Sunshine Act Meetings

Federal Register
Vol. 54, No. 193
Friday, October 6, 1989

This section of the FEDERAL REGISTER contains notices of meetings published under the "Government in the Sunshine Act" (Pub. L. 94-409) 5 U.S.C. 552b(e)(3).

FEDERAL RETIREMENT THRIFT INVESTMENT BOARD

TIME AND DATE: 10:00 a.m., October 16, 1989.

PLACE: 5th Floor, Conference Room, 805 Fifteenth Street, N.W., Washington, D.C.

STATUS: Open.

MATTERS TO BE CONSIDERED:

1. Approval of the minutes of last meeting.
2. Thrift Savings Plan Activities report by Executive Director.
3. Review of the Price Waterhouse report on "Review of Thrift Savings Plan Annuity Operations at the Thrift Investment Board and Metropolitan Life."

CONTACT PERSON FOR MORE INFORMATION: Tom Trabucco, Director, Office of External Affairs, (202) 523–5660

Dated: October 3, 1989.

Francis X. Cavanaugh,

Ececutive Director, Federal Retirement Thrift Investment Board.

[FR Doc. 89–23789 Filed 10–4–89; 11:34 am]

BILLING CODE 6760-01-M

Corrections

Federal Register
Vol. 54, No. 193
Friday, October 6, 1989

This section of the FEDERAL REGISTER contains editorial corrections of previously published Presidential, Rule, Proposed Rule, and Notice documents. These corrections are prepared by the Office of the Federal Register. Agency prepared corrections are issued as signed documents and appear in the appropriate document categories elsewhere in the issue.

DEPARTMENT OF AGRICULTURE

Commodity Credit Corporation

1989 Price Support Levels for Fire-Cured (Type 21), Fire-Cured (Types 22-23), Dark Air-Cured (Types 35-36), Virginia Sun-Cured (Type 37), Cigar-Filler and Binder (Types 42-44, 53-55) and Cigar-Filler (Type 46) Tobaccos

Correction

In notice document 89-21248 beginning on page 37491 in the issue of Monday, September 11, 1989, make the following corrections:

1. On page 37493, in the table, in the second and third columns, in the third entry, "106.7" and "105.2" should read "105.9" and "104.4", respectively.

2. On the same page, in the same table, insert "Virginia sun-cured, type 37"; "106.7"; and "105.2," in their respective columns, between the third and fourth entries.

BILLING CODE 1505-01-D

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket Nos. RP89-136-011 and TM90-1-59-001]

Northern Natural Gas Co., Division of Enron Corp.; Filing

Correction

In notice document 89-22659 appearing on page 39465 in the issue of Tuesday, September 26, 1989, make the following corrections:

1. On page 39465, in the third column, the docket heading should read as set forth above.

2. On the same page, in the same column, the subject heading should read as set forth above.

BILLING CODE 1505-01-D

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket Nos. CP89-2082-000, et al.]

Northwest Pipeline Corp., et al.; Natural Gas Certificate Filings

Correction

In notice document 89-22495 beginning on page 39224 in the issue of Monday, September 25, 1989, make the following correction:

On page 39225, in the second column, under "**5. American Distribution Co. (Alabama Division)**", the docket numbers should read "[Docket Nos. CP84-474-012 and CP86-263-004]".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

21 CFR Ch. I

[Docket No. 87N-0246]

Certain Food, Cosmetic, and Miscellaneous Regulations; Editorial Amendments; Confirmation of Effective Date

Correction

In rule document 89-22051 appearing on page 38514 in the issue of Tuesday, September 19, 1989, make the following corrections:

1. On page 38514, in the first column, under "**FOR FURTHER INFORMATION CONTACT:**", in the fourth line, the phone number should read "301-443-2994".

2. On the same page, in the second column, in the second complete paragraph, in the 12th line, insert "21 CFR Parts" after "except for:".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

Advisory Committees; Notice of Meetings

Correction

In notice document 89-21871 beginning on page 38439 in the issue of Monday, September 18, 1989, make the following correction:

On page 38439, in the third column, in the first full paragraph, in the third line, "17509" should read "1750".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

[Docket No. 89N-0303]

International Drug Scheduling; Convention on Psychotropic Substances; Certain Benzodiazepine Drugs; Propylhexedrine

Correction

In notice document 89-21948 beginning on page 38441 in the issue of Monday, September 18, 1989, make the following correction:

On page 38441, in the second column, under "**II. Notification**", in the second line of the reference citation, "HOW" should read "WHO".

BILLING CODE 1505-01-D

DEPARTMENT OF THE INTERIOR

Office of the Secretary

43 CFR Part 11

Natural Resource Damage Assessments

Correction

In proposed rule document 89-22382, beginning on page 39015 in the issue of Friday, September 22, 1989, make the following correction:

On page 39016, in the second column, in the **DATE** section the date should read "October 23, 1989".

BILLING CODE 1505-01-D

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[AZ 020-41-5410-10-ZAFH;AZA-23386]

Receipt of Conveyance of Mineral Interest Application

Correction

In notice document 89-18574 appearing on page 32698 in the issue of Wednesday, August 9, 1989, make the following correction:

On page 32698, in the second column, under "Gila and Salt River Meridian, Arizona", in the seventh line, "SE¼" should read "SW¼".

BILLING CODE 1505-01-D

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1910

[Docket No. S-012A]

RIN 1218-AA53

Control of Hazardous Energy Sources (Lockout/Tagout)

Correction

In rule document 89-20574 beginning on page 36644 in the issue of Friday, September 1, 1989, the following file line was omitted:

[FR Doc. 89-20574 Filed 8-31-89; 8:45am]

BILLING CODE 1505-01-D

DEPARTMENT OF THE TREASURY

Customs Service

19 CFR Part 171

[T.D. 89-86]

Seizure of Property for Possession of Controlled Substances

Correction

In rule document 89-21211 beginning on page 37600 in the issue of Monday, September 11, 1989, make the following corrections:

§ 171.12 [Corrected]

1. On page 37603, in the first column, in § 171.12(b), in the eighth line, insert "the" after "mailing of".

§ 171.51 [Corrected]

2. On the same page, in the same column, in § 171.51(a), in the ninth line, "or" should read "of".

3. On the same page, in the second column, in § 171.51(b)(5), in the eighth line, "of" should read "for".

4. On the same page, in the third column, in § 171.51(b)(6)(i), in the third line, "of" should read "or".

§ 171.52 [Corrected]

5. On page 37604, in the second column, in § 171.52(b), in the 20th line, "pursuant" was misspelled.

BILLING CODE 1505-01-D

DEPARTMENT OF THE TREASURY

Internal Revenue Service

26 CFR Part 5h

RIN 1545-AM76

Certain Elections Under the Technical and Miscellaneous Revenue Act of 1988

Correction

In rule document 89-22350 beginning on page 38979 in the issue of Friday, September 22, 1989, make the following corrections:

§ 5h.6 [Corrected]

1. On page 38981, in § 5h.6(a)(1), in the fourth column of the table, in the third and fourth lines, "January 20, 1990" should read "January 22, 1990".

2. On page 38982, in the 4th column of the same table, in the 8th and 9th entries, in the 5th and 10th lines respectively, "January 20, 1990" should read "January 22, 1990".

3. On page 38984, in § 5h.6(a)(2)(i)(B) and (b), in the 1st and 16th lines respectively, "January 20, 1990" should read "January 22, 1990".

Note: For a Department of the Treasury/Internal Revenue Service correction to this document see the Rules section of this issue.

BILLING CODE 1505-01-D

federal register

Friday
October 6, 1989

Part II

Department of Transportation

Coast Guard

33 CFR Parts 154, 155, and 156
46 CFR Parts 32, 35, and 39
Marine Vapor Control Systems; Notice of Proposed Rulemaking

DEPARTMENT OF TRANSPORTATION

Coast Guard

33 CFR Parts 154, 155, 156

46 CFR Parts 32, 35, 39

[CGD 88-102]

RIN 2115-AC65

Marine Vapor Control Systems

AGENCY: Coast Guard, DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: The Coast Guard proposes to adopt new regulations for the safe design, installation, and operation of marine vapor control systems. Some states, in an attempt to meet the national ambient air quality standard for ozone set by the EPA under the Clean Air Act, have issued requirements for the control of volatile organic compound (VOC) emissions from tank vessels which carry oil and chemicals in bulk. Vapor emission control is also being considered as a means of reducing occupational exposure to toxic chemicals such as benzene. Unsafe vapor control system design or operation could result in fires and explosions, tank ruptures and oil spills. This rulemaking will not require the installation or use of vapor control systems.

DATE: Comments must be received on or before November 20, 1989.

ADDRESSES: Comments should be mailed to the Executive Secretary, Marine Safety Council (G-LRA-2/3600) (CGD 88-102), U.S. Coast Guard, 2100 Second St. SW., Washington, DC 20593-0001, (202) 267-1477. Comments may also be delivered to and will be available for inspection and copying at the Marine Safety Council, room 3600, U.S. Coast Guard, 2100 Second Street, SW., Washington, DC, between 8:00 a.m. and 3:00 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Lieutenant Commander Robert H. Fitch, Office of Marine Safety, Security and Environmental Protection (G-MTH-1), room 1214, (202) 267-1217, between 7:00 a.m. and 3:30 p.m., Monday through Friday, except Federal holidays.

SUPPLEMENTARY INFORMATION: The public is invited to participate in this proposed rulemaking by submitting written views, data or arguments. Comments should include the name and address of the person making them, identify this notice (CGD 88-102) and the specific section of the proposal to which each comment applies, and give the reason for each comment. If an acknowledgement is desired, a stamped self-addressed post card or envelope should be enclosed.

The rules as proposed may be changed in light of the comments received. All comments received before the expiration of the comment period will be considered before final action is taken on this proposal.

No public hearing is planned. However, one may be held at a time and place to be set in a subsequent notice in the Federal Register if written requests for a public hearing are received and it is determined that the opportunity to make oral presentations will be beneficial to the rulemaking process.

Drafting Information

The principal persons involved in drafting this proposal are: Lieutenant Commander Robert H. Fitch, Project Manager, and Lieutenant Commander Don M. Wrye, Project Counsel, Office of Chief Counsel.

Background

During loading or ballasting of bulk liquid cargo tanks, the liquid introduced into a tank displaces vapors within the tank, which in typical operations today are released to the atmosphere. The displaced vapors of certain cargoes contain VOC's which are a precursor to the formation of ozone, a major air pollutant in some areas. Several states, acting pursuant to their authority under the Clean Air Act of 1970, are considering requirements for the control of VOC emissions from the loading and ballasting of tankships and tank barges. Three states currently have regulations which will require the control of marine VOC emissions in the future.

Marine occupational exposure offers another reason for using vapor control systems. In a separate regulatory project (CGD 88-040), the Coast Guard is developing regulations requiring lower occupational exposure limits for benzene. In anticipation of these requirements, vessel and facility operators are considering the use of marine vapor control systems for the purpose of reducing occupational exposure to benzene and other hazardous chemicals.

In a typical vapor control system, vapors emitted from a tank vessel being loaded or ballasted are collected and piped ashore where they are destroyed through a process such as incineration, recovered through a process such as refrigeration/condensation, or returned to the shore tank being emptied (vapor balancing). When vapors are collected for purposes of reducing occupational exposure, and air pollution is not a factor, facility operators may choose to pipe the vapors to a remote location and disperse them to the atmosphere.

The use of marine vapor control systems introduces potentially significant new hazards to the loading and ballasting operations of tank vessels. The Coast Guard can best address these hazards through the development of safety regulations for tank vessels and facilities using vapor control systems. This rulemaking will not require the installation or use of vapor control systems.

The primary hazards associated with the use of vapor control equipment are: cargo tank over- or underpressurization; overfill and spillage; and fire, explosion, and detonation. The severity and likelihood of accidents which might result from the use of vapor control systems warrant Coast Guard measures to minimize the risk of such accidents. It is, for example, possible for a vapor control system pipeline interconnecting a tank on a tank vessel with a shoreside vapor processing system to be filled with a flammable vapor. An ignition of this vapor could initiate a detonation wave which would propagate along the pipeline in either direction at the speed of sound and would generate pressure exceeding 600 pounds per square inch. Such an ignition could originate in shoreside vapor processing units such as incinerators or flares which are likely to be the most commonly used vapor processing systems. In 1983, such a flare initiated casualty occurred in a marine vapor control system. As a result, two barges were totally destroyed and considerable damage was done to the facility. Review of the casualty indicates that additional safety features, routine inspections and better training of personel would have contributed to minimizing the likelihood of this casualty.

Present regulations do not address vapor control in the comprehensive manner considered necessary for safe operation of vapor control systems. There are currently no safety regulations applicable to facility vapor control system installations. In the case of tank vessels, while there are existing regulations for piping and electrical equipment which are applicable to vapor control equipment on vessels, the regulations are at this time inadequate in addressing all of the hazards associated with vapor control. Because of the complexities of vapor control systems, proper training of both ship and facility personnel is also considered essential to the safe operation of vapor control systems. At this time there are no Coast Guard requirements dealing with the training and qualifications of

personnel operating vapor control systems.

Recognizing the hazards associated with vapor control systems, the Coast Guard began to review proposed shoreside systems used in handling limited numbers of vessels in dedicated trade. While effective when vapor control system use was limited to a small number of dedicated trades, the case by case reviews fell short of providing a comprehensive safety check and providing the standardization considered necessary for widespread application of vapor control. Case by case review was also an inefficient means of conveying to Coast Guard field units and to industry the level of safety which must be provided.

The use of vapor control systems is expected to increase dramatically as states require their use to help achieve Clean Air Act standards for air quality and as industry increases its use of vapor control systems to meet new or proposed limits for occupational exposure to benzene and other carcinogenic chemicals carried in bulk. Given the anticipated increased use of vapor control systems, the Coast Guard can best ensure safety through regulations.

Because there was little historical experience to provide background data for vapor control systems and serious concerns existed over potential safety hazards introduced in implementing vapor control requirements, in 1986 the Coast Guard funded a National Research Council (NRC), Commission on Engineering and Technical Systems, Marine Board study to assess the technical, safety and economic aspects of vapor control systems. The NRC study was released in January, 1988 and concluded that control and recovery of hydrocarbon vapors from tankships and tank barges was feasible with available technology provided that national safety standards for vapor emission controls were developed and implemented.

In response to the NRC recommendation, the Chemical Transportation Advisory Committee (CTAC) Subcommittee on Vapor Control was formed to develop standards for the design and operation of vapor control systems. The Subcommittee held its first meeting in August 1987. Six Subcommittee and ten working group meetings were held to develop the standards. All meetings were open to the public and announced in the **Federal Register**. CTAC presented the recommendations to the Coast Guard in February 1989.

The Coast Guard funded a failure modes and effects analysis and a worst case scenario analysis on several hypothetical vapor control systems which included the safety provisions contained in draft recommendations prepared by CTAC. On basis of the analysis, the Coast Guard proposed changes to the CTAC draft recommendations. CTAC reviewed the Coast Guard recommendations and incorporated some of those recommendations in their final recommendations. The American Petroleum Institute (API) has funded a quantitative risk analysis (referred to as the API risk analysis) based upon the final CTAC recommendations. Some changes resulting from the API risk analysis have been incorporated in these proposed rules. Both the Coast Guard and the API studies are included in this rulemaking docket and are available for examination.

The CTAC recommendations were used as the basis for these proposed regulations. The recommendations were reorganized and revised as appropriate to conform with language required for regulations, and some recommendations were not included because they were outside the scope of this rulemaking. Specific technical deviations from the CTAC recommendations are discussed in the Discussion section that follows:

The objective of this regulatory proposal is to provide standards for the safe design and operation of vapor control systems and provide qualification requirements for personnel operating vapor control systems. The requirements would be applicable to vessels and facilities that use vapor control systems. This rulemaking will not require the installation or use of vapor control systems. The requirement to use a vapor control system will stem from a state requirement to control vessel emissions, or alternatively, as part of a vessel or facility operator's program for complying with personnel exposure requirements for hazardous chemicals.

Discussion of the Proposed Regulation

33 CFR Part 154

The Coast Guard has another regulatory project (CGD 86–034) which would change part 154 to apply existing requirements for bulk oil transfer facilities to facilities which transfer bulk liquid hazardous materials. A Notice of Proposed Rulemaking of this project was published in the **Federal Register** on June 13, 1988 at 53 FR 22118, and a Supplemental Notice of Proposed Rulemaking was published in the **Federal Register** on June 9, 1989 at 54 FR 24718. Some of the changes in that rulemaking are necessary to make this part applicable to facilities using vapor control. Changes to §§ 154.100, 154.105, and 154.106 included in that proposal are repeated in these proposed rules for the convenience of the reader. If CGD 86–034 becomes a final rule before this rulemaking, the proposed changes for those sections will be deleted from this rulemaking except for some additional incorporation by reference standards in § 154.106.

Section 154.100 Applicability

This section would amend the applicability of this part to include facilities which transfer bulk liquid hazardous materials.

Section 154.105 Definitions

This section would redefine "facility" to include facilities which transfer hazardous materials to or from a vessel.

Section 154.106 Incorporation by Reference

This section would list the materials which are incorporated by reference into this part.

Section 154.310 Operations Manual: Contents

This section would require operating procedures and a line diagram of a facility's vapor control system to be included in the facility's operations manual.

Section 154.740 Records

This section would require a facility to keep records of repairs to the vapor control system and all automatic shutdowns of the vapor control system. This was not part of the CTAC recommendations. However, the Coast Guard's position is that this is needed to indicate to the Coast Guard recurring problems which may require design changes.

33 CFR 154, Subpart E

A new subpart E would be added to part 154 entitled "Vapor Control Systems" which would include requirements for the safe design and operation of vapor control systems at facilities. The following sections would be included in the new subpart:

Section 154.800 Applicability

This section would describe the applicability of this subpart. The rules would be applicable to any facility which recovers flammable or combustible vapors from tank vessels. Recovery of vapors from liquefied flammable gases is exempted. The CTAC recommendations listed applicability only for vapors from crude oil, benzene, and gasoline cargoes. The

Coast Guard anticipates that vapor control systems must be utilized in controlling emissions from a wider range of cargoes. The requirements developed by CTAC can apply equally to all cargoes listed in Table 30.25–1 of 46 CFR part 30 and to hydrocarbon compounds (i.e., only made up of hydrogen and carbon) listed in 46 CFR Table 151.01–10(b) or Table 1 of 46 CFR part 153. Cargoes listed in 46 CFR Table 151.01–10(b) or Table 1 of 46 CFR part 153, which are not hydrocarbons liquids, are given special consideration in § 154.803 of this subpart.

Section 154.802 Definitions

This section would give definitions of terms which are used in this subpart. Several terms were added to those provided by CTAC in order to define terms which may not otherwise be clear to people likely to use these rules. "Recognized industry standards" which was included in the CTAC recommendations, is not included in these proposed rules because the subject is dealt with in the section on "Incorporation by Reference". "Sources of ignition", which was included in the CTAC recommendations, is not included in these proposed rules because its primary usage in the CTAC recommendations is not contained in these proposed rules.

Section 154.803 Other Hazardous Materials

This section would require a facility which collects vapors of cargoes listed in 46 CFR Table 151.01–10(b) or Table 1 of 46 CFR part 153, which are not hydrocarbons liquids, to meet the requirements in this subpart and any additional requirements which the Commandant (G–MTH) may prescribe. These cargoes may have unusual flammability characteristics or other particular hazards which are not adequately addressed by this subpart and must receive special consideration.

Section 154.804 Review of System Designs and Initial Inspection

This section describes the proposed process for review of a facility's vapor control system design. It includes provisions for review by a third party acceptable to the Coast Guard. All new and existing facility vapor control systems would be reviewed and certified by an entity acceptable to the Coast Guard, including these facility vapor control systems which were previously approved by the Coast Guard. Owners or operators of a facility with a previously approved vapor control system would have six months to make their submittal, twelve months to make modifications after notification by the certifying entity, and not more than two years total to come into compliance with the regulations. The CTAC recommendations called for previously approved existing systems to be accepted by the Coast Guard without formal review, however, the Coast Guard is proposing that formal review. When the Coast Guard previously reviewed the systems, the potential hazards were not fully understood, and they were not reviewed to the same standards of safety which would be required by these regulations.

This section would also require a qualitative failure analysis as part of the review process. It would require the analysis to show that the vapor control system has two means of protection to prevent an ignition in the facility's system from propagating to the vessel and to prevent an ignition on the vessel from propagating into the facility's system, and these means of protection must operate automatically, independent of human intervention. The CTAC recommendations called for three means of protection to prevent an ignition from propagating to the vessel, however, the first means of protection was intended to be good design which eliminates sources of ignition. The Coast Guard's position is that this good design means of protection is addressed throughout these proposed rules, would be difficult to demonstrate in a failure analysis, and therefore is not needed. Although not included in the CTAC recommendations, the Coast Guard is proposing to include in the definition of "means of protection" that these means of protection must operate without intervention, because an operator is not likely to be able to act with sufficient speed to prevent propagation of an ignition.

This section would authorize the certifying entity to conduct the initial inspection and testing of the installation to verify that the system conforms to the plans and specifications, and meets the requirements of this subpart. After the certifying entity certifies that the installation meets the requirments of this subpart, the Captain of the Port will endorse the facility's Letter of Adequacy that the facility is acceptable to collect vapors.

The CTAC recommendations did not address procedures relating to alterations to a vapor control system. The Coast Guard's position is that alterations involving any component required by this subpart must be approved and inspected by an approval entity. Therefore, this provision is included.

Section 154.806 Application for Acceptance as a Certifying Entity

This section would give the process and required qualifications for obtaining Coast Guard acceptance as a certifying entity. The CTAC recommendations provided for a professional engineer to perform the review. The Coast Guard's position is that persons other than professional engineers may be qualified to perform the review, and that additional criteria should be met to demonstrate acceptable qualifications. The Coast Guard wants certifying entities to be available when the final rules become effective. Entities may submit their applications based on these proposed rules, and the Coast Guard will begin to grant acceptances when the final rules are published. If there are no acceptable entities when the final rules become effective, the Commandant (G–MTH) will consider conducting the review and analysis required by § 154.804 of this subpart on an interim basis and Coast Guard field units will conduct the initial inspection.

Section 154.808 Vapor Control System, General

This section would give some general requirements for a facility's vapor control system. The proposed requirements would include provisions for elimination of potential sources of ignition, for vapor collection system components to meet ANSI Standard B31.3 with a design working pressure of at least 150 psig, for a means to drain and collect any liquid condensate in the vapor line, and for a liquid knockout vessel to protect the vapor compressor from liquid carryover. Based upon the results of the API risk analysis, this section would also require a high level alarm and overfill shutdown for the knockout vessel to prevent liquid carryover.

Section 154.810 Vapor Line Connections

This section would give requirements for the facility vapor connection, shutoff valves at the facility vapor connection, and vapor hoses and loading arms. A requirement for the automatic shutoff valve to close in five seconds, and to be located upstream of any vapor assist device and the point where inerting, diluting, or enriching gas is introduced into the system, has been included. The Coast Guard is proposing to require an isolation valve capable of manual operation in addition to the automatic shutoff valve called for in the CTAC recommendations. The Coast Guard's position is that the facility needs to be able to isolate its vapor collection

system from the vessel manually, in case of failure of the automatic shutoff valve.

The requirements for vapor hoses and vapor loading arms would be expanded from the CTAC recommendations. The proposed rules would require that the hoses and loading arms have a maximum allowable working pressure of at least 25 psi pressure and 2.0 psi vacuum, require annual testing of hoses, and require specific types of connections. The rules would also require the last 1.5 meters of vapor piping or vapor loading arm to be painted a bright orange color (international orange), and all of the vapor hose to be that color in lieu of only the last two feet as specified in the CTAC recommendations. Although CTAC wanted a standard color to be used to distinguish vapor connections, it could not agree on a color. The Coast Guard is proposing to require orange because it is easily recognizable and will not conflict with existing piping color code systems.

Both the Coast Guard hazards analysis and the API risk analysis recognized the hazard involved in misconnecting a loading hose to the vessel vapor connection and recommended steps to prevent it from occuring. The Coast Guard's position is that this can best be handled by requiring some means of physically preventing misconnection. The Coast Guard proposes to require a lug with a corresponding hole on each flange to prevent misconnection. Suggestions of other physical means to prevent misconnection are solicited.

Section 154.812 Vessel Liquid Overfill Protection

This section would give requirements for facilities to prevent the overfill of tank barges. These requirements are needed because of the potentially increased hazards resulting from the closed loading of tank vessels associated with vapor control. The requirements would be applicable to facilities loading tank barges which use the overfill protection measures proposed in 46 CFR 39.20–9(b). It would give requirements for an overfill control panel located on the facility, which would receive a high level signal from sensors on the tank barge. Although the CTAC recommendations did not specify an automatic shutdown of cargo loading, the Coast Guard's position is that this should be required. The need for this automatic shutdown is indicated by the Coast Guard's hazards analysis and API's risk analysis. The Coast Guard is also proposing that the loading should automatically shut down when signal circuit continuity is lost.

Section 154.814 Vessel Vapor Overpressure and Vacuum Protection

This section would give requirements to prevent a facility from over-or underpressurizing a tank vessel. The requirements would include maximum and minimum pressures at the facility vapor connection, and high and low pressure alarms and shutdowns. The CTAC recommendations specified a maximum pressure of 0.2 psig for inland tank barges and 0.3 psig for ocean tank barges. The Coast Guard's position is that the 0.1 psig pressure difference does not add any benefit, and therefore is proposing to require that the maximum pressure be 0.3 psig for all non-inerted vessels. The Coast Guard is proposing that the facility's vapor collection system have a capacity at least equal to 1.25 times the facility's maximum loading rate in order to reduce the possibility of overpressurizing a vessel. The 1.25 factor is used to account for vapor generation during loading.

This section would also include provisions for high/low pressure alarms and high/low pressure shutdowns of the vapor collection system and cargo loading when the high/low pressure levels are exceeded by a specific pressure. The CTAC recommendations did not include maximum/minimum settings for the alarms and shutdowns. The Coast Guard has decided that these maximum/minimum settings should be specified in order to ensure standard performance criteria.

The Coast Guard's hazards analysis recommended that the pressure sensing devices used to activate high pressure alarms and shutdowns be located in the vapor collection line as close to the tank vessel as possible, that is, upstream of the facility's first valve, so this provision has been included. The API risk analysis recommended that a liquid vacuum breaker to relieve excessive vacuum should be located in the vapor collection line if a device is used to assist drawing the vapors, so this has been included. Provisions are also included which would require the liquid vacuum breaker to be tested for capacity in accordance with API Standard 2000. The Coast Guard is proposing that a means of determining whether the maximum allowable loading rate is exceeded for a vessel must be provided.

Section 154.820 Fire, Explosion and Detonation Protection

This section would give requirements to prevent a fire, explosion, or detonation in a facility's vapor control system. The CTAC recommendations required three means of protection against flame propagation from any source of ignition in the vapor control system to the tank vessel, and two means of protection against flame propagation from the tank vessel to the facility. The Coast Guard's position is that this approach is too confusing, not sufficiently specific, and may result in some systems not having an adequate level of safety. This section would be more specific than the CTAC recommendations, yet still retain flexibility to allow operators to design any type of system which would provide for an adequate level of safety.

This section would require a two-way detonation arrester at the facility vapor connection. The CTAC recommendations identified this device as one of the means of protection. An ASTM specification for the testing of detonation arresters is under development, and is expected to be published prior to the publishing of these requirements as a final rule. In these proposed rules, the number of this specification is left blank and will provide in the final rule. A draft of this specification is included as Appendix A. Detonation arresters have not yet been tested to the requirements of this specification. The Coast Guard expects that due to the expense of the test, no company will want to perform the test until the standard is adopted. It is anticipated that some commercially available detonation arresters can meet the draft ASTM standard. API has expressed its intention to conduct tests after the standard is adopted.

This section would also require a means of maintaining the concentration of the vapor mixture outside the flammable range. The operator would have the option of using either air dilution, enrichment, or inerting. The proposed regulation would provide the acceptable range of hydrocarbon concentration or oxygen concentration based upon a percentage of either the upper or lower flammable limit. An alarm would be required when the mixture deviates from the acceptable concentration range and an automatic shutdown of the vapor collection system would be required when the concentration deviates even further from the acceptable range. The CTAC recommendations would require an inerting system to alarm when the oxygen content exceeded 7.0 percent and to shut down vapor transfer at 8.0 percent. Coast Guard regulations and requirements of the International Convention for the Safety of Life at Sea of 1974, as amended (SOLAS 74/83), require that the oxygen content in cargo

tanks of certain oil tankers be maintained at 8.0 percent by volume or less. The Coast Guard's position is that this concentration provides an acceptable margin of safety for ships and that it will be equally appropriate for vapor control purposes. Therefore, these proposed regulations require an oxygen concentration of 8.0 percent for the alarm set point and 9.0 percent for the shutdown set point.

This proposed section goes into more detail on the means of analyzing the vapor stream than was recommended by CTAC, such as including provisions for the injection of a test span gas. The API risk analysis indicated that there was a danger of the cargo tanks being overpressurized by a blockage in the vapor collection line, or of the cargo tanks being overpressurized by the diluting, enriching or inerting gas system. Therefore, a provision was added to require a pressure relieving device in the facility vapor collection line.

The CTAC recommendations recognized an explosion suppression system as an acceptable fire protection measure. The Coast Guard has reservations on the effectiveness of an explosion suppression system for this application, and questions whether the design criteria for such a system have been adequately defined. Tests to demonstrate its effectiveness are now being planned. If these tests demonstrate the effectiveness of an explosion suppression system, design criteria will also be developed, and the Coast Guard will modify the final rule to allow the use of an explosion suppression system as a fire protection measure.

This proposed section requires a flame arrester at all outlets to the atmosphere of the vapor control system and at any incinerator or flare. Each flame arrester must meet an ASTM standard which is under development and is expected to be published prior to the publishing of these requirements as a final rule. In these proposed rules, the number of this specification is left blank and will be provided in the final rule. A draft of this specification is included as Appendix B.

The CTAC recommendations did not address all of the ignition hazards introduced by an incinerator or flare used to destroy the vapors or by a compressor or blower used to assist the movement of the vapors. This section would provide additional requirements to address these hazards.

If inerted vapors are handled by the vapor collection system, there may be a build-up of pyrophoric iron sulphide deposits in the system. If air is introduced into the system, there is a danger of heating by the pyrophoric iron sulphide. This section proposes a requirement for a facility to have provisions to reduce the risk of heating from pyrophoric iron sulfide deposits if the vapor control system handles inerted vapors.

Section 154.840 Personnel

Since few systems are currently installed, the Coast Guard is proposing that training be specifically tailored to a particular facility's installed vapor control system. The guidelines for a training program were developed by CTAC and are included as Appendix D. For personnel who have not previously received vapor control system training, the proposed rules would require a 40 hour course, with at least 8 hours of hands-on training in normal and emergency operating procedures. For personnel who have completed this training at another facility or similar training for vessel personnel, the training could be reduced to 24 hours, including 8 hours of hands-on training in normal and emergency operating procedures. Comments are specifically requested on the duration of the training and whether individual training courses should be approved by the Coast Guard.

Section 154.850 Operational Requirements

This section would detail operational requirements for a facility using a vapor control system. It would include limitations on the loading rate and verification that all necessary valves in the vapor control system are open. In addition to the CTAC recommendations, the Coast Guard is proposing that a facility shall only receive vapors from a vessel approved for vapor control, that all alarms and sensing devices must be tested not more than 24 hours prior to each loading operation, that both oxygen or hydrocarbon analyzers must be operable at the start of each loading operation, and that the cargo loading must be terminated whenever the vapor control system is shut down.

The CTAC recommendations did not address the size or the length of vapor hose which can be used. The proposed regulations assume that pressure drops through hoses will be minimal. The Coast Guard's position is that, in order for this to be a reasonable assumption, the length of vapor hose should be limited to 30 meters and the inside diameter to no less than that of the vessel's vapor collection system piping. Longer hose lengths may be used if provisions are made to account for the resistance of the additional vapor hose.

The Coast Guard hazard analysis and the API risk analysis brought out several other potential hazards which were not addressed in the CTAC recommendations. The following provisions to address these additional hazardcs were added to this proposed rulemaking: The initial loading rate to each cargo tank should be limited in order to reduce the possibility of generating static electricity; and vapors from an inerted vessel must be at a higher pressure than on the facility side of the isolation valve before the valve is opened, in order to prevent the possibility that non-inerted air will enter the vessel's vapor collection line and cause heating of pyrophoric iron sulphide deposits.

The CTAC recommendations did not address line clearing of the cargo loading line. The Coast Guard's position is that line clearing risks overpressurizing cargo tanks when a vessel is closed loading. Therefore, line clearing would be prohibited.

A damaged flame arrester at a flare contributed to a casualty with a vapor control system. The flame arrester had been damaged by a previous flare-back. Therefore, a provision is included to inspect the flame arrester prior to continuing transfer operations if a flame is detected on the flame arrester or if it is suspected that a flare-back has occurred.

33 CFR Part 155

Section 155.750 Contents of Oil Transfer Procedures

This section would require operating procedures and a line diagram of the vessel's vapor collection system to be included in the vessel's oil transfer procedures.

33 CFR Part 156

Section 156.120 Requirements for Oil Transfer

This section would require that certain operational conditions of the vapor control system be verified prior to conducting a transfer operation.

Section 156.170 Equipment Tests and Inspections

This section would require certain tests and inspections to be performed on a facility's or vessel's vapor control system. The CTAC recommendations did not include provisions for periodic testing and inspection other than tests prior to each transfer operation. The Coast Guard's position is that most components of the vapor control system which are not tested prior to each transfer operation should be tested

annually. Although periodic inspection of detonation arresters is necessary, the Coast Guard does not have sufficient information to determine how often inspection should be required. Clogging of detonation and flame arresters varies with different cargoes. The Coast Guard proposes to require annual inspection of detonation and flame arresters, and requests information regarding the frequency of inspection considered necessary based on operational experience. The Coast Guard also proposes to require weekly calibration of hydrocarbon and oxygen analyzers.

46 CFR Part 32

Section 32.53–85 Instruction Manual—T/ALL

This section would require a vessel's inert gas instruction manual to be amended to include procedures relating to vapor control operations.

46 CFR Part 35

Section 35.35–20 Inspection Prior to Transfer of Cargo—TB/ALL

This section would require certain operational conditions of a tank vessel's vapor control system to be verified prior to conducting an oil transfer operation.

Section 35.35–30 "Declaration of Inspection" for Tankships—T/ALL

This section would require checks to a vessel's vapor control system prior to transfer to be added to the vessel's Declaration of Inspection as an appendix.

46 CFR Part 39

A new part 39 entitled "Vapor Control Systems" would be added which would include requirements for the safe design and operation of vapor control systems on tank vessels. The CTAC recommendations had separate requirements for tankships and tank barges. Because of the extent of overlap, the Coast Guard is proposing that these requirements should be combined, with differing requirements pointed out. The following sections would be included in the new part:

Section 39.10–1 Applicability—TB/ALL

This section would describe the applicability of this part. This part would be applicable to any tankship or tank barge which recovers hydrocarbon vapors. Because state requirements to control vapor emissions may require foreign vessels in U.S. ports to control vapor emissions, these safety regulations would apply to foreign vessels collecting vapor emissions. Recovery of vapors from liquefied flammable gases is exempted. The CTAC recommendations listed applicability only for vapors from crude oil, benzene, and gasoline cargoes. The Coast Guard anticipates that vapor control systems may be utilized in controlling emissions from a wider range of cargoes. The requirements developed by CTAC can apply equally to all cargoes listed in Table 30.25–1 of 46 CFR part 30 and to hydrocarbon compounds (i.e., only made up of hydrogen and carbon) listed in 46 CFR Table 151.01–10(b) or Table 1 of 46 CFR part 153. Cargoes listed in 46 CFR Table 151.01–10(b) or Table 1 of 46 CFR part 153, which are not hydrocarbon liquids, are given special consideration in § 39.10–7 of this part.

Section 39.10–3 Definitions—TB/ALL

This section would give definitions of terms which are used in this part which may not otherwise be clear to people likely to use these rules. The CTAC recommendations did not include a definition section for tankships or tank barges.

Section 39.10–5 Incorporation by Reference—TB/ALL

This section would list the materials which are incorporated by reference into this part.

Section 39.10–7 Other Hazardous Materials—TB/ALL

This section would require a facility which collects vapors of cargoes listed in 46 CFR Table 151.01–10(b) or Table 1 of 46 CFR part 153, which are not hydrocarbon liquids, to meet the requirements in this subpart and any additional requirements which the Commandant (G–MTH) may prescribe. These cargoes may have unusual flammability characteristics or other particular hazards which are not adequately addressed by this subpart and must receive special consideration.

Section 39.10–9 Vessel Vapor Processing Unit—TB/ALL

Since a tank vessel with a vapor processing unit on board has hazards similar to a facility with a vapor control system, this section would require such a vessel to be reviewed to verify that the vessel provides an equivalent level of safety as required for a facility in proposed 33 CFR 154, subpart E. Although this requirement was not part of the CTAC recommendations, CTAC addressed this type of vessel assuming that it would meet the requirements for a facility. Therefore, this is consistent with the assumption and intent of the CTAC recommendations.

Section 39.10–11 Personnel—TB/ALL

Since few systems are currently installed, the Coast Guard is proposing that training be specifically tailored to a vapor control system installed on a particular vessel or class of vessels. The guidelines for a training program were developed by CTAC and are included as Appendix D. For personnel who have not previously received vapor control system training, the proposed rules would require a 40-hour course, with at least 8 hours of hands-on training in normal and emergency operating procedures. For personnel who have completed this training on another vessel or similar training for facility personnel, the training could be reduced to 24 hours, including 8 hours of hands-on training in normal and emergency operating procedures. Comments are specifically requested on the duration of the training and whether individual training courses should be approved by the Coast Guard.

Section 39.10–13 Submission of Vapor Control System Designs—TB/ALL

This section would specify the procedures for submitting vessel vapor control plans to the Coast Guard's Marine Safety Center (MSC) for review. The installation on a foreign flag vessel would be certified by the classification society which classes the vessel. All new and existing vessel vapor control systems would have to be reviewed and approved by the MSC. Owners or operators of a vessel with a previously approved vapor control system would have six months to make their submittal, twelve months to make modifications after notification by the Coast Guard, and not more than two years total to come into compliance with the regulations. The CTAC recommendations were that previously approved existing systems should not need further review. However, the Coast Guard's position is that further review is necessary. When the Coast Guard previously reviewed the systems the potential hazards were not fully understood, and they were not reviewed to the same standards of safety which would be required by these regulations.

Section 39.20–1 Vapor Collection System—TB/ALL

This section would give some general requirements for a tank vessel's vapor collection system. It would give requirements for the vessel vapor connection line and for vapor hoses. The CTAC recommendations did not require the vapor piping to be permanently installed. The Coast Guard is proposing that vapor piping should be permanently

installed. However, the Coast Guard recognizes that there may be instances when the use of vapor hoses would be acceptable. Therefore, the proposed regulations allow for exceptions. The CTAC recommendations called for the vessel vapor connection to be in the vicinity of the loading manifold. The Coast Guard agrees that such a location is desirable. However, the recommendation provided by CTAC is vague and would do little to enhance safety. The API is presently developing a standard for manifold arrangements which will provide a more definitive description than the CTAC recommendation. When this standard is received, the Coast Guard may propose adopting it as a requirement. Comments are specifically requested on the need for specifying the location of the vapor connection and what this location should be.

The requirements for vapor hoses and vapor loading arms would be expanded from the CTAC recommendations. The proposed regulations would require that the hoses have a maximum allowable working pressure of at least 25 psig, be capable of withstanding a vacuum of 2.0 psi, and require specific types of connections. They would also require the last 1.5 meters of the vessel's vapor piping to be painted a bright orange color (international orange), and all of the vapor hose to be that color in lieu of only the last two feet as specified in the CTAC recommendations. As previously discussed, orange is proposed because it is easily recognizable and will not conflict with existing piping color code systems.

Both the Coast Guard hazards analysis and the API risk analysis recognized the hazard involved in misconnecting a loading hose to the vessel vapor connection and recommended steps to prevent it from occurring. The Coast Guard's position is that this can best be handled by requiring some means of physically preventing misconnection. The Coast Guard proposes to require a lug with a corresponding hole on each flange to prevent misconnection. Suggestions of other physical means to prevent misconnection are solicited.

Section 39.20–3 Cargo Gauging System—TB/ALL

This section would require a closed gauging system on a tank vessel which recovers hydrocarbon vapors in order to determine liquid level in the cargo tank, and gives the requirements for such a system. The CTAC recommendations for tank barges called for the gauging system to be permanently installed, while this was not included for tankships. The Coast Guard's position is that the gauging system should be permanently installed on all vessels.

This section would also require a secondary gauging system for the topping off range for tank barges which recover hydrocarbon vapors, because they will not normally have the high level and overflow alarms that tankships have. The CTAC recommendations did not specify the range for this secondary gauging system. The Coast Guard's position is that at least the cargo level in the top 1.5 meters of the tank should be indicated by this system. However, where a tank barge does have the same high level and overflow alarms that are required for tankships, the proposed regulations exempt them from the secondary gauging system requirements. Although not included in the CTAC recommendations, the Coast Guard is proposing that an exemption under these circumstances would be appropriate.

Section 39.20–7 Tankship Liquid Overfill Protection—T/ALL

This section would require a high level alarm and a tank overflow alarm on tankships which recover hydrocarbon vapors, and give the requirements for these alarms. The CTAC recommendations called for the high level alarm to be set at no less than 95 percent of the tank capacity and the overflow alarm to be set at no higher than 98.5 percent of tank capacity. The Coast Guard's position is that it is not appropriate to specify a lower limit for the high level alarm, but that tanks should not normally be filled over 97 percent capacity. Therefore, the proposed regulations require that the high level alarm set point be not higher than 97 percent capacity. The Coast Guard has decided that the set point for the overflow alarm should be given as a performance standard. Therefore, the proposed regulations require that the alarm should be set to go off at a level where the operator has sufficient time to shut down cargo loading before the cargo tank overflows. The requirements are intended to be similar to the requirements for high level and overflow alarms in 46 CFR part 153.

Section 39.20–9 Tank Barge Liquid Overfill Protection—B/ALL

This section would give the overfill protection requirements for tank barges which recover hydrocarbon vapors. The Coast Guard is proposing four different alternatives: dual high level alarms meeting § 39.20–7, an overflow control system which has sensors on the tank barge and electrical connection to an overflow control panel on shore, an acceptable spill valve, or an approved rupture disk. The CTAC recommendations called for a spill valve to limit the back pressure in the tank from reaching the design pressure of the tank. The Coast Guard's position is that it would create less confusion to specify a maximum back pressure of 3.0 psig for tankships and 2.0 psig for tank barges. An ASTM specification for spill valves is under development, and is expected to be published prior to the publishing of these requirements as a final rule. In these proposed rules, the number of this specification is left blank and will be provided in the final rule. A draft of this specification is included as appendix C.

The use of rupture disks introduces some additional concerns which are not present when spill valves are used. Spill valves resist passage of flame into a cargo tank in the case of a fire on deck. Rupture disk arrangements may not, since, when the disk ruptures, it leaves an open path into the tank. Alternatively, if a valve is provided to close off the rupture disk discharge, the valve may be left closed when the tank is loaded. These proposed rules require approval from the Commandant for rupture disk arrangements addressing these added concerns. The Coast Guard has already approved one such arrangement.

Section 39.20–11 Vapor Overpressure and Vacuum Protection—TB/ALL

This section would give requirements to prevent over- or underpressurizing a cargo tank on a vessel which recovers hydrocarbon vapors. The Coast Guard is proposing to require pressure relief devices with an adequate capacity to vent vapors at a rate at least 1.25 times the maximum loading rate without exceeding 3.0 psig for tankships or 2.0 psig for tank barges, and with a relief pressure of not less than 1.5 psig. Vacuum relief devices would be required which have an adequate capacity to vent air into the tank at a rate at least 1.25 times the maximum loading rate without exceeding 1.0 psi vacuum, and with a relief pressure of not less than 0.5 psi vacuum. The 1.25 factor is used to account for vapor generation during loading.

The CTAC recommendations did not specify the maximum back pressure or vacuum which can be reached in the tank. Also, the CTAC recommendations did not specify the minimum pressure or vacuum setting of the relief devices. The Coast Guard is proposing minimum relief settings and maximum tank pressure and vacuum to enhance

standardization of systems and, thereby, improve safety.

This section would require that a relief device installed after the effective date of these regulations have means to check that the device is operating freely. The CTAC recommendations for tank barges called for a delay in the implementation of this requirement until January 1, 1991. The Coast Guard's position is that this delay is unwarranted because the feature is currently available from most manufacturers of relief devices.

Although not part of the CTAC recommendations, the Coast Guard is proposing that the capacity of relief devices must be demonstrated through testing in accordance with API Standard 2000.

Section 39.20–13 High and Low Vapor Pressure Protection for Tankships—T/ALL

This would require sensors and alarms on tankships which recover hydrocarbon vapors to warn against over- or underpressurizing the tankship. The CTAG recommendations did not specify the number of pressure sensors or the location of the pressure sensors. The Coast Guard's position is that short of having a pressure sensor at each tank, a vessel should have two pressure sensors located at the forwardmost and aftermost tanks which are connected to the vapor collection system. If only one pressure sensor is provided, the operator of a vessel will not know the highest or lowest pressure reading on the vessel, particularly when multiple tanks forward and aft of the vessel vapor connection are being loaded. Provisions are included for arrangements which do not have tanks connected to the vapor collection system which are both forward and aft of the vessel vapor connection. Although not specified in the CTAC recommendations, the Coast Guard is proposing that the high pressure alarm be activated when the pressure reaches 50 percent of the lowest pressure relief device setting, and that the low pressure alarm be activated when the pressure falls to four inches water gauge (0.144 psig) for inerted tankships, or 0.5 psi vacuum for other tankships.

Section 39.30–1 Operational Requirements—TB/ALL

This section would detail operational requirements for a tank vessel using a vapor control system. Although not part of the CTAC recommendations, the Coast Guard is proposing that a tank vessel may only transfer vapors to a facility or vessel which is approved to receive the vapors.

This section would include limitations on the loading rate based upon the venting capacity of the pressure relief devices or the capacity of the vapor collection system, in both cases assuming that vapors are vented at 1.25 times the loading rate. The 1.25 factor is used to account for vapor generation during loading. The CTAC recommendations for tankships and tank barges differ in their approach to ensuring that the maximum allowable pressure in a cargo tank is not exceeded due to excessive loading rates. The tankship recommendations require the size of the vapor collection lines to be sufficient to prevent the back pressure in the tank from exceeding the tank's maximum operating pressure. The tank barge recommendations require the loading rate to be limited so that the pressure does not exceed any pressure relief device setting or the venting capacity of the pressure relief devices. The Coast Guard's position is that this would be best handled as an operational requirement, and that 50 percent of any pressure relief device setting should be specified as the maximum back pressure in order to provide a greater margin of safety. The Coast Guard is also proposing that the maximum pressure in the tank when venting vapors at 1.25 times the maximum loading rate be 3.0 psig for tankships and 2.0 psig tank barges. If the capacity of the tank vessel's vapor collection system is the limiting factor, the maximum loading rate will vary with the pressure at the facility's vapor connection. Information on the maximum loading rate would be provided as part of the vessel's oil transfer procedures required under proposed 33 CFR 155.750(d). The information may be provided as a table or graph giving the maximum allowable loading rate versus the pressure at the vessel's vapor connection.

This section would limit cargo tank filling to a capacity of 97 percent or the set point level for the high level alarm, whichever is lower. The CTAC recommendations called for a maximum filling limit of 98%. The Coast Guard's position is that filling a tank higher than 97% carries too high a risk that the person in charge will not be able to shut down loading in time and that the loading should not be continued after the high level alarm goes off. The 97% filling limit is consistent with the requirement in 46 CFR 153.409 for the setting of the high level alarm. Vessels with special circumstances would be able to request permission from the Commandant to fill higher than 97%.

This section would require certain operational conditions to be met in order to open gauge for cargo sampling or custody transfer. The International Safety Guide for Oil Tankers and Terminals recommends waiting at least 30 minutes after loading a tank before gauging or sampling the tank with metallic equipment, to allow static electricity accumulations to dissipate. This requirement is included in this section.

This section would limit the initial loading rate to each cargo tank to one meter per second linear velocity until the cargo level in the tank reaches one meter in height. This requirement is consistent with standard industry guidelines. The purpose is to minimize the risk of a vapor ignition due to static electricity. The CTAC recommendations for tank barges included a similar requirement, but they did not specify at what height of cargo the reduced loading rate could be increased. The CTAG recommendations for tankships did not include this requirement.

This section would also require the inert gas generator to be isolated from the vapor collection system while the vapors are being collected, and the pressure indicator required by § 39.20–13 of this part to be continuously monitored during the loading operation.

In addition to the CTAC recommendations, the Coast Guard is proposing requirements that an inerted tank vessel must be tested for oxygen content, and that each high level and overflow alarm must be tested prior to each loading operation.

The CTAC recommendations did not address the size or the length of vapor hose which can be used. The proposed regulations assume that pressure drops through hoses will be minimal. The Coast Guard's position is that, in order for this to be a reasonable assumption, the length of vapor hose should be limited to 30 meters and the inside diameter to no less than that of a vessel's vapor collection system piping. Longer hose lengths may be used if provisions are made to account for the resistance of the additional vapor hose.

Section 39.40–1 General Requirements for Vapor Balancing—TB/ALL

The CTAC recommendations did not include provisions for lightering. A lightering working group developed draft standards for lightering, but they have not yet been approved by CTAC. The provisions of subpart 39.40 of this proposed rulemaking are drawn from that working group's draft standards. This section would require tank vessels which control vapor emissions while lightering to meet all requirements in this part for a vessel with a vapor control system. It also requires special

approval from the Commandant in order to use a method other than vapor balancing to control the vapors in a lightering operation.

Section 39.40–3 Design and Equipment for Vapor Balancing—TB/ALL

This section would give the design and equipment requirements for tank vessels which engage in vapor balancing during lightering operations. It would require a detonation arrester on at least one of the vessels. The working group recommended that a flame arrester could be used at this location. The Coast Guard's position is that a flame arrester would be inadequate because detonations are possible at this location. This section would also require that in order to have a device to assist the transfer or recovery of vapors, special approval must be received from the Commandant. This was not a part of the lightering working group's draft standards, because the working group assumed that no such device was necessary. The Coast Guard's position is that the Commandant's approval is necessary because vessels engaged in lightering normally would not have the same fire protection provisions as would be available at a facility.

This section would require a pressure indicator and high pressure alarm on the service vessel. This was not part of the lightering working group's draft standards. The Coast Guard's position is that this is necessary because the vessel will not have the overpressure protection it would have at a facility. This would only be a factor on tank barges, because § 39.20–13 of this chapter would require the indicator and alarm for tankships. Although not a part of the lightering working group's draft standards, the Coast Guard is proposing that, where the service vessel in a lightering operation is a tank barge which has an overflow control system in accordance with § 39.30–9(b) of this chapter, the vessel to be lightered must have an overflow control panel which meets 33 CFR 154.812.

When the service vessel or both vessels are inerted vessels, this section would require an oxygen sensor and alarm, normally located on the vessel to be lightered, which would alarm when the oxygen content in the vapor collection line exceeds 8 percent. It would also require provisions to be made to inert the vapor transfer hose between the vessels prior to the transfer of vapors. Although not part of the lightering working group's draft standards, it would require means to add span gas in order to test the oxygen sensors.

Section 39.40–5 Operational Requirements for Vapor Balancing—TB/ALL

This section would detail the operational requirements for tank vessels which engage in vapor balancing during lightering operations. It would require each cargo tank being loaded to be connected by the vapor collection system to a cargo tank which is being discharged. This was not part of the lightering working group's draft standards. The Coast Guard's position is that this is necessary because vessels which do not use a common vent line for the vapor collection system, or have a means of isolating individual tanks from the vapor collection system, could transfer vapors to a tank which is not being discharged and overpressurize the tank. It would also require that the pressure indicator be continuously monitored during the transfer operation. Although not a part of the lightering working group's draft standards, it would require that one of the vessel's provide an insulating flange at its vapor connection. This is similar to the requirement in 33 CFR 154.810(g) for a facility to provide an insulating flange.

If both vessels are inerted, this section would require all tanks on the service vessel to be tested for oxygen content prior to cargo transfer and to be continuously monitored during the transfer. It would require that the vessel to be lightered control the cargo transfer rate to ensure that the maximum allowable loading rate is not exceeded. Although not part of the lightering working group's draft standards, the Coast Guard is proposing that tank washing and cargo tank ballasting be prohibited during the loading operation.

If only the service vessel is inerted, this section would require the same operational requirements to be met as when both vessels are inerted. It would also require that the vapor collection system isolation valve on the service vessel not be opened until the pressure in the vapor collection system on the service vessel exceeds the pressure in the vapor collection system on the vessel to be lightered.

This section would require that, when neither vessel is inerted, the vessel to be lightered control the cargo transfer rate so that the maximum allowable loading rate is not exceeded.

This section would prohibit vapor balancing when only the vessel to be lightered is inerted. This requirement is consistent with the lightering working group draft standards, and was developed to prevent non-inerted vapors from entering an inerted tank.

Regulatory Evaluation

The proposed regulations are considered to be non-major under Executive Order 12291 and significant under Department of Transportation (DOT) regulatory policies and procedures (DOT Instruction 2100.5). A draft evaluation has been prepared and placed in the public docket. It may be inspected or copied at the Marine Safety Council, Room 3600, at the address listed above under "ADDRESSES." (Copies may also be obtained by contacting that office at (202) 267–1477.

The proposed rules, if adopted, would benefit industry by providing standards for the safe design and operation of vapor control systems. The rules would result in fewer vessels and facilities being damaged from fires and explosions, fewer vessels being damaged from overfilling and over- or underpressurization, fewer injuries/deaths from fires and explosions, and less oil spilled from overfilling or overpressurizing of tanks while loading with a vapor control system in use.

The proposed rules, if adopted, would also benefit the Federal and state governments. The standards promulgated would facilitate review and inspection of vapor control systems by the Coast Guard. State governments would not need to become involved in developing safety requirements when they impose vapor control requirements, and there will not be differing safety requirements between states.

Because the proposed rules would not require the installation of vapor control systems, the entire cost of installing vapor control systems should not be attributed to this rulemaking. The only costs which are properly attributable to this rulemaking are those which would be increased to meet standards in these rules which exceed normal industry practice. Since these rules have been developed in close cooperation with industry, the differences should be minimal. Estimated costs of installing vapor control systems were provided in the NRC Marine Board study. The study estimated that the cost to modify a typical 35,000 deadweight ton product tanker for vapor control would be $831,250. It estimated that the cost to modify a typical inland river barge for vapor control would be about $167,750. It also estimated that the cost to modify a typical product terminal for vapor control which serves ships and barges would be about $7,502,160.

Small entities would be affected by this rulemaking only if the state or local governments require the use of vapor control systems. These costs should be

attributed to the state or local government rulemaking. Therefore, the Coast Guard certifies that, if adopted, the proposed regulations will not have a significant economic impact on a substantial number of small entities.

Differing state requirements to control hydrocarbon emissions could adversely impact competition between states. Since this rulemaking addresses safety requirements for vapor control systems, it will ease the impact on competition between states by providing for nationwide safety requirements. It is possible that some owners of foreign tank vessels will not install vapor control systems on their vessels and withdraw them from U.S. trade, however, it is not expected that the overall pattern of oil importation will be significantly affected. In addition, the Coast Guard is working with the International Maritime Organization (IMO) to develop international safety requirements for the design and operation of vapor control systems.

Environmental Impact

This rulemaking has been thoroughly reviewed by the Coast Guard and it has been determined to be categorically excluded from further environmental documentation in accordance with section 2.b.2.c & 1 of Commandant Instruction (COMDTINST) M16475.1B. The environmental impact associated with vapor control systems is the direct result of state or local action requiring the use of such systems. A Categorical Exclusion Determination statement has been prepared and is included as part of the rulemaking docket.

Paperwork Reduction Act

This rule contains information collection requirements in 33 CFR 154.310, 154.804, 154.806, 154.814, 155.750, 156.120, and 156.170 and 46 CFR 32.53–85, 32.35–30, 39.10–13, and 39.20–11. These have been submitted to the Office of Management and Budget (OMB) for approval under the provisions of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*). Persons desiring to comment on these information collection requirements should submit their comments to: Office of Regulatory Policy, Office of Management and Budget, 726 Jackson Place, NW., Washington, DC 20503, Attn: Desk Officer, U.S. Coast Guard. Persons submitting comments to OMB are also requested to submit a copy of their comments to the Coast Guard as indicated under "ADDRESSES."

Federalism

Based on the information currently available, the Coast Guard is unable to determine whether the proposed rule would have sufficient federalism implications to warrant the preparation of a Federalism Assessment. The Coast Guard's position at this time is that once a state requires vapor control, the discretion available to the state to modify the requirements, as they pertain to shoreside facilities, may be limited. For example, all flexible hoses used in vapor control systems and the last 1.5 meters (4.9 feet) of fixed piping leading to the facility vapor connection flange must be color coded bright orange (international orange). The vapor connection flanges are also of unique design to prevent cross-connection with other piping systems. These requirements, and others like them, could not be modified. Some standardization of equipment and procedures is necessary since affected vessels move from port to port in the national marketplace and excessive modification of the requirements would be burdensome and potentially unsafe. The Coast Guard specifically seeks public comment on the federalism implications of this proposal.

Appendices

Three draft ASTM specifications have been referenced in this rulemaking document. The draft specifications address: (1) The testing of detonation flame arresters, (2) the testing of flame arresters, and (3) specifications for spill valves. Since the information in the draft specifications may be helpful to the public in commenting on the proposed regulations, and since this rulemaking has a relatively short comment period, the draft specifications have been reproduced, respectively, as appendices A, B, and C.

CTAC developed recommended guidelines for vessel and facility personnel. The Coast Guard would use these guidelines in developing criteria for approval of industry training courses, if it is determined that courses should require Coast Guard approval. The CTAC guidelines have been reproduced as appendix D.

List of Subjects

33 CFR Part 154

Incorporation by reference, Oil pollution, Reporting and recordkeeping requirements, Vapor control.

33 CFR Part 155

Oil pollution, Reporting and recordkeeping requirements.

33 CFR Part 156

Hazardous materials transportation, Oil pollution, Reporting and recordkeeping requirements, Water pollution control.

46 CFR Part 32

Cargo vessels, Fire prevention, Marine safety, Navigation (water), Occupational safety and health, Seamen.

46 CFR Part 35

Cargo vessels, Fire prevention, Marine safety, Navigation (water), Occupational safety and health, Reporting and recordkeeping requirements, Seamen.

46 CFR Part 39

Cargo vessels, Hazardous materials transportation, Incorporation by reference, Marine safety, Occupational safety and health, Vapor control.

For the reasons set out in the preamble, the Coast Guard proposes to amend title 33, chapter I, subchapter O, parts 154, 155, and 156, and title 46, chapter I, parts 32 and 35, and add new part 39 as set forth below.

TITLE 33—[AMENDED]

PART 154—[AMENDED]

1. The authority citation for part 154 is revised to read as follows:

Authority: 33 U.S.C. 1231; 49 CFR 1.46.

2. Section 154.100 is revised to read as follows:

§ 154.100 Applicability.

This part applies to each facility or marina that transfers, in bulk, to or from any vessel with a capacity of 250 barrels or more, oil or any material, other than liquefied gases, determined to be hazardous under 46 CFR 153.40 (a), (b), (c) or (e) except that §154.735 applies to each facility or marina that—

(a) Transfers in bulk any quantity of these producing; or

(b) Has storage tanks containing these products, mixtures that include these products, or their residues.

Note: A storage tank that is not gas free and safe for entry is considered to have residues of these products or mixtures of these products.

3. Section 154.105 is amended by revising the definition for the word "facility" to read as follows:

§ 154.105 Definitions.

* * * * *

"Facility" means any structure on or in the navigable waters of the United States or any land structure or shore area immediately adjacent to such waters, used or capable of being used to transfer oil or hazardous materials to or from a vessel.

* * * * *

4. Section 154.106 is revised to read as follows:

§ 154.106 Incorporation by reference.

(a) Certain materials are incorporated by reference into this part with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a). To enforce any edition other than the one listed in paragraph (b) of this section, notice of change must be published in the **Federal Register** and the material made available to the public. All approved material is on file at the Office of the Federal Register, 1100 L Street, NW., Washington, DC, and at the U.S. Coast Guard, Marine Technical and Hazardous Materials Division (G–MTH), 2100 Second Street, SW., Washington, DC, 20593–0001, and is available from the sources indicated in paragraph (b) of this section.

(b) The material approved for incorporation by reference in this part, and the section affected are:

American Petroleum Institute (API), 2101 L Street NW., Washington, DC 20037:	
API Standard 2000, Venting Atmospheric and Low-Pressure Storage Tanks (Nonrefrigerated and Refrigerated), January 1982	154.814
API Recommended Practice 550, Manual on Installation of Refinery Instruments and Control Systems, Part II—Process Stream Analyzers, Section 5—Oxygen Analyzers, Fourth Edition, August 1983.	154.820
American Society of Mechanical Engineers (ASME), United Engineering Center, 345 E. 47 Street, New York, NY 10017:	
ANSI B16.5—Steel Pipe Flanges and Flanged Fittings, 1981	154.500; 154.810
ANSI B16.24—Brass or Bronze Pipe Flanges, 1979	154.500; 154.810
ANSI B31.3—Chemical Plant and Petroleum Refinery Piping, 1987	154.510; 154.808
American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103:	
ASTM _____—Standard Specification for Tank Vent Flame Arresters	154.820
ASTM_____—Standard Specification for Detonation Flame Arresters	154.820
National Fire Protection Association (NFPA), Batterymarch Park, Quincy, MA 02269:	
NFPA 70—National Electrical Code, 1987	154.735; 154.820
NFPA 85A—Standard for Prevention of Furnace Explosions in Fuel Oil- and Natural Gas-Fired Single Burner Boiler-Furnaces, 1987.	154.820
Oil Companies International Marine Forum (OCIMF), 6th Floor, Portland House, Stag Place, London SWIE 5BH: International Safety Guide for Oil Tankers and Terminals, Third Edition, 1988.	154.735

5. Section 154.310 is amended by redesignating existing paragraphs (b) and (c) as (c) and (d), respectively, and adding new paragraph (b) to read as follows:

§ 154.310 Operations manual: Contents.

* * * * *

(b) If a facility collects vapors emitted from vessel cargo tanks for recovery, destruction, or dispersion, the operations manual must contain a description of the vapor collection system at the facility which includes:

(1) A line diagram of the facility's vapor control system piping, including the location of each valve, control device, pressure/vacuum relieving device, pressure indicator, flame arrester, and detonation arrester; and

(2) A description of, and procedures for operating, the vapor control system including the:

(i) Vapor line connection;

(ii) Startup and shutdorn procedures;

(iii) Steady state operating procedures;

(iv) Provisions for dealing with pyrophoric sulfide (for facilities which handle inerted vapors);

(v) Alarms and shutdowns; and

(vi) Pre-transfer equipment inspection requirements.

* * * * *

6. Section 154.740 is amended by deleting the word "and" at the end of paragraph (e) and adding new paragraphs (g), (h), and (i) to read as follows:

§ 154.740 Records.

* * * * *

(g) A record of all repairs to any component, which is required by subpart E of this part, of the facility's vapor control system is to be kept for 3 years;

(h) A record of all automatic shutdowns of the facility's vapor control system is to be kept for 3 years; and

(i) Plans, calculations, and specifications of the facility's vapor control system certified under § 154.804 of this part.

7. A new subpart E is added to read as follows:

Subpart E—Vapor Control Systems

154.800 Applicability.
154.802 Definitions.
154.803 Other hazardous materials.
154.804 Review of system designs and initial inspection.
154.806 Application for acceptance as a certifying entity.
154.808 Vapor control system, general.
154.810 Vapor line connections.
154.812 Vessel liquid overfill protection.
154.814 Vessel vapor overpressure and vacuum protection.
154.820 Fire, explosion and detonation protection.
154.840 Personnel.
154.850 Operational requirements.

Subpart E—Vapor Control Systems

§ 154.800 Applicability.

(a) This subpart applies to the following:

(1) Each facility which collects vapors of flammable or combustible liquids emitted from a tank vessel's cargo tanks for recovery, destruction, or dispersion, or other vapor control process.

(2) A vessel that is not a tank vessel but which has a vapor processing unit located on board for recovery, destruction, or dispersion of vapor of flammable or combustible liquids from a tank vessel.

(b) This subpart does not apply to the collection of vapors of liquefied flammable gases as defined in 46 CFR 30.10–39.

§ 154.802 Definitions.

As used in this subpart:

"Existing vapor control system" means a vapor control system which was approved by the Coast Guard prior to October 6, 1989.

"Facility vapor connection" means the point in the facility's vapor collection system where it interconnects with the vessel's vapor collection system.

"Inerted" means the oxygen content of the vapor space in a tank vessel's cargo tank is reduced to 8 percent by volume or less in accordance with the

inert gas requirements of 46 CFR 32.53 or 46 CFR 153.500 or other inerting arrangements acceptable to the Commandant (G–MTH).

"Liquid knockout vessel" means a device to separate liquid out of the vapor stream.

"Maximum allowable loading rate" means the maximum volumetric rate at which a vessel may receive cargo or ballast. The criteria for determining this rate is given in 46 CFR 39.30–1(b).

"Means of protection" means a system or device which will prevent ignition from occurring or prevent flame propagation without human intervention.

"New vapor control system" means a vapor control system which is not an existing vapor control system.

"Vapor balancing" means the transfer of vapors displaced by incoming cargo from the tanks of the vessel receiving cargo into the tanks of the vessel or facility delivering cargo.

"Vapor collection system" means an arrangement of piping and hoses used to collect vapors emitted from a vessel's cargo tanks and transport the vapors to a vapor processing unit.

"Vapor control system" means an arrangement of piping and equipment used to control hydrocarbon vapor emissions collected from a vessel. It includes the vapor collection system and the vapor processing unit.

"Vapor dispersion system" means a vapor control system which releases vapors to the atmosphere through a venting system not located on the vessel which is collecting the vapors.

"Vapor processing unit" means the components of the vapor control system that recovers, destroys, or disperses vapors collected from the vessel.

"Vessel vapor connection" means the point in the vessel's fixed vapor collection system where it connects with the facility's vapor collection system or another vessel's vapor collection system (for lightering operations).

§ 154.803 Other hazardous materials.

A facility which collects vapors of flammable or combustible cargoes listed in 46 CFR Table 151.01–10(b) or Table 1 of 46 CFR part 153, which are not hydrocarbon liquids, must meet the requirements of this subpart and any additional requirements that the Commandant (G-MTH) may prescribe.

§ 154.804 Review of system designs and initial inspection.

(a) New vapor control system installation must be certified by an entity accepted under § 154.806 of this subpart as meeting the requirements of this subpart.

(b) Plans, calculations, and specifications for existing vapor control system installations must be submitted to an entity accepted under § 154.806 of this subpart within [insert date six (6) months after the effective date of these regulations]. Any modifications required to bring the installation into compliance shall be completed within twelve (12) months after receipt of notification by the approval entity of modifications to be required, but not later than [insert date twenty-four (24) months after the effective date of these regulations]. After completion of modifications and tests and inspections under paragraph (d) of this section, the installation must be certified by the certifying entity as meeting the requirements of this subpart. The certification and a copy of the plans, calculations, and specifications on which the system is based shall be maintained at the facility.

(c) Plans and information submitted to the certifying entity must include a qualitative failure analysis to demonstrate that the system's fire, explosion and detonation components provide the following:

(1) Two independent means of protection to prevent an ignition occurring anywhere in the facility's vapor control system from propagating to the tank vessel; and

(2) Two independent means of protection to prevent an ignition on the tank vessel from propagating into the facility's vapor control system.

(d) The certifying entity shall conduct all initial inspections and tests to demonstrate that the facility:

(1) Conforms to approved plans and specifications;

(2) Meets the requirements of this subpart; and

(3) Operates properly.

(e) Upon receipt of the certification required by paragraphs (a) and (b) of this section, the Captain of the Port shall endorse the letter of adequacy required by § 154.325 that the facility is acceptable for collecting vapors of flammable or combustible liquid.

(f) Any alteration involving any component required by this subpart must be reviewed by a certifying entity accepted under § 154.806 of this subpart. The certifying entity must conduct the tests and inspection in accordance with paragraph (d) of this section before certifying that the alteration meets the requirements of this subpart. A copy of the certification shall be submitted to the Captain of the Port.

§ 154.806 Application for acceptance as a certifying entity.

(a) Any entity seeking acceptance to certify facility vapor control systems shall apply in writing to the Commandant (G–MTH). Each application must be signed and certified to be correct by the applicant or, if the applicant is an organization, by an authorized officer or official representative of the organization, and must include a letter of intent from a facility owner or operator to use the services of the entity to approve a vapor control system installation. Any false statement or representation, or the knowing and willful concealment of a material fact may subject the applicant to prosecution under the provisions of 18 U.S.C. 1001, and denial or termination of acceptance.

(b) The applicant must possess the following minimum qualifications, and be able to demonstrate these qualifications to the satisfaction of the Commandant (G–MTH):

(1) The ability to review and evaluate design drawings, and qualitative failure analyses;

(2) A knowledge of the applicable regulations of this subpart, including the standards incorporated by reference in these regulations;

(3) The ability to conduct or monitor and evaluate test procedures and results;

(4) The ability to perform inspections and tests of bulk liquid cargo handling systems;

(5) Is not controlled by the owners or operators of the vessels or the facilities engaged in controlling vapor emission; and

(6) Is not dependent upon Coast Guard acceptance under this section to remain in business.

(c) Each application for acceptance must contain the following:

(1) The name and address of the applicant, including subsidiaries and divisions if applicable;

(2) A statement that the applicant is not controlled by the owners or operators of vessels or facilities engaged in controlling vapor emissions, or a full disclosure of any ownership or controlling interest held by such owners or operators;

(3) A description of the experience and qualifications of the person(s) who would be reviewing or testing the system;

(4) A statement that the person(s) who would be reviewing or testing the systems is/are familiar with the regulations in this subpart; and

(5) A statement that the Coast Guard may verify the information submitted in the application and may examine the person(s) who would be reviewing or testing the systems to determine their qualifications.

(d) The acceptance of an entity may be terminated by the Commandant if the entity fails to properly review or test systems in accordance with this subpart.

Note: A list of entities accepted to approve vapor control system installations is available from the Commandant (G–MTH).

§ 154.808 Vapor control system, general.

(a) The vapor control system design and installation must eliminate potential sources of ignition to the maximum practical extent. Each remaining ignition source which is not eliminated must be specifically addressed in the protection system design and operational requirements.

(b) The vapor collection system piping, valves, flanges, and fittings must be in accordance with ANSI Standard B31.3 and designed for a maximum allowable working pressure of at least 150 psig. This maximum allowable working pressure does not apply to the vapor processing unit equipment, loading arms, vapor hoses, compressors, blowers and liquid knockout vessels.

(c) A means must be provided to drain and collect any liquid condensate which may carry over from the vessel from each low point in the line.

(d) A liquid knockout vessel must be provided for compressor units to protect the compressor from liquid carryover, unless the manufacturer certifies that the compressor can safely handle flammable and combustible liquids. Any required liquid knockout vessel must have the following:

(1) Means to indicate the level of liquid in the device;

(2) Provisions to cause the automatic vapor shutoff valve required by § 154.810(b) of this subpart to automatically close prior to liquid carryover from the device to the compressor; and

(3) An audible and visible high level alarm which is activated at a liquid level lower than the level which will activate the automatic shutoff valve required by § 154.810(b) of this subpart.

§ 154.810 Vapor line connections.

(a) An isolation valve capable of manual operation must be provided at the facility vapor connection. The valve must have an indicator to show clearly whether the valve is in the open or closed position.

(b) In addition to the isolation valve required by paragraph (a) of this section, an automatically operated vapor shutoff valve must be installed which meets the following:

(1) The valve must close within five (5) seconds of detection of a shutdown condition by a component required by §§ 154.808(d)(2), 154.814(f), 154.814(g), 154.820(c)(3), 154.820(d)(4), 154.820(e)(3), 154.820(f)(5), or 154.820(k) of this subpart;

(2) An audible and visible alarm must warn the person in charge when a signal to shut down is received; and

(3) The valve must be located upstream of any device used to assist drawing vapors from the vessel, any liquid knockout vessel, and the point where inerting, enriching, or diluting gas is introduced into the vapor collection line.

(c) Vapor connection flanges and the last 1.5 meters (4.9 feet) of vapor piping from the facility vapor connection must be painted bright orange (international orange) and clearly marked with the words "VAPOR PIPING" in black letters 2½ inches high.

(d) Each facility vapor connection flange, vapor hose flange, vapor loading arm flange, and vapor line adapter flange must meet the following:

(1) Each flange must have a 0.5 inch diameter lug, which is at least 1.0 inch long, permanently attached to the flange;

(2) Each flange must have a 0.625 inch diameter hole in the flange located directly opposite the lug;

(3) The lug and hole must be located midway between bolt holes in line with the bolt hole pattern;

(4) The lug must be on the left hand side of the installed flange when looking at the open end of the flange; and

(5) Fixed flanges must be arranged such that the lug and hole line up horizontally.

(e) Each hose used for transferring vapors must:

(1) Have a design burst pressure of at least 100 psig;

(2) Have a maximum allowable working pressure of at least 25 psig;

(3) Be capable of withstanding at least 2.0 psi vacuum without collapsing or constricting;

(4) Have flanges that meet ANSI Standard B16.5 or B16.24;

(5) Be electrically continuous with a maximum resistance of one million ohms (1 Mohm);

(6) Where two or more hoses are connected in series, have a maximum resistance between points of bonding to the vessel of 1 Mohm.

(7) Have an exterior coating which is bright orange (international orange) in color; and

(8) Be stenciled with the words "VAPOR HOSE" in black letters 2½ inches high.

(f) Fixed vapor loading arms must:

(1) Meet the requirements of § 154.810(e)(1) through (5) of this part;

(2) Have the last 1.5 meters (4.9 feet) of the arm painted bright orange (international orange); and

(3) Be clearly marked with the words "VAPOR RETURN LINE" in black letters 2½ inches high.

(g) An electrical insulating flange must be provided at the facility vapor connection.

§ 154.812 Vessel liquid overfill protection.

Each facility which serves a tank barge fitted with overfill protection in accordance with 46 CFR 39.20.–9(b) must:

(a) Have an overfill control panel installed on the dock capable of receiving a shutdown signal from an intrinsically safe system aboard the tank barge;

(b) Have cargo pumps and cargo shutdown valves which automatically shut down upon receiving a shutdown signal from the tank barge without causing piping design pressure limits to be exceeded and without causing the barge tanks to become 100 percent liquid full;

(c) Have an alarm on the overfill protection control panel which;

(1) Is activated by the shutdown signal from the tank barge or by a high level signal set at a liquid level below the shutdown level, and

(2) Is visible and audible to vessel as well as facility personnel;

(d) Have means to electrically and mechanically test alarm and shutdown systems prior to each loading operation; and

(e) Have the shutdown system activate upon loss of continuity of the tank barge's overflow control system circuitry.

§ 154.814 Vessel vapor overpressure and vacuum protection.

(a) A facility's vapor collection system must have the capacity for collecting vapors at a rate not less than 1.25 times the facility's maximum design liquid loading rate.

(b) A facility's vapor collection system must be capable of maintaining the pressure at the facility vapor connection between 0.3 psi vacuum and 0.3 psig for a non-inerted tank vessel and between 0.2 psig and 1.0 psig for an inerted tank vessel. The specified pressures must be maintained at any loading rate less than or equal to the facility's maximum design loading rate.

(c) A pressure sensing device must be provided which actuates an alarm when the pressure at the facility vapor connection exceeds either the maximum pressure given in paragraph (b) of this section or a lower pressure agreed upon

at the pre-transfer conference required by § 156.120(w) of this chapter.

(d) A pressure sensing device must be provided which actuates an alarm when the pressure at the facility vapor connection falls below either the minimum pressure given in paragraph (b) of this section or a higher level agreed upon at the pre-transfer conference.

(e) The pressure alarms required by paragraphs (c) and (d) of this section must be audible and visible at the facility at the place where cargo loading is controlled and from any point in the cargo deck area of the vessel as defined in 46 CFR 39.10–3.

(f) A pressure sensing device must be provided which causes automatic shutdown of the cargo transfer and closure of the automatic vapor shutoff valve required by § 154.810(b) of this subpart when the pressure exceeds the maximun level given in paragraph (b) of this section by 0.25 psi. The sensing device must be independent of the device used to activate the alarms referred to in paragraphs (c) and (d) of this section.

(g) A pressure sensing device must be provided which causes automatic shutdown of the cargo transfer and closure of the automatic vapor shutoff valve required by § 154.810(b) of this subpart when the pressure falls below the minimum level given in paragraph (b) of this section by 0.25 psi. The sensing device must be independent of the device used to activate the alarms referred to in paragraphs (c) and (d) of this section.

(h) The pressure sensing devices required by paragraphs (c), (d) (f), and (g) of this section must be located in the vapor collection line such that there are no valves between the facility vapor connection and the sensing devices.

(i) A pressure indicating device must be provided at the location where the cargo transfer and vapor control system are controlled which indicates the vapor pressure in the vapor collection line.

(j) If a device is installed to assist drawing vapors from the vessel (e.g. compressor or blower), a liquid vacuum breaker must be installed in the vapor collection line between the device and the facility vapor connection, which meets the following:

(1) The capacity of the liquid vacuum breaker must not be less than the capacity of the vapor assist device;

(2) The liquid vacuum breaker must relieve at a pressure such that the pressure in the vapor collection system at the facility vapor connection does not exceed 1.0 psi vacuum when the liquid vacuum breaker is venting at the capacity of the vapor assist device; and

(3) Each liquid vacuum breaker must be tested for venting capacity in accordance with paragraph 1.5.1.3 of API Standard 2000.

(k) A pressure relieving device must be installed which meets the following:

(1) The relieving capacity of the device must not be less than the greater of 1.25 times the facility's maximum design liquid loading rate or the maximum capacity of any inerting, enriching, or diluting gas source;

(2) The device must relieve at a pressure such that the pressure in the vapor collection system at the facility vapor connection when the device is venting at 1.25 times the facility's maximum loading rate or the capacity of the gas source, whichever is greater, does not exceed 2.0 psig.

(3) Each device must be tested for venting capacity in accordance with paragraph 1.5.1.3 of API Standard 2000; and

(4) The device must be located upstream of the detonation arrester required by § 154.820(a) of this subpart and the location where inerting, enriching, or diluting gas is introduced into the vapor collection line.

(1) Means must be provided to determine that the cargo loading rate does not exceed the maximum allowable loading rate given in the vessel's oil transfer procedures in accordance with § 155.750(e) of this chapter.

§ 154.820 Fire, explosion and detonation protection.

(a) Each facility vapor connection must be fitted with a detonation arrester which:

(1) Meets ASTM _____;

(2) Is capable of arresting a detonation from either side of the device; and

(3) Is installed within 6.0 meters (19.7 feet) of the facility vapor connection.

(b) Except as provided for in paragraph (g) of this section, the vapor control system must be fitted with a system which maintains the concentration of the vapor mixture outside the flammable range by one or a combination of the following methods:

(1) *Air dilution:* A system which meets paragraphs (c) and (f) of this section and supplies additional air to the vapor stream in sufficient quantities to insure that the hydrocarbon concentration of the vapor in the vapor control system is maintained below 30 percent by volume of the lower flammable limit;

(2) *Enrichment:* A system which meets paragraphs (d) and (f) of this section and supplies a compatible hydrocarbon gas to the vapor stream in sufficient quantities to insure that the hydrocarbon concentration of the vapor in the vapor control system is maintained above 170 percent by volume of the upper flammable limit; or

(3) *Inerting:* A system which meets paragraphs (e) and (f) of this section and supplies an inerting gas to the vapor stream in sufficient quantities to insure that the oxygen concentration of the vapor in the vapor control system is maintained below 8.0 percent by volume.

(c) An air dilution system must meet the following requirements:

(1) Have at least two sets of independent hydrocarbon analyzers with independent sensor taps;

(2) An alarm must be activated when the flammable vapor concentration exceeds 30 percent of the lower flammable limit; and

(3) The automatic vapor shutoff valve required by § 154.810(b) of this subpart must automatically close when the flammable vapor concentration exceeds 50 percent of the lwer flammable limit.

(d) An enrichment system must meet the following requirements:

(1) Have at least two sets of independent hydrocarbon analyzers with independent sensor taps;

(2) In lieu of the hydrocarbon analyzers, two independent oxygen analyzers with independent sensor taps may be provided if the upper flammable limit for the enriching gas does not vary by more than 5 percent by volume;

(3) An alarm must be activated when the flammable vapor concentration falls below 170 percent of the upper flammable limit;

(4) The automatic vapor shutoff valve required by § 154.810(b) of this subpart must automatically close when the flammable vapor concentration falls below 150 percent of the upper flammable limit; and

(5) If oxygen sensors are utilized, the alarm and shutdown set points must be calculated for an equivalent upper flammable limit based upon the enriching gas.

An inerting system must meet the following:

(1) The system must have at least two sets of independent oxygen analyzers with independent sensor taps;

(2) An alarm must be activated when the oxygen concentration exceeds 8.0 percent by volume;

(3) The automatic vapor shutoff valve required by § 154.810(b) of this subpart must automatically close when the oxygen concentration exceeds 9.0 percent by volume; and

(4) When a combustion device is used to produce the inerting gas, the flow of gas from the vapor collection system

into the inert gas line must be prevented by a hydraulic seal and a non-return valve.

(f) An air dilution, enrichment, or inerting system, installed to meet the requirements of paragraph (b) of this section, must meet the following:

(1) The appropriate gas must be injected into the vapor control system at a point within 6.0 meters (19.7 feet) of the facility vapor connection;

(2) The design must provide for complete mixing of the gases within 20 pipe diameters of the injection point;

(3) Analyzers must have response times of no more than 30 seconds;

(4) Analyzers must sample the vapor concentration at a point where the vapor mixture is homogeneous, at least 20 but no more than 50 pipe diameters downstream from the point of gas injection;

(5) Analyzers must be designed such that the more severe concentration reading must be used to activate the required alarms and shutdowns;

(6) If a mixing device is installed between the injection point and the sampling point, the analyzers may be installed closer than 20 pipe diameters from the injection point, but must be after the point where a homogeneous mix of the vapor is achieved;

(7) Analyzers must be in accordance with API Recommended Practice 550;

(8) Oxygen analyzers of the zirconia electrochemical or thermomagnetic type must not be used;

(9) At least one connection for injecting zero gas and a span gas of known concentration into the system must be provided for testing and calibration of the analyzers;

(10) Systems must have the capability to dilute, enrich, or inert the shore vapor collection line prior to receiving vapors from a vessel;

(11) An indicator must be provided which indicates the oxygen or hydrocarbon (as appropriate) content and is located where the cargo transfer and vapor control systems are controlled; and

(12) For enrichment and inerting systems, the vapor collection piping must be operated at a positive gauge pressure after the injection point unless a means acceptable to Commandant (G-MTH) is provided which ensures that air is not drawn into the system.

(g) If a terminal serves only vessels whose cargo tanks are inerted, the following is applicable:

(1) An additional supply of inerting gas is not required, except for the provision to be capable of inerting the vapor line prior to the transfer in accordance with paragraph (f)(10) of this section;

(2) Paragraph (e) of this section must be met; and

(3) The analyzers required by paragraph (e) of this section must sample the vapor concentration within 3 meters (9.8 feet) of the facility vapor connection.

(h) Any alarm condition specified in this part must activate an audible and visible alarm which can be seen and heard where the cargo transfer and vapor control system are controlled, and from anywhere the operator may be reasonably expected to be located.

(i) If a vapor control system interconnects with more than one vapor collection system, it must meet the following:

(1) Only one of the methods of controlling the vapor mixture (air dilution, enrichment, or inerting) required by paragraph (b) of this section may be used at any one time;

(2) Each branch must be fitted with a detonation arrester that meets paragraph (a) of this section at the points of intersection; and

(3) Any branch shut down after loading ceases for that branch must be isolated near the junction point with other branches by double block and bleed valves, double shutoff valves, or a blind acceptable to the Commandant (G-MTH).

(j) The vapor control system must be separated or insulated from external heat sources to limit vapor control system piping surface temperature to 177 °C (350 °F) during normal operation.

(k) An incinerator or flare in the vapor control system must:

(1) Have two automatic quick acting stop valves installed in the vapor collection line upstream of the incinerator or flare which automatically close whenever the incinerator or flare shuts down or has a flameout condition;

(2) Be designed such that actuation of the automatic quick acting stop valves must also cause the automatic vapor shutoff valve required by § 154.810(b) of this subpart to close and cargo transfer to stop;

(3) Have a flame arrester that meets ASTM _____ installed in accordance with the manufacturer's instructions;

(4) Have a liquid seal flame arrester installed;

(5) Have a means of detecting a flame on the flame arrester which is closest to the incinerator or flare which will actuate the automatic quick acting stop valves, actuate the automatic vapor shutoff valve, and cause cargo transfer to stop; and

(6) Not be located within 30 meters (98.4 feet) of any tank vessel moored at the facility.

(l) An incinerator in the vapor control system must be designed in accordance with NFPA 85A.

(m) If a reciprocating or screw-type compressor is used to assist movement of vapors in the vapor collection system, it must be provided with indicators and audible and visible alarms to warn against the following conditions:

(1) Excessive discharge gas temperatures at each compressor chamber or cylinder;

(2) Excessive cooling water temperature;

(3) Excessive vibration;

(4) Low lube oil level;

(5) Low lube oil pressure; and

(6) Excessive shaft bearing temperatures.

(n) If a centrifugal compressor or fan is used to assist movement of vapors in the vapor collection system, it must meet the following:

(1) Construction of the blades and/or housing must meet one of the following:

(i) Blades or housing of nonmetallic construction;

(ii) Blades and housing of nonferrous material;

(iii) Blades and housing of corrosion resistant steel;

(iv) Ferrous blades and housing with one-half inch or more design tip clearance; or

(v) Blades of aluminum or magnesium alloy and a ferrous housing with a nonferrous insert ring at the periphery of the impeller;

(2) Any combination of an aluminum alloy or a magnesium alloy component and a ferrous component is prohibited, regardless of the material that is used as the fixed or rotating component; and

(3) All metal parts must be electrically bonded and grounded.

(o) If the facility handles inerted vapors, provisions must be made to control heating from pyrophoric iron sulphide deposits in the vapor collection line.

(p) All outlets of the vapor control system to atmosphere must have a flame arresting device located at the outlet. The device must meet ASTM _____ and be installed in accordance with the manufacturer's instructions.

(q) All electrical equipment used in the vapor control system must comply with NFPA 70.

§ 154.840 Personnel.

(a) The person in charge of the transfer operation utilizing a vapor control system must have completed a training program covering the particular system installed at the facility. For persons who have not previously received training under this section,

there must be at least 40 hours of training with a minimum of 8 hours of drills or demonstrations, using the installed vapor control system, covering normal operations and emergency procedures. For persons who have previously received training under this section or training for vessel personnel under 46 CFR 39.10–11, there must be at least 24 hours of training with a minimum of 8 hours of drills or demonstration, using the installed vapor control system, covering normal operations and emergency procedures.

(b) The training course must cover the following subjects:

(1) Purpose of a vapor control system;

(2) Coast Guard regulations in this subpart;

(3) Principles of vapor control systems;

(4) Hazards of vapor control systems;

(5) Components of a vapor control system;

(6) Operating procedures:

(i) Testing and inspection requirements,

(ii) Pre-transfer procedures,

(iii) Connection sequence,

(iv) Start-up procedures, and

(v) Normal operations; and

(7) Emergency procedures.

§ 154.850 Operational requirements.

(a) A facility shall receive vapors only from a vessel which has its certificate of inspection or certificate of compliance endorsed in accordance with 46 CFR 39.10–13(e).

(b) Whenever a condition results in a shutdown of the vapor control system, the person in charge shall immediately terminate cargo loading.

(c) Loading rate must not exceed the maximum allowable loading rate for the vessel.

(d) Loading rate must not exceed the facility's maximum design loading rate.

(e) The person in charge shall test all alarms, automatic shutdowns, and sensing devices required by § 154.820 (c), (d), and (e) of this subpart not more than 24 hours prior to each loading operation.

(f) If one of the oxygen or hydrocarbon analyzers required by § 154.820 of this subpart becomes inoperable during a loading operation, the operation may continue provided the remaining analyzer remains operational; however, no further loading operations may be started until the inoperable analyzer is replaced or repaired.

(g) The person in charge shall verify that all necessary valves in the vapor line between the vessel's tanks and the shore system are open prior to starting of the loading.

(h) The initial loading rate to each cargo tank shall be limited to one meter per second (3.28 feet per second) linear velocity until cargo level has exceeded one meter (3.28 feet) in height.

(i) The person in charge shall verify that normal vapor flow has been established once vapors are generated from loading.

(j) When vapors are being received from an inerted vessel, prior to opening the isolation valve the person in charge shall verify that the vessel side of the isolation valve is at a higher pressure than the shore side.

(k) No more than 30 meters (98.4 feet) of vapor hose may be used unless provisions are made to reduce the maximum allowable loading rate to account for the resistance of the additional vapor hose.

(l) The inside diameter of all vapor hoses connected to a tank vessel must not be less than the inside diameter of the vessel's vapor collection system piping.

(m) Line clearing of a cargo loading line is prohibited while transferring cargo to a vessel.

(n) If a flare in the vapor control system is suspected of having a flare-back, or a flame is detected on the flame arrester by the detection means required by § 154.820(k)(5) of this subpart, the transfer operation shall not be continued until the flame arrester has been inspected internally and found to be in satisfactory condition.

PART 155—[AMENDED]

8. The authority citation for part 155 is revised to read as follows and all other authority citations in the part are removed:

Authority: 33 U.S.C. 1321 (j)(1)(C), 1902(c) and 1903(b), E.O. 11735, 49 CFR 1.46.

9. Section 155.750 is amended by adding paragraph (d) to read as follows:

§ 155.750 Contents of oil transfer procedures.

* * * * *

(d) If a vessel is fitted with a vapor control system, the oil transfer procedures must contain a description of the vapor collection system on the vessel which includes:

(1) A line diagram of the vessel's vapor collection system piping, including the location of each valve, control device, pressure/vacuum relieving device, pressure indicator, and device to prevent the passage of flame;

(2) The location of spill valves and rupture disks if fitted;

(3) The maximum allowable loading rates as described in 46 CFR 39.30–1(b);

(4) A description of, and procedures for operating, the vapor collection system including the:

(i) Vapor line connection;

(ii) Closed gauging system;

(iii) High level alarm system;

(iv) Independent automatic shutdown system; and

(v) Pre-transfer equipment inspection requirements; and

(5) The relief settings of all spill valves, rupture disks, and pressure/vacuum relieving devices.

PART 156—[AMENDED]

10. The authority citation for part 156 is revised to read as follows:

Authority: 33 U.S.C. 1321 (j)(1) (C) and (D); 46 U.S.C. 3715; E.O. 11735, 3 CFR, 1971–1975 COMP., p. 793; 49 CFR 1.46.

11. Section 156.120 is amended by adding paragraph (aa) to read as follows:

§ 156.120 Requirements for oil transfer.

* * * * *

(aa) A transfer operation which includes collection of the vapors emitted from the vessel's cargo tanks for recovery, destruction, or dispersion through a venting system not located on the vessel must have the following verified by the person in charge:

(1) Each part of the vapor collection system is aligned to allow the flow of vapor to shore;

(2) Vapor recovery hoses or loading arms are connected to the vessel's vapor collection connection;

(3) The electrical insulating flange required by § 154.810(g) of this chapter or 46 CFR 39.40–5(c) is installed at the vapor connection;

(4) Maximum loading rate for the transfer is identified;

(5) Maximum and minimum operating pressures at the vessel/shore connection are identified;

(6) If installed, the overflow control system on a tank barge is properly connected to the facility and operating;

(7) All alarms and automatic shutdowns required by § 154.820 (c), (d) and (e) of this chapter and 46 CFR 39.20–7, 39.20–9, and 39.40–3(d) have been tested not more than 24 hours prior to the start of the transfer operation and are operating properly;

(8) Each vapor recovery hose has no unrepaired loose covers, kinks, bulges, soft spots, or any other defect which would permit the discharge of vapors through the hose material, and no external gouges, cuts, or slashes that penetrate the first layer of hose reinforcement.

12. Section 156.170 is amended by adding new paragraph (g) to read as follows:

§ 156.170 Equipment tests and inspections.

* * * * *

(g) If a facility or vessel collects vapors emitted from vessel cargo tanks for recovery, destruction, or dispersion, no person may use any equipment in this paragraph for vapor control operations unless the vessel or facility operator, as appropriate, tests and inspects the equipment as follows:

(1) Each vapor hose, loading arm, pressure or vacuum relief device, and pressure gauge is tested and inspected in accordance with paragraphs (b), (c), and (f) of this section;

(2) Each remote operating or indicating equipment is tested for proper operation in accordance with paragraph (f) of this section; and

(3) Each detonation arrester required by § 154.820(a) of this chapter or 46 CFR 39.40–3(a), and each flame arrester required by § 154.820 (j) and (o) of this chapter, is inspected internally at least annually, or more frequently if operational shows frequent clogging or rapid deterioration.

(4) Each hydrocarbon and oxygen analyzer required by § 154.820 (c), (d) and (e) of this chapter and 46 CFR 39.40–3(d), is calibrated weekly.

TITLE 46—[AMENDED]

PART 32—[AMENDED]

13. The authority citation for part 32 continues to read as follows:

Authority: 46 U.S.C. 3306, 3703; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

14. Section 32.53–85 is amended by designating the existing text as paragraph (a) and adding paragraph (b) to read as follows:

§ 32.53–85 Instruction manual—T/ALL.

* * * * *

(b) If the tankship is fitted with a vapor control system to which part 39 of this subchapter is applicable, the instruction manual must include procedures relating to vapor control operations.

PART 35—[AMENDED]

15. The authority citation for part 35 continues to read as follows:

Authority: 33 U.S.C. 1321(j); 46 U.S.C. 3706, 3703, 6101; 49 U.S.C. App. 1804; E.O. 11735, 38 FR 21243, 3 CFR 1971–1975 Comp., p. 793; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

16. Section 35.35–20 is amended by adding paragraph (m) to read as follows:

§ 35.35–20 Inspection prior to transfer of cargo—TB/ALL.

* * * * *

(m) When the transfer operation includes collection of the vapors emitted from the vessel's cargo tanks for recovery, destruction, or dispersion through a system other than the vessel's approved venting system:

(1) Each part of the vapor collection system is aligned to allow the flow of vapor to shore or, if lightering, to the other vessel;

(2) Vapor recovery hoses or loading arms are connected to the vessel's vapor collection connection;

(3) An electrical insulating flange is installed as required by 33 CFR 154.810(g) or § 39.40–5(c) of this subchapter as appropriate;

(4) Maximum loading rate for the tranfer is identified;

(5) Maximum and minimum operating pressures at the vessel/shore connection are identified;

(6) An overflow control system on a tank barge is properly connected to the facility and operating;

(7) All alarms required by §§ 39.20–7, 39.20–9 and 39.40–3(d) of this subchapter have been tested not more than 24 hours prior to the start of the transfer operation and are operating properly; and

(8) Each vapor recovery hose has no unrepaired loose covers, kinks, bulges, soft spots, or any other defect which would permit the discharge of vapors through the hose material, and no gouges, cuts, or slashes that penetrate the first layer of hose reinforcement.

17. Section 35.35–30 is amended by adding paragraph (c) to read as follows:

§ 35.35–30 "Declaration of Inspection" for tankships—T/ALL.

* * * * *

(c) In addition to the requirements in paragraph (b) of this section, if the transfer operation includes collection of the vapors emitted from the vessel's cargo tanks for recovery, destruction, or dispersion through a vapor control system not located on the vessel, the Declaration of Inspection must include the following as an appendix:

(1) Is each part of the vapor collection system aligned to allow the flow of vapor to shore or, if lightering, to the other vessel?

(2) Are the vapor recovery hoses or loading arms connected to the vessel's vapor collection connection?

(3) Is an electrical insulating flange installed as required by 33 CFR 154.810(g) or § 39.40–5(c) of this subchapter as appropriate;

(4) Has the maximum loading rate for the transfer been identified?

(5) Have the maximum and minimum operating pressures at the vessel/shore connection been identified?

(6) Is the overflow control system on a tank barge properly connected and operating?

(7) Have all alarms required by §§ 39.20–7, 39.20–9 and 39.40–3(d) of this subchapter been tested not more than 24 hours prior to the start of the transfer operation and found to be operating properly?

(8) Is each vapor recovery hose free of unrepaired loose covers, kinks, bulges, soft spots, or any other defect which would permit the discharge of vapors through the hose material, and gouges, cuts, or slashes that penetrate the first layer of hose reinforcement?

18. A new part 39 is added to read as follows:

PART 39—VAPOR CONTROL SYSTEMS

Subpart 39.10—General

Sec.

39.10–1 Applicability—TB/ALL.
39.10–3 Definitions—TB/ALL.
39.10–5 Incorporation by reference—TB/ALL.
39.10–7 Other hazardous materials—TB/ALL.
39.10–9 Vessel vapor processing unit—TB/ALL.
39.10–11 Personnel—TB/ALL.
39.10–13 Submission of vapor control system designs—TB/ALL.

Subpart 39.20—Design and Equipment

39.20–1 Vapor collection system—TB/ALL.
39.20–3 Cargo gauging system—TB/ALL.
39.20–7 Tankship liquid overfill protection—TB/ALL.
39.20–9 Tank barge liquid overfill protection—B/ALL.
39.20–11 Vapor overpressure and vaccum protection—TB/ALL.
39.20–13 High and low vapor pressure protection for tankships—T/ALL.

Subpart 39.30—Operations

39.30–1 Operational requirements—TB/ALL.

Subpart 39.40—Lightering Operations With Vapor Balancing

39.40–1 General requirements for vapor balancing—TB/ALL.
39.40–3 Design and equipment for vapor balancing—TB/ALL.
39.40–5 Operational requirements for vapor balancing—TB/ALL.

Authority: 33 U.S.C. 1231; 46 U.S.C. 3306, 3703; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

Subpart 39.10—General

§ 39.10-1 Applicability—TB/ALL.

(a) This part applies to all U.S. flag tank vessels, and foreign flag tank vessels operating in the navigable waters of the United States, when collecting vapors of a flammable or combustible liquid emitted from a vessel's cargo tanks for recovery, destruction, or dispersion through a venting system not located on the vessel, or other vapor control process.

(b) This part does not apply to the collection of vapors of liquefied flammable gases as defined in § 30.10-39 of this subchapter.

§ 39.10-3 Definitions—TB/ALL.

As used in this part:

"Cargo deck area" means that part of the weather deck that is directly over the cargo tanks.

"Existing vapor collection system" means a vapor collection system approved by the Coast Guard prior to [insert effective date of these rules].

"Facility vapor connection" means the point in a facility's vapor collection system where it connects with a vessel's collection system.

"Independent" as applied to two systems means that one system will operate with a failure of any part of the other system except power sources and electrical feeder panels. The electrical wiring for several independent systems may be carried in a single conduit or tray (for special requirements applicable to intrinsically safe systems, see § 111.105-15 of this chapter).

"Inerted" means the oxygen content of the vapor space in a cargo tank is reduced to 8 percent by volume or less in accordance with the inert gas requirements of § 32.53 or § 153.500 of this chapter, or other inerting arrangements acceptable to the Commandant (G-MTH).

"Lightering" or *"lightering operation"* means the transfer of a flammable or combustible liquid from one vessel to another, except when that liquid is intended only for use as fuel or lubricant aboard the receiving vessel.

"Marine Safety Center" means Commanding Officer, U.S. Coast Guard Marine Safety Center, 400 Seventh Street, SW., Washington, DC 20590.

"Maximum allowable loading rate" means the maximum volumetric rate at which a vessel may receive cargo or ballast. The criteria for determining this rate is given in § 39.30-1(b) of this chapter.

"New vapor collection system" means a vapor collection system which is not an existing vapor collection system.

"Service vessel" means a vessel which receives a flammable or combustible cargo from another vessel in a lightering operation.

"Vapor balancing" means the transfer of vapors displaced from the tanks of the service vessel by incoming cargo into the tanks of the vessel to be lightered or the facility delivering cargo via a vapor collection system.

"Vapor collection system" means an arrangement of piping and hoses used to collect vapors emitted from a vessel's cargo tanks and to transport the vapors to a vapor processing unit.

"Vapor control system" means an arrangement of piping and equipment used to control vapor emissions collected from a vessel. It includes the vapor collection system and vapor processing unit.

"Vapor dispersion system" means a type of vapor control system which releases vapors to the atmosphere through a venting system not located on the vessel.

"Vapor processing unit" means the components of a vapor control system that processes, destroys, or disperses vapors collected from a vessel.

"Vessel to be lightered" means a vessel which transfers a flammable or combustible liquid to another vessel in a lightering operation.

"Vessel vapor connection" means the point in a vessel's vapor collection system where it connects with a facility's vapor collection system or, for lightering operations, to another vessel's vapor collection system.

§ 39.1.-5 Incorporation by reference—TB/ALL.

(a) Certain materials are incorporated by reference into this part with the approval of the Director of the **Federal Register** in accordance with 5 U.S.C. 552(a). To enforce any edition other than the one listed in paragraph (b) of this section, notice of change must be published in the **Federal Register** and the material made available to the public. All approved material is on file at the Office of the Federal Register, 100 L Street, NW., Washington, DC, and at the U.S. Coast Guard, Marine Technical and Hazardous Materials Division (G-MTH), 2100 Second Street, SW., Washington, DC, 20593-0001, and is available from the sources indicated in paragraph (b) of this section.

(b) The material approved for incorporation by reference in this part, and the sections affected are:

American Petroleum Institute (API), 2101 L Street, NW., Washington, DC 20037:	
API Standard 2000—Venting Atmospheric and Low-Pressure Storage Tanks (Nonrefrigerated and Refrigerated), January 1982	39.20-11
American Society of Mechanical Engineers, United Engineering Center, 345 E. 47 Street, New York, NY 10017:	
ANSI B16.5—Steel Pipe Flanges and Flanged Fittings, 1981	39.20-1
ANSI B16.24—Brass or Bronze Pipe Flanges, 1979	39.20-1
American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103:	
ASTM —Standard Specification for Spill Valves for Use in Marine Tank Liquid Overpressure Protection Applications	39.20-9
ASTM —Standard Specification for Detonation Flame Arresters	39.40-3

§ 39.10-7 Other hazardous material—TB/ALL.

A tank vessel which collects vapors of flammable or combustible cargoes listed in Table 151.01-10(b) or Table 1 of part 153 of this chapter, which are not hydrocarbon liquids, must meet the requirements of this part and any additional requirements that the Commandant (G-MTH) may prescribe.

§ 39.10-9 Vessel vapor processing unit—TB/ALL.

Each vessel which has a vapor processing unit located on board must submit plans, calculations, and specifications to the Marine Safety Center and meet the intent of 33 CFR 154, subpart E.

§ 39.10-11 Personnel—TB/ALL.

(a) The person in change of the transfer operation utilizing a vapor collection system must have completed a training program covering the particular system installed on the vessel. For persons who have not previously received training under this section, there must be at least 40 hours of training with a minimum of 8 hours of drills or demonstrations, using the installed vapor control system, covering normal operations and emergency procedures. For persons who have previously received training under this section or training for facility personnel under 33 CFR 154.840, there must be at least 24 hours of training with a minimum of 8 hours of drills or demonstration, using the installed vapor

collections system, covering normal operations and emergency procedures.

(b) The training course must cover the following subjects:

(1) Purpose of a vapor control system;

(2) Coast Guard regulations in this part;

(3) Principles of vapor control systems;

(4) Hazards of vapor control systems;

(5) Components of a vapor control system;

(6) Operating procedures:

(i) Testing and inspection requirements,

(ii) Pre-transfer procedures,

(iii) Connection sequence,

(iv) Start-up procedures, and

(v) Normal operations; and

(7) Emergency procedures.

§ 39.10-13 Submission of vapor control system designs—TB/ALL.

(a) Plans, calculations, and specifications for each new vapor collection system must be submitted in accordance with § 31.10-5(a) of this subchapter.

(b) Except as provided for in paragraph (c) of this section, existing vapor collection system installations must have plans, calculations, and specifications submitted in accordance with § 31.10-5(a) of this subchapter by April 6, 1990. In addition, modifications required to bring the installation into compliance must be completed within twelve (12) months after receipt of notification by the Coast Guard of modifications to be required, but not later than October 7, 1991.

(c) A tank vessel with an existing vapor collection system which will operate the system at a facility other than the facility for which it was originally approved to operate will be treated as a vessel with a new vapor collection system and must meet paragraph (a) of this section. The vapor collection system may not be operated at a facility other than the facility for which it was approved until approval to do so has been obtained.

(d) The owners/operators of a foreign flag vessel may submit certification by the classification society which classes the vessel that the vessel meets the requirements of this part as an alternative to meeting the requirements in paragraph (a) of this section.

(e) Upon satisfactorily completion of plan review and inspection of the vapor collection system or receipt of the certification provided for in paragraph (d) of this section, the Officer in Charge, Marine Inspection, shall endorse the Certificate of Inspection for U.S. flag vessels, or the Certificate of Compliance for foreign flag vessels, that the vessel is acceptable for collecting vapors of flammable or combustible liquids.

Subpart 39.20—Design and Equipment

§ 39.20-1 Vapor collection system—TB/ALL.

(a) Each vapor collection system must meet the following requirements:

(1) Piping must be permanently installed, except as allowed by the Commandant (G-MTH);

(2) A means must be provided to drain and collect condensate from each low point in the vapor collection system;

(3) Vapor collection piping must be electrically bonded to the hull and must be electrically continuous; and

(4) An inerted tankship must have a stop valve installed in the cargo deck area to isolate the inert gas supply from the vapor collection system.

(b) A vapor collection system must not interfere with the proper operation of any cargo tank pressure relief device.

(c) An isolation valve capable of manual operation must be provided at the vessel vapor connection. The valve must have an indicator to show clearly whether the valve is in the open or closed position.

(d) The last 1.5 meters (4.9 feet) of the vessel's vapor piping before the vessel vapor connection must be painted bright orange (international orange) and clearly marked with the words "VAPOR PIPING" in black letters 2½ inches high.

(e) Each vessel vapor connection flange, vapor hose flange, and vapor line adapter flange must meet the following:

(1) Each flange must have a 0.5 inch diameter lug, which is at least 1.0 inch long, permanently attached to the flange;

(2) Each flange must have a 0.625 inch diameter hole in the flange located directly opposite the lug;

(3) The lug and hole must be located midway between bolt holes in line with the bolt hole circle;

(4) The lug must be on the left hand side of the installed flange when looking at the open end of the flange; and

(5) On the vessel vapor connection, the lug and hole must line up horizontally.

(f) Each hose used for transferring vapors must:

(1) Have a design burst pressure of at least 100 psig;

(2) Have a maximum allowable working pressure of at least 25 psig;

(3) Be capable of withstanding at least 2.0 psi vacuum without collapsing or constricting;

(4) Have flanges that meet ANSI Standard B16.5 or B16.24;

(5) Be electrically continuous with a maximum resistance of one million ohms (1 Mohm);

(6) Where two or more hoses are connected in series, have a maximum resistance between points of bonding to the vessel of 1 Mohm.

(7) Have an exterior coating which is colored bright orange (international orange); and

(8) Be stenciled with the words "VAPOR HOSE" in black letters 2½ inches high.

§ 39.20-3 Cargo gauging system—TB/ALL

(a) Each cargo tank of a tank vessel which is connected to a vapor collection system must be equipped with a permanently installed cargo gauging system which:

(1) Allows determination of the liquid level in the tank without opening the tank to the atmosphere (closed gauging system);

(2) Allows the operator to determine the liquid level in the tank for the full range of liquid levels in the tank;

(3) Indicates the liquid level in the tank at the cargo tank and, if the cargo loading is controlled at some point other than at the cargo tank, at the point where the cargo loading is controlled; and

(4) For a tank barge, has the maximum liquid level permitted under § 39.30-1(c) of this part at even keel conditions conspicuously and permanently marked on the cargo gauging system at each tank.

(b) Except when a tank barge complies with § 39.20-9(a) of this part, each cargo tank of a barge must have a device giving a visual indication of the liquid level in the cargo tank within 1.5 meters (4.9 feet) of the tank top. The indication must be visible from all points in the cargo deck area.

§ 39.20-7 Tankship liquid overfill protection—T/ALL.

(a) Each cargo tank of a tankship must be equipped with a high level alarm and a tank overflow alarm.

(b) The high level alarm and tank overflow alarm must:

(1) Be independent of one-another;

(2) Alarm in the event of loss of power to the alarm sytem or failure of electrical circuitry to the tank level sensor;

(3) Be able to be checked at the tank for proper operation prior to each loading;

(4) Have audible and visible alarm indications that can be seen and heard where cargo tansfer is controlled and in the cargo deck area; and

(5) For components of alarms located within cargo tanks, use only non-conductive material or conductive material bonded to the tank structure.

(c) The high level alarm must:

(1) Alarm before the tank overflow alarm, but no higher than 97 percent of tank capacity; and

(2) Be identified with the legend "HIGH LEVEL ALARM" in lettering as specified for the warning sign in § 153.955 of this chapter.

(d) The tank overflow alarm must:

(1) Be independent of the cargo gauging system;

(2) At the maximum allowable loading rate, alarm early enough to allow the person in charge to;

(i) Stop the loading operation before the cargo tank overflows, and

(ii) Avoid surge pressures that exceed the cargo piping's maximum working pressure; and

(3) Be identified with the legend "TANK OVERFLOW ALARM" in lettering as specified for the warning sign in § 153.955 of this chapter.

(e) If spill valves are fitted, they must meet § 39.20–9(c) of this part.

(f) Rupture disk installations must meet § 39.20–9(d) of this part.

§ 39.20–9 Tank barge liquid overfill protection—B/ALL

Each cargo tank of a tank barge must have one of the following liquid overfill protection arrangements:

(a) A system meeting the requirements of § 39.20–7 of this part;

(b) An overflow control system which:

(1) Is independent of the cargo gauging system required by § 39.20–3(a) of this part,

(2) Actuates a system onshore, or on the vessel to be lightered if a lightering operation, which automatically stops the flow of cargo to the tank barge before the tank becomes 100 percent liquid full; and

(3) Is able to be checked at the tank for proper operation prior to each loading;

(c) A spill valve which meets the following requirements:

(1) Relieves at a pressure higher than the pressure reached in the tank which the pressure relief device operates at the maximum anticipated loading rate, assuming a vapor rate of 1.25 times the liquid loading rate;

(2) Limits the maximum pressure at the cargo tank top during liquid overfill at the maximum anticipated loading rate to not more than 3.0 psig for tankships or 2.0 psig for tank barges;

(3) Is in accordance with ASTM Specification _____; and

(4) If the vessel is in ocean or coastwise service, has provisions to prevent opening of the spill valve due to sloshing loads; or

(d) A rupture disk arrangement which meets paragraphs (c) (1), (2) and (4) of this section and is approved by the Commandant (G–MTH).

§ 39.20–11 Vapor overpressure and vacuum protection—TB/ALL

(a) Each cargo tank must be protected by a pressure relief device which meets the following:

(1) Is capable of discharging saturated cargo vapors at 1.25 times the maximum anticipated loading rate such that the pressure in the cargo tank vapor space does not exceed 3.0 psig for tankships or 2.0 psig for tank bages, or if a spill valve is fitted, the pressure at which the spill valve will relieve; and

(2) Must not relieve at a pressure in the cargo tank vapor space of less than 1.5 psig.

(b) Each cargo tank must be protected by a vacuum relief device which meets the following:

(1) Prevents a vacuum in the cargo tank vapor space, whether generated by withdrawal of cargo or vapor at maximum rates, that exceeds 1.0 psi vacuum; and

(2) Relieves at not less than 0.5 psi below atmospheric pressure (0.5 psi vacuum) in the cargo tank vapor space.

(c) Each pressure/vacuum relief device must:

(1) Be tested for venting capacity in accordance with paragraph 1.5.1.3 of API Standard 2000; and

(2) Have mechanical means to check that it is operating freely if installed after [insert effective date of these rules].

§ 39.20–13 High and low vapor pressure protection for tankships—T/ALL

Each tankship vapor collection system must be fitted with a pressure sensing device which:

(a) Has a pressure indicator located where the cargo loading is controlled; and

(b) Has a high pressure and low pressure alarm that:

(1) Is audible and visible where cargo transfer is controlled and in the cargo deck area;

(2) Alarms at a high pressure of not more than 50 percent of the lowest pressure relief device setting in the vapor collection system;

(3) Alarms at a low pressure of not less than four inches water gauge (0.144 psig) for inerted tankships, or 0.5 psi vacuum for non-inerted tankships;

(4) If cargo tanks connected to the vapor collection system are located only forward of the vessel vapor connection, senses the pressure in the vapor collection line at the forwardmost cargo tank connected to the vapor collection system;

(5) If cargo tanks connected to the vapor collection system are located only aft of the vessel vapor connection, senses the pressure in the vapor collection line at the aftermost cargo tank connected to the vapor collection system;

(6) If cargo tanks connected to the vapor collection system are located forward and aft of the vessel vapor connection, senses the pressure in the vapor collection line at the forwardmost and the aftermost cargo tanks connected to the vapor collection system; and

(7) If only one cargo tank is connected to the vapor collection system, senses the pressure in the vapor collection line at the cargo tank.

Subpart 39.30—Operations

§ 39.30–1 Operational requirements—TB/ALL

(a) Vapors from a tank vessel may not be transferred to:

(1) A facility which does not have its letter of adequacy endorsed as meeting the requirements of 33 CFR 154, subpart E; or

(2) In the case of lightering operations, a vessel which does not have its certificate of inspection endorsed as meeting the requirements of subpart 39.40 of this part.

(b) The rate of cargo transfer must not exceed the maximum allowable loading rate specified in the oil transfer procedures required by 33 CFR 155.720. This rate is the lesser of the following:

(1) The rate at which the pressure relief devices in the vapor collection system or on any tank connected to the system are capable of venting vapors to atmosphere at 1.25 times the loading rate such that no cargo tank pressure exceeds 3.0 psig for tankships or 2.0 psig for tank barges, or if a spill valve or rupture disk is fitted, the pressure at which the spill valve or rupture disk will relieve; or

(2) The rate based on calculation at which, for a given pressure at the vessel vapor connection, the pressure in any cargo tank connected to the vapor collection system is no more than 50 percent of any pressure relief device setting on any tank connected to the system, assuming a vapor flow rate of 1.25 times the loading rate.

Note: The maximum allowable loading rate will normally be given as a table or graph in the vessel's oil transfer procedures showing the maximum allowable loading rate versus the pressure at the vessel's vapor connection.

(c) Unless exempted by the Commandant (G–MTH), a cargo tank must not be filled higher than the lesser of:

(1) 97 percent of the cargo tank volume; or

(2) The level at which the high level alarm complying with § 39.20–7 of this part is set.

(d) A cargo tank must not be opened to the atmosphere during cargo loading operations except as provided in paragraph (e) of this section.

(e) A cargo tank may be opened to the atmosphere for gauging or sampling while the tank vessel is connected to a vapor control system if the following conditions are met:

(1) The tank is not being filled;

(2) Except if the tank is inerted, any pressure in the cargo tank vapor space is first reduced to atmospheric pressure by the vapor control system;

(3) The cargo is not required to be closed or restricted gauged by Table 151.05 or Table 1 in part 153 of this chapter; and

(4) All metallic equipment used in sampling or gauging is electrically bonded to the vessel before it is put into the tank, remains bonded to the vessel until it is removed from the tank, and a period of 30 minutes has elapsed since loading of the tank was completed.

(f) The initial loading rate to each cargo tank must not exceed one meter per second (3.28 feet per second) average linear velocity through the cargo fill line until the cargo level in the tank exceeds one meter (3.28 feet) in height.

(g) If the emitted vapors are collected by a facility which requires the vapors from the vessel to be inerted in accordance with 33 CFR 154.820(g), the master shall ensure by measurement before loading or ballasting begins that the oxygen content in the vapor space of each cargo tank connected to the vapor collection system does not exceed 8 percent by volume. The oxygen content of each tank must be measured at a point one meter (3.28 feet) below the tanktop and in the center of the ullage space. Where tanks have partial bulkheads, the oxygen content of each area of that tank formed by each partial bulkhead must be measured at a point one meter (3.28 feet) below the tanktop and in the center of the area.

(h) If the vessel is equipped with an inert gas system, the stop valve required by § 39.20–1(a)(4) of this part must remain closed during vapor control operations.

(i) Each high level alarm and tank overflow alarm on all cargo tanks being loaded must be tested at the tank for proper operation prior to each loading operation.

(j) The pressure indicator required by § 39.20–13(a) of this part must be continuously monitored during the loading operation.

(k) No more than 30 meters (98.4 feet) of vapor hose may be used unless provisions are made to reduce the maximum allowable loading rate to account for the resistance of the additional vapor hose.

(l) The inside diameter of all vapor hoses must not be less than the inside diameter of the vessel's vapor collection system piping.

Subpart 39.40—Lightering Operations with Vapor Balancing

§ 39.40–1 General requirements for vapor balancing—TB/ALL.

(a) Except as provided in paragraph (b) of this section, each vessel which engages in a lightering operation while collecting flammable or combustible vapors emitted from a cargo tank for retention on the vessel to be lightered must be fitted with vapor balancing equipment that meets the requirements of this subpart in addition to the requirements of subparts 39.10, 39.20, and 39.30 of this part.

(b) An arrangement to control vapor emissions during lightering operations which does not use vapor balancing must receive specific approval from the Commandant (G–MTH).

§ 39.40–3 Design and equipment for vapor balancing—TB/ALL.

(a) A detonation arrester must be installed in the vapor collection system which:

(1) Meets ASTM _____;

(2) Is capable of arresting a detonation from either side of the device; and

(3) Is installed not more than 1.0 meter (3.28 feet) from the vessel vapor connection on at least one of the vessels involved in the lightering.

(b) A vapor collection system must not use a device to assist the transfer or recovery of vapors (e.g. a compressor or blower) without specific approval by the Commandant (G–MTH).

(c) If a tank barge which is the service vessel has a means of liquid overfill protection in accordance with § 39.20–9(b) of this part, the vessel to be lightered must have a power supply and overflow control panel which meets the requirements of 33 CFR 154.812.

(d) If the service vessel or both vessels involved in a lightering operation are inerted tank vessels, the following requirements must be met:

(1) An oxygen sensor and an oxygen alarm must be provided which meets the following:

(i) Are located at the vessel vapor connection on the vessel to be lightered, unless the Commandant (G–MTH) has approved alternative arrangements with the oxygen sensor and oxygen alarm on the service vessel;

(ii) Produce an audible and visible signal when the oxygen content in the vapor collection system exceeds 8 percent by volume;

(iii) Have a connection for injecting a span gas of known concentration for testing and calibration of the oxygen sensor; and

(iv) Have an indicator located where the cargo transfer is controlled which indicates the oxygen content.

(2) The vessel to be lightered must have a means to inert the vapor transfer hose between vessels prior to admitting any vapors into its vapor collection system.

§ 39.40–5 Operational requirements for vapor balancing—TB/ALL.

(a) During lightering operations, each cargo tank being loaded must be connected by the vapor collection system to a cargo tank which is being discharged.

(b) During lightering operations, the pressure indicator required by § 39.40–3(c) of this part on the service vessel must be continuously monitored.

(c) During lightering operations, an electrical insulating flange must be provided at the vessel vapor connection on either the vessel to be lightered or the service vessel.

(d) If both vessels involved in a lightering operation are inerted tankships, the following requirements must be met.

(1) All tanks on the service vessel which are connected to the vapor collection system must be tested prior to cargo transfer to ensure that the oxygen content in the vapor space is not more than 8 percent by volume. The oxygen content of each tank must be measured at a point one meter (3.28 feet) below the tanktop and in the center of the ullage space. Where tanks have partial bulkheads, the oxygen content of each area of that tank formed by each partial bulkhead must be measured at a point one meter (3.28 feet) below the tanktop and in the center of the area;

(2) The oxygen sensor must be tested for proper operation prior to the start of each transfer operation. The oxygen content of vapors being transferred must be continuously monitored during the transfer operation. Transfer of cargo must be terminated if the oxygen

content exceeds 8 percent by volume and must not be restarted until the oxygen content is reduced to 8 percent by volume or less.

(3) The rate of cargo transfer must be controlled from the vessel to be lightered, and must not exceed the maximum allowable loading rate for either vessel.

(4) Tank washing on a vessel to be lightered shall not be conducted on any tank connected to the vapor collection system unless the isolation valve required by § 39.20–1 of this part is closed.

(5) Cargo tanks must not be ballasted during cargo transfer operations.

(e) If only the service vessel in a lightering operation is an inerted tankship:

(1) All requirements in paragraph (d) of this section must be met; and

(2) The service vessel isolation valve required by § 39.20–1(c) of this part must not be opened until the pressure in the vapor collection system on the service vessel exceeds the pressure in the vapor collection system on the vessel to be lightered.

(f) When neither vessel is an inerted tankship in a lightering operation, the rate of cargo transfer must be controlled from the vessel to be lightered, and must not exceed the maximum allowable loading rate for either vessel.

(g) Vapor balancing must not be utilized when only the vessel to be lightered is an inerted tankship.

Dated: July 21, 1989.

J.D. Sipes,

Chief, Office of Marine Safety, Security and Environmental Protection.

Note: The following Appendices will not appear in the Code of Federal Regulations.

Appendix A—Standard Specification for Detonation Flame Arresters

1. *Scope*

1.1 This standard provides the minimum requirements for design, construction, performance and testing of detonation flame arresters.

2. *Intent*

2.1 This standard is intended for detonation flame arresters protecting systems containing vapors of flammable or combustible liquids where vapor temperatures do not exceed 60 °C. For all tests, the test media defined in 14.1.1 can be used except where detonation flame arresters protect systems handling vapors with a maximum experimental safe gap (MESG) below 0.9 millimeters. Detonation flame arresters protecting such systems must be tested with appropriate media (the same vapor or a media having a MESG no greater than the vapor). Various gases and their respective MESG are listed in attachment 1 to Appendix A.

2.2 The tests in this standard are intended to qualify detonation flame arresters for all in-line applications independent of piping configuration provided the operating pressure is equal to or less than the maximum operating pressure limit specified in the manufacturer's certification and the diameter of the piping system in which the detonation arrester is to be installed is equal to or less than the piping diameter used in the testing.

Note: Detonation flame arresters meeting this standard as Type I devices, which are certified to be effective below 0 °C and which can sustain three stable detonations without being damaged or permanently deformed, also comply with the minimum requirements of the International Maritime Organization, Maritime Safety Committee Circular No. 373 (MSC/Circ. 373/Rev. 1).

3. *Applicable Documents*

3.1 ASTM Standards [1]: A395 Ferritic Ductile Iron Pressure-Retaining Castings For Use at Elevated Temperatures; F722 Welded Joints for Shipboard Piping Systems; F1155 Standard Practice for Selection and Application of Piping System Materials.

3.2 ANSI Standards [2]: B16.5 Pipe Flanges and Flanged Fittings.

3.3 Other Documents

3.3.1 ASME Boiler and Pressure Vessel Code [2]: Section VIII, Division 1, Pressure Vessels; Section IX, Welding and Brazing Qualifications.

3.3.2 International Maritime Organization, Maritime Safety Committee [3] MSC/Circ. 373/Rev. 1—Revised Standards for the Design, Testing and Locating of Devices to Prevent the Passage of Flame into Cargo Tanks in Tankers.

3.3.3 International Electrotechnical Commission [4] Publication 79–1—Electrical Apparatus for Explosive Gas Atmospheres.

4. *Terminology*

4.1 $\Delta P/P_o$—The dimensionless ratio, for any deflagration and detonation test of 14.3, of the maximum pressure increase (the maximum pressure minus the initial pressure), as measured in the piping system on the side of the arrester where ignition begins by the device described in paragraph 14.3.3, to the initial absolute pressure in the piping system. The initial pressure should be greater than or equal to the maximum operating pressure specified in paragraph 11.1.7.

4.2 Deflagration—A combustion wave that propagates subsonically (as measured at the pressure and temperature of the flame front) by the transfer of heat and active chemical species to the unburned gas ahead of the flame front.

4.3 Detonation—A reaction in a combustion wave propagating at sonic or supersonic (as measured at the pressure and temperature of the flame front) velocity. A detonation is stable when it has a velocity equal to the speed of sound in the burnt gas or may be unstable (overdriven) with a higher velocity and pressure.

4.4 Detonation flame arrester—A device which prevents the transmission of a detonation and a deflagration.

4.5 Flame speed—The speed at which a flame propagates along a pipe or other system.

4.6 Flame Passage—The transmission of a flame through a device.

4.7 Gasoline Vapors—A non-leaded petroleum distillate consisting essentially of aliphatic hydrocarbon compounds with a boiling range approximating 65 °C/75 °C.

5. Classification

5.1 The two types of detonation flame arresters covered in this specification are classified as follows:

5.1.1 Type I—Detonation flame arresters acceptable for applications where stationary flames may rest on the device.

5.1.2 Type II—Detonation flame arresters acceptable for applications where stationary flames are unlikely to rest on the device, and further methods are provided to prevent flame passage when a stationary flame occurs. One example of "further methods" is a temperature monitor and an automatic shutoff valve.

6. Ordering Information

6.1 Orders for detonation flame arresters under this specification shall include the following information as applicable:

6.1.1 Type (I or II).

6.1.2 Nominal pipe size.

6.1.3 Each gas or vapor in the system and the corresponding MESG.

6.1.4 Inspection and tests other than specified by this standard.

6.1.5 Anticipated ambient air temperature range.

6.1.6 Purchaser's inspection requirements (see section 10.1).

6.1.7 Description of installation.

6.1.8 Materials of construction (see section 7).

6.1.9 Maximum flow rate and the maximum design pressure drop for that maximum flow rate.

6.1.10 Maximum operating pressure.

7. Materials

7.1 The detonation flame arrester housing, and other parts or bolting used for pressure retention, shall be constructed of materials listed in ASTM F1155, or section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code. Cast and malleable iron shall not be used; however, ductile cast iron in accordance with ASTM A395 may be used.

7.1.1 Arresters, elements, gaskets, and seals must be made of materials resistant to attack by seawater and the liquids

[1] Available for the American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103.

[2] Available from the American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017

[3] Available from the International Maritime Organization, 4 Albert Embankment, London SE1 7SR, England.

[4] Available from the International Electrotechnical Commission, 1 rue de Varembe, Geneva, Switzerland.

and vapors contained in the system being protected [see section 6.1.3].

7.2 Nonmetallic materials, other than gaskets and seals, shall not be used in the construction of pressure retaining components of the detonation flame arrester.

7.2.1 Nonmetallic gaskets and seals shall be non-combustible and suitable for the service intended.

7.3 Bolting materials, other than that of section 7.1, shall be at least equal to those listed in Table 1 of ANSI B16.5.

7.4 The possibility of galvanic corrosion shall be considered in the selection of materials.

7.5 All other parts shall be constructed of materials suitable for the service intended.

8. Other Requirements

8.1 Detonation flame arrester housings shall be gas tight to prevent the escape of vapors.

8.2 Detonation flame arrester elements shall fit in the housing in a manner that will insure tightness of metal-to-metal contacts in such a way that flame cannot pass between the element and the housing.

8.2.1 The net free area through detonation flame arrester elements shall be at least 1.5 times the cross-sectional area of the arrester inlet.

8.3 Housings, elements, and seal gasket materials shall be capable of withstanding the maximum and minimum pressures and temperatures to which the device may be exposed under both normal and the specified fire test conditions in section 14, and shall be capable of withstanding the hydrostatic pressure test of section 9.2.3.

8.4 Threaded or flanged pipe connections shall comply with the applicable B16 standards in ASTM F1155. Welded joints shall comply with ASTM F722.

8.5 All flat joints of the housing shall be machined true and shall provide for a joint having adequate metal-to-metal contact.

8.6 Where welded construction is used for pressure retaining components, welded joint design details, welding and non-destructive testing shall be in accordance with section VIII, Division 1, of the ASME Code and ASTM F722. Welders and weld procedures shall be qualified in accordance with section IX of the ASME Code.

8.7 The design of detonation flame arresters shall allow for ease of inspection and removal of internal elements for replacement, cleaning or repair without removal of the entire device from the system.

8.8 Detonation flame arresters shall allow for efficient drainage of condensate without impairing their efficiency to prevent the passage of flame. The housing may be fitted with one or more drain plugs for this purpose.

8.9 All fastenings shall be protected against loosening.

8.10 Detonation flame arresters shall be designed and constructed to minimize the effect of fouling under normal operating conditions.

8.11 Detonation flame arresters shall be capable of operating over the full range of ambient air temperatures anticipated.

8.12 Detonation flame arresters shall be of first class workmanship and free from imperfections which may affect their intended purpose.

8.13 Detonation flame arresters shall be tested in accordance with section 9.

9. Tests

9.1 Tests shall be conducted by an independent laboratory capable of performing the tests. The manufacturer, in choosing a laboratory, accepts that it is a qualified independent laboratory by determining that it has (or has access to) the apparatus, facilities, personnel, and calibrated instruments that are necessary to test detonation flame arresters in accordance with this standard.

9.1.1 A test report shall be prepared by the laboratory which shall include:

9.1.1.1 Detailed drawings of the detonation flame arrester and its components (including a parts list identifying the materials of construction).

9.1.1.2 Types of tests conducted and results obtained. This shall include the maximum temperature reached and the length of testing time in section 14.2 in the case of Type II detonation flame arresters.

9.1.1.3 Description of approved attachments (reference 9.2.6).

9.1.1.4 Types of gases of vapors for which the detonation flame arrester is approved.

9.1.1.5 Drawings of the test rig.

9.1.1.6 Record of all markings found on the tested detonation flame arrester.

9.1.1.7 A report number.

9.2 One of each model Type I and Type II detonation flame arrester shall be tested. Where approval of more than one size of a detonation flame arrester model is desired, only the largest and smallest sizes need be tested provided it is demonstrated by calculation and/or other testing that intermediate size devices have equal or greater strength to withstand the force of a detonation and have equivalent detonation arresting characteristics. A change of design, material, or construction which may affect the corrosion resistance, or ability to resist endurance burning, deflagrations or detonations shall be considered a change of model for the purpose of this paragraph.

9.2.1 The detonation flame arrester shall have the same dimensions, configuration, and most unfavorable clearances expected in production units.

9.2.2 A corrosion test shall be conducted. In this test, a complete detonation flame arrester, including a section of pipe similar to that to which it will be fitted, shall be exposed to a 20% sodium chloride solution spray at a temperature of 25 °C for a period of 240 hours, and allowed to dry for 48 hours. Following this exposure, all movable parts shall operate properly and there shall be no corrosion deposits which cannot be washed off.

9.2.3 The detonation flame arrester shall be subjected to a hydrostatic pressure test of at least 350 psig for ten minutes without rupturing, leaking, or showing permanent distortion.

9.2.4 Flow characteristics as declared by the manufacturer, shall be demonstrated by appropriate tests.

9.2.5 Detonation flame arresters shall be tested for endurance burn and deflagration/detonation in accordance with the test procedures in section 14. Type I detonation flame arresters shall show no flame passage when subjected to both tests. Type II detonation flame arresters shall show no evidence of flame passage during the detonation/deflagration tests in section 14.3. Type II detonation flame arresters shall be tested for endurance burn in accordance with section 14.2. From the endurance burn test of a Type II detonation flame arresters, the maximum temperature reached and the test duration shall be recorded and provided as part of the laboratory test report.

9.2.6 Where a detonation flame arrester is provided with cowls, weather hoods and deflectors, etc., it shall be tested in each configuration in which it is provided.

9.2.7 Detonation flame arresters which are provided with a heating arrangement designed to maintain the surface temperature of the device above 85 °C shall pass the required tests at the maximum heated operating temperature.

9.2.8 Each finished detonation arrester shall be pneumatically tested at 10 psig to ensure there are no defects or leakage.

10. Inspection

10.1 The manufacturer shall afford the purchaser's inspector all reasonable facilities necessary to assure that the device is being furnished in accordance with this standard. All examinations and inspections shall be made at the place of manufacture, unless otherwise agreed upon.

10.2 Each finished detonation arrester shall be visually and dimensionally checked to ensure that the device corresponds to this standard, is certified in accordance with section 11 and is marked in accordance with section 12. Special attention shall be given to the checking of welds and the proper fit-ups of joints (see sections 8.5 and 8.6).

11. *Certification*

11.1 Manufacturer's certification that a detonation flame arrester meets this standard shall be provided in an instruction manual. The manual shall include as applicable:

11.1.1 Installation instructions and a description of all configurations tested (reference paragraph 9.2.6). Installation instructions to include the device's limitations.

11.1.2 Operating instructions.

11.1.3 Maintenance requirements.

11.1.3.1 Instructions on how to determine when arrester cleaning is required and the method of cleaning.

11.1.4 Copy of test report (see section 9.1.1).

11.1.5 Flow test data, maximum temperature and time tested (Type II).

11.1.6 The ambient air temperature range over which the device will effectively prevent the passage of flame.

Note: Other factors such as condensation and freezing of vapors should be evaluated at the time of equipment specification.

11.1.7 The maximum operating pressure for which the device is suitable.

12. *Marking*

12.1 Each detonation flame arrester shall be permanently marked indicating:

12.1.1 Manufacturer's name or trademark.

12.1.2 Style, type, model or other manufacturer's designation for the detonation flame arrester.

12.1.3 Size of the inlet and outlet.

12.1.4 Type of device (Type I or II).

12.1.5 Direction of flow through the detonation flame arrester.

12.1.6 Test laboratory and report number.

12.1.7 Lowest MESG of gases that the detonation flame arrester is suitable for.

12.1.8 ASTM designation of this standard.

12.1.9 Ambient air operating temperature range.

12.1.10 Maximum operating pressure.

13. *Quality Assurance*

13.1 Detonation flame arresters shall be designed, manufactured and tested in a manner that ensures they meet the characteristics of the unit tested in accordance with this standard.

13.2 The detonation flame arrester manufacturer shall maintain the quality of the arresters that are designed, tested and marked in accordance with this standard. At no time shall a detonation flame arrester be sold with this standard designation that does not meet the requirements herein.

14. *Test Procedures for Detonation Arresters*

14.1 *Media/Air Mixtures*

14.1.1 For vapors from flammable or combustible liquids with a MESG greater than or equal to 0.9 mm, technical grade hexane or gasoline vapors shall be used for all tests in this section except technical grade propane may be used for the deflagration/detonation tests in section 14.3 For vapors with a MESG less than 0.9 mm, the specific vapor (or alternatively, a media with a MESG less than or equal to the MESG of the vapor) must be used as the test medium in all section 14 tests.

14.1.2 Hexane, propane, gasoline and other test vapors shall be mixed with air to form the most easily ignitable mixture.[5]

14.2 *Endurance Burn Test Procedure*

14.2.1 An endurance burning test shall be carried out as follows:

14.2.1.1 The test rig shall consist of an apparatus producing an explosive mixture, a small tank with a diaphragm, a prototype of the detonation flame arrester and a firing source in close proximity to the test device (see Figure 1). The detonation flame arrester shall be installed so that the mixture emission is vertically upwards, or installed in the position for which it is designed and which will cause the most severe heating of the device under the prescribed endurance burn conditions. In this position the mixture shall be ignited.

14.2.1.2 Endurance burn test shall start by using the most easily ignitable test vapor/air mixture with the aid of a pilot flame or a spark igniter at the outlet. The flammable mixture may be reignited as necessary in the course of the endurance burn.

14.2.1.3 Temperature measurement will be performed on the surface of the arrester element half way between the center and its edge.

14.2.1.4 By varying the proportions of the flammable mixture and the flow rate, the detonation flame arrester shall be heated by a stable flame on the surface of the arrester until the highest obtainable temperature is reached on the ignited side or until the temperature on the side which was not ignited (protected side) rises 100 °C.

14.2.1.5 The flammable mixture proportions will then be varied again until the conditions which result in the highest temperature on the protected side are achieved. This temperature shall be maintained for a period of ten minutes, after which the flow shall be stopped and the conditions observed. The highest attainable temperature is considered to have been reached when any subsequent rise of temperature does not exceed 0.5 °C per minute over a ten minute period.

14.2.1.6 If difficulty arises in establishing the highest attainable temperature on the protected side, the following criteria shall apply. When the increase in temperature on the protected side occurs so slowly that its temperature does not rise 100 °C, the conditions which produced the highest temperature on the ignited side of the arrester will be maintained for two hours. For the condition in which the temperature on the protected side continues to rise at a rate in excess of 0.5 °C per minute for a 10 minute period, endurance burning shall be continued, using the most severe conditions of flammable mixtures and flow rate, for a period of two hours. In either of these cases, at the end of the two hour period, the flow shall be stopped and the conditions observed. The two hour interval shall be measured commencing with the setting of the conditions which produced the most severe conditions of mixture and flow rate. For Type I detonation flame arresters, flame passage shall not occur during this test. For Type II detonation flame arresters, the maximum temperature obtained, and the time elapsed from the time when the most severe conditions are set to when flame passage occurs, shall be recorded. However, for Type II detonation flame arresters the test may be terminated 15 minutes after setting the most severe conditions on the protected side.

14.3 *Deflagration/Detonation Test Procedure*

14.3.1 A detonation flame arrester shall be installed at one end of a pipe of the same diameter as the inlet of the detonation flame arrester (see Figure 2). The length and configuration of the test pipe shall develop a stable detonation[6] at the device and shall be capable, by change in its length or configuration, of developing deflagrations and unstable (overdriven) detonations as measured on the side of the pipe where ignition occurs (run-up side). For deflagration testing, two test piping arrangements shall be used on the outlet side of the detonation flame arrester (the side which is not ignited). In both of the following end arrangements, the outlet side pipe diameter shall be equal to that on the run-up side. In one arrangement, the outlet side pipe shall be at least 10 pipe diameters long with a plastic bag over the free end. (Alternate end of pipe closures are also acceptable provided they easily give way during the course of the test, and the closure allows the required gas concentration to be maintained throughout the test piping arrangement.) In the other arrangement the outlet side pipe shall be fitted with a restriction located 0.6 meter from the outlet side arrester flange. The size of the restriction for each nominal size detonation flame arrester shall be as follows:

Nominal pipe diameter	Restriction diameter
3"	½"
4"	½"
6"	1"
8"	1½"
10"	1½"
12"	2"
18"	2"
24"	2"

The entire pipe shall be filled with the most easily ignitable vapor/air mixture to a pressure corresponding to or greater than the upper limit of the device's maximum operating pressure (see 11.1.7). The concentration of the mixture should be verified by appropriate testing of the gas composition in the plastic bag. The vapor/air mixture shall then be ignited.

14.3.2 Flame speeds shall be measured by optical devices capable of providing accuracy of +/− 5%. These devices shall be situated no more than 11.75 inches apart with one device no more than 4 inches from the end of the test pipe to which the detonation flame arrester is attached. In addition, each outlet arrangement described in paragraph 14.3.1 shall be fitted with an optical device located no more than 6 inches from the detonation flame arrester outlet.[7]

[5] See IEC Publication 79-1.

[6] Some data are available for the estimation of flame speeds in horizontal pipes without detonation flame arresters. Some data indicate that the presence of small obstacles, fittings or bends in the test pipe can accelerate the flame speeds appreciably.

[7] Other pressure and/or flame speed measuring techniques may be used if effective.

14.3.3 Explosion pressures within the pipe shall be measured by a high frequency transducer situated in the test pipe no more than 4 inches from the run-up side of the housing of the detonation flame arrester.

14.3.4 Using the first end arrangement (10 pipe diameter outlet) described in paragraph 14.3.1, a series of tests shall be conducted to determine the test pipe length and configuration that results in the maximum unstable (overdriven) detonation having the maximum measured flame speed at the detonation flame arrester. (These tests may also be carried out using a single length of pipe with igniters spaced at varying distances from the arrester.) The flame speeds, explosion pressures and test pipe configurations shall be recorded for each of these tests. The piping configuration that resulted in the highest recorded unstable (overdriven) detonation flame speed shall be used, and the device shall be subjected to at least four additional unstable (overdriven) detonations. In the course of testing, the device shall also demonstrate its ability to withstand five stable detonations, five deflagrations (as determined by flame speed) where $\Delta P/P_o$ was less than 1 and five deflagrations (as determined by flame speed) where $\Delta P/P_o$ was greater than 1 but less than 10. Deflagration tests using the restricted outlet arrangement described in paragraph 14.3.1 shall then be conducted. In these tests the device shall demonstrate its ability to stop five deflagrations (as determined by flame speed) generated by the same configurations which resulted in $\Delta P/P_o$ being less than 1 during the deflagration tests which were conducted without the restricted end arrangements, and five deflagrations (as determined by flame speed) generated by the same configurations which resulted in $\Delta P/P_o$ being greater than 1 but less than 10 during the deflagration tests which were conducted without the restricted end arrangements. No evidence of flame passage shall occur during these tests. The flame speeds and explosion pressures for each of these tests shall be recorded.

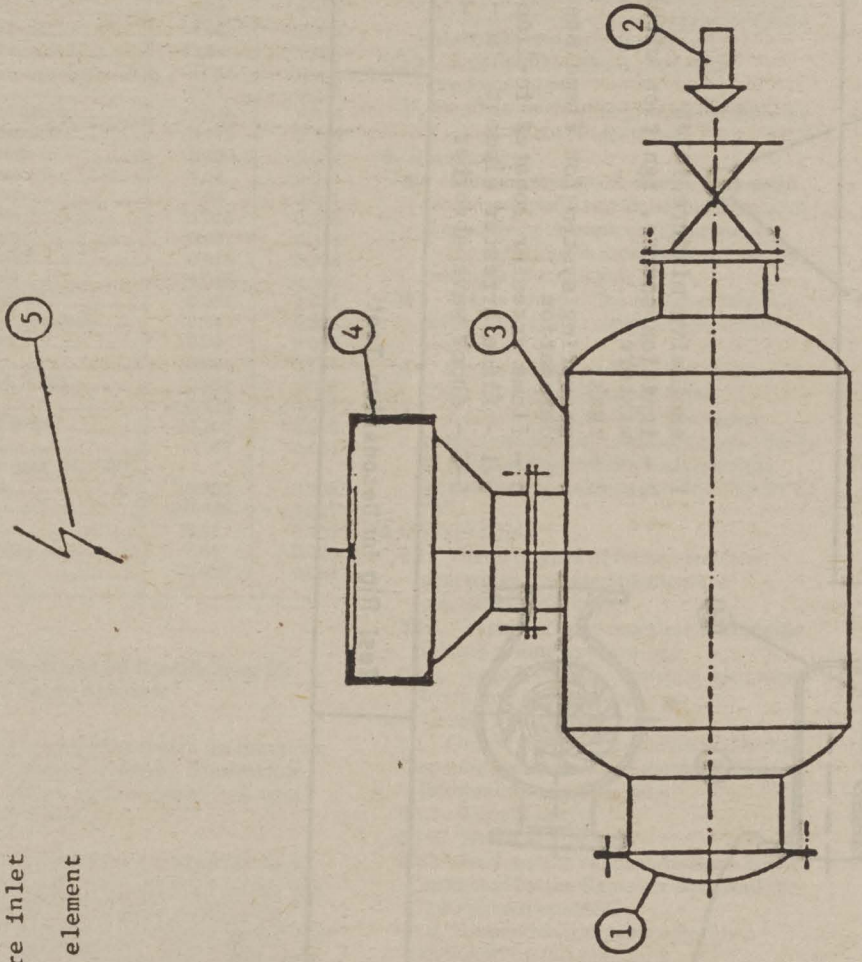
14.3.5 A device that successfully passes the tests of 14.3.4 shall be considered to be directional (suitable for arresting a detonation advancing only from the direction as tested) except:

14.3.5.1 A device may be tested according to 14.3.4 for detonations approaching from either direction, or

14.3.5.2 The design of the device is symmetrical where each end may be considered to be identical when approached by a detonation from either direction.

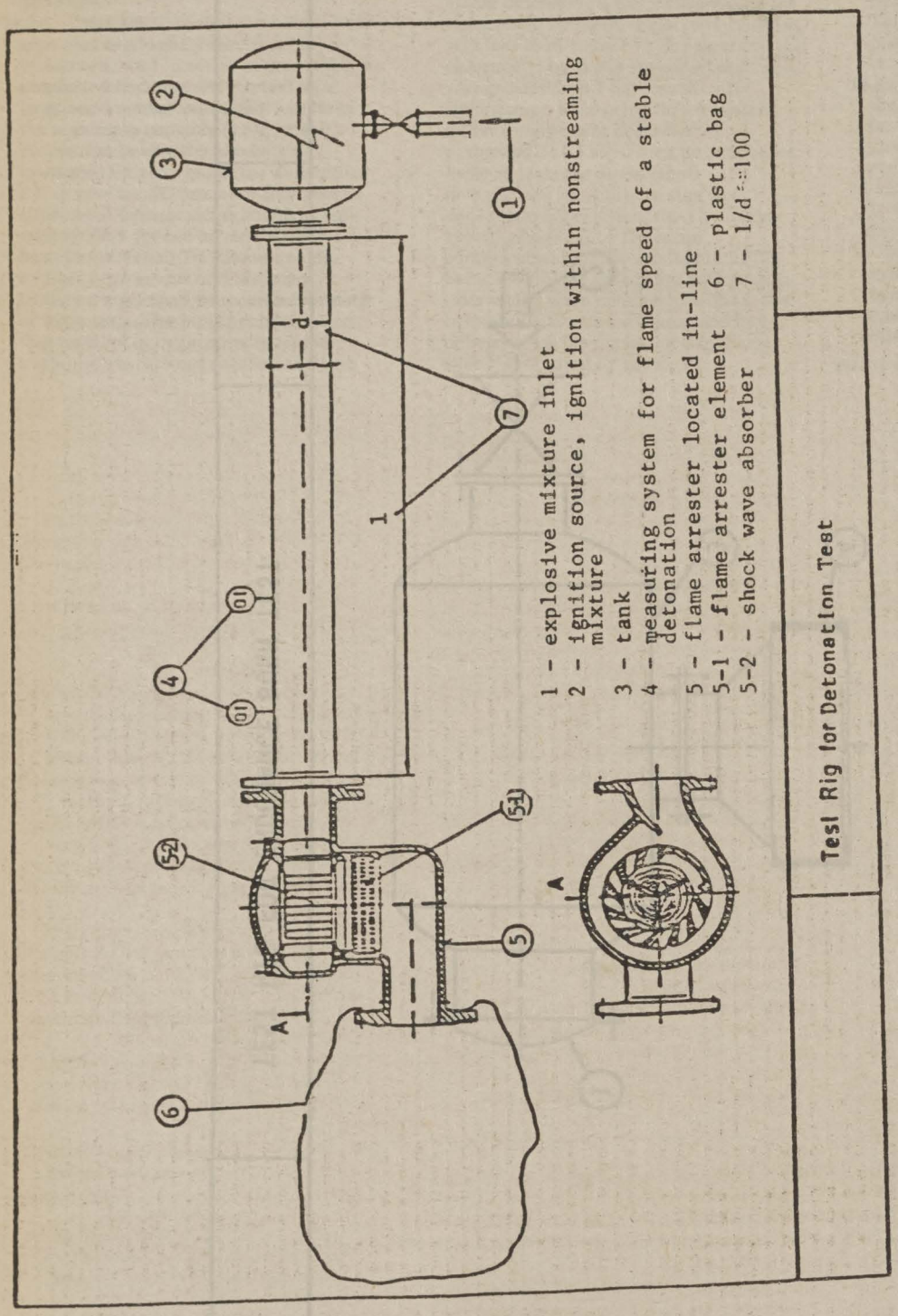
BILLING CODE 4910-14-M

FIGURE 1



TEST RIG FOR ENDURANCE BURN TEST

Figure 2



BILLING CODE 4910-14-C

Attachment 1 to Appendix A

Inflammable gas or vapour	Experimental maximum safe gap	
	mm	in.
Methane	1.170	0.046
Blast furnace gas	1.193	0.047
Propane	0.965	0.038
Butane	1.066	0.042
Pentane	1.016	0.040
Hexane	0.965	0.038
Heptane	0.965	0.038
Iso-octane	1.040	0.041
Decane	1.016	0.040
Benzene	0.99	0.039
Xylene	1.066	0.042
Cyclohexane	0.94	0.037
Acetone	1.016	0.040
Ethylene	0.71	0.028
Methyl-ethyl-ketone	1.016	0.040
Carbon monoxide	0.915	0.036
Methyl-acetate	0.990	0.039
Ethyl-acetate	1.04	0.041
Propyl-acetate	1.04	0.041
Butyl-acetate	1.016	0.040
Amyl-acetate	0.99	0.039
Methyl alcohol	0.915	0.036
Ethyl alcohol	1.016	0.040
Iso-butyl-alcohol	0.965	0.038
Butyl-alcohol (Normal)	0.94	0.037
Amyl-alcohol	0.99	0.039
Ethyl-ether	0.864	0.034
Coal gas (H_2 57%)	0.482	0.019
Acetylene	<0.025	<0.001
Carbon disulphide	0.203	0.008
Hydrogen	0.102	0.004
Blue water gas (H_2 53% CO 47%)	0.203	0.008
Ethyl nitrate	<0.025	<0.001
Ammonia	3.33	0.133
Ethylene oxide	[1] .65	[1] 0.026
Ethyl nitrite	0.922	0.038

[1] Approx.

Appendix B—Standard Specification for Tank Vent Flame Arresters

1. *Scope*

1.1 This standard provides the minimum requirements for design, construction, performance and testing of tank vent flame arresters.

2. *Intent*

2.1 This standard is intended for flame arresters protecting systems containing vapors of flammable or combustible liquids where vapor temperatures do not exceed 60°C. The text media defined in 14.1.1 can be used except where arresters protect systems handling vapors with a maximum experimental safe gap (MESG) below 0.9 millimeters. Flame arresters protecting such systems must be tested with appropriate media (the same vapor or a media having a MESG no greater than the vapor). Various gases and their respective MESG are listed in Attachment 1 to Appendix B.

Note: Flame arresters meeting this standard also comply with the minimum requirements of the International Maritime Organization. Maritime Safety Committee Circular No. 373 (MSC/Circ. 373/Rev.1).

3. *Applicable Documents*

3.1 ASTM Standards [1]

F722 Welded Joints for Shipboard Piping Systems

F1155 Standard Practice for Selection and Application of Piping System Materials

3.2 ANSI Standards [2]

B16.5 Pipe Flanges and Flanged Fittings.

3.3 Other Documents

3.3.1 ASME Boiler and Pressure Vessel Code [2]

Section VIII, Division 1, Pressure Vessels

Section IX, Welding and Brazing Qualifications.

3.3.2 International Maritime Organization, Maritime Safety Committee [3]

MSC/Circ. 373/Rev. 1—Revised Standards for the Design, Testing and Locating of Devices to Prevent the Passage of Flame into Cargo Tanks in Tankers.

3.3.3 International Electrotechnical Commission [4]

Publication 79-1—Electrical Apparatus for Explosive Gas Atmospheres.

4. *Terminology*

4.1 Flame arrester—A device to prevent the passage of flame in accordance with a specified performance standard. Its flame arresting element is based on the principle of quenching.

4.2 Flame speed—The speed at which a flame propagates along a pipe or other system.

4.3 Flame passage—The transmission of a flame through a flame arrester.

4.4 Gasoline Vapors—A non-leaded petroleum distillate consisting essentially of aliphatic hydrocarbon compounds with a boiling range approximately 65°C/75°C.

5. *Classification*

5.1 The two types of flame arresters covered in this specification are classified as follows:

5.1.1 Type I—Flame arresters acceptable for end-of-line applications

5.1.2 Type II—Flame arresters acceptable for in-line applications.

6. *Ordering Information*

6.1 Orders for flame arresters under this specification shall include the following information as applicable:

6.1.1 Type (I or II).

6.1.2 Nominal pipe size.

6.1.3 Each gas or vapor in the tank being protected by the flame arrester, and the corresponding MESG.

6.1.4 Inspection and tests other than specified by this standard.

6.1.5 Anticipated ambient air temperature range.

6.1.6 Purchaser's inspection requirements (see section 10.1).

6.1.7 Description of installation (distance and configuration of pipe between the arrester, and the atmosphere or potential ignition source) (see section 9.2.4.2).

6.1.8 Materials of construction (see section 7).

6.1.9 Maximum flow rate and the design pressure drop for that maximum flow rate.

7. *Materials*

7.1 The flame arrester housing, and other parts or bolting used for pressure retention, shall be constructed of materials listed in ASTM F1155, or section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code.

7.1.1 Arresters, elements, gaskets, and seals must be of materials resistant to attack by seawater and the liquids and vapors contained in the tank being protected (see section 6.1.3).

7.2 Nonmetallic materials, other than gaskets and seals, shall not be used in the construction of pressure retaining components of the flame arrester.

7.2.1 Nonmetallic gaskets and seals shall be non-combustible and suitable for the service intended.

7.3 Bolting materials, other than that of section 7.1, shall be at least equal to those listed in Table 1 of ANSI B16.5.

7.4 The possibility of galvanic corrosion shall be considered in the selection of materials.

7.5 All other parts shall be constructed of materials suitable for the service intended.

8. *Other Requirements*

8.1 Flame arrester housings shall be gas tight to prevent the escape of vapors.

8.2 Flame arrester elements shall fit in the housing in a manner that will insure tightness of metal-to-metal contacts in such a way that flame cannot pass between the elements and the housing.

8.2.1 The net free area through flame arrester elements shall be at least 1.5 times the cross-sectional area of the arrester inlet.

8.3 Housings and elements shall be of substantial construction and designed for the mechanical and other loads intended during service. In addition, they shall be capable of withstanding the maximum and minimum pressures and temperatures to which the device may be exposed under both normal and the specified fire test conditions in section 14.

8.4 Threaded or flanged pipe connections shall comply with the applicable B16 standards in ASTM F1155. Welded joints shall comply with ASTM F722.

8.5 All flat joints of the housing shall be machined true and shall provide for a joint having adequate metal-to-metal contact.

8.6 Where welded construction is used for pressure retaining components, welded joint design details, welding and non-destructive testing shall be in accordance with section VIII, Division 1, of the ASME Code and ASTM F722. Welders and weld procedures shall be qualified in accordance with section IX of the ASME Code.

[1] Available from the American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103

[2] Available from the American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.

[3] Available from the International Maritime Organization, 4 Albert Embankment, London SE1 7SR, England.

[4] Available from the International Electrotechnical Commission, 1 rue de Varembe, Geneva, Switzerland

8.7 The design of flame arresters shall allow for ease of inspection and removal of internal elements for replacement, cleaning or repair without removal of the entire device from the system.

8.8 Flame arresters shall allow for efficient drainage of condensate without impairing their efficiency to prevent the passage of flame.

8.8.1 Where the design does not permit complete drainage of condensate through its connection to the tank, the housing shall be fitted with a plugged drain opening on the side of the atmospheric outlet of not less than ½ inch nominal pipe size (NPS ½).

8.9 All fastenings shall be protected against loosening.

8.10 Flame arresters shall be designed and constructed to minimize the effect of fouling under normal operating conditions.

8.11 Flame arresters shall be capable of operating over the full range of ambient air temperatures anticipated.

8.12 End-of-line flame arresters shall be so constructed as to direct the efflux vertifically upward.

8.13 Flame arresters shall be of first class workmanship and free from imperfections which may affect their intended purpose.

8.14 Tank vent flame arresters shall show no flame passage when subjected to the tests in 9.2.4.

9. *Prototype Tests*

9.1 Tests shall be conducted by an independent laboratory capable of performing the tests. The manufacturer, in choosing a laboratory accepts that it is a qualified independent laboratory by determining that it has (or has access to) the apparatus, facilities, personnel, and calibrated instruments that are necessary to test flame arresters in accordance with this standard.

9.1.1 A test report shall be prepared by the laboratory which shall include:

9.1.1.1 Detailed drawings of the flame arrester and its components (including a parts list identifying the materials of construction).

9.1.1.2 Types of tests conducted and results obtained.

9.1.1.3 Specific advice on approved attachments (see section 9.2.4.1).

9.1.1.4 Types of gases or vapors for which the flame arrester is approved (see section 6.1.3).

9.1.1.5 Drawings of the test rig.

9.1.1.6 Record of all markings found on the tested flame arrester.

9.1.1.7 A report number.

9.2 One of each model Type I and Type II flame arrester shall be tested. Where approval of more than one size of a flame arrester model is desired, the largest and smallest sizes shall be tested. A change of design, material, or construction which may affect the corrosion resistance, endurance burn, or flashback capabilities of the flame arrester shall be considered a change of model for the purpose of this paragraph.

9.2.1 The flame arrester shall have the same dimensions, configuration, and the most unfavorable clearances expected in production units.

9.2.2 A corrosion test shall be conducted. In this test, a complete arrester, including a section of pipe similar to that to which it will be fitted, shall be exposed to a 20% sodium chloride solution spray at a temperature of 25 degrees C for a period of 240 hours, and allowed to dry for 48 hours. Following this exposure, all movable parts shall operate properly and there shall be no corrosion deposits which cannot be washed off.

9.2.3 Performance characteristics as declared by the manufacturer, such as flow rates under both positive and negative pressure, operating sensitivity, flow resistance, and velocity, shall be demonstrated by appropriate tests.

9.2.4 Tank vent flame arresters shall be tested for endurance burn and flashback in accordance with the test procedures in section 14. The following constraints apply:

9.2.4.1 Where a Type I flame arrester is provided with cowls, weather hoods and deflectors, etc., it shall be tested in each configuration in which it is provided.

9.2.4.2 Type II arresters shall be specifically tested with the inclusion of all pipes, tees, bends, cowls, weather hoods, etc., which may be fitted between the arrester and the atmosphere.

9.2.5 Devices which are provided with a heating arrangement shall pass the required tests at the heated temperature.

9.2.6 After all tests are completed, the device shall be disassembled and examined, and no part of the device shall be damaged or show permanent deformation.

10. *Inspection*

10.1 The manufacturer shall afford the purchaser's inspector all reasonable facilities necessary to assure that the material is being furnished in accordance with this standard. All examinations and inspections shall be made at the place of manufacture, unless otherwise agreed upon.

10.2 Each finished flame arrester shall be visually and dimensionally checked to ensure that the device corresponds to this standard, is certified in accordance with section 11 and is marked in accordance with section 12. Special attention shall be given to checking the proper fit-up of joints (see sections 8.5 and 8.6)

11. *Certification*

11.1 Manufacturer's certification that a flame arrester has been constructed in accordance with this standard shall be provided in an instruction manual. The manual shall include as applicable:

11.1.1 Installation instructions and a description of all configurations tested (reference paragraph 9.2.4.1 and 9.2.4.2). Installation instructions to include manufacturer's recommended limitations based on all configurations tested.

11.1.2 Operating instructions.

11.1.3 Maintenance requirements.

11.1.3.1 Instructions on how to determine when flame arrester cleaning is required and the method of cleaning.

11.1.4 Copy of test report (see section 9.1.1).

11.1.5 Flow test data, including flow rates under both positive and negative pressures, operating sensitivity, flow resistance, and velocity.

11.1.6 The ambient air temperature range over which the device will effectively prevent the passage of flame.

Note: Other factors such as condensation and freezing of vapors should be evaluated at the time of equipment specification.

12. *Marking*

12.1 Each flame arrester shall be permanently marked indicating:

12.1.1 Manufacturer's name or trademark.

12.1.2 Style, type, model or other manufacturer's designation for the flame arrester.

12.1.3 Size of the inlet and outlet.

12.1.4 Type of device (Type I or II).

12.1.5 Direction of flow through the flame arrester.

12.1.6 Test laboratory and report number.

12.1.7 Lowest MESG of gases for which the flame arrester is suitable for.

12.1.8 Ambient air operating temperature range.

12.1.9 ASTM designation of this standard.

13. *Quality Assurance*

13.1 Flame arresters shall be designed, manufactured and tested in a manner that ensures they meet the characteristics of the unit tested in accordance with this standard.

13.2 The flame arrester manufacturer shall maintain the quality of the flame arresters that are designed, tested and marked in accordance with this standard. At no time shall a flame arrester be sold with this standard designation that does not meet the requirements herein.

14. *Test Procedures for Flame Arresters*

14.1 *Media/Air Mixtures*

14.1.1 For vapors from flammable or combustible liquids with a MESG greater than or equal to 0.9 mm, technical grade hexane or gasoline vapors shall be used for all tests in this section except technical grade propane may be used for the flashback test in section 14.2. For vapors with a MESG less than 0.9 mm, the specific vapor (or alternatively, a media with a MESG less than or equal to the MESG of the vapor) must be used as the test medium in all section 14 tests.

14.1.2 Hexane, propane, gasoline and chemical vapors shall be mixed with air to form the most easily ignitable mixture.[5]

14.2 *Flashback Test*

14.2.1 A flashback test shall be carried out as follows:

14.2.1.1 The test rig shall consist of an apparatus producing an explosive mixture, a small tank with a diaphragm, a prototype of the flame arrester, a

[5] See IEC Publication 79-1

plastic bag [6] and a firing source in three positions (see Figure 1).[7]

14.2.1.2 The tank, flame arrester assembly and the plastic bag enveloping the prototype flame arrester shall be filled so that this volume contains the most easily ignitable vapor/air mixture.[8] The concentration of the mixture should be verified by appropriate testing of the gas composition in the plastic bag. Three ignition sources shall be installed along the axis of the bag, one close to the flame arrester, another as far away as possible therefrom, and the third at the midpoint between these two. These three sources shall be fired in succession, one during each of the three tests. Flame passage shall not occur during this test.

14.2.1.3 If flame passage occurs, the tank diaphragm will burst and this will be audible and visible to the operator by the emission of a flame. Flame, heat and pressure sensors may be used as an alternative to a bursting diaphragm.

14.3 *Endurance Burn Test*

14.3.1 An endurance burning test shall be carried out as follows:

14.3.1.1 The test rig as referred to in 14.2 may be used, without the plastic bag. The flame arrester shall be so installed that the mixture emission is vertical. In this position the mixture shall be ignited.

14.3.1.2 Endurance burning shall be achieved by using the most easily ignitable test vapor/air mixture with the aid of a pilot flame or a spark igniter at the outlet. By varying the proportions of the flammable mixture and the flow rate, the arrester shall be heated until the highest obtainable temperature on the cargo tank side of the arrester is reached. The highest attainable temperature may be considered to have been reached when the rate of rise of temperature does not exceed 0.5 °C per minute over a ten minute period. This temperature shall be maintained for a period of ten minutes, after which the flow shall be stopped and the conditions observed. If difficulty arises in establishing the highest attainable temperature, the following criteria shall apply. When the temperature appears to be approaching the maximum temperature, using the most severe conditions of flammable mixtures and flow rate, but increases at a rate in excess of 0.5 °C per minute over a ten minute period, endurance burning shall be continued for a period of two hours after which the flow shall be stopped and the conditions observed. Flame passage shall not occur during this test.

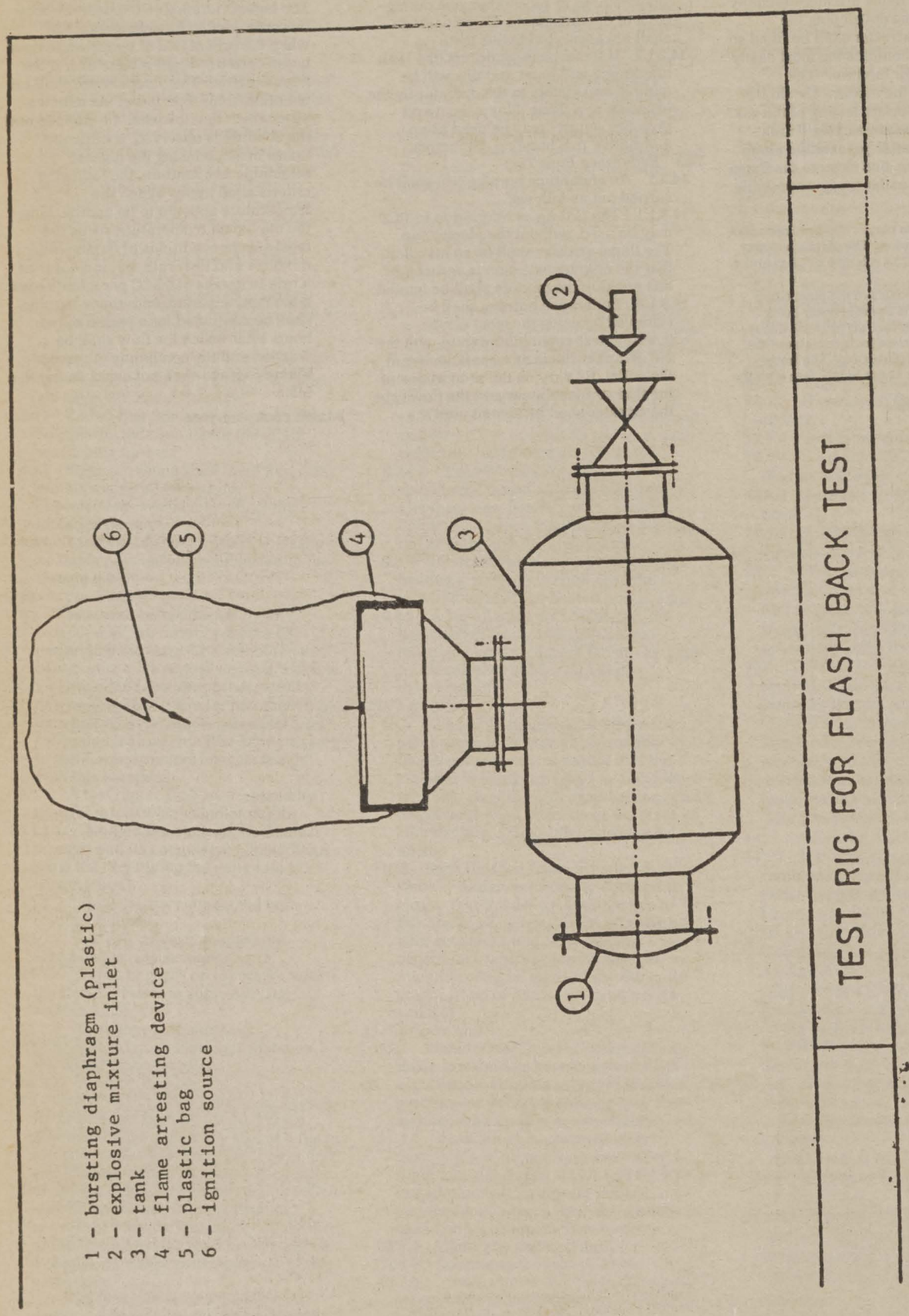
BILLING CODE 4910-14-M

[6] The dimensions of the plastic bag are dependent on those of the flame arrester. The plastic bag may have a circumference of 2 m, a length of 2.5 m and a wall thickness of .05 m.

[7] In order to avoid remnants of the plastic bag from falling back on to the flame arrester being tested after ignition of the fuel/air mixture, it may be useful to mount a coarse wire frame across the flame arrester within the plastic bag. The frame should be constructed so as not to interfere with the test result.

[8] See IEC Publication 79-1

FIGURE 1



BILLING CODE 4910-14-C

Attachment 1 to Appendix B

Inflammable gas or vapour	Experimental maximum safe gap	
	mm	in.
Methane	1.170	0.046
Blast furnace gas	1.193	0.047
Propane	0.965	0.038
Butane	1.066	0.042
Pentane	1.016	0.040
Hexane	0.965	0.038
heptane	0.965	0.038
Iso-octane	1.040	0.041
Decane	1.016	0.040
Benzene	0.99	0.039
Xylene	1.066	0.042
Cyclohexane	0.94	0.037
Acetone	1.016	0.040
Ethylene	0.71	0.028
Methyl-ethyl-ketone	1.016	0.040
Carbon monoxide	0.915	0.036
Methyl-acetate	0.990	0.039
Ethyl-acetate	1.04	0.041
Propyl-acetate	1.04	0.041
Butyl-acetate	1.016	0.040
Amyl-acetate	0.99	0.039
Methyl alcohol	0.915	0.036
Ethyl alcohol	1.016	0.040
Iso-butyl-alcohol	0.965	0.038
Butyl-alcohol (Normal)	0.94	0.037
Amyl-alcohol	0.99	0.039
Ethyl-ether	0.864	0.034
Coal gas (H_2 57%)	0.482	0.019
Acetylene	<0.025	<0.001
Carbon disulphide	0.203	0.008
Hydrogen	0.102	0.004
Blue water gas (H_2 53% CO 47%)	0.203	0.008
Ethyl nitrate	<0.025	<0.001
Ammonia	3.33	0.133
Ethylene oxide	[1].65	[1]0.026
Ethyl nitrite	0.922	0.038

[1] Approx.

Appendix C—Standard Specification for Spill Valves for Use in Marine Tank Liquid Overpressure Protection Applications

1. *Scope*

1.1 This standard provides the minimum requirements for design, construction, performance and testing of devices to prevent marine tank liquid overpressurization (hereafter called spill valves).

1.2 The spill valves provided to this standard will satisfy Regulation 1I–2/59.1.6 of the 1981 and 1983 Amendments to the International Convention for the Safety of Life at Sea, 1974 (SOLAS) which states: "Provision shall be made to guard against liquid rising in the venting system to a height which would exceed the design head of the cargo tank. This shall be accomplished by high level alarms or overflow control systems or other equivalent means, together with gauging devices and cargo tank filling procedures."

1.3 The spill valves are not intended for the venting of vapors or the relief of vapor overpressurization or underpressurization of marine tanks.

2 *Applicable Documents*

2.1 ANSI Standards (1)

B2.1 Pipe Threads

B16.1 Cast Iron Pipe Flanges and Flanged Fittings.

B16.3 Malleable Iron Threaded Fittings.

B16.4 Cast Iron Threaded Fittings.

B16.5 Steel Pipe Flanges and Flanged Fittings.

B16.11 Forged Steel Fittings, Socket-Welding & Threaded.

B16.15 Cast Bronze Threaded Fittings.

B16.24 Bronze Pipe Flanges and Flanged Fittings.

B31.1 Power Piping.

B117 Standard Method of Salt Spray (Fog) Testing.

2.2 Other Documents

ASME Boiler and Pressure Vessel Code [1]

Section VIII, Division 1, Pressure Vessels.

Section IX, Welding and Brazing Qualifications.

3. *Terminology*

3.1 Spill Valve—An independent device that automatically prevents liquid overpressurization of a tank by relieving liquid at a predetermined pressure set higher than the pressure reached in the tank when the tank vapor relieving device operates at its maximum design venting rate (based on a volumetric vapor volume 1.25 times the maximum design loading rate).

4. *Ordering Information*

4.1 Orders for spill valves under this specification shall include the following information as applicable:

4.1.1 Nominal pipe size and end connections.

4.1.2 Product(s) in tank being protected by the spill valve.

4.1.3 Inspection and tests other than specified by this standard.

4.1.4 Required relieving pressure at maximum tank loading flow rate.

4.1.5 Set (opening) pressure.

4.1.6 Maximum tank design loading flow rate.

4.1.7 Inlet pressure drop resulting from the maximum tank design loading flow rate.

4.1.8 Back pressure of the spill valve discharge lines resulting from maximum tank design loading flow rate.

4.1.9 Purchaser's inspection requirements (see section 9.1).

4.1.10 Installation inclinations in excess of 2½ degrees (see section 6.6).

4.1.11 Purchaser's specifications for preventing the valve from leaking due to cargo sloshing.

4.1.12 Additional requirements or testing as contracted by the manufacturer and purchasers.

5. *Materials*

5.1 All parts shall be constructed of materials suitable for the service intended. Table I of 46 CFR 153 specifies materials that may not be used in components that contact liquid or vapor of each hazardous liquid cargo.

5.2 Housing of spill valves, and all other parts and/or bolting used for pressure retention, shall be constructed of materials having a solidus melting point of greater that 1700 °F and be listed in ANSI–B31.1, Power Piping, or Section VIII Division 1 of the ASME Boiler and Pressure Vessel Code, except as noted in section 5.5.

5.3 Materials in contact with the liquid or the liquid's vapor shall be suitable for the service and resistant to attack by the liquid carried in the tank being protected (see section 4.1.2).

5.4 Corrosion resistant materials shall be used for the following:

5.4.1 Housings, discs, spindles and seats of valves.

5.4.2 Springs that actuate discs of valves. Springs plated with corrosion resistant material are not acceptable.

5.5 Nonmetallic materials shall not be permitted except for gaskets, seals, bushings in way of moving parts, and valve diaphragms.

5.6 Bolting materials shall be at least equal to those listed in Table 1 of ANSI B16.5. Bolts, screws, and fasteners in contact with interior liquid shall be compatible with the liquid (see section 4.1.2).

6. *Other Requirements*

6.1 Pressure retaining housings shall be designed to withstand a hydrostatic pressure of at least 125 pounds per square inch without rupturing or showing permanent distortion.

6.2 Housing shall have suitable pipe connections for the removal, maintenance, and testing of the spill valve.

6.2.1 Pipe and connections shall be in accordance with one of the standards listed in paragraph 2.1 or as agreed by the manufacturer and user (see 4.1.12).

6.3 The design of spill valves shall allow for ease of inspection and removal of internal elements for replacement, cleaning or repair without removal of the spill valve.

6.4 All flat joints of the housing shall be machined true and shall provide for a joint having adequate metal-to-metal contact.

6.5 Where welded construction is used, welded joint design details, welding and non-destructive testing shall be in accordance with Section VIII, Division 1, of the ASME Code. Welders and weld procedures shall be qualified in accordance with section IX of the ASME Code.

6.6 The spill valve shall be fully operable at static inclinations up to 2½ degrees unless otherwise specified by the ordering information of section 4.

6.7 Spill valves shall allow for efficient drainage of moisture without impairing their proper operation.

6.7.1 Where the design does not permit complete drainage of condensate through its connection to the tank, the housing shall be fitted with a plugged drain opening on the side of the atmospheric outlet of not less than nominal pipe size ½ (12mm).

6.8 Housing, elements, and seal gasket materials shall be capable of withstanding the highest pressure and

[1] Available from the American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.

temperature to which the spill valve may be exposed under normal conditons.

6.9 Spill valves shall be vapor tight at pressures below the rated liquid relieving pressure.

6.10 Fastenings essential to the operation of the spill valve shall be protected against loosening.

6.11 Spill valves shall be designed and constructed to minimize the effect of fouling under normal conditions.

6.12 The spill valve shall not be provided with a means of positive closure. In installations where cargo sloshing is expected, the spill valve installation must be designed to preclude premature opening of the valve due to cargo sloshing. Also, spill valves shall be designed so that they comply with applicable Loadline and Subdivision requirements.

6.13 Spill valves shall be capable of operating in freezing conditions.

6.14 Each of the free areas through the valve seat and through the valve discharge at maximum lift shall not be less than the cross-sectional area of the valve inlet connection.

6.15 Means shall be provided to check that any valve opens freely and does not remain in the open position.

6.16 Valves discs.

6.16.1 Valve discs shall be guided by a ribbed cage or other suitable means to prevent binding and insure proper seating. Where valve stems are guided by bushings suitably designed to prevent binding and to insure proper seating, the valves need not be fitted with ribbed cages.

6.16.2 Valve discs shall close tight against the valve seat by metal to metal contact; however, resilient seating seals may be provided if the design is such that the disc closes tight against the seat in case the seals are destroyed or in case they carry away.

6.16.3 Valve discs may be solid or hollow. The pressure at which the valve discs open fully at maximum flow rating shall not exceed 120 percent of the set (opening) pressure.

6.17 Valves may be actuated by nonmetallic diaphragms.

6.17.1 Nonmetallic diaphragms are not allowed where failure results in unrestricted flow of flammable or toxic tank vapors to the atmosphere or in an increase in the pressure at which the valve normally releases.

6.18 Relief pressure adjusting mechanisms shall be permanently secured by lockwire, locknuts or other suitable means.

6.18.1 Hollow portions of the valve used to vary the relieving pressure by adding or removing weight shall be watertight.

6.1.19 Spill valves shall not permit entrance of water when exposed to boarding seas.

7. *Tests*

7.1 *Prototype Tests*

7.1.1 A prototype of the largest and smallest spill valve of each design, based on valve inlet connection size, shall be tested as specified below in 7.1.5 through 7.1.10.

7.1.2 The spill valve shall have the dimensions of and most unfavorable clearances expected in production units.

7.1.3 Tests shall be conducted by a laboratory capable or performing the tests.

7.1.4 A test report shall be prepared by the laboratory which shall include:

7.1.4.1 Detailed drawings of the spill valve.

7.1.4.2 Types of tests conducted and results obtained.

7.1.4.3 Specific advice on approved attachments.

7.1.4.4 Types of liquid for which the spill valve is approved.

7.1.4.5 Drawings of the test rig.

7.1.4.6 The pressures at which the spill valve opens and closes and the efflux flow rate at various inlet pressures.

7.1.4.7 Record of all markings found on the prototype spill valve.

7.1.4.8 A traceable report number.

7.1.5 *Corrosion Test:* A corrosion test shall be conducted in accordance with ANSI B117. The valve shall be subjected to the test for a period of 240 hours and allowed to dry for 48 hours. There shall be no corrosion deposits which cannot be washed off.

7.1.6 *Hydrostatic Test:* A hydrostatic pressure test shall be conducted to show compliance with section 6.1 The test shall be made with water or other liquid having a maximum viscosity of 40 SSU at 125 °F (52 °C) with a maximum pressure test temperature of 125 °F (52 °C). Minimum duration of test shall be one minute.

7.1.7 *Performance Tests:* Performance characteristics, including flow rates under various positive pressures, operating sensitivity, flow resistance and velocity, shall be demonstrated by appropriate tests with a representative fluid.

7.1.8 *Freeze Test:* Simulate water sloshing on deck by spraying a prototype spill valve completely with water from all sides and below using a fully pressurized fire hose. Allow 3 minutes to drain off. Immediately immerse it in a freeze chamber prechilled to 20°F. Hold in chamber for two hours at this temperature. Immediately test the valve as in 7.1.7 to determine opening pressure while frozen. The unit passes the test if it opens within 10% of its previously measured set (opening) pressure.

7.1.9 *Vapor Tightness Test:* Compliance with 6.9 shall be demonstrated by testing the spill valve with compressed air at 90% of the spill valve set (opening) pressure. The test apparatus shall have a total volume of air (in cubic feet) equal to 5 X D, where D is the seat diameter of the spill valve, in inches (test volume may vary by plus or minus 10%). The valve design shall be deemed satisfactory if the air leakage rate is such that the pressure drop is not more than 2% in two hours.

7.1.10 *Seaworthiness Test:* In a simulated installation, immerse the spill valve in 2.0 feet of water. Spray it for 10 minutes with a 2½ inch fire hose with a fully open ⅞ inch diameter nozzle at a pitot pressure of 80 psig measured at the open nozzle. Spray all parts of the valve, both immersed and non-immersed, from all angles. The hose nozzle shall not be located further than 10 feet from the spill valve during the course of this test. The valve design is sufficient if leakage through the housing and/or past the disk is no more than 1 ounce.

7.2 *Production Tests*

7.2.1 Each finished spill valve is to be tested by a hydrostatic test conducted at 1½ times the rate relieving pressure of the spill valve, with the closure device secured. The test shall be made with water or other liquid having a maximum viscosity of 40 SSU at 125 °F (52 °C) with a maximum pressure test temperature of 125 °F (52 °C). Minimum duration of test shall be 1 minute. The purpose of this test is to detect leaks and structural imperfections. No visible leakage is permitted.

7.2.2 Before being shipped, each unit shall be tested as necessary to verify it will function at its set (opening) pressure and that the disc moves freely and fully.

8. *Workmanship, Finish, and Appearance*

8.1 Spill valves shall be of first class workmanship and free from imperfections which may affect their intended purpose.

8.2 Each finished spill valve shall be visually and dimensionally checked to ensure that the spill valve corresponds to this standard, is certified in accordance with Section 10 and is marked in accordance with Section 11.

9. *Inspection*

9.1 The manufacturer shall afford the purchaser's inspector all reasonable facilities necessary to satisfy him that the material is being furnished in accordance with this standard. Inspection by the purchaser shall not interfere unnecessarily with the manufacturer's operations. All examinations and inspections shall be made at the place of manufacture, unless otherwise agreed upon.

10. *Certification*

10.1 Manufacturer's certification that a spill valve has been constructed in accordance with this standard shall be provided in an instruction manual. The manual shall include:

10.1.1 Installation instructions, including size of the inlet and outlet, approved location for installation, and maximum or minimum length of pipe if any between the spill valve and the atmosphere.

10.1.2 Operating instructions.

10.1.3 Maintenance requirements.

10.1.3.1 Instructions on how to determine when spill valve cleaning is required and the method of cleaning.

10.1.4 Copy of prototype test report (see section 7.1).

10.1.5 Product(s) which the valve is designed for and/or restricted to.

11. *Marking*

11.1 Each spill valve shall be permanently marked indicating:

11.1.1 Manufacturer's name or trademark.
11.1.2 Style, type, model or other manufacturer's designation for the spill valve.
11.1.3 Direction of flow through the spill valve.
11.1.4 Maximum rated flow.
11.1.5 ASTM designation of this standard.
11.1.6 Relief pressure setting at full flow rating.
11.1.7 Set (opening) pressure.
11.1.8 Indication of proper orientation of valve, if critical.

12. *Quality Assurance*

12.1 Spill valves shall be designed, manufactured and tested in a manner that ensures they meet the characteristics of the prototype tested in accordance with this standard.

12.2 The spill valve manufacturer shall maintain the quality of the spill valves that are designed, tested and marked in accordance with this standard. At no time shall a spill valve be sold with this standard designation that does not meet the requirements herein.

Appendix D

Waterfront Facility Vapor Control Training Guidelines

A. Purpose
1. Air Pollution
a. State/Federal Requirements
2. Toxicity
a. OSHA/USCG Standards
B. Coast Guard Regulations
C. Vapor Collection and Processing System
1. Explanation of the System
2. Waterfront Facility Systems
3. Waterfront Facility Interface
D. Hazards
1. Explosion/Detonation/Fire
2. Over/Under Pressurization
3. Improper Shutdown
4. Misconnection of Liquid and Vapor Lines
5. Liquid/Condensation in Vapor Lines
6. Static Electricity Discharge
7. Auto-ignition
8. Pyrophoric Iron Sulfide Deposits
E. Active Components
1. Processing Unit
2. Compressor/Blower (If Installed)
3. Inerting/Dilution/Enrichment System and Analyzers
4. Vapor Pressure Gauges and Alarms
5. Automatic Shutdown (If Installed)
F. Passive Components
1. Explosion Suppression System
2. Detonation Arrestor
3. P/V Valves
4. Piping
G. Operating Procedures
1. Testing and Inspection Requirements
2. Additional Pre-transfer Conference Topics
a. Maximum Cargo Transfer Rates
b. Vapor Recovery Pressures
c. Emergency Shutdown
3. Hose Connection Sequence
4. Start-up
a. Proper Valve Alignment
b. Check Operating Pressure During Initial Start-up
c. Check That Vapor Processing Unit is Operating
d. Check That Inerting/Dilution/Enrichment System is Operating
5. Normal Operations
a. Check Operating Pressures
b. Check Processing Unit Operation
c. Check Inerting/Dilution/Enrichment System Operation
H. Emergency Procedures
1. Explosion/Detonation/Fire
2. Over/Under Pressure
3. Spill
4. Ship/Barge Emergencies

Marine Vessel Vapor Control Training Guidelines

A. Purpose
1. Air Pollution
a. State/Federal Requirements
2. Toxicity
a. OSHA/USCG Standards
B. Coast Guard Regulations
C. System Principles
1. Positive Pressure/Vacuum
2. Waterfront Facility Systems
3. Waterfront Facility Interface
D. Hazards
1. Explosion/Fire
2. Over/Under Pressure
3. Overfill
4. Misconnection of Liquid and Vapor Lines
5. Liquid/Condensation in Vapor Lines
E. Active Components
1. Liquid Level Indicators
2. High Level Alarm(s)
3. Vapor Collection Manifold
4. Vapor Pressure Gauges
F. Passive Components
1. Detonation Arrestor
2. P/V Valves
3. Piping
4. Overfill/Overpressurization Protection
a. Spill Valves
b. Rupture Disks
G. Operating Procedures
1. Testing and Inspection Requirements
2. Additional Pre-transfer Conference Topics
a. Maximum Cargo Transfer Rates
b. Vapor Recovery Pressures
c. Emergency Shutdown
3. Hose Connection Sequence
4. Start-up
a. Proper Cargo and Vapor System Alignment
b. Confirm Operating Pressure During Initial Start-up
5. Normal Operations
a. Monitor Vapor Pressure
b. Monitor Cargo Level
H. Emergency Procedures
1. Explosion/Fire
2. Over/Under Pressurization
3. Overfill
4. Activation of Spill Valve/Rupture Disk
5. Waterfront Facility Emergencies

[FR Doc. 89-23431 Filed 10-5-89; 8:45 am]
BILLING CODE 4910-14-M