defines as intrinsically safe for use in a Class I, Group D hazardous location.

(c) Each separator component that is a moving part must be designed so that its movement during operation of the separator does not cause formation of static electricity.

(d) Each separator must be designed in accordance with the applicable requirements in subchapters F and J of this chapter.

(e) Each separator must be designed to be operated both automatically and manually. Each separator to be installed in an unattended machinery space must be capable of operating automatically for at least twenty-four (24) hours.

(f) Each separator must be designed so that adjustments to valves or other equipment are not necessary to start it.

(g) Each part of a separator that is susceptible to wear and tear must be readily accessible for maintenance in its installed position.

§ 162.050–23 Separator: approval tests.

(a) *Test Conditions.* (1) Each test described in this section must be performed at a throughput equal to the maximum throughput at which the separator being tested is designed to operate. The tests and each of the steps in the tests must be carried out in the order described in this section. Each test must be performed without time delay between steps in the test.

(2) Except as provided in Test No. 3S, the influent oil used in each test must be a heavy fuel oil that has a relative density of approximately 0.94 at 15° C and a viscosity of at least 220 centistokes (approximately 900 seconds Redwood No. 1) at 37.8° C.

(3) A test rig of the type described in § 162.050–17 of this subpart must be used in performing each of the tests.

(4) If a separator has a supply pump, it must be tested using that pump. If a separator does not have a supply pump, it must be tested using a mixture pump provided by the facility. The mixture pump must be a centrifugal pump capable of operating at one thousand (1,000) revolutions per minute or more. The pump must have a delivery capacity of at least one and one half (1.5) times the maximum throughput at which the separator being tested is designed to operate. The pump must have either bypass piping to its suction side or a throttle valve or orifice on its discharge side.

(5) The influent water used in each test must be clean and have a relative density at 15° C that is equal to or less than 0.085 plus the relative density of the heavy fuel oil used in the testing.

(6) Each test must be conducted at an ambient temperature that is between 10° C and 30° C.

(7) The oil content of each sample must be measured using the method described in § 162.050–39 of this subpart.

(8) Each sample must be approximately one (1) liter in volume and must be collected in a narrow-necked glass bottle that has a pressure sealing cap.

(9) Influent oil content must be determined during testing by measuring the flow rates of the oil and water that are mixed to form the influent or by use of an oil content meter on the inlet piping of the test rig. If an oil content meter is used, a sample of influent and a meter reading must be taken at the beginning of each test. If the meter reading is not within ±10 percent of the measurement of oil content of the sample, the meter readings subsequently taken during the test are unacceptable test results.

(10) When collecting a sample at a sample point that has a stop cock, the first minute of fluid flow through the stop cock must not be included in the sample collected.

(11) In each test, the separator must be operated in accordance with the procedures described in its instructions manual.

(b) *Test No. 1S.* The separator is filled with water and started. It is fed with oil for at least five (5) minutes and then with an oil-water influent containing an oil content of between 5,000 and 10,000 p.p.m. until a steady flow rate occurs. After the flow rate is steady, the influent is fed to the separator for thirty (30) minutes. Samples of influent and separated water effluent are taken after the first ten (10) and twenty (20) minutes. At thirty (30) minutes the air cock on the test rig is opened and, if necessary, the oil and water supply valves are closed to stop the flow of influent. A sample is then taken of the separated water effluent as the effluent flow ceases.

(c) *Test No. 2S.* Test No. 1S is repeated using an influent containing approximately 25 percent oil and 75 percent water.

(d) *Test No. 3S.* Tests No. 1S and 2S are repeated using, in lieu of a heavy fuel oil in the influent, a light distillate fuel oil having a relative density of approximately 0.83 at 15° C.

(e) *Test No. 4S.* The separator is fed with oil until oil is discharged at the oil discharge outlet of the separator at essentially the same rate that oil is being fed to the separator. The separator is then fed with oil for five (5) additional minutes. If any oily mixture is discharged from the separated water outlet on the separator during the test, that observation is recorded.

(f) *Test No. 5S.* The separator is fed with water for fifteen (15) minutes. Samples of the separated water effluent are taken at the beginning of the test and after the first ten (10) minutes.

(g) *Test No. 6S.* The separator is operated automatically for three (3) hours. During the test the separator is continuously fed with an influent varying from water to a mixture of 25 percent oil in water and back to water every fifteen (15) minutes. The oil concentration in the influent is varied in at least five (5) equal increments during each fifteen (15) minute period and the time intervals between the incremental changes are equal. During the last period in which the unit is fed a 25 percent oil mixture, a sample of the separated water effluent is taken. If operation of the separator is not continuous during this test, that observation is recorded.

§ 162.050–25 Cargo monitor: design specification.

(a) This section contains requirements that apply to cargo monitors.

(b) Each monitor must be designed so that it is calibrated by a means that does not involve manually mixing a known quantity of oil and a known quantity of water to form a mixture and manually feeding the mixture into the monitor.

(c) The electrical components of a monitor that are to be installed in an explosive atmosphere must be approved by an independent laboratory as components that Underwriters Laboratories Standard 913 (dated January 20, 1976) defines as intrinsically safe for use in a Class I, Group D hazardous location.

(d) Each monitor component that is a moving part must be designed so that its movement during operation of the monitor does not cause formation of static electricity.

(e) A monitor must be designed to operate in each plane that forms an angle of 22.5° with the plane of its normal operating position.

(f) Each monitor must be designed in accordance with the applicable requirements contained in subchapters F and J of this chapter.

(g) Each monitor must be designed so that it records each change in oil content of the mixture it is measuring within twenty (20) seconds after the change occurs.

(h) Each cargo monitor must have a device that produces a warning signal and a signal that can be used to actuate valves in a vessel's fixed piping system, if—

(1) The oil content of the mixture being measured exceeds the concentration limit set by the operator of the monitor; or

(2) Malfunction, breakdown, or other failure of the monitor occurs.

(i) Each monitor must have a means to determine whether it is accurately calibrated.

(j) Each cargo monitor must have a device that has a means to record continuously the amount of oil (in liters) of any oily cargo residue or other oily mixture combined with an oily cargo residue discharged overboard from the vessel on which the monitor is installed and the amount of oil in the discharge per nautical mile of vessel travel. The device must also have a means to record the date and time of discharge. The record must be durable enough to be kept for three (3) years. If the device has more than one scale, it must have a means to show on the record the scale in use at the time of the reading.

§ 162.050–27 Cargo monitor: approval tests.

(a) This section contains requirements that apply to cargo monitors.

(b) *Test conditions.* (1) The tests and each step in the tests must be carried out in the order described in this section. Each test must be performed without time delay between steps in the test.

(2) A test rig of the type described in § 162.050–19 of this subpart must be used in performing each of the tests.

(3) Each mixture used during the tests must be prepared by combining a known flow of oil supplied from the oil injection pipe of the test rig and a known flow of water supplied from the mixture tank of the test rig, except that if the flow of oil through the oil injection pipe becomes intermittent a known quantity of oil and a known quantity of water must be combined in the mixture tank to form the mixture.

(4) A mixture may be circulated through a monitor only once during testing.

(5) Except as otherwise provided, the water used in each test must be clean, fresh water (in lieu of salt water).

(6) The oil used in each test, except Test No. 2CM, must be Arabian light crude oil.

(7) Each test must be performed at an ambient temperature that is between 10° C. and 30° C.

(8) Except as otherwise provided, each test must be performed at the maximum mixture pressure, the maximum flow rate, and the power supply ratings at which the monitor is designed to operate.

(9) The particulate contaminant described in Table 162.050–27(g) must be of a type that does not lose more than three (3) percent of its weight after ignition and must be insoluble.

(10) In each test the monitor must be operated in accordance with the procedures described in its instructions manual.

(c) *Test No. 1CM.* The cargo monitor is calibrated and zeroed. It is then fed with mixtures in concentrations of 0 p.p.m., 15 p.p.m., 50 p.p.m., and 100 p.p.m., followed by concentrations that increase incrementally in size by 50 p.p.m. per concentration up to the highest concentration that can be read on the monitor. Each incremental concentration is fed to the monitor for fifteen (15) minutes and the oil content reading is then recorded. After each concentration is fed to the monitor, the equipment is fed with water for fifteen (15) minutes and the oil content reading then recorded.

(d) *Test No. 2CM.* (1) If the applicant states in his application that the cargo monitor is to be used with crude oils, the monitor is fed with a mixture containing the first oil listed in Table 162.050–27(d) at a concentration of 15 p.p.m. and then at a 100 p.p.m. concentration and at a concentration that is ninety (90) percent of the highest oil concentration in water that can be read on the monitor. Each concentration is fed to the monitor until a steady reading occurs and is recorded. After each steady

reading is recorded, the monitor is fed with water for fifteen (15) minutes. The reading of oil content at the end of each fifteen (15) minute period is also recorded.

(2) The steps described in paragraph (d)(1) of this section are repeated using each of the other oils listed in Table 162.050–27(d).

TABLE 162.050–27(d).—OIL TYPE AND CHARACTERISTICS

Oil type:	Characteristics
1. Sahara blend crude oil.	Density—low; viscosity—low; pour point—very low; producing country—Algeria; general description—mixed base.
2. Arabian light crude oil.	Density — medium; viscosity — medium; pour point —low; producing country — Saudi Arabia; general description—mixed base.
3. Nigerian medium crude oil.	Density—high; viscosity — medium; pour point—low; producing country—Nigeria; general description—napthenic base.
4. Bachaquero 17 crude oil.	Density—very high; viscosity — very high; pour point —low; producing country — Venezuela; general description — asphaltic base.
5. Minas crude.	Density — medium; viscosity — high; pour point—very high; producing country — Indonesia; general description — paraffinic base.
6. Residual fuel.	Bunker C or No. 6 fuel oil.

(3) If any oil listed in Table 162.050–27(d) is unavailable, an oil with similar properties is substituted in testing.

(4) If the applicant states in his application that the monitor is to be used with refined products, the steps described in paragraph (d)(1) of this section are performed using each of the following in lieu of an oil listed in Table 162.050–27(d):

(1) Leaded regular grade automotive gasoline.

(2) Unleaded automotive gasoline.

(3) Kerosene.

(4) Light diesel or no. 2 fuel oil.

(e) *Test No. 3CM.* (1) The cargo monitor is fed with water, zeroed, and then fed with a 100 p.p.m. mixture. The time of turning on the metering pump of the test rig, the time at which the monitor first detects oil in the mixture, the tmes of readng 63 p.p.m. and 90 p.p.m., and the time of reading the highest steady reading of oil content are recorded. The value of the highest steady reading is also recorded.

(2) The metering pump is turned off and the time at which the highest reading starts to decrease, the times of reading 37 p.p.m. and 10 p.p.m., and the time of reading the lowest steady reading are recorded. The value of the lowest steady reading is also recorded.

(3) The time interval between starting oil injection and reading 63 p.p.m. and the time interval between turning the metering pump off and reading 37 p.p.m. are averaged and recorded as the response time for the monitor.

(f) *Test No. 4CM.* (1) The cargo monitor is fed with water, zeroed, and then fed with a mixture containing ten (10) percent oil for one (1) minute. The following times occurring during this procedure are recorded:

(i) Time of turning on the metering pump of the test rig.

(ii) Time at which the monitor first detects oil.

(iii) Time of reading 100 p.p.m.

(iv) Time of exceeding the highest oil concentration that can be read on the monitor.

(v) Time of returning to the highest oil concentration that can be read on the monitor.

(vi) Time of returning to a reading of 100 p.p.m.

(vii) Time of returning to the lowest steady oil content reading.

(2) The value of the lowest steady oil content reading described in paragraph (f)(1)(vii) of this section is recorded.

(3) The monitor is fed with water, zeroed, and then fed with oil for one (1) minute after which the flow of water is resumed. The times described in paragraph (f)(1) of this section are recorded.

(4) The monitor is fed with a 100 p.p.m. mixture until a steady oil content reading is obtained and recorded.

(g) *Test No. 5CM.* (1) The cargo monitor is fed with a 500 p.p.m. mixture until a steady reading is obtained and recorded.

(2) The monitor is fed with a 500 p.p.m. mixture to which sodium chloride has been added to provide a concentration of 60,000 parts per million of sodium chloride in water. The oil content reading, when steady, is recorded.

(3) The monitor is fed with a 500 p.p.m. mixture to which the insoluble particulate contaminant described in Table 162.050–27(g) has been added to provide a concentration of 100 parts per million of particulate contaminant in water. The oil content reading, when steady, is recorded.

TABLE 162.050–27(g).—INSOLUBLE PARTICULATE CONTMINANT

PHYSICAL DESCRIPTION

Particle sizes, microns:	*Percentage by weight of particle size in contaminant*
0–5	39+2
5–10	18+3
10–20	16+3
20–40	18+3
40–80	9+3

(h) *Test No. 6CM.* (1) The cargo monitor is fed with a 100 p.p.m. mixture until a steady oil content reading occurs and is recorded.

(2) The monitor is fed with a 100 p.p.m. mixture that has first passed through the centrifugal pump of the test rig. The pump is run at one fourth (¼) of its design speed. The oil content reading, when steady, is recorded.

(3) The steps described in paragraph (h)(2) of this section are repeated with the pump running at one-half (½) of its design speed and then repeated at its design speed.

(i) *Test No. 7CM.* (1) The steps described in paragraph (h)(1) of this section are repeated.

(2) The temperature of the mixture is adjusted to 10° C. and the flow continued until a steady oil content reading is obtained and recorded.

(3) The steps described in paragraph (i)(2) of this section are repeated with the temperature of the mixture 65° C. or the mixture temperature at which the cargo monitor is designed to operate, whichever is lower.

(j) *Test No. 8CM.* (1) The steps described in paragraph (h)(1) of this section are repeated.

(2) If the cargo monitor has a positive displacement mixture pump, the mixture pressure is lowered to one half of the monitor's maximum design pressure. If the monitor has a centrifugal mixture pump or is not equipped with a mixture pump the mixture flow rate is reduced to one-half of the monitor's design flow rate. The reduced flow rate or mixture pressure is maintained until a steady oil content reading is obtained and recorded.

(3) If the cargo monitor has a positive displacement mixture pump, the mixture pressure is increased to twice the monitor's maximum design pressure. If the monitor has a centrifugal mixture pump or does not have a mixture pump, the mixture flow rate is increased to twice the monitor's maximum design flow rate. The increased flow rate or mixture pressure is maintained until a steady oil content reading is obtained and recorded.

(k) *Test No. 9CM.* (1) The steps described in paragraph (h)(1) of this section are repeated.

(2) The water and metering pumps on the test rig are stopped for eight (8) hours after which the steps described in paragraph (h)(1) of this section are repeated.

(l) *Test No. 10CM.* (1) The supply voltage to the cargo monitor is increased to one hundred and ten (110) percent of its design supply voltage. The monitor is then fed a 100 p.p.m. mixture for one (1) hour. At one (1) hour the oil content reading is recorded.

(2) The steps described in paragraph (1)(1) of this section are repeated with the supply voltage to the monitor lowered to ninety (90) percent of its design supply voltage.

(3) Upon completion of the steps described in paragraph (1)(2) of this section, the supply voltage to the monitor is returned to the design rating.

(4) The steps described in paragraph (1)(1), (1)(2), and (1)(3) of this section are repeated varying each other power supply to the monitor in the man-

ner prescribed in those steps for supply voltage.

(m) *Test No. 11CM.* (1) The monitor is calibrated and zeroed.

(2) The steps described in paragraph (h)(1) of this section are repeated.

(3) A 100 p.p.m. mixture is fed to the monitor for eight (8) hours. At eight (8) hours the oil content reading is recorded.

(4) The monitor is fed with water until a steady oil content reading is obtained and recorded.

(n) *Test No. 12CM.* (1) All power to the monitor is shut off for one (1) week. After one week the monitor is started, zeroed, and calibrated.

(2) The monitor is fed with a 100 p.p.m. mixture for one (1) hour. The oil content reading is then recorded.

(3) The monitor is fed with water for one (1) hour. The oil content reading is then recorded.

(4) The steps described in paragraphs (n)(2) and (n)(3) of this section are repeated three (3) additional times.

§ 162.050–29 Bilge monitor: design specification.

(a) This section contains requirements that apply to bilge monitors.

(b) Each bilge monitor must be designed to meet the requirements of this section and the requirements for a cargo monitor in §§ 162.050–25 (b) through (g) and 162.050–25(i) of this subpart.

(c) Each bilge monitor must have—

(1) A device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, when the oil content of the mixture being measured exceeds 15 p.p.m. ±5 p.p.m.;

(2) A device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, when the oil content of the mixture being measured exceeds 100 p.p.m. ±20 p.p.m.; and

(3) A device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, when malfunction, breakdown, or other failure of the bilge monitor occurs.

(d) Each bilge monitor must have a device that has a means to record continuously the concentration of oil in p.p.m. that the monitor measures. The device must also have a means to record the date and time of the measurement. The record must be durable enough to be kept for three (3) years. If the device has more than one scale, it must have a means to show on the record the scale in use at the time of the reading.

§ 162.050–31 Bilge monitor: approval tests.

(a) This section contains requirements that apply to bilge monitors.

(b) *Test conditions.* (1) Each test must be conducted under the conditions prescribed in this section and under the conditions prescribed for cargo monitors in § 162.050–27 (b)(1) through (b)(4) and § 162.050–27 (b)(7) through (b)(10).

(2) Except as provided in test No. *2BM*, the oil used in each test must be a heavy fuel oil that has a relative density of approximately 0.94 at 15° C and a viscosity of at least 220 centistokes (approximately 900 seconds Redwood No. 1) at 37.8° C.

(3) The water used in each test must be clean and have a relative density at 15° C that is equal to or less than 0.085 plus the relative density of the heavy fuel oil used in the testing.

(c) *Test No. 1BM.* (1) The bilge monitor is calibrated and zeroed. It is then fed with mixtures in concentrations of 0 p.p.m., 15 p.p.m., 50 p.p.m., 75 p.p.m., and 100 p.p.m., followed by concentrations that increase incrementally in size by 25 p.p.m. per concentration up to the highest concentration that can be read on the monitor. Each incremental concentration is fed to the monitor for fifteen (15) minutes and the oil content reading is then recorded. After each concentration is fed to the bilge monitor, the equipment is fed with water for fifteen (15) minutes and the oil content reading then recorded.

(2) The metering and water pumps of the test rig are started and the oil content of the mixture is increased until the device required by § 162.050–29(c)(1) actuates. The oil content of the mixture causing actuation is recorded.

(3) The oil content of the mixture is then increased until the device required by § 162.050–29(c)(2) actuates. The oil content of the mixture causing actuation is recorded.

(d) *Test No. 2BM.* Test No. 1BM is repeated using, in lieu of a heavy fuel oil in the influent, a light distillate fuel oil having a relative density of approximately 0.83 to 15° C.

(e) *Test No. 3BM.* (1) The bilge monitor is fed with water, zeroed, and then fed with a 15 p.p.m. mixture until a steady reading is obtained and recorded. The time of turning on the metering pump of the test rig and the time of obtaining the highest steady reading of oil content are also recorded.

(2) The metering pump is turned off and the time at which the highest steady reading starts to decrease and the time of reading the lowest steady reading are recorded. The value of the lowest steady reading is also recorded.

(3) The steps in paragraphs (1) and (2) of this section are repeated using a 100 p.p.m. mixture.

(f) *Test No. 4BM.* (1) The bilge monitor is fed with water, zeroed, and then fed with a mixture containing (10) percent oil for one (1) minute. The following times occurring during this procedure are recorded:

(i) Time of turning on the metering pump of the test rig.

(ii) Time at which the bilge monitor first detects oil.

(iii) Time of actuation of the device required by § 162.050–29(c)(1).

(iv) Time of actuation of the device required by § 162.050–29(c)(2).

(v) Time of exceeding the highest oil concentration that can be read on the bilge monitor.

(vi) Time of returning to the highest oil concentration that can be read on the bilge monitor.

(vii) Time of returning to the lowest steady oil content reading.

(2) The value of the lowest steady oil content reading described in paragraph (f)(1)(vii) of this section is recorded.

(3) The monitor is fed with water, zeroed, and then fed with oil for one (1) minute after which the flow of water is resumed. The times described in paragraph (f)(1) of this section are recorded.

(4) The monitor is fed with a 15 p.p.m. mixture until a steady oil content reading is obtained and recorded.

(5) The monitor is fed with a 100 p.p.m. mixture until a steady oil content reading is obtained and recorded.

(g) *Test No. 5BM.* (1) The bilge monitor is fed with an 80 p.p.m. mixture until a steady reading is obtained and recorded.

(2) The monitor is fed with an 80 p.p.m. mixture to which sodium chloride has been added to provide a concentration of 60,000 parts per million of sodium chloride in water. The oil content reading, when steady, is recorded.

(3) The monitor is fed with an 80 p.p.m. mixture to which the insoluble particulate contaminant described in Table 162.050–27(g) has been added to provide a concentration of 20 parts per million of particulate contaminant in water. The oil content reading, when steady, is recorded.

(h) *Test No. 6BM.* (1) The bilge monitor is fed a 10 p.p.m. mixture until a steady reading is obtained and recorded.

(2) If the monitor has a positive displacement mixture pump, the mixture pressure is lowered to one half of the monitor's maximum design pressure. If the monitor has a centrifugal mixture pump or is not equipped with a mixture pump, the mixture flow rate is reduced to one half of the monitor's maximum design flow rate. After reduction of the pressure or flow rate, the oil content of the mixture is increased until the device required by § 162.050–29(c)(1) actuates. The oil content causing actuation is recorded.

(3) The bilge monitor is fed with an 80 p.p.m. mixture until a steady reading is obtained and recorded. The oil content of the mixture is then increased until the device required by § 162.050–29(c)(2) actuates. The oil content causing actuation is recorded.

(4) If the monitor has a positive displacement mixture pump, the mixture pressure is increased to twice the monitor's maximum design pressure. If the monitor has a centrifugal mixture pump or if the monitor is not equipped with a mixture pump, the mixture flow rate is increased to twice the monitor's maximum design flow rate. After increasing the pressure or flow rate, the oil content of the mixture is increased until the device required by § 162.050–29(c)(1) actuates. The oil content causing actuation is recorded.

(5) The steps described in paragraph (h)(3) of this section are repeated.

(i) *Test No. 7BM.* (1) The steps described in paragraphs (c) (2) and (c) (3) of this section are repeated.

(2) The water and metering pumps on the test rig are stopped for eight (8) hours after which the steps described in paragraphs (c) (2) and (c) (3) of this section are repeated.

(j) *Test No. 8BM.* (1) The supply voltage to the bilge monitor is increased to one hundred and ten (110) percent of its design supply voltage. The monitor is then fed at 10 p.p.m. mixture for one (1) hour. At one (1) hour the oil content reading is recorded.

(2) The oil content of the mixture is increased until the device required by § 162.050–29(c) (1) actuates. The oil content causing actuation is recorded.

(3) The bilge monitor is fed with an 80 p.p.m. mixture for one (1) hour. At one (1) hour the oil content reading is recorded.

(4) The oil content of the mixture is increased until the device required by § 162.050–29(c) (2) actuates. The oil content causing actuation is recorded.

(5) The steps described in paragraphs (j) (1) through (j) (4) of this section are repeated with the supply voltage to the bilge monitor lowered to ninety (90) percent of its design voltage.

(6) Upon completion of the steps described in paragraph (j) (5) of this section, the supply voltage to the monitor is returned to the design rating.

(7) The steps described in paragraphs (j) (1), (j) (2), (j) (3), and (j) (4) of this section are repeated varying each other power supply to the monitor in the manner prescribed in those steps for supply voltage.

(k) *Test No. 9BM.* (1) The steps described in paragraphs (c) (2) and (c) (3) of this section are repeated.

(2) An 80 p.p.m. mixture is fed to the bilge monitor for eight (8) hours. At eight (8) hours the oil content reading is recorded.

(3) The steps described in paragraphs (c) (2) and (c) (3) of this section are repeated.

(4) The monitor is fed with water until a steady reading is obtained and recorded.

(l) *Test No. 10BM.* (1) All power to the bilge monitor is shut off for one (1) week. After one week the monitor is started, zeroed, and calibrated.

(2) The monitor is fed with an 80 p.p.m. mixture for one (1) hour. The oil content reading is then recorded.

(3) The steps described in paragraphs (c) (2) and (c) (3) of this section are repeated.

(4) The monitor is fed with water for one (1) hour. The oil content reading is then recorded.

(5) The steps described in paragraphs (l) (2), (l) (3), and (l) (4) of this section are repeated three (3) additional times.

§ 162.050–33 Bilge alarm: design specification.

(a) This section contains requirements that apply to bilge alarms.

(b) Each bilge alarm must be designed to meet the requirements for a cargo monitor in §§ 162.050–25 (b) through (g) and 162.050–25(l) of this subpart and the requirements in this section.

(c) Each bilge alarm must have a device that produces a warning signal, and a signal that can be used to actuate stop valves in a vessel's fixed piping system, if—

(1) The oil content of the mixture being measured by the bilge alarm exceeds 15 p.p.m. ±5 p.p.m.; or

(2) Malfunction, breakdown, or other failure of the bilge alarm occurs.

§ 162.050–35 Bilge alarm: approval tests.

(a) This section contains requirements that apply to bilge alarms.

(b) *Test Conditions.* (1) Each test must be conducted under the conditions prescribed for cargo monitors in § 162.050–27 (b) (1) through (b) (5) and § 162.050–27(b) (7), (b) (8), and (b) (10) of this subpart.

(2) Each test must be performed using a light distillate fuel oil having a relative density of approximately 0.83 at 15° C.

(c) *Test No. 1A.* The bilge alarm is calibrated and zeroed. The metering and water pumps of the test rig are started and the oil content of the mixture is increased until the alarm actuates. The oil content of the mixture causing actuation of the alarm is recorded. The alarm is then fed with water for fifteen (15) minutes.

(d) *Test No. 2A.* (1) The metering and water pumps of the test rig are started and the oil content of the mixture is increased until the bilge alarm actuates. The oil content of the mixture causing actuation of the alarm is recorded.

(2) If the alarm has a positive displacement mixture pump, the mixture pressure is reduced to one-half (½) of the alarm's maximum design pressure. If the alarm has a centrifugal mixture pump or is not equipped with a mixture pump, the mixture flow rate is reduced to one-half (½) of the alarm's maximum design flow rate. After reduction of pressure or flow rate, the oil content in the mixture is increased until the alarm actuates. The oil content of the mixture causing actuation of the alarm is recorded.

(3) If the alarm has a positive displacement mixture pump, the influent pressure is increased to twice the alarm's maximum design pressure. If the alarm has a centrifugal mixture pump or if the alarm is not equipped with a mixture pump, the influent flow rate is increased to twice the alarm's maximum design flow rate. After increasing the pressure or flow rate, the oil content in the mixture is increased until the alarm actuates. The oil content of the mixture causing actuation is recorded.

(e) *Test No. 3A.* (1) The steps described in paragraph (d) (1) of this section are repeated.

(2) The metering and water pumps of the test rig are stopped for eight (8) hours.

(3) The metering and water pumps are started and the oil content of the mixture is increased until the bilge alarm actuates. The oil content of the mixture causing actuation is recorded.

(f) *Test No. 4A.* (1) The steps described in paragraph (d) (1) of this section are repeated.

(2) The supply voltage to the bilge alarm is raised to one hundred ten (110) percent of its design supply voltage. The oil content of the mixture is then increased until the alarm actuates. The oil content of the mixture causing actuation is recorded.

(3) The supply voltage to the alarm is lowered to ninety (90) percent of its design supply voltage. The oil content of the mixture is then increased until the alarm actuates. The oil content of the mixture causing actuation is recorded.

(4) Upon completion of the steps described in paragraph (f) (3) of this section, the supply voltage to the alarm is returned to its design value.

(5) The steps described in paragraphs (f) (2), (f) (3), and (f) (4) of this section are repeated varying each other power supply to the alarm in the manner prescribed in those steps for supply voltage.

(g) *Test No. 5A.* (1) The steps described in paragraph (d) (1) of this section are repeated.

(2) The bilge alarm is fed with a 5 p.p.m. mixture for eight (8) hours. After eight (8) hours the oil content of the mixture is then increased until the alarm actuates. The oil content of the mixture causing actuation is recorded.

(h) *Test No. 6A.* (1) All power to the bilge alarm is shut off for one (1) week. After one (1) week the alarm is then started, zeroed, and calibrated.

(2) The steps described in paragraph (d) (1) of this section are repeated. Water is then fed to the alarm for one (1) hour.

(3) The steps described in paragraph (h) (2) are repeated seven (7) additional times.

§ 162.050–37 Vibration test.

(a) Equipment submitted for Coast Guard approval must first be tested under the conditions prescribed in paragraph (b) of this section. The test must be performed at an independent laboratory that has the equipment to subject the item under test to the vibrating frequencies and amplitudes prescribed in paragraph (b) of this section. The test report submitted with the application for Coast Guard approval must be prepared by the laboratory and must contain the test results.

(b) Each bilge alarm and monitor and each control of a separator must be subjected to continuous sinusoidal vibration in each of the following directions for a 4 hour period in each direction:

(1) Vertically up and down.

(2) Horizontally from side to side.

(3) Horizontally from end to end.

The vibrating frequency must be 80Hz, except that the vibrating frequency of equipment that has a resonant frequency between 2Hz and 80Hz must be the resonant frequency. If the vibrating frequency is between 2Hz and 13.2Hz, the displacement amplitude must be ±1 mm.

If the vibrating frequency is between 13.2Hz and 80Hz, the acceleration amplitude must be ±.7g.

§ 162.050–39 Measurement of oil content.

(a) *Scope.* This section describes the method and apparatus to be used in measuring the oil content of a sample taken in approval testing of a separator. Light oil fractions in the sample, with the exception of volatile components lost during extractions, are included in each measurement.

(b) *Summary of method.* Each sample is acidified to a low pH and extracted with two volumes of carbon tetrachloride. The oil content of the sample is determined by comparison of the infrared absorbance of the sample extract against the absorbance of known concentrations of a reference oil in carbon tetrachloride.

(c) *Apparatus.* The following apparatus is used in each measurement:

(1) A separatory funnel of 1000 ml. volume that has a Teflon stopcock.

(2) An infrared spectrophotometer.

(3) A cell of 5 mm. pathlength that has sodium chloride or infrared grade quartz with a minimum of 80 percent transmittance at 2930 cm^{-1}. (This cell should be used if the oil content of the sample to be measured is expected to have a concentration of between 2 p.p.m. and 80 p.p.m.).

(4) A cell of pathlength longer than 5 mm. that has sodium chloride or infrared grade quartz with a minimum of 80 percent transmittance at 2930 cm^{-1}. (This cell should be used if the oil content of the sample to be measured is expected to have a concentration of between 0.1 p.p.m. and 2 p.p.m.).

(5) Filter paper that is medium grade and 12.5 cm. in diameter.

(6) 100 ml. volumetric flasks.

(d) *Storage of sample.* Unless a sample is to be measured on the day of collection, it is preserved by the addition of 5 ml. of hydrochloric acid.

(e) *Reagents.* The following reagents are used in each measurement:

(1) Hydrochloric acid prepared by mixing equal amounts of concentrated hydrochloric acid and distilled water.

(2) Reagent grade sodium chloride.

(3) Reagent grade carbon tetrachloride.

(4) Reference oil, which is a sample of the oil used in the portion of the test during which the sample is collected.

(5) Stock reference standard prepared by weighing 0.30 g. of reference oil in a tared 100 ml., volumetric flask and diluting to 100 ml. volume with carbon tetrachloride.

(f) *Preparation of calibration standards.* A series of dilutions are prepared by pipetting volumes of stock reference standard into 100 ml. volumetric flasks and diluting to volume with carbon tetrachloride. A convenient series of volumes of the stock reference standard is 5, 10, 15, 20, and 25 ml. The exact concentrations of the dilutions in milligrams of oil per 100 milliliters of diluted stock reference standard are calculated. The calibration standards are the dilutions.

(g) *Extraction.* (1) A reagent blank is carried through each step described in this paragraph and paragraph (h) of this section.

(2) If a sample was not acidified at time it was taken, 5 ml. of hydrochloric acid are added to the sample bottle. After mixing hydrochloric acid with the sample, the pH is checked by touching pH-sensitive paper to the bottle cap to ensure that the pH is 2 or lower. More acid is added if necessary until the pH is 2 or lower.

(3) The sample is poured into a separatory funnel and 5 g. of sodium chloride are added.

(4) Fifty (50) ml. of carbon tetrachloride are added to the sample bottle. The bottle is capped tightly and shaken thoroughly to rinse its inside. The contents of the bottle are then transferred to the separatory funnel containing the sample and extracted by shaking vigorously for 2 minutes. The layers are allowed to separate.

(5) The solvent layer is drained through a funnel containing carbon tetrachloride moistened filter paper into a 100 ml. volumetric flask.

(6) Fifty (50) ml. of carbon tetrachloride are added to the sample bottle. The bottle is capped tightly and shaken thoroughly to rinse its inside surface. The contents of the bottle are then transferred to the separatory funnel containing the water layer of the sample. The contents of the separatory funnel are then extracted by shaking vigorously for 2 minutes. The layers are allowed to separate. The solvent layer is then drained through a funnel containing carbon tetrachloride moistened filter paper into the volumetric flask containing the solvent layer of the sample.

(7) The tips of the separatory funnel, filter paper, and funnel are rinsed with small portions of carbon tetrachloride and the rinsings are collected in the volumetric flask containing the solvent layer of the sample. The volume is adjusted with carbon tetrachloride up to 100 ml. The flask is then stoppered and mixed well.

(8) The water layer remaining in the separatory funnel is drained into a 1000 ml. graduated cylinder and the water volume estimated to the nearest 5 ml.

(h) *Infrared spectroscopy.* (1) The infrared spectrophotometer is prepared according to manufacturer instructions.

(2) A cell is rinsed with two volumes of the solvent layer contained in the volumetric flask. The cell is then completely filled with the solvent layer. A matched cell containing carbon tetrachloride is placed in the reference beam.

(3) If a scanning spectrophotometer is used, the solvent layer in the cell and the calibration standards are scanned from 3200 cm^{-1} to 2700 cm^{-1}. If a single beam or non-scanning spectrophotometer is used, the manufacturer's instructions are followed and the absorbance is measured at or near 2930 cm^{-1}.

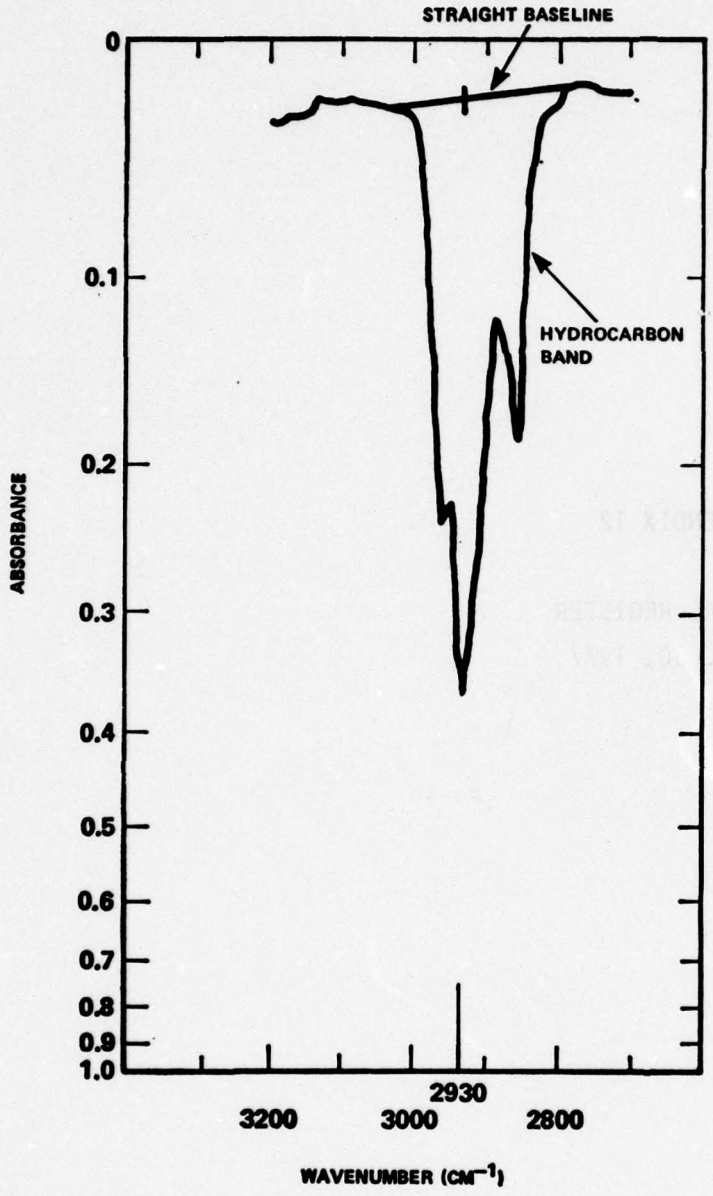
(4) If the scan is recorded on absorbance paper, a straight baseline of the type described in figure 162.050–39(h) is constructed. To obtain the net absorbance, the absorbance of the baseline at 2930 cm^{-1} is subtracted from the absorbance of the maximum peak on the curve at 2930 cm^{-1}.

(5) If the scan is recorded on transmittance paper, a straight baseline is constructed on the hydrocarbon band plotted on the paper. The net absorbance is:

$$\log_{10} \frac{\text{percent } T \text{ (baseline)}}{\text{percent } T \text{ (peak maximum)}}$$

(6) A plot is prepared for net absorbance vs. oil content of the calibration standards or of the percentages of stock reference standard contained in the calibration standards.

FIGURE 162.050—39(h) - SPECTRUM ILLUSTRATING BASELINE CONSTRUCTION



(7) If the net absorbence of a sample determined by the calibration plot exceeds 0.8 or the linear range of the spectrophotometer, a dilution of the solvent layer contained in the volumetric flask after completing the step described in paragraph (g) of the section is prepared by pipetting an appropriate volume of the solvent layer into a second volumetric flask and diluting to volume with carbon tetrachloride. If the net absorbance is less than 0.1 when determined in accordance with the procedures in this paragraph, it is recalculated using a longer pathlength cell.

(i) *Calculations.* (1) The plot described in paragraph (h)(6) of this section is used to determine the milligrams of oil in each 100 ml. of solvent layer contained in the volumetric flask after completing the steps described in paragraph (g) or paragraph (h)(7) of this section.

(2) The oil content of the sample is calculated using the following formula:

$$\text{oil content of sample} = \frac{R \times D \times 1{,}000}{V}$$

R = milligram of oil in 100 ml of solvent layer determined from plot.
D = 1 or, if the step described in paragraph (h)(7) of this section is performed, the ratio of the volume of the 2d volumetric flask described in that paragraph to the volume of solvent layer pipetted into the 2d volumetric flask.
V = The volume of water in milliliters drained into the graduated cylinder at the step described in paragraph (g)(8) of this section.

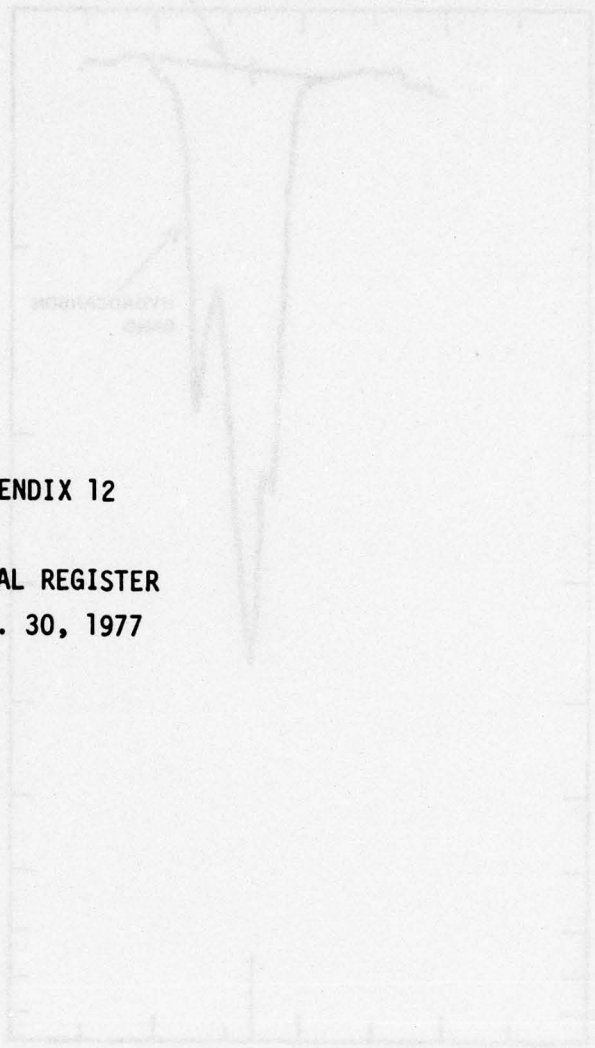
(3) The results are reported to two significant figures for oil contents below 100 mg/l and to three significant figures for oil contents above 100 mg/l.

NOTE: The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: June 17, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77-18089 Filed 6-24-77;8:45 am]



APPENDIX 12

FEDERAL REGISTER
JUN. 30, 1977

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
proposed rules

MAILING ADDRESS:
U.S. COAST GUARD (G-CMC/81)
WASHINGTON, D.C. 20590
PHONE: 202 426 1477

5991/2
5 July 1977
Serial 19-P-77

Interested persons are invited to participate in this rulemaking by submitting written comments to Commandant (G-CMC/81) U.S. Coast Guard 400 7th St. S.W. Washington, D.C. 20590 prior to 11 August 1977.

DEPARTMENT OF TRANSPORTATION

Coast Guard

[46 CFR Parts 31, 34, 38, 40, 54, 98, 154]

[CGD 77-069]

CONSTRUCTION AND EQUIPMENT OF EXISTING SELF-PROPELLED VESSELS CARRYING BULK LIQUEFIED GASES

Development of New Standards

AGENCY: Coast Guard, DOT.

ACTION: Advance notice of proposed rulemaking.

SUMMARY: The Coast Guard is considering amending the regulations for existing self-propelled vessels that carry bulk liquefied gases by including the substantive requirements of the "IMCO Code for Existing Ships Carrying Liquefied Gasese in Bulk", adopted in London by the Inter-Governmental Maritime Consultative Organization (IMCO) that exceed current standards contained in 46 CFR Subchapters D, F, I, and J. This advance notice invites the public to participate in the rulemaking at an early stage in the process. The adoption of the substantive requirements of the "IMCO Code for Existing Ships Carrying Liquefied Gases in Bulk" would be beneficial in that it would increase the level of safety of existing gas ships.

DATE: Comments must be received by August 11, 1977.

ADDRESS: Comments should be submitted to the Commandant (G-CMC/81), U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, S.W., Washington, D.C. 20590 (202 426-1477).

SUPPLEMENTARY INFORMATION:

On October 4, 1976, the Coast Guard published in the FEDERAL REGISTER (41 FR 43822) a Notice of Proposed Rulemaking entitled "Self-Propelled Vessels Carrying Bulk Liquefied Gases." That Notice was based on the "IMCO Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk." Both the Code and the Notice were limited to "new" ships. In October, 1976, IMCO adopted the "IMCO Code for Existing Ships Carrying Liquefied Gases in Bulk." This latter Code contains standards for upgrading existing gas ships; that is, those gas ships not covered by the Notice of Proposed Rulemaking of October 4, 1976, and the IMCO Code for new gas ships. Some of these standards exceed current Coast Guard requirements for gas ships. Existing vessels are required to meet certain of those standards 2 years after the effective date of October 31, 1976, while other modifications are required 6 years after the effective date. The Coast Guard plans to make any amendments to current gas ship regulations effective on these same dates.

The proposed rulemaking would apply to a self-propelled vessel that has on board a bulk liquefied gas as a cargo, cargo residue or vaper and that—

a. Is constructed under a building contract awarded before November 1, 1976;

b. In the absence of a building contract, has the keel laid or is at similar stage of construction before January 1, 1977;

c. Is delivered before July 1, 1980; or

d. Has undergone a major conversion for which—

(1) The building contract is awarded before November 1, 1976;

(2) In the absence of a building contract, conversion is begun before January 1, 1977; or

(3) Conversion is completed before July 1, 1980.

Any proposed rules would be derived from the requirements in the "IMCO Code for Existing Ships Carrying Liquefied Gases in Bulk" that exceed current gas ship requirements in 46 CFR Subchapters D, F, I, and J.

Interested persons may obtain a copy of the "IMCO Code For Existing Ships Carrying Liquefied Gases in Bulk" from the following:

1. New York Nautical Instrument and Service Co., 140 West Broadway, New York, New York 10013, phone (212) 962-4622.
2. Southwest Instrument Co., 235 West 7th St., San Pedro, California 90731, phone (213) 832-0358.
3. IMCO Secretariat, Publications Section, 101-104 Piccadilly, London W1V 0AE, England.

The purpose of this advance notice is to learn as much as possible from the public and industry regarding the following:

1. The estimated amount of new equipment or material that would be required for existing gas ships.

2. The current purchase price of the equipment or material.

3. The availability of the equipment or material.

4. The length of time needed for the delivery of the equipment or material to the vessel.

5. The length of time needed to install the equipment or material.

6. The cost to install the equipment or material.

SDL 105

A: acdefghijklmnopqrsuv(1)
B: bce(3)gj(2)ohpq(1)
C: o(6)g(3)ghpq(1)
D: bdl(1)
E: ao(4)
F: k(25)b(5)cmp(1)
LIST CG-10
CG-26

DRAFTING INFORMATION: The principal persons involved in drafting this document are: Lieutenant Commander Thomas R. Dickey, Project Manager, Office of Merchant Marine Safety, and Mr. Stanley M. Colby, Project Attorney, Office of the Chief Counsel.

This advance notice of proposed rulemaking is issued under the following authority:

Regulations for dangerous cargoes issued under R.S. 4472, as amended (46 U.S.C. 170) except those for flammable and combustible liquids issued under sec. 201, 86 Stat. 427, as amended (46 U.S.C. 391a); the functions, powers, and duties relating to the Coast Guard under R.S. 4472, as amended, transferred to the Department under sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1); 46 U.S.C. 170 delegated to the Coast Guard under 49 CFR 1.46 (b) and (t), (n)(4).

Dated: June 24, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard,
Commandant.

[FR Doc.77-18774 Filed 6-29-77;8:45 am]

APPENDIX 13

FEDERAL REGISTER
SEP. 26, 1977

federal register

MONDAY, SEPTEMBER 26, 1977

PART III

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

SAFETY RULES FOR SELF-PROPELLED VESSELS CARRYING HAZARDOUS LIQUIDS

Title 46—Shipping

CHAPTER I—COAST GUARD, DEPARTMENT OF TRANSPORTATION

[CGD 73-96]

SAFETY RULES FOR SELF-PROPELLED VESSELS CARRYING HAZARDOUS LIQUIDS

AGENCY: Coast Guard, DOT.

ACTION: Final rule.

SUMMARY: This amendment revises safety regulations for all self-propelled vessels operating in U.S. navigable waters and self-propelled U.S. vessels in other waters while engaged in the carriage of certain bulk dangerous liquid cargoes. The growing frequency of hazardous chemical shipments in bulk cargo tanks has increased the crew's exposure to cargo hazards and the potential for their release due to accident. This rule will reduce exposure of the crew and people near the vessel to these cargo hazards. The requirements have been chosen to be practical, and economically and technically feasible. The amendment adopts (with some extensions) the recommendations contained in the IMCO Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (Resolution A.212(VII) as amended).

EFFECTIVE DATE: December 27, 1977.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street, SW., Washington, D.C. 20590 (202-426-1477).

SUPPLEMENTARY INFORMATION: On June 24, 1976, the Coast Guard published a proposed rule (41 FR 26126) to revise the regulations governing self-propelled vessels carrying certain bulk dangerous liquid cargoes. Interested persons were given until August 20, 1976 to submit comments. A public hearing was held in Washington, D.C., on August 3, 1976.

Drafting Information

The principal program person and lawyer involved in the drafting of this rulemaking are Mr. Robert M. Query, Project Manager, Office of Merchant Marine Safety and Mr. Michael N. Mervin, Project Attorney, Office of Chief Counsel.

Discussion of Major Comments

GENERAL COMMENTS

The Coast Guard received seven comments of a general nature. The National Transportation Safety Board (NTSB) noted that "* * * a significant risk will exist until the qualification procedures (for the person in charge of cargo transfer operations) are adopted." As noted in the preamble of the proposed rule, the Coast Guard published a Notice of Proposed Rulemaking describing the qualifications a person must have before being designated the person in charge of cargo transfer onboard a chemical tankship (See "Tankerman Requirements," CGD 74-44, 42 FR 21190). The final requirements will be published shortly.

The NTSB further recommended that "* * * the owner's responsibilities for manning the vessel, for the equipment on the vessel * * * (and) the method he should use to indoctrinate the crew to the vessel's systems and to cargo handling procedures" should be included in the rulemaking. Both the notice and final rule describe the owner's responsibility for the equipment on the vessel and the standards the vessel must meet before obtaining a permit endorsed for a particular cargo. The owner's responsibility for manning a vessel is described in Coast Guard regulations located elsewhere in Title 46. Due to the many and varied types of tankship chartering agreements employed today, the owner is generally not the person most familiar with the systems and cargo handling arrangements installed on his vessel. The ship's officers are usually the most familiar with these aspects of the chemical tanker and are in a much better position to indoctrinate the crew than the owner.

Because the ship's officers are themselves responsible for the operation of the chemical tanker under the new rule, they will provide the crew with the instruction necessary to assure the safe transfer of cargo. To facilitate safe cargo transfer, an additional requirement has been incorporated into the operations sections of the final rule. It requires the person in charge of cargo transfer on the tankship to confer with his counterpart ashore before commencing cargo transfer operations.

The NTSB also recommended that each tankship should be required to have an operating manual which describes in detail the procedures involved in operating the liquid transfer systems. The Coast Guard agrees that some specific information on cargo transfer operations may be helpful to the person in charge of cargo transfer. The operating sections have been amended to require a piping diagram that shows the cargo piping, valves, pumps and any other important components of the cargo containment system. A detailed operations manual, as suggested, that describes every possible valving and piping arrangement would be extremely complex and awkward to use on most vessels. However, the Coast Guard has proposed requirements for a reasonably detailed operations manual in part 35 (see 42 FR 23517). These requirements will apply to vessels certificated under part 153.

Finally, the NTSB recommended that the Coast Guard limit the hours of duty for the people involved in cargo transfer operations. This recommendation falls outside the scope of the material presented in the notice of proposed rulemaking but will be considered for inclusion in the appropriate section of the regulations.

REQUIREMENTS FOR EXISTING VESSELS

The American Institute of Merchant Shipping (AIMS) requested clarification of several points in § 153.7 of the proposal dealing with existing vessels. The Coast Guard has redrafted this section in a second notice of proposed rulemaking discussed later. The redrafted section should clarify these points.

AIMS also forwarded to the Coast Guard the comments of the International Chamber of Shipping (ICS), a group representing, among others, international tanker operators. ICS objected principally to the fact that the Coast Guard proposed standards that exceeded the IMCO Chemical Code in some instances. ICS noted the Coast Guard's participation in developing the IMCO Chemical Code and its support of the adoption of the Code by the IMCO General Assembly in October 1971. ICS feels that the Coast Guard, by going in excess of the Code's requirements in certain instances, is reneging on its support of the IMCO Chemical Code. ICS also commented on the fact that the time period within which existing ships must comply with the rule differs from the timetable prescribed by the IMCO Chemical Code. Several sections of the final rule have been modified to give the Coast Guard wider latitude in its acceptance of equivalent designs than the proposal permitted. One example is the requirement that wheelhouse windows must be tight when tested with a firehose rather than dogged and gasketed.

Since adoption of the Chemical Code the Coast Guard has recommended numerous changes to IMCO. Many of these have been approved as amendments to the Code and will most likely be adopted shortly. However, IMCO intends to amend the Chemical Code only once every two years. Considering the time necessary to put such amendments into effect, a vessel might be operating in U.S. waters for four or more years using techniques and equipment the Coast Guard feels are possibly unsafe. The laws under which the Coast Guard is issuing this rule require that all vessels in U.S. navigable waters operating under the rule meet essentially the same standards. For these reasons, the rule contains standards that in some cases exceed those of the IMCO Chemical Code, even though the Coast Guard has attempted to keep such instances to a minimum.

Section 153.7(c) of the proposal contained a series of dates and section numbers describing the schedule an existing ship would be allowed to follow if it were modified to operate under the new part. This schedule would have extended over a period of approximately five years, so that a ship would have met virtually all the requirements in the proposal by sometime in 1982. A number of people commented on § 153.7(c), mostly on how quickly a ship would have to meet a particular section or whether it would have to meet a section at all.

However, several comments noted that the Coast Guard was, as a practical matter, changing the effective dates of the IMCO Chemical Code. These people argued that the proposed rules would allow ships not following the Code to continue to operate without modification until 1982, whereas those ships which were complying with the Code would have to be modified by April 12, 1978.

This would give an unfair advantage to ships not meeting the Code. Comments also pointed out that the Code was published in 1971 so that the marine chemical shipping industry has had ample notice of the Code's timetable for upgrading.

The Coast Guard reviewed the design of existing chemical ships under U.S. flag and those foreign ships operating in U.S. waters when it assessed the economic impact of the original proposal. The Coast Guard determined that most U.S. flag and many foreign flag ships carrying hazardous chemicals either already comply with or are close to complying with the requirements in part 153. The Coast Guard's estimate of the cost of the original proposal, including existing and new, foreign and U.S. flag ships showed that the cost per year for the first five years (during the period existing tankers were being converted) would be roughly $3,000,000. If the total cost were compressed into one year, it would amount to about $15,000,000, ignoring any inflationary increase since the original evaluation in the spring of 1976 and disregarding costs from lost operating time and shipyard scheduling problems.

After considering the various objections to the time schedule in the original proposal and the costs involved in meeting the schedule for conversion prescribed by the Chemical Code, the Coast Guard determined that the schedule in the proposal should be modified to coincide with that in the Chemical Code. However, since this change represented a significant departure from the original proposal, the Coast Guard issued a second Notice of Proposed Rulemaking on effective dates for existing ships (see 42 FR 23518).

The Coast Guard received two comments on the proposal to change the effective dates for existing ships. One comment, received after the closing date for comments, did not address the subject of the notice but rather differences between the location of deckhouse openings on chemical tankers, liquified gas tankers, and petroleum tankers. The Coast Guard recognizes these differences and has brought the apparent anomaly to IMCO's attention. Work at IMCO is currently underway to harmonize the various Codes as much as possible, and the subject of deckhouse openings will be included.

The second comment concerned an older foreign flag vessel that was to be phased out of operation in the near future. According to the comment the change in effective dates might force this vessel out of operation sooner than expected. However, the comment did not describe in what ways the vessel would fail to meet the new rule, nor how close the vessel was to meeting any standards it failed to meet. The Coast Guard believes any realistic problems can be resolved under § 153.7(c)(6). Therefore, the change in effective dates for existing ships is incorporated in this rule.

One comment suggested that the Coast Guard adopt the IMCO Code verbatim rather than publishing a separate regulation containing the IMCO recommendations. The same comment noted that the IMCO Chemical Code was developed long before this rule was published and for that reason it would appear "* * * that foreign experience should be far ahead of the U.S. flag experience." As previously noted in the preamble of the proposal, the Chemical Transportation Industry Advisory Committee (CTIAC) in cooperation with the Coast Guard began developing the proposed regulations in August, 1968, and completed their recommendations at about the same time the IMCO Chemical Code was adopted in 1971. In the administration of the Letter of Compliance program, the Coast Guard has had about the same amount of experience using the requirements in this rule as it has had using the requirements in the IMCO Chemical Code.

As is the case with many codes and recommendations, the IMCO Chemical Code is not sufficiently detailed in many instances to be used as a regulation. Moreover, the Code's provisions, being written in the form of recommendations, are not suitable as regulations. For these reasons the Coast Guard is required to publish a rule incorporating the Chemical Code rather than to publish the Chemical Code as the rule itself.

The Maritime Administration recommended that the Coast Guard consider incorporating within this rule part of the requirements from 33 CFR Subchapter O that apply to oil pollution prevention. The laws authorizing the Coast Guard to publish this rule are clear in requiring that pollution and safety rules be distinguished. The Coast Guard will develop rules covering chemical pollution but must wait for the Environmental Protection Agency to identify "hazardous substances" in accordance with the Federal Water Pollution Control Act or until ratification and coming into force of the 1973 Marine Pollution Convention.

The Maritime Administration also recommended that the Coast Guard specify a minimum intensity of deck lighting in the cargo transfer area as is now specified in 33 CFR 155.790. The Coast Guard is now in the process of developing regulations that will prescribe requirements for waterfront facilities handling bulk liquid chemicals. Minimum lighting standards for the cargo transfer area will be included in these regulations.

The American Bureau of Shipping (ABS) noted that the proposal would apply to cargoes carried in the deep tanks of chemical tankers and vessels other than chemical tankers. ABS felt that such a requirement on deep tanks is premature. The Coast Guard and IMCO are studying the question of deep tanks and expect to develop standards for these eventually. Because the volume of cargoes carried in deep tanks is quite small at present and because many of the cargoes listed in the proposal would be difficult to carry safely in deep tanks, the Coast Guard will continue to evaluate these situations on a case by case basis.

Several people commented that the term "senior deck officer" does not refer to a specific person but may be the master, chief mate, or whichever officer is in charge of the vessel at any particular time. To clarify whom we are talking about, and to ensure that the master of the tankship is responsible for seeing that the operational responsibilities under his supervision are followed, the term has been changed to "master". To enable the master to delegate his authority to another responsible person if he wishes, the phrase "the master shall ensure that" is used throughout the rule.

COMMENTS ON SPECIFIC SECTIONS

Changes to existing parts. Some of the revisions in sections of other regulations included in the proposal to conform with part 153 were modified to accommodate a revised 46 CFR part 154 that will deal with liquefied gases.

Although the proposal included changes to 46 CFR part 2 dealing with the Hazardous Materials Incident Report, the Coast Guard decided to cancel this report altogether (42 FR 41636).

Section 153.2 Definitions. The definitions contain five new terms: "accommodation spaces," "Commandant," "dedicated ballast tank," "master," and "service spaces." Several of the definitions are the same as proposed in the rules for liquefied gases (41 FR 43822), and each of the definitions should help clarify the rule.

Two comments were received regarding the definition of "independent tanks". One comment suggested that rather than defining integral and independent tanks, the rule should distinguish only between tanks separated from the sea by an intervening space and those that allow the cargo to contact the vessel's side shell or bottom plating. An independent tank is one that has special supports that prevent it from being stressed by the loads on the tankship itself. An independent tank is not only separated from the sea but is also not as likely to leak as an integral tank, regardless of whether the integral tank is surrounded by void spaces. The Coast Guard requires independent tanks in instances where cargo leakage would pose an unusually hazardous condition or where some property of the cargo would make an integral tank impractical. For example, motor fuel antiknock compound, if leaked from a tank, would be extremely difficult to clean out of a void space or wing tank separating the tank from the sea. Therefore, the Coast Guard requires an independent tank to reduce the chance of cargo leaks.

Another comment asked whether a tank whose foundation was welded to the hull or which had one bulkhead formed from one of the ship's transverse bulkheads would be considered independent. The Coast Guard does not consider such tanks to be independent because in both cases the tanks would be forming part of the vessel's hull and would be subject to the same stresses as the vessel's hull. The definitions of integral and independent tanks have been reworded to clarify the difference between the two.

One person recommended that a definition for "designated ballast space" be

added to the rule. This phrase is not used in the proposed rule; however, the phrase "dedicated ballast tank" is used. A dedicated ballast tank is a tank within the vessel used only for clean ballast. The Coast Guard has added this definition to the final rule.

Section 153.7 Existing tankships. The Maritime Administration recommended that section 153.294(a) of the proposed rule, requiring piping systems to be marked with the name of the tank they serve, be made effective immediately since it is not a difficult requirement to meet and is useful from a safety standpoint. The Coast Guard agrees with this suggestion and has made section 153.294 effective immediately for existing vessels by adding it to section 153.7(c)(1).

Another comment noted that proposed section 153.7(c)(5) incorrectly implied that a type I containment system on an existing vessel could have a bottom shell clearance less than type II containment on the same vessel. This section has been changed so that existing type I and II containment systems must both be at least 76 cm from the bottom shell of the vessel.

One comment recommended that proposed sections 153.202 and 153.258 not be required of existing tankships. These sections set forth location requirements for doors, airports and the separation distances of cargo tanks from machinery, service and other spaces. In response, the Coast Guard has deleted the 76 cm separation distance contained in proposed section 153.258. This section has been reassigned to section 153.233 in the final rule. It now contains the same provisions as set forth in the IMCO Chemical Code. Existing vessels should have little difficulty meeting the requirements of this section since segregation has been a tankship design requirement for many years. Furthermore, existing vessels certificated under the IMCO Chemical Code will also have to meet this same requirement by April 1978.

Section 153.9 Foreign flag vessel endorsement application. This section, describing measures a foreign vessel must take to get a Letter of Compliance, now includes two certificates under the Safety of Life at Sea Convention. These certificates are necessary to show the vessel meets the Coast Guard's tanker requirements under subchapter D.

The proposed rule may have implied that submitting an IMCO Certificate was optional. The wording of section 153.9 has been changed to make it clear that the owner of a vessel registered in a country that issues IMCO Certificates must submit a copy of the IMCO Certificate in order to receive a Letter of Compliance.

Section 153.12 IMCO Certificates. A new section 153.12 is added to explain under what conditions the Coast Guard issues an IMCO Certificate to a U.S. tankship. The IMCO Certificate shows that the U.S. flag tankship meets the recommendations of the IMCO Chemical Code.

Section 153.30 Permeability of spaces. When the Coast Guard proposed the rules for liquefied gas tankers in part 154, it described the limits it places on permeability assumptions when assessing a vessel's stability after flooding in greater detail than it did in the proposal for this part. To aid ship designers in understanding the Coast Guard's vessel stability requirements, the more detailed description of permeability assumptions set out in the proposal for liquefied gas tankers is included in § 153.30. Sections 153.31 and 153.34 also have been made more detailed for the same reason.

Section 153.32 Damage. One comment suggested that proposed section 153.32(a)(1)(ii) should allow a collision penetration to be calculated from the highest deck level rather than at the assigned loadline so that the protection provided by the flare found at the vessel's bow could be utilized. The same comment stated, with no explanation, that theoretical bottom damage should be based on the vessel's depth rather than it's beam. In both cases, the penetration measurments used were taken from correlations derived from accident statistics. They are convenient reference points from which to describe the penetrations found in IMCO's analysis of accident data, rather than being theoretical deductions. If the Coast Guard had not adopted these recommendations, U.S. flag ships would not meet the minimum requirements of the IMCO Code.

Section 153.200 Portlights, wheelhouse windows, and wheelhouse doors. The proposed requirements for locating openings in superstructure, section 153.200, came from the Chemical Code. This section of the final rule was reworded to clarify the requirements and match the wording of the Chemical Code more closely.

Section 153.202 Location of deckhouse doors and airports. One comment argues that this section and the corresponding section of the IMCO Chemical Code should be written differently. The comment maintains that the purpose of this rule is to keep openings into the deckhouse clear of the cargo space regardless of the location of the accommodations house front and that, for this reason, the measurements should be made from the after transverse bulkhead of the cargo space. The purpose of this requirement is to reduce the possibility of toxic and flammable vapors being trapped in accommodation spaces bounding the deckhouse front. Vapors that are swept against the house front would be free to enter open portlights and doors if it were not for this design requirement. Taking measurements from the end of the cargo containment system, as suggested, would have no effect on minimizing this particular hazard.

Section 153.208 Ballast equipment. One comment said that proposed section 153.208(b)(2) was too restrictive in requiring that a non-return valve be located at the point where the ballast fill line enters the ballast tank. We agree. This section has been modified to allow either a stop value and a check valve or a stop-check valve to be used and to allow this valving arrangement to be located anywhere in the cargo containment area so long as it is not located within a cargo containment system.

Section 153.214 Personnel emergency and safety equipment. Two comments pointed out that the protective clothing described in proposed section 153.214(b) was too specific and would not insure adequate personnel protection from many corrosive or toxic cargoes. This section has been modified to broaden the description of the protective clothing while at the same time requiring it to be made of chemically resistant materials. Other comments suggested changes to § 153.527 as well as this section to require that the respiratory equipment and first aid kits be approved by the Mining Enforcement and Safety Administration and the National Institute for Occupational Safety and Health, or similar foreign organization. This suggestion has been adopted. The respiratory equipment has also been described in greater detail to exclude a type that can be hazardous if used incorrectly; the respiration equipment now must be ". . . a portable oxygen inhalation and bag valve mask manual resuscitator."

One comment suggested that the safety equipment lockers required by proposed 153.214(c) should be located in a protected area. While moving these lockers into protected areas may make them less subject to damage, the lockers would also be less available in an emergency. The lockers themselves should sufficiently protect the safety equipment and this requirement has not been changed. Another comment noted that proposed section 153.214(f) did not require the shower and eye wash fountain to operate at any ambient temperature. This suggestion has been incorporated in section 153.216 of the final rule.

Section 153.217 Access to void spaces. A section 153.217 is added that requires access openings to void spaces adjacent to cargo tanks to be the same minimum size as openings to cargo tanks. These void spaces may easily have cargo vapors within them so that a man wearing self-contained breathing equipment should be able to get in them.

Section 153.230 Type I system. One person commented that this section appeared contradictory in that a type I cargo containment system would have to be located 76 cm in from the vessel's shell while also having to be inboard a distance of B/5 at the assigned loadline. However, depending on the curvature of the hull at the tank location, a straight-sided tank located a distance of B/5 inboard at the loadline might be only 76 cm from the hull where the hull turns inward near the turn of the bilge. This section is not contradictory and has not been changed.

Section 153.235 Exceptions to cargo piping location restrictions. One comment stated that the exceptions contained in this section could result in placing the cargo piping in a poor location. This allowance is also included in the IMCO Chemical Code, and permits cargo piping to be located closer to the vessel's shell than a cargo tank, provided that the piping is designed in such a way that no cargo release will result in the event of a collision. This piping location would not

present a hazard and may offer some flexibility to the designer. The section has been modified slightly to more clearly reflect its purpose.

Section 153.236 Prohibited materials. In volume 42 number 28 of the FEDERAL REGISTER dated February 10, 1977 on page 8377 the Coast Guard published a final rule modifying the restrictions in 46 CFR 151 on the use of certain materials in containment systems on barges carrying caustic soda and caustic potash. In the preamble, the Coast Guard noted that "there are some data that show that copper alloys with a high zinc content are attacked by caustic." The Coast Guard restricted the use of alloys containing more than 10 percent zinc by weight at that time. This section has been modified to adopt this restriction.

Section 153.258 Tank separation. This section was moved to section 153.233. The entire section was redrafted in an attempt to clarify some of the ambiguities described in several comments. One comment said many existing small tankships will not meet the proposed requirement. Section 153.233, as written in the final rule, is a standard that U.S. tankships have been required to meet for many years and is also an IMCO requirement. The Coast Guard will not exempt existing vessels from this requirement.

Section 153.280 Cargo transfer valving. In response to several questions received regarding the group of sections entitled "Cargo Handling Equipment" in the proposal, this area has been reorganized for clarification. This particular section has been redesignated as section 153.283 and slightly modified to require that a valve be located within each tank a cargo line serves.

Section 153.294 Marking of piping systems. One comment asked whether the cargo piping system should not be marked at more than one location. This section is modified to require that the cargo piping system be marked at each hose connection and at each valve and blind flange in the piping system. This modification should aid in preventing mistakes in tank loading.

Section 153.296 Emergency shutdown stations. One comment recommended that this section be modified to require an emergency shutdown station at the point where cargo transfer is controlled. The Coast Guard agrees with this recommendation and has made the change. Another comment recommended that the power shutdown control in the engine room be acceptable as one of the required emergency shutdowns. Since such a control would be nowhere near the point of cargo transfer and would be awkward to get to in an emergency, the Coast Guard will not accept this as one of the shutdown stations. This section of the final rule contains an additional requirement: emergency actuators must not interact with one another in a way that could prevent operation of the other emergency systems.

Section 153.330 Access. One comment stated that the ANSI standard for industrial stairs referred to in this section of the proposal was inappropriate and conflicted with other parts of the same section. Reference to this standard has been dropped from the final rule. One comment objected to the requirements for guard railings on ladders and platforms. The same comment also found the ladder inclination requirement "difficult and costly." The Coast Guard finds it somewhat difficult to believe that a requirement for guard railings and limitations on the inclination of ladders would have a significant financial impact on a ship costing 40 to 50 million dollars. Except where mentioned, this section has not been changed.

Section 153.361 Arrangements for removal of valves from venting systems having multiple relief valves. Included in the final rule is this new section that allows the use of vent systems with multiple relief valves which can be removed for servicing without taking the cargo tank out of service.

Section 153.404 Containment systems requiring closed gauges. Several sections describing requirements for cargo gauging systems were reorganized for clarity. The requirement for a high level alarm system, originally described in section 153.404 of the proposal, has been separated from the other requirements for closed gauging systems and redesignated section 153.409.

One comment recommended that the Coast Guard review its proposal to require vapor return connections on cargo tanks endorsed for cargoes having the greatest vapor hazards. This recommendation is based on the belief that a number of these cargoes are now being transferred without using vapor return and without creating any "* * * problems whatsoever." The Coast Guard's purpose in proposing this requirement was to minimize the amount of hazardous vapor discharged during cargo loading. Since many of these vapors pose chronic toxicity hazards that may take effect only after long periods of time, their dangers may not be immediately obvious to persons conducting cargo transfer operations. It is for this reason that the Coast Guard is retaining these requirements as proposed.

The same person suggested that the high level alarm and the tank overfill control system should be actuated at the same level. He recommended that 98 percent of the tank's capacity be used in each case but offered no reason for this comment. The high level alarm is provided to alert personnel filling cargo tanks than an immediate corrective action is necessary. The one percent set point difference, as provided in these sections, will give the operator sufficient time to take corrective action before the loading operation is automatically terminated. Both the high level alarm and the overfill control system are provided as safety devices in the event of personnel error or a failure of the required tank gauging system. Routine and frequent use of these backup devices is undesirable from both an operational and safety standpoint. For these reasons the Coast Guard did not change the proposed rule.

Section 153.406 Containment systems requiring restricted gauges. One comment recommended that the restricted gauge maximum diameter should be increased because 5 cm would be too small to allow accurate gauging of cargo tanks of 30 to 40 feet in depth. The maximum diameter has been increased to 20 cm, which has been found to be sufficient to allow gauging of a tank that is 40 or more feet deep.

Section 153.407 Special requirements for sounding tube gauges. In response to several comments, this section has been expanded to describe the requirements for sounding tube gauges in more detail. Sounding tubes will now be required to extend to within one meter of the tank bottom. This requirement will minimize the amount of vapor escaping through the tube during tank loading operations.

Section 153.408 Tank overfill controls. One comment recommended that a 30-second maximum closure time for quick-closing valves be allowed after the cargo tank has reached the 98 percent level. The intent of this requirement is to assure that the shutdown valve is completely closed by the time the tank level reaches 98 percent. Therefore, it is not necessary to specify a maximum closure time. The final rule was reworded slightly to clarify this point.

Section 153.432 Cooling systems. One person commented that this section should also describe the size of the backup units and how readily they must be placed in operation. Paragraph (b) has been rewritten to insure that the standby refrigeration equipment is installed and ready for immediate use. Paragraph (c) was also added; it requires a piping diagram for the refrigeration system and instructions on changing over to the standby unit.

Section 153.438 Cargo temperature alarms required. One comment argued that the cargo high temperature alarm should not be required to be located on the bridge but only to be audible and visible from the bridge. The Coast Guard has not modified this section because in many circumstances, such as when the vessel is underway, a person on the bridge of the vessel might not be able to hear the cargo high temperature alarm or see it if it were located only on the deck of the vessel. It is important that the alarm be immediately recognized and corrective actions be taken.

Section 153.440 Cargo temperature sensors required. One comment recommended that section 153.440 be rewritten to allow a thermometer well on the tank rather than having a remote sensing thermometer located at the point from which cargo transfer is controlled. The comment pointed out that remote reading temperature indicators are unreliable and that the requirement as applied to elevated temperature cargoes affects only the quality of a cargo and not the safety of the vessel or crew. Overheating of cargo can often create safety problems as well as affecting cargo quality. Furthermore, heating a cargo beyond the temperature for which a tank is designed can cause a tank to crack and leak or can raise stresses in main structural mem-

bers within the vessel beyond the values they were designed to accommodate. This problem has appeared to be involved in some past accidents with sulfur carriers. For these reasons the Coast Guard has retained the requirement, though modifying it slightly to require only two rather than three remote reading temperature sensors on each tank.

Section 153.460 Fire protection systems. A number of people commented on the fire protection requirements described in section 153.460. These comments can be summarized as follows:

a. The section on fire protection systems refers to part 34 of title 46. Part 34 contains no standards for dry chemical fire protection systems.

b. Water spray systems are ineffective in controlling a fire and the requirement should be changed to foam spray systems.

c. Dry chemical systems are ineffective in controlling flash back and reignition.

d. A category of fire protection systems requiring AFFF fire fighting agent should be created.

e. Dry chemical agents are ineffective in controlling cargo vapor.

f. The regulations would allow a dry chemical system to be substituted for any other fire protection system specified. Dry chemical systems may not be effective with many of the cargoes. This provision should be changed to require only approved type fire protection systems.

The objections to dry chemical systems are generally correct. The proposal would have allowed substitution of dry chemical for a type A or B system, (and mistakenly for a type C system) apparently at the choice of the designer. Because of the many considerations involved in substituting dry chemical for other systems, and since standards for dry chemical systems do not exist in part 34, the regulations have been revised. Section 153.460 now requires that a dry chemical system substituted for a type A or B system must be specially approved, by the Commandant (G–MMT). The Coast Guard will publish rules for dry chemical systems on chemical tankers in a future rulemaking.

Water spray systems are generally ineffective in controlling a fire, and are not usually prescribed for fire extinguishment purposes. They are effective, however, in cooling exposed tanks and piping and in preventing reignition of cargo vapors after a fire is out. Therefore, water spray systems are still required for some cargoes.

The Coast Guard has not added a category requiring AFFF agents. These agents are not unique in being effective on both regular hydrocarbons and polar solvents since all Coast Guard approved polar solvent foams are suitable for regular hydrocarbons as well. The terms "alcohol" and "regular foam" have been deleted from the footnotes to table I, since they may be subject to misinterpretation.

Section 153.463 Vent system discharges. One comment objected to the 10 meter separation distance required between cargo tank vent discharges and ignition sources. This section has been revised to apply only to those cargoes requiring PV venting, a provision contained in the IMCO Chemical Code.

Section 153.465 Flammable vapor detector. In keeping with the IMCO Code, this section was modified to permit one of the two required flammable vapor detectors to be the permanently installed type.

Section 153.466 Electrical equipment. This new section was added to ensure that all electrical equipment meets the provisions of Subchapter J of Title 46.

Section 153.467 Ventilation systems for flammable cargoes. This new section requires non-sparking ventilation equipment for all flammable cargoes. This was added because the Coast Guard actually reviews ventilation equipment on tankers carrying any flammable cargo to see that the equipment is non-sparking. To mention the requirement only under alkylene oxides as was done in the proposal would have been misleading.

Section 153.500 Inert gas systems. One comment objected that the proposal required that isopropylamine, toluene diisocyanate, and vinylidene chloride be inerted when carried. Toluene diisocyanate is carried with an inerted, pressurized vapor space to prevent water vapor from entering the tank. The Coast Guard had intended to include for toluene diisocyanate the requirement that the inert gas system supply inert gas with no more than 100 parts per million water. This requirement was contained in section 153.501, and was omitted in table 1 of the proposal. Toluene diisocyanate decomposes when mixed with water and releases carbon dioxide. If much water vapor, such as might come through an inert gas system supplying scrubbed stack gas, mixed with the cargo, the rate of carbon dioxide evolution might be greater than the tank venting equipment could handle, overpressuring the tank. The Chemical Code requires that normal propylamine and vinylidene chloride both be inerted. Since isopropylamine and normal propylamine differ only slightly in the characteristics that make inerting important, such as autoignition temperature, flammable limits, and reactivity with air, the Coast Guard proposed that isopropylamine also be carried under an inert gas pad. The Coast Guard will review with IMCO the requirement that these cargoes be inerted; however, in the interim the requirement will be imposed.

The comment further recommended that the requirements for inert gas systems be modified to allow part of the system's capacity to come from auxiliary inert gas supplies on shore during cargo discharge. This is a reasonable alternative so long as there are operational controls to prevent a tank's vacuum relief valve from operating when discharging a cargo required to be inerted. Therefore, the Coast Guard has modified section 153.975 to add an operational requirement that any necessary auxiliary inert gas supplies be connected before cargo discharge.

One comment remarked that the Coast Guard's proposal to require about 14 kiloPascal (kPa) gauge pressure of inert gas within a tank is excessive. He suggested that a pressure of about 1.75 kPa would be sufficient, would cut down on inert gas use, and would decrease the amount of cargo vapor vented. The Coast Guard agrees that the inerting pressure of 14 kPa is excessive and has modified this requirement to make the minimum inert gas pressure in the tank equal to the minimum pressure at which a tank relief valve may begin to open, that is, 3.5 kPa.

The Maritime Administration suggested that in order to specify the volumetric flow capacity of the inert gas system accurately, the pressure at which the volumetric flow capacity must be computed should be specified. The Coast Guard agrees and has modified section 153.500(d) to specify that when calculating the system's flow, the gas be at 46°C and 3.5 kPa pressure.

Section 153.520 Special requirements for carbon disulfide. Paragraph (d) of the carbon disulfide requirements was modified slightly to specify a type 304 or 316 stainless steel on the pv valves instead of the unspecified type in the proposal.

Section 153.525 Special requirements for unusually toxic cargoes. Two comments suggested changes to the requirements for toxic cargoes contained in this proposed rule. One comment recommended that section 153.525(d) be changed to read, "be arranged so as not to contaminate other systems via supply and return of heating source". The proposed rule would require an independent heating system or a heating system totally external to the cargo containment system. The IMCO Code is worded similarly, but allows a third alternative in which the heat transfer fluid may be sampled for the presence of cargo before being returned from the tank to the heat exchanger. The Coast Guard will consider systems for sampling the fluid that would prevent circulation of contaminated heat transfer fluid into other heat transfer systems. To clarify this point, a provision has been added to section 153.525(d) of the final rule that will allow such sampling systems, provided they have the approval of Commandant (G–MHM).

One comment objected to the requirement in section 153.525(b) that the relief valve on a cargo tank carrying unusually toxic cargoes be set at no less than 21 kPa. The comment argued that venting a tank at about 2-kPa would relieve a much lesser "volume of toxic vapors". Under normal operating conditions a cargo tank carrying an unusually toxic cargo would release vapors through the vent system only because of pressure changes caused by temperature variations within the cargo liquid and vapor phases. This cyclical phenomenon is commonly referred to as "tank breathing". The amount of cargo released during breathing is a function of the temperature extremes encountered and the pressure setting of the vent system relief

valve. The Coast Guard has set the lower limit on this relief valve setting at 21 kPa to minimize tank breathing by forcing the relief valve to operate less often. If vapor is vented, it will be released a distance of at least 6 meters above the deck where personnel may be working and at a higher velocity than if vented at 2 kPa. This distance and initial velocity should be sufficient to disperse and dilute the vented vapors.

One comment objected to the excessive separation distance required under 153.525(e) between toxic cargoes and bunkers. This section of the proposal is modified to require separation of the cargo and not cargo containment from bunkers by two bulkheads.

Section 153.530 Special requirements for alkylene oxides. One comment recommended that this section include all IMCO Chemical Code requirements and that the Coast Guard review its requirements for propylene oxide in light of its highly flammable and reactive characteristics. Upon review, proposed section 153.530 was revised to incorporate the restrictions on construction materials contained in the IMCO Chemical Code. In conjunction with the Chemical Transportation Industry Advisory Committee (CTIAC), the Coast Guard is continuing a review of its propylene oxide requirements. The Coast Guard is also conducting an active testing program aimed at determining possible reactions between seawater and propylene oxide in the presence of various catalysts, such as rust. Any rule changes that might result from the test program findings or the recommendations of the CTIAC's Subcommittee on Chemical Vessels will be handled in a separate rulemaking.

Section 153.556 Special requirements for sulfuric acid and oleum. One comment asked why the requirements for sulfuric acid did not mention stainless steel as a material of construction. Although the Coast Guard would consider stainless steel equivalent to mild steel in its ability to resist corrosion by sulfuric acid and oleum, the Coast Guard has no evidence that stainless steels are sufficiently more corrosion resistant than mild steel to be useful at all concentrations of sulfuric acid. Therefore, the Coast Guard has left this requirement unchanged and will handle any requests to use materials other than those specified in the section on a case by case basis as described in paragraph (c) of the section.

The proposed rule was possibly misleading in allowing unlined steel to be used for tanks carrying oleum containing more than 4 percent free sulfur trioxide. The 4 percent figure applies only to a method of measuring oleum concentration peculiar to the sulfuric acid industry. As the proposal was worded, this concentration should have been 20 percent rather than 4 percent. Twenty percent free sulfur trioxide is specified in the final rule.

Section 153.806 Stability test and information. One person commented that this section is confusing because it refers to the requirements for Cargo and Miscellaneous Vessels in Part 93 of title 46 when describing the stability tests and information a tankship must have before its Certificate is endorsed. The requirements in part 93 are general in nature and can be applied to any vessel. In fact, the Coast Guard recently proposed to apply these same requirements to tankers certificated under parts 30–35 of title 46. The Coast Guard does not believe this reference will cause confusion once people become familiar with it and, therefore, has left the rule as proposed.

Sections 153.808 through 153.812. Four sections from the existing 46 CFR Part 154 were added in the "Testing and Inspection" group to describe the procedures the owner of a foreign flag vessel must follow to arrange for the Coast Guard to examine his vessel. The new sections describe a systematic procedure to follow to arrange an examination and list the information the Coast Guard needs for the examination. The Coast Guard requires a minimum of 14 calendar days to set up an examination. A vessel that does not have a Letter of Compliance may carry a dangerous cargo into U.S. waters on the examination voyage only if it has specific authorization from the Coast Guard.

Sections 153.900–153.976. Many of these sections have been moved and renumbered to improve the order of presentation.

Section 153.902 Expiration of Letters of Compliance. A section was added to state that a Letter of Compliance, like a Certificate of Inspection, is good for a period not exceeding two years. This is an existing rule in part 154 that is now incorporated here.

Section 153.907 Cargo information cards. One comment stated that the ship's personnel should not be responsible for ensuring that terminal personnel "* * * be knowledgeable of the nature of the products that the terminal handles." By this rule the Coast Guard is not requiring that ship's personnel ensure that terminal personnel be familiar with all the cargoes handled by the terminal, but rather that they ensure that terminal personnel are aware of the products being carried on the tankship. The ship may have onboard cargoes that are not necessarily handled by the terminal. It is imperative in emergency situations that terminal personnel have a copy of the vessel's shipping document and a set of cargo information cards. Proposed section 153.907(b) is being retained but has been moved to section 153.914 of the final rule.

Section 153.910 Cargo piping plan. As previously mentioned, this new section requires that a cargo piping plan be provided on board each tankship.

Section 153.933 Protective clothing required. This new section is added to the final rule to give direction to the master regarding the wearing of protective clothing for specific cargo handling operations.

Section 153.950 Person in charge of cargo transfer. One comment opposed the description in section 153.950 of the proposal, redesignated section 153.957, of the person in charge of cargo transfer and felt that the Coast Guard should require a tankerman at the point of cargo transfer in addition to the licensed officer. According to the comment, the complexities of cargo transfer are such that more than one person is necessary to continuously oversee the transfer procedures. The Coast Guard agrees that in most transfer operations more than one person would likely be necessary to do all the operations on the ship necessary to transfer the cargo. However, in drafting the rule, the Coast Guard has tried to place both the responsibility and authority to supervise a cargo transfer operation on the person in charge of cargo transfer. The Coast Guard has in no way limited the freedom of the person in charge to use other people on board the vessel and to assign them various tasks in the cargo transfer operations. However, it is unwise to fragment the responsibility for coordination of cargo transfer operations by assigning more than one person responsibility for the overall transfer, and the requirement as proposed has been retained. As mentioned in the preamble to the proposal of this part, section 153.957 refers to proposed regulations for tankermen (42 FR 21190, April 25, 1977). The Coast Guard expects these rules to be published in final form shortly. In the interim, § 153.957 has been changed to refer to 33 CFR 155.710 that describes requirements for the person in charge of an oil transfer operation.

Section 153.952 Warning signs. One comment suggested that 153.952 of the proposal, now redesignated 153.955, might be clearer if the sign containing the cargo warnings were illustrated rather than described in the text. The Coast Guard has retained the description of the sign in the text but has added an illustration of the sign to that section.

Section 153.1020 Unusually toxic cargoes. In the proposal, the requirement that a toxic cargo be isolated from other cargoes was described as a design requirement. However, unless a tankship dedicates certain cargo tanks only to toxic cargoes, it is impractical to guarantee this requirement in the design phase of the vessel. Therefore, the Coast Guard has modified the requirement slightly so that the cargo tank and piping system for an unusually toxic cargo must be designed so that they can be isolated. To make sure this is done when a toxic cargo is loaded, the Coast Guard has added to section 153.1020 a prohibition again any person loading or carrying toxic cargoes in containment systems which are not isolated from other cargo containment systems.

Section 153.1025 Motor fuel antiknock compounds. Two comments questioned the requirement in section 153.1025 that a person get specific approval from the Commandant (G-MHM) before entering a cargo tank endorsed for motor fuel antiknock compounds. The decontamination of a cargo tank which has carried motor fuel antiknock compounds is a difficult, dangerous, and tedious operation. For this reason the Coast

Guard does not want people haphazardly cleaning and entering motor fuel antiknock compound tanks. The manufacturers of motor fuel antiknock compounds usually have specially trained personnel to decontaminate materials that have been in contact with motor fuel antiknock compounds. To accommodate in part a suggestion that the manufacturers be allowed to enter tanks without Coast Guard approval, the Coast Guard has added a provision in section 153.1025 which would allow manufacturers to obtain prior approval of a decontamination procedure from the Coast Guard, and to obtain specific authorization to enter a tank in accordance with that procedure by merely calling Commandant (G-MHM).

Section 153.1052 Carriage of other cargoes in acid tanks. One comment questioned why the ship's personnel could not be given responsibility for deciding whether another cargo could be carried in a containment system endorsed for sulfuric, hydrochloric, or phosphoric acid. The Coast Guard's concern in this instance is that lining materials or other materials designed specifically to protect the tank against attack by one of these acids might be damaged if used with another cargo. Determining the compatibility of cargoes and tank lining materials can be quite complicated in many cases. The Coast Guard does not believe that the ship's licensed officers are likely to have the specialized training necessary to make such determinations. Therefore, the Coast Guard has left this requirement as proposed.

Section 153.1055 Nitropropane. One comment argued that the Coast Guard's proposal for nitropropane is too restrictive and ". . . not justified by any published technical data." The Coast Guard proposed that nitropropane be treated as follows:

a. It could not be carried in deck tanks.

b. It could not be carried in heated tanks, adjacent to heated cargoes, or adjacent to hold spaces containing tanks with heated cargoes:

c. If carried in a tank containing heating coils, the heating supply to the coils must be disconnected to prevent inadvertent heating.

The Coast Guard, in effect, is safeguarding against the possibility of this cargo becoming heated while carried on the tankship. The comment is correct in saying that the Coast Guard has no data to show that nitropropane is more hazardous when heated above ambient temperatures. In fact, the Coast Guard has data to show that nitropropane is not shock sensitive, even when heated, some of which the commenter furnished. However, nitromethane sometimes detonates violently when heated, and the chemical similarity of the two products raises the possibility that nitropropane might behave similarly. While some tests have shown that it will not, there is no assurance that those test procedures adequately simulate all the conditions under which the product might detonate. Similar testing difficulties were encountered with nitromethane. Until further testing has demonstrated that nitropropane will not behave similarly to nitromethane when heated under certain conditions, the relatively minor restrictions on the carriage of nitropropane will be retained.

Besides the changes to the original proposal described in this preamble, the final rule corrects many typographical errors.

This rule has been reviewed for economic effects under the Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). When doing so, the Coast Guard reviewed the design of both new and existing chemical ships under U.S. flag and those foreign ships operating in U.S. waters. As mentioned previously, the Coast Guard estimates that the rule will cost about $15,000,000 over the approximately one year period owners of existing vessels will have to meet the requirements. The rule will reduce the exposure of the crew and others near the vessel to cargo hazards. As a side effect, the rule may also reduce the likelihood of cargoes being spilled into waterways, though the incidence of spillage of these particular cargoes has been very low. Because the rule applies to all tankships carrying the listed cargoes in U.S. waters, and because the rule becomes fully effective on the same day as does the IMCO Chemical Code, no tankship will be put at an economic disadvantage in trying to meet the Chemical Code.

In consideration of the foregoing, Chapter I of Title 46 of the Code of Federal Regulations is amended by revoking Part 39; amending Parts 1, 2, 24, 30, 31, 32, 35, 40, 42, 56, 90, 91, 98, 105, 110, and 151 thereof; and adding a new Part 153 as follows:

PART 1—ORGANIZATION, GENERAL COURSE AND METHODS GOVERNING MARINE SAFETY FUNCTIONS

1. In § 1.01(b)(1), by inserting the words "Chief, Cargo and Hazardous Materials Division," immediately after the words "Chief, Merchant Vessel Inspection Division" and by adding § 1.01(b)(1)(iv) to read as follows:

§ 1.01 Organization.

* * * * * * *

(b) * * *

(1) * * *

(iv) The Chief, Cargo and Hazardous Materials Division at Coast Guard Headquarters, under the direction of the Chief, Office of Merchant Marine Safety, administers the program for the development of safe containment systems for certain bulk dangerous cargoes, administers the Letter of Compliance program for foreign vessels carrying cargoes of unusual hazard and evaluates the hazards involved in the shipment of dangerous cargoes.

§ 1.20 [Amended]

2. By striking out in the third sentence of § 1.20(b) the word "three" and inserting the word "four" in place thereof.

PART 2—VESSEL INSPECTIONS

§ 2.01–1 [Amended]

3. By adding in § 2.01–1(c) the words "O (Certain Bulk Dangerous Cargoes)," immediately after the words, "J (Electrical Engineering)".

4. By revising footnote number 10 to Table 2.01–7(a) to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10(b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and in table 2.01–7(a) by revising column 8 and adding footnote 12 to read as set forth below, and by adding a new paragraph (b)(6) as follows:

§ 2.01–7 Classes of vessels (including motorboats) examined or inspected and certificated.

* * * * * * *

(b) * * *

(6) For vessels carrying certain bulk dangerous cargoes see subchapter O of this chapter.

Col. 1	Col. 2	* * *	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self-propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11,12]
	Vessels 100 gross tons or over		Do.

* * * * * * *

[12] Except those cases excluded under 46 U.S.C. 170 or 391a.

* * * * * * *

7. By revising § 2.01–13(c) to read as follows:

§ 2.01–13 Inspection requirements—foreign vessels.

* * * * *

(c) For details concerning application of regulations to foreign vessels, see Part 30 (Tank Vessels), Part 70 (Passenger Vessels), Part 90 (Cargo and Miscellaneous Vessels), § 146.02–2 (Danger-

ous Cargoes), Part 148 (Bulk Solid Hazardous Materials), Parts 153 and 154 (Certain Bulk Dangerous Cargoes), and Part 175 (Small Passenger Vessels) of this chapter.

8. By adding § 2.01–15(a)(10) to read as follows:

§ 2.01–15 Vessel repairs.

* * * * * * *

(a) * * *

(10) For vessels carrying compressed gases regulated by Subchapter O (Certain Bulk Dangerous Cargoes), see § 151.50–30(c) of this chapter.

9. By revising the last sentence of § 2.01–25(b)(1) to read as follows:

§ 2.01–25 International Convention for Safety of Life at Sea, 1960.

* * * * * * *

(b) * * *

(1) * * * Further details are set forth in Subchapter D (Tank Vessels), Subchapter H (Passenger Vessels), Subchapter I (Cargo and Miscellaneous Vessels), Subchapter O (Certain Bulk Dangerous Cargoes), and Subchapter T (Small Passenger Vessels) of this chapter.

* * * * * * *

10. By adding § 2.90–1(h) to read as follows:

§ 2.90–1 General requirements.

* * * * * * *

(h) The requirements for vessels carrying certain bulk dangerous cargoes are in Parts 148, 151, 153, and 154 of this chapter.

PART 24—GENERAL PROVISIONS

§ 24.05–1 [Amended]

In § 24.05–(a) the table is amended by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10(b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	* * *	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self-propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

* * * * * * *

[11] Except those cases excluded under 46 U.S.C. 170 or 391a.

* * * * * * *

PART 30—GENERAL PROVISIONS

§ 30.01–5 [Amended]

By revoking §§ 30.01–5(b) (8) and (9), and by amending the table in paragraph (d) by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10(b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	* * *	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self-propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

* * * * * * *

[11] Except those cases excluded under 46 U.S.C. 170 or 391a.

* * * * * * *

§ 30.10–15 [Amended]

In § 30.10–15, by striking out the second sentence.

§ 30.10–22 [Amended]

In § 30.10–22, by striking out the second sentence.

By revising § 30.25–1 to read as follows:

§ 30.25–1 Cargoes carried in vessels certificated under the rules of this subchapter.

The cargoes listed in table 30.25–1 and mixtures composed solely of these cargoes have been found to be flammable or combustible and may be transported in bulk only in vessels certificated under the rules of this subchapter.[1]

TABLE 30.25–1

Acetone
Amyl Acetate (iso-, n-)
Amyl Alcohol (n-)
Amyl Tallate
Asphalt
Asphalt Blending Stocks:
  Roofers Flux
  Straight Run Residue
Butane
Butyl Acetate (iso-, n-, sec-)
Butyl Alcohol (iso-, n-, sec-, tert-)
Butyl Benzyl Phthalate
Butylene
1,3-Butylene Glycol
Cumene
Cycloaliphatic Resins
Cyclohexane
Cyclohexanol
Cymene (para-)
Decyl Alcohol (iso-, n-)
Decyl Benzene (-n)
Decaldehyde (iso-, n-)
Decene
Diacetone Alcohol
Dibutyl Phthalate (ortho-)
Diethylbenzene
Diethylene Glycol
Diethylene Glycol Monobutyl Ether (Methyl Carbitol)
Diethylene Glycol Monobutyl Ether Acetate
Diethylene Glycol Monoethyl Ether
Diethylene Glycol Monomethyl Ether
Diglycidyl Ether of Bisphenol A
Diheptyl Phthalate
Diisobutylene
Diisobutyl Carbinol
Diisobutyl Ketone
Diisodecyl Phthalate
Dinonyl Phthalate
Dioctyl Phthalate
Diphenyl-diphenyl oxide
Dipropylene Glycol
Distillates:
  Straight Run
  Flashed Feed Stocks
Diundecyl Phthalate
Dodecanol
Dodecylbenzene (commercial)
Epoxylated Linear Alcohols, C11–C16
Ethane
Ethoxylated Alcohols, C12–C15
Ethoxy Triglycol (crude)
Ethyl Acetate
Ethyl Alcohol

[1] See Parts 151, 153, and 154 of this chapter for additional rules governing the bulk carriage of dangerous cargoes.

Ethyl Benzene
Ethyl Butanol
Ethylene
Ethylene Glycol
Ethylene Glycol Monobutyl Ether
Ethylene Glycol Monobutyl Ether Acetate
Ethylene Glycol Monoethyl Ether
Ethylene Glycol Monoethyl Ether Acetate
Ethylhexaldehyde
2-Ethyl Hexanol
Ethyl Hexyl Tallate
Furfuryl Alcohol
Gas Oil:
  Cracked
Gasoline Blending Stocks:
  Alkylates
  Reformates
Gasolines:
  Casinghead (natural)
  Automotive (containing not over 4.23 grams lead per gallon)
  Aviation (containing not over 4.86 grams lead per gallon)
  Polymer
  Straight Run
Glycerine
Glycol Diacetate
Glyoxal (40%)
Heptane
Heptanol
Hexane (iso-, n-)
Hexanol
Hexene
Hexylene Glycol
Isophorone
Jet Fuels:
  JP-1 (Kerosene)
  JP-3
  JP-4
  JP-5 (Kerosene, Heavy)
Kerosene
Latex, Liquid Synthetic
Methane
Methyl Acetate
Methyl Alcohol
Methyl Amyl Acetate
Methyl Amyl Alcohol
Methyl Ethyl Ketone
Methyl Formal (Dimethyl Formal)
Methyl Isobutyl Ketone
Methyl Isobutyl Carbinol
Mineral Spirits
Naphtha:
  Solvent
  Stoddard Solvent
  Varnish Makers' and Painters' (75%)
Nonane
Nonene
Nonyl Alcohol
Nonyl Phenol
Nonyl Phenol (ethoxylated)
Octene
Octyl Alcohol (iso-, n-)
Octyl Aldehyde (iso-)
Octyl Epoxytallate
Oils:
  Absorption
  Aromatic
  Clarified
  Coal Oil
  Coal Tar
  Croton
  Crude Oil
  Diesel Oil
  Fuel Oils:
    No. 1 (Kerosene)
    No. 1-D
    No. 2
    No. 2-D
    No. 4
    No. 5
    No. 6
  Heartcut Distillate
  Lubricating
  Mineral Seal
  Mineral
  Motor
  Neatsfoot
  Linseed
  Penetrating
  Range
  Residual
  Resin
  Resinous Petroleum
  Road
  Rosin
  Sperm
  Spindle
  Spray
  Tall
  Tanner's
  Transformer
  Turbine
Edible Oils, including:
  Castor
  Coconut
  Cotton Seed
  Fish
  Lard
  Olive
  Palm
  Peanut
  Safflower
  Soya Bean
  Tucum
  Vegetable
Pentadecanol
Pentane (iso-, n-)
1-Pentene
Petrolatum
Petroleum Naphtha
Phosphorized Bicyclic Terpine
Phthalate Plasticizers
Polybutene
Polyethylene Glycols
Polymerized Esters
Polypropylene
Polypropylene Glycol Methyl Ether
Polypropylene Glycols
Propane
Propyl Acetate (iso-, n-)
Propyl Alcohol (iso-, n-)
Propylene
Propylene Butylene Polymer
Propyl Ether (iso-)
Propylene Glycol
Propylene Tetramer
Soybean Oil (Epoxidized)
Sulfolane
Tallow
Tetradecanol
Tetradecene
Tetradecyl Benzene
Tetraethylene Glycol
Tetrahydronaphthalene
Toluene
Tridecanol
Tridecene
Tridecyl Benzene
Triethyl Benzene
Triethylene Glycol
Triethylene Glycol Diethyl Butyrate
Tripropylene Glycol
Turpentine
Undecanol
Undecene
Undecylbenzene
Waxes:
  Carnauba
  Paraffin
Xylene (meta-, para-, ortho-)
Zinc Dialkyldithiophosphate

§ 30.25-5 [Revoked]

By revoking § 30.25-5 and table 30.25-5.

PART 31—INSPECTION AND CERTIFICATION

§ 31.05-1 [Amended]

By striking out the last sentence in § 31.05-1(b).

PART 32—SPECIAL EQUIPMENT, MACHINERY, AND HULL REQUIREMENTS

By revising § 32.55-20(b)(1) to read as follows:

§ 32.55-20 Venting of cargo tanks of tankships constructed on or after July 1, 1951—T/ALL.

* * * * *

(b) * * *

(1) Cargo tanks in which Grade A liquids are to be transported must be fitted with a venting system consisting of a branch vent line from each cargo tank connected to a vent header which must extend to a height above the weather-deck equal to at least 13.1 feet and must terminate at a comparable distance from any living or working space, ventilator inlet, or source of ignition. When special conditions will prevent the vent line or header outlets being permanently installed at a height above the deck of 13.1 feet, an adjustable system must be provided which, when extended vertically, is capable of reaching a height of 13.1 feet.

* * * * *

PART 35—OPERATIONS

§ 35.30-1 [Amended]

By striking out § 35.30-1(b)(2).

PART 39—FLAMMABLE OR COMBUSTIBLE LIQUIDS HAVING LETHAL CHARACTERISTICS [REVOKED]

By revoking Part 39.

PART 40—SPECIAL CONSTRUCTION, ARRANGEMENT, AND OTHER PROVISIONS FOR CARRYING CERTAIN FLAMMABLE OR COMBUSTIBLE DANGEROUS CARGOES IN BULK

Subpart 40.10 [Revoked]

By revoking Subpart 40.10.

PART 42—DOMESTIC AND FOREIGN VOYAGES BY SEA

§ 42.20-5 [Amended]

In § 42.20-5(a-1), by adding the words "46 CFR 153.20, 153.21, 153.22, or 154.210" immediately after the words "33 CFR 157.21".

PART 56—PIPING SYSTEMS AND APPURTENANCES

§ 56.04-2 [Amended]

By revising footnote 2 of table 56.04-2 in § 56.04-2 to read as follows:

[2] For definitions, see 46 CFR Parts 30, 151, and 154. Note that the category "B and C" poisons is not used in the rules applying to self-propelled vessels (46 CFR Part 153).

PART 70—GENERAL PROVISIONS

In § 70.05—1(a) the table is amended by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01-10 (b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	• • •	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

[12] Except those cases excluded under 46 U.S.C. 170 or 391a.

PART 90—GENERAL PROVISIONS

In § 90.05–1 (o) the table is amended by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10 (b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	• • •	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

[12] Except those cases excluded under 46 U.S.C. 170 or 391a.

PART 91—INSPECTION AND CERTIFICATION

§ 91.55–15 [Amended]

In § 91.55–15(a)(2), by striking out the words "1300 'E' Street NW., Washington, D.C. 20590" and substituting the words "Washington, D.C. 20590" in place thereof.

PART 98—SPECIAL CONSTRUCTION, ARRANGEMENT, AND PROVISIONS FOR CERTAIN DANGEROUS CARGOES IN BULK

§ 98.01–5 [Amended]

By revoking § 98.01–5(d).

By striking out the first sentence of § 98.01–5(e).

Subpart 98.05 [Revoked]

By revoking Subpart 98.05.

Subpart 98.10 [Revoked]

By revoking Subpart 98.10.

Subpart 98.15 [Revoked]

By revoking Subpart 98.15.

Subpart 98.18 [Revoked]

By revoking Subpart 98.18.

PART 105—COMMERCIAL FISHING VESSELS DISPENSING PETROLEUM PRODUCTS

§ 105.10–10 [Amended]

In § 105.10–10(a), by striking out the second sentence.

§ 105.10–15 [Amended]

In § 105.10–15(a), by striking out the second sentence.

PART 110—GENERAL PROVISIONS

In § 110.05–1(a) the table is amended by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10 (b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	• • •	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self-propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

• • • • • • • •

[12] Except those cases excluded under 46 U.S.C. 170 or 391a.

• • • • • • • •

PART 151—UNMANNED BARGES CARRYING CERTAIN BULK DANGEROUS CARGOES

By amending table 151.01–10(d) in § 151.01–10(d) as follows:

TABLE 151.01–10(d) • • •

Acetone
Amyl Acetate (iso-, n-)
Amyl Alcohol (n-)
Amyl Tallate
Asphalt
Asphalt Blending Stocks:
  Roofers Flux
  Straight Run Residue
Butane
Butyl Acetate (iso-, n-, sec-)
Butyl Alcohol (iso-, n-, sec-, tert-)
Butyl Benzyl Phthalate
Butylene
1,3-Butylene Glycol
Cumene
Cycloaliphatic Resins
Cyclohexane
Cyclohexanol
Cymene (para-)
Decyl Alcohol (iso-, n-)
Decyl Benzene (n-)
Decaldehyde (iso-, n-)
Decene
Diacetone Alcohol
Dibutyl Phthalate (ortho-)
Diethylbenzene
Diethylene Glycol
Diethylene Glycol Monobutyl Ether (Methyl Carbitol)
Diethylene Glycol Monobutyl Ether Acetate
Diethylene Glycol Monoethyl Ether
Diethylene Glycol Monomethyl Ether
Diglycidyl Ether of Bisphenol A
Diheptyl Phthalate
Diisobutylene
Diisobutyl Carbinol
Diisobutyl Ketone
Diisodecyl Phthalate
Dinonyl Phthalate
Dioctyl Phthalate
Diphenyl-diphenyl oxide
Dipropylene Glycol
Distillates:
  Straight Run
  Flashed Feed Stocks
Diundecyl Phthalate
Dodecanol
Dodecylbenzene (commercial)
Epoxylated Linear Alcohols, C11–C15
Ethane
Ethoxylated Alcohols, C12–C15
Ethoxy Triglycol (crude)
Ethyl Acetate
Ethyl Alcohol
Ethyl Benzene
Ethyl Butanol
Ethylene
Ethylene Glycol
Ethylene Glycol Monobutyl Ether
Ethylene Glycol Monobutyl Ether Acetate
Ethylene Glycol Monoethyl Ether
Ethylene Glycol Monoethyl Ether Acetate
Ethylhexaldehyde
2-Ethyl Hexanol
Ethyl Hexyl Tallate
Furfuryl Alcohol
Gas Oil:
  Cracked
Gasoline Blending Stocks:
  Alkylates
  Reformates
Gasolines:
  Casinghead (natural)
  Automotive (containing not over 4.23 grams lead per gallon)
  Aviation (containing not over 4.86 grams lead per gallon)
  Polymer
  Straight Run
Glycerine
Glycol Diacetate
Glyoxal (40 percent)
Heptane
Heptanol
Hexane (iso-, n-)
Hexanol
Hexene
Hexylene Glycol
Isophorone
Jet Fuels:
  JP–1 (Kerosene)
  JP–3
  JP–4
  JP–5 (Kerosene, Heavy)
Kerosene
Latex, Liquid Synthetic
Methane
Methyl Acetate
Methyl Alcohol
Methyl Amyl Acetate
Methyl Amyl Alcohol
Methyl Ethyl Ketone
Methyl Formal (Dimethyl Formal)
Methyl Isobutyl Ketone
Methyl Isobutyl Carbinol
Mineral Spirits
Naphtha:
  Solvent
  Stoddard Solvent
  Varnish Makers' and Painters' (75 percent)
Nonane
Nonene
Nonyl Alcohol
Nonyl Phenol
Nonyl Phenol (ethoxylated)
Octene
Octyl Alcohol (iso-, n-)
Octyl Aldehyde (iso-)
Octyl Epoxytallate
Oils:
  Absorption
  Aromatic
  Clarified
  Coal Oil
  Coal Tar
  Croton
  Crude Oil
  Diesel Oil
Fuel Oils:
  No. 1 (Kerosene)
  No. 1–D
  No. 2
  No. 2–D
  No. 4
  No. 5
  No. 6
Heartcut Distillate Lubricating:
  Mineral Seal
  Mineral
  Motor
  Neatsfoot
  Linseed
  Penetrating
  Range
  Residual
  Resin
  Resinous Petroleum
  Road
  Rosin
  Sperm
  Spindle
  Spray
  Tall
  Tanner's
  Transformer
  Turbine
Edible Oils, Including:
  Castor
  Coconut
  Cotton Seed
  Fish
  Lard
  Olive
  Palm
  Peanut
  Safflower
  Soya Bean
  Tucum
  Vegetable
Pentadecanol
Pentane (iso-, n-)
1-Pentene
Petrolatum
Petroleum Naphtha
Phosphorized Bicyclic Terpine
Phthalate Plasticizers
Polybutene
Polyethylene Glycols
Polymerized Esters
Polypropylene
Polypropylene Glycol Methyl Ether
Polypropylene Glycols
Propane
Propyl Acetate (iso-, n-)
Propyl Alcohol (iso-, n-)
Propylene
Propylene Butylene Polymer
Propyl Ether (iso-)
Propylene Glycol
Propylene Tetramer
Soybean Oil (Epoxidized)
Sulfolane
Tallow
Tetradecanol
Tetradecene
Tetradecyl Benzene
Tetraethylene Glycol
Tetrahydronaphthalene
Toluene
Tridecanol
Tridecene
Tridecyl Benzene
Triethyl Benzene
Triethylene Glycol
Triethylene Glycol Diethyl Butyrate
Tripropylene Glycol
Turpentine
Undecanol
Undecene
Undecylbenzene

Waxes:
Carnauba
Paraffin
Xylene (meta-, para-, ortho-)
Zinc Dialkyldithiophosphate

In § 151.01–10(f) the table is amended by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10 (b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	• • •	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

[12] Except those cases excluded under 46 U.S.C. 170 or 391a.

PART 175—GENERAL PROVISIONS

In § 175.05–1(a) the table is amended by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10 (b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	• • •	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self-propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

[12] Except those cases excluded under 46 U.S.C. 170 or 391a.

PART 188—GENERAL PROVISIONS

In § 188.05–1(a) the table is amended by revising footnote number 10 to read as follows: "10 Bulk dangerous cargoes are cargoes specified in table 151.01–10 (b), in table I of Part 153, and in table 4 of Part 154 of this chapter" and by revising column 8 and adding footnote 12 as follows:

Col. 1	Col. 2	• • •	Col. 8
Steam	Vessels not over 65 ft in length		All vessels carrying in bulk the cargoes listed in table I of pt. 153 and table 4 of pt. 154.[12]
	Vessels over 65 ft in length		Do.
Motor	Vessels not over 15 gross tons		Do.
	Vessels over 15 gross tons except seagoing motor vessels of 300 gross tons and over.		Do.
	Seagoing motor vessels of 300 gross tons and over		Do.
Sail	Vessels not over 700 gross tons		Do.
	Vessels over 700 gross tons		Do.
Non-self-propelled	Vessels less than 100 gross tons		All tank barges carrying in bulk the cargoes listed in table 151.05 of this chapter.[11, 12]
	Vessels 100 gross tons or over		Do.

[12] Except those cases excluded under 46 U.S.C. 170 or 391a.

PART 153—SAFETY RULES FOR SELF-PROPELLED VESSELS CARRYING HAZARDOUS LIQUIDS

By amending Subchapter O by adding a new Part 153 to read as follows:

Subpart A—General

Subpart B—Requirements

AUTHORITY: 46 U.S.C. 170 for all dangerous cargoes except flammable and combustible liquids, for which the authority for the regulations is 46 U.S.C. 391a.

Subpart A—General

§ 153.1 Applicability.

This part prescribes rules that apply to tankships[1] that have on board the cargoes described in § 153.5 for the purpose of implementing the requirements in the law governing vessels having on board flammable or combustible liquid cargo in bulk (46 U.S.C. 391a) and the law governing the carriage of explosives and

[1] Because the definition of "tankship" includes the condition that at least one of the cargo tanks have some quantity of cargo liquid or vapor inside, this part does not apply to a vessel whose cargo tanks are clean and gas free.

other dangerous articles in bulk (46 U.S.C. 170).

§ 153.2 Definitions.

As used in this part:

"Accommodation spaces" means halls, dining rooms, lounges, lavatories, cabins, staterooms, offices, hospitals, cinemas, game and hobby rooms, pantries containing no cooking appliances, and similar permanently enclosed spaces.

"B" means the breadth of the vessel in meters and is defined in § 42.13–15(d) of this chapter.

"Cargo containment system" means a cargo tank, its cargo piping system, its venting system, and its gauging system.

"Cargo handling space" means an enclosed space that must be entered during a routine loading, carriage, or discharge of cargo and that contains an element of the cargo containment system having a seal or packing to prevent the escape of cargo, such as a valve, cargo pump, or cargo vapor compressor.

"Cargo piping system" means a tankship's permanently installed piping arrangement, including any valves and pumps, that carries cargo to or from a cargo tank.

"Cargo tank" means a tank that—

(1) Is part of or permanently affixed to a tankship; and

(2) Carries a cargo described in § 153.5 in any quantity, including residual liquid or vapor.

"Closed gauging system" means an arrangement for gauging the amount of cargo in a tank, such as a float and tape or a magnetically coupled float and indicator, that does not have any opening through which cargo vapor or liquid can escape.

"Combustible" is defined in § 30.10–15 of this chapter.

"Commandant" means Commandant of the U.S. Coast Guard.

The term is often followed by a mailing code in parentheses. The mailing address should include any mailing code and should be written as follows:

Commandant (mailing code), U.S. Coast Guard, Washington, D.C. 20590.

"Dedicated ballast tank" means a tank that is used only for clean ballast.

"Emergency shutdown station" means a part of the tankship where the required emergency shutdown controls are clustered.

"Flammable" is defined in § 30.10–22 of this chapter.

"Forward perpendicular" is defined in § 42.13–15(b) of this chapter.

"IMCO" means the Inter-Governmental Maritime Consultative Organization.

"IMCO Certificate" means a Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk issued under the IMCO *Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk*, Resolution A.212 (VII), 1971.

"Independent tank" means a cargo tank that is permanently affixed to the vessel, that is self-supporting, that incorporates no part of the vessel's hull and that is not essential to the integrity of the hull.

"Intank cargo pump" means a pump—

(1) Located within the cargo tank it serves; and

(2) Whose piping passes through only the top of the cargo tank.

"Integral tank" means a cargo tank that also is part of or is formed in part by the vessel's hull structure so that the tank and the hull may be stressed by the same loads.

"L" means the length of the vessel in meters and is defined in § 42.13–15(a) of this chapter.

"Letter of Compliance" means a letter issued by the Commandant (G–MHM) permitting a foreign flag tankship to carry a bulk cargo regulated under this part.

"Marine Inspector" is defined in § 30.10–43 of this chapter.

"Master" means the master of a tankship of 100 gross tons or more or the operator of a tankship of less than 100 gross tons.

"Open gauging" means an arrangement for gauging the amount of cargo in a tank through a large opening, such as a tank hatch or ullage opening.

"Open venting system" means a venting system that always allows vapor to flow freely to and from the tank.

"Phosphoric acid" means phosphoric acid, superphosphoric acid, and aqueous solutions of phosphoric acid.

"Pressure-vacuum (PV) valve" means a valve that is normally closed and which opens under a preset positive pressure or a vacuum.

"Pumproom" means any enclosed space containing a pump that is part of a cargo containment system.

"Refrigerated tank" means a cargo tank that is equipped to carry a cargo that must be cooled in order to keep the cargo's vapor pressure from exceeding the tank's pressure-vacuum or safety relief valve setting under ambient conditions of 32° C (approx. 90° F) still water and 46° C (approx. 115° F) still air.

"Relief valve setting" means the inlet line pressure at which a vent system's pressure-vacuum or safety relief valve fully opens.

"Restricted gauging system" means a method of gauging the amount of cargo in a tank through an opening of limited size that does not vent the tank's vapor space, such as an unperforated sounding tube.

"Safety relief (SR) valve" means a normally closed valve that opens under a preset positive pressure.

"Service spaces" mean spaces outside the cargo area used for galleys, pantries containing cooking appliances, lockers, store rooms, workshops other than those forming part of machinery spaces, and trunks to such spaces.

"SR venting system" means a venting system in which an SR valve controls vapor flow from the cargo tank.

"Tankship" means any self-propelled vessel having on board a permanently affixed tank that contains a cargo described in § 153.5 in any quantity, including residual liquid or vapor.

"Venting system" means a permanent piping arrangement leading from a cargo tank and used to control the flow of vapor to and from the tank.

§ 153.5 Carriage of hazardous or flammable cargo in bulk.

(a) A hazardous or flammable cargo listed in table I may be carried in bulk on board self-propelled vessels if the requirements of this part are met.

(b) When authorized by the Commandant (G–MHM), a hazardous or flammable cargo not listed in table I, table 4 of part 154, or in § 30.25–1 of this chapter may be carried in bulk on board a self-propelled vessel if the requirements of this part and any additional requirements for the cargo that the Commandant (G–MHM) may prescribe are met.

§ 153.7 Existing tankships.

(a) *Definitions.*

(1) "Permit" means a Certificate of Inspection or a Letter of Compliance.

(2) "Existing tankship" means a tankship for which a contract was let on or before December 27, 1977.

(b) *Endorsements for existing tankships.*

(1) The Coast Guard endorses the permit of an existing tankship to carry a cargo listed in table I if—

(i) The tankship held a permit on December 27, 1977, endorsed for the cargo in question;

(ii) The tankship meets the construction standards under which the Coast Guard issued the permit; and

(iii) The tankship meets the standards in paragraph (c) of this section.

(2) The Coast Guard endorses the permit of an existing tankship to carry a cargo listed in table I if—

(i) The tankship held a permit on December 27, 1977;

(ii) The Coast Guard did not require the permit to be endorsed with the name of the cargo at any time before December 27, 1977;

(iii) The tankship meets the construction standards under which the Coast Guard issued the permit;

(iv) The tankship carried the cargo in question; and

(v) The tankship meets the standards in paragraph (c) of this section.

(3) The Coast Guard endorses the permit of an existing tankship to carry a cargo listed in table I if—

(i) The tankship held a permit on December 27, 1977 endorsed to carry class B or C poisons under 46 CFR part 39;

(ii) The cargo in question is a class B or C poison;

(iii) The tankship meets the construction standards in 46 CFR part 39; and

(iv) The tankship meets the standards in paragraph (c) of this section.

(4) The Commandant (G–MHM) endorses on a case by case basis the permit of an existing tankship to carry a cargo listed in table I if—

(i) The tankship does not come within the categories described in subparagraphs (1) through (3) above;

(ii) The tankship meets paragraph (c) of this section; and

(iii) The tankship meets any additional requirements the Commandant (G-MHM) may prescribe.

(c) *Requirements for existing tankships.* In addition to the standards required of existing tankships in paragraph (b) of this section, every existing tankship must meet the sections of this part according to the following schedule:

(1) The following sections in this part apply to an existing tankship after December 27, 1977: 153.1, 153.2, 153.5, 153.7, 153.8, 153.9, 153.10, 153.208, 153.214, 153.294, 153.515, 153.520, 153.530, 153.559, and subpart C.

(2) After April 12, 1978, an existing tankship must meet all the requirements of this part except as described in subparagraphs (3), (4), (5), and (6) of this section.

(3) The Commandant (G-MHM) considers on a case by case basis endorsing as a type II containment system one that fails to meet §§ 153.21, 153.231(b), and 153.234 if the tankship and containment system meet the following minimum conditions:

(i) The tankship has a loadline certificate.

(ii) The cargo tank is not part of the tankship's shell plating.

(iii) The distance between the bottom plating of the cargo tank and the bottom shell plating of the tankship is at least 76 cm measured parallel to the vertical axis of the tankship.

(4) The Commandant (G-MHM) considers on a case by case basis endorsing a containment system as a type II containment system if—

(i) The containment system is modified after December 27, 1977 to meet § 153.231(b) by adding double bottoms or wing tanks; and

(ii) The tankship can survive the damage described in §§ 153.32 and 153.34 to those parts of the tankship other than machinery spaces.

(5) The Commandant (G-MHM) considers on a case by case basis endorsing as a type III containment system one that does not meet §§ 153.22 and 153.234 if the tankship has a loadline certificate.

(6) The Commandant (G-MHM) considers on a case by case basis extending beyond April 12, 1978 the time an existing tankship may operate before meeting the requirements effective on that date.

§ 153.8 U.S. flag vessel endorsement application.

(a) A person who desires the endorsement required by § 153.900 for a U.S. flag vessel must submit an application to one of the Coast Guard offices described in § 91.55-15 of this chapter, requesting endorsement of the vessel's subchapter D Certificate of Inspection.

(b) The person requesting an endorsement under paragraph (a) of this section must transmit to the Coast Guard when requested—

(1) Hull type calculations;

(2) The plans and information listed in §§ 54.01-18, 56.01-10, 91.55-5(a), (b), (d), (g), and (h), and 111.05-5(d) of this chapter; and

(3) Any other vessel information, such as plans, design calculations, test results, certificates, and manufacturer's data, that the Coast Guard needs to determine that the vessel meets the standards of this part.

§ 153.9 Applications for Letters of Compliance.

(a) *Letter of Compliance applications for a vessel whose flag administration issues IMCO certificates.* A person who desires the endorsed Letter of Compliance described by § 153.900 for a vessel whose flag administration issues IMCO certificates must submit to the Commandant (G-MHM) an application that includes the following:

(1) The vessel's IMCO Certificate.[2]

(2) The vessel's Cargo Ship Safety Construction Certificate and Cargo Ship Safety Equipment Certificate issued under the International Convention for Safety of Life at Sea, 1960.

(3) A general arrangement plan.

(4) A capacity plan.

(5) A midship section plan.

(6) A diagram of cargo piping on deck and in tanks, including all valves and pumps (schematic).

(7) A diagram of cargo tank vent piping, including location of relief valves and flame screens (schematic).

(8) A fire fighting and safety plan.

(9) A description of tank liquid level gauging systems.

(10) Details of tank cooling, heating, and inerting systems.

(b) *Letter of Compliance applications for a vessel whose flag administration does not issue IMCO Certificates.* A person who desires the endorsed Letter of Compliance described by § 153.900 for a vessel whose flag administration does not issue IMCO Certificates must submit to the Commandant (G-MHM) an application that includes the following:

(1) A copy of the vessel's Cargo Ship Safety Construction Certificate and Cargo Ship Safety Equipment Certificate issued under the International Convention for Safety of Life at Sea, 1960.

(2) A list of those cargoes for which the Letter of Compliance is to be endorsed.

(3) The specific tanks that are to be endorsed for each cargo.

(4) The names of the U.S. ports in which the person anticipates operating the vessel.

(5) The name of the vessel's flag administration.

(6) The name of the society that classes the vessel.

(7) A brief description of the vessel's cargo containment systems.

(8) Hull type calculations.

(9) The plans and information listed in §§ 54.01-18, 56.01-10, 91.55-5 (a), (b), (d), (g), and (h), and 111.05-5(d) of this chapter.

(c) *Conditions applying to all Letter of Compliance applications.* If requested by the Commandant (G-MHM), a person desiring a Letter of Compliance for a vessel must furnish any other vessel information, such as plans, design calculations, test results, certificates, and manufacturer's data, that the Coast Guard needs to determine that the vessel meets the standards of this part.

§ 153.10 Equivalent standards.

(a) A vessel that does not meet each standard required in this part for an endorsement on a Certificate of Inspection or Letter of Compliance may meet an alternate standard if the Commandant finds that the alternate standard provides an equivalent or greater level of protection for the purpose of safety.

(b) The Commandant considers on a case by case basis the issuance of a determination of equivalence to a standard required by this part if the person requesting the determination sends a written application to Commandant (G-MHM) that includes—

(1) A detailed explanation of the vessel's characteristics that do not meet the requirements in this part; and

(2) An explanation of how the substituted standards enable the vessel to meet a level of safety equivalent to the standards of this part.

§ 153.12 IMCO Certificates for U.S. flag vessels.

(a) The Coast Guard Officer in Charge of Marine Inspection issues an IMCO Certificate to a U.S. flag tankship if the—

(1) Tankship's owner or representative requests an IMCO Certificate for the tankship;

(2) The tankship meets the recommendations in the IMCO Chemical Code; and

(3) The tankship meets the requirements of this part.

(b) The IMCO Certificate expires on the day when the tankship's Certificate of Inspection expires.

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[2] Generally, the IMCO Certificate is sufficient for the Coast Guard to endorse the vessel's Letter of Compliance with the names of those cargoes in table I that are listed on the IMCO Certificate. The IMCO Certificate would not be sufficient when the Certificate authorizes a cargo that is not permitted in U.S. waters, when the Certificate is in error or waives part of the Code, when the regulations in this part exceed those of the Code, or similar situations.

TABLE 1—TABLE OF MINIMUM REQUIREMENTS

Cargo name	Cargo containment system [1]	Vent height [2]	Vent [3]	Gage [4]	Fire protection system [5]	Special requirements	Electrical hazard group and class [6]
Acetic acid	III	4 m	PV	Restr.	A	.238(a), .554	I-D
Acetic anhydride	II	4 m	PV	Restr.	A	.238(a), .526, .554,	I-D
Acetone cyanohydrin	II	B/3	PV	Closed	A	.238(a), .316, .336, .408, .525, .526, .912(b), .933, .1020, .1035	
Acetonitrile	II	B/3	PV	Restr.	A	.336, .525, .526, .1020	I-D
Acrylic acid	III	4 m	PV	Restr.	A	.238(a), .526, .912(a)	I-D
Acrylonitrile	II	B/3	PV	Closed	A	.236 (a), (c), (d), .316, 336, .408, .525, .526, .912(a), .1020	I-D
Adiponitrile	III	4 m	PV	Restr.	A	.526	
Allyl alcohol	II	B/3	PV	Closed	A	.316, .336, .408, .525, .526, .933, .1020	I-C
Allyl chloride	II	B/3	PV	Closed	A	.316, .336, .408, .525, .526, .1020	I-D
Aminoethylethanolamine	III	NR	Open	Open	A	.236 (a), (b), (c), (g)	
Ammonium hydroxide (28 pct or less NH_3).	III	4 m	PV	Restr.	C	.236 (b), (c), (f), .526	I-D
Aniline	II	B/3	PV	Closed	A	.316, .336, .408, .525, .526, .933, .1020	
Benzene	III	B/3	PV	Restr.	B	.316, .526	I-D
Benzyl chloride	II	B/3	PV	Closed	B	.316, .336, .408, .525, .526, .912(b), .1020	
(iso-, n-) Butyl Acrylate	II	4 m	PV	Restr.	A	.526, .912(a)	I-D
(iso-, n-, sec-, tert-) Butylamine.	II	B/3	PV	Closed	A	.236 (b), (c), .336, .408, .525, .526, .1020	
(n-) Butyl ether	III	B/3	PV	Closed	A	.500, .525, .526, .1020	
Butyl methacrylate	III	4 m	PV	Restr.	B	.526, .912(a)	
(iso-, n-, crude) butyraldehyde	III	4 m	PV	Open	A	.526	I-C
Camphor oil	III	4 m	PV	Open	B	None	I-D
Carbolic oil	II	B/3	PV	Closed	A	.408, .525, .526, .933, .1020	
Carbon disulfide	II	B/3	PV	Closed	C	.236(c), .252, .408, .500, .515, .520, .525, .526, .1020, .1040	(7)
Carbon tetrachloride	III	B/3	PV	Closed		.316, .336, .408, .525, .526, .1020	
Caustic potash solution	III	NR	Open	Open		.236 (a), (c), (g), .933	
Caustic soda solution	III	NR	Open	Open		.236 (a), (c), (g), .933	
(mono-) Chlorobenzene	III	4 m	PV	Restr.	B	.526	I-D
Chloroform	III	B/3	PV	Restr.		.525, .526, .1020	
(crude) Chlorohydrins	II	B/3	PV	Closed	A	.408, .525, .526, .1020	I-D
Chloroprene	II	B/3	PV	Closed	B	.316, .336, .525, .526, .912(a), .1020	
Chlorosulfonic acid	I	B/3	PV	Closed		.408, .525, .526, .554, .555, .933, .1000, .1020, .1045.	
Coal tar naphtha	III	4 m	PV	Restr.	A	.526	I-D
Creosote	III	NR	Open	Open	B	.409	
Cresols	III	NR	Open	Open	B	None	

Footnotes at end of table.

TABLE 1—TABLE OF MINIMUM REQUIREMENTS

Cargo name	Cargo containment system [1]	Vent height [2]	Vent [3]	Gage [4]	Fire protection system [5]	Special requirements	Electrical hazard group and class [6]
Crotonaldehyde	II	B/3	PV	Restr.	A	.316, .336, .525, .526, .1020	I-C
Cyclohexanone	III	4 m	PV	Restr.	A	.236 (a), (b), .526	I-D
Cyclohexylamine	III	4 m	PV	Restr.	A	.236 (a), (b), (c), (g), .526	
(iso-, n-) Decyl acrylate	III	NR	Open	Open	A, C	.236 (b), (c), .912(a)	
Dibutylamine	III	4 m	PV	Restr.	B	.236 (b), (c), .526	
Dichlorobenzene	III	4 m	PV	Restr.	B	.236 (a), (b), .526	
1,1-Dichloroethane	III	4 m	PV	Restr.	B	.526	
2,2'-Dichloroethyl ether	II	4 m	PV	Restr.	A	.236 (a), (b), .526	I-D
Dichloromethane	III	4 m	PV	Restr.		.526	
1,1- or 1,2-Dichloropropane	II	B/3	PV	Restr.	B	.525, .526, .1020	I-D
1,3-Dichloropropene	II	B/3	PV	Closed	B	.316, .336, .408, .525, .526, .1020	I-D
Diethanolamine	III	NR	Open	Open	A	.236 (b), (c)	
Diethylamine	III	B/3	PV	Restr.	A	.236 (a), (b), (c), (g), .525, .526, .1020	I-C
Diethylenetriamine	III	NR	Open	Open	A	.236 (b), (c)	
Diethylethanolamine	III	4 m	PV	Restr.	A	.236 (a), (b), (c), (g), .526	
Diisopropanolamine	III	NR	Open	Open	A	.236 (b), (c)	I-D
Diisopropylamine	II	B/3	PV	Closed	A	.236 (b), (c), .408, .525, .526, .1020	I-C
Dimethylamine (40 pct or less)	III	B/3	PV	Restr.	A, C	.236 (a), (b), (c), (d), .525, .526, .1020	I-C
Dimethylethanolamine	III	4 m	PV	Restr.	A	.236 (b), (c), .526	
Dimethylformamide	III	4 m	PV	Restr.	A	.236 (b), .526	
1,4-Dioxane	II	B/3	PV	Closed	A	.408, .525, .526, .1020	I-C
Epichlorohydrin	II	B/3	PV	Closed	A	.316, .336, .408, .525, .526, .1020	I-C
Ethanolamine	III	NR	Open	Open	A	.236 (b), (c), .526	
Ethyl acrylate	II	4 m	PV	Restr.	A	.526, .912(a)	I-D
Ethylene chlorohydrin	II	B/3	PV	Closed	A, C	.316, .336, .408, .525, .526, .933, .1020	
Ethylene cyanohydrin	III	NR	Open	Open	A	None	I-D
Ethylenediamine	II	4 m	PV	Restr.	A	.236 (b), (c), .526	I-D
Ethylene dibromide	II	B/3	PV	Closed		.408, .525, .526, .1020	
Ethylene dichloride	II	4 m	PV	Restr.	B	.236(b), .409, .526	I-D
Ethyl ether	II	4 m	PV	Closed	A	.236(g), .252, .408, .500, .515, .526	I-C
2-Ethylhexyl acrylate	III	NR	Open	Open	A	.912(a)	
Ethyl methacrylate	III	4 m	PV	Restr.	B	.912(a), .526	
2-Ethyl-3-Propyl acrolein	III	4 m	PV	Restr.	A	.526	
Formaldehyde solution (37 to 50 pct).	III	4 m	PV	Restr.	A	.526	I-C
Formic acid	III	4 m	PV	Restr.	A	.238 (b), (c), .526, .554	
Furfural	III	4 m	PV	Restr.	A	.526	
Hydrochloric acid	III	4 m	PV	Restr.		.252, .526, .554, .555, .557, .933, .1045, .1052	
2-Hydroxyethyl acrylate	II	B/3	PV	Closed	A	.408, .525, .526, .912(a), .933, .1020	
Isoprene	III	4 m	PV	Restr.	B	.912(a)	I-C
Mesityl oxide	III	4 m	PV	Restr.	A	.409, .526	I-D
Methyl acrylate	II	4 m	PV	Restr.	B	.526, .912(a)	I-D
2-Methyl-5-Ethyl pyridine	III	NR	Open	Open	A	.236(b)	
Methyl methacrylate	II	4 m	PV	Restr.	B	.526, .912(a)	I-D
(alpha-) Methyl styrene	III	4 m	PV	Restr.	B	.526, .912(a)	

Footnote at end of table.

TABLE 1—TABLE OF MINIMUM REQUIREMENTS

Cargo name	Cargo containment system [1]	Vent [2] height	Vent [3]	Gage [4]	Fire protection system [5]	Special requirements	Electrical hazard group and class [6]
Morpholine	III	4 m	PV	Restr.	A	.236 (b), (c)	I-C
Motor fuel anti-knock compounds (containing lead alkyls).	II	B/3	PV	Closed	B, C	.252, .336, .408, .525, .526, .933, .1020, .1025	
Naphthalene (liquid)	III	4 m	PV	Restr.	B, C	None	
Nitric acid (70 pct or less)	II	4 m	PV	Restr.		.406, .526, .554, .555, .559, .933, .1045	
(mono-) Nitrobenzene	II	B/3	PV	Closed	B, C	.316, .336, .408, .525, .933, .1020	
1- or 2-Nitropropane [8]	III	4 m	PV	Restr.	A [9]	.526, .600, .1055	I-C
(ortho-, para-) Nitrotoluene	II	B/3	PV	Closed	B	.316, .336, .408, .525, .526, .1020	
Oleum	II	B/3	PV	Closed		.316, .336, .408, .526, .554, .555, .556, .933, .1000, .1045, .1052	
Paraldehyde	III	4 m	PV	Restr.	A	None	
Pentachloroethane	III	B/3	PV	Restr.		.316, .336, .525, .526, .1020	
Phenol	II	B/3	PV	Closed	A	.408, .525, .526, .933, .1020	
Phosphoric acid	III	NR	Open	Open		.554, .555, .558, .1045, .1052	
Phthalic anhydride (liquid).	III	4 m	PV	Restr.	D	None	
(iso-,n-) Propanolamine	III	NR	Open	Open	A	.236 (b), (c), .526	
Propionic acid	III	4 m	PV	Restr.	A	.238(a), .554	I-D
Propionic anhydride	III	4 m	PV	Restr.	A	.238(a), .556	
(iso-,n-) Propylamine	II	B/3	PV	Closed	C	.236 (b), (c), .408, .500, .525, .526, .1020, .1060	I-D
Propylene oxide	II	4 m	PV	Closed	A	.500, .526, .530, .1010, .1011	I-B
Pyridine	III	4 m	PV	Restr.	A	.236(b)	
Sodium hydrosulfide solution (45 pct or less).	III	4 m	PV	Restr.		.526, .933	
Sodium hypochlorite solution (15 pct or less).	III	4 m	PV	Restr.		.236 (a), (b)	
Styrene	III	4 m	PV	Open	B	.236(b), .912(a)	I-D
Sulfur (liquid)	III	NR	Open	Open		.252, .526, .545	
Sulfuric Acid	III	NR	Open	Open		.554, .555, .556, .933, .1000, .1045, .1046, .1052	
1,2,2,2-Tetrachloroethane	III	B/3	PV	Restr.		.316, .336, .525, .526, .1020	
Tetraethylenepentamine	III	NR	Open	Open	A	.236 (b), (c)	
Tetrahydrofuran	III	4 m	PV	Restr.	A, D	.526, .912(b)	I-C
Toluene Diisocyanate	II	B/3	PV	Closed	C, D	.236(b), .316, .408, .500, .501, .525, .526, .1000, .1020,	
Tricresyl phosphate (containing 1 pct or more of the ortho isomer).	II	4 m	PV	Closed	B	.408, .525(a), .1020	
Triethanolamine	III	NR	Open	Open	A	.236 (a), (b), (c), (g)	
Triethylamine	II	B/3	PV	Restr.	B	.236 (b), (c), .525, .526, .1020	I-C
Triethylenetetramine	III	NR	Open	Open	A	.236 (a), (b), (c)	
Urea, ammonium nitrate solution (containing more than 2 pct NH_3).	III	4 m	PV	Restr.	A	.236(b), .526	I-D
(iso-,n-) Valeraldehyde	III	4 m	PV	Restr.	A	.500, .526,	I-C
Vinyl acetate	III	4 m	PV	Open	A	.912(a)	I-D
Vinylidene chloride	II	4 m	PV	Restr.	B	.236 (a), (b), .500, .526, .912(a),	I-D
Vinyl ethyl ether	II	4 m	PV	Closed	A	.236 (b), (f), (g), .408, .500, .515, .526, .912(a),	
Vinyl toluene	III	4 m	PV	Restr.	B	.236 (a), (c), (g), .912(a)	I-D

For details see these sections
[1] 153.230–153.232.
[2] 153.350–153.351.
[3] 153.355.
[4] 153.400–153.406.
[5] 153.420.
[6] 46 CFR 111.80–5.
[7] 153.520(b).
[8] Dry chemical extinguishers should not be used on nitropropane fires because some dry chemicals may react with nitropropane and make the fire worse.

NOTES ON TABLE I

Cargo containment system—The containment system type, either I, II, or III, is listed. See secs. 153.230 through 153.232.
Vent heights—The location and height of the vent riser is described in terms of the vent height, either B/3 or 4 m. See secs. 153.350 and 153.351.
Vent—The type of venting control valve, either pressure vacuum (PV) or open, is listed. See sec. 153.355.
Gauge—The type of gauge, either closed, restricted (Restr.), or open, is listed. See secs. 153.400–153.406.
Fire protection system—The type of fire protection system is shown, where: A is a foam system for water soluble cargoes (polar solvent foam), B is a foam system for water insoluble cargoes (nonpolar solvent form), C is a water spray system, and D is a dry chemical system.
Unless table 1 specifies a dry chemical (D) system as an option, a dry chemical system may be substituted for an A or B type system only if the Commandant (G-MMT) approves the substitution.
Special requirement—The special requirements are shown by the digits of the section numbers, without the "153" part number preceding them.
Electrical hazard group and class—This column is for use with subchapter J (Electrical Engineering) of this chapter.
NOTE.—See app. *I* of this part for a list of cargoes to which neither this part nor subch. *D* (tank vessels) of this chapter apply.

Subpart B—Requirements

GENERAL

§ 153.15 Requirements for U.S. flag vessel permits.

To have its Certificate of Inspection endorsed with the name of a cargo listed in table I, a U.S. flag vessel must meet the requirements for the cargo in this subpart.

§ 153.16 Requirements for foreign flag vessel permits.

To have its Letter of Compliance endorsed with the name of a cargo listed in table I, a foreign flag vessel must:

(a) Have an IMCO Certificate, if the flag administration issues IMCO Certificates, endorsed with the name of the cargo and meet any specific requirements in this subpart that the Commandant (G-MHM) may prescribe; or

(b) Meet the requirements of this subpart and § 30.01–5(e) of this chapter.

HULL TYPE CALCULATIONS

§ 153.20 Type I hull calculations.

Calculations for a type I hull must show that it can survive damage as described in §§ 153.32 and 153.34 to any location.

§ 153.21 Type II hull calculations.

(a) Calculations for a type II hull 150 m (approx. 492 ft) or less in length must show that it can survive damage described in §§ 153.32 and 153.34 to any location except the transverse bulkheads bounding an aft machinery space.

(b) Calculations for a type II hull greater than 150 m (approx. 492 ft) in length must show that it can survive damage described in §§ 153.32 and 153.34 to any location.

§ 153.22 Type III hull calculations.

(a) Calculations for a type III hull less than 125 m (approx. 410 ft) in length must show that it can survive damage described in §§ 153.32 and 153.34 to any location except to an aft machinery space.

(b) Calculations for a type III hull 125 m (approx. 410 ft) or greater in length must show that it can survive damage as described in §§ 153.32 and 153.34 to any location except the transverse bulkheads bounding an aft machinery space.

§ 153.30 Permeability of spaces.

(a) As used in this section, "permeability of a floodable space" means the ratio of the volume within the space that is assumed to be occupied by water to the total volume of the space.

(b) The permeability of a floodable space must be assumed as follows:

(1) Machinery spaces: 0.85 unless a permeability of less than 0.85 is justified in detail.

(2) Storerooms: 0.60.

(3) Accommodation spaces: 0.95.

(4) Voids: 0.95.

(5) Tanks containing consumable liquids: 0.95 or 0.0, whichever is the more disabling.

(6) Tanks containing liquids other than consumables: 0.95 or 0.0, the permeability of partially filled tanks to be consistent with the density and amount of liquid carried in the tank.

(c) If a cargo tank would be penetrated under the assumed damage, the cargo tank must be assumed to lose all cargo and refill with salt water up to the level of the tankship's final plane of equilibrium.

§ 153.31 Free surface effect.

(a) The virtual increase in the vertical center of gravity of the tankship due to a liquid in a space must be determined by calculating either:

(1) The free surface effect with the ship assumed heeled 5° from the vertical; or

(2) The shift of the center of gravity of the liquid by the moment of transference method.

(b) In calculating the free surface effect of consumable liquids, the following must be done:

(1) For each type of liquid, at least one transverse pair of wing tanks or a single centerline tank must be assumed to have a free surface.

(2) Of the two assumptions in subparagraph (1), the one having the greater free surface effect must be chosen.

§ 153.32 Damage.

(a) Calculations must assume both collision and grounding damage, separately; and the damage must consist of the most disabling penetration up to and including penetrations having the following dimensions:

(1) Collision penetration:		
(i) Longitudinal extent		(1/3)$L_s^{2/3}$ or 14.5 m (approx. 0.495$L_s^{2/3}$ or 47.6 ft), whichever is less.
(ii) Transverse extent: (inboard from the ship's side at right angles to the centerline at the level of the summer loadline assigned under subchapter E).		B/5 or 11.5 m (approx. 37.7 ft), whichever is less.
(iii) Vertical extent		From the base line upwards without limits.
(2) *Grounding penetration:*		
At the forward end but excluding any damage aft of a point 0.3L aft of forward perpendicular.		At any other longitudinal position.
(i) Longitudinal	L/10	L/10 or 5 m (approx. 16.4 ft), whichever is less.
(ii) Transverse	B/6 or 10 m (approx. 32.8 ft), whichever is less.	5 m (approx. 16.4 ft).
(iii) Vertical extent from the base line.	B/15 or 6 m (approx. 19.7 ft), whichever is less.	B/15 or 6 m (approx. 19.7 ft), whichever is less.

(b) If the damage assumption excludes a transverse bulkhead bounding a machinery space, the machinery space must be assumed to be flooded as a case separate from the damage assumption.

(c) Damage must be assumed to include transverse bulkheads spaced more closely than the longitudinal extent of damage specified in paragraphs (a)(1)(i) and (a)(2)(i) of this section.

§ 153.34 Survival.

A tankship is presumed to survive if it meets the following conditions:

(a) *Heel angle.* (1) Except as described in paragraph (a)(2) of this section, in the final condition of flooding the angle of heel must not exceed 15° (17° if no part of the freeboard deck is immersed).

(2) The Commandant (G-MMT) considers on a case by case basis vessels 150m or less in length having heel angles greater than 17° but less than 25°.

(b) *Final waterline.* The final waterline, taking into account sinkage, heel, and trim, must be below the lower edge of openings such as air pipes and openings closed by weathertight doors or hatch covers. The following types of openings may be submerged when the tankship is at the final waterline:

(1) Openings covered by watertight manhole covers or watertight flush scuttles.

(2) Small watertight cargo tank hatch covers.

(3) Remotely operated watertight sliding doors.

(4) Side scuttles of the non-opening type.

(c) *Range of stability.* Through an angle of 20° beyond its position of equilibrium after flooding, a tankship must meet the following conditions:

(1) The righting lever curve must be positive.

(2) The maximum of the righting lever curve must be at least 10 cm (approx. 4 in.).

(3) Each submerged opening must be weathertight.

(d) *Metacentric height.* After flooding, the tankship's metacentric height must be at least 5 cm (approx. 2 in.) when the ship is in the upright position.

(e) *Watertight superstructure.* Watertight superstructure beyond the extent of damage adds to the stability of the tankship only if it is separated from the damaged space by a watertight bulkhead.

(f) *Progressive flooding.* Pipes, ducts, or tunnels within the assumed extent of damage must be either:

(1) Equipped with arrangements such as stop check valves to prevent progressive flooding in other spaces with which they connect; or

(2) Assumed to flood the spaces with which they connect.

(g) *Equalization arrangements.* Flooding equalization arrangements requiring mechanical operation such as valves or cross flooding lines may not be assumed to reduce the angle of heel. (However, note that spaces joined by ducts of large cross section may be assumed to be common spaces.)

(h) *Intermediate stages of flooding.* If it is not clear that a tankship meets the requirements of this section throughout intermediate stages of flooding, the shipowner shall furnish calculations showing that the tankship meets these requirements in intermediate flooding if requested by the Commandant (G-MMT).

§ 153.35 Loadline requirements.

A vessel that meets §§ 153.20, 153.21, or 153.22 also meets § 42.20-5 of this chapter.

General Vessel Arrangements

§ 153.200 Portlights, wheelhouse windows, and wheelhouse doors.

(a) In this section, "hosetight" means tight when tested with a firehose at not less than 207 kPa gauge (approx. 30 psig).

(b) Except as permitted under paragraph (c),

(1) Each portlight must be fixed and hosetight; and

(2) Each wheelhouse window and door must be hosetight.

(c) The following are not required to meet paragraph (b):

(1) Portlights, wheelhouse windows, wheelhouse portlights, and wheelhouse doors on the after bulkhead of a superstructure or deckhouse.

(2) Portlights, wheelhouse windows, wheelhouse portlights, and wheelhouse doors on the outboard side of a deckhouse or superstructure and the greater of L/25 or 3.05 m (approx. 10 ft) aft, measured from the aftermost forward bulkhead of the deckhouse.

§ 153.202 Location of doors and airports on deckhouses and superstructures.

Doors and airports on a deckhouse or superstructure must be on its aft or outboard side and, if on the side, at least L/25 but no less than 3.05 m (approx. 10 ft) aft, measured from the aftermost forward bulkhead of the deckhouse.

§ 153.208 Ballast equipment.

(a) Except for the arrangement described in paragraph (b), no piping that serves a dedicated ballast tank that is adjacent to a cargo tank may enter an engine room or accomodation space.

(b) Piping used only to fill a dedicated ballast tank adjacent to a cargo tank may enter an engine room or accommodation space if the piping has a valve or valving arrangement:

(1) Within the part of the tankship where a containment system may be located under § 153.234;

(2) That allows liquid to flow only towards that ballast tank (such as a check valve); and

(3) That enables a person to shut off the fill line from the weatherdeck (such as a stop valve).

(c) Piping, pumps and vent lines serving a dedicated ballast tank may not be located within a cargo containment system.

§ 153.209 Bilge pumping systems.

Bilge pumping systems for cargo pumprooms, slop tanks, and void spaces separated from cargo tanks by only a single bulkhead must be entirely within the locations allowed containment systems in §153.234.

§ 153.214 Personnel emergency and safety equipment.

Each tankship must have the following: (a) Two stretchers or wire baskets complete with equipment for lifting an injured person from a pumproom or a cargo tank.

(b) In addition to any similar equipment required by subchapter D of this chapter, three each of the following:

(1) A 30 minute self-contained breathing apparatus of the pressure demand type, approved by the Mining Enforcement and Safety Administration and the National Institute for Occupational Safety and Health, or the tankship's flag administration with five refill tanks or cartridges of 30 minutes capacity each.

(2) A set of coveralls or large apron, boots, long sleeved gloves, and goggles, each made of materials resistant to the cargoes in table I that are endorsed on the Certificate of Inspection or Letter of Compliance.

(3) A steel-cored lifeline with harness.

(4) An explosion-proof lamp.

(c) A first aid kit approved by the Mining Enforcement and Safety Administration and the National Institute for Occupational Safety and Health, or the tankship's flag administration for the number of crewmen normally aboard the vessel.

(d) A portable oxygen inhalator and bag valve mask manual resuscitator.

§ 153.215 Safety equipment lockers.

(a) Each tankship must have at least two safety equipment lockers.

(b) One safety equipment locker must be adjacent to the emergency shutdown station required by § 153.296(b). This locker must contain one set of the equip-

ment required by § 153.214(a) and two sets of that required by § 153.214(b).

(c) The second safety equipment locker must be adjacent to the second emergency shutdown station required by § 153.296(b). This locker must contain the remaining equipment required by § 153.214 (a) and (b).

(d) Each safety equipment locker must be marked as described in § 153.955 (c), (d), and (e) with the legend "SAFETY EQUIPMENT."

§ 153.216 Shower and eye wash fountains.

Each tankship must have a shower and an eye wash fountain that:

(a) Operate in any ambient temperature;

(b) Are located on the weatherdeck; and

(c) Are marked "EMERGENCY SHOWER" as described in § 153.955 (c), (d), and (e), so that the legend is visible from work areas in the part of the deck where the cargo containment systems are located.

§ 153.217 Access to void spaces.

Any access opening to a void space must meet the requirements for a cargo tank access in §§ 153.254 (b), (c), and (d) if:

(a) The void space is adjacent to a cargo containment system; or

(b) A part of a cargo containment system lies within the void space.

CARGO CONTAINMENT SYSTEMS

§ 153.230 Type I system.

A type I containment system must meet the following requirements:

(a) It must be in a type I hull.

(b) Except as described in § 153.235:

(1) It may be no closer to the tankship's shell than 76 cm (approx. 29.9 in.); and

(2) It may not be located in any part of the tankship subject to the damage described in §§ 153.32(a)(1)(ii) and 153.32(a)(2)(iii).

§ 153.231 Type II system.

A type II containment system must meet the following requirements:

(a) It must be in either a type I or II hull.

(b) Except as described in § 153.235:

(1) It may be no closer to the tankship's shell than 76 cm (approx. 29.9 in.); and

(2) It may not be located in any part of the tankship subject to the damage described in § 153.32(a)(2)(iii).

§ 153.232 Type III system.

A type III containment system must be in either a type I, II, or III hull.

§ 153.233 Separation of tanks from machinery, service, and other spaces.

(a) To prevent leakage through a single weld failure, the following spaces must be separated from a cargo by two walls, two bulkheads, or a bulkhead and a deck not meeting in a cruciform joint:

(1) Machinery spaces.

(2) Service spaces.

(3) Accommodation spaces.

(4) Spaces for storing potable domestic, or feed water.

(5) Spaces for storing edibles.

(b) Some examples of arrangements that may separate cargo from the spaces listed in paragraph (a) of this section are the following:

(1) Dedicated ballast tanks.

(2) Cargo pumprooms.

(3) Ballast pumprooms.

(4) Tanks not carrying a cargo listed in this part.[*]

(5) A cofferdam aft of the cargo containment systems and whose forward bulkhead is forward of any joint common to an accommodations space and the deck.

(6) Double walled piping or a piping tunnel.

§ 153.234 Fore and aft location.

(a) Each cargo containment system and any compartments within which a containment system is located must be forward of a tankship's accommodation spaces.

(b) Except as described in § 153.235, each cargo containment system must be located at least 0.05L aft of the forward perpendicular, but in no case forward of a collision bulkhead.

§ 153.235 Exceptions to cargo piping location restrictions.

Cargo piping must not be located in those areas from which a containment system is excluded by §§ 153.230(b), 153.231(b), and 153.234(b) unless the cargo piping:

(a) Drains back to the cargo tank under any heel or trim resulting from the damage specified in § 153.32; and

(b) Enters the cargo tank above the liquid level for a full tank in any condition of heel or trim resulting from the damage specified in § 153.32.

§ 153.236 Prohibited materials.

When one of the following paragraphs of this section is referenced in table I, the materials listed in that paragraph may not be used in components that contact the cargo liquid or vapor:

(a) Aluminum or aluminum alloys.

(b) Copper or copper alloys.

(c) Zinc, galvanized steel or alloys having more than 10 percent zinc by weight.

(d) Magnesium.

(e) Lead.

(f) Silver or silver alloys.

(g) Mercury.

§ 153.238 Required materials.

When one of the following paragraphs of this section is referenced in table I, only those materials listed in that paragraph may be used in components that contact the cargo liquid or vapor:

(a) Aluminum, stainless steel, or steel covered with a protective lining or coating.

(b) With cargo concentrations of 98 percent or greater, aluminum or stainless steel.

(c) With cargo concentrations of less than 98 percent, 304L or 316 stainless steel.

§ 153.239 Cast iron prohibited.

No gray cast iron may be used in a cargo containment system.

§ 153.240 Insulation.

Cargo containment system insulation made necessary by the requirements of this part must meet the requirements in § 38.05-20 of this chapter. However, the vapor barrier required by § 38.05-20(b) is unnecessary if the insulation is—

(a) Protected from the weather, and attached to a containment system maintained at a temperature in excess of 46° C (approx. 115° F); or

(b) In an atmosphere whose dewpoint is less than the temperature of any surface in contact with the insulation.

CARGO TANKS

§ 153.250 Double-bottom and deep tanks as cargo tanks.

Except in those cases in which Commandant (G-MHM) specifically approves another arrangement, such as a double-bottom or deep tank as a cargo tank, an integral cargo tank or the hold within which an independent cargo tank is located must extend to the weatherdeck.

§ 153.251 Independent cargo tanks.

(a) An independent cargo tank must meet § 38.05-10 (a)(1), (b), (d), and (e)(1) of this chapter, even if the tank is not to be endorsed to carry a cargo requiring an independent tank.

(b) A tank endorsed to carry a cargo requiring an independent cargo tank must meet §§ 38.05-2(d) and 38.05-4(g) of this chapter. (See also § 153.256(b)).

§ 153.252 Special requirement for an independent cargo tank.

When table I refers to this section, the cargo tank must be an independent tank.

§ 153.253 Quick closing shutoff valves required with spill valves.

A cargo tank with a spill valve must have a remotely actuated quick closing shutoff valve in its fill line.

§ 153.254 Cargo tank access.

(a) A cargo tank must have at least one covered manhole opening into the vapor space described in § 153.354.

(b) An access through a vertical cargo tank surface must be at least 60 cm by 80 cm (approx. 23.6×31.5 in.) and no more than 60 cm above a foothold, grating, or surface on both sides of the access way.

(c) An access through a horizontal cargo tank surface must be at least 60 cm by 60 cm (approx. 23.6×31.5 in.).

(d) An access trunk must be no less than 76 cm (approx. 29.9 in.) in diameter.

[*] See also §§ 32.56-5 and 32.60-10 of this chapter for limitations on the stowage of combustible liquids adjacent to ignition sources.

§ 153.256 Trunks, domes, and openings of cargo tanks.

(a) The hatch of a cargo tank must—

(1) Be at the highest point of the tank; and

(2) Open on or above the weatherdeck.

(b) To be endorsed to carry a cargo requiring an independent cargo tank, a tank must have—

(1) A trunk or dome at the uppermost part of the tank, extending above the weatherdeck;

(2) Its hatch at the top of the trunk or dome; and

(3) No openings below the weatherdeck.

§ 153.266 Tank linings.

A tank lining must be—

(a) At least as elastic as the tank material; and

(b) Applied or attached to the tank as recommended by the lining manufacturer.

PIPING SYSTEMS AND CARGO HANDLING EQUIPMENT

§ 153.280 Piping system design.

(a) Each cargo piping system must meet the standards of part 56 and §§ 38.-10–1(b), 38.10–1(e), and 38.10–10(a) of this chapter.

(b) Piping carrying cargo or cargo residue may not enter any machinery space except a cargo pumproom.

§ 153.281 Piping to required independent tanks.

An independent cargo tank required by this part must have no piping except through that part of the trunk or dome extending above the weatherdeck.

§ 153.282 Cargo filling lines.

The discharge point of a cargo tank filling line must be no higher above the bottom of the cargo tank or sump than 10 cm (approx. 4 in.) or the radius of the filling line, whichever is greater.

§ 153.283 Valving for cargo piping.

(a) Except as described in this section, a cargo line must have a deck operable, manual stop valve—

(1) In each tank which the line serves; and

(2) At each cargo hose connection point.

(b) The valve required by (a)(1) may be in a cargo pumproom at the pumproom bulkhead if the cargo tank the cargo line serves is adjacent to the pumproom.

(c) The valve required by (a)(1) may be on the weatherdeck if—

(1) The weatherdeck is the top of the tank;

(2) The line goes through the weatherdeck into the tank; and

(3) The valve is at the point where the line penetrates the weatherdeck.

(d) The valve required by (a)(1) may be outside the tank if—

(1) The tank is an independent tank; and

(2) The valve is at the point where the line penetrates the tank.

(e) The discharge line of an intank cargo pump need not have the valve required by (a)(1).

§ 153.284 Characteristics of required quick closing valves.

Remotely actuated quick closing shutoff valves required by this part must—

(a) Be of the fail-closed type that closes on loss of power;

(b) Allow manual operation; and

(c) Operate from fully open to fully closed in no more than thirty seconds.

§ 153.285 Valving for cargo pump manifolds.

(a) When cargo lines serving different tanks enter a pumproom and connect to the same pump—

(1) Each cargo line must have a stop valve within the line;

(2) The valve must be before the cargo line joins the other lines or pump; and

(3) The valve must be within the pumproom.

(b) The valve in paragraph (a) is required in addition to any valve required under § 153.283(b).

§ 153.294 Marking of piping systems.

(a) Each cargo piping system must be marked with the designation number of the cargo tank it serves at each hose connection, valve, and blind in the piping system. The markings must be in characters at least 5 cm (approx. 2 in.) high.

(b) Every hose connection of a cargo piping system must be marked with the cargo piping system's working pressure required by § 38.10–10(a) of this chapter.[4]

§ 153.296 Emergency shutdown stations.

(a) Each tankship must have at least two emergency shutdown stations.

(b) One emergency shutdown station must be located forward of the deckhouse, in the after part of the weatherdeck in which the cargo tanks are located.

(c) An emergency shutdown station must be accessible from any part of the weatherdeck if a break in a cargo piping system or hose causes spraying or leaking.

(d) Each emergency shutdown station must contain a single remote actuator for all quick closing shutoff valves required by this part.

(e) Each emergency shutdown station must have the controls necessary to stop all cargo pumps on the tankship.

(f) Any remote emergency actuator, such as that for a quick closing shutoff valve, a cargo pump, or a water spray system, must be of a type that will not defeat the operation of other remote emergency actuators. The emergency action must occur whether one or several actuators are operated.

(g) Each emergency shutdown station must be marked as described in § 153.955 (c), (d), and (e) with the legend "EMERGENCY SHUTDOWN STATION" so that the legend is visible from work areas in the part of the deck where the cargo containment systems are located.

§ 153.297 Emergency actuators at the point of cargo control.

(a) The point from which cargo transfer is controlled must have the same actuators an emergency shutdown station must have under § 153.296 and an actuator for any deck water spray systems required by this part.

(b) The point from which cargo transfer is controlled may be one of the emergency shutdown stations required under § 153.296 if it meets the requirements of that section.

CARGO HANDLING SPACE VENTILATION

§ 153.310 Ventilation system type.

A cargo handling space must have a permanent forced ventilation system of the exhaust type.

§ 153.312 Ventilation system standards.

A cargo handling space ventilation system must meet the following:

(a) A ventilation system exhaust duct must discharge no less than 10 m (approx. 32.8 ft) from openings into or ventilation intakes for, accommodation or service spaces.

(b) A ventilation system must not recycle vapors from ventilation discharges.

(c) Except for the space served by the ventilation duct, a ventilation duct must not pass through a machinery room, an accommodation space, or working spaces.

(d) A ventilation system must be operable from outside the space it ventilates.

(e) A ventilation system must be sized to change the air in the ventilated space at least 30 times per hour.

(f) A ventilation system must not allow air to stagnate in any part of a ventilated space.

(g) A ventilation system must be able to exhaust air from both above and below the deck plates of a ventilated space.

§ 153.314 Ventilation of spaces not usually occupied.

(a) Each tankship must have portable ventilation equipment that fits the mount required in paragraph (b)(1) of this section.

(b) Each cofferdam, duct keel, pipe tunnel, and cargo tank hold that does not have a permanent ventilation system meeting § 153.312 must have—

(1) A mount for the portable mechanical ventilation equipment required by this section; and

(2) Either permanent ventilation ductwork connected to the mount and arranged to supply air to the extremities of the space; or

(3) An attachment for temporary ductwork at the mount with enough ductway in the ventilated space and temporary ductwork stowed aboard the vessel to supply air to the extremities of the space.

[4] See § 153.282 of this part.

§ 153.316 Special cargo pumproom ventilation rate.

When table I refers to this section, the cargo pumproom ventilation system must change the air in the cargo pumproom 45 times per hour and discharge no less than 4 m (approx. 13.1 ft) above the deck.

CARGO PUMPROOMS

§ 153.330 Access.

(a) The access door to a cargo pumproom must open on the weatherdeck.

(b) The access way to a cargo pumproom and its valving must allow passage of a man wearing the breathing apparatus required by § 153.214(b)(1).

(c) Each ladderway in a cargo pumproom must be free from obstructions by piping, framework, or other equipment.

(d) Cargo pumproom ladders and platforms must have guard railings.

(e) Each ladder to a cargo pumproom must have an incline from the horizontal of less than 60°.

§ 153.332 Hoisting arrangement.

(a) A cargo pumproom located below the weatherdeck must have a permanent hoisting arrangement with a lifting capacity of 2500 N (approx. 562 lbs), operable from the weatherdeck, for the removal of an unconscious person.

(b) The cargo pumproom must have a 60 cm by 60 cm (approx. 2 ft by 2 ft) cross-sectional clearance through the hoistway.

§ 153.333 Cargo pump discharge pressure gauge.

Each cargo pump within a pumproom must have a discharge pressure gauge outside the pumproom.

§ 153.334 Bilge pumping systems.

(a) A cargo pumproom must have a bilge pumping system.

(b) The bilge pumping system must have—

(1) Complete remote operating controls outside the cargo pumproom; and

(2) An alarm that operates when the depth of liquid in the bilges exceeds 50 cm (approx. 19.7 in.).

§ 153.336 Special cargo pump or pumproom location requirements.

When table I refers to this section—

(a) The cargo pump must be an in-tank cargo pump;

(b) The cargo pumproom must be on or above the weatherdeck; or

(c) The cargo pumproom must have the specific approval of the Commandant (G-MHM).

CARGO VENTING SYSTEMS

§ 153.350 Location of B/3 vent discharges.

(a) A B/3 venting system must discharge at the highest of the following points:

(1) 6 m (approx. 19.7 ft.) above the weatherdeck.

(2) B/3 above the weatherdeck.

(3) 6 m (approx. 19.7 ft.) above a walkway if the walkway is within 6 m (approx. 19.7 ft.) of a line drawn through the vent discharge and perpendicular to the deck.

(b) A B/3 venting system must discharge at least 15 m (approx. 49.2 ft) from air intakes for, or openings into, accommodation and service spaces.

§ 153.351 Location of 4 m vent discharges.

(a) A 4 m venting system must discharge at least 4 m (approx. 13.1 ft) above the higher of—

(1) The weatherdeck; or

(2) Any walkway that is within 4 m (approx. 13.1 ft) of a line through the vent discharge and perpendicular to the deck.

(b) A 4 m venting system must discharge at least 10 m (approx. 32.8 ft) from air intakes for, or openings into, accommodation or service spaces.

§ 153.352 B/3 and 4 m venting system outlets.

A B/3 or 4 m venting system outlet must—

(a) Discharge vertically upwards; and

(b) Prevent precipitation from entering the vent system.

§ 153.353 High velocity vents.

The Commandant (G-MHM) approves on a case by case basis reductions in the 4 m or B/3 vent height requirements with the use of high velocity variable orifice vent outlets.

§ 153.354 Venting system inlet.

A venting system must terminate in the vapor space above the cargo when the tank is filled to a 2 percent ullage and the tankship has no heel or trim.

§ 153.355 PV venting systems.

When table I requires a PV venting system, the cargo tank must have a PV valve in its vent line. The PV valve must be located between the tank and any connection to another tank's vent line (such as a vent riser common to two or more tanks).

§ 153.358 Venting system flow capacity.

(a) The cross-sectional flow area of any vent system segment, including any PV or SR valve, must at no point be less than that of a pipe whose inside diameter is 6.4 cm (approx. 2.5 in.).

(b) When table I requires a closed or restricted gauging system, calculations must show that, under conditions in which a saturated cargo vapor is discharged through the venting system at the maximum anticipated loading rate, the pressure differential between the cargo tank vapor space and the atmosphere does not exceed 28 kPa gauge (approx. 4 psig), or, for independent tanks, the maximum working pressure of the tank.

§ 153.360 Venting system restriction.

A venting system must have no assembly that could reduce its cross-sectional flow area or flow capacity to less than that required in § 153.358.

§ 153.361 Arrangements for removal of valves from venting systems having multiple relief valves.

A venting system must have no arrangement that allows the easy removal of a valve (for repair, as an example) unless it—

(a) Has multiple relief valves;

(b) Has valves that are interlocked, so that a person cannot remove so many valves that the venting system no longer has the minimum relieving capacity required by § 153.358; and

(c) Does not allow cargo vapor to escape through the opening left after a valve has been removed.

§ 153.362 Venting system drain.

Unless a cargo vent system at every point is level or slopes back to the cargo tank under all conditions of heel and trim allowed under § 153.806, the cargo vent system must have a drain valve at each low point (trap) in the vent line.

§ 153.364 Venting system supports.

Supports for a vent system must meet § 38.10-10(c) of this chapter.

§ 153.366 Spill valves.

A spill valve—

(a) Must discharge into a container that has at least 0.6 m^3 (approx. 21.2 ft^3) capacity at any heel or trim allowed in the stability manual required by § 153.806; and

(b) Must meet subpart 162.017 of this chapter.

§ 153.368 Pressure-vacuum valves.

(a) The pressure side of a required pressure-vacuum relief valve must begin to open only at a pressure exceeding 3.5 kPa gauge (approx. 0.5 psig).

(b) A pressure-vacuum relief valve must meet the requirements of subpart 162.017 of this chapter.

§ 153.370 Minimum relief valve setting for ambient temperature cargo tanks.

The relief valve setting for a containment system that carries a cargo at ambient temperature must at least equal the cargo's vapor pressure at 46° C (approx. 115° F).

§ 153.371 Minimum relief valve setting for refrigerated cargo tanks.

The relief valve setting for a containment system that carries a refrigerated cargo must at least equal the lesser of—

(a) That in § 153.370; or

(b) 110 percent of the cargo's vapor pressure at the steady state temperature obtained by a full tank of cargo with the refrigeration system operating under ambient conditions described within the definition of a refrigerated tank in § 153.2.

§ 153.372 Gauges and vapor return for cargo vapor pressures exceeding 100 kPa (approx. 1 atmosphere).

por pressure exceeds 100 kPa absolute at ambient temperature a cargo whose vapor pressure exceeds 100 kPa absolute at 37.8° C (approx. 14.7 psia at 100° F) must have a—

(a) Tank pressure gauge at the point where cargo flow is controlled during transfer; and

(b) Vapor return connection.

CARGO GAUGING SYSTEMS

§ 153.400 General requirements for gauges.

(a) Columnar gauge glasses must not be installed on a cargo containment system.

(b) Flat sight glasses must meet § 38.10-20(h) of this chapter.

§ 153.404 Standards for containment systems having required closed gauges.

When table I requires a cargo's containment system to have a closed gauge, the containment system must have the following:

(a) A permanently installed closed gauging system.

(b) A vapor return connection.

(c) The high level alarm described in § 153.409.

(d) Either a closed cargo sampling system or a cargo sampling arrangement allowing the retrieval of a sample through an orifice not exceeding—

(1) 0.635 cm (approx. 0.25 in.) diameter when the cargo's vapor pressure is 28 kPa gauge (approx. 4 psig) or less; or

(2) 0.140 cm (approx. 0.055 in.) diameter when the cargo's vapor pressure exceeds 28 kPa (approx. 4 psig).

§ 153.406 Standards for containment systems having required restricted gauges.

When table I requires a cargo's containment system to have a restricted gauge, the containment system must have—

(a) A closed gauging system; or

(b) A system that has—

(1) A restricted gauge (e.g., a sounding tube) with an orifice diameter not exceeding 20 cm (approx. 7.8 in.);

(2) A permanently attached gauge cover that is vapor tight when in place; and

(3) A venting system that has either—

(i) Lock open PV valves; or

(ii) Valved bypasses around the PV valves.

§ 153.407 Special requirements for sounding tube gauges.

(a) A sounding tube installed as a restricted gauge must extend to within one meter (approx. 39.4 in.) of the bottom of the tank.

(b) A sounding tube must not be installed on a tank whose relief valve setting exceeds 28 kPa (approx. 4 psig) unless it is specifically permitted by the Commandant (G-MHM).

(c) A sounding tube must have no perforations in the tube wall.

§ 153.408 Tank overfill controls.

(a) When table I refers to this section, a cargo containment system must have—

(1) A cargo high level alarm system that meets § 153.409 and whose operation can be checked before each loading;

(2) A tank overfill control system that automatically closes the filling line before the tank is filled to 98 percent of its capacity; and

(3) A continuous tank cargo level indicator.

(b) The high level alarm system must be completely independent of the overfill control system.

(c) Each high level alarm must be marked as described in § 153.955 (c), (d), and (e) with the legend "TANK OVERFILL ALARM" so that the legend is visible from work areas in the part of the deck where the cargo containment systems are located.

§ 153.409 High level alarms.

When table I refers to this section or requires a cargo to have a closed gauging system, the cargo's containment system must have a high level alarm that—

(a) Gives an audible and visual signal before the cargo tank fills to 97 percent of its capacity; and

(b) Can be seen and heard where cargo transfer is controlled and on the open deck.

CARGO TEMPERATURE CONTROL SYSTEMS

§ 153.430 Heat transfer systems; general.

Each cargo cooling system required by this part and each cargo heating system must—

(a) Meet the standards of subchapters F (Marine Engineering) and J (Electrical Engineering) of this chapter;

(b) Have valving that enables the system to be isolated from all other cooling and heat transfer systems; and

(c) Allow manual regulation of the system's heat transfer rate.

§ 153.432 Cooling systems.

(a) Each cooling system required by this part must have an equivalent standby unit that is installed and that can be placed in operation immediately after an equipment failure.

(b) Each tankship that has a cargo tank with a required cooling system must have a manual that contains—

(1) A piping diagram for the cooling system; and

(2) Instructions for changing over to the standby system described in paragraph (a).

§ 153.434 Heat transfer coils within a tank.

A cargo cooling or heating system having coils within a tank must keep the heat transfer fluid at a pressure greater than that of the cargo.

§ 153.436 Heat transfer fluid.

A heat transfer fluid must have the approval of the Commandant (G-MHM) for use with each particular cargo.

§ 153.438 Cargo pressure or temperature alarms required.

(a) Each refrigerated tank must have—

(1) An alarm that operates when the cargo's pressure exceeds the vapor pressure described in § 153.371(b); or

(2) An alarm that operates when the cargo's temperature exceeds the steady state temperature described in § 153.371 (b).

(b) The alarm must give an audible and visual signal on the bridge and at the cargo control station.

(c) The cargo pressure or temperature alarm must be independent of other cargo pressure or temperature sensing arrangements.

§ 153.440 Cargo temperature sensors required.

(a) Each elevated temperature or refrigerated cargo tank must have a remote reading thermometer sensing the temperature within the cargo tank at the bottom of the tank.

(b) A refrigerated cargo tank must have a second thermometer at the top of the tank.

(c) A readout for each thermometer required by this section must be at the point where cargo transfer is controlled.

SPECIAL REQUIREMENTS FOR FLAMMABLE OR COMBUSTIBLE CARGOES

§ 153.460 Fire protection systems.

(a) With the exception of the vent riser, each part of a cargo containment system exposed on the weatherdeck must be covered by the fire protection system listed beside the cargo in table I and described in the footnotes to table I.

(b) The Commandant (G-MMT) approves the substitution of a dry chemical (D) type fire protection system for an A or B type on a case by case basis.

(c) A fire protection system required by this part must meet part 34 of this chapter or be specifically approved by the Commandant (G-MMT).

§ 153.461 Electrical bonding of independent tanks.

An independent metallic cargo tank that carries a flammable or combustible cargo must be electrically bonded to the tankship's hull.

§ 153.462 Static discharges from inert gas systems.

An inert gas system on a tank that carries a flammable or combustible cargo must not create static arcing as the inert gas is injected into the tank.

§ 153.463 Vent system discharges.

The discharge of a venting system must be at least 10 m (approx. 32.8 ft) from an ignition source if—

(a) The cargo tank is endorsed to carry a flammable or combustible cargo; and

(b) Table I requires the cargo to have a PV venting system.

§ 153.464 Fusible elements.

Each remotely actuated quick closing shutoff valve on a containment system that carries a flammable or combustible cargo must have a fusible element that melts at less than 104° C (approx. 220° F) and closes the valve.

§ 153.465 Flammable vapor detector.

(a) A tankship that carries a flammable cargo must have two vapor de-

tectors that meet § 35.30–15(b) of this chapter.

(b) At least one of the vapor detectors in paragraph (a) must be portable.

153.466 Electrical equipment.

A tankship carrying a flammable or combustible cargo under this part must meet subchapter J of this chapter.

§ 153.467 Ventilation systems for flammable cargoes.

Each ventilation system for a tankship endorsed to carry a flammable cargo must meet the following:

(a) Each electric motor that drives a ventilation fan must be outside ducts for any space that may contain flammable cargo vapor.

(b) Each ventilation impeller and its housing must meet one of the following:

(1) The impeller, housing, or both must be made of non-metallic material that does not generate static electricity.

(2) The impeller and housing must be made of non-ferrous material.

(3) The impeller and housing must be made of austenitic stainless steel.

(4) The tip clearance between the impeller and housing must be at least 1.3 cm (approx. 0.51 in.).

(c) No ventilation fan may have a combination of fixed and rotating components where one is made of an aluminum or magnesium alloy and the other made of a ferrous material.

SPECIAL REQUIREMENTS

§ 153.500 Inert gas systems.

When table I refers to this section, a cargo containment system must have a permanent inert gas system that:

(a) Maintains the vapor space of the containment system in an inert state by filling the vapor space with a gas that is neither reactive with the cargo nor flammable;

(b) Has a pressure control system that:

(1) Prevents the inert gas system from raising the cargo tank pressure to more than the relief valve setting; and

(2) Maintains at least a 3.5 kPa gauge (approx. 0.5 psig) pressure within the containment system at all times, including cargo discharge;

(c) Has storage for enough inerting gas to replace that normally lost while the tank's atmosphere is maintained in an inert condition (e.g. through tank breathing and relief valve leakage), but in no case an amount less than 5 percent of the tank's capacity when measured with the gas at −18°C (approx. 0°F) and a pressure equal to the cargo tank's relief valve setting; and

(d) Has connections for any supplemental gas supply necessary to maintain the inert gas pressure described in paragraph (b) during cargo discharge.

§ 153.501 Requirement for dry inert gas.

When table I refers to this section, an inert gas system for the containment system must supply inert gas containing no more than 100 ppm water.

§ 153.515 Special requirements for extremely flammable cargoes.

When table I refers to this section:

(a) An enclosed space containing a cargo tank must have an inerting system that meets the requirements in § 153.500 applying to the inert gas system of a containment system;

(b) Cargo discharge pumps must be of a type that does not subject the shaft gland to the cargo under pressure or that is submerged; and

(c) The cargo tank's relief valve setting must be no less than 21 kPa gauge (approx. 3 psig).

§ 153.520 Special requirements for carbon disulfide.

A containment system carrying carbon disulfide must meet the following:

(a) Each cargo pump must be of the intank type and encased within a cylindrical well that extends from the top of the tank to a point no more than 10 cm (approx. 4 in.) above the bottom of the tank.

(b) Within that part of the tankship where the use of electrical equipment is restricted by § 111.85–10 of this chapter, a tankship must have no:

(1) Electrical equipment; or

(2) Equipment that may exceed a temperature of 80°C (approx. 175°F).

(c) The cargo piping and venting systems must be completely independent of those for other cargo.

(d) Pressure relief valves must be made of type 304 or 316 stainless steel.

§ 153.525 Special requirements for unusually toxic cargoes.

When table I refers to this section a containment system must meet the following:

(a) The cargo piping system must be designed so that it can be isolated from any containment system endorsed for a cargo not covered by this section.

(b) A cargo tank's relief valve setting must be not less than 21 kPa gauge (approx. 3 psig).

(c) All cargo pumps and valves located below the weatherdeck must be operable from the weatherdeck.

(d) A heat transfer system for the cargo must not enter the engine room and must be:

(1) Independent of any other system;

(2) Totally external to the cargo containment system; or

(3) Approved by the Commandant (G–MHM) for use with toxic cargoes.

(e) The cargo must be separated from any bunkers by at least two bulkheads.

(f) A cargo tank's venting system must have a vapor return connection.

§ 153.526 Toxic vapor detectors.

When table I refers to this section, a tankship must have two toxic vapor detectors, at least one of which must be portable, each able to measure the time weighted average (TWA) vapor concentration of the cargo. These vapor detectors may be combined with those required by § 153.465.

§ 153.527 Toxic vapor protection.

When table I refers to this section, a tankship must have on board for each crewmember a pressure demand respiratory protective device approved by the Mining Enforcement and Safety Administration and the National Institute for Occupational Safety and Health, or the tankship's flag administration, as an escape only device.

§ 153.530 Special requirements for alkylene oxides.

When table I refers to this section, a containment system must meet the following:

(a) Except as provided in paragraphs (b) and (c), a cargo containment system must be made of:

(1) Stainless steel other than types 416 and 442; and

(2) Steel.

(b) Except as provided in paragraph (c), gaskets must be composites of spirally wound stainless steel and Teflon or similar fluorinated polymer.

(c) The Commandant (G–MHM) approves a cargo containment system using materials other than those described in this section for alkylene oxides on a case by case basis if:

(1) The person wishing to have the containment system approved completes any tests prescribed by the Commandant (G–MHM); and

(2) The Commandant (G–MHM) approves the results of the tests and the material for use with alkylene oxides.

(d) The following materials are generally found unsatisfactory for gaskets, packing, insulation, and similar uses in alkylene oxide containment systems and would require extensive testing as described in paragraph (c) before being approved:

(1) Neoprene or natural rubber if it might be in contact with the alkylene oxide.

(2) Asbestos or asbestos mixed with other materials such as with many common insulations, packing materials, and gasket materials.

(3) Materials containing oxides of magnesium, such as mineral wools.

(e) The tank's relief valve setting must not be less than 21 kPa guage (approx. 3 psig).

(f) A containment system must have a cooling system. The cooling system:

(1) Must not compress the cargo;

(2) Must regulate the cargo temperature automatically and allow manual regulation; and

(3) Must maintain the cargo temperature below 40°C (approx. 104°F).

(g) The cargo piping system must:

(1) Comply with part 38 of this chapter;

(2) Be completely separate from all other systems;

(3) Be assembled from valves, fittings, and accessories having a pressure rating of not less than 1030 kPa guage (approx. 150 psig) (American National Standards Institute); and

(4) Have no threaded joints.

(h) The cargo containment system must have an arrangement for sampling the vapor space above the cargo as described in § 153.1010(c).

(i) Valve disks or disk faces, seats, and other wearing valve parts must be made of stainless steel containing no less than 11 percent chromium.

(j) The venting system must be entirely separate from other containment or tankship systems.

(k) When a cargo tank is in an enclosed space, the space must have:

(1) An inert gas system meeting the requirements that apply to the inert gas system of a containment system in § 153.500, or

(2) A forced ventilation system meeting the requirements that apply to a cargo handling space ventilation system in § 153.312.

(l) Cofferdams, cargo tanks, double bottom spaces, and other enclosed spaces adjacent to an integral cargo tank must have an inert gas system meeting the requirements that apply to the inert gas system of a containment system in § 153.500.

(m) An intank pump or inert gas displacement must be used to discharge cargo.

(n) The cargo piping system's hose connection must have a remotely actuated quick closing shutoff valve.

(o) Cargo hose must: (1) Have the specific approval of the Commandant (G-MMT) for use in alkylene oxide transfer; and

(2) Be marked "For Alkylene Oxide Transfer Only".

(p) All exposed parts of the cargo containment system above or on the deck, such as tank domes, cargo piping, and loading manifolds, must be covered by a water spray system that:

(1) Operates automatically in a fire involving the cargo containment system;

(2) Has at least two remote manual actuators, one in each emergency shutdown station required by § 153.296; and

(3) Covers the area of application with a uniform spray of

$$0.175\frac{l}{m^2\ sec}\left(0.0043\frac{gal}{ft^2\ sec}\right)$$

§ 153.545 Special requirements for liquid sulfur.

(a) A containment system carrying liquid sulfur must have:

(1) A cargo tank ventilation system that:

(i) Maintains the H_2S vapor concentration below 1.85 percent by volume; and

(ii) Prevents sulfur buildup within itself; and

(2) An alarm system designed to operate when the ventilation system blower fails.

(b) The void spaces around a cargo tank that carries liquid sulfur must be oil tight.

(c) A cargo tank that carries liquid sulfur and the void spaces surrounding the tank must have connections for sampling vapor.

§ 153.554 Special requirements for acids.

When table I refers to this section:

(a) Each containment system loading and discharge connection must have a spray shield;

(b) Each cargo containment system must be separated from bunkers by double walls, such as a cofferdam and piping tunnels; and

(c) Each vessel must have on board a means to determine whether cargo has leaked into the spaces adjacent to a cargo containment system.

§ 153.555 Special requirements for inorganic acids.

When table I refers to this section:

(a) A tankship's shell plating must not be a part of the cargo tank; and

(b) An enclosed compartment containing, or a compartment adjacent to, a cargo tank must have no electrical equipment.

§ 153.556 Special requirements for sulfuric acid and oleum.

(a) Except as prescribed in paragraphs (b) and (c) of this section, containment systems carrying sulfuric acid, oleum, or contaminated sulfuric acid are approved by the Commandant (G-MHM) on a case by case basis.

(b) A containment system carrying sulfuric acid may be:

(1) Made of unlined steel if the cargo composition is between 70 and 80 or between 90 and 100 percent acid by weight;

(2) Lined with lead if the cargo composition does not exceed 96 percent acid by weight; or

(3) Lined with natural rubber or neoprene if the cargo composition does not exceed 51 percent acid by weight.

(c) A containment system for oleum may be of unlined steel if the concentration of free sulfur trioxide in the oleum exceeds 20 percent by weight.

§ 153.557 Special requirements for hydrochloric acid.

(a) A containment system that carries hydrochloric acid must be lined with:

(1) Natural rubber;

(2) Neoprene; or

(3) A material approved for hydrochloric acid tanks by the Commandant (G-MHM).

(b) Containment systems for contaminated hydrochloric acid are approved by the Commandant (G-MHM) on a case by case basis.

§ 153.558 Special requirements for phosphoric acid.

A phosphoric acid containment system must be:

(a) Lined with natural rubber or neoprene;

(b) Lined with a material approved for phosphoric acid tanks by the Commandant (G-MHM); or

(c) Made of a stainless steel that resists corrosion by phosphoric acid.

§ 153.559 Special requirements for nitric acid (less than 70 percent).

A containment system that carries nitric acid (less than 70 percent) must be of stainless steel that resists corrosion by nitric acid.

§ 153.600 Special requirements for nitropropane.

Nitropropane must not be carried in a deck tank.

TESTING AND INSPECTION

§ 153.806 Stability test and information.

(a) Each tankship must meet part 93 of this chapter.

(b) Each tankship must have a manual containing:

(1) Information that enables the master to load and ballast the tankship while keeping structural stresses within design limits;

(2) Damage stability information including, but not limited to, all loading restrictions necessary to ensure that the tankship meets the requirements for its hull type; and

(3) Trim information.

§ 153.808 Examination required for a Letter of Compliance.

Before the Commandant (G-MHM) issues a Letter of Compliance to a vessel, the vessel must call at a U.S. port for an examination by the Coast Guard, following the procedures under § 153.809.

§ 153.809 Procedures for having the Coast Guard examine a vessel for a Letter of Compliance.

To have the Coast Guard examine his vessel for a Letter of Compliance, the owner of a vessel must proceed as follows:

(a) After making application pursuant to § 153.9, await notification by the Commandant (G-MHM) that review of the vessel's plans or IMCO Certificate is complete.

(b) After notification that review is complete, request the Commandant (G-MHM) to arrange an examination by the Coast Guard, stating:

(1) The expected date of the vessel's arrival in U.S. waters;

(2) The port of call where the vessel is to be inspected;

(3) The vessel's agent in the port of call; and

(4) Any cargoes the vessel is to carry under § 153.811.

(c) If the vessel is to carry a cargo under § 153.811, allow at least 14 calendar days from the time the Commandant (G-MHM) receives the request for an examination before bringing the vessel into U.S. waters.

(d) If the vessel is not to carry a cargo under § 153.811, allow at least 14 calendar days from the time the Commandant (G-MHM) receives the request for an examination until the date of the vessel's examination.

§ 153.810 Fourteen day notice required for a Letter of Compliance examination.

Unless the Commandant (G-MHM) agrees to examine a specific tankship on shorter notice, the Commandant (G-MHM) does not examine a tankship for a Letter of Compliance sooner than 14

calendar days from the time the Commandant (G-MHM) receives the owner's request under § 153.809(b).

§ 153.811 Carrying cargo into U.S. waters on the voyage for a Letter of Compliance examination.

If entering U.S. waters for examination under §§ 153.808 and 153.809, a vessel that has never received a Letter of Compliance or whose Letter of Compliance has expired may only carry a cargo described in § 153.5 if specifically authorized to do so by the Commandant (G-MHM).

§ 153.812 Inspection for Certificate of Inspection.

The rules governing the issuance of Certificates of Inspection are contained in part 31 of this chapter.

Subpart C—Operations

Documents and Cargo Information

§ 153.900 Certificates, letters, endorsements required.

(a) Each U.S. flag tankship * must have its Certificate of Inspection issued under Subchapter D (Tank Vessels) of this chapter endorsed under this part with the name of each cargo in table I that it carries or must have written authorization under § 153.5(b) from the Commandant (G-MHM).

(b) Each foreign flag tankship * whose flag administration issues the IMCO Certificate must have—

(1) an IMCO Certificate issued by the flag administration and a Letter of Compliance issued and endorsed under this part with the name of the cargo; or

(2) prior written authorization under § 153.5(b) or § 153.808 from the Commandant (G-MHM).

(c) Each foreign flag tankship * whose flag administration does not issue the IMCO Certificate must have—

(1) a Letter of Compliance issued and endorsed under this part with the name of the cargo; or

(2) written authorization under § 153.5(b) or § 153.808 from the Commandant (G-MHM).

§ 153.901 Certificates or letters required to be on bridge.

No person may operate a tankship unless the endorsed Certificate of Inspection, Letter of Compliance, or written authorization required by § 153.900 is posted on the bridge of the tankship.

§ 153.902 Expiration of Letters of Compliance.

A Letter of Compliance is valid for a period not exceeding two years after the date of examination under § 153.808. The Coast Guard enters the expiration date on the Letter of Compliance.

§ 153.904 Limitations in the endorsement.

No person may operate a tankship unless he complies with all limitations in the endorsement on the tankship's Certificate of Inspection or Letter of Compliance.

§ 153.905 Regulations required to be on board.

No person may operate a tankship unless a copy of this part and parts 34 and 35 of this chapter, containing all amendments up to the date of the endorsement of the tankship's Certificate of Inspection or Letter of Compliance are on board.

§ 153.907 Cargo information cards.

(a) No person may operate a tankship unless a cargo information card for each cargo being transported that is listed in table I is carried either on the bridge, in the ship's office, or in another location easily accessible to the person in charge of the watch.

(b) Each cargo information card must be at least 17 cm x 24 cm (approx. 6.7 in. x 9.4 in.), have printing on one side only, and contain the following information about the cargo:

(1) The name of the cargo, as listed in Table I.

(2) A description of the appearance of the cargo.

(3) A description of the odor of the cargo.

(4) The hazards involved in handling the cargo.

(5) Instructions for safe handling of the cargo including any special procedures such as inerting.

(6) The procedures to be followed in the event of cargo spills, leaks, uncontrolled release, human exposure to the cargo, or cargo handling equipment breakdown.

(7) A list of fire fighting procedures and extinguishing agents effective with cargo fires.

§ 153.908 Shipping document.

No person may operate a tankship without a shipping document, such as a manifest, on the bridge of the tankship completed by the shipper, the tankship's master, the shipowner, or the tankship's agent that lists for each cargo on board—

(a) The tank in which the cargo is stowed;

(b) The name of the shipper;

(c) The location of the loading terminal;

(d) The cargo name listed in table I or § 30.25-1 of this chapter, or the shipper's name for the cargo if it is not listed; and

(e) The quantity of the cargo.

§ 153.909 Cargo location plan.

(a) No person may operate a tankship unless a cargo location plan is kept with the set of cargo information cards required by § 153.907.

(b) The cargo location plan must show the location and number of each cargo tank and the name of the cargo in each tank.

(c) Names of dangerous cargoes on the plan must not differ from those listed in table I or § 30.25-1 of this chapter.

§ 153.910 Cargo piping plan.

No person may operate a tankship unless the tankship has a cargo piping plan that—

(a) Shows all cargo piping on the tankship;

(b) Shows all cargo valving, pumps, and other equipment that is used during cargo transfer;

(c) Shows the cargo tanks;

(d) Shows any modifications necessary to a containment system that is to be isolated under § 153.963 or §§ 153.525 and 153.1020; and

(e) Emphasizes the piping and equipment described in paragraphs (a), (b), and (d) of this section by using contrasting colors, line widths, or similar methods.

§ 153.912 Certificate of inhibition or stabilization.

(a) When a cargo in table I is referred to this section, no person may operate a tankship carrying the cargo without a written certification, carried on the bridge of the tankship, from the shipper that the cargo is—

(1) Inhibited; or

(2) Stabilized.

(b) The certification required by this section must contain the following information:

(1) Whether the cargo is inhibited or stabilized.

(2) The name and concentration of the inhibitor or stabilizer.

(3) The date the inhibitor or stabilizer was added.

(4) The length of time the inhibitor or stabilizer is effective.

(5) Any temperature limitations qualifying the inhibitor's or stabilizer's effective lifetime.

(6) The action to be taken should be duration of the voyage exceed the inhibitor's or stabilizer's useful life.

§ 153.914 Documents at the transfer terminal.

While a tankship is moored at a transfer terminal, the master shall ensure that the terminal has, in addition to the copies the tankship must have—

(a) A copy of the shipping document prescribed in § 153.908; and

(b) A set of the information cards prescribed in § 153.907.

General Cargo Operational Requirements

§ 153.920 Cargo quantity limitations.

(a) No person may load a cargo tank or operate a tankship that carries a cargo tank containing in excess of 1250 m^3 (approx. 44,138 ft^3) of cargo requiring a type I containment system.

(b) No person may load a cargo tank or operate a tankship that carries a cargo tank containing in excess of 3000 m^3 (approx. 105,932 ft^3) of a cargo requiring a type II containment system.

* The definition of "tankship" excludes those vessels whose tanks are clean and gas free.

§ 153.921 Explosives.

No person may load, off-load, or carry a cargo listed in this part on board a vessel that carries explosives unless he has the prior written permission of the Commandant (G-MHM).

§ 153.923 Inerting systems.

The master shall ensure that the inert gas systems for any cargo that this part requires to be inerted are operating correctly.

GENERAL VESSEL SAFETY

§ 153.930 Cargo antidotes.

No person may operate a tankship that carries a cargo listed in Table I unless the tankship has on board the antidotes described for the cargo in the *Medical First Aid Guide for Use in Accidents Involving Dangerous Goods*, published by IMCO.

§ 153.931 Obstruction of pumproom ladderways.

The master shall ensure that all cargo pumproom ladderways are unobstructed at all times.

§ 153.932 Goggles and protective clothing.

(a) The master shall ensure that each person wear a face mask or tight-fitting goggles for eye protection against splashing or spraying liquids if that person is—

(1) Sampling cargo;

(2) Transferring cargo;

(3) Making or breaking a cargo hose connection;

(4) Gauging a cargo tank; or

(5) Opening a cargo tank by opening a Butterworth hatch, ullage hatch, cargo tank hatch, or similar opening.

(b) The master shall ensure that each person wear a face mask or tight-fitting goggles for eye protection against splashing or spraying liquids if the person is—

(1) In the area of the deck where the cargo tanks, cargo piping, and cargo pumprooms are located while a cargo transfer is taking place; or

(2) In a cargo pumproom, void space adjacent to a cargo tank, or a space containing part of a cargo containment system.

(c) The master shall ensure that each person in paragraphs (a) and (b) wear any additional protective clothing the master believes necessary to protect the person from the cargo's hazards.

§ 153.933 Protective clothing required.

When table I refers to this section, the master shall ensure that every person forward of the accommodation deckhouse who is involved in cargo sampling, gauging, or making or breaking cargo connections wears coveralls or a large apron, boots, gloves, and tight-fitting goggles.

§ 153.934 Entry into spaces containing cargo vapor.

(a) No person may enter a cargo tank, cargo handling space, or void space in that part of the tankship where the cargo tanks are located without the permission of the master.

(b) Before permitting anyone to enter a cargo tank, cargo handling space, or void space, the master shall ensure that—

(1) The space is free of toxic vapors and has sufficient oxygen to support life; or

(2) Those entering the space wear protective equipment with self-contained breathing apparatus as described in § 153.214(b) and an officer closely supervises the entire operation.

§ 153.935 Opening of tanks and cargo sampling.

(a) Except as provided in paragraph (b) of this section, the master shall ensure that all cargo tank hatches, ullage openings, and tank cleaning openings are tightly closed at all times.

(b) The master may not authorize the opening of a cargo tank, except—

(1) To clean a tank;

(2) To transfer a cargo that table I allows in a containment system having an open gauging system;

(3) To sample a cargo that table I allows in a containment system having an open gauging system; or

(4) To sample a cargo that table I allows in a containment system having a restricted gauging system if—

(i) The tank is not being filled during sampling;

(ii) The vent system has relieved any pressure in the tank;

(iii) The person sampling the cargo wears the protective clothing required during cargo transfer; and

(iv) The tank is closed tightly following sampling.

(c) The master shall ensure that cargoes requiring closed gauging are sampled only through the controlled sampling arrangement required by § 153.404 (b).

§ 153.936 Illness, alcohol, drugs.

The master shall ensure that no person participates in cargo related operations who appears to be intoxicated by alcohol or drugs or to be so ill as to be unfit for the particular operation.

MARKING OF CARGO TRANSFER HOSE

§ 153.940 Standards for marking of cargo hose.

No person may mark a hose assembly as meeting the standards of this section unless the hose assembly meets the following requirements:

(a) Each hose assembly must have—

(1) Fully threaded connections;

(2) Flanges that meet standard B16.5, *Steel Pipe Flanges and Flange Fittings*, or standard B16.31, *Nonferrous Pipe Flanges*, of the American National Standards Institute; or

(3) Quick-connect couplings that are acceptable to the Commandant (G-MMT).

(b) Each hose assembly must be marked with the—

(1) Date of manufacture;

(2) Working pressure described in paragraph (d);

(3) Date of the last test required by paragraph (e) of this section; and

(4) Manufacturer's recommended maximum and minimum temperatures.

(c) A cargo hose assembly must have a minimum bursting pressure as stated by the manufacturer of at least 5152 kPa gauge (approx. 750 psig).

(d) The working pressure marked on a hose must meet the following:

(1) Be at least 1030 kPa gauge (approx. 150 psig).

(2) Not exceed 20 per cent (one-fifth) of the manufacturer's stated bursting pressure.

(3) Not exceed the manufacturer's recommended working pressure.

(4) Not exceed the test pressure used in the latest test under paragraph (e) (3).

(e) A cargo hose assembly must be inspected and tested by placing it in a straight, horizontal position so that its entire external surface is accessible. It must be ascertained that the hose assembly—

(1) Has no loose covers, kinks, bulges, soft spots, and no gouges, cuts, or slashes that penetrate any hose reinforcement;

(2) Has no external and, to the extent internal inspection is possible with both ends of the hose open, no internal deterioration; and

(3) Does not burst, bulge, leak, or abnormally distort under static liquid pressure at least as great as the recommended working pressure.

CARGO TRANSFER PROCEDURES

§ 153.953 Signals during cargo transfer.

The master shall ensure that—

(a) The tankship displays a red flag in the day and a red light at night when transferring cargo while fast to a dock;

(b) The tankship displays a red flag when transferring cargo while at anchor; and

(c) The red flag or the red light is visible from all sides of the tankship.

§ 153.955 Warning signs during cargo transfer.

(a) When transferring cargo while fast to a dock or at anchor in port, the master shall ensure that the tankship displays a warning sign at the gangway facing the shore so that it may be seen from the shore and another warning sign facing outboard towards the water so that it may be seen from the water. (See figure 1.)

(b) Except as provided in paragraph (f) of this section, each warning sign must have the following legends:

(1) Warning.

(2) Dangerous Cargo.

(3) No Visitors.

(4) No Smoking.

(5) No Open Lights.

(c) Each letter must be block style, black on a white background.

(d) Each letter must—

(1) Be 7.5 cm (approx. 3 in.) high;

(2) Be 5 cm (approx. 2 in.) wide except for "M" and "W" which must be 7.5 cm (approx. 3 in.) wide and the letter "I" which may be 1.3 cm (approx. ½ in.) wide; and

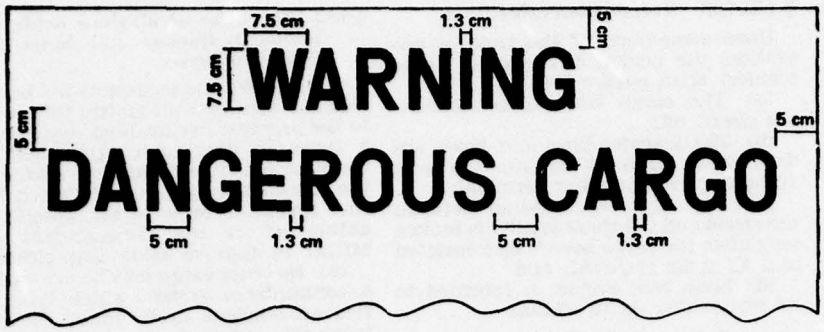

Figure 1 - Minimum Dimensions for Warning Sign

(3) Have 1.3 cm (approx. ½ in.) stroke width.

(e) The spacing must be—

(1) 1.3 cm (approx. ½ in.) between letters of the same word;

(2) 5 cm (approx. 2 in.) between words;

(3) 5 cm (approx. 2 in.) between lines; and

(4) 5 cm (approx. 2 in.) at the borders of the sign.

(f) Except as described in § 153.1045, the legends "No Smoking" and "No Open Lights" are not required when the cargoes on board the tankship are neither flammable nor combustible.

§ 153.957 Person in charge of cargo transfer.

(a) The master of a U.S. flag tankship shall ensure that cargo transfer operations are supervised by a person designated as a person in charge of cargo transfer under 33 CFR 155.710.

(b) No person may serve, and no one may use the services of a person as a person in charge of cargo transfer on a foreign flag tankship unless the person—

(1) Holds a valid document issued by the flag administration authorizing service as a person in charge of cargo transfer aboard the vessel that is transferring cargo;

(2) Is designated by the master;

(3) Is readily able to communicate in English with the person in charge of cargo transfer at the transfer facility either directly or through an interpreter who is available to him during the transfer; and

(4) Has studied and understands his responsibilities as described in this subchapter.

§ 153.959 Approval to begin transfer operations required.

No person may make connections for cargo transfer or transfer cargo unless he has authorization from the person in charge of cargo transfer.

§ 153.963 Incompatible cargo.

(a) The person in charge of cargo transfer may not authorize the loading of incompatible[7] cargoes into cargo containment systems unless the cargoes are separated by double walls or double bulkheads, such as—

(1) Cofferdams;

(2) Empty tanks;

(3) Tanks containing mutually compatible cargo; and

(4) Piping tunnels.

(b) The person in charge of cargo transfer may not authorize loading of incompatible cargoes into cargo containment systems that have common piping or venting systems.

§ 153.964 Discharge by gas pressurization.

The person in charge of cargo transfer may not authorize cargo discharge by gas pressurization unless—

(a) The tank to be offloaded has an SR or PV venting system;

(b) The pressurization medium is either the cargo vapor or a nonflammable, nontoxic gas inert to the cargo; and

(c) The pressurizing line has—

(1) A pressure reducing valve whose setting does not exceed 90% of the tank's relief valve setting and a manual control valve between the pressure reducing valve and the tank; or

(2) For an inert gas medium—

(i) A safety relief valve with a cross sectional flow area at least equal to that of the pressurizing line and whose relieving pressure does not exceed 90 percent of the tank's relief valve setting;

(ii) A manual control valve between the safety relief valve and the tank; and

(iii) A check valve between the manual control valve and the tank.

§ 153.966 Discharge by liquid displacement.

The person in charge of cargo transfer may not authorize cargo discharge by liquid displacement unless the liquid supply line to the tank has—

(a) a safety relief or pressure reducing valve set to operate at no more than 80 percent of the tank's relief valve setting; and

(b) a manual control valve between the tank and the supply line's safety relief valve or pressure reducing value.

§ 153.968 Cargo transfer conference.

(a) Before he may begin making connections for cargo transfer, the person in charge of cargo transfer shall confer with the person supervising the cargo transfer at the facility.

(b) The person in charge of cargo transfer shall discuss the important aspects of the transfer operation, such as the following, with the supervisor at the facility:

(1) The products to be transferred.

(2) The transfer rates.

(3) The critical or hazardous stages of the transfer operation.

(4) The emergency procedures in case of a spill.

§ 153.970 Cargo transfer piping.

The person in charge of cargo transfer shall ensure that—

(a) Cargo is transferred to or from a cargo tank only through the tankship's cargo piping system;

(b) Vapor not returned to shore through the tankship's vapor return system is discharged at the height required for the cargo's vent riser in table I, and

(c) All cargo vapor is returned to shore through the valved connection on the venting system if—

(1) The cargo requires closed gauging, is referenced to § 153.372 or is referenced to § 153.525;

(2) The transfer terminal has vapor return equipment; and

(3) In his estimation the vapor return equipment is adequate to handle the vapor expected from the tank.

§ 153.972 Connecting a cargo hose.

The person in charge of cargo transfer may not authorize the connection of a hose to a cargo containment system unless—

(a) He has ensured himself that the cargo will not weaken or damage the hose;

(b) The hose is marked as meeting the standards of § 153.940;

(c) The date of the hose's last pressure test is within one year of the date on which the hose is used to transfer cargo;

(d) The recommended working pressure marked on a hose used for discharge meets or exceeds the working pressure marked on the cargo piping at the hose connection; and

(e) The cargo's temperature is within the manufacturer's recommended maximum and minimum hose temperatures.

§ 153.975 Preparation for cargo transfer.

The person in charge of cargo transfer may not approve or continue cargo transfer unless the following conditions are met:

(a) No fires or open flames are on deck or in compartments near the hose connections when table I requires the cargo's containment system to have a fire protection system.

(b) Any electrical bonding of the tankship to the transfer facility is made before the cargo transfer piping is joined.

(c) Any supplemental inert gas supply necessary to maintain the 3.5 kPa gauge (approx. 0.5 psig) pressure in the tank during offloading (see § 153.500) is connected to the inert gas pressure control system.

[7] Incompatible cargoes are described in NVC 4-75, available from the Commandant (G-MHM-3/83). Tel. no. (202) 426-1577.

(d) The transfer connections have enough slack to allow for vessel movement.

(e) The transfer connections are supported by tackles.

(f) The cargo high level alarms are functioning correctly when cargo is loaded.

(g) Joints and couplings are gasketed and mated tightly.

(h) Flanges are bolted tightly.

(i) No repair work is underway in areas where cargo or cargo vapors may collect.

(j) Cargo and sea valves are properly set, with those sea valves connected to cargo piping lashed or sealed shut.

(k) Venting system bypass valves are set for cargo transfer and are operating properly.

(l) All scuppers are plugged.

(m) Smoking is limited to safe places.

(n) Fire fighting and safety equipment is ready.

(o) He is in effective communication with the transfer terminal.

(p) The person in charge of the transfer terminal has acknowledged that he is ready to transfer.

(q) Pressures within the cargo transfer and containment systems do not exceed the pressure ranges for which the transfer hose and containment systems are designed.

(r) No vessels that would hazard cargo transfer are alongside the tankship.

§ 153.976 Transfer of packaged cargo or ship's stores.

The person in charge of cargo transfer may neither begin nor continue the transfer of a flammable or combustible cargo while packaged cargo or ship's stores are transferred unless transfer of the packaged cargo or ship's stores does not hazard transfer of the flammable or combustible cargo.

§ 153.977 Supervision of cargo transfer.

The person in charge of cargo transfer shall—

(a) Supervise the operation of cargo system valves; and

(b) Monitor the cargo loading rate to avoid overfilling cargo tanks.

§ 153.979 Gauging with a sounding tube.

(a) No person may remove the cover of a sounding tube unless he has authorization from the person in charge of cargo transfer.

(b) The person in charge of cargo transfer may not authorize removal of the cover from a sounding tube gauge unless all tank pressure has been relieved through the tank's venting system.

§ 153.981 Leaving room in tank for cargo expansion.

The person in charge of cargo transfer shall ensure that the amount of cargo in a tank does not exceed the tank's capacity at any ambient temperature between −18° C (approx. 0° F) and 46° C (approx. 115° F).

§ 153.983 Termination procedures.

Upon completion of the transfer operation, the person in charge of cargo transfer shall ensure that—

(a) The cargo transfer connections are closed off;

(b) The transfer lines and hoses are drained of cargo, either into the tank or back to the transfer terminal;

(c) Any electrical bonding between the vessel and the shore facility is broken only after the cargo hose is disconnected and all spills removed; and

(d) Each vent system is returned to its nonloading configuration.

SPECIAL CARGO PROCEDURES

§ 153.1000 Special operating requirements for cargoes reactive with water.

When table I refers to this section, the master must ensure that the cargo—

(a) Is carried only in a containment system completely isolated from any systems containing water, such as slop tanks, ballast tanks, cargo tanks containing slops or ballast, their vent lines or piping; and

(b) Is separated by double walls, such as cofferdams and piping tunnels, from any system containing water, as for example those described in paragraph (a) of this section.

§ 153.1010 Alkylene oxides.

(a) Before he loads a cargo containment system with a cargo referenced to this section in table I, the person in charge of cargo transfer shall do the following:

(1) Inspect the cargo tank to be sure it does not have heavy rust accumulations on its walls or bottom.

(2) Purge the containment system until the oxygen content of the cargo tank is less than 2% by volume.

(b) The person in charge of an alkylene oxide cargo transfer shall ensure that—

(1) No alkylene oxide vapor or liquid is released to the atmosphere during cargo transfer;

(2) No vapor return system connected to an alkylene oxide containment system is at the same time connected to another containment system;

(3) Alkylene oxide is discharged only by an intank cargo pump or inert gas displacement;

(4) Transfer hose is approved by the Commandant (G-MMT) under § 153.530 (o) for alkylene oxide transfer and is marked "For Alkylene Oxide Transfer Only"; and

(5) A water hose is laid out on deck with water pressure to the nozzle, and all alkylene oxide spillages are washed away immediately.

(c) After loading alkylene oxides, the person in charge of cargo transfer shall check the composition of the vapor space above the alkylene oxide and purge the space with inert gas until the oxygen content is below 2% by volume.

§ 153.1011 Use of alkylene oxide containment systems and hoses with other products.

(a) An alkylene oxide may not be carried in a containment system that, within the previous five loadings, has carried a cargo in paragraph (d) unless the containment system has been cleaned to the satisfaction of a Coast Guard Marine Inspector or a person specifically authorized by the Commandant (G-MHM) to approve oxide tank cleaning.

(b) No other cargo may be loaded into a containment system which has carried an alkylene oxide unless the containment system has been cleaned of alkylene oxide to the satisfaction of a Coast Guard Marine Inspector or a person specifically authorized by the Commandant (G-MHM) to approve oxide tank cleaning.

(c) No person may use a hose marked "For Alkylene Oxide Transfer Only" for the transfer of a cargo other than an alkylene oxide.

(d) The following cargoes are particularly reactive with alkylene oxides:

(1) Ammonia.
(2) Ammonia solutions.
(3) Amines.
(4) Alcoholamines.
(5) Inorganic acids.
(6) Organic acids.
(7) Phenolic compounds.
(8) Monomers.
(9) Compounds containing a halogen.
(10) Compounds containing sulfur except sulfates or sulfonates yielding a solution having a pH between 7.5 and 6.5 when mixed with water in all proportions.
(11) Caustic soda and caustic potash.

§ 153.1020 Unusually toxic cargoes.

(a) No person may load or carry a cargo referenced to this section in table I unless the cargo's piping system is isolated from piping systems carrying cargoes not referred to this section as shown in the piping plan required by § 153.910.

(b) The master shall ensure that no heat transfer medium that has been circulated through a cargo referenced to this section in table I is circulated through a cargo not referenced to this section unless he determines the medium to be uncontaminated with cargo.

(c) No person may discharge overboard condensed steam from the heating system of a cargo referenced to this section in table I unless he first determines the condensate to be uncontaminated with cargo.

§ 153.1025 Motor fuel antiknock compounds.

(a) No person may load or carry any other cargo in a containment system approved for motor fuel antiknock compounds containing lead alkyls except a cargo to be used solely in the manufacture of motor fuel antiknock compounds.

(b) The master shall ensure that no person enter a pumproom or void space

that contains piping from a containment system approved for motor fuel antiknock compounds containing lead alkyls unless—

(1) The pumproom or void space atmosphere has been analyzed for its lead content and found to be less than 0.15 mg/m³; or

(2) The person follows the procedures for entering a cargo tank described in paragraph (c).

(c) No person may enter a cargo tank endorsed for motor fuel antiknock compounds containing lead alkyls without prior specific authorization from the Commandant (G-MHM). This authorization may be obtained by telephone ((202) 426-1217) if the person has previously obtained approval for the cargo tank entry procedure from the Commandant (G-MHM).

(d) No person may enter a cargo tank endorsed for motor fuel anti-knock compounds if he does not follow the conditions in the authorization under paragraph (c).

§ 153.1035 Stabilization of acetone cyanohydrin.

No person may operate a tankship having on board acetone cyanohydrin unless the acetone cyanohydrin is stabilized with an inorganic acid.

§ 153.1040 Carbon disulfide.

(a) No person may load, carry, or discharge carbon disulfide unless the cargo tank has a water pad over the cargo of at least one meter (approx. 40 in.).

(b) The person in charge of a carbon disulfide transfer operation shall ensure that carbon disulfide is discharged only by displacement or intank cargo pump.

(c) No person may remove a cargo pump for a containment system that carries carbon disulfide unless—

(1) The containment system has a gas free certificate issued under the standards in § 35.01-1 of this chapter; or

(2) The vapor space in the pump well is filled with water.

§ 153.1045 Inorganic acids.

When table I refers to this section, the person in charge of cargo transfer shall ensure that the legends "NO SMOKING" and "NO OPEN LIGHTS" are displayed on the warning sign required in § 153.955(a) when cargo is transferred.

§ 153.1046 Sulfuric acid.

No person may liquefy frozen or congealed sulfuric acid other than by external tank heating coils.

§ 153.1052 Carriage of other cargoes in acid tanks.

Other cargo must not be carried in a cargo containment system endorsed to carry sulfuric acid, hydrochloric acid, or phosphoric acid without specific authorization from the Commandant (G-MHM).

§ 153.1055 Nitropropane.

(a) No person may load or carry 1- or 2-nitropropane in a tank having heating coils unless the heating coils have been isolated from their heat source by completely disconnecting them, for example, by inserting a blanking plate or by removing a spool piece in a steam supply line.

(b) No person may load or carry 1- or 2-nitropropane in a tank located in a hold, or adjacent to a cargo, whose temperature exceeds 50° C (approx. 122° F).

MAINTENANCE

§ 153.1500 Venting system rupture disks.

The master shall ensure that a relief valve exposed to a cargo after the failure of a rupture disk or breaking pin is cleaned and operates properly before the next cargo is loaded into the tank.

§ 153.1502 Fixed ballast relocation.

No person may remove or relocate fixed ballast unless—

(a) the change is approved by the Commandant (G-MMT); or

(b) the ballast is temporarily moved under the supervision of a Coast Guard Marine Inspector for examination or repair of the tankship.

§ 153.1504 Inspection of personnel emergency and safety equipment.

The master shall ensure that the personnel emergency and safety equipment required by § 153.214 is inspected each 30 days and found to be in good condition and operating properly.

APPENDIX I—LIST OF CARGOES NOT REGULATED UNDER PART 153 OR SUBCHAPTER D

Table II—Bulk liquid cargoes that may be carried in vessels having neither a Certificate of Inspection under subchapter D (Tank Vessels) nor a Letter of Compliance under this part are the following:

Ammonium nitrate, urea, water solution, 2% or less NH_3
Calcium chloride in water
2-chloro-4-ethylamino- 6 -isopropylamino-5-triazine, water solution
Hexamethylene diamine adipate
Lignin liquor (calcium ligno-sulfonate, water solution)
Magnesium hydroxide suspensions in water
Methyl chloroform (1, 1, 1-trichoroethane)
Molasses
Pentasodium salt of diethylene triamine pentaacetic acid, water solution
Perchloroethylene
Sodium lignosulfonates, sodium hydroxide (not exceeding 1% by weight), water solution
Sorbital in water
Tetrasodium salt of ethylene diamine tetraacetic acid, water solution
Urea in water
Water
Mixtures solely of the cargoes in this list.

APPENDIX II (RESERVED)

APPENDIX III.—*Metric units used in pt. 153*

Parameter	Metric (SI unit)	Abbreviation	Equivalent to English or common metric
Length	Meter	m	39.37 in.
	Centimeter	cm	.3937 in.
Volume	Cubic meter	m^3	264 gallons (gal).
	do	m^3	35.3 ft^3.
Temperature	Degree Celsius	°C	5/9(° F-32)
Force	Newton	N	0.225 lbs.
Pressure	Pascal	Pa	1.450×10^{-4} lbs/in².
	Kilo-Pascal (1,000 Pascals).	kPa	0.145 lbs/in².
	Kilo-Pascal	kPa	1×10^{-2} kg/cm².
	do	kPa	1×10^{3} N/m².

(R. S. 4472, as amended (46 U.S.C. 170); sec. 201, 86 Stat. 427, as amended (46 U.S.C. 391a); sec. 6(b)(1), 80 Stat. 937 (49 U.S.C. 1655(b)(1); 49 CFR 1.46 (b), (t), (n)(4).)

NOTE.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: September 20, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard
Commandant.

[FR Doc.77-27790 Filed 9-23-77;8:45 am]

APPENDIX 14

FEDERAL REGISTER
SEP. 29, 1977

federal register

Area Code 202 Phone 523-5240

THURSDAY,

SEPTEMBER 29, 1977

RULES AND REGULATIONS

Title 46—Shipping

CHAPTER I—COAST GUARD, DEPARTMENT OF TRANSPORTATION

[CGD 75-104]

PART 31—INSPECTION AND CERTIFICATION

Stability Requirements

AGENCY: Coast Guard, DOT.

ACTION: Final rule.

SUMMARY: This rulemaking amends the stability regulations for tank vessels. The amendments require each newly constructed tank vessel of 150 gross tons and over, except a tank barge that operates only on inland waters, and each other tank vessel the stability of which is questioned by the Coast Guard, to meet the stability standards and stability testing and information requirements that currently apply to cargo and miscellaneous vessels in Subchapter I of Title 46. These requirements have been applied to tank vessels by the Coast Guard for several years and, therefore, represent current enforcement practice.

This rulemaking also sets forth conditions under which tank vessels are exempt from the requirement to have a stability test conducted. These conditions have been developed on the basis of a recent Coast Guard review of existing tank vessels and current tank vessel designs. The exemptions apply essentially to tank vessel designs for which a stability test is not currently required and to tank vessels over 300 feet in length that have one longitudinal bulkhead.

EFFECTIVE DATE: These amendments become effective on December 28, 1977.

FOR FURTHER INFORMATION CONTACT:

Captain George K. Greiner, Marine Safety Council (G-CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590 (202-426-1477).

SUPPLEMENTARY INFORMATION: A notice of proposed rulemaking was published in the FEDERAL REGISTER on February 7, 1977 (42 FR 7170). Interested persons were invited to submit written comments before March 23, 1977. One comment was received. The commenter concurred with the rules as proposed.

DRAFTING INFORMATION

The principal persons involved in drafting these regulations are: Ralph E. Johnson, Project Manager, Office of Merchant Marine Safety, and William R. Register, Project Attorney, Office of the Chief Counsel.

SDL 105
A: acdefghijklmnopqrsuv(1)
B: bce(3)aj(2)ohpq(1)
C: o(6)q(3)ahpq(1)
D: bdl(1)
E: ao(4)
F: k(25)h(5)cmp(1)
LIST CG-10

DISCUSSION OF REGULATIONS

The stability test exemptions, as proposed in the notice of proposed rulemaking, were intended to apply only to current tank vessel designs. On the basis of further review, however, it has been determined that the description of current tank vessel designs contained in the notice of proposed rulemaking is not entirely accurate. Accordingly, the final rules clarify the exemption provisions in order to describe more accurately the designs covered by the exemptions. As clarified in § 31.10–30(c), the exemptions apply to a tank vessel that—

(1) Has a flush freeboard deck, one or more longitudinal bulkheads, and no independent tanks;

(2) Has ordinary proportions and form; and

(3) Is designed not to carry cargo above the freeboard deck. The exemptions, as proposed, did not cover items (2) and (3).

The exemptions, as clarified, also provide that the center of gravity of a vessel assumed for purposes of performing stability calculations must be its center of gravity while in an assumed "lightweight" condition. A definition of "lightweight" has been added to the final rules as § 31.10–30(f)(1). The definition is the same as the definition of "lightweight" in Part 157 of Title 33, Code of Federal Regulations. (Part 157 of Title 33 contains rules for the Protection of the Marine Environment Relating to Tank Vessels Carrying Oil in Bulk.) The purpose of the clarification is to reflect a longstanding practice to have stability tests performed on a vessel only when it is in a lightweight condition.

A definition of "molded depth" has been added to the final rules as § 31.10–30(f)(2). An explanation in the notice of proposed rulemaking, the definition is the same as the definition of "molded depth" contained in the load line regulations in Part 42 of Title 46, Code of Federal Regulations.

In consideration of the foregoing, Part 31 of Title 46, Code of Federal Regulations, is amended as follows:

[illegible]

(a) This section applies to—

(1) Each tank vessel of 150 gross tons and over construction of which is started on or after December 28, 1977, except a tank barge that operates only on inland waters; and

(2) Each other tank vessel the stability of which is questioned by the Commandant or Officer in Charge, Marine Inspection.

(b) Each tank vessel must meet the stability requirements for cargo and miscellaneous vessels contained in the following provisions of Part 93 of this chapter:

(1) The requirement in § 93.05–1(a) to conduct a stability test, except as modified in paragraphs (d) and (e) of this section.

(2) The procedural rules in § 93.05–1(b) and § 93.05–5 for conducting a stability test.

(3) The stability standards in §§ 93.07–5, 93.07–10, and 93.07–15.

(4) The requirement in § 93.10–1 to provide stability information to the master.

(5) The information requirements concerning stability leters in §§ 93.15–1 and 93.15–5, except that the stability letter issued to a tank barge may be kept in any location on the barge that is dry, protected and accessible.

(c) The exemptions in paragraphs (d) and (e) of this section apply only to a tank vessel that—

(1) Has ordinary proportions and form;

(2) Has a flush freeboard deck, one or more longitudinal bulkheads, and no independent tanks; and

(3) Is designed not to carry cargo above its freeboard deck.

(d) A stability test need not be conducted for a tankship of a type described in paragraph (c) of this section if, in performing the stability calculations required by this chapter and 33 CFR Part 157, the assumption is made that the center of gravity of the ship while in a lightweight condition is located a vertical distance of at least 0.1 times the molded depth of the ship from the keel amidships at that perpendicular where [illegible]

[illegible]

if, in performing the stability calculations required by this chapter and 33 CFR Part 157, the assumption is made that the center of gravity of the barge while in a lightweight condition is located a vertical distance of at least 0.6 times the molded depth of the tank barge from the keel amidships or from a horizontal plane tangent to the keel amidships.

(f) As used in this section—

(1) "Lightweight" has the same meaning that is provided for the term in 33 CFR § 157.03(h); and

(2) "Molded depth" has the same meaning that is provided for the term in § 42.13–15(e) of this chapter.

(46 U.S.C. 391a; 49 U.S.C. 1655(b); 49 CFR 1.46.)

NOTE—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A–107

Dated: September 21, 1977.

O. W. SILER,
Admiral, U.S. Coast Guard
Commandant.

[FR Doc.77-28723 Filed 9-28-77;8:45 am]

APPENDIX 15

FEDERAL REGISTER
NOV. 14, 1977

federal register

MONDAY, NOVEMBER 14, 1977

PART III

DEPARTMENT OF TRANSPORTATION

Coast Guard

■

VESSELS OF 1600 GROSS TONS OR MORE

Proposed Electronic Navigation Equipment

[4910–14]

DEPARTMENT OF TRANSPORTATION

Coast Guard

[33 CFR Part 164]

[CGD 77–168]

VESSELS OF 1,600 GROSS TONS OR MORE

Proposed Electronic Navigation Equipment

AGENCY: Coast Guard, DOT.

ACTION: Proposed rule; withdrawal of prior proposed rule.

SUMMARY: This document withdraws an earlier notice of proposed rulemaking and proposes amending the regulations requiring certain navigation equipment on all vessels of 1,600 gross tons or more by adding a requirement for an electronic position fixing device. Many vessels in the coastal area do not have an adequate position fixing capability. This amendment would require vessels entering U.S. navigable waters bound to or from a U.S. port to have that capability.

DATE: Comments must be received before January 13, 1978.

ADDRESSES: Comments should be submitted to Commandant (G–CMC/81) (CGD 77–168), U.S. Coast Guard, Washington, D.C. 20590. Comments will be available for examination at the Marine Safety Council (G–CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590. A copy of the economic evaluation from which the economic summary in this document is taken is also available for examination at the above address.

FOR FURTHER INFORMATION CONTACT:

Capt. George K. Greiner, Marine Safety Council (G–CMC/81), Room 8117, Department of Transportation, Nassif Building, 400 Seventh Street SW., Washington, D.C. 20590.

SUPPLEMENTARY INFORMATION: Interested persons are invited to participate in this proposed rulemaking by submitting written views, data, or arguments. Each person submitting a comment should include his or her name and address, identify this notice (CGD 77–168) and the specific section of the proposal to which the comment applies, and give reasons for each comment. All comments received before the expiration of the comment period will be considered before final action is taken on this proposal. No additional public hearing is planned but one may be held at a time and place to be set in a later notice in the FEDERAL REGISTER if such meeting is requested in writing by an interested person raising a genuine issue and desiring to comment orally at a public hearing.

DRAFTING INFORMATION

The principal persons involved in drafting this document are: Mr. Fred Schwer, Office of Marine Environment and Systems, Project Manager, and Mr. Stanley Colby, Office of Chief Counsel, Project Attorney.

WITHDRAWAL OF CGD 77–002

In the January 31, 1977, issue of the FEDERAL REGISTER (42 FR 5966) the Coast Guard published a proposed rule (docket No. CGD 77–002) to require LORAN–C receivers on vessels of 1,600 gross tons or more. Interested persons were given until April 1, 1977, to submit comments. A correction to the notice was published in the FEDERAL REGISTER of February 17, 1977 (42 FR 9685) and the closing date for comments was subsequently extended to April 20, 1977. Public hearings on this proposal were held in Washington on March 4, 1977, and in San Francisco on March 16, 1977.

Seven persons presented oral comments at the Washington hearing. Six were heard in San Francisco. Fifty-nine written comments were received by the closing date, April 20, 1977.

The correction to the notice of proposed rulemaking on LORAN–C published on February 17, 1977 (42 FR 9685) stated in part that a supplementary notice of proposed rulemaking setting forth minimum standards for acceptable LORAN–C receivers would be published in the near future. After analyzing the great number of responses to the notice, the Coast Guard determined that an entirely new proposal should be published. Accordingly, the notice of proposed rulemaking (docket No. CGD 77–002) published in the January 31, 1977, issue of the FEDERAL REGISTER (42 FR 5966), as corrected by the notice of February 17, 1977 (42 FR 9685) is hereby withdrawn.

DISCUSSION OF PROPOSED REGULATIONS

Eighteen letters of comment were received which endorsed the proposal of January 31, 1977. Proponents included individuals, equipment manufacturers, mariners, ship owners, ecology and conservation-oriented groups, and government officials.

Sixteen commenters concurred in the need for an accurate offshore positioning system, but objected to the requirement of a specific system, i.e., LORAN–C. They maintained that other navigation systems can serve equally well and purchase of LORAN–C would be an unnecessary and redundant expense. Ten more commenters objected to the specific requirement of LORAN–C without commenting on the need for better position fixing. Six more pointed out that requirement of any "national" system invites other sovereignties to require their own system, leading to a proliferation of disparate and incompatible systems. Many of the commenters suggested that, rather than require a specific system, the Coast Guard set standards of navigational accuracy or equipment performance and let each mariner decide on how best to meet the requirement.

The proposed requirement for LORAN–C stemmed directly from the National Plan for Navigation (NTIS AD 741944), as amended, which named LORAN–C the primary navigation system for the U.S. Coastal Confluence Zone (CCZ). This is defined in the plan as the area from the U.S. shoreline and harbor entrances to 50 miles offshore or to the 100 fathom curve, whichever is greater. In arriving at that determination, other radio navigation systems were considered. LORAN–C was judged best in terms of capabilities, availability, and cost.

Presently, the single navigation system which can continuously provide a merchant mariner with an adequate positioning capability throughout the CCZ is LORAN–C. Neither Decca nor Differential Omega is generally available. Radar is available only inshore. TRANSIT based satellite navigation systems are extremely accurate, but do not provide continuous information. Some hybrid systems, such as satellite/doppler, satellite/inertial, and satellite/Omega, do provide reasonably accurate information on a continuous basis. Therefore, these hybrid systems are considered to be adequate alternatives to LORAN–C. It must be remembered, however, that all of the satellite systems now in use rely on the TRANSIT satellite, a military system which can be modified or discontinued at any time.

Other radio navigation systems are under development which may meet the intent of this proposed rule. It is proposed that the Coast Guard would consider other receivers or receiver combinations which can be shown to meet the intent of the marine navigation requirements for the U.S. CCZ regarding availability, coverage, and accuracy as stated in the National Plan for Navigation, as amended. In considering other receivers, the Coast Guard would seek to insure that an equivalent level of navigation safety is achieved.

The Coast Guard gave lengthy consideration to the option of requiring an accuracy standard without specifying equipment. The alternative was finally rejected for the reasons stated above and because it would be impossible to enforce economically.

Thirteen commenters requested that the Coast Guard allow LORAN–A or A/C receivers in lieu of LORAN–C until the LORAN–A system is discontinued in 1980. This was considered, but it is believed that vessels of 1,600 gross tons or more need a more accurate positioning capability than LORAN–A can provide.

Five commenters maintained that the level of accuracy attainable with LORAN–C is not necessary until a vessel is within radar range of shore, where radar can provide an even more accurate fix. This is a subjective opinion with which the Coast Guard does not agree. Many coastlines are poor radar targets and provide ambiguous returns at best. Moreover, vessels in convergence areas may have to keep their single radars on a maneuvering and collision avoidance scale and not be able to use it efficiently for navigation.

Six commenters maintained that LORAN–C is limited in coverage and therefore not sufficiently useful. The

proposed regulation does not require LORAN–C in areas where coverage does not exist. However, adequate coverage now exists in almost all of the U.S. continental CCZ, except in the Gulf of Mexico, where LORAN–C chains will be on the air in mid-1978, and on the Great Lakes, scheduled for February 1980. It is not prudent to deprive the greater part of U.S. coastlines the protection provided by LORAN–C simply because some areas do not have coverage yet.

Several individual commenters raised questions concerning the capabilities of the LORAN–C system. Most of the questions concern receiver capabilities, charting accuracy, and availability of Loran signals. A modern LORAN–C receiver which complies with the minimum standards set forth in this proposed regulation should be reliable and easily adjusted. LORAN–C chains routinely achieve a 99.7-percent level of availability and the user is adequately warned of the brief periods of signal unreliability by the "blink" feature. A LORAN–C chart verification program by the Federal government is in progress to provide improved accuracy. Although the LORAN–C system is not perfect, it offers a vast improvement in overall positioning capability in the U.S. CCZ when compared with most other available systems.

The Special Committee of the Radio Technical Commission for Marine Services (RTCM) is developing a Minimum Performance Specification (MPS) for Marine LORAN–C receivers. The Coast Guard feels that proceeding with this proposal is too vital to the public interest to delay pupblication until the RTCM Executive Committee has approved the MPS. Persons desiring to comment should be aware of the MPS and may consider it a detailed standard against which this proposal may be evaluated. Moreover, the RTCM MPS will contain definitions, explanations, and test procedures which also may aid the purchaser.

The minimum standards set forth in the proposed new § 164.41 (c) and (d) are those characteristics which will provide for an adequate position fixing capability within the limits of the U.S. CCZ. A lesser device may not be capable of using the systems' full potential. It is recognized that the "state-of-the-art" in receiver electronics is evolving rapidly. However, unless technological advances make these standards markedly obsolescent, the Coast Guard would allow continued use of receivers installed under these standards for a reasonable period of time.

While the Coast Guard proposes to require an electronic position fixing device on all vessels of 1,600 gross tons or more that enter U.S. waters, it recognizes that a requirement of this nature would place a sudden surge on manufacturers' capabilities and could cause a severe backlog problem. Accordingly, the Coast Guard proposes that if the amendment is adopted, it will become effective for each category of vessel at staggered intervals. Because the tank vessel segment of the industry is somewhat smaller than the freighter segment, and because the ability to accurately navigate tankers has assumed much greater importance of late, it is proposed that this segment of the industry would be required to comply with the regulations at the earliest time, such as 120 days after publication of the rule. It is proposed to require the remaining vessels to comply one year after publication of the rule.

This proposal has been reviewed for economic effects under Department of Transportation "Policies to Improve Analysis and Review of Regulations" (41 FR 16200). The Coast Guard estimates that there would be no more than 500 U.S. and 5,000 foreign flag vessels which might be affected by this rule. Of those, it is estimated that 50 percent of U.S. and 20 percent of foreign flag vessels already have a suitable electronic positioning device installed. Therefore, approximately 250 U.S. and 4,000 foreign flag vessels would have to purchase and install the equipment.

For the purpose of this analysis, it is estimated that the average cost for installed equipment would be $8,000 for LORAN–C and $35,000 for satellite/Omega hybrid receivers. Satellite/doppler and satellite/inertial systems cost considerably more than either of the previously mentioned systems and therefore probably would not be purchased solely to comply with this regulation. Therefore, for the purpose of this statement, only the LORAN–C and satellite/Omega hybrid systems are considered. The depreciation period is assumed to be seven years and the installed cost would be passed to U.S. consumers in seven equal increments. The economic impact on the U.S. economy for the first year would be the initial cost of the installed equipment for U.S. vessels, plus a portion of the total cost to both U.S. and foreign vessels which will be passed on to the U.S. consumers over the life of the equipment in the form of increased shipping rates. The initial cost of the equipment to foreign vessels is not considered a cost to the U.S. economy.

The highest single year costs to the U.S. shipping industry would be the first year cost of $3,350,000 for initial purchase and installation. First year total impact on the U.S. economy would be $11,5000,000. Total cost of compliance to the U.S. economy over the seven year period would be $60,300,000.

Because of more accurate navigation, the benefits from having this equipment installed include cost saving in vessel operation and the probability of fewer vessel accidents This in turn could yield a reduction in injuries and deaths, as well as savings in search and rescue costs, ship repair costs, and pollution costs.

The following terms are used in the regulation, and are explained here for clarity:

Automatic signal acquisition. After inserting numbers which identify the stations to be used and commanding the receiver to start, no further action by the operator is required to obtain time difference information.

Manually assisted automatic acquisition. In addition to the operations he performs for automatic signal acquisition, the operator must insert, or set, the secondary station course timing numbers. No further action is required by the operator.

In consideration of the foregoing, it is proposed to amend Part 164 of Chapter I of Title 33, Code of Federal Regulations, as follows:

§ 164.30 [Amended]

1. By striknig, in § 164.30, the section number "164.35" and inserting the section number "164.41" in place thereof.

2. By adding a new § 164.41 to read as follows:

§ 164.41 Equipment: Certain vessels.

(a) This section applies to vessels calling at ports in the continental U.S. or on the Gulf of Alaska, except—

(1) Vessels not engaged in commerce and owned or bareboat chartered and operated by the United States, by a State or its political subdivisions, or by a foreign nation; and

(2) Vessels calling only at U.S. ports on the Gulf of Mexico or on the Great Lakes are not required to meet paragraph (b) of this section until LORAN–C for those areas is declared operational by the U.S. Coast Guard.

(b) Each vessel must have—

(1) A LORAN–C receiver that is warranted by the manufacturer as meeting paragraph (c) of this section;

(2) A continual update, satellite-based hybrid navigation receiver (i.e., satellite/doppler, satellite/inertial, or satellite/Omega) that is warranted by the manufacturer as meeting paragraph (d) of this section; or

(3) A receiver other than a LORAN–C or satellite hybrid receiver that the Commandant finds meets the intent of the statements of availability, coverage, and accuracy for the U.S. Coastal Confluence Zone (CCZ) contained in the U.S. Department of Transportation National Plan for Navigation (NTIS AD 741944), as amended. A person desiring a determination by the Commandant on a receiver under this subparagraph must submit to Commandant (G–W/73), Washington, D.C. 20590, a written request describing the receiver. The Commandant may require that the applicant obtain and submit additional data and test results to establish the suitability of the receiver.

(c) Each LORAN–C receiver must—

(1) Have the capability of rejecting at least two near band sources of interference;

(2) Acquire the signal with

(i) Automatic signal acquisition; or

(ii) Manually assisted automatic acquisition, which, as used in this subdivision, means that after manual crude positioning of the receiver's time base relative to that of the received LORAN–

C secondary signal to within 100 microseconds, the receiver must automatically locate the master and secondary signals;

(3) Automatically select correct ground wave cycle on each signal;

(4) Continuously track groundwave phase (cycle) on all pulses;

(5) Automatically display 2 or more time difference readings, simultaneously or sequentially, with a readout resolution of at least 0.1 microseconds and with data updates every 15 seconds or less; and

(6) Automatically activate an alarm for signal "blink," lost signal, signal below useable level, cycle selection disabled or unreliable, and time-difference readings not yet reliable.

(d) A hybrid satellite system must have—

(1) Automatic acquisition of the satellite signals after initial operator settings have been entered;

(2) Position updates derived from satellite information obtained during each satellite pass; and

(3) A continuous tracking complementary system which provides, in between satellite fixes, position update at intervals of one minute or less.

§ 164.53 [Amended]

3. By adding in § 164.53(b) the words "radio navigation receivers," after the word "radar," and before the word "gyrocompass."

(Sec. 104, Stat. 427 (33 U.S.C. 1224); sec. 201(3), 86 Stat. 428, as amended (46 U.S.C. 391a(3)); 49 CFR 1.46(n)(4).)

NOTE.—The Coast Guard has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Statement under Executive Order 11821, as amended, and OMB Circular A-107.

Dated: November 8, 1977.

E. L. PERRY,
Vice Admiral, U.S. Coast Guard,
Acting Commandant.

[FR Doc.77-32911 Filed 11-11-77;8:45 am]