technologies in the health care marketplace and how they relate to what VA is doing in supporting its medical operations.

The meeting will be open to the public up to the seating capacity of the room. Due to the limited seating capacity of the room, those who plan to attend the session should contact Lorraine Pertino, Office of Information Resources Management (731), Department of Veterans Affairs Central Office, 810 Vermont Avenue NW., Washington, 20420, at least 5 days before the meeting. Mrs. Pertino's telephone number is (202) 233–6204.

Dated: June 7, 1990.

By direction of the Secretary.

Sylvia Chavez Long,

Committee Management Officer.

[FR Doc. 90–14295 Filed 6–20–90; 8:45 am]

BILLING CODE 8320–01–M

Special Medical Advisory Group; Meeting

The Department of Veterans Affairs gives notice under Public Law 92–463 that a meeting of the Special Medical Advisory Group will be held on July 12–13, 1990. The session on July 12 will be held at the Capital Hilton Hotel, 16th and "K" Streets NW, Washington, DC, and the session on July 13 will be held in the Omar Bradley Conference room (10th floor) at the Department of Veterans Affairs Central Office, 810 Vermont Avenue NW, Washington, DC. The purpose of the Special Medical Advisory Group is to advise the Secretary and Chief Medical Director relative to the care and treatment of disabled veterans, and other matters pertinent to the Department's Veterans Health Services and Research Administration. The session on July 12 (held at the Capital Hilton Hotel) will convene at 6 p.m. and the session on July 13 will convene at 8:30 a.m. All sessions will be open to the public up to the seating capacity of the rooms. Because this capacity is limited, it will be necessary for those wishing to attend to contact Lorri Fertal, Office of the Chief Medical Director, Department of Veterans Affairs (phone 202/233–3985) prior to July 6, 1990.

Dated: June 5, 1990.

By direction of the Secretary.

Sylvia Chavez Long,

Committee Management Officer.

[FR Doc. 90–14294 Filed 6–20–90; 8:45 am]

BILLING CODE 8320–01–M

Sunshine Act Meetings

Federal Register
Vol. 55, No. 120
Thursday, June 21, 1990

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).

COPYRIGHT ROYALTY TRIBUNAL

TIME AND DATE: Thursday, July 12, 1990, 10:00 a.m.

PLACE: 1111 20th Street NW., Suite 450, Washington, DC 20036.

STATUS: Closed pursuant to a vote taken June 18, 1990.

MATTERS TO BE CONSIDERED: Formal rule making—adjustment of the syndicated exclusivity surcharge.

CONTACT PERSON FOR MORE INFORMATION: Robert Cassler, General Counsel, Copyright Royalty Tribunal, 1111 20th Street NW., Suite 450, Washington, DC 20036, 202–653–5175.

Dated: June 18, 1990.

J.C. Argetsinger,

Chairman.

[FR Doc. 90–14462 Filed 6–18–90; 5:02 am]

BILLING CODE 1410–09–M

FEDERAL ELECTION COMMISSION

* * * * *

"FEDERAL REGISTER" NUMER: 90–31977.

PREVIOUSLY ANNOUNCED DATE AND TIME: Thursday, June 21, 1990, 10:00 a.m.

This meeting will be open to the public.

The following items have been added to the agenda:

Draft Debt Settlement Forms with Explanation and Justification
Proposed Rulemaking Proceeding on Foreign National Issue

* * * * *

DATE AND TIME: Tuesday, June 26, 1990, 10:00 a.m.

PLACE: 999 E Street NW., Washington, DC.

STATUS: This meeting will be closed to the public.

ITEMS TO BE DISCUSSED:

Compliance matters pursuant to 2 U.S.C. 73g.
Audits conducted pursuant to 2 U.S.C. 437g, 438(b), and Title 26 U.S.C.
Matters concerning participation in civil actions or proceedings or arbitration.
Internal personnel rules and procedures or matters affecting a particular employee.

* * * * *

DATE AND TIME: Thursday, June 28, 1990, 10:00 a.m.

PLACE: 999 E Street NW., Washington, DC (ninth floor).

STATUS: This meeting will be open to the public.

MATTERS TO BE CONSIDERED:

Correction and Approval of Minutes.
Draft Advisory Opinion 1990–11—Friends of Gary Hart '88
Administrative Matters

* * * * *

PERSON TO CONTACT FOR INFORMATION: Mr. Fred Eiland, Press Officer, Telephone: (202) 376–3155.

Marjorie W. Emmons,

Secretary of the Commission.

[FR Doc. 90–14558 Filed 6–19–90; 3:34 pm]

BILLING CODE 6715–01–M

FOREIGN CLAIMS SETTLEMENT COMMISSION

F.C.S.C. Meeting Notice No. 3–90

Notice of Meetings—Announcement in Regard to Commission Meetings and Hearings

The Foreign Claims Settlement Commission, pursuant to its regulations (45 CFR Part 504), and the Government in the Sunshine Act (5 U.S.C. 552b), hereby gves notice in regard to the scheduling of open meetings and oral hearings for the transaction of Commission business and other matters specified, as follows:

Date and Time

Friday, June 29, 1990 at 10:00 a.m.

Subject Matter

Oral Hearing on objection to Proposed Decision issued on claims against the Government of the Arab Republic of Egypt:
EG–084—Yolanda Sheriff
Hearings on the Record on objections to Proposed Decisions issued on claims against the Government of the Arab Republic of Egypt:
EG–007—Estate of Felix Mansour Benzakian, Decreased
EG–114—Saad Mansour Ibrahim, et al.

Subject matter listed above, not disposed of at the scheduled meeting, may be carried over to the agenda of the following meeting.

All meetings are held at the Foreign Claims Settlement Commission, 1111—20th Street, NW., Washington, DC Requests for information, or advance notices of intention to observe a meeting, may be directed to: Administrative Officer, Foreign Claims Settlement Commission, 1111—20th Street, NW., Room 400, Washington, DC 20579. Telephone: (202) 653–6155.

Dated at Washington, DC, on June 18, 1990.

Judith H. Lock,

Administrative Officer.

[FR Doc. 90–14559 Filed 6–19–90; 3:34 pm]

BILLING CODE 4410–01–M

Corrections

Federal Register
Vol. 55, No. 120
Thursday, June 21 1990

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.

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 795

[OPTS-42100B; FRL-3627-4]

Tributyl Phosphate; Final Test Rule

Correction

In rule document 89-18850 beginning on page 33400 in the issue of Monday, August 14, 1989, make the following correction:

§795.228 [Corrected]

On page 33412, in the first column, in § 795.228(c)(2)(iii)(B), the paragraphs designated "(1)" and "(2)", should be designated as "*(1)*" and "*(2)*"

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

21 CFR Parts 444 and 448

[Docket No. 76N-482B]

RIN 0905-AA06

Topical Antimicrobial Drug Products for Over-the-Counter Human Use; Proposed Amendment of Final Monograph for OTC First Aid Antibiotic Drug Products

Correction

In proposed rule document 90-13316 beginning on page 23450, in the issue of Friday, June 8, 1990, make the following corrections:

§ 444.542l [Corrected]

1. On page 23453, in the second column, in § 444.542l(a)(1), in the third line, after "sulfate"insert a "hyphen"(-).

§ 444.542l [Corrected]

2. On the same page, in the same column, in the same section (§ 444.542l(a)(1)), in the eighth line, "8" should read "B".

§ 448.513c [Corrected]

3. On the same page, in the third column, at § 448.513c, in the third line of the section heading, after "sulfate" insert a hyphen (-).

§ 448.513c [Corrected]

4. On the same page, in the same column, in § 448.513c(a)(1)(iii), in the last line, "8" should read "B".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

21 CFR Part 452

[Docket No. 89N-0058]

Human and Veterinary Drugs; Editorial Amendments

Correction

In rule document 90-6284 beginning on page 11575 in the issue of Thursday, March 29, 1990, make the following correction:

On page 11584, in the third column, under § 452.910, in the third line, "(a)(3)(ii)", should read "(a)(4)(ii)".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

[Docket No. 90D-0194]

Compliance Policy Guide for Radioimmunoassay (RIA) Analysis of Hair To Detect the Presence of Drugs of Abuse; Availability

Correction

In notice document 90-13649 beginning on page 23985 in the issue of Wednesday, June 13, 1990, in the second column, in the last line of the SUMMARY, "(21 U.S.C. 360)" should read "(21 U.S.C. 360e)".

BILLING CODE 1505-01-D

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[ID-943-90-4214-11; IDI-010804, et al.]

Proposed Continuation of Withdrawals; Idaho

Correction

In notice document 90-11508 appearing on page 20538 in the issue of Thursday, May 17, 1990, make the following corrections:

On page 20538, in the first column, under **Boise Meridian**, in the land description for Rush Creek Administrative Site, the third line should begin "Sec. 28".

On the same page, in the second column, in the land description for Bear Gulch Picnic Area, an additional "NE1/4" was omitted from the end of the description.

BILLING CODE 1505-01-D

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[NV-930-09-4920-10-4410; N-48869]

Realty Action; Private Exchange in Clark and Washoe Counties, NV

Correction

In notice document 90-12765 appearing on page 22851, in the issue of Monday, June 4, 1990, make the following correction:

In the first column, in the land description, under "T. 22 S., R. 61 E.", under "Sec. 17", in the fourth line, after "W½" insert "E½".

BILLING CODE 1505-01-D

PENSION BENEFIT GUARANTY CORPORATION

29 CFR Part 2610

RIN 1212-AA53

Payment of Premiums

Correction

In rule document 89-15866 beginning on page 28944, in the issue of Monday, July 10, 1989, make the following correction:

§ 2610.24 [Corrected]

On page 28959, in the first column, in § 2610.24(c), the first paragraph designated "(2)" should read "(1)".

BILLING CODE 1505-01-D

federal register

Thursday
June 21, 1990

Part II

Department of Transportation

Coast Guard

33 CFR Part 154 et al.
46 CFR Part 30 et al.
Marine Vapor Control Systems; Final Rule

DEPARTMENT OF TRANSPORTATION

Coast Guard

33 CFR Parts 154, 155, 156

46 CFR Parts 30, 32, 35, 39

[CGD 88-102]

RIN 2115-AC65

Marine Vapor Control Systems

AGENCY: Coast Guard, DOT.
ACTION: Final rule.

SUMMARY: The Coast Guard is adopting 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 does not require the installation or use of vapor control systems.

DATES: This regulation is effective July 23, 1990. The incorporation by reference of certain publications listed in this regulation is approved by the Director of the **Federal Register** as of July 23, 1990.

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

SUPPLEMENTARY INFORMATION: On October 6, 1989, the Coast Guard published a Notice of Proposed Rulemaking (NPRM) in the **Federal Register** (54 FR 41366). Interested persons were requested to submit comments. On November 29, 1989, the Coast Guard published a notice in the **Federal Register** (54 FR 49097) extending the comment period for the NPRM from November 20, 1989 to January 2, 1990. A total of 103 comment letters were received. Because of comments received which requested either a public hearing or a CTAC meeting, a CTAC meeting open to the public was held on November 28, 1989.

Drafting Information

The principal persons involved in drafting this rule 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. A Notice of Proposed Rulemaking concerning benzene exposure was published in the **Federal Register** on January 29, 1990 (55 FR 2978). 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 does 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 pressures exceeding 600 pounds per square inch. Such an ignition could originate in shoreside vapor processing units such as incinerators or flares. 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 personnel 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 final 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 earlier draft recommendations prepared by CTAC. On the 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) funded a quantitative hazards analysis (referred to as the API hazards analysis) based upon the final CTAC recommendations. Some changes to the CTAC recommendations resulting from the API hazards analysis were incorporated in the 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 the proposed regulations in the notice of proposed rulemaking (NPRM) published in the **Federal Register** on October 6, 1989 (54 FR 41366). 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 were discussed in the Discussion section of the NPRM.

A CTAC meeting was held on November 28, 1989, at which some questions raised in comments submitted to the docket up to that time were discussed. The meeting was announced in the **Federal Register** on November 2, 1989 (54 FR 46317), and was open to the public.

The close of the comment period was announced as November 20, 1989 in the NPRM. An extension of the comment period to January 2, 1990, was published in the **Federal Register** on November 29, 1989 (54 FR 49097).

The objective of this rulemaking is to provide standards for the safe design and operation of marine 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 to collect vapors of crude oil, gasoline blends, and benzene from a tank vessel's cargo tanks. 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 Comments and Changes to the Regulations

General

During the comment period, as extended, a total of 103 comment letters were received. Beginning with this General section, the comments are arranged by issue or topic addressed.

Fifteen comments requested an extension to the comment period. The requested extension ranged from December 20, 1989 to January 20, 1990. As previously discussed, the comment period was extended to January 2, 1990.

Seven comments requested either a public hearing or a CTAC meeting. As previously discussed, a CTAC meeting open to the public was held on November 28, 1989.

Six comments stated that the next step in the rulemaking should be to issue an interim final rule, to permit the industry and the Coast Guard to begin implementation of the requirements while still permitting modifications to be made to the regulations as experience is obtained. Two of the comments recommended a 24=month interim final rule comment period. The Coast Guard's position is that an interim final rule is not appropriate for this rulemaking. Because vapor control systems involve large expenditures on equipment, any revisions in the interim final rule could have significant impact on vessels and facilities as they replace equipment to comply with the changes in the requirements. The Coast Guard will evaluate the adequacy of these regulations as they are applied and necessary changes will be proposed through the normal rulemaking process.

Federalism

Three comments were received regarding the federalism implications of this rulemaking. All supported the concept that states should not be permitted to modify requirements relating to standardization and safety. One of the comments stated that legislation is needed to make the control of marine emissions a national issue, which must provide specific responsibilities for the EPA, the Coast Guard, and the states. While such legislation might be beneficial, it is beyond the scope of this rulemaking.

Timing

One comment stated that the compliance date for state vapor control regulations should coincide with the ability of facilities to acquire the hardware to comply with these regulations. Another comment stated that most of the modifications will have to be done with the ships out of service, and forcing compliance with the regulations prior to a ship's scheduled drydocking will cause financial problems. Another comment stated that the Coast Guard should make it clear to air quality authorities that requiring implementation in less than five years will entail removing vessels out of service before their scheduled drydockings to make modifications, and result in financial hardships and potential disruption of vital products.

The Coast Guard cannot control the implementation dates of state required vapor control systems. However, the Coast Guard has worked with the states to encourage them to allow sufficient time to allow proper design and installation of vapor control systems from the promulgation of these regulations tothe implementation date of state vapor control requirements.

One comment stated that a provision should be added addressing the operational timing problems stemming from the state deadlines. The comment asserted that since some companies will modify their vessels anticipating the final regulations, a temporary certification of these new shipboard systems should be provided to allow these vessels to operate until the next regularly scheduled drydocking. The Coast Guard's position is that it is not appropriate to allow temporary certification of vapor control systems which are not in compliance with the final regulations. Systems with minor differences from the final regulations may be reviewed on a case by case basis and allowed to operate with a certain period allowed to come into compliance.

One comment noted that there is no plan for phasing in of systems, and it will take a long time to develop cost efficient technology, design, approve, retrofit, and build these systems. One comment asked if the standards would apply as soon as they come into force where vapors are currently being collected. This comment also stated that some period of grace for the application of the standards relative to when a local authority declares its intention to require vapor control is necessary. The final rules in 33 CFR 154.804 and 46 CFR 39.10–13 contain implementation schedules for existing vapor control systems at facilities and on vessels which were operating prior to the effective date of the regulations. Implementation schedules for new systems depends upon the compliance schedules of those states requiring vapor control systems. The Coast Guard has encouraged the states to provide sufficient time to design and install safe systems.

One comment stated that final rules for bulk liquid hazardous material cargo transfer (CGD 86–034) and benzene exposure (CGD 88–040) should be delayed until these regulations are in place. The Coast Guard's position is that the rule for bulk liquid hazardous material cargo transfer is sufficiently distinguishable from this rulemaking that it does not need to be promulgated after this rule. However, the rule for benzene exposure is scheduled to be promulgated after this rule.

Four comments stated that the Coast Guard should delay implementation of requirements until the International Maritime Organization (IMO) has developed international requirements for vapor control systems. Another comment stated that the IMO standards being developed will only cover ships and the ship/shore interface, not the facility requirements. At the IMO Subcommittee on Bulk Chemicals in September 1989, a joint ad hoc working group was formed to develop uniform international design standards for vapor control systems. It was agreed that standards would be developed for both the ship and the facility arrangements. These standards are scheduled to be completed in 1991. Because of impending state requirements to require control of vapors, the Coast Guard cannot wait for the development of international requirements. The Coast Guard will work with IMO to try to make the international standards compatible with this rulemaking.

One comment stated that the adoption of these national standards will do much to promote national consistency for marine vapor control equipment, and they should be adopted swiftly. Another comment stated that it is crucial that the Coast Guard meet its published schedule for issuing final regulations by February 28, 1990, for industry to be able to meet the deadlines for controlling vapor emissions set by the states. The Coast Guard has made every effort to promulgate these regulations as soon as possible.

Economic Impact

One comment stated that, in general, the NPRM was responsible and cost-effective.

Nine comments opined that the NPRM would have significant economic impact which needs to be considered. One of the comments stated that the regulations will damage U.S. competitiveness. Another of the comments stated that facilities in non-attainment areas and small tug-barge companies may be forced out of business. Another of the comments stated that the limited environmental benefit cannot justify increasing the risk of an accident and the additional costs of vapor control. As discussed in the Background and the Regulatory Evaluation sections, these regulations do not require the installation or use of vapor control systems, and so the costs should not be attributed to this rulemaking. The cost/benefits ratio and the loss of competitiveness should be analyzed by the authorities mandating the use of vapor control systems.

Three of the comments mentioned in the preceding paragraph specified reducing the allowable loading to 97% of tank capacity and expanding the application of the regulations beyond crude oil, gasoline, and benzene as major contributors to the economic impact. The applicability of the regulations has been changed to directly apply only to the loading of crude oil, gasoline blends, and benzene. However, systems loading other cargoes will be reviewed on a case by case basis by the Coast Guard. It would be irresponsible of the Coast Guard to ignore the impact on safety of the control of other cargo vapors, which may be required by some states. Filling limits have been increased to 98.5% of the tank capacity or the level at which the overfill alarm is set.

One comment stated that estimates of constructing vapor control systems at two loading facilities were $10 million for one and $16 million for the other. These figures are not inconceivable. The costs estimated in the NRC study were for typical systems. The size, number of loading berths, number of products loaded, and complexity of the system could easily push the costs beyond that estimated by the NRC study. These costs should be brought to the attention of and analyzed by the authorities mandating the use of vapor control systems.

General Control Technology

Six comments stated that the rulemaking was too specific, and would hinder advancements in technology and flexibility in design. One of those comments suggested establishing performance standards, and another suggested giving the minimum technical content necessary to ensure safety. Title 33 CFR 154.808, 154.810, 154.814, 154.820, 154.840, and 154.850, and Title 46 CFR 39.10–11, 39.20–1, 39.20–7, 39.20–9, 39.20–11, 39.20–13, and 39.30–1 have been revised in the final rule to be made more performance oriented and to allow greater flexibility in choosing different alternatives. All of these revisions are discussed in greater detail later in this rulemaking document. The Coast Guard's position is that the regulations are now as flexible and as performance oriented as possible consistent with ensuring public safety. Certain specifications are needed for uniformity, such as vapor connection requirements. Future technological development which has not been anticipated by the regulations can be handled under existing provisions contained in 33 CFR 154.107 and 154.108, and 46 CFR 30.15.1

for approval and acceptance of equivalent technology.

Seven comments stated that the rulemaking significantly deviated from the CTAC recommendations and would hinder flexibility and greatly increase costs. The Goast Guard's position is that the NPRM did not differ as significantly from the intent of the CTAC recommendations as the comments indicate. The recommendations were reorganized and revised as appropriate to conform with language required for regulations. Specific deviations from the CTAC recommendations were discussed in the preamble of the NPRM, and will not be repeated here. Some people will consider the revisions to 33 CFR 154.800, 154.808, 154.810, 154.814, 154.820, 154.840, and 154.850, and Title 46 CFR 39.10–1, 39.10–11, 39.20–1, 39.20–7, 39.20–9, 39.20–11, 39.20–13, and 39.30–1 in the final rule as being more in accordance with the CTAC recommendations in allowing greater flexibility. As discussed previously, the regulations allow as much flexibility as possible consistent with ensuring public safety.

Four comments stated that the rulemaking did not properly consider the API hazards analysis. One of the comments stated that the analysis does not justify requirements which go beyond safety levels established by the CTAC recommendations. Another comment stated that the Coast Guard's references to the API's hazards analysis were responsible and correct. When the NPRM was drafted the final report of the hazards analysis had not yet been released. Since publication of the NPRM, the Coast Guard has been able to further study the analysis. The requirements in 46 CFR 154.820 concerning fire, explosion, and detonation protection have been revised and reorganized in the final rule, and more properly reflect the analysis. However, because of imposed constraints of the analysis and the lack of operational experience to back up the failure data which was used, the results of the analysis cannot be accepted carte blanche.

One comment stated that the regulations may fail to provide safe and economical vapor recovery. The Coast Guard's position is that these regulations, coupled with proper enforcement, will help to ensure that vapor control systems operate safely, and these regulations provide for control of vapors as economically as is possible while ensuring safe operation. As was previously discussed, it is not appropriate for the Coast Guard to weigh the cost/benefits of vapor control.

One comment stated that the EPA and the Coast Guard have not coordinated the analysis of risks in employing such systems with the states implementing air quality control programs for ships. The Coast Guard has discussed the risks involved in using vapor control systems to meet air quality standards with the EPA and interested state officials and will continue to do so. The risks are thoroughly discussed in the various studies. The Coast Guard does not have the authority to control state action to require use of these systems.

One comment stated that the regulations drive vapor control systems towards incineration of the vapors. Five other comments stated that it should not be assumed that incinerators or flares will be the most commonly used vapor processing system, and that such assumption will preclude the use of other equally effective technologies. While the Coast Guard acknowledges that incineration of the vapors will be an attractive alternative in some circumstances, the Coast Guard did not intend to assume that incineration will be the most common means of processing the vapors, nor does the Coast Guard desire to drive all vapor control systems toward destruction techniques. Some changes have been made to 33 CFR 154.820 to provide certain allowances when nondestructive techniques are used. This is discussed in more detail in the discussion for that section.

Two comments stated that if barges are loaded under vacuum, safety provisions for closed loading are unnecessary, since leaks will be in, not out, and minor during ullaging. While this may be acceptable for certain dedicated operations where a facility has oversized blowers or compressors and the size of the ullage openings on the dedicated barge are known, the Coast Guard's position is that this is an unacceptable situation for general operations and should not be permitted as an option in the regulations. A facility needs to know that the vapor control system is not drawing in excess amounts of air to be able to operate safely within its design parameters.

One comment stated that industry needs to know the pressure drop across detonation arresters to properly design facilities to meet the proposed regulations. Because of different sizes of arresters and different flow rates, it is not feasible to specify a maximum pressure drop. However, in accordance with paragraph 6.1.9 of appendix A, the maximum design pressure drop at the maximum flow rate for each detonation arrester is to be part of the ordering information.

One comment asked if the necessary equipment for vapor control systems exists for safe use in a marine environment. The Coast Guard's position is that all of the necessary components are available. Large size detonation arresters have not been tested, but a test program is expected to begin shortly.

One comment stated that equipment needs to be thoroughly tested and approved by the Coast Guard. The Coast Guard's position is that the testing and certification of these devices is more appropriately done by third party independent test organizations.

One comment stated that the Coast Guard should make it clear to air quality authorities that these regulations are based on untested assumptions and not on proven tests on existing equipment. The Coast Guard has corresponded with the states known to be considering vapor control requirements and informed them of the hazards and unproven technology of vapor control systems. However, while vapor control systems have not been tested in non-dedicated operation, the Coast Guard is confident that these regulations will provide for the safe design and operation of vapor control systems.

One comment stated that the Coast Guard should provide a detailed outline of a safe vapor control system based on tested equipment. Because of the many variables which must be considered in designing a vapor control system, it is not feasible to present a standard system. It would also appear that the Coast Guard was trying to prevent flexibility of designs.

One comment stated that while it is appropriate to set definite parameters for loading rates and pressures, the requirements are too rigid on how these ends are to be accomplished. Revisions have been made to 33 CFR 154.814 and 46 CFR 39.20–11 and 39.30–1(d) in order to make limitations on loading rates and pressures more flexible. See the discussions on these sections for details.

One comment stated that past experience has shown that barge operators are unfamiliar with the electrical requirements for hazardous areas, and that a reminder should be added to the regulations that wiring methods for Class I hazardous locations must meet the requirements of 46 CFR 111.105. A reference to 46 CFR 111.105 has been added to 33 CFR 154.812 and 46 CFR 39.20–9.

One comment stated that all vessels should be required to be leak tight during loading at their desired maximum pressure. The Coast Guard's position is that this is not a safety issue, but rather an effectiveness issue which the Coast

Guard does not have the statutory authority to regulate.

One comment stated that the hazards should be addressed with three levels of protection: control systems designed to establish and maintain safe operating conditions; automatic systems designed to prevent operation with an unsafe condition; and automatic/passive systems designed to minimize damage in the event that an accident does occur. Where feasible, this is the approach that the Coast Guard has taken in this rule.

One comment stated that emissions control could be achieved with greater safety and efficiency if it is handled by a vapor collection and combustion system on board the vessel. Another comment stated that a vessel vapor processing unit should be prohibited. Nothing in this rulemaking prohibits installing a vapor control system on a vessel, and it may be economically attractive to do this in certain dedicated operations. A tank vessel which has a vapor processing unit on board is required by 46 CFR 39.10–9 to comply with 33 CFR part 154, subpart E.

One comment stated that the success of recovering vapors from tank trucks cannot be transferred directly to vessel loading because of differences in the operations. These requirements have been developed independently of tank truck operations, and the Coast Guard has made no attempt to apply tank truck regulations to marine vapor control systems.

One comment stated that regulations are becoming overly complicated and very difficult for people to understand and comply with and that these regulations should only cover the additional requirements needed without trying to duplicate and confuse existing regulations. The Coast Guard is sensitive to such concerns, and has made every effort to make the regulations understandable and to eliminate duplication as much as possible without sacrificing safety or clarity.

33 CFR 154.106 and 46 CFR 39.10–5 Incorporation by Reference

One comment supports the Coast Guard's efforts to address the compatibility of vessel and terminal systems, and stated that industry guidelines should be incorporated where available. The Coast Guard has incorporated by reference as many existing industry guidelines as possible.

One comment pointed out API's correct address in the Incorporation by Reference section. This has been corrected in 33 CFR 154.106 and 46 CFR 39.10–5.

Three comments stated the American Institute of Chemical Engineers (AIChE), Guidelines for Hazard Evaluation Procedures, 1985, should be added to the incorporated material. The Coast Guard disagrees. While the guidelines are mentioned in 33 CFR 154.804 as guidance for conducting a hazards analysis, it is not being incorporated as a standard. The guidelines provide good guidance in conducting a hazards analysis, but a hazards analysis should not be restricted by the guidelines.

One comment recommended that the following industry standards should be added to the references under API in 33 CFR 154.106: API Recommended Practice XXX on Ship, Barge and Terminal Hydrocarbon Vapor Collection Manifolds, dated XXX; API Recommended Practice XXX on Overflow Control Systems for Petroleum Tank Barges, dated XXX; and API Recommended Practice XXX on Effectiveness for Marine Vapor Control Systems, dated XXX. These are recommended practices still under development. The Coast Guard cannot incorporate these by reference because they will not be completed in time for this rulemaking. The Coast Guard may consider incorporating them at a later time.

Two comments stated that appendix C of the NPRM (Draft Standard Specification for Spill Valves for Use in Marine Tank Liquid Overpressure Protection Applications) should be added to the referenced ASTM standards in 33 CFR 154.106. This specification is not referenced in 33 CFR part 154, therefore it does not need to be added to the list of incorporated references. The number of this specification was left blank in 46 CFR 39.10–5 of the NPRM because it was under development. It has been adopted by ASTM as Standard F1271 and the specification number has been included in the final rule.

The number of the Standard Specification for Tank Vent Flame Arresters was enclosed as Appendix B and the specification number was left blank in 33 CFR 154.106 of the NPRM because it was under development. The specification has not yet been adopted, and the reference to it has been deleted from these sections. It has been included as appendix B of 33 CFR part 154 of the final rule as guidance material.

The number of the Standard Specification for Detonation Flame Arresters was left blank in 33 CFR 154.106 and 46 CFR 39.10–5 of the NPRM because it was under development. The specification has not yet been adopted, and the reference to it has been deleted from these sections. It has been included as appendix A of 33 CFR part 154 of the final rule as guidance material.

In response to comments concerning electrical connections, three standards have been added to 33 CFR 154.106 and 46 CFR 39.10–5: IEC 309–1, IEC 309–2, and NEMA WD6. These standards are referenced in 33 CFR 154.812 and 46 CFR 39.20–9, and are used to specify standard electrical connections for tank barges and facilities.

The International Safety Guide for Oil Tankers and Terminals (ISGOTT) has been added to 46 CFR 39.10–5. It is referenced in 46 CFR 39.30–1 to specify the initial loading for static accumulator cargoes.

33 CFR 154.310 Operations Manual

One comment stated that a copy of the operations manual which includes the facility's vapor control system should be located at the transfer control point (dock) available for review by the person in charge of the vessel to be loaded. While it may be desirable to have the operations manual available for review by the vessel personnel, the Coast Guard does not see a need for vessel personnel to review the manual, and parts of the manual may be considered privileged information. Therefore, it is not appropriate to require facilities to have the operations manual available for review by the vessel personnel.

One comment stated that minor changes are continuously made in operating procedures, and minor changes should not have to be submitted to the Coast Guard; therefore, operating procedures should be kept up to date and readily available at the transfer control point (dock) separate from the operations manual. The Coast Guard agrees that detailed operating procedures are not necessary for the operations manual, so the introduction of § 154.310(b)(2) has been revised to require only a description of the vapor control system's design and operation including specific components.

Four comments stated that the term "line diagram" should be replaced with a "simplified piping and instrumentation diagram (P&ID)" to be consistent with accepted shoreside terminology. The Coast Guard agrees, and has made the change to § 154.310(b)(1).

Three comments stated that the requirement in § 154.310(b)(2)(iv) that the operations manual contain provisions for dealing with pyrophoric sulfide for inerted vapors should only apply to facilities which handle vapors containing hydrogen sulfide in an oxygen deficient atmosphere, that it does not have to contain an inert gas.

The Coast Guard partially agrees. The Coast Guard agrees that pyrophoric iron sulfide is not a problem with all vapors, only those vapors containing sulfur. Therefore, the requirement has been changed to only apply to facilities which handle cargoes containing sulfur. The Coast Guard is not aware of pyrophoric iron sulfide deposits being a problem with enriched atmospheres.

33 CFR 154.740 Records

Six comments were received regarding the length of record retention in this section. One comment stated that the records should be retained for five to ten years. One comment stated that two years record retention is adequate. One comment stated that 18 months record retention is sufficient. Two comments stated that it should be one year. One comment stated that records of all repairs and failures should be kept for the life of the system. The Coast Guard has decided that three years is the optimum for record retention. That will provide sufficient time for observing problem trends without creating an undue burden upon the record keepers.

One comment stated that keeping records of minor repairs will be an unnecessary burden on the facilities. The comment recommended that only records of repairs to components which are certified under 33 CFR 154.804 be retained. While the Coast Guard agrees that keeping records of minor repairs is unnecessary, limiting record retention to records of repairs to components required by subpart E is sufficient to eliminate repairs considered to be minor.

One comment stated that paragraph (h) of this section should require a dock operation log, including problems with the vapor control system and corrective measures, since these logs are maintained by the persons in charge. The Coast Guard does not think that this change is needed. The log described by the comment would be adequate to meet the requirement. The Coast Guard will allow the operators discretion to choose the format for the record.

One comment stated that specific penalties should be attached to recordkeeping violations. The Coast Guard disagrees. The penalties for violation of the regulations are in the authorizing statutes. The penalty assessed in a particular case will depend on the nature and severity of the violation.

33 CFR 154.800 and 46 CFR 39.10–1 Applicability

One comment stated that the Coast Guard should require all vessels transporting crude oil and its products to install a vapor control system to protect both directly exposed workers and the general population. Two other comments stated that vapor control should be required as a method to control occupational exposure for benzene and other hazardous chemicals. The Coast Guard does not have statutory authority to require vapor control to reduce emissions for air pollution. This authority is granted to the EPA and the states. However, the Coast Guard does have authority to require reduced exposure to marine personnel of hazardous chemicals. As discussed in the Background section, a separate rulemaking (CGD 88–040) is under development which would lower occupational exposure limits for benzene. If the Coast Guard determines that additional products warrant requirements to lower occupational exposure, they will be developed in separate rulemakings.

One comment stated that because occupational exposure was not considered during CTAC's work, this rulemaking should not be linked to the need to lower benzene exposure. This rulemaking is not linked to lowering benzene exposure. It does not matter why vapor control systems are installed. But if they are installed, then their design, installation, and operation must be reviewed for compliance with applicable safety standards.

One comment stated that vessels complying with the IMO gas and chemical carrier codes should be permitted to perform vapor control in U.S. ports without any modifications. The IMO gas carrier code is applicable to vessels carrying liquefied flammable gases. This rulemaking specifically exempts the collection of these cargoes. Even though a vessel may meet the IMO chemical carrier code, some modifications will probably have to be made or else the vessel could not load safely while collecting the vapors. However, these modifications should be minor.

Six comments were received concerning the general applicability requirements of 33 CFR 154.100. These comments appear to have a misunderstanding that every facility to which part 154 was made applicable would have to meet the vapor control requirements. The applicability in 33 CFR 154.100 is for applicability to the whole part. The specific applicability to the facility vapor control requirements is in 33 CFR 154.800 of this part. In addition, the change to this section is not as a result of this rulemaking, but of another rulemaking. Since it now appears that the change to 33 CFR 154.100 will be final before this rulemaking, it has been deleted from this final rule.

One comment stated that a statement should be included which says that these regulations do not require vapor control, and that the authority to require such systems rests with the individual states. The Coast Guard's position is that this type of statement is not necessary. Nowhere in these regulations is the installation of vapor control systems required, and it should be apparent in reading the applicability sections of 33 CFR 154.800 and 46 CFR 39.10–1 that these regulations do not require their installation.

One comment stated that a statement should be included which says that these regulations are only applicable when vapors are required to be controlled as a result of state requirements. Another comment stated that these regulations should only apply to vessels and facilities in non-attainment areas. The Coast Guard disagrees. Because of safety concerns applicable whenever the vapors are being controlled, these regulations should apply regardless of why the vapors are being controlled.

One comment stated that designation of flammable or combustible should be deleted, since states will determine which VOC cargoes will be listed. The change to applicability discussed in the previous paragraph should satisfy this comment.

Seventeen comments stated that these regulations should only apply to the loading of crude oil, gasoline (or gasoline blends), and benzene. The most common argument was that the CTAC recommendations and the API hazards analysis considered only crude oil, gasoline, and benzene, so inclusion of a broader range of hydrocarbons at this stage is inappropriate and extremely risky. Several of the comments stated that no investigation of compatibility associated with mixing vapors has been made. One of the comments stated that the chemical carrier trade is too different from the crude oil trade to be able to include chemical carriers in this rulemaking. The Coast Guard agrees that the control of all cargo vapors has not been thoroughly analyzed and that initial applicability of the vapor control regulations to a broad range of VOC vapors, as proposed in the NPRM, is inappropriate. Therefore, the direct applicability of the vapor control regulations has been limited to vapors of crude oil, gasoline blends, or benzene in 33 CFR 154.800(a) and 46 CFR 39.10–1(a). However, since control of vapors of other cargoes will sometimes be required, a new paragraph (b) has been

added to 46 CFR 154.800 and 39 CFR 39.10–1 which requires a facility or vessel which collects vapors of flammable or combustible cargoes other than crude oil, gasoline blends, or benzene, to meet the requirements prescribed by the Commandant (G–MTH) on a case by case approval.

Two comments stated that cargoes with low vapor pressures should be excluded from the regulations because they will not emit vapors in the flammable range. The change discussed previously to the cargoes of applicability should exclude cargoes with low vapor pressures from these regulations. However, a vapor control system which collects these vapors will require case by case review in accordance with the new paragraph (b). It is unlikely that vapors of these cargoes will be required to be collected because they do not emit a significant amount of vapors.

Three comments stated that the application of individual vapor collection systems to parcel/chemical tanker operations would be very complex. One of the comments stated that the rule should apply only to petroleum tankers and barges, and allow chemical carrier operators to work with the Coast Guard to prepare requirements applicable to chemical tankships and barges. The Coast Guard agrees that collecting vapors from many different, incompatible products creates technical problems. These problems can be worked out, but solutions may be complicated and may require a separate collection system for each incompatible product. At this time the Coast Guard does not anticipate vapor control to be required on a large number of incompatible cargoes. However, if the vapors are being collected, safety concerns need to be addressed. As mentioned previously, case by case review will be necessary for vessels collecting vapors on cargoes other than crude oil, gasoline blends, and benzene. The Coast Guard is willing to work with the chemical carrier operators to develop general requirements for chemical tankships.

One comment stated that multiple berths are not fully addressed, that different product vapors may require different methods of recovery due to compatibility and vapor pressure. Some changes have been made to 33 CFR 154.820 to address fire protection for facilities with multiple berths. The problems associated with the collection of vapors from incompatible cargoes will have to be addressed on a case by case basis.

One comment stated that 46 CFR Table 151.05 and Table 1 in 46 CFR part 153 should be modified to indicate hydrocarbons to help determine applicability of these regulations. One comment stated that it is important for all tank vessels to have rules for vapor control; however, certain changes should be added for specialized tankers. By specialized tankers, the Coast Guard assumes that the comment meant chemical tankships. Because of the changes previously discussed, neither of these changes are needed.

One comment stated that vapor control of pressure tanks on vessels should be exempted. The Coast Guard disagrees. Because of the hazards involved with collecting the vapors, if vapors are collected from a pressure tank the safety considerations cannot be ignored.

One comment stated that existing vapor control systems with a safe operating record should not have to meet the regulations. A safe operating record is only one indication that the system is safe. The Coast Guard's position is that facility systems which have been approved by the Coast Guard and are operating prior to the effective date of these regulations should be exempt except for operational requirements. Therefore, a new paragraph (c) has been added to 33 CFR 154.800 to exempt these systems from the subpart except for 33 CFR 154.850. Existing facility systems which have not been approved by the Coast Guard will be permitted to operate on an interim basis and have a period of time, as given in 33 CFR 154.804(b), in which to fully comply with the regulations.

Existing vapor control systems on vessels which have been approved by the Coast Guard are exempted by a new paragraph (c) in 46 CFR 39.10–1 except for operational requirements in 46 CFR 39.30–1 and 39.40–5. Existing vessel systems which have not been approved by the Coast Guard will be permitted to operate on an interim basis, and have a period of time, as given in 46 CFR 39.10–13(b), in which to comply with the regulations.

One comment asked if these regulations would apply if the amount of vapors vented to atmosphere is well under the EPA regulations. These regulations will apply if the vapors are being collected, regardless of why they are collected.

One comment stated that the Coast Guard should provide the states with a standard for those products from which significant VOC's are emitted and thus for which these systems may be cost effective. It is not appropriate for the Coast Guard to do this. The EPA and state air quality authorities have the statutory authority under the Clean Air Act to designate products for which vapor control may be required.

One comment stated that additional clarification is required to distinguish applicability between tankships and tank barges. The notations given in 46 CFR 30.01–5(c) distinguish whether a section applies to tankships, tank barges, or both, for all of 46 CFR subchapter D.

One comment stated that many barges have vent stacks on an existing vapor collection system, which can be isolated by a valve, and can vent the vapors when loading cargoes for which there are occupational exposure limits. This is perfectly acceptable provided there are no requirements by the local air quality authorities or the EPA to collect the vapors, and these regulations will not apply. As noted in 46 CFR 39.10–1(a), the regulations will apply to vapor dispersion methods only when the vapors are collected through a vapor control system.

One comment stated that the term "vapor processing unit" in 33 CFR 154.802 and 46 CFR 39.10–3 should be changed to "dedicated vapor processing unit" to deal with a facility which collects vapors and routes them to an existing refinery vapor processing system, and that the regulations should not apply to that portion of a vapor control system which is part of an existing refinery vapor processing system. The Coast Guard agrees that this type of system deserves special consideration. A new paragraph (d) has been added to 33 CFR 154.800 to exempt that portion of a facility's existing vapor control system used to process vapor streams from other processes in the facility.

One comment asked how the collection of vapors of liquefied flammable gases (LFG's) will be regulated since they are exempted from these regulations. Because of the differences involved in handling vapors of LFG's, the Coast Guard's position is that they cannot be handled in this rulemaking. The Coast Guard will evaluate the need for developing regulations for collecting vapors of LFG's, and develop such regulations if deemed appropriate.

Because of the change in applicability, the section on Other Hazardous Materials (33 CFR 154.803 and 46 CFR 39.10–7 in the NPRM) has been revised and moved in the final rule to 33 CFR 154.800 and 46 CFR 39.10–1 as paragraph (b). It now requires a facility or vessel which collects vapors of flammable or combustible cargoes other than crude oil, gasoline blends, or benzene to meet

the requirements prescribed by the Commandant (G–MTH).

Seven comments were received concerning 33 CFR 154.803 and 46 CFR 39.10–7 which either stated that the section should be deleted or it should be revised to reflect applicability to only crude oil, gasoline blends, and benzene. The Coast Guard acknowledges that the regulations may not adequately address the collection of vapors of all flammable and combustible liquids, but the Coast Guard cannot ignore the safety aspect of collecting vapors of cargoes other than crude oil, gasoline blends, or benzene. Therefore, systems which collect vapors of cargoes other than crude oil, gasoline blends, or benzene, will be reviewed on a case by case basis by the Commandant (G–MTH).

One comment stated that cargoes with a flash point over 125 °F should be exempted because they will not emit vapors in the flammable range. The Coast Guard's position is that if the vapors are being collected, the system must be reviewed for safety.

One comment argued that the Coast Guard should provide a list of cargoes which are not hydrocarbon liquids to ensure that there are no additional safety considerations required for the handling of these products. Because of the changes in applicability, the reference to hydrocarbon liquids in paragraph (b) of 33 CFR 154.800 and 46 CFR 39.10–1 has been deleted.

33 CFR 154.802 and 46 CFR 39.10–3 Definitions

The NPRM proposed to redefine "facility" in 33 CFR 154.105 to include facilities which transfer hazardous materials to or from a vessel. Six comments were received regarding this change. Five of the comments appeared to have the misunderstanding that this definition only related to a facility which collected vapors. Since this proposed change was a part of rulemaking CGD 86.034, "Hazardous Materials Pollution Prevention," the comments have been referred to the project manager for that rulemaking. This definition has been deleted from this rulemaking.

Two comments stated that the definition for "existing vapor control/collection systems" should include those systems which have been submitted to and reviewed by the Coast Guard. The Coast Guard agrees. The definition has been revised to include all systems which are operating prior to the effective date of these regulations.

One comment asked if vessels operating under current Coast Guard issued letters of Compliance would be included under "existing vapor collection systems." These vessels would be included if they have a vapor collection system operating prior to the effective date of these regulations.

Ten comments expressed confusion as to where the "facility vapor connection" was actually located. They stated that it should be at the point where the shoreside vapor control system interconnects with the vapor hose or the base of the vapor collection arm. The Coast Guard agrees, and this change has been made.

Five comments expressed similar uncertainty about the "vessel vapor connection." They stated it should be at the point where the ship's vapor collection system interconnects with the end of the vapor hose or the vapor collection arm. The Coast Guard agrees, and this change has been made.

One comment stated that for the definition of "maximum allowable loading rate," the following should be added to the end of the first sentence: "or non-vapor generating cargo into unwashed tanks previously containing crude oil, gasoline, gasoline blending stocks, or benzene." The Coast Guard's position is that this change is not needed. This definition is appropriate no matter what cargo is loaded when the vapors are collected.

One comment stated that in the definitions of "lightering," "service vessel," and "vessel to be lightered," the words "flammable or combustible liquids" should be changed to "crude oil, gasoline blends, and benzene." The Coast Guard's position is that this change is not needed. The applicability section has been changed to include only those cargoes, so there is no reason to change the definitions.

Because of changes to 46 CFR subpart 39.40, the term "vessel to be lightered" has been deleted from 46 CFR 39.10–1.

One comment recommended changes so that reasonable bounds can be placed on the extent of applicability for systems that are not dedicated to marine systems. These recommendations were to change the definitions of "vapor control system" and "vapor processing unit" to limit applicability, and to replace the term "vapor processing unit" with the terms "dedicated vapor processing unit" and "nondedicated vapor processing unit" to account for facilities which are not dedicated to marine vessels. The Coast Guard agrees that some limit to applicability for this kind of facility is needed, but that the recommended changes are not necessary. A new paragraph (d) has been added to the applicability section (33 CFR 154.800) to exempt the portion of the facility's vapor control system where it connects with the facility's main vapor control system when that system also serves tank storage areas and other refinery processes.

Three comments stated that the term "means of protection" should be deleted, because other recommended changes make it unnecessary. The Coast Guard agrees. Because of changes to the regulations concerning design, review, and initial installation inspection in 33 CFR 154.804, the term is no longer used, so its definition has been deleted from 33 CFR 154.802.

One comment stated that a definition of "emergency lightering" should be added in order to exempt lightering without vapor control in an emergency situation. The Coast Guard's position is that this term is not needed. Vapor control will be required by the states, so an emergency exemption must be provided by the states.

One comment suggested that the following terms be defined: detonation arrester, flame propagation, explosive limits, flame arrester, flame screen, and electrostatic conditions; and that examples of acceptable and unacceptable devices would be helpful. The Coast Guard's position is that definitions for these terms is not necessary. These terms are either familiar with the industry, or criteria for an acceptable device is given in the regulations. Giving examples of acceptable or unacceptable devices would be interpreted as limiting flexibility.

The term "independent" has been revised to delete the last sentence, which referred to electrical wiring. The Coast Guard decided that this sentence was not needed.

The definition of "inerted" has been revised to delete "other inerting arrangements acceptable to the Commandant (G–MTH)" as unnecessary.

Because of revisions to 46 CFR subpart 39.40 of the final rule, the definition of "lightering" has been revised to delete reference to liquids intended only for use as fuel or lubricant as unnecessary, and to specify that the cargo is transferred to a service vessel.

The definition of "maximum allowable loading rate" has been changed to "maximum allowable transfer rate." The reference to 46 CFR 39.30–1(b) has been deleted since it is unnecessary.

Because of revisions to 46 CFR subpart 39.40 of the final rule, the definition of "service vessel" in 46 CFR 39.10–3 has been revised to mean "a vessel which transports flammable or

combustible cargo between a facility and another vessel."

A definition for "topping-off operation" has been added to 46 CFR 39.10–3. This term is used in the revised 46 CFR subpart 39.40.

The definition of "vapor balancing" has been revised for clarification to add that the vapors are transferred via a vapor collection system.

A definition for "certifying entity" has been added to 33 CFR 154.802. The Coast Guard decided that adding this definition would help to clarify its use in 33 CFR 154.804 and 154.806.

Definitions for "vapor destruction unit" and "vapor recovery unit" have been added to 33 CFR 154.802. These terms are used in the revised 33 CFR 154.820 of the final rule.

33 CFR 154.804 Review and Certification of System Designs and Initial Inspection

One comment stated that the proposed regulations' reference to equivalence is vague, qualitative, and unworkable, and that a quantifiable risk related to the current industry practice of open loading should be used as the base level of safety. Another comment stated that if a facility obtained Coast Guard approval, information should be submitted on equipment which was added or modified since the Coast Guard approval and a record of operating experience since the Coast Guard approval. Also, where the existing system, as modified, would not meet a specific requirement of Subpart E, an analysis or a record of actual operating experience to demonstrate an equivalent level of protection should be allowed. One comment stated that each of the criteria for a hazards analysis should be compared to the level of safety of current industry practice of open loading. The NPRM contained no reference to equivalence. The existing 33 CFR 154.108 gives the criteria applicable to facilities for exemptions. The use of a quantitative hazards analysis is just one tool to help show equivalence. Because of the limitations on quantitative hazards analysis, the Coast Guard will not allow total reliance on such an analysis. Reliable failure data on vapor control systems is not available which reduces the confidence in a close comparison by a quantitative hazards analysis. A new paragraph (d)(4) has been added to this section to allow a quantitative hazards analysis to support the qualitative hazards analysis. Because of the limitations on quantitative hazards analysis and uncertainty in failure data, the standard of acceptance is set one order of magnitude (10 times) higher than that for operating without a vapor control system. Military Standard MIL–STD–882B is given as a reference which can be used for guidance in performing a quantitative hazards analysis.

One comment stated that existing systems that have been operating satisfactorily should not have to be reviewed. Another comment stated that systems which have received Coast Guard approval and have been operating satisfactorily should only have to demonstrate an equivalent level of safety. The Coast Guard partially agrees. A new paragraph (c) has been added to this section which exempts existing systems at facilities which have been approved by the Coast Guard as long as they continue to operate with only the vessels for which they were approved. However, vapor control systems currently operating which have not been approved by the Coast Guard must submit design plans to an accepted certifying entity within 6 months after the effective date of these rules and complete certification within 24 months after the effective date of these rules.

One comment stated that there should be a 60 month period from the effective date of these regulations in which to install the vapor control equipment. This rulemaking does not contain any compliance date for requiring control of vapors when vapor control is required. Compliance dates will be established by local air quality authorities. The Coast Guard's position is that the time period in paragraph (b) of this section provides adequate time for existing vapor control systems to come into compliance with these regulations.

One comment stated that only the Coast Guard should provide system review and initial inspection. Another comment stated that the process of acceptance needs to be more strict and that the certifying entity should be independent of the designer, fabricator, owner and operator of the facility. The third party review process is being instituted because the Coast Guard does not have the resources to conduct the initial review and inspection. The Coast Guard agrees that the certifying entity must be independent. Therefore, in addition to the requirements for independence in 33 CFR 154.806, a new paragraph (i) has been added to this section to prohibit an entity which was involved in the design or installation of a vapor control system to certify the system.

One comment recommended that the Coast Guard consider the use of the certifying entity to review barge vapor collection systems. The Coast Guard has an existing mechanism for reviewing and inspecting barge construction and modification by the Marine Safety Center and local Marine Safety Offices which is appropriate for vapor collection systems.

One comment stated that the maximum review period for the certifying entity needs to be specified as six months. The Coast Guard's position is that it is not appropriate to specify the maximum review period of the certifying entity. The Coast Guard anticipates that the time period to review a vapor control system will be much shorter than six months.

Eight comments stated that 12 months is not sufficient time to complete modifications for facilities. One comment stated that 12 months may be too short if an environmental permit is needed, so there should be a provision for lengthening the time period if compliance within 12 months is beyond the facility's control. The comments recommended ranges from 18 months to 24 months from the date of notification of needed modifications from the certifying entity. One comment stated that an exemption to completing the modifications within 24 months should be provided if the facility owner can demonstrate that compliance within this time period is beyond his control. The Coast Guard agrees that the 12 month period in the NPRM was too severe. Therefore, the regulation has been amended in the final rule to require completion of modifications not later than 24 months after the effective date of this rule. The Coast Guard expects that the certifying entities will review plans as quickly as practicable.

One comment asked if the Coast Guard will be able to enforce the regulations. Five other comments stated that inspection and enforcement provisions are needed and should be adopted. One of the comments stated that facilities should be inspected at least annually. Another comment stated that periodic inspections by the certifying entities should be required. The Coast Guard currently conducts an annual exam of every facility. The Coast Guard intends to develop an enforcement program for the vapor control system which will become a part of this exam. It is the Coast Guard's position that this inspection will be adequate and a periodic inspection by the certifying entities is not needed.

One comment stated that calculations for facilities should only be provided on an as needed basis. The Coast Guard agrees. Only calculations needed to help show compliance with these regulations should be submitted. If no calculations are needed to demonstrate compliance, none have to be submitted.

Three comments stated that the requirement for a qualitative failure analysis focusing only on fire protection is inadequate and needs to include analysis of additional hazards. Two comments stated that the criteria for hazards analysis was unnecessarily restrictive and should show that the vapor control system will be safe. Three comments stated that the criteria suggested at the November 28, 1989 CTAC meeting, which broadened the criteria for the hazards analysis, would be more appropriate for the hazards analysis. The Coast Guard agrees, and paragraph (d) of this section (was paragraph (c) in the NPRM) is revised in accordance with the criteria suggested at the CTAC meeting. This criteria will provide a more complete and useful analysis than what was contained in the NPRM.

One comment stated that two levels of safety to protect the terminal from the vessel is not possible to accomplish. Another comment stated that the CTAC Subcommittee did not recommend two levels of protection, that this additional level of protection is not necessary, and that it is not cost effective. The Coast Guard disagrees with the comments, but as discussed previously the references to two means of protection for the criteria of the hazards analysis have been deleted.

Two comments stated that protection against ignition should be expanded to conform with the definition of "means of protection." Another comment stated that sources of ignition with very low probability of occurring should only require one means of protection. Because of the previously discussed changes to the criteria for the hazards analysis, "means of protection" has been deleted.

Three comments suggested that the hazards analysis should be in accordance with guidelines for hazards analysis published by the American Institute of Chemical Engineers (AIChE). The Coast Guard partially agrees. The AIChE guidelines provide good guidance in conducting a hazards analysis, but a hazards analysis should not be restricted by the guidelines. The AIChE guidelines are mentioned in paragraph (d) of this section as a source for guidance in conducting the analysis.

One comment stated that an internal review of the hazards analysis by a company's own certified employees should be acceptable in lieu of review by a separate certifying entity. The Coast Guard disagrees. While the facility's own employees may conduct the hazards analysis, it is important that the review be conducted by an independent third party in order to maintain objectivity.

Two comments stated that letters of adequacy should be issued by Commandant (G–MTH) or the Marine Safety Center. Existing provisions for letters of adequacy are contained in 33 CFR 154.325, which specifies that the letter is issued by the local Captain of the Port (COTP). The letter addresses more than just the safety of the vapor control system. Most of the safety aspects of the letter of adequacy are best addressed on the local level by the COTP, who is most familiar with the local conditions.

Nine comments addressed the type of alterations which need to be reviewed by a certifying entity as required by paragraph (g) of this section in the final rule, all wanting to eliminate review of normal maintenance or repairs. The Coast Guard agrees and has changed the paragraph to read "Any design or configuration alteration * * *.

One comment stated that a copy of the plans, calculations, and specifications should be submitted to the COTP for indefinite retention. The Coast Guard partially agrees. The plans, calculations, and specifications need to be retained, but they do not need to be retained by the Coast Guard. A new paragraph (h) has been added to this section which requires that the plans, calculations, and specifications be retained by the facility.

Two comments stated that designers of vapor control systems should be permitted to certify designs, because they represent a large source of expertise. The Coast Guard agrees. However, as discussed previously, designers of vapor control systems should not be permitted to certify systems which they designed. To remove potential conflicts of interest, paragraph (i) was added to 33 CFR 154.804 to prohibit vapor control system designers from certifying systems with which they were involved in the design or installation.

33 CFR 154.806 Application for Acceptance as a Certifying Entity

One comment expressed concurrence with the requirements in this section concerning the acceptance of certifying entities. Three comments expressed concern about the qualifications of the certifying entities. Two of these comments stated that the certifying entity should be a classification society or equivalent. One of the comments stated that certification should be by a classification society under terms similar to the current arrangement between the American Bureau of Shipping (ABS) and the Coast Guard, and that private companies should not be allowed to certify. Classification societies have most of their experience with vessels, and may not have the expertise to review facilities. The current arrangement between ABS and the Coast Guard for plan review is applicable only to the review of vessels. The Coast Guard's position is that there are other entities with the ability to review facilities other than classification societies. The Coast Guard will carefully review each application in order to ensure a high level of ability.

One comment stated that any qualified, independent professional engineer should be able to review, evaluate and analyze vapor control systems. The Coast Guard disagrees. Not all professional engineers will have the necessary experience to review vapor control systems. A professional engineer who desires to be accepted as a certifying entity must apply in accordance with this section.

One comment stated that provision should be made to obtain a letter from foreign classification societies stating that they are ready to certify facility vapor control systems. Foreign classification societies may apply to be accepted as a certifying entity just like any other organization.

One comment stated that the applicant should have the ability to review and evaluate hazards analyses in accordance with AIChE standards and any other standards that may be accepted by the Commandant (G–MTH). The Coast Guard agrees that a certifying entity should have the ability to review hazards analyses, and this provision has been added to paragraph (b)(1) of this section. However, it is not appropriate to specify the standards because the regulations do not specify the standards which must be used.

Six comments stated that owners/operators should not have to use outside firms to certify their vapor control systems since this would be an extra and unnecessary expense. The Coast Guard disagrees. While owners/operators may have very competent design personnel, an independent entity, free of all possible biases, is needed to certify the system.

Two comments stated that certifying entities should monitor and evaluate tests, but not conduct tests. The Coast Guard agrees. The regulations in 33 CFR 154.804(e) and paragraph (b)(3) of this section have been changed to reflect this.

One comment stated that some oversight program is needed to monitor review by certifying entity. The Coast

Guard intends to develop a program to oversee the certification process.

33 CFR 154.808 Vapor Control System, General

One comment expressed general agreement with this section.

Because of changes to the criteria for hazards analysis, paragraph (a) of this section has been revised to include potential overfill, overpressure, and vacuum hazards which must be eliminated or addressed in the system design and installation.

One comment stated that 150 psig maximum allowable working pressure is over-design. While another comment stated that it should be required. The Coast Guard's position is that 150 psig maximum allowable working pressure is appropriate. While 150 psig is much higher than a vapor control system should ever see in normal operation, the extra strength is needed for mechanical protection and to contain most detonations within the vapor collection system if any should occur. The requirements in paragraph (b) of this section have been revised to require that valves and flanges meet ANSI B16.5 or B16.24, 150 pound class. These standards are more appropriate than ANSI B31.3 as was proposed in the NPRM.

One comment stated that steel should not be allowed for the vapor collecting piping systems because non-steel piping will minimize the formation of iron sulfide. While this is an acceptable way of dealing with pyrophoric iron sulfide, the Coast Guard's position is that there are effective ways of dealing with the problem other than prohibiting steel pipe. Therefore, to maintain greatest flexibility in the rules, steel pipe is permitted for vapor control piping systems.

One comment stated that an outside audible and visual alarm is not appropriate for a facility which has a continuously manned control room with multiple loadings occurring simultaneously. Another comment stated that the alarms should be received in the facility control room as well as on deck. The Coast Guard agrees that the alarm need only sound in a control room, if provided. A new paragraph (e) of this section requires an alarm required by this subpart to be audible and visible at the location where the cargo transfer system and the vapor control system is controlled.

One comment expressed support for the requirement to separate or insulate the vapor control system from external heat sources to limit surface temperature to 177 °C that was given in 33 CFR 154.820(j) in the NPRM. Two comments stated that 177 °C is too high. The Coast Guard's position is that 177 °C is well below the autoignition temperatures of the applicable cargoes, but sufficiently high to allow heat tracing or steam heating of the vapor collection line if the design requires this feature. This requirement has been retained but moved to paragraph (f) of this section in the final rule.

One comment pointed out that there are ways to handle liquid condensate other than collecting it. The Coast Guard agrees. The requirement in paragraph (g) of this section (was paragraph (c) in the NPRM) has been revised to make the requirement to deal with liquid in the vapor line more flexible by making it a performance standard. It requires a means to be provided to eliminate any liquid condensate from the vapor collection system.

One comment recommended excluding liquid seal screw and other compressors not affected by liquid carryover from the requirement to have a liquid knockout vessel. Two comments stated that a liquid knockout vessel may not be needed if the compressor/blower is at the high point of the system. Another comment stated that a liquid knockout vessel is necessary regardless of whether the compressor is at the high point of the system, because entrained liquid will be carried by the gas both horizontally and vertically. Because of the previously discussed change to make paragraph (g) of this section a performance standard, the Coast Guard's position is that it is not necessary to require a liquid knockout vessel. A liquid knockout vessel is just one means of preventing liquid carryover into a compressor, and the compressor may not need to be protected from liquid carryover. The requirements in paragraph (h) of this section in the final rule have been revised to require certain features on a liquid knockout vessel if it is installed.

Two comments stated that the high level in the liquid knockout vessel should trip the compressor instead of, or in addition to, closing the vapor valve. The Coast Guard agrees, and paragraph (h) of this section has been revised to require this.

One comment stated that a requirement for expansion joints in vapor lines on ship or shore to be provided with electrical bonding connections should be included. The Coast Guard agrees. The requirement in 46 CFR 39.20-1(a)(5) requires electrical continuity on vessels and a new paragraph (i) has been added to this section to require electrical continuity at facilities.

Two comments stated that pyrophoric sulfide contaminations come from inert gas generator systems located on board vessels, and do not apply to an inerting process which uses an inert gas such as nitrogen. The Coast Guard disagrees. Pyrophoric sulfide can be a problem in inerted atmospheres regardless of the source or type of inerting gas.

Three comments pointed out that not all cargoes have the ability to generate pyrophoric iron sulfide deposits and that only facilities that handle inerted vapors from pyrophoric iron sulfide generating materials need to have provisions to control the deposits. The Coast Guard agrees. The proposed requirements in 33 CFR 154.820(o) of the NPRM has been revised in 33 CFR 154.808(j) of the final rule to require provisions to control heating from pyrophoric iron sulfide deposits if the facility handles inerted vapors of cargoes containing sulfur.

One comment suggested that a low concentration of sulfur oxides should be required in order to minimize the formation of iron sulfide deposits. Although this may be effective, the Coast Guard's position is that it is not appropriate to limit vessels to only load cargoes with a low concentration of sulfur oxides.

One comment stated that pyrophoric iron sulfide deposits can form in oxygen deficient atmospheres, not just in inerted spaces. The Coast Guard's position is that pyrophoric iron sulfide deposits will only be a problem in inerted atmospheres, enriched atmospheres will normally have sufficient oxygen to prevent iron sulfide deposits from forming.

Two comments requested clarification as to what procedures are available to protect against pyrophoric iron sulfide deposits. One comment stated that the deposits can be handled by operating procedures, such as by having a slow and controlled oxidation in the vapor line before air is allowed into the system. Another comment suggested that the requirements for facilities to control heating from pyrophoric iron sulfide deposits should be the same as for vessels. The Coast Guard's position is that the necessary provisions to control the heating from pyrophoric iron sulfide deposits depends upon the unique circumstances of each facility, such as the frequency of handling inerted vapors, the concentration of sulfur in the cargo, etc. Therefore, it is inappropriate to establish a specific criteria. Section 22.3 of ISGOTT provides guidance for dealing with the problem on vessels that can also be applied to facilities in order to control pyrophoric iron sulfide deposits.

Generally, procedures to control the heating include purging the line with an inert gas containing a slowly increasing amount of oxygen to allow the deposits to slowly oxidize, prior to introducing any flammable vapors.

Four comments stated that the unique configurations and requirements of offshore terminals have not been properly addressed, and that many of the proposed requirements will be impractical offshore and at facilities using subsea lines. One of these comments stated that the rulemaking should either be modified to account for such facilities or they should be exempted from the requirements. Another of the comments stated that recovery of vapors on board the vessel is necessary for safe vapor control. Three other comments stated that the NPRM does not address loading at mooring buoys, with one saying that this should be noted in the preamble, another saying that an entire section should be developed to address this issue, and the other saying that they should be reviewed on a case by case basis. The Coast Guard agrees that these types of facilities present some unique problems, and that having the vapor processing unit on board the vessel is a viable option. However, exempting them from the regulations is not possible since some states may require offshore terminals to collect cargo vapors emitted from vessels within their jurisdictional waters. A new paragraph (k) has been added to 33 CFR 154.814 to better address the concerns for controlling the pressure on tank vessels by these facilities.

33 CFR 154.810 Vapor Line Connections

Four comments stated there is no need for a separate isolation valve, that one automatic valve capable of manual operation would be sufficient. Two other comments stated that this separate manual isolation valve is needed, one clarified that it is needed to isolate an inactive system after completion of loading. The requirements for the automatic and manual valves have been revised. The term "automatic vapor shutoff valve" has been changed to "remotely operated cargo vapor shutoff valve" since this better describes its function. A separate manual isolation valve is required only if the facility is fitted with an enriching system and operates at a positive gauge pressure at the facility vapor connection. This is to prevent enriching gas from leaking back onto a vessel after the transfer operation is completed. Otherwise, only a remotely operated cargo vapor shutoff valve capable of manual operation is required. The revised requirement for the manual isolation valve is in paragraph (h) of this section in the final rule. The revised requirement for the remotely operated cargo vapor shutoff valve is in paragraph (a) of this section (was paragraph (b) in the NPRM).

Seven comments addressed the location of the isolation valve. All thought that there should be some distance between the facility vapor connection and the isolation valve. Two of the comments suggested "as close as practical" should be specified. The Coast Guard agrees that some distance between the facility vapor connection and the isolation valve can be allowed. The requirement in paragraph (h)(1) of this section (was paragraph (a) in the NPRM) has been revised to require the manual isolation valve to be located between the remotely operated cargo vapor shutoff valve (referred to as an automatically operated vapor shutoff valve in the NPRM) and the facility vapor connection. This will allow sufficient distance for required pressure sensors, and still locate the valve close enough to the facility vapor connection.

One comment asked if the remotely operated cargo vapor shutoff valve was to be between the ship and the detonation arrester. The requirement in paragraph (a) of this section in the final rule has been revised to require the valve to be between the facility vapor connection and the point where any inerting enriching, or diluting gas is introduced into the vapor collection line or a detonation arrester is fitted.

Eleven comments disagreed with the requirement for the remotely operated cargo vapor shutoff valve to close in five seconds, and suggested either 30 or 60 seconds for closing time. Generally, the reasoning of the comments was that five seconds closing time would cause hydraulic hammer in the lines and the closing time should be consistent with the closing time of the liquid loading valve. The Coast Guard disagrees that hydraulic hammer would be a problem in vapor lines. However, the Coast Guard does agree that 30 seconds closing time is adequate for this valve, and has revised the requirement in paragraph (a)(1) of this section accordingly.

One comment stated that the automatic vapor shutoff valve should be "fail safe." Another comment stated that the valve should fail in the closed position. The Coast Guard intreprets "fail safe" in this instance to mean fail in the closed position. The Coast Guard's position is that requiring a valve to fail in the closed position would unnecessarily restrict the type of valve which could be used, and some otherwise acceptable valves would be prohibited. However, requiring a valve to close upon loss of control signal is a reasonable requirement with added safety benefits. Therefore, paragraph (a)(2) of this section has been added to require the valve to automatically close on loss of control signal.

One comment said that the automatic vapor shutoff valve should be a "fire safe" valve. Another comment said that the valve should not be "fire safe" because the valve is solely a control valve. Because this valve will often serve as the isolation valve, it is not just a control valve. Although the Coast Guard endorses the idea that the valve should be fire safe, there is not an accepted standard for "fire safe." Therefore, paragraph (a)(6) of this section has been added which gives a criteria to make the valve fire resistant.

Two requirements have been added to the final rule for the remotely operated cargo vapor shutoff valve because the valve may be the only isolation valve. A new paragraph (a)(4) of this section requires the valve to be capable of manual operation or activation, and a new paragraph (a)(5) of this section requires the valve to have a means of determining locally the valve position.

Eight comments were received expressing disagreement with the proposed color coding of the vapor pipe and vapor hose. Four of the comments stated that bright orange is used for cargo loading hoses at offshore moorings to help pilots see them. Six of the comments said that the color coding should agree with the red/yellow/red striping criteria included in a draft API guideline. Another comment stated that the color coding requirements should be deleted because API is developing an industry guideline for manifolds. Because the API guidelines are still under development, they cannot be incorporated by reference. However, the Coast Guard agrees that the red and yellow striping arrangement in the proposed API guidelines is more appropriate, and has revised the color code requirements in paragraphs (b), (d), and (f) of this section, and 46 CFR 39.20–1 (d) and (f) of the final rule to require red and yellow striping consistent with the proposed API guidelines.

One comment said that vapor hoses do not need to be stenciled, that color coding is sufficient. The Coast Guard disagrees. The hoses need to be labeled to ensure they will not be used for anything else.

One comment recommended that vapor hoses be "marked" with black letters, "not more than" 2½ inches high.

The Coast Guard agrees, and these changes have been made in paragraphs (b), (d), and (f) of this section, and 46 CFR 39.20–1 (d) and (f) of the final rule. The Coast Guard has also revised the minimum height of the letters to 50 millimeters (2 inches).

Seven comments expressed concern about the requirements for the stud and hole in the vapor connection flanges. Four of the comments stated that it was not needed because of required color coding and pre-loading checks. Two of the comments said that hose alignment would be difficult, especially for floating hoses. One of the comments suggested that the requirement be operational. Three of the comments also said that the stud system could be defeated by the use of adapters or by sawing off the stud. The Coast Guard's position is that because of the severe consequences of a misconnection, a mechanical means of preventing misconnection is necessary, and that color coding and pre-loading checks are not sufficient. The Coast Guard has revised the requirements in paragraphs (b), (c), (d), and (f) of this section, and 46 CFR 39.20–1 (e) and (f) of the final rule to facilitate alignment. Only the vessel and facility vapor connection flanges are required to have the studs. Vapor hose and vapor collection flanges can have floating flanges or flanges with multiple holes to facilitate alignment. It is true that this method of protection could be defeated, but the operator must be aware of the possible consequences, which could include civil penalties, condemnation of vapor connection flanges with corrective requirements, or operational restrictions.

One comment suggested that the stud arrangement should agree with the proposed API standard, which calls for it to be located at the top of the flange. The Coast Guard agrees and has revised paragraph (c) of this section and 46 CFR 39.20–1(e) accordingly.

Seven comments stated that 100 psig for the burst pressure of vapor hoses is too high and recommended that 25 psig burst pressure would be sufficient. Their arguments were that 100 psig burst pressure will require heavier and more expensive hoses than necessary, and less strong hoses will be sufficient if they are abrasion resistant. The Coast Guard agrees and has revised paragraph (d) of this section and 46 CFR 39.20–1(f) to require hoses with a burst pressure of 25 psig and working pressure of 5 psig which are resistant to abrasion and kinking.

Because of the reduced vapor hose strength allowed, the Coast Guard has decided that provisions are needed to prevent a hose from collapsing when it is handled. A new paragraph (e) has been added to this section and a new paragraph (g) has been added to 46 CFR 39.20–1 which requires vapor hose handling equipment to be provided with hose saddles which provide adequate support to prevent kinking or collapse of a hose.

Two comments expressed disagreement with the requirement for a maximum hose resistance of 1 million ohms (1 Mohm). One of the comments recommended 200 ohms. The other comment recommended 1,000 ohms. The Coast Guard agrees that 1 Mohm is too high, and has revised paragraph (d)(4) of this section and 46 CFR 39.20–1(f)(4) in the final rule to require a maximum resistance of 10,000 ohms.

One comment expressed concurrence with the requirement for the insulating flange in paragraph (g) of this section. Four other comments stated that it should not be required. One of the comments stated that the insulating flange is inconsistent with the requirement for electrical continuity of hoses. Another of the comments stated that the insulating flange should be left to the discretion of the facility to be consistent with the grounding of the vessel. The other stated that it was inconsistent with current practice of grounding the vessel. The Coast Guard's position is that it is not inconsistent with the hose requirement for continuity and it is not dependent upon grounding of the vessel. The hoses need to be conductive to dissipate static charges to either the facility or the vessel. Without the insulating flange, there is potential for arcing when the connections are made up or disconnected, even if the vessel is grounded to the facility by a separate grounding.

Three comments said that a non-conducting length of hose should be allowed in place of the insulating flange, as is often currently used. The Coast Guard agrees. The requirement in paragraph (g) of this section has been revised to require insulation of the vessel vapor connection in accordance with ISGOTT, which allows a single length of non-conductive hose.

One comment recommended adding a definition for insulating flange. The Coast Guard's position is that this is not necessary. The revised requirement refers to ISGOTT, and does not mention insulating flange. The term is used in ISGOTT and is adequately described there.

33 CFR 154.812 Facility Requirements for Vessel Liquid Overfill Protection

Two comments stated that paragraph (b) of this section (paragraph (a) in the NPRM) should be revised to clearly indicate that the automatic cargo loading shutdown system, which is connected to the barge, is only required when the barge has no other means of overfill protection. The Coast Guard agrees. The requirement has been revised to require the system only when it is the barge's only means of overfill protection.

Twelve comments stated that the automatic shutdown system in paragraph (b) of this section should either be made voluntary or deleted. One of the comments stated that if the facility installs a system other than an overfill control panel, the barge must have a backup overfill protection system. One of the other comments stated that the API risk analysis did not find the need for such a system. Two of the comments stated that the system was rejected by the CTAC Subcommittee because it would degrade safety. The Coast Guard disagrees with these comments. This system was developed by the CTAC Subcommittee as a cost-effective method and included in the recommendations to the Coast Guard. This system was also accepted by the API hazards analysis. An emergency shutdown system is already required by 33 CFR 154.550 which allows for a vessel linkage to the facility by electrical, pneumatic, or mechanical means.

Two of the comments stated that independent systems would be safer. The Coast Guard disagrees. An independent shutdown system located on the barge could create surge pressures in the cargo loading hose or the facility's piping which the facility was not designed to handle.

Another of the comments stated that the system was not practical, because the facility panel would be required to monitor as many as 40 tanks on the barge. The Coast Guard disagrees. The facility's control panel would be independent of the number of tanks on the barge. All of the sensors in the tanks are required to be connected in series, so that a high level in any of the tanks would activate the shutdown system, and only one control circuit is needed.

Three of the comments stated that an automatic shutdown was not needed, that the proposed high level alarms would be sufficient. The Coast Guard disagrees. The high level alarms of 46 CFR 39.20–7 are not mandatory for barges. The automatic shutdown system is in lieu of the high level alarms.

Two of the comments stated that the system would be relied upon by the crew as the means to load the barge instead of careful monitoring, resulting in a net reduction in safety. There is a

danger of complacency with any automatic alarm or shutdown. Proper training and management oversight will be necessary to help prevent this.

Four comments pointed out that this system could cause confusion between vessel and facility personnel concerning responsibility and liability. The Coast Guard's position is that if the pre-loading checks and tests are properly performed, this should not be a problem.

Because of objections received to the automatic shutdown, paragraph (a) of 46 CFR 39.20-9 has been revised to allow dual high level alarms on tank barges if they are fitted with an electrical shore power connection to power the alarms. To supply a shore power connection, a new paragraph (a) has been added to this section for the facility to provide a suitable electrical shore power connection, and this paragraph gives the requirements to standardize the connection. Vessels and facilities may prefer to go to this type of arrangement in lieu of paragraph (b) of this section (was paragraph (a) in the NPRM).

Four comments stated a need for standardization of the system. The Coast Guard agrees. API is developing a guideline for standardizing the system connection. Some requirements from the draft API standard have been added to paragraph (b) of this section, as well as references to additional standards, to provide the degree of standardization necessary.

Two comments suggested including the requirements for intrinsically safe wiring in 46 CFR 111.105. The Coast Guard disagrees with the need to cite the intrinsically safe wiring requirements of 46 CFR 111.105 in paragraph (b) of this section. However, a reference to 46 CFR 111.105 has been added in paragraph (a)(3) of this section to require that the shore power connection equipment be listed by an independent test organization.

Four comments suggested that the cargo pump does not always need to be shut down when loading is shut down. One comment suggested that the requirement for shut down is inconsistent with the 30 to 60 second shutdown in 33 CFR 154.550(c). The Coast Guard agrees. The requirement in paragraph (b)(1) of this section has been revised to require loading to be shutdown in accordance with 33 CFR 154.550. This section requires shutdown within either 30 or 60 seconds of receiving the shutdown signal, depending on the age of the facility. This change was necessary because a maximum time needs to be established so that barges will know the amount of time they will have to secure loading in order to set the sensors at the proper level.

Paragraph (b)(1) of this section has been revised to require that the remotely operated cargo vapor shutoff valve be closed upon receiving the shutdown signal. The Coast Guard has determined that this is needed as a precaution to prevent liquid from being drawn into the vapor collection line if the tank were to become overfilled.

One comment suggested that the cable for receiving the signal from the barge should be supported to prevent mechanical damage. The Coast Guard's position is that while in most cases it would be prudent to support the cable, it is not appropriate to require it in all situations.

Two comments confirmed the requirement that the alarms should be visible and audible on both the dock and the vessel, and they should be distinctive from other alarms. One of the comments suggested that the high level alarm should have a yellow strobe light or rotating beacon with a distinct low frequency sounder, and the high level shutdown alarm should have a red strobe light or rotating beacon with a distinct high frequency sounder. While the Coast Guard agrees that such distinctiveness is prudent, this is an area which can best be addressed by an industry standard.

33 CFR 154.814 Facility Requirements for Vessel Vapor Overpressure and Vacuum Protection

Two comments stated that 33 CFR 154.814 should clarify that this section applies only for shoreside equipment. The Coast Guard agrees and has changed the title for this section to clarify this.

Seven comments stated that a 25% factor for vapor pressure is excessive for certain cargoes. The comments suggested that the factor should be based upon the cargo loaded, or 5% or 20% for benzene. The Coast Guard partially agrees. The 25% factor is valid for most cargoes. Most available information gives figures which are based on average loading. For this application, the most severe case with turbulent loading is needed. However, the Coast Guard realizes that some facilities may handle only heavy crude oils or other cargoes with low vapor pressures, and has added a provision to paragraph (a) of this section that a lower factor can be used if the facility owner/operator can show that the most volatile cargo under the most severe conditions will have a lower figure.

Two comments stated that a facility's maximum liquid transfer rate, as referred to in paragraph (a) of this section, is difficult to determine at a complicated refinery with a number of loading pumps available and a number of loading berths. The Coast Guard agrees that this figure may be difficult to determine, but the designer will have to use some figure as a basis for designing the size of compressors, vapor collection piping, and the vapor processing unit. This may require limiting the number of pumps which will be used.

Three comments pointed out that as proposed, a facility would be required to size its vapor collection system for the highest loading rate for any liquid product, even if that product did not require vapor control. The Coast Guard agrees, and has revised 33 CFR 154.814(a) to specify that the maximum design loading rate is for cargoes for which the vapors will be collected.

Fourteen comments expressed disagreement with the required pressure ranges given in paragraph (b) of this section. Another comment stated that the pressure range specified in paragraph (b) of this section should be maintained at the vessel vapor connection rather than the facility vapor connection. The purpose of this requirement is to limit the pressures in the cargo tanks to acceptable levels. The following paragraph discusses this more fully.

Another comment suggested that the pressure range given in paragraph (b) of this section should be maintained in the vessel's cargo tanks, based on the pressure measured at the facility vapor connection, corrected for pressure drops across the vessel's vapor collection system and the vapor transfer hose/loading arm. The Coast Guard agrees with the concept of maintaining the pressure in the cargo tanks corrected for pressure drops. Paragraph (b) has been revised to reflect this concept. However, the pressure range has been changed. Since the allowable pressure range will be the pressure in the tank, the range can be based upon the actual tank conditions. Therefore, the upper range has been changed to 80% of the pressure relief valve setting, and the lower range for non-inerted vessels has been changed to 80% of the setting of the vacuum relief valve. A new paragraph (c) has been added to this section to require the pressure drop across the vessel's vapor collection system and the vapor hoses to be taken into consideration in order to maintain the pressure in the tanks.

One comment stated that the pressure sensing device should be specified to be intrinsically safe. The Coast Guard disagrees. The pressure sensing device is not required to be electrical. Where it

is electrical, 33 CFR 154.808(c) requires all electrical equipment to comply with the National Electric Code.

One comment stated that the vapor overpressure and vacuum protection must activate upon loss of continuity of the tank vessel's overflow control system circuitry. A tank barge fitted with an overflow control system in accordance with 46 CFR 39.20–9(b) will be protected from overpressure and excessive vacuum. The requirements in paragraph (b) of this section requires the shutdown system to be activated by loss of continuity in the sensor system and the remotely operated cargo vapor shutoff valve to close upon activation of the shutdown system.

Two comments stated that the pressure shutdown settings should be fixed for all loading operations to avoid erroneously setting the shutdown levels. One of the comments suggested 0.5 psi vacuum and 1.2 psig pressure. Another comment stated that the shutdown system should be activated when the pressure falls below a low pressure shutdown limit that is equal to or greater than the vacuum relief limits of vessels loaded at the facility. The Coast Guard agrees with the concept of fixed settings for shutdown, but recognizes that the vessel can be better protected if the settings are adjustible. The requirements in paragraphs (f) and (g) of this section have been revised to require an upper and lower limit for the shutdown settings at 2.0 psig for high pressure, and 1.0 psi vacuum for high vacuum, and allows the settings to be adjusted within this range. These paragraphs have also been revised to require the emergency shutdown system required by 33 CFR 154.550 to be activated at these pressure settings.

One comment pointed out that the high pressure shutdown need not cause the automatic vapor shutoff valve to close if there is a means of detecting backflow of gas from the facility to the vessel, and if backflow is detected to the vessel, the cargo transfer and vapor shutoff valves are closed. Two other comments stated that automatic shutdowns are not needed. Another comment stated that the low pressure shutdown should not require shut down of the cargo transfer, since the cargo loading will increase the pressure in the cargo compartments. The Coast Guard agrees that automatic shutdown of cargo transfer is not needed on low pressure, but disagrees with the other comments. Paragraph (g) of this section has been revised to delete the requirement to automatically stop cargo transfer when the low pressure shutdown is activated. Backflow of gas from a facility to a vessel is not the only means to overpressure a vessel. The liquid cargo may be entering the cargo tanks faster than the vapor control system can draw the vapors off the vessel. Without knowing what is causing the abnormal pressure, the safest practice is to secure both cargo and vapor transfer and isolate the vessel from the facility.

Four comments stated that root valves should be allowed in the line for the pressure sensing device to allow for in-line testing or repair of pressure sensing devices. The Coast Guard agrees. The requirement in paragraph (h) of this section was not intended to prevent root valves in the sample line. One comment suggested placing locking devices on the instrument isolation valves. The Coast Guard does not consider this to be necessary. Paragraph (h) has been revised to specify the location of the sensing device between the facility vapor connection and the manual isolation valve.

Twelve comments stated that a designer should be able to choose a mechanical relief valve instead of a liquid vacuum breaker. The Coast Guard agrees and has revised 33 CFR 154.814(j) to allow this flexibility by requiring a "vacuum relief valve."

One comment pointed out that some blowers may be incapable of developing more than 1.0 psi vacuum and should not have to have a vacuum relief valve. The Coast Guard agrees and has revised paragraph (j) of this section to require the vacuum relief valve only if the compressor, blower, or eductor are capable of drawing more than 1.0 psi vacuum.

Two comments stated that pressure and vacuum relief valves should be required to have means to prevent the passage of flame, such as a flame screen. A second comment stated that the capacity test for the vacuum relief valve should include a flame screen connected to the valve. The Coast Guard agrees and paragraph (j) has been revised to require a flame screen fitted at the opening of a vacuum relief valve and that the valve be flow tested with this screen in place.

One comment stated that the location of the safety relief valves should not be specified since the hazard evaluation will indicate the optimum location. While paragraph (j) of this section does not specify an exact location, it requires the valve to be located between the vapor connection and the vapor compressor or blower. The exact location is left to the designer.

Several comments were concerned that the pressure control requirements would adversely impact offshore terminal design. The Coast Guard agrees and a new paragraph (k) has been added to 33 CFR 153.814 to address this issue for facilities with offshore loading moorings with undersea pipelines. This paragraph allows the facility to develop a vacuum greater than 1.0 psi vacuum in order to draw the vapors through the long undersea pipeline. However, the pressure drop in the vapor hoses and undersea pipeline must be considered and, since the actual pressure drop depends on the velocity of the vapors, the actual loading rate must be considered.

Two comments stated that additional relief valves are only needed if gasses are injected into the system, because the vessels are protected by on board valves. The Coast Guard agrees and has revised paragraph (l) in the final rule (paragraph (h) in the NPRM) to only require the pressure relief valve if inerting, diluting, or enriching gas is injected into the vapor stream and is capable of exceeding 2.0 psig.

One comment stated that requiring the capacity of the pressure relief valve to include a vapor generation factor of 25% is too high for some cargoes. Because of the previously discussed revision to paragraph (l) of this section, the reference to maximum loading rate and the vapor generation factor have been removed. The facility vapor relief valve is only required to have a capacity equal to the maximum capacity of the inerting, enriching, or diluting gas source.

One comment stated that 2.0 psig is too low for the relief valve to allow for unassisted vapor balancing. The Coast Guard disagrees. While a vessel may have a high setting for its pressure relief valves which allows for higher pressure than 2.0 psig on the vessel, there will be a pressure drop across the vapor collection lines which will likely reduce the pressure below 2.0 psig. A lower setting would not adequately protect the majority of vessels which are likely to load at a facility. However, a facility which loads dedicated vessels with high pressure relief valve settings may apply to the Coast Guard for an exemption from this requirement.

One comment stated that fixed orifices to limit injection flow will more reliably protect against the hazard of overpressurizing from the injection gas than a pressure relief valve. The Coast Guard disagrees. While using fixed orifices may be safer than using a control valve, there is still the danger of a blockage in the vapor collection line, which would allow the pressure to build up.

One comment stated that the pressure relief valve must also have a capacity

equal to that of the blowers. The Coast Guard disagrees. While the capacity of the blower is a factor in the sizing of the vacuum relief valve, it is not a factor in the sizing of the pressure relief valve required by these regulations.

Two comments expressed uncertainty as to whether the requirements in 33 CFR 154.820(p) of the NPRM would require flame arresters on the outlet of pressure relief valves. To clarify this, paragraph (l) of this section has been revised to require a flame screen at the outlet of a pressure relief valve. Unless the pressure relief valve is a high velocity vent valve, flash back through a pressure relief valve is possible if there is no means provided to prevent it. A comment pointed out that a vacuum relief valve should be tested for venting capacity with the flame screen attached. Paragraph (j) has been revised to require a vacuum relief valve to be tested for relieving capacity with a flame screen fitted. A new paragraph (m) has been added to require a pressure relief valve to be tested for relieving capacity with a flame screen fitted unless the valve is a high velocity relief valve.

One comment stated that the pressure relief valve should be located between the point where inerting, enriching, or diluting gas is introduced and the vapor assist device or the vapor processing unit, with no valves allowed in between. The Coast Guard disagrees. A location between the point of gas injection and the facility vapor connection offers better protection to a vessel connected to the vapor control system.

One comment questioned the location of the pressure relief valve relative to the manual isolation valve. The NPRM proposed to require the pressure relief valve to be located upstream of the detonation arrester and the injection point of the inerting, enriching, or diluting gas. The reference to the detonation arrester has been deleted from paragraph (l)(1) of this section (paragraph (k)(4) in the NPRM). While the pressure relief valve could be located on either side of the manual isolation valve or the remotely operated cargo vapor shutoff valve, the Coast Guard anticipates that it will normally be located in close proximity to the point where inerting, enriching, or diluting gas is injected into the system.

One comment stated that the pressure relief valve should be able to be part of the vacuum relief valve. The Coast Guard agrees. There is nothing in this rule to prohibit this.

Seven comments stated that measurement of the loading rate, proposed in paragraph (l) of this section in the NPRM, should not be required. Five of the comments stated that provisions for overpressure would be adequate. Four of the comments were concerned that a "means" to determine the loading rate would require cargo metering equipment. The means to determine the loading rate does not have to be metering equipment in the cargo loading line. Pump capacity curves or a continuous facility tank gauging system is also acceptable. The Coast Guard realizes that this paragraph created an excessive amount of confusion. The requirements in 33 CFR 154.850(g) require the loading rate to be less than the maximum allowable transfer rate. The Coast Guard does not intend to specify how the facility will ensure that the maximum allowable loading rate is not exceeded. Therefore, the requirement in paragraph (l) of the NPRM is redundant and has been deleted from the final rule.

33 CFR 154.820 Fire, Explosion, and Detonation Protection

Nine comments were received which disagreed with the approach taken in this section. Most stated that the requirements of this section were too specific and inflexible, and that they would not allow for future technology. This section has been extensively revised and reorganized into five separate sections to make it as flexible as possible while ensuring adequate protection. These changes are discussed in more detail in the following paragraphs. The requirements allow for the development of new technology.

One comment said that systems should be designed to prevent ignition from ever occurring, claimed that a detonation cannot be stopped, and proposed that automatic devices be required at all critical points in the overall system. The Coast Guard agrees that the system should be designed to prevent ignition from occurring, and the requirements in this subpart are designed to do that as much as possible. However, all possible sources of ignition cannot be eliminated, so provisions are required to stop the spread or minimize the damage from an ignition. The Coast Guard disagrees that a detonation cannot be stopped. Detonation arresters are designed to do just that. An inerting, enriching, and diluting system is also capable of stopping a detonation flame front, although the pressure wave will continue until it is dissipated. Most automatic shutdown devices cannot react fast enough to shut down and isolate the system once a detonation wave has developed.

Two comments stated that the test for equivalence should specifically state that the rulemaking is designed to not reduce the level of safety below that of the current industry practice of open loading, and any system seeking approval as equivalent would be approved when a hazards analysis shows that it meets or exceeds the base level of safety. Existing provisions for equivalence are contained in 33 CFR 154.108, and the Coast Guard's position is that these provisions are adequate. A hazards analysis is just one tool to help show equivalence.

One comment stated that events with a very low probability of occurrence could either be ignored or require fewer means of protection. Because of revisions to 33 CFR 154.804, the term "means of protection" is not referred to in this rulemaking. Revisions to this section take into account vapor processing units which have lower probabilities of ignition than vapor destruction units.

One comment stated that low pressure disks that enable flame to blow out at designated, controlled points provides a greater degree of safety than high pressure containment designs and devices. The Coast Guard disagrees. While blowout disks are not prohibited, these alone are not adequate since in a detonation the flame front will precede the pressure wave.

Twenty comments were received which objected to the mandatory installation of detonation arresters at all facilities as proposed in paragraph (a) of this section in the NPRM. Nine of the comments expressed concern over the unproven technology, the lack of testing, and the unavailability of detonation arresters. An API test program is expected to begin testing detonation arresters in actual detonations in March 1990. The Coast Guard expects that several of the models will pass the tests and that availability of the arresters will be adequate. Nine of the comments stated that the mandatory use of detonation arresters would limit flexibility unnecessarily, and will not necessarily be more effective than other devices or systems that are or may become available. The Coast Guard agrees and has revised this section to allow more flexibility. Detonation arresters are not mandatory for a vapor control system with a single facility vapor connection which either uses a vapor recovery unit or only receives vapor from inerted vessels.

Two comments stated that the requirement to install detonation arresters should be deleted until the standard is published for comment. The draft ASTM standard was published as appendix A in the NPRM for comment.

One comment recommended allowing a flame arrester with a high temperature

shutdown. The Coast Guard disagrees. Most flame arresters do not have the strength to withstand the pressures generated by a detonation and are not designed to quench a flame front traveling at sonic velocities.

One comment asked if liquid seals could be used in place of a detonation arrester. A liquid seal will be acceptable if it meets the material design standards and the test requirements in appendix A of 33 CFR part 154.

Eight comments disagreed with the proposed requirement in paragraph (a)(3) of this section in the NPRM to require the detonation arrester to be installed within 6.0 meters of the facility vapor connection. They recommended the arrester be allowed to be located "as close as practical" or "as close as feasible" to the facility vapor connection. The Coast Guard disagrees. Such language in regulations would be difficult to enforce. It is important that the detonation arrester be as close to the vessel as possible, and a facility should be able to find room within 6.0 meters of the facility vapor connection. Six of the comments appeared to be uncertain as to where the facility vapor connection is located. The definition of "facility vapor connection" has been revised to clarify this in 33 CFR 154.802 and 46 CFR 39.10–3. As a result of the reorganization of section 33 CFR 154.820 as proposed in the NPRM, the requirements for location of detonation arresters are contained in paragraphs (b)(1), (c)(1), (d)(1), (e), (f)(1), and (g)(1) of this section.

Two comments stated that the number of pipe diameters which would allow a flame to propagate to a detonation should be given, so that flame arresters could be accepted as an alternative. The Coast Guard disagrees. There are too many factors which can affect the run-up distance to reach a detonation. In addition, if an ignition were to occur on the vessel, it would have the length of the vapor collection piping on the vessel plus the length of the vapor hose to build up to a detonation. Therefore, the run-up distance to reach detonation is not relevant.

Seventeen comments disagreed with the mandatory use of inerting, enriching, or diluting for all vapor control systems. Some of the comments stated that it would force facilities to incinerate cargo vapor, economically prohibit refrigeration units, and increase the size of vapor control systems. Several of the comments pointed out that carbon bed adsorption and refrigeration units have proven safety records. Some of the comments pointed out that the API hazards analysis showed that flammable vapors could be handled safely. Three comments expressed support for inerting, enriching, or diluting of all vapors. They pointed out that incinerators have flames, carbon beds can overheat, refrigeration systems have rotating equipment, and compressors and blowers can be ignition sources. One of the comments claimed that enriching cargo vapor would not force facility owners to choose combustion and would not increase the size of the recovery system.

The requirements to inert, enrich, or dilute in this section have been revised. The Coast Guard has concluded that inerting, enriching, or diluting is not necessary for all installations. It will not be mandatory for a vapor control system with a single facility vapor connection which either processes vapor with a vapor recovery unit, only receives vapor from inerted vessels, or vapor balances; and for a vapor control system with multiple facility vapor connections which processes vapor with a vapor recovery unit.

Three comments stated that the fire protection requirements for facilities with multiple berths need additional study and development. One of the comments stated that each facility with multiple berths should be studied and approved on an individual basis consistent with the findings of the API hazards analysis. The Coast Guard agrees that the regulations do not address every aspect of multiple berths. It is difficult to anticipate every type of vapor control system design which will be used and develop the appropriate requirements. These regulations give general requirements which should be applicable to most systems. The hazards analysis and the review by the certifying entity are means to help uncover details in system designs which are not adequately covered and may cause a hazardous situation. The fire protection requirements that were in 33 CFR 154.820(i) of the NPRM have been deleted from the final rule, and all of § 154.820 has been reorganized to give the fire protection requirements for multiple and single berth facilities separately. Paragraph (e) of this section gives the requirements for a multiple berth facility which has a vapor recovery unit, and paragraph (f) of this section gives the requirements for a multiple berth facility which has a vapor destruction unit.

One comment stated that the subject of individual pressure control stations leading to a common collection pipeline with appropriate shutdown valves and non-return valves needs additional treatment in the rules. This comment is similar to the comments discussed in the previous paragraph. While detailed requirements may not be included, 33 CFR 154.814 gives the requirements that must be met at each facility vapor connection for each vessel simultaneously using the vapor control system. It is up to the designer to determine how to meet the requirements. The hazards analysis and the review by the certifying entity will help to uncover additional details in a system which could create a hazardous system.

A vapor control system with a single facility vapor connection which only receives vapor from inerted vessels and processes vapor with a vapor recovery unit must verify that the vapors are inerted. A vapor control system with a single facility vapor connection which only receives vapor from inerted vessels and processes vapors with a vapor destruction unit must either have a detonation arrester or an inerting system. A vapor control system with a single facility vapor connection that receives non-inerted vapor from a vessel and processes vapor with a vapor recovery unit must have either a detonation arrester or an inerting, diluting, or enriching system. A vapor control system with multiple facility vapor connections that processes vapor with a vapor recovery unit must have a detonation arrester at each facility vapor connection. A vapor control system that uses vapor balancing must have detonation arresters at the facility vapor connection and at the storage tank, and must have high level alarm and overfill control systems at the storage tank. All other vapor control systems must have both a detonation arrester and an inerting, enriching, or diluting system. The requirements in 33 CFR 154.826(a) require facilities which do not have an inerting, enriching, or diluting system to have the inlet and outlet of each vapor compressor or blower protected by either a flame arrester, detonation arrester, or an explosion suppression system acceptable to the Coast Guard. This approach allows maximum flexibility while maintaining a minimum level of safety.

One comment stated that the regulations should be independent of climate zones, including cold climate zones, therefore, enrichment or air dilution should not be allowed. The Coast Guard disagrees. Although there will be problems to overcome if enrichment is used in cold weather, the problems can be overcome. In addition, a facility's vapor control system can be tailored for the specific climate at its location, whereas vessels must be

designed to operate over a wider range of climatic conditions.

One comment stated that cargo tank inerting is needed to eliminate flammable vapor throughout the system because an ignition on a vessel will have a much more devastating effect on the vessel and surrounding area than an ignition at a facility. While the Coast Guard agrees that inerting the cargo tank vapor space on the vessel will eliminate this additional hazard, it does not agree that this increase in safety is worth the additional expense and complexity that would result from requiring inertion on all tankships and tank barges.

Two comments stated that explosion suppression systems should be tested, that design criteria should then be developed, and that provisions for such systems in lieu of inerting, enriching, or diluting systems should be added in the regue systems.

Two comments stated that vapor balancing should be added as a method of controlling the vapor mixture. The Coast Guard agrees that vapor balancing should be allowed. Although the NPRM did not prohibit it, by requiring inerting, enriching, or diluting, vapor balancing was impractical. With the revision to this section, a vapor balancing system will be more practical. A new paragraph (g) has been added to this section which permits vapor balancing when detonation arresters are installed at the facility vapor connection and at the cargo storage tank. Control of vapor emissions where the facility cargo storage tank is filled becomes a separate but linked problem which can be addressed by 33 CFR 154.800(d).

One comment stated that halons should not be allowed, considering the recent resolution adopted at IMO. The Coast Guard disagrees. The regulations do not require the use of explosion suppression systems that use halon. Manufacturers of fire fighting systems are actively looking for other equally effective media. The prohibition of halons is not appropriate at this time. However, a facility owner must bear in mind that the availability of halon is likely to be limited in the future and that future rulemakings may prohibit its use.

One comment suggested that the term "lower explosive limit" should be used instead of the term "lower flammable limit." The Coast Guard disagrees. While lower flammable limit and lower explosive limit have the same meaning, only one should be used in this rulemaking for consistency. It is the Coast Guard's position that lower flammable limit is more descriptive of the actual conditions. Because of the reorganization of the fire protection requirements, lower flammable limit and upper flammable limit are referred to in 33 CFR 154.824 in the final rule.

One comment expressed support for requiring an alarm to be seen and heard where the cargo transfer and vapor control system are controlled, and anywhere the operator may be reasonably expected to be located. One comment stated that the alarm only needs to be heard in the cargo transfer control area. The Coast Guard's position is that any alarm must at least be audible and visible where the cargo transfer and vapor control systems are controlled. Another comment stated that the point where the cargo transfer is controlled needs to be defined to ensure that it is not considered to be on the vessel. The Coast Guard's position is that this is not necessary. The term is clear enough to indicate that this is the place at the facility where cargo transfer is controlled. This requirement was moved to 33 CFR 154.808 in the final rule because it is applicable to more than just alarms for fire protection. The provision proposed in 33 CFR 154.820(h) of the NPRM to require the alarm to also be audible and visible anywhere the operator may be reasonably expected to be located has been deleted from the revised 33 CFR 154.808(e) of the final rule because it is not needed.

Three comments stated that requiring the analyzers to be not more than 3.0 meters from the facility vapor connection for facilities which only receive vapors from inerted vessels and do not have a source of inert gas is not sufficient. Two of the comments suggested that 6.0 meters be allowed. The Coast Guard agrees. The proposed requirement in 33 CFR 154.820(g)(3) of the NPRM has been revised in paragraph (a)(2) of this section in the final rule to allow a 6.0 meter distance. This paragraph has also been revised to allow only one oxygen analyzer to be used to verify the oxygen content of vapors coming off the vessel.

One comment stated that 33 CFR 154.820(g)(3) in the NPRM would prohibit pre-inerting of a vessel. The Coast Guard does not agree. The requirement has been revised in paragraph (a)(2) of this section in the final rule and neither the proposed nor the revised version of this paragraph would prohibit pre-inerting of the vessel.

Two comments stated that a vessel's inert gas system should be allowed to purge the collection lines prior to cargo transfer, which can be done while ballast from cargo tanks is being transferred ashore. The Coast Guard agrees. This is not prohibited by paragraph (a) of this section.

Six comments objected to the proposed requirement in 33 CFR 154.820(i) of the NPRM for a detonation arrester at the junction point of each branch. Three of the comments stated that short branches do not need the detonation arresters and will only add a significant pressure drop to the system. Two of the comments stated that the hazard evaluation will indicate where and what type of safety devices are needed. One of the comments stated that detonation arresters are not needed at the junction point because of other safeguards. Five comments raised objections to the requirement in 33 CFR 154.820(i) of the NPRM to provide dual means of isolation of branches at the junction point of a multiple berth system. One of the comments stated that the hazard evaluation would determine if the double valves were needed. One of the comments stated that double block and bleed valves have not been accepted in the past for use in an inert gas system. Another of the comments suggested liquid seals be permitted to isolate the branches. One of the comments stated that a single shutoff valve should be sufficient. One of the comments stated that the junction point may be in an inaccessible location, and it should be permissible to isolate the branches upstream of the junction point. Another comment suggested that a branch line may remain open to the downstream system if a purge gas is supplied continuously to the open unused branch. With the extensive revisions to 33 CFR 154.820 to differentiate between vapor destruction systems and vapor recovery systems, and single and multiple vessel vapor collection systems, the Coast Guard has determined that the requirements in 33 CFR 154.820(i) (2) and (3) of the NPRM are no longer necessary and has deleted them. The Coast Guard has also determined that the prohibition against mixing different methods of controlling the vapor mixture contained in 33 CFR 154.820(i)(1) of the NPRM is not needed and has deleted it. However, one aspect of mixing inerted and enriched vapors needs to be addressed. An enriching system which uses oxygen analyzers will not operate properly if inerted vapors are received unless special provisions are made. Paragraph (k) has been added to 33 CFR 154.824 to provide requirements for an enriching system which receives inerted vapors.

Eight comments requested clarification of the requirement to provide flame arresters at all outlets of the vapor control system. One comment pointed out that it would require a vent on double block and bleeds and low

point drains. Two comments stated that flame arresters should not be required on unintended openings such as open hatches, fittings, relief valves, and drains. Four comments stated that flame arresters should be required for normal vapor vents to atmosphere, except for stacks on combustion units. Two comments stated the only outlets will be pressure relief vents, and a plugged flame arrester could cause a relief valve to be ineffective. One comment suggested that a flame arrester or flame screen should be installed on the outlet of the vapor processing unit if a flammable mixture can occur, which would include all processing units except for combustion devices. The Coast Guard agrees that the requirement needs clarification. The regulation proposed in 33 CFR 154.820(p) of the NPRM has been revised in 33 CFR 154.820(h) of the final rule to require a flame arrester at each outlet of a vapor control system that vents to atmosphere which is not isolated with a pressure vacuum relief valve. The Coast Guard's position is that a flame screen would not be sufficient to prevent flashback into the system at these outlets. This would exclude non-normal vent outlets and stacks of combustion devices.

One comment stated that the NPRM ignores unintended openings such as open hatches, fittings, and relief valves, and that intentional or accidental leakage should not be tolerated. The degree of tightness sought by this comment appears to go beyond what is required for safety and addresses effectiveness for air pollution control. The Coast Guard does not have statutory authority to regulate effectiveness for air pollution control. This rulemaking addresses tightness insofar as it affects safety, such as requirements to close load and close gauge. It would be unsafe to not allow pressure relief valves to vent in an overpressure condition. However, the requirements in this rulemaking are designed to prevent a relief valve from opening except in an emergency condition.

One comment stated that the hazard evaluation will indicate where and what type of safety devices are needed for fire protection. The Coast Guard disagrees. A hazard evaluation is not required to know that a flame arrester is needed at certain vent outlets. However, the hazard evaluation may point out a need for additional safety features at other outlets.

33 CFR 154.822 Detonation Arresters, Flame Arresters, and Flame Screens

This new section consolidates general requirements for detonation arresters, flame arresters, and flame screens.

Appendix A of the NPRM contained the draft Standard Specification for Detonation Flame Arresters. Because this standard has not yet been adopted by ASTM, it is included in this rulemaking as appendix A to 33 CFR part 154. Paragraph (a) requires a detonation arrester to be capable of arresting a detonation from either direction and to be acceptable to the Commandant (G-MTH). A detonation arrester built and tested in accordance with appendix A is acceptable.

One comment recommended that a detonation arrester have a rupture disk which would divert the pressure to an area where it can be controlled and dissipated. The Coast Guard disagrees. Tests of detonation arresters conducted by the Jet Propulsion Laboratory for the Coast Guard showed that rupture disks were not effective in dissipating the energy associated with a detonation.

Appendix B of the NPRM contained a draft standard specification for Tank Vent Flame Arresters. Because this standard has not yet been adopted by ASTM, it is included in this rulemaking as Appendix B to 33 CFR part 154. A new paragraph (b) in this section requires all flame arresters to be acceptable to the Commandant (G-MTH). A flame arrester built and tested in accordance with appendix B is acceptable. A new paragraph (c) has been added to this section which gives the criteria for a flame screen. This criteria is identical to that in 46 CFR 30.10-25.

33 CFR 154.824 Inerting, Enriching, and Diluting Systems

The specific requirements for inerting, enriching, and diluting systems have been put into this new section. Paragraphs (h), (i), and (l) of this section have been revised to require that an inerting, enriching, or diluting system be able to supply sufficient gas to maintain the vapor stream outside of the flammable range by an adequate margin. This was implied, but not clearly spelled out in the NPRM.

Six comments stated that 6.0 meters was not sufficient for locating the injection point of the inerting, enriching, or diluting gas, because of other safety devices and pressure control valves that need to be located upstream of the point of injection. One of the comments recommended 40 to 60 feet. Four of the other comments recommended as "close as practical." The Coast Guard agrees that 6.0 meters may be unnecessarily restrictive. Specifying "as close as practical" is not appropriate for regulations without a maximum distance specified. The proposed requirements in 33 CFR 154.820(f)(1) of the NPRM have been revised in 33 CFR 154.824(b) of the final rule to require the injection point to be located as close as practical to but not more than 10 meters from the facility vapor connection.

One comment stated that complete or homogeneous mixing of the vapor stream is difficult to achieve in 20 diameters, and that mixing only needs to be sufficient to ensure that all parts of the vapor stream are outside the flammable range. The Coast Guard agrees that homogeneous mixing connotes a degree of mixing that is impractical and unnecessary. The proposed requirement in 33 CFR 154.820(f)(4) of the NPRM has been revised in paragraph (f)(3) of this section in the final rule to delete the reference to homogeneous mixing. However, the Coast Guard views mixing to ensure that all parts of the vapor stream are outside of the flammable range as complete mixing. The requirement for complete mixing proposed in 33 CFR 154.820(f)(2) of the NPRM is now located in paragraph (b) of this section in the final rule, and it requires complete mixing within 20 pipe diameters of the injection point.

Eight comments expressed objections to prohibiting drawing a vacuum after the point of injection of inerting or enriching gas. One of the comments suggested that a means should be provided which ensures that equivalent safety is maintained. Four of the comments said that means can be provided to prevent excessive air in-leakage. Two of the comments suggested that it should be acceptable to limit the number of flanges and require the vapor stream to be measured upstream of the vapor mover. One of the comments stated that Commandant (G-MTH) approval should not be necessary because these systems will frequently not operate at a positive gauge pressure. The Coast Guard agrees that criteria can be given to control the leakage of air into the vapor control system without requiring Commandant (G-MTH) approval. The proposed requirement in 33 CFR 154.820(f)(12) of the NPRM has been revised in paragraph (c) of this section in the final rule to allow two different design options. The first option is to not have any sleeve-type pipe couplings, vacuum relief valves, or other devices which could allow air leakage into the vapor collection system downstream of the injection point. The

second option is to provide an additional analyzer downstream with means to inject additional enriching or inerting gas.

Two comments stated that the words "sets of" should be deleted from the proposed requirement in 33 CFR 154.820(d) of the NPRM for two independent hydrocarbon analyzers for enriching systems. The Coast Guard agrees and the new paragraph (d) of this section in the final rule does not contain the words "sets of." This new paragraph consolidates the analyzer requirements that were in the NPRM. The requirements in paragraph (d) of this section in the final rule requires two analyzers when the analyzers control the amount of inerting, enriching, or diluting gas injected into the vapor collection line. This change was made because new paragraphs (c)(2) and (e) of this section, and 33 CFR 154.820(a)(2) allow a single analyzer when the analyzer does not control the amount of inerting, enriching, or diluting gas injected.

One comment stated that provision should be made for using volumetric measurement instruments to control the addition of inerting, diluting, or enriching gases. The Coast Guard agrees. A new paragraph (e) has been added to this section to allow this in lieu of controlling the mixture by means of dual analyzers. However, one analyzer is still required as a check to ensure that the vapor mixture is maintained in an acceptable range.

Two comments stated that some types of hydrocarbon analyzers always read low when they fail (fail safe), and so redundant hydrocarbon analyzers should not be required for an enriching or diluting system. The Coast Guard disagrees. Sufficient information is not available at this time to be able to determine which analyzer types exhibit this characteristic or if it is only a design feature of some models. Allowing the proposed option could limit an operator's options when replacing equipment.

Two comments questioned how the 30 second response time of the analyzers is measured. The time is measured from when the sample is removed from the vapor stream to when the analyzer registers the reading. If the analyzers are located in the vapor stream, the time is measured from when the gasses contact the analyzer to when the analyzer registers the reading. One comment stated that it is more appropriate to specify a maximum distance from the gas injection point to the sampling point and a maximum sampling time, rather than a maximum time from injection to analysis; because the latter time will vary depending on the vapor flow rate. The Coast Guard agrees. This requirement is now located in paragraph (f)(2) of the final rule. A revision to specify the maximum time from injection to analysis was considered but rejected.

One comment stated that the frequency of an analyzer sampling the vapor concentration should be continuous. The Coast Guard agrees. The proposed requirement in 33 CFR 154.820(f)(4) of the NPRM has been revised in paragraph (f)(3) of this section in the final rule to require continuous sampling.

The requirement to be able to inert, enrich, or dilute the vapor hose in 33 CFR 154.820(f)(10) of the NPRM has been moved to paragraph (a) of this section in the final rule. The requirement to have the more severe analyzer concentration reading activate the required alarms and automatic shutdown system in 33 CFR 154.820(f)(5) of the NPRM has been moved to paragraph (d) of this section and has been broken down to specifically address inerting, enriching, and diluting systems individually. The requirement to sample the vapor concentration no more than 30 pipe diameters downstream from the point of gas injection in 33 CFR 154.820(f)(4) of the NPRM has been moved to paragraph (f)(3) of this section.

One comment stated that certain oxyen analyzers were prohibited without any rationale. The proposed requirements in 33 CFR 154.820(f)(8) of the NPRM prohibited zirconia electrochemical and thermomagnetic type oxygen analyzers because these analyzers operate at an elevated temperature and so could become a source of ignition in the vapor stream. This requirement has been changed in paragraph (g) of this section in the final rule to prohibit oxygen analyzers that operate at elevated temperatures which could become a source of ignition, and gives zirconia electrochemical and thermomagnetic type oxygen analyzers as examples of these types of analyzers.

One comment stated that zero and span gas should be injected into the "sample system." This arrangement is acceptable. The Coast Guard has determined that the requirement proposed in 33 CFR 154.820(f)(9) of the NPRM for a connection for injecting zero and span gas into the system was unnecessary. The requirements in 33 CFR 154.850(b), 156.120(aa)(7), and 156.170(g)(4) require testing and calibration of analyzers, it is up to the designer/operator to provide a means to perform the tests and calibrations.

One comment stated that the lower flammable limit and the upper flammable limit of vapors are variable, and sometimes difficult to determine. The changing of the applicability to crude oil, gasoline blends, and benzene should satisfy this concern since the flammability limits of these products are similar.

Two comments stated that automatic shutdown of cargo loading should be required any time the remotely operated cargo vapor shutoff valve is closed by an inerting, enriching, or diluting system shutdown condition. One comment stated that automatic shutdown of cargo loading should not be required. The requirements in this section (33 CFR 154.820 in the NPRM) do not require the automatic shutdown of cargo loading when the remote cargo vapor shutoff valve is closed. The requirement in 33 CFR 154.850(j) (33 CFR 154.850(b) in the NPRM) requires the operator to shut down the loading whenever a condition results in a shutdown of the vapor control system. The Coast Guard's position is that there is sufficient time for the operator to shut down the cargo loading when the vapor control system shuts down.

Two comments pointed out that the "(e)" was missing from 33 CFR 154.820(e) of the NPRM. This was an inadvertent mistake. The requirements for an inerting system in this paragraph in the NPRM have been moved to paragraph (h) of this section in the final rule.

One comment recommended that the set point for the oxygen alarm for inerted vapor control systems should be given as a range, for example 6%–8%, because the operator may need more time to react. The Coast Guard's position is that this is not necessary. The 8% alarm set point in paragraph (h) of this section in the final rule is the maximum set point which may be used, the operator may choose a lower set point if desired.

Two comments stated that the alarm set point should be set not higher than 7% and the shutdown set point should be set not higher than 8% for inerting systems to be consistent with the CTAC recommendations and requirements of the International Convention for the Safety of Life at Sea, 1974, as amended (SOLAS 74/83). The Coast Guard disagrees. SOLAS 74/83 requires inerted tanks to have an oxygen content no higher than 8%. If a tankship being loaded was inerted to 7.5%, it would set off a high oxygen alarm set at 7% during the entire loading operation while still meeting SOLAS 74/83. An alarm should only reflect an abnormal condition, with the automatic shutdown set at an

appropriately higher level while still outside of the flammable range.

One comment stated that the alarm and shutdown set points for inerting systems are not appropriate for all cargoes because some products have explosive ranges form 1.7% to 36.5%. With the change to the cargo vapors applicable to these regulations in 33 CFR 154.800, the explosive ranges of the applicable cargoes will be much narrower and the set points given are appropriate.

Two comments stated that the values for activating alarms and shutdown valves for enriching systems should be given as minimums to allow them to be set higher. The Coast Guard's position is that the present wording is sufficient to allow the set points to be higher. If the set points are higher, they will fulfill the requirements as written.

One comment stated that there should be provisions to purge the vessel's tanks of oxygen if the vapor control system shuts down at high oxygen level. Another comment suggested that the regulations should allow the vapor control system to be supplied with inert gas from either the ship itself or from shore. The Coast Guard disagrees. The facility vapor control system is not required to be sized to handle the additional inert gas that would be transferred ashore.

One comment stated that oxygen analyzers are not appropriate for monitoring enrichment systems, because a change of 5% in hydrocarbon content is required to change the oxygen concentration by 1%. The Coast Guard partially agrees. Oxygen analyzers can be used, but because of the wide variance of hydrocarbon content reflected by a small change in oxygen content, the appropriate criteria for proper enrichment needs to be carefully considered. The Coast Guard has reviewed the proposed requirement in 33 CFR 154.820(d)(5) of the NPRM and concluded that it failed to properly consider this effect. The requirements in paragraph (j) of the final rule have been revised to require the maximum set point for the alarm at 15.5% oxygen and the maximum set point for automatic shut down at 16.5%. This corresponds to 170% and 150%, respectively, of the UFL for methane.

One comment expressed support for the requirements for air dilution. The requirements for air dilution (33 CFR 154.820(c) in NPRM) have been moved to paragraph (1) of this section.

33 CFR 154.826. Vapor Compressors and Blowers

This new section consolidates the requirements for vapor compressors and blowers into one section. Paragraphs (m) and (n) proposed in 33 CFR 154.820 of the NPRM have been moved to this new section as paragraphs (b) and (d), respectively. A new paragraph (a) has been added to require a detonation arrester, flame arrester, or explosion suppression system acceptable to the Commandant (G-MTH) at the inlet and outlet of each compressor or blower which handles vapor that has not been inerted, enriched, or diluted. This addition is necessary because of the revision to 33 CFR 154.820 which does not require the inerting, enriching, or diluting of all vapors.

One comment stated that the requirements for compressors and blowers in the NPRM were too restrictive, and that other designs can achieve an equivalent level of protection. The requirements given for compressors and blowers are meant to address known hazards characteristics of most types of compressors and blowers. The Coast Guard does not intend to limit compressors and blowers to the types mentioned in this section.

One comment stated that quick closing valves or explosion suppression systems have been extensively tested over a broad scale of applications, and so should be considered for use in lieu of detonation arresters. The Coast Guard disagrees. The Coast Guard does not know of any testing done on these types of systems to demonstrate their ability to stop a fully developed detonation wave travelling at sonic velocities. If successful testing demonstrates the effectivness of these types of systems for this application, the Coast Guard can accept such systems under equivalence provisions. The Coast Guard acknowledges that explosion suppression systems are likely to be effective in certain locations in a vapor control system where a deflagration wave has not accelerated to a detonation. Paragraph (a) of this section and 33 CFR 154.828(a) in the final rule allow an explosion suppression system acceptable to the Coast Guard in lieu of a flame arrester or detonation arrester at the inlet and outlet of a compressor or blower, or the inlet of a vapor recovery unit.

Four comments stated that liquid ring compressors were not addressed and should be allowed. The Coast Guard agrees. The exclusion of liquid ring compressors from the NPRM was not meant to prohibit them. A new paragraph (c) has been added to this section to provide requirements for liquid ring compressors, if used.

Two comments stated that the use of aluminum, aluminum alloys, magnesium, and magnesium alloys should be prohibited for blowers because sparks can be produced on impact with iron oxide. The Coast Guard disagrees. The Coast Guard accepts that this described hazard is possible, but it is not aware of any explosions attributed to rust or scale impacting the impeller. The proposed requirements in 33 CFR 154.820(n) of the NPRM are consistent with the requirements for a nonsparking fan contained in 46 CFR 110.15-1(b)(16). These requirements have been moved to paragraph (d) of this section in the final rule.

Two comments suggested including requirements for lobe blowers. The Coast Guard agrees and lobe blowers have been added to centrifugal compressors and fans in paragraph (d) of this section in the final rule.

Two comments pointed out that it may be impossible to "bond" the shaft of a fan to the fan casing because it passes through a seal. The Coast Guard agrees and has deleted this requirement.

One comment stated that additional fan specifications as to gas tight construction criteria for the housing and seal should be provided. It is the Coast Guard's position that these regulations do not need to go into this much detail.

33 CFR 154.828 Vapor Recovery and Destruction Units

This new section consolidates the requirements for vapor recovery and destruction units. It includes requirements that were in 33 CFR 154.820(k) of the NPRM.

Paragraph (a) of this section requires either a detonation arrester, a flame arrester, or an explosion suppression system acceptable to the Commandant (G-MTH) at the inlet of a vapor recovery unit if the vapors are not inerted, enriched, or diluted. This requirement was not in the NPRM and is needed since the requirements for inerting, enriching, or diluting have been changed.

One comment asked if a hydraulic seal required by paragraph (b)(1) of the final rule is like a typical deck water seal in a vessel's inert gas system. The Coast Guard interprets the terms to have the same meaning.

One comment stated that automatic quick acting stop valves should not be required for an incinerator or flare. Two comments stated that a double block and bleed valving arrangement should be acceptable in lieu of the two automatic quick acting valves for an incinerator or flare, with one of the valves automatic quick acting and the other manual. The Coast Guard disagrees. Quick acting valves are necessary to quickly isolate the

incinerator or flare from the rest of the vapor control system when there is a flame failure. The second is needed for redundancy in case the first valve leaks. The requirements for flares and incinerators that were contained in 33 CFR 154.820(k) in the NPRM are now contained in paragraphs (b), (c), and (d) of this section.

Four comments suggested allowing a detonation arrester in lieu of a flame arrester at the inlet of a vapor destruction unit. Three comments stated that a detonation arrester should be required in lieu of a flame arrester. The Coast Guard's position is that either is acceptable. The purpose of the requirement is to protect the rest of the vapor control system from an ignition originating in the vapor destruction unit and a separate detonation arrester will serve that purpose as well as a flame arrester located close to or integrated into the unit. The requirements in paragraph (c) of this section have been revised to allow a detonation arrester in lieu of a flame arrester.

One comment stated that a flame arrester is not needed in addition to the water seal for a vapor destruction unit. The Coast Guard disagrees. A flame arrester fitted with a means to detect a flame on the arrester is needed to ensure that the flame front does not back up into the vapor collection system from the vapor destruction unit during normal system operation.

One comment stated that a minimum velocity at the vapor injection nozzle to the incinerator should be required, along with an interlock system to take appropriate action if the velocity drops below some set point. While this would be prudent, the Coast Guard's position is that it is not appropriate to include this in these regulations. This rulemaking is not intended to include detailed safety requirements for various vapor processing units. To do so could limit technical development and restrict the design of these units. The Coast Guard must rely on other authorities, the system designer, and the certifying entities to develop the details for safety of vapor processing units. In keeping with this approach, the requirement proposed in 33 CFR 154.820(1) of the NPRM that incinerators meet NFPA 85A has been dropped in the final rule. The reference to NFPA 85A has also been deleted from 33 CFR 154.106.

33 CFR 154.840 and 46 CFR 39.10–11 Personnel Training

One comment stated that an extensive personnel training program will be required to ensure safe operation and that this will take time. The Coast Guard agrees with this assessment. An adequate training program is an integral part of a safe vapor control system operation. The development of a training program must begin early in the design phase of a vapor control system.

One comment recommended that the Coast Guard propose a comprehensive training program for review by national authorities, perhaps via the International Maritime Organization (IMO). The Coast Guard intends to submit to IMO a training program similar to Appendix D in the NPRM as part of the effort to develop international standards for vapor control systems.

One person suggested that the scope should be broadened to include all persons involved in the transfer operation, with additional training in supervision for persons in charge. While it would be prudent to provide training for all personnel, the Coast Guard's position is that the minimum necessary for safety is to have one person on the vessel and one person at the facility on watch with the necessary training.

Three comments supported the personnel training requirements and the duration of training. One of the comments stated that personnel training is better than technical requirements for automatic shut downs of cargo loading or the vapor control system. Another comment supported eight hours of hands-on training in normal and emergency operating procedures.

Twenty four comments stated that 40 hours of training, as proposed in paragraph (a) of these sections in the NPRM, is excessive. Eight comments supported eight hours for vessel crews. Three of the comments supported 16 hours. One of the comments supported 12 hours for new tankermen. Two comments stated that 24 hours of training for personnel who had previously undergone the training is excessive. One of the comments supported one hour of drills for a barge of each type. One of the comments supported one day on the job training for system specific equipment. Eleven of the comments stated that either a minimum time should not be required, or the minimum time should be left to the operator. The Coast Guard agrees that it is not practical to require a minimum time because of the wide variation of complexity of both vessel and facility systems. The regulations in paragraph (a) in each of these sections have been revised to delete the minimum required time for training. The subjects to be covered by the training program remain the same as those proposed in the NPRM.

One comment stated that the Coast Guard should not become involved in the training of facility operators. The Coast Guard disagrees. The Coast Guard has the responsibility to issue regulations for the safety of facilities, and human error accounts for the majority of all marine accidents.

One comment stated that a tankerman should not be required to have eight hours of training on each barge worked on. The wording in 46 CFR 39.10–11(a) is not intended to require additional training for a person every time they work on a different vessel, only when "the particular system on the vessel" differs from those with which the person has experience. In addition, as previously discussed, the minimum time period has been deleted, therefore the amount of additional training for a different system is up to the operator. Because the amount of training is up to the operator, the last sentence of 33 CFR 154.840(a) and 46 CFR 39.10–11(a) in the NPRM requiring training for persons who have had previous vapor control system training has been deleted from the final rule.

One comment suggested that in addition to the training course, the employer must verify that the man has had enough supervised on the job training to be qualified to be a person in charge. The Coast Guard's position is that this is included by requiring "drills or demonstrations using the installed vapor control system covering normal operations and emergency procedures."

One comment stated that training for vessel personnel can be integrated into existing internationally accepted tanker training courses. The Coast Guard agrees that this can be done to a certain extent. Most existing tanker training programs are not vessel specific, and therefore will not be able to give the necessary detailed training for the particular system installed on a vessel. In addition, training schools may not want to include training for vapor control systems since not all vessels will have the systems installed.

One comment stated that the training criteria should be included in the tankerman regulations. The Coast Guard disagrees. Not all tank vessels will have vapor collection systems, so the training will not be required for all tankermen.

One comment recommended that on the job training of junior officers by the Master or Chief Officer should be permitted. Details of how the training is achieved is up to the owner/operator. If the owner/operator wants on the job training run by the Master or Chief Officer, that is acceptable. The Coast Guard anticipates that some on the job training supervised by the Master or

Chief Officer will be a part of most tankship training programs.

One comment stated that more detailed and specific information on training requirements, instructors, and criteria should be provided. The Coast Guard disagrees that this is needed in the regulations. More detail on the content of the course was published as appendix D in the NPRM and is available from the Commandant (G–MVP). Other details for training are dependent on the specifics of each type of vapor control system and the experience of the personnel. It is the responsibility of the owner/operator to ensure that each person gets adequate training.

Four comments stated that the training program should include additional criteria for health effects of vapors and proper use of personal protection equipment. The Coast Guard disagrees. These topics are applicable to all tankermen, and are part of the alraady required training for all tankermen.

Two comments questioned how the training and certification of training will be accomplished. One comment recommended that the vessel or facility should issue a certification to all employees who have completed the training program. How the training is accomplished is up to each owner/operator. They may set up an in-house training program. Alternatively, established schools may develop programs, with part of the course going to the vessel or facility for the on-hands portion. Completion of the training should be documented by the owner/operator or training school by a letter, similar to the way training for crude oil washing is currently documented.

Nine comments were received regarding the review or approval of the training program. One comment recommended having the certifying entity approve the facility training program. Four comments supported Coast Guard approval of training programs. Two comments supported review but not approval of programs by the Coast Guard. Two comments stated that the Coast Guard should neither review nor approve the programs. The Coast Guard's position is that owners/operators can develop and provide adequate training programs with guidance from the Coast Guard, if requested. Coast Guard review and approval of the programs is not necessary. While it may be prudent to have the certifying entity review a facility's training program, it is not appropriate to require this. Requiring a certifying entity to also have expertise in personnel training may eliminate many otherwise qualified applicants.

One comment recommended specifying in 46 CFR 39.10–11(a) that it is the "shipboard" person in charge that must have received training. The Coast Guard's position is that this is not necessary because the paragraph is only applicable to vessels.

One comment suggested adding a requirement to have a short ship/shore training and safety exercise as part of the pre-transfer procedures. The Coast Guard's position is that this is not needed. Requirements for pre-transfer checks of sensors and automatic shutdown systems will keep personnel familiar with the equipment. Additional exercises prior to each loading will not be cost effective.

Two comments recommended a requirement to have periodic refresher or updating courses. The Coast Guard's position is that such a requirement is not appropriate. The necessary refresher training depends upon the complexity of the vapor control system. The Coast Guard recommends that each facility and vessel conduct periodic drills and refresher training for personnel, appropriate to its vapor control system.

Two comments pointed out that the time frame for compliance with the training requirements is not given. One of the comments recommended that existing approved operations should be given 24 months to comply. The Coast Guard disagrees. All vessel and facility persons in charge must complete training prior to operating a vessel control system. Persons in charge of existing vapor control systems should have already had training at least similar to that required by these regulations.

33 CFR 154.850 Operational Requirements

The requirements in this section have been reorganized and revised to follow the sequence of events in a transfer operation.

Seven comments addressed the frequency of testing of the alarms, automatic shutdown systems, and sensing devices. One comment suggested testing just prior to loading. One comment suggested testing just prior to loading if the vapor control system is used infrequently, otherwise every two weeks. Two comments stated that daily testing would be appropriate for analyzers. One comment recommended monthly testing of the alarms and automatic shutdown systems. One comment recommended testing once per week. Another comment stated that testing should be less frequent or use self-checking devices, because often equipment cannot be tested without product flowing through the system. The Coast Guard's position is that daily testing is appropriate. By specifying not more than 24 hours prior to loading, a facility in continuous operation will not have to shut down to test if it has tested not more than 24 hours prior to the loading for another vessel. If the facility loads infrequently, it will not have to test until within 24 hours of loading. The importance placed on these alarms, automatic shutdown systems, and sensing devices makes it necessary to require at least daily testing. A system can be designed to make this testing simple and quick, without having to have vapors flowing through the system.

Two comments suggested changes to the requirement to test alarms and automatic shutdown systems within 24 hours prior to each loading to ensure that it is not confused with the calibration of analyzers in 33 CFR 156.170(g)(4). One of the comments suggested specifying that the tests be electrical and mechanical. The other comment suggested requiring a mechanical test. The Coast Guard disagrees. The wording in paragraph (b) of this section in the final rule (paragraph (d) in the NPRM) is sufficiently clear to indicate that the alarms and automatic shutdown systems are to be operationally tested by whatever means is appropriate for each particular system.

One comment suggested that the preloading checks should specify a check on the calibration of each analyzer to be ussd, which will entail observing the recorded response of each analyzer to the calibration span gas. The Coast Guard agrees. The requirements in paragraph (b) of this section (paragraph (d) in the NPRM) and 33 CFR 156.120(aa)(7) have been revised to specify that the analyzers must be checked for calibration by use of a span gas. The term "sensors" in paragraph (b) and 33 CFR 156.120(aa)(7) has been replaced with the term "analyzers" to more clearly specify the intent.

One comment suggested including or referencing the requirement for weekly analyzer calibration in 33 CFR 156.170. The Coast Guard disagrees, this would result in confusing required periodic tests or instrument calibration with operational checks. Periodic tests will normally be performed by different personnel than the operational checks.

Because of revisions to 33 CFR 154.812(b), a facility's overfill sensor circuit must be labelled with the maximum allowable length of cable and maximum allowable inductance and

capacitance which can be connected to the control panel. A new paragraph (d) has been added to this section which prohibits a barge with an overfill control system in accordance with 33 CFR 154.812(b) from connecting to a facility's overfill control panel if the length of cable, inductance, or capacitance exceeds the allowable values for the facility.

One comment pointed out that the requirement for the facility to control the initial loading rate should instead apply to the tankerman on the vessel. Another comment supported the requirement and stated that the initial loading rate is difficult to determine on the vessel because the vessel will not have a flow meter, and the facility will have to monitor the flow rate. The Coast Guard has revised paragraph (f) of this section (paragraph (h) in the NPRM) to require this cooperation between the facility and vessel so that the loading rate can be properly limited.

Seven comments objected to requiring the slow initial loading to be continued until the height of cargo reaches one meter in depth, noting that one meter could be ¼ or ⅛ of the cargo capacity on some river barges. The comments estimated that the resulting loading time could increase by 50% over current loading time. The Coast Guard agrees that one meter may be excessive. The requirements in paragraph (f) of this section (paragraph (h) in the NPRM) have been revised to require the initial loading rate to comply with the rate agreed to at the pre-transfer conference required by 33 CFR 156.120(w) and 46 CFR 39.30.1(h). The regulation in 46 CFR 39.30.1(h) now requires the initial loading rate to meet the cargo tank filling recommendations in section 7.4 of ISGOTT.

Two comments pointed out that controlling the loading rate to each cargo tank is only within the control of the vessel, that the facility can only control the overall loading rate. The Coast Guard agrees that this is true, however, there will still be a maximum loading rate for the vessel which cannot be exceeded and that only the facility can limit. For the sake of clarity, paragraph (g) of this section in the final rule has been revised to include both paragraphs (c) and (d) of the NPRM.

Two comments supported the prohibition of line clearing of a cargo loading line. One of the comments stated that it should be prohibited even for open loading. Nine comments objected to the requirement, stating that it will have a major impact on operations. Three of the comments stated that clearing the line can be accomplished without overpressurizing the vessel. One of the comments suggested that line clearing could be done with inert gas. One of the comments stated that clearing of liquid cargo hoses to the vessel would allow only a small quantity of vapor to be involved, and should be permitted. One of the comments stated that pigging of cargo lines can be done safely. One of the comments stated that certain cargoes which can crystallize need to be pigged to clear the lines. One of the comments stated that this requirement would prevent the facility from loading other vessels, and does not recognize the need to wash cargo tanks. The hazard involved in line clearing, overpressurizing the cargo tanks, is caused by the pressurized gas used in the line clearing. While this hazard may exist to some extent for open loading, the risk and consequence is greatly increased during closed loading with vapor control. The Coast Guard agrees that pigging of cargo hoses can be done safely as long as compressed air or gas is not used and that clearing of cargo hoses can be done safely with compressed air or gas. In order to allow this, the requirements in paragraph (h) of this section (paragraph (m) in the NPRM) have been revised to allow gas to be used to clear cargo loading hoses or loading arms when transferring cargo to a vessel connected to a vapor control system. The cargo lines can be modified to allow clearing cargo lines with compressed air or gas while the cargo loading valve is closed.

One comment stated that when one of the analyzers fails, further loadings should be allowed provided the remaining device is tested and calibrated before every load rather than weekly, and the failed analyzer is repaired or replaced within a specified time. The Coast Guard disagrees. Because of the importance of the analyzers, it is the Coast Guard's position that it would not be prudent when dual analyzers are required to begin another loading operation with only one analyzer. The requirement to not conduct further transfer operations if one of the dual analyzers is inoperable is contained in paragraph (i) of this section (paragraph (f) in the NPRM).

Two comments recommended that paragraph (j) of this section (paragraph (b) in the NPRM) allow the continuation of loading without vapor control provided local air quality district regulations allow the facility to do so. If cargo vapor is not being collected, these requirements do not apply. Therefore, if the local air quality district regulations allow a facility to continue loading without collecting vapor, these requirements will not prohibit the operation. However, if a condition results in a shutdown of the vapor control system, it is important to secure cargo loading in accordance with this paragraph, determine the cause, and then, if conditions permit, disconnect the vapor collection hose or arm, and secure the facility and vessel vapor collection systems before restarting cargo transfer.

One comment stated that a shutdown condition should include simultaneous shutdown of both the cargo pumping system and the vapor control system. The Coast Guard does not agree. Simultaneous shutdown of both the cargo loading and the vapor control system is not required when the fault or shutdown condition originates in the facility vapor control system. With these conditions, there will normally be sufficient time to manually shut down cargo loading.

Three comments recommended including periodic inspection and cleaning of flame arresters in addition to the requirement to inspect the flame arrester after a flare-back as required in paragraph (k) of this section (paragraph (n) in the NPRM). Another comment suggested adding "in addition to routine maintenance." The Coast Guard's position is that this is not necessary. Requirements for periodic inspections are contained in 33 CFR 156.170(g) of the final rule.

The Coast Guard has determined that the proposed requirement to verify normal vapor flow, contained in paragraph (i) of the NPRM, is vague and does not significantly contribute to safety. Therefore, it has been deleted from the final rule.

Four comments objected to the proposed requirement to limit vapor hose length to 30 meters. Suggested alternatives were to require limits on hose length to be determined by pressure drop considerations, and to specify a maximum pressure drop of 0.1 psi at the maximum vapor collection rate. The Coast Guard agrees that the desired result can be achieved by better means than limiting the length of vapor hose. The requirement to limit the length of vapor hose proposed in paragraph (k) of the NPRM has been deleted. The requirements in 33 CFR 154.814(c) require the pressure drop across the vapor collection hose or arm to be considered in maintaining the proper pressure.

Thirteen comments objected to the proposed requirement to have the vapor hose not less than the size of the tank vessel's vapor collection system. Suggested alternatives were to match the size of the hose to the facility's maximum loading rate considering

pressure drop, or to require the total cross sectional area of all vapor hoses to exceed the cross section area of the vessel's vapor collection pipe. Two comments stated that the requirement should be deleted because the vessel is protected from overpressurization at the maximum loading rate. The Coast Guard agrees that the desired result can be achieved by better means than limiting the size of the vapor hose. The requirement to limit the size of the vapor hose proposed in 33 CFR 154.850(l) of the NPRM has been deleted. The requirements in 33 CFR 154.814(c) require the pressure drop across the vapor collection hose or arm to be considered in maintaining the proper pressure.

33 CFR 155.750 Contents of Oil Transfer Procedures

One comment stated that all the information required to be put in the vessel's oil transfer procedures by paragraph (d) could be included on the line diagram drawing which is tailored to the equipment for each barge. The requirement does not specify how the information is to be presented. If it can all be put on one drawing, that will be satisfactory.

One comment recommended that the maximum loading rate should be either on the vessel's Certificate of Inspection (COI), or it could be painted on a barge. The Coast Guard considered adding this information to the COI or requiring that it be marked on the vessel and decided the most appropriate place to record this information was in the oil transfer procedures. Placement of this information on the COI would not be sufficient since the person in charge will have to be knowledgeable of all the information included in the oil transfer procedures.

Two comments pointed out that paragraph (d)(1) of this section requires the line drawing to show the location of flame arresters and other devices that are not necessarily installed on every vessel. The Coast Guard agrees, and has added "if fitted" to the paragraph.

Two comments pointed out that the proposed regulation in the NPRM requires the transfer procedures to contain a description of the automatic shutdown system, which is not required for every vessel. The Coast Guard agrees, and "if fitted" has been added to 33 CFR 155.750(d)(7)(v). "If fitted" has also been added to paragraph (4)(iv) for a description of the high level alarm system, since it also is not required for every vessel.

Two comments stated that the vessel's oil transfer procedures should include a table or graph showing the maximum pressure drop across the vessel's vapor collection system versus the cargo loading rate. One of the comments suggested using the density of air (1.0 specific gravity), the other comment suggested using the density of a gasoline/air mixture (2.0 specific gravity). The Coast Guard agrees that the pressure drop across the vessel's vapor collection system as a function of loading rate should be in the oil transfer procedures. Consistent with the change to 33 CFR 154.814(b), the facility needs to be able to determine the pressure drop in a vessel's vapor collection system. A new 33 CFR 155.750(d)(5) has been added which requires this information, calculated in accordance with 46 CFR 39.30–1(b), to be provided in the oil transfer procedures. The regulation in 46 CFR 39.30–1(b) has been revised to require the pressure drop to be calculated based upon the density of a 50% cargo vapor and air mixture.

One of the comments stated that certifying entities should be authorized to review oil transfer procedures, because COTP's and OCMI's may not have the experience needed to approve them. The Coast Guard disagrees. It is not appropriate for a certifying entity to review a vessel's oil transfer procedures. A COTP or OCMI can obtain assistance from the Marine Safety Center in reviewing oil transfer procedures, if needed.

33 CFR 156.120 Requirements for Oil Transfer

Three comments stated that the oxygen content of inerted cargo tanks should be verified prior to transfer. Two of the comments recommended the facility personnel verify the oxygen content. The other comment stated it would be sufficient to have the vessel personnel verify the oxygen content, because the facility monitors the oxygen content as the vapors come ashore. The Coast Guard agrees that the oxygen content should be checked prior to transfer, but because the facility will monitor the vapors as they come off the vessel, the facility personnel do not need to also verify the oxygen content on the vessel. Requiring the facility personnel to also verify the oxygen content would prohibit the vessel from beginning to check the tanks prior to docking. A new paragraph (aa)(9) has been added to this section which makes verification of the oxygen content a part of the pre-transfer checks for inerted tank vessels.

Four comments requested clarification of the requirement for the insulating flange. The requirements in 33 CFR 154.810(g) and 46 CFR 39.40–5(c) have been revised to allow an insulating flange or a section of insulating hose. Additionally, paragraph (aa)(3) of this section has been revised to verify that the electrical insulating device required by 33 CFR 154.810(g) or 46 CFR 39.40–3(c) has been installed.

Two comments suggested that the requirement in 33 CFR 156.120(aa)(6) to check the tank barge overflow control system specify to test the system. The Coast Guard agrees. The paragraph has been revised to require that the system is tested and operating properly.

One comment suggested that the schedule for testing alarms and automatic shutdown systems in paragraph (aa)(7) of this section should specify not more frequently than once a week for those terminals with less than once a week loading situations. The Coast Guard's position is that the present wording of the requirement would allow this. The alarms and automatic shutdown systems are to be tested within 24 hours prior to the start of the transfer operation. If there is only one transfer operation a week, this will only have to be done once a week.

One comment stated that the testing schedule proposed in 33 CFR 156.120(aa)(7) is too stringent, and recommended that the schedule proposed in 33 CFR 154.850(e) in the NPRM be used. The Coast Guard's position is that these two requirements contain the same testing schedule: not more than 24 hours prior to the transfer operation. Section 154.850(e) in the NPRM has been moved to § 154.850(b) in the final rule.

One comment stated that testing alarms and automatic shutdown systems once a week would provide an adequate level of safety. The Coast Guard disagrees. The alarms and automatic shutdown systems are essential safety components, and frequent testing, contingent on cargo loading frequency, is necessary to ensure that they will function properly.

One comment stated that intrinsically safe wiring requirements should be included in paragraph (aa)(7) of this section. The Coast Guard disagrees. It is not appropriate to include intrinsically safe wiring requirements in requirements for pre-transfer checks.

33 CFR 156.170 Equipment Tests and Inspections

One comment pointed out the word "experience" was missing from paragraph (g)(3) of this section. The Coast Guard agrees, the word was inadvertently left out.

One comment stated that styrene vapors could cause clogging of a detonation arrester in the heat of the

day, that the device should be inspected after a predetermined number of hours in operation, and a maintenance report should be maintained for the life of the device. The Coast Guard agrees that detonation arresters may need to be inspected and cleaned more than once per year. With the change in applicability to only crude oil, gasoline blends, and benzene, rapidly clogging cargoes such as styrene can be considered on a case by case basis. However, some crude oils may require frequent cleaning of detonation arresters. Because there is no operational experience with detonation arresters, there is no information available as to how often they need to be inspected and cleaned. The regulations in paragraph (g)(3) of this section require a detonation arrester to be inspected and cleaned more frequently if experience shows it is necessary. Cleaning of detonation arresters should be included as part of the record of repairs required by 33 CFR 154.740(g).

Two comments suggested that weekly calibration of analyzers is not needed if the vapor control system is used infrequently. The Coast Guard agrees that the analyzers do not need to be calibrated weekly if the system is not used that frequently. The requirement in paragraph (g)(4) of this section has been clarified to allow testing within 24 hours prior to operation if the system is operated less frequently than once a week.

Four comments recommended less frequent testing of analyzers because they are reliable and not subject to calibration drift. Two of the comments recommended biweekly. The other two recommended monthly calibration. The Coast Guard agrees that thay can be calibrated less frequently than weekly. Therefore, paragraph (g)(4) of this section has been revised to allow biweekly calibration.

One comment stated that because analyzers must be tested regularly, they should be tested either 24 hours before loading or once a week. The Coast Guard's position is that regular testing is required by these regulations. The regulation in paragraph (g)(4) of this section requires calibration either biweekly or not more than 24 hours prior to operation when the system is operated less frequently than once a week.

One comment stated that verifying the analyzer prior to its being used rather than at some arbitrary interval would better achieve the desired result, and suggested that this be included as a part of 33 CFR 154.850(b). The Coast Guard's position is that this is provided for in the regulations. The regulation in 33 CFR 156.170(g)(4) requires calibration either biweekly or not more than 24 hours prior to operation when the system is operated less frequently than twice a week, and 33 CFR 154.850(b) requires operationally testing analyzers not more than 24 hours prior to each transfer operation.

One comment stated that calibration of the analyzers should be the same ship-side and shore-side. The Coast Guard's position is that this is required by the regulations. The requirement in paragraph (g) of this section applies to both vessels and facilities.

One comment recommended that each facility should be routinely examined and inspected by the Coast Guard. Facilities currently have an annual inspection by the Coast Guard.

Appendices

Seven comments were received on Appendices A, B, and C of the NPRM. These appendices were draft ASTM standards which were presented for the information of readers. Appendix C has been adopted as ASTM standard F1271. Appendices A and B of the NPRM, Standard Specification for Detonation Flame Arresters and Standard Specification for Tank Vent Flame Arresters, have not been adopted, and have been included for guidance as appendix A and B to 33 CFR part 154.

46 CFR 32.53–85 Instruction manual—T/ALL

One comment noted that additions to the IGS Instruction Manual required by 46 CFR 32.53–85 should not be required unless the vapor control and inert gas systems are interconnected. The Coast Guard agrees and has so modified the final rule.

Another comment stated that the IGS instruction manual should not be changed and that a new manual should be required. This comment is rejected because it would unnecessarily add to the paperwork burden.

One comment stated a concern about who would be responsible for approving amendments to the IGS manual. Since this section does not require changes to the manual but a rather minor addition to the manual, reapproval of the manual will not be necessary.

A new paragraph was added to this section which requires that the oxygen content of the vessel's cargo tanks, if inerted, be at or below 8 percent by volume. This addition was necessary because of changes made to the "Declaration of Inspection" in § 35.35–30.

46 CFR 35.35–20 Inspection prior to transfer of cargo—TB/ALL

One comment voiced general agreement with the requirements of this section, however, two other comments questioned the need for an insulating flange and three comments were concerned that the wording used to state the insulating flange requirement eliminates alternatives currently used by industry. In response to these comments the final rule has been changed to allow alternative procedures that follow the ISGOTT guidelines for the electrical insulating requirements.

One comment questioned whether an insulating flange would be needed for a barge to barge transfer. The answer is yes. Paragraph (m)(3) of this section references § 39.40–3(c) which states that for lightering operations "An electrical insulating flange or one length of non-conductive hose must be provided between the vessel vapor connection on the service vessel and the vapor connection on the vessel being lightered or topped-off."

Three comments pointed out that not all barges are required to have an overflow control system and, therefore, the connection of this system to the facility is not always required. The Coast Guard agrees with this comment and the final rule has been revised to clarify this point.

46 CFR 35.35–30 "Declaration of Inspection" for tankships—T/ALL

One comment stated that the Declaration of Inspection should also include verification that the oxygen content of the cargo tanks of an inerted vessel is below 8%. The Coast Guard agrees with this statement and has added this verification to the list of requirements in the Declaration of Inspection.

46 CFR 39.10–9 Vessel vapor processing unit—TB/ALL

Two comments were received that suggested that vessel processing units should be prohibited from a safety standpoint. The Coast Guard disagrees since vessels so equipped, other than tank vessels, must meet the requirements contained in subpart E of 33 CFR part 154 and by so doing will be able to operate safely.

One comment recommended that this section should say "meet the requirements of," rather than "meet the intent of," 33 CFR part 154, subpart E. The Coast Guard agrees and has revised the subject paragraph. The entity responsible for determining if these requirements have been met has been changed from the Marine Safety Center

to the Commandant (G–MTH) since policy decisions, such as this, are normally made by Coast Guard headquarters. The Coast Guard recognizes that not all of the requirements in subpart E of 33 CFR part 154 will be applicable to vessels since it deals with facilities. However, since Coast Guard approval of the installation will be required, the Coast Guard will be able to evaluate alternative proposals to ensure that an equivalent level of safety is achieved.

46 CFR 39.10–13 Submission of vapor control system designs—TB/ALL

One comment recommended that plans, calculations, and specifications that must be submitted for approval be sent directly to the Marine Safety Center rather than using the requirements contained in 46 CFR 31.10–5(a). The regulations in 46 CFR 39.10–13 of the final rule has been revised to indicate this change.

Four comments questioned why vapor control system designs on U.S. vessels have to be certified by the Coast Guard while foreign vessels can obtain certification from classification societies. The Coast Guard intends, at least initially, to be involved in the certification of these systems on all U.S. tank vessels. The certification of vapor control systems on foreign vessels by classification societies will be accepted as a substitute for the Coast Guard plan review and inspection. As experience is gained in the use of vapor control systems, the Coast Guard will consider revising the agreements with the American Bureau of Shipping (ABS) to permit them to review and approve vapor control systems.

Five comments recommended that local MSO's and OCMI's be allowed to review vapor control systems for approval and reapproval. This recommendation has not been incorporated. Personnel at MSO's and OCMI's do not have the experience or the expertise to carry out complete plan reviews of tank vessels. Currently, the Marine Safety Center is responsible for carrying out plan reviews for tank vessel systems other than vapor control, so this requirement is consistent with present Coast Guard policies.

Three comments stated that previously approved vapor control systems should not require reapproval. A new paragraph (c) has been added to this section to exempt tank vessels with existing vapor collection systems that have been approved by the Coast Guard and were operating prior to the effective date of the final rule as long as they only transfer vapor to the specific facilities for which they were approved.

Four comments stated that the amount of time allowed for modifying existing vapor control systems was not adequate. The Coast Guard agrees and has modified the regulations in this section of the final rule to allow up to 24 months after the effective date of the final rule for completing any modifications.

Four comments took exception to the requirement that a vessel which has a vapor collection system that was approved for use at one facility must be reapproved if it is to use a different facility. These comments have misinterpreted the requirements of this section. Only vessels, approved by the Coast Guard and operating at a specific facility prior to the effective date of this final rule must be reapproved if they intend to transfer vapor at a facility other than the one for which they were approved.

One comment questioned whether oversight or certification of foreign vessels would be required, and if so, who will be responsible. Plans for oversight are in the development stage, details are still to be determined.

One comment stated that certain gas and chemical carriers are already in possession of Certificates of Compliance approving their existing vapor control installations in accordance with IMO codes and should be accepted by the Coast Guard. The Coast Guard disagrees with this suggestion since section 15.12.2 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk only requires that a vapor connection be provided. It does not contain design, installation, or operational requirements for vapor control systems.

46 CFR 39.20–1 Vapor collection system—TB/ALL

Five comments stated concern about the compatibility of ship to shore vapor connections. The Coast Guard's position is that this will not be a problem since this section prescribes the configuration of the flanges used in making the connections.

Five comments dealing with the location of vapor connections and the compatibility of vessel and facility connections were received. One comment was received which agreed with the Coast Guard's position on the location of the vapor manifold. In light of these comments, this section has been revised to require that vapor collection piping must be permanently installed as close as practical to the vessel's loading manifold. An exception is allowed for those vessels certified to carry cargoes listed in 46 CFR Table 151.05 or Table 1 of 46 CFR part 153. These vessels, in order to preserve segregation of cargo systems, will be allowed to locate their vapor connections in the vicinity of each tank.

One comment questioned whether the requirements in this section would interfere with vapor connections in use outside the U.S. This may be the case, however, the Coast Guard is working through the International Maritime Organization to develop an international standard for vapor control systems.

Another comment questioned if these requirements would preclude the current chemical-tanker practice of hooking up shore vapor return hoses directly to semi-permanent connections on tank hatches, butterworth openings, or cargo or inert gas piping. The answer is yes since this section states that all vapor control piping must be permanently installed. In addition, the variable size openings involved with such hook-ups would make it difficult to determine the pressure drop that would result.

One comment suggested that the permanent piping required by this section could pose a problem for barges that must transit low bridges. The Coast Guard position is that the height of this piping would not be higher than the present venting arrangement required by 46 CFR 32.55, so it should cause no more of a problem than that which presently exists.

Two comments stated that this section prohibits using the inert gas piping system for both inerting and vapor collection purposes. This section does require a means to isolate the vessel's inert gas supply line from the vapor collection system but it does not prohibit the use of the IG main and tank connections for vapor collection purposes.

One comment suggested that the requirement in proposed paragraph (a)(4) of this section to have a stop valve which can isolate the inert gas system from the vapor collection system be modified so that equivalent means of isolation, such as a spool piece, can be used. This requirement has been changed and added to paragraph (a)(6) of the final rule to require a "means to isolate" rather than a specific device.

Two comments questioned the requirement to have a means to drain liquid from all low points in the vapor collection system. They stated that this would be difficult to do because of changing tanker trim and that it would require too many drains thereby creating more sources of leakage. Paragraph (a)(4) of this section has been revised in the final rule to require a means to eliminate liquid condensate

from the line. The draining and collection of liquid from the low points in the line would be one method to meet this requirement.

One comment questioned if a rising stem valve would satisfy the requirement for having an isolation valve at the vessel vapor connection. The answer is yes, if the valve is capable of manual operation.

Twenty-one comments were received concerning the labeling and color coding of hoses and the use of lugs on vapor connection flanges. Most of the comments stated that the use of lugs is not necessary and that they would only make the connection of hoses very difficult and possibly lead to hose damage. The Coast Guard's position is that in order to ensure that vapor collection systems are not accidentally connected to cargo loading systems the use of a lug or stud is necessary. However, in order to allow easier connection of vessel vapor control systems to facility vapor control systems this section of the final rule has been modified so that a stud (lug) is only required on the vessel and facility vapor manifold flanges and not on hoses or facility loading arms. Additionally, the flanges on vapor hoses and on facility loading arms must have at least one hole to accept the stud, but may have as many as practical. The regulations in this section addressing color coding and labeling requirements for vapor hoses and piping have also been changed to be in agreement with an API guideline currently under development.

One comment suggested that this section should require use of the industry practice of having a measured in-service resistance of not less than 1,000 ohms recommended by ISGOTT for the vapor hose instead of the maximum value of one million ohms (Mohm) being required. The Coast Guard agrees that one Mohm is too high and paragraph (f)(5) of this section in the proposed rule has been revised in paragraph (f)(4) of this section of the final rule to require a maximum resistance of 10,000 ohms.

46 CFR 39.20–3 Cargo gauging system—TB/ALL

Four comments took exception with the requirement for permanently installed cargo gauging systems since portable gauging systems are available and are adequate. The introductory text to paragraph (a) of this section in the final rule has been modified to eliminate this restriction.

One comment assumed that the use of sight glasses would satisfy the requirements of paragraphs (a) (1) and (2, of this section. The Coast Guard's position is that a viewing port on the tank hatch cover or expansion trunk would be acceptable.

One comment stated that paragraph (a) of this section should only be applicable for closed loaded vessels. The Coast Guard has no problem with this comment since every vessel using vapor control is required to be closed loaded.

One comment stated that even if a barge is fitted with an overfill alarm system it should still have a "topping-off" level indication. The Coast Guard disagrees. A single high level warning and overfill control system should be adequate. However, the regulations do not prohibit such an arrangement.

Two comments stated that local indication by cargo gauging systems should not be required if the vessel has a cargo transfer control room, because this is not required for closed cargo gauging systems in 46 CFR part 153. The Coast Guard agrees. Paragraph (a)(3) of this section has been revised to only require the liquid level to be indicated where cargo transfer is controlled.

Four comments expressed the opinion that it was not necessary for the cargo gauging system to simultaneously indicate the liquid level at the tank as well as at the point from which cargo loading is monitored and controlled. The Coast Guard agrees and has modified the requirement for indication to be at the location where cargo transfer is being controlled.

Nineteen comments were received concerning the visual level indicator required for tank barges that are not equipped with a high level and overflow alarm system. The comments were directed at two areas, the height at which indication begins and locations from which the indicator is visible. All of the comments indicated that a height of 1.5 meters for a "dip stick" type of device was excessive and would expose the device to damage from mooring lines and cargo hoses. The comments recommended heights ranging from 0.75 to 1.05 meters. The Coast Guard understands the problem and has revised the final rule to require that the visual indicator becomes activated when the liquid level in the cargo tank is within one meter of the tank top. Most comments indicated that the requirement to insure that the tank level indicator be visible from all points on the deck would be impossible in some instances and recommended that the indicator should be visible from all cargo control areas. The Coast Guard agrees and has changed the requirement in paragraph (b)(3) of this section as recommended.

46 CFR 39.20–7 Tankship liquid overfill protection—T/ALL

Eleven comments questioned the requirement proposed in paragraph (a) of this section that each cargo tank must be equipped with both a high level alarm and a tank overflow alarm. The Coast Guard has reviewed this requirement and the CTAC recommendations and has concluded that both alarms are warranted in order to prevent tank overfilling and possible tank rupture during closed loading.

One comment questioned the special non-conductive material requirements for in-tank instruments and another stated that these instruments must be intrinsically safe. Upon review of this section, the Coast Guard has decided to delete the specific material requirements proposed in paragraph (b) of the NPRM and replace them in paragraph (a) of the final rule with a requirement that the alarm circuits be intrinsically safe.

Five comments questioned the requirement that high level and overflow alarms must be capable of being checked at the tank. They pointed out that many alarms, such as those using radar or pressure transducer systems, cannot be tested at the tank and that allowance should be made for electronic testing. The Coast Guard agrees and has amended this section of the final rule to allow for electronic testing. In addition to allowing electronic testing of alarms, the Coast Guard has also amended paragraph (b) so that the requirements listed therein are only applicable to alarms that are installed after the effective date of these regulations.

Twenty-two comments opposed having the high level alarm activated prior to reaching 97% of tank capacity. The consensus was that setting the alarm point below 97% would have a great economic impact in that less cargo could be carried thereby increasing shipping costs. In reviewing these comments the Coast Guard has noticed a difference in philosophy among operators as to how the high level alarms are used. Some utilize this alarm as an indicator to the operator that the tank is nearly filled to capacity and to begin a shut down of the loading operation. Others use this alarm as a warning that if some action is not immediately taken the tank overfill alarm will sound. The Coast Guard has reviewed the alarming requirements in light of these differing philosophies and has modified this section of the final rule to allow operators flexibility in how the alarms are used by requiring that the high level alarm activate before the tank

overflow alarm sounds but at a level no lower than 95% of tank capacity.

One comment stated that high level alarms will probably be activated frequently by the operator filling as close as possible to the overfill alarm level, therefore there should be no high level alarm. The Coast Guard's position is that through proper training and management oversight these occurrences will be minimized.

Two comments indicated that the requirement for rupture disks should be applicable only if they are installed, as is the case with spill valves. The Coast Guard agrees and has reworded the requirement in this section of the final rule.

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

Because of objections received to the automatic shutdown system which were discussed under 33 CFR 154.812, paragraph (a) of this section has been revised to allow dual high level alarms on tank barges if they have a self-contained power supply or are fitted with an electrical shore power connection to power the alarms.

Three comments indicated support for this section and for the requirements that it contains.

Four comments stated a need for standardization of the automatic shutdown system. The Coast Guard agrees. API is developing a guideline for standardizing the system connection. Some requirements from the draft API standard have been added to paragraph (b) of this section as well as reference to additional standards to provide the degree of standardization necessary.

One comment stated that a closed gauging system should not be required on a vessel which loads under vacuum. The Coast Guard's position is that all vessels using a vapor control system must be equipped with a closed gauging system since the loading conditions are controlled by the facility. Furthermore, most facilities will not be able to process the amount of vapor that would be collected during open loading if open loading were allowed.

One comment stated that this rule should not mandate the type of overflow protection necessary but should outline the minimum system alternatives which are acceptable. The rule, as written, mandates overflow protection but rather than mandate the type of protection required lists four alternatives, one of which must be used.

One comment suggested that the spill valve mentioned in this section should be called a "liquid overfill protection valve." This is rejected since the term spill valve is universally accepted and recognized throughout the marine industry.

Two comments suggested that each tank should not be required to have its own spill valve, stating that one or two spill valves on a common header should be sufficient. The Coast Guard disagrees with this recommendation. This arrangement will not protect the tanks due to flow restrictions in the vapor collection line unless the flow rate into a tank is significantly below the maximum loading rate. Furthermore, ASTM F1271 is based on a valve installation on the tank top.

Fourteen comments took exception with the pressure settings that were being required for the spill valve. They stated that a specific value should not be given since different tanks have different design pressures. They also suggested that the pressure setting should be set higher than the pressure relief valve setting but lower than maximum internal design pressure of the task. Another comment suggested that the wording describing the requirement that a spill valve relieve at a pressure higher than that of the relief valve when operating at "the maximum anticipated loading rate" be changed to "the maximum allowable transfer rate." The Coast Guard agrees with this approach and has changed this section of the final rule to reflect these suggestions.

One comment stated that the protecting devices used should be fitted with flame screens or flame arresters unless they have been approved to operate without these devices. The Coast Guard's position is that flame screens or flame arresters in these situations would be impractical since they would have too much resistance and would probably be blown out by the cargo when the valve opened.

Four comments were received concerning the use of rupture disks. One comment stated they should not be allowed, the others stated they should be allowed if a standard could be developed or if specific types of rupture disks could be approved, rather than require case by case approval. The use of rupture disks has been left in the final rule as an optional arrangement which, if used, must be approved by the Coast Guard. The Coast Guard intends to propose to the ASTM F25.13 Subcommittee on Piping that an ASTM standard be developed to cover cargo tank rupture disks.

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

Thirty-nine comments discussed the set points for the pressure-vacuum relief valve settings. Most of the comments stated that specific values should not be required but that they should be determined on an individual basis and set to a percentage of the vessel's maximum internal design pressure and vacuum. The Coast Guard agrees with these concerns and has revised this section. Rather than prescribing a fixed set point, each cargo tank pressure relief valve must be set so that it is capable of discharging cargo vapor at 1.25 times the maximum cargo transfer rate so that the pressure in the cargo tank vapor space does not exceed the maximum allowable working pressure of the tank or the settings on spill valves or cargo tank rupture disks. Likewise, each cargo tank vacuum relief valve must be set so that it prevents a vacuum in the tank that exceeds the maximum allowable vacuum for that tank.

One comment asked if the testing of pressure-vacuum relief valves in this section was restricted to new valves. The regulation requires that all valves be tested since the flow rate through the valves is critical when a vapor collection system is used, whereas for previous arrangements without vapor collection the capacity of the valve was not a major concern.

One comment questioned the record keeping requirements for the pressure-vacuum relief valve testing. Each pressure-vacuum relief valve manufacturer will normally test a prototype or production valve of each model it manufactures. The results should be kept on file by the manufacturer and provided to the designer/installer of the vapor collection system.

One comment stated that mandating a requirement that each valve have a mechanical means available for checking the valve before loading would render useless all pressure-vacuum relief valves currently in use on tank barges. The Coast Guard disagrees since only those valves installed one year after the effective date of the final rule will need to meet this requirement.

Another comment questioned if existing pressure-vacuum relief valves are allowed to have a mechanical means to check their operation prior to loading. This rule mandates that valves installed one year after the effective date of the final rule need to have such means, it does not preclude the use of such means on existing valves.

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

One comment questioned whether the pressure sensor required by this section included visible and audible alarms or a pressure indicator. The requirement in

this section states that each tankship vapor collection system must have a pressure sensing device that has both a pressure indicator and an alarm located where cargo loading is controlled.

Three comments stated that vessels whose tanks are protected by pressure-vacuum relief valves should not be required to have pressure sensing alarms. The Coast Guard's position is that although the pressure-vacuum relief valve provides the primary protection, the addition of an alarm set to alarm at a pressure before the pressure-vacuum relief valve relieves will provide an operational means to prevent unnecessary pressure rise that would lead to the opening of the pressure-vacuum relief valves and increased vapor emissions.

Four comments stated that the requirement to have the pressure sensing alarms sound on the deck area is not necessary and could be a distraction. The Coast Guard agrees and has amended this section to require that the alarms need only be heard at the cargo transfer control point.

Eight comments questioned the requirement that the high pressure sensor alarm be set at 50% of the lowest pressure relief valve setting. Suggestions were made to set the alarm point at the lowest pressure relief valve setting or at some percentage of that value. The Coast Guard agrees that the 50% value is too conservative and has amended the alarm point to coincide with 90% of the lowest pressure relief valve setting.

Six comments questioned the need for more than one pressure sensing device and discussed the best location for the device. The consensus was that one device should be sufficient and that its location was not critical since the pressure drop through the vapor collection header would be negligible. The Coast Guard agrees with this assessment and changed the final rule to require one pressure sensing device located at the aft end of the vapor collection line. This location minimizes the length of instrument cabling and piping associated with the requirement.

One comment stated that ships with closed gauging that have local readouts only at the tank should be allowed to locally install pressure gauges and alarms. The Coast Guard disagrees, with the exception of chemical tankships which are permitted to have vapor collection for individual tanks. Fixed vapor collection piping is required, therefore, only a single pressure sensor location is needed.

46 CFR 39.30–1 Operational requirements—TB/ALL

One comment correctly noted that this section would be applicable to U.S. vessels wherever located, even outside U.S. ports, when transferring cargo vapor to a shore facility. The Coast Guard has modified the final rule so that the prohibition against transferring vapors to a facility which does not have a properly endorsed letter of adequacy is only applicable to U.S. ports.

Twenty-two comments discussed the rate of cargo transfer and the set points used to calculate this value. Most of the comments indicated that the requirement to restrict the vapor collection system pressure to 50% of the lowest pressure relief valve was overly conservative. The Coast Guard has reassessed these requirements and has revised this section to require that the rate of cargo transfer be determined by using an 80% rather than a 50% figure and by dropping the 3.0 and 2.0 pressure set points in favor of the setting of the lowest cargo tank vent system pressure relief valve.

Twenty-three comments discussed the requirement that cargo tanks must not be filled higher than 97% of the cargo tank volume. Several of the comments noted that limiting the amount of cargo to the 97% value would have a substantial economic impact. Suggestions for the filling limit ranged from 98% to 100%. The Coast Guard agrees that the 97% limit is unreasonable and has revised the filling limit to be either 98.5% of the cargo tank volume or the level at which the overfill alarm is set.

One comment stated that the requirements for opening tanks carrying static accumulating cargoes should not be required for crude oil, most alcohols, ketones, and esters or for inerted vessels. The Coast Guard agrees that if the cargo is not a static accumulator the requirement does not apply, however, the Coast Guard is not convinced that the cargoes mentioned fall into this category.

Two comments pointed out that the 30 minute wait required before sampling or gauging devices can be placed into the cargo tank is unnecessary for inerted vessels. The Coast Guard agrees and has modified the section to reflect this fact.

Another comment stated that since it will be necessary to open cargo tanks for sampling purposes it may be necessary to install vapor seal valves for sampling. This is correct and is not prohibited by the regulations.

One comment stated that barge owners should be made aware of these upcoming rules so that they can make provisions for the installation of vapor lock valves designed for restricted or closed gauging and sampling. The Coast Guard agrees, and that is one of the reasons for utilizing the rulemaking process.

Four comments took exception with the requirement to maintain a loading rate of one meter per second or less until the cargo level in the tank reached a meter in depth. The consensus was that this requirement would increase loading times unnecessarily and that limiting the loading rate until the bottom of the tank is covered would provide the required degree of safety. The Coast Guard agrees that the requirements contained in the notice were too stringent and has amended the final rule to require that the initial transfer rate be controlled in accordance with Section 7.4 of ISGOTT.

Two comments pointed out that there was a degree of confusion concerning the location at which the oxygen content of the tank is to be measured. Based on these comments the location for these measurements has been changed to include a point one meter below the tanktop and at one-half the ullage space. As previously discussed, several comments indicated that many high level alarm systems, such as those employing radar or capacitance techniques, do not have the means to be tested at the tank. The testing requirement in this section has been revised to agree with § 39.20–7.

Two comments stated that the term "continuously monitored" in § 39.30–1(j) of the NPRM was unclear. The Coast Guard agrees and on further analysis has deleted the requirement.

Five comments stated that limiting hose length to 30 meters and the inside diameter of all vapor hoses to not less than the inside diameter of the vessel's vapor collection system piping were too restrictive. The Coast Guard has deleted both of these paragraphs (k and l) because the requirement to determine the pressure drop in § 39.20–9(d) of this section is adequate to cover the reason for originally proposing these requirements.

46 CFR 39.40–1 General requirements for vapor balancing—TB/ALL

One comment stated that it was premature to publish regulations applicable to lightering operations since the safety of life and equipment is not assured by these regulations. The Coast Guard disagrees since states may require vapor control during lightering operations that take place under their jurisdiction.

One comment suggested that the applicability of this section to "flammable or combustible liquids" should be changed to "crude oil, gasoline blends, and benzene" in keeping with the suggestions of CTAC. The Coast Guard has made this revision and added paragraph (e) which requires lightering operations involving the collection of vapors from other cargoes to obtain specific approval from the Coast Guard.

One comment stated that it was not necessary to prohibit transferring vapor from a non-inerted vessel to an inerted vessel and that control of oxygen content can be achieved by overcharging the tanks with inert gas. The Coast Guard's position is that it is unsafe to transfer non-inerted vapor to an inerted vessel and that there is insufficient space to add the amount of inert gas that would be required to control the oxygen content without overpressurizing the tanks.

One comment stated that there should be provisions to allow lightering of a barge in an emergency situation without controlling the vapors. It is not appropriate for the Coast Guard to include such a provision. Vapor control will be required by the states, so an emergency exemption must be provided by the states. The Coast Guard position is that if a state mandates the use of vapor control during lightering operations under emergency conditions the requirements in this rule must be met.

Three comments stated that lightering is not adequately addressed since the rules prohibit vapor collection during the majority of lightering operations which involve transfer from an inerted tank ship to a non-inerted barge. They also suggested that the only way to handle a full discharge is to retain the vapors on the vessel receiving cargo or being ballasted by compressing the vapor within the vapor space. The Coast Guard recognizes that transfers from an inerted vessel to a non-inerted vessel is common, however, vapor transfer cannot be done safely with this arrangement. The method recommended for handling ballast vapor is allowed by these regulations provided the pressure does not exceed the value given in § 39.40–5(e) of this section. Alternatively, the receiving vessel could be equipped with a vapor processing unit.

One comment asked what was meant by a device to assist in the transfer of vapor. This requirement has been changed to refer to a compressor or blower.

One comment stated that there are no impending air quality requirements which would govern lightering operations. The Coast Guard disagrees because requirements are presently being prepared by the State of California.

Two paragraphs (c and d) were added to this section. These paragraphs were originally contained in other sections of the NPRM and were moved here as a result of a reorganization of the rule and to provide added clarity to this section.

46 CFR 39.40–3 Design and equipment for vapor balancing—TB/ALL

One comment stated that the detonation arrester should be installed on the receiving vessel. The Coast Guard partially agrees with this comment. The rule has been revised to require placement on the service vessel, which could be either the vessel receiving or discharging cargo. This location places the major burden of complying with the rule on the service vessel rather than on the more transient vessel.

One comment stated that the installation of a detonation arrester when both vessels are inerted is unnecessary, since continuous monitoring of the oxygen content of the vapor stream will provide a level of safety at least as great as that of current operations. The Coast Guard agrees with this concept and has revised the final rule to require a detonation arrester only when the tanks on the vessel discharging the cargo are not inerted.

One comment stated that detonation arresters should not be required since there are no tested, proven detonation arresters available. The Coast Guard disagrees, the technology is proven and manufacturers are currently engaged in a test program to qualify their products. Appendix A of this rule contains an acceptable procedure for testing detonation arresters.

One comment asked why the requirements for pressure sensing devices, although referred to in the preamble as being present in this section, were not included in the proposed rule. The requirements did appear in the NPRM. They were moved to § 39.20–13 but the preamble was not amended to note this move. The preamble discussion has been corrected in the final rule.

Three comments questioned the location of the oxygen analyzer and suggested that it should be located on the service vessel. The Coast Guard agrees and has amended this section of the final rule as suggested.

46 CFR 39.40–5 Operational requirements for vapor balancing—TB/ALL

One comment stated that the requirement for inerting the vapor hose prior to the transfer of cargo vapor should be changed to read "the vapor hose must be bled to atmosphere prior to the start of vapor transfer, inert gas can be used to purge and inert the hose." The Coast Guard agrees and has revised the rule to reflect this suggestion.

One comment suggested that impressed current cathodic protection systems should be shut down during lightering operations. The Coast Guard agrees and has added this requirement.

Three comments questioned the requirement for a continuously monitored pressure indicator proposed in paragraph (b) of this section in the NPRM. This requirement has been removed in the final rule and only the requirements in § 39.20–13 must be met.

Two comments suggested that a non-conductive length of hose should be allowed in lieu of an electrical insulating flange. The Coast Guard agrees and has added this option to the final rule.

One comment stated that the use of insulating flanges is contrary to past U.S. practice. Although this may have been true in the past, the Coast Guard's position is that their use is necessary in operations involving vapor collection.

One comment stated that the oxygen sampling procedure in the proposed rule seemed onerous and that if necessary should be included in 46 CFR 35.35. The Coast Guard disagrees, the requirement in 46 CFR 35.35 is to verify that the testing was done. The required procedure for testing has been retained in this section.

One comment felt that pump speeds could be used to estimate the cargo transfer rate. The Coast Guard has no problem with this method. Another comment stated that the rate of cargo transfer should be monitored by tank gauging. The Coast Guard agrees, this method should be used to confirm transfer rates based on pump characteristics.

Nine comments opposed the restriction for simultaneous lightering and tank cleaning. The Coast Guard has revised § 39.40–5(g) to allow tank washing when both vessels are inerted.

Incorporation by Reference

The material referenced in 33 CFR 154.106 and 46 CFR 39.10–5 has been approved for incorporation by reference by the Director of the **Federal Register** under 5 U.S.C 552 and 1 CFR part 51.

The materials are available as indicated in those sections.

Regulatory Evaluation

While the regulations are considered to be non-major under Executive Order 12291, they are considered significant under Department of Transportation (DOT) regulatory policies and procedures (44 FR 11034; February 26, 1979). A final regulatory evaluation has been prepared and placed in the public docket. It may be inspected or copied at the Office of the Marine Safety Council, U.S. Coast Guard, room 3314, 2100 Second Street., SW., Washington, DC 20593–0001 between 8 a.m. and 3 p.m., Monday through Friday, except Federal holidays. The telephone number is (202) 267–1477.

The changes made to the rule since publication of the NPRM either will impose no new burdens or will reduce the burdens proposed in the NPRM. The changes to 33 CFR 154.800 and 46 CFR 39.10–1 limit the applicability to the collection of vapors of crude oil, gasoline blends, and benzene. Changes to 33 CFR 154.804 and 33 CFR 39.10–1 grant exemptions to certain existing facility and vessel vapor control systems. Changes to 33 CFR 154.808, 154.810, 154.814, 154.820, 154.840, and 154.850, and 46 CFR 39.10–11, 39.20–1, 39.20–7, 39.20–9, 39.20–11, 39.20–13, and 39.30–1 make the regulations more performance oriented and allow greater flexibility in choosing different alternatives.

The rules will benefit industry by providing standards for the safe design and operation of vapor control systems. The rules will 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 rules will also benefit the Federal and state governments. The standards promulgated will facilitate review and inspection of vapor control systems by the Coast Guard. State governments will 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.

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 will be approximately $831,250. It estimated that the cost to modify a typical inland river barge for vapor control will be approximately $167,750. It also estimated that the cost to modify a typical product terminal for vapor control which serves ships and barges will be approximately $7,502,160.

Because the rules will 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 incremental amounts necessary 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. A review of information the Coast Guard has on existing vapor control systems indicates that the costs of those installations are comparable to the costs expected for systems installed in accordance with these regulations.

The Coast Guard cannot predict where and under what circumstances the use of vapor control systems will be required. However, it is unlikely that state and local governments will mandate the use of vapor control systems unless the expected improvement in ambient air quality justifies the cost, or the use of vapor control systems is necessary because the local area is not meeting the national ambient air quality standards set under the provisions of the Clean Air Act. Where the use of vapor control systems is mandated, the safety benefits of standardized equipment and operating procedures are expected to outweigh any increased costs over a marginally acceptable system that might have been installed in the absence of these standards.

Small entities will 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 these 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. 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. These items have been submitted to the Office of Management and Budget (OMB) for review under the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*) and have been approved by OMB. The section numbers and the corresponding OMB approval number are:

Section	Topic	OMB control number
33 CFR		
154.310	Operations Manual	2115–0078
154.740	Records	2115–0096
154.804	Facility Plan Review	2115–0581
154.806	Application for Certifying Entity	2115–0581
155.750	Oil Transfer Procedures	2115–0120
156.120	Declaration of Inspection	2115–0506
156.170	Equipment Tests and Inspections	2115–0096
46 CFR		
32.53–85	Inert Gas System Manual	2115–0505
35.35.30	Declaration of Inspection	2115–0506
39.10–13	Vessel Plan Review	2115–0505

Federalism

This action has been analyzed in accordance with the principles and criteria contained in Executive Order 12612, and it has been determined that while this final rule has important federalism implications, they are not sufficient to warrant the preparation of a Federalism Assessment. Although the Coast Guard has determined that this action does not have sufficient federalism implications to warrant the preparation of a Federalism

Assessment, it should be noted that the Coast Guard has also determined that regulations for the safe design, installation, and operation of vapor control systems, as described in this rulemaking, can only be effectively implemented at the national level. Once a state requires vapor control, the discretion available to that state to modify requirements concerning design, installation, and operation of vapor control systems, as they pertain to shoreside facilities, will be limited. For example, all flexible hoses used in vapor control systems and the last one meter (3.3 feet) of fixed piping leading to the facility vapor connection must be color coded with three bands painted red/yellow/red of specified width. The vapor connection flange is also of unique design to prevent improper cross-connection. These requirements, and others like them, could not be modified. Some standardization of equipment and operational 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.

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 30

Cargo vessels, Foreign relations, Hazardous materials transportation, Penalties, Reporting and recordkeeping requirements.

46 CFR Part 32

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

For the reasons set out in the preamble, the Coast Guard amends title 33, chapter I, Subchapter O, parts 154, 155, and 156, and title 46, chapter I, parts 30, 32, and 35, and adds a new part 39 to 46 CFR, Chapter I, 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, 1321(j)(1)(C); sec. 2, E.O. 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp., p. 793; 49 CFR 1.46.

2. 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 part, and the sections affected are:

American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005	
API Standard 2000, Venting Atmospheric and Low-Pressure Storage Tanks (Nonrefrigerated and Refrigerated), Third Edition, January 1982 (reaffirmed December 1987)	154.814
API Recommended Practice 550, Manual on Installation of Refinery Instruments and Control Systems, Part II—Process Stream Analyzers, Section 1—Analyzers, Fourth Edition, February 1985	154.824
American National Standards Institute (ANSI), 1430 Broadway, New York, NY 10018	
ANSI B16.5, Steel Pipe Flanges and Flanged Fittings, 1981	154.500; 154.808; 154.810
ANSI B16.24—Bronze Pipe Flanges and Flanged Fittings, Class 150 and 300, 1979	154.500; 154.808
ANSI B31.3—Chemical Plant and Petroleum Refinery Piping, 1987 (including B31.3a–1988, B31.3b–1988, and B31.3c–1989 addenda)	154.510; 154.808
International Electrotechnical Commission (IEC), Bureau Central de la Commission Electrotechnique Internationale, 1 rue de Varembé, Geneva, Switzerland	
IEC 309–1—Plugs, Socket-Outlets and Couplers for Industrial Purposes: Part 1, General Requirements, 1979	154.812
IEC 309–2—Plugs, Socket-Outlets and Couplers for Industrial Purposes: Part 2, Dimensional Interchangeability Requirements for Pin and Contact-tube Accessories, 1981	154.812
National Electrical Manufacturers Association (NEMA), 2101 L St. NW., Washington, DC 20036	
ANSI/NEMA WD6—Wiring Devices, Dimensional Requirements, 1988	154.812
National Fire Protection Association (NFPA), Batterymarch Park, Quincy, MA 02269	
NFPA 70—National Electrical Code, 1987	154.735; 154.808; 154.812
Oil Companies International Marine Forum (OCIMF), 6th Floor, Portland House, Stag Place, London SWIE 5BH, England	
International Safety Guide for Oil Tankers and Terminals, Third Edition, 1988	154.735; 154.810

3. Section 154.310 is amended by redesignating existing paragraphs (b) and (c) as (c) and (d), respectively, adding new paragraph (b), and adding a parenthetical at the end of the section 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 or simplified piping and instrumentation diagram (P&ID) of the facility's vapor control system piping, including the location of each valve, control device, pressure-vacuum

relief valve, pressure indicator, flame arrester, and detonation arrester; and

(2) A description of the vapor control system's design and operation including the:

(i) Vapor line connection;

(ii) Startup and shutdown procedures;

(iii) Steady state operating procedures;

(iv) Provisions for dealing with pyrophoric sulfide (for facilities which handle inerted vapors of cargoes containing sulfur);

(v) Alarms and shutdown devices; and

(vi) Pre-transfer equipment inspection requirements.

* * * * *

(Approved by the Office of Management and Budget under control number 2115-0078)

4. Section 154.740 is amended by deleting the word "and" at the end of paragraph (e), by replacing the period at the end of paragraph (f) with a semicolon, adding new paragraphs (g), (h), and (i), and adding a parenthetical at the end of the section to read as follows:

§ 154.740 Records.

* * * * *

(g) A record of all repairs made within the last three years involving any component of the facility's vapor control system required by subpart E of this part;

(h) A record of all automatic shut downs of the facility's vapor control system within the last 3 years; and

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

(Approved by the Office of Management and Budget under control number 2115-0096)

5. A new subpart E is added to part 154 to read as follows:

Subpart E—Vapor Control Systems

Subpart E—Vapor Control Systems

§ 154.800 Applicability.

(a) Except as specified by paragraph (c) of this section, this subpart applies to:

(1) Each facility which collects vapors of crude oil, gasoline blends, or benzene emitted from vessel cargo tanks;

(2) A vessel which is not a tank vessel that has a vapor processing unit located on board for recovery, destruction, or dispersion of crude oil, gasoline blends, or benzene vapors from a tank vessel; and

(3) Certifying entities which review, inspect, test, and certify facility vapor control systems.

(b) A facility which collects vapors of flammable or combustible cargoes other than crude oil, gasoline blends, or benzene, must meet the requirements prescribed by the Commandant (G-MTH).

(c) A facility with an existing Coast Guard approved vapor control system which was operating prior to July 23, 1990 is subject only to § 154.850 of this subpart as long as it receives cargo vapor only from the specific vessels for which it was approved.

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

(e) When a facility vapor control system which receives cargo vapor from a vessel is connected to a facility vapor control system that serves tank storage areas and other refinery processes, the specific requirements of this subpart apply between the vessel vapor connection and the point where the vapor control system connects to the facility's main vapor control system.

§ 154.802 Definitions.

As used in this subpart:

Certifying entity means an individual or organization accepted by the Commandant (G-MTH) to review plans and calculations for vapor control system designs, and to conduct initial inspections and witness tests of vapor control system installations.

Existing vapor control system means a vapor control system which was operating prior to July 23, 1990.

Facility vapor connection means the point in a facility's vapor collection system where it connects to a vapor collection hose or the base of a vapor collection arm.

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.

Liquid knockout vessel means a device to separate liquid from vapor.

Maximum allowable transfer rate means the maximum volumetric rate at which a vessel may receive cargo or ballast.

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

Vapor balancing means the transfer of vapor displaced by incoming cargo from the tank of a vessel receiving cargo into a tank of the vessel or facility delivering cargo via a vapor collection system.

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

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

Vapor destruction unit means a vapor processing unit that destroys cargo vapor by a means such as incineration.

Vapor dispersion system means a vapor processing unit which releases cargo vapor to the atmosphere through a venting system not located on the vessel being loaded or ballasted.

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

Vapor recovery unit means a vapor processing unit that recovers cargo vapor by a non-destructive means such as lean oil absorbtion, carbon bed adsorption, or refrigeration.

Vessel vapor connection means the point in a vessel's fixed vapor collection system where it connects to a vapor collection hose or arm.

§ 154.804 Review, certification, and initial inspection.

(a) A new vapor control system installation must be certified by a certifying entity as meeting the requirements of this subpart prior to operating.

(b) An existing vapor control system installation not exempted by § 154.800(c) of this subpart must be certified by a certifying entity by July 23, 1992. Plans, calculations, and specifications for the installation must be submitted to a certifying entity for review by January 23, 1991.

(c) An existing vapor control system installation that has been Coast Guard approved for operation with specific

vessels must be certified by a certifying entity prior to receiving vapors from other vessels.

(d) Plans and information submitted to the certifying entity must include a qualitative failure analysis. The analysis must demonstrate the following:

(1) The vapor control system is designed to permit the system to continuously operate safely when receiving cargo vapors from tankships and barges over the full range of transfer rates expected at the facility;

(2) The vapor control system is provided with the proper alarms and automatic control systems to prevent unsafe operation;

(3) The vapor control system is equipped with sufficient automatic or passive devices to minimize damage to personnel, property, and the environment if an accident were to occur; and

(4) If a quantitative failure analysis is also conducted, the level of safety attained is at least one order of magnitude greater than that calculated for operating without a vapor control system.

Note: The *American Institute of Chemical Engineers* publication, "Guidelines for Hazard Evaluation Procedures" may be used as guidance when preparing a qualitative failure analysis. Military Standard MIL–STD–882B may be used as guidance when preparing a quantitative failure analysis.

(e) The certifying entity must conduct all initial inspections and witness all tests required to demonstrate that the facility:

(1) Conforms to certified plans and specifications;

(2) Meets the requirements of this subpart; and

(3) Is operating properly.

(f) Upon receipt of written certification from the certifying entity that a facility's vapor control system complies with the requirements of this part the COTP shall endorse the letter of adequacy required by § 154.325 of this part to indicate that the facility is acceptable for collecting vapors of crude oil, gasoline blends, benzene, or any other vapors for which it is certified.

(g) Any design or configuration alteration involving a certified vapor control system must be reviewed by a certifying entity. After conducting any inspections and witnessing tests necessary to verify that the modified vapor control system meets the requirements of this subpart, the certifying entity must recertify the installation.

(h) Certifications issued in accordance with this section and a copy of the plans, calculations, and specifications for the vapor control system must be maintained at the facility.

(i) A certifying entity accepted under § 154.806 of this subpart may not certify a facility vapor control system if it was involved in the design or installation of the system.

(Approved by the Office of Management and Budget under control number 2115–0581)

§ 154.806 Application for acceptance as a certifying entity.

(a) An individual or organization seeking acceptance as a certifying entity must 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 individual or organization to certify a vapor control system installation. Any false statement or misrepresentation, 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 as a certifying entity.

(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 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 monitor and evaluate test procedures and results;

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

(5) That it is not controlled by an owner or operator of a vessel or facility engaged in controlling vapor emissions; and

(6) That it 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 an owner or operator of a vessel or facility 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 systems;

(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 a certifying entity may be terminated by the Commandant (G–MTH) if the entity fails to properly review, inspect, or test a system in accordance with this subpart.

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

(Approved by the Office of Management and Budget under control number 2115–0581)

§ 154.808 Vapor control system, general.

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

(b) Vapor collection system piping and fittings must be in accordance with ANSI B31.3 and designed for a maximum allowable working pressure of at least 150 psig. Valves and flanges must be in accordance with ANSI B16.5 or B16.24, 150 pound class.

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

(d) Any pressure, flow, or concentration indication required by this part must provide a remote indicator on the facility where the cargo transfer and vapor control systems are controlled.

(e) Any alarm condition specified in this part must activate an audible and visible alarm where the cargo transfer and vapor control systems are controlled.

(f) The vapor control system must be separated or insulated from external heat sources to limit vapor control system piping surface temperature to not more than 177 °C. (350 °F.) during normal operation.

(g) A means must be provided to eliminate any liquid condensate from the vapor collection system which carries over from the vessel or condenses as a result of an enrichment process.

(h) If a liquid knockout vessel is installed it must have:

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

(2) A high liquid level sensor that activates an alarm; and

(3) A high high level sensor that closes the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart and shuts down any compressors or blowers prior to liquid carrying over from the vessel to the compressor or blower.

(i) Vapor collection piping must be electrically grounded and electrically continuous.

(j) If the facility handles inerted vapors of cargoes containing sulfur, provisions must be made to control heating from pyrophoric iron sulfide deposits in the vapor collection line.

§ 154.810 Vapor line connections.

(a) A remotely operated cargo vapor shutoff valve must be installed in the vapor collection line between the facility vapor connection and the nearest point where any inerting, enriching, or diluting gas is introduced into the vapor collection line or where a detonation arrester is fitted. The valve must:

(1) Close within thirty (30) seconds after detection of a shutdown condition by a component required by this subpart;

(2) Close automatically if the control signal is lost;

(3) Activate an alarm when a signal to shut down is received;

(4) Be capable of manual operation or manual activation;

(5) Have a local valve position indicator or be designed so that the valve position can be readily determined from the valve handle or valve stem position; and

(6) If the valve seat is fitted with resilient material, not allow appreciable leakage when the resilient material is damaged or destroyed.

(b) Except when a vapor collection arm is used, the last 1.0 meter (3.3 feet) of vapor piping before the facility vapor connection must be:

(1) Painted red/yellow/red with:

(i) The red bands 0.1 meter (0.33 feet) wide, and

(ii) The middle yellow band 0.8 meter (2.64 feet) wide; and

(2) Labeled "VAPOR" in black letters at least 50 millimeters (2 inches) high.

(c) Each facility vapor connection flange must have a permanently attached 0.5 inch diameter stud at least 1.0 inch long projecting outward from the flange face. The stud must be located at the top of the flange, midway between bolt holes, and in line with the bolt hole pattern.

(d) Each hose used for transferring vapors must:

(1) Have a design burst pressure of at least 25 psig;

(2) Have a maximum allowable working pressure of at least 5 psig;

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

(4) Be electrically continuous with a maximum resistance of ten thousand (10,000) ohms;

(5) Have flanges with:

(i) A bolt hole arrangement complying with the requirements for 150 pound class ANSI B16.5 flanges, and

(ii) One or more 0.625 inch diameter holes in the flange located midway between bolt holes and in line with the bolt hole pattern;

(6) Be abrasion resistant and resistant to kinking; and

(7) Have the last 1.0 meter (3.3 feet) of each end of the vapor hose marked in accordance with paragraph (b) of this section.

(e) Vapor hose handling equipment must be provided with hose saddles which provide adequate support to prevent kinking or collapse of hoses.

(f) Fixed vapor collection arms must:

(1) Meet the requirements of paragraphs (d)(1) through (d)(5) of this section;

(2) Have the last 1.0 meter (3.3 feet) of the arm marked in accordance with paragraph (b) of this section.

(g) The facility vapor connection must be electrically insulated from the vessel vapor connection in accordance with section 6.10 of the OCIMF International Safety Guide for Oil Tankers and Terminals.

(h) A vapor collection system fitted with an enriching system that operates at a positive gauge pressure at the facility vapor connection must be fitted with:

(1) A manual isolation valve between each facility vapor connection and the remotely operated cargo vapor shutoff valve required by paragraph (a) of this section; and

(2) A means to prevent backflow of enriched vapor to the vessel's vapor collection system.

§ 154.812 Facility requirements for vessel liquid overfill protection.

(a) Each facility which receives cargo vapor from a tank barge which is fitted with overfill protection in accordance with 46 CFR 39.20–9(a) as its only means of overfill protection must provide a 120 volt, 20 amp explosion proof receptacle which meets:

(1) ANSI/NEMA WD6;

(2) NFPA 70, Articles 410–57 and 501–12; and

(3) 46 CFR 111.105–9.

(b) Each facility that receives cargo vapor from a tank barge fitted with an intrinsically safe cargo tank level sensor system complying with 46 CFR 39.20–9(b) as its only means of overfill protection must have an overfill control panel on the dock capable of powering and receiving an alarm and shutdown signal from the cargo tank level sensor system that:

(1) Closes the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart and activates the emergency shutdown system required by § 154.550 of this part when:

(i) A tank overfill signal is received from the barge, or

(ii) Electrical continuity of the cargo tank level sensor system is lost;

(2) Activates an alarm which is audible and visible to barge personnel and facility personnel when a tank overfill signal, or an optional high level signal corresponding to a liquid level lower than the tank overfill sensor setting, is received from the barge;

(3) Has a means to electrically and mechanically test the alarms and automatic shutdown systems prior to transferring cargo to or ballasting the tank barge;

(4) Has suitable means, such as approved intrinsic safety barriers able to accept passive devices, to ensure that the overfill and optional alarm circuits on the barge side of the overfill control panel, including cabling, normally closed switches, and pin and sleeve connectors, are intrinsically safe;

(5) Is labeled with the maximum allowable inductance and capacitance to be connected to the panel, as specified by the equipment manufacturer; and

(6) Has a female connecting plug for the tank barge level sensor system with a 5 wire, 16 amp connector body meeting IEC 309–1/309–2 which is:

(i) Configured with pins S2 and R1 for the tank overfill sensor circuit, pin G connected to the cabling shield, and pins N and T3 reserved for an optional high level alarm connection;

(ii) Labeled "Connector for Barge Overflow Control System"; and

(iii) Connected to the overfill control panel by a shielded flexible cable.

§ 154.814 Facility requirements for vessel vapor overpressure and vacuum protection.

(a) A facility's vapor collection system must have the capacity for collecting cargo vapor at a rate of not less than 1.25 times the facility's maximum liquid transfer rate for cargo for which vapor collection is required plus any inerting,

diluting, or enriching gas which may be added to the system, unless the vapor growth for turbulent loading of the most volatile liquid handled by the facility is less than 25 percent.

(b) A facility vapor collection system must maintain the pressure in a vessel's cargo tanks between 80 percent of the highest setting of any of the vessel's vacuum relief valves and 80 percent of the lowest setting of any of the vessel's pressure relief valves for a non-inerted tank vessel, and between 0.2 psig and 80 percent of the lowest setting of any of the vessel's pressure relief valves for an inerted tank vessel. The system must be capable of maintaining the pressure in the vessel's cargo tanks within this range at any cargo transfer rate less than or equal to the maximum transfer rate determined at the pre-transfer conference required by § 156.120(w) of this chapter.

(c) The pressure measured at the facility vapor connection must be corrected for pressure drops across the vessel's vapor collection system and the vapor collection hose or arm.

(d) A pressure sensing device must be provided which activates an alarm when the pressure at the facility vapor connection exceeds either the pressure corresponding to the upper pressure determined 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.

(e) A pressure sensing device must be provided which activates an alarm when the pressure at the facility vapor connection falls below either the pressure corresponding to the lower pressure determined in paragraph (b) of this section or a higher pressure agreed upon at the pre-transfer conference required by § 156.120(w) of this chapter.

(f) A pressure sensing device must be provided which activates the emergency shutdown system required by § 154.550 of this part and closes the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the pressure at the facility vapor connection exceeds 2.0 psi, or a lower pressure agreed upon at the pre-transfer conference required by § 156.120(w) of this chapter. The sensing device must be independent of the device used to activate the alarm required by paragraph (d) of this section.

(g) A pressure sensing device must be provided which closes the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the vacuum at the facility vapor connection is more than 1.0 psi, or a lesser vacuum set at the pre-transfer conference required by § 156.120(w) of this chapter. The sensing device must be independent of the device used to activate the alarm required by paragraph (e) of this section.

(h) The pressure sensing devices required by paragraphs (e) and (f) of this section must be located in the vapor collection line between the facility vapor connection and the manual isolation valve, if required by § 154.810(h) of this subpart, unless an interlock is provided which prevents operation of the system when the isolation valve is closed.

(i) A pressure indicating device must be provided which indicates the pressure in the vapor collection line.

(j) If a compressor, blower, or eductor capable of drawing more than 1.0 psi vacuum is used to draw vapor from the vessel, a vacuum relief valve must be installed in the vapor collection line between the compressor, blower, or eductor and the facility vapor connection, which:

(1) Relieves at a pressure such that the pressure in the vapor collection system at the facility vapor connection does not exceed 1.0 psi vacuum;

(2) Has a relieving capacity equal to or greater than the capacity of the compressor, blower, or eductor;

(3) Has a flame screen fitted at the vacuum relief opening; and

(4) Has been tested for relieving capacity in accordance with paragraph 1.5.1.3 of API 2000 with a flame screen fitted.

(k) When a facility collects cargo vapor through an undersea pipeline from a vessel moored offshore, the vacuum relief valve may be set at a vacuum greater than 1.0 psi vacuum provided the pressure controls take into account the pressure drop across the vessel's vapor collection system, any vapor collection hoses, and the undersea pipeline as a function of the actual transfer rate.

(l) If the pressure in the vapor collection system can exceed 2.0 psig due to a malfunction in an inerting, enriching, or diluting system a pressure relief valve must:

(1) Be installed between the point where inerting, enriching, or diluting gas is introduced into the vapor collection system and the facility vapor connection;

(2) Relieve at a pressure such that the pressure in the vapor collection system at the facility vapor connection does not exceed 2.0 psig;

(3) Have a relieving capacity equal to or greater than the maximum capacity of the facility inerting, enriching, or diluting gas source;

(4) If not designed to insure a minimum vapor discharge velocity of 30 meters (98.4 ft.) per second, have a flame screen fitted at the discharge opening; and

(5) Have been tested for relieving capacity in accordance with paragraph 1.5.1.3 of API 2000.

(m) The relieving capacity test required by paragraph (l)(5) must be carried out with a flame screen fitted at the discharge opening if the pressure relief valve is not designed to insure a minimum vapor discharge velocity of 30 meters (98.4 ft.) per second.

§ 154.820 Fire, explosion, and detonation protection.

(a) A vapor control system with a single facility vapor connection that receives vapor only from a vessel with inerted cargo tanks and processes vapor with a vapor recovery unit must:

(1) Be capable of inerting the vapor collection line in accordance with § 154.824(a) of this subpart prior to receiving vapors from the vessel;

(2) Have at least one oxygen analyzer that samples the vapor concentration continuously at a point not more than 6 meters (19.7 ft.) from the facility vapor connection; and

(3) Meet § 154.824 (f)(1), (f)(2), (g), (h)(2), and (h)(3) of this subpart.

(b) A vapor control system with a single facility vapor connection that receives vapor only from a vessel with inerted cargo tanks and processes vapor with a vapor destruction unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from the facility vapor connection; or

(2) Have an inerting system that meets the requirements of § 154.824 of this subpart.

(c) A vapor control system with a single facility vapor connection that receives vapor from a vessel with cargo tanks that are not inerted and processes vapor with a vapor recovery unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from the facility vapor connection; or

(2) Have an inerting, enriching, or diluting system that meets the requirements of § 154.824 of this subpart.

(d) A vapor control system with a single facility vapor connection that receives vapor from a vessel with cargo tanks that are not inerted and processes the vapor with a vapor destruction unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from the facility vapor connection; and

(2) Have an inerting, enriching, or diluting system that meets the requirements of § 154.824 of this subpart.

(e) A vapor control system with multiple facility vapor connections that processes vapor with a vapor recovery unit must have a detonation arrester located not more than 6 meters (19.7 ft.) from each facility vapor connection.

(f) A vapor control system with multiple facility vapor connections that processes vapor with a vapor destruction unit must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from each facility vapor connection; and

(2) Have an inerting, enriching, or diluting system that meets the requirements of § 154.824 of this subpart.

(g) A vapor control system that uses a vapor balancing system in which cargo vapor from a vessel is transferred through the facility vapor collection system to facility storage tanks must:

(1) Have a detonation arrester located not more than 6 meters (19.7 ft.) from each facility vapor connection;

(2) Have a detonation arrester located within the storage tank containment area as close as practical to the vapor return connection of each facility storage tank; and

(3) Have facility storage tank high level alarm systems and facility storage tank overfill control systems arranged to prevent cargo from entering the vapor return line.

(h) Except for a discharge vent from a vapor destruction unit, each outlet of a vapor control system that vents to atmosphere and is not isolated with a pressure-vacuum relief valve must have a flame arrester located at the outlet.

§ 154.822 Detonation arresters, flame arresters, and flame screens.

(a) Each detonation arrester required by this part must:

(1) Be capable of arresting a detonation from either side of the device; and

(2) Be acceptable to the Commandant (G–MTH). A detonation arrester designed, built, and tested in accordance with appendix A of this part will be acceptable to the Commandant (G–MTH).

(b) Each flame arrester required by this part must be acceptable to the Commandant (G–MTH). A flame arrester designed, built, and tested in accordance with appendix B of this part will be acceptable to the Commandant (G–MTH).

(c) Each flame screen required by this part must be either a single screen of corrosion resistant wire of at least 30 by 30 mesh, or two screens, both of corrosion resistant wire, of at least 20 by 20 mesh, spaced not less than 25 millimeters (½ in.) or more than 75 millimeters (1½ in.) apart.

§ 154.824 Inerting, enriching, and diluting systems.

(a) A vapor control system which uses inerting, enriching or diluting gas must be capable of inerting, enriching, or diluting the vapor collection line and the vapor collection hose or arm prior to receiving cargo vapor.

(b) Except as permitted by § 154.820(a) of this subpart, a vapor control system which uses an inerting, enriching, or diluting system must be equipped with a gas injection and mixing arrangement located as close as practical but not more than 10 meters (32.8 ft.) from the facility vapor connection that ensures complete mixing of the gases within 20 pipe diameters of the injection point;

(c) A vapor control system that uses an inerting or enriching system may not be operated at a vacuum after the injection point unless:

(1) There are no sleeve-type pipe couplings, vacuum relief valves, or other devices which could allow air into the vapor collection system downstream of the injection point; or

(2) An additional analyzer is used to monitor the downstream vapor concentration and a means is provided to inject additional inerting or enriching gas.

(d) A vapor control system that uses analyzers to control the amount of inerting, enriching, or diluting gas injected into the vapor collection line must be equipped with at least 2 analyzers. The analyzers must be connected so that:

(1) When oxygen analyzers are used, the higher oxygen concentration reading controls the inerting or enriching system and activates the alarm and automatic shutdown system required by paragraph (h), (j) or (k)(2) of this section;

(2) When hydrocarbon analyzers are used, the lower hydrocarbon concentration reading controls the enriching system and activates the alarm and automatic shutdown system required by paragraph (i) or (k)(1) of this section; and

(3) When hydrocarbon analyzers are used, the higher hydrocarbon concentration reading controls the diluting system and activates the alarm and automatic shutdown system required by paragraph (l) of this section.

(e) A vapor control system that uses volumetric measurements to control the amount of inerting, enriching, or diluting gas injected into the vapor collection line must be equipped with at least one analyzer to activate the alarms and automatic shutdown systems required by this section.

(f) Each oxygen or hydrocarbon analyzer required by this section must:

(1) Be installed in accordance with API Recommended Practice 550;

(2) Have a response time of not more than 30 seconds from the time the vapor is sampled; and

(3) Sample the vapor concentration continuously not more than 30 pipe diameters from the gas injection point.

(g) Oxygen analyzers which operate at elevated temperatures (i.e. zirconia oxide or thermomagnetic) must not be used.

(h) An inerting system must:

(1) Supply sufficient inert gas to the vapor stream to ensure that the oxygen concentration throughout the vapor collection system is maintained below 8.0 percent by volume;

(2) Activate an alarm when the oxygen concentration in the vapor collection line exceeds 8.0 percent by volume;

(3) Close the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this part when the oxygen concentration in the vapor collection line exceeds 9.0 percent by volume; and

(4) If a combustion device is used to produce the inert gas, have a hydraulic seal and non-return valve between the combustion device and the vapor collection line.

(i) An enriching system must:

(1) Supply sufficient compatible hydrocarbon vapor to the vapor stream to ensure that the hydrocarbon concentration throughout the vapor collection system is maintained above 170 percent by volume of the upper flammable limit;

(2) Activate an alarm when the hydrocarbon concentration in the vapor collection line falls below 170 percent by volume of the upper flammable limit; and

(3) Close the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the hydrocarbon concentration in the vapor collection line falls below 150 percent by volume of the upper flammable limit.

(j) Oxygen analyzers may be used in lieu of hydrocarbon analyzers in an enriching system at a facility that receives cargo vapor only from a vessel with non-inerted cargo tanks, provided that the analyzers:

(1) Activate an alarm when the oxygen concentration in the vapor collection line exceeds 15.5 percent by volume; and

(2) Close the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the

oxygen concentration in the vapor collection line exceeds 16.5 percent by volume.

(k) An enriching system may be used in a vapor collection system that receives cargo vapor from a vessel with inerted cargo tanks if:

(1) Hydrocarbon analyzers are used to comply with paragraph (i)(2) and (i)(3) of this section; or

(2) If oxygen analyzers are used, the analyzers activate an alarm when the oxygen concentration in the vapor collection line exceeds 8 percent by volume, and close the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the oxygen concentration exceeds 9 percent by volume.

(l) An air dilution system must:

(1) Supply sufficient additional air to the vapor stream to ensure that the hydrocarbon concentration throughout the vapor collection system is maintained below 30 percent by volume of the lower flammable limit;

(2) Activate an alarm when the hydrocarbon concentration in the vapor collection line exceeds 30 percent by volume of the lower flammable limit; and

(3) Close the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart when the hydrocarbon concentration in the vapor collection line exceeds 50 percent by volume of the lower flammable limit.

§ 154.826 Vapor compressors and blowers.

(a) Each inlet and outlet to a compressor or blower which handles vapor that has not been inerted, enriched, or diluted in accordance with § 154.824 of this subpart must be fitted with:

(1) A detonation arrester;

(2) A flame arrester; or

(3) An explosion suppression system acceptable to the Commandant (G–MTH).

(b) If a reciprocating or screw-type compressor handles vapor 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 temperature 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.

(c) If a liquid ring-type compressor handles vapor in the vapor collection system, it must be provided with indicators and audible and visible alarms to warn against the following conditions:

(1) Low level of liquid sealing medium;

(2) Lack of flow of liquid sealing medium;

(3) Excessive temperature of the liquid sealing medium;

(4) Low lube oil level;

(5) Low lube oil pressure, if pressurized lubricating system; and

(6) Excessive shaft bearing temperature.

(d) If a centrifugal compressor, fan, or lobe blower handles vapor in the vapor collection system, construction of the blades and/or housing must meet one of the following:

(1) Blades or housing of nonmetallic construction;

(2) Blades and housing of nonferrous material;

(3) Blades and housing of corrosion resistant steel;

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

(5) Blades of aluminum or magnesium alloy and a ferrous housing with a nonferrous insert sleeve at the periphery of the impeller.

§ 154.828 Vapor recovery and vapor destruction units.

(a) The inlet to a vapor recovery unit which receives cargo vapor that has not been inerted, enriched, or diluted in accordance with § 154.824 of this subpart must be fitted with one of the following:

(1) A detonation arrester;

(2) A flame arrester; or

(3) An explosion suppression system acceptable to the Commandant (G–MTH).

(b) The inlet to a vapor destruction unit must:

(1) Have a liquid seal; and

(2) Have two quick-closing stop valves installed in the vapor line.

(c) A vapor destruction unit must:

(1) Not be within 30 meters (98.8 ft.) of any tank vessel berth or mooring at the facility;

(2) Have a flame arrester or detonation arrester fitted in the vapor line; and

(3) Alarm and shut down when a flame is detected on the flame arrester or detonation arrester.

(d) When a vapor destruction unit shuts down or has a flame-out condition the vapor destruction unit control system must:

(1) Close the quick-closing stop valves required by paragraph (b)(2) of this section; and

(2) Close the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart.

§ 154.840 Personnel training.

(a) A person in charge of a transfer operation utilizing a vapor control system must have completed a training program covering the particular system installed at the facility. Training must include drills or demonstrations using the installed vapor control system covering normal operations and emergency procedures.

(b) The training program required by paragraph (a) of this section must cover the following subjects:

(1) Purpose of a vapor control system;

(2) Principles of the vapor control system;

(3) Components of the vapor control system;

(4) Hazards associated with the vapor control system;

(5) Coast Guard regulations in this subpart;

(6) Operating procedures, including:

(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 must 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) The following must be performed not more than 24 hours prior to each transfer operation:

(1) All alarms and automatic shutdown systems required by this part must be tested; and

(2) The analyzers required by § 154.820(a), § 154.824 (d) and (e) of this subpart must be checked for calibration by use of a span gas.

(c) The position of all valves in the vapor line between the vessel's tanks and the facility vapor collection system must be verified prior to the start of the transfer operation.

(d) A tank barge overfill control system that meets the requirements of 46 CFR 39.20–9(b) must not be connected to an overfill sensor circuit that exceeds the system's rated cable length, inductance, and capacitance.

(e) When vapor is being received from a vessel with inerted cargo tanks, the remotely operated cargo vapor shutoff valve required by § 154.810(a) of this subpart must not be opened until the pressure at the facility vapor connection

exceeds the pressure on the downstream side of the remotely operated cargo vapor shutoff valve.

(f) The initial cargo transfer rate must not exceed the rate agreed upon at the pre-transfer conference required by § 156.120(w) of this chapter and 46 CFR 39.30–1(h).

(g) The cargo transfer rate must not exceed the maximum allowable transfer rate as determined by the lesser of the following:

(1) A transfer rate corresponding to the maximum vapor processing rate for the vapor control system, as specified in the facility operations manual required by § 154.300 of this chapter; or

(2) The vessel's maximum transfer rate determined in accordance with 46 CFR 39.30–1(d).

(h) While transferring cargo to a vessel connected to a vapor control system, compressed air or gas may be used to clear cargo hoses and loading arms, but must not be used to clear cargo lines.

(i) If one of the two analyzers required by § 154.824(d) of this subpart becomes inoperable during a transfer operation, the operation may continue provided the remaining analyzer remains operational; however, no further transfer operations may be started until the inoperable analyzer is replaced or repaired.

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

(k) If it is suspected that a flare in the vapor control system has had a flare-back, or if a flame is detected on the flame arrester required by § 154.828(c)(2) of this subpart, the transfer operation must be stopped and not be restarted until the flame arrester has been inspected and found to be in satisfactory condition.

5a. Appendices A and B are added to part 154 to read as follows:

Appendix A to Part 154—Guidelines for Detonation Flame Arresters

This appendix contains the draft ASTM standard for detonation flame arresters. Devices meeting this standard will be accepted by the Commandant (G–MTH).

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.

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.

[1] Footnotes appear at the end of this article.

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 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. The design of a drain plug should be such so that by cursory visual inspection it is obvious whether the drain has been left open.

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 or 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 access 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 meters 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 (inches)	Restriction diameter (inches)
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 test pressure corresponding to or greater than the upper limit of the device's maximum operating pressure (see 11.1.7). In order to obtain this test pressure, a device such as a bursting disc may be fitted on the open end of the device in place of the plastic bag. The concentration of the mixture should be verified by appropriate testing of the gas composition. 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 a distance equal to 3% of the length of the run-up pipe apart with one device no more than 8 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 8 inches from the detonation flame arrester outlet. (7)

14.3.3 Explosion pressures within the pipe shall be measured by a high frequency transducer situated in the test pipe no more than 8 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. Initiation of deflagrations shall be at several locations to generate a range for $\Delta P/P_o$. 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.

(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.

(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.

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FIGURE 1

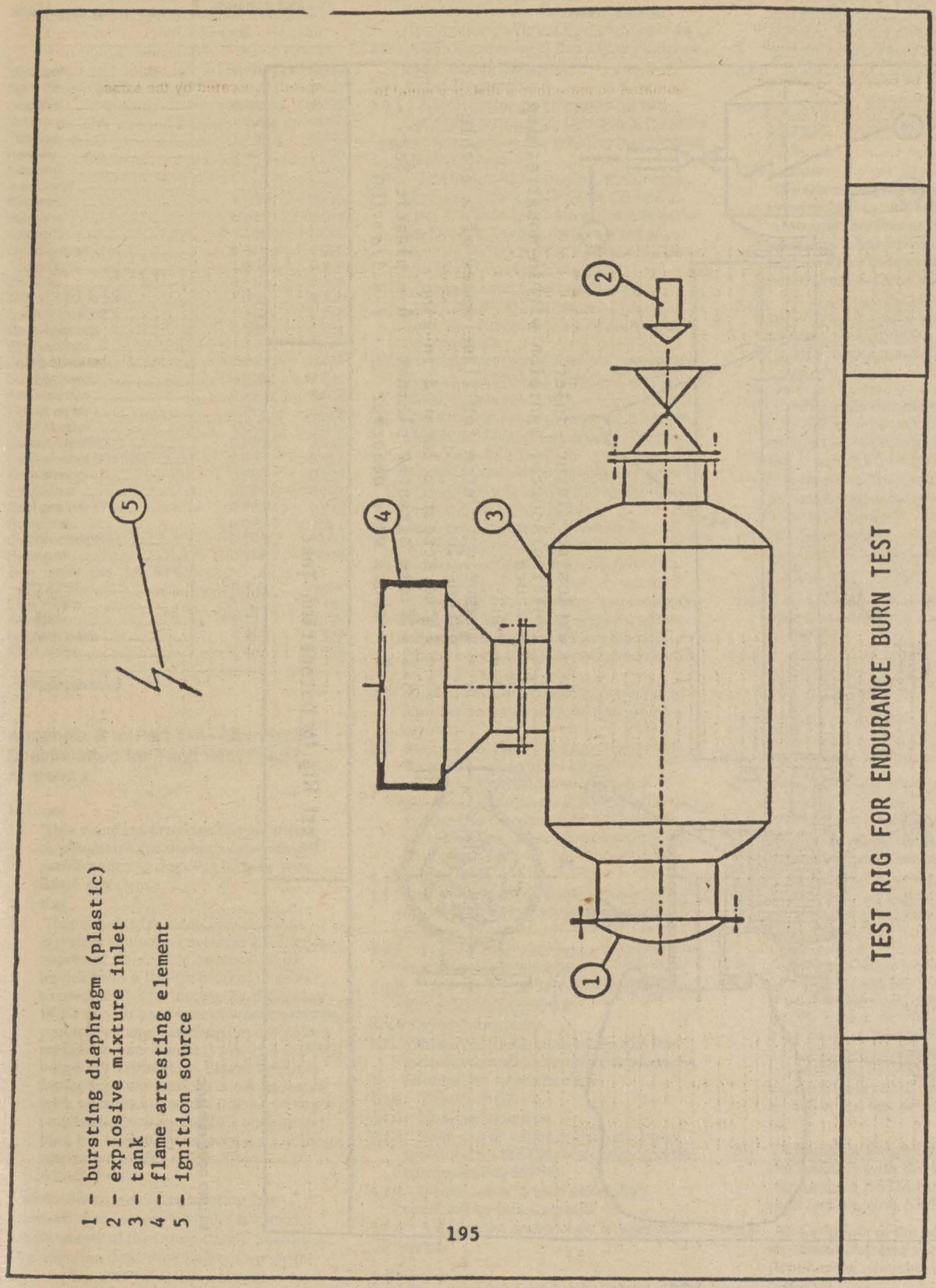
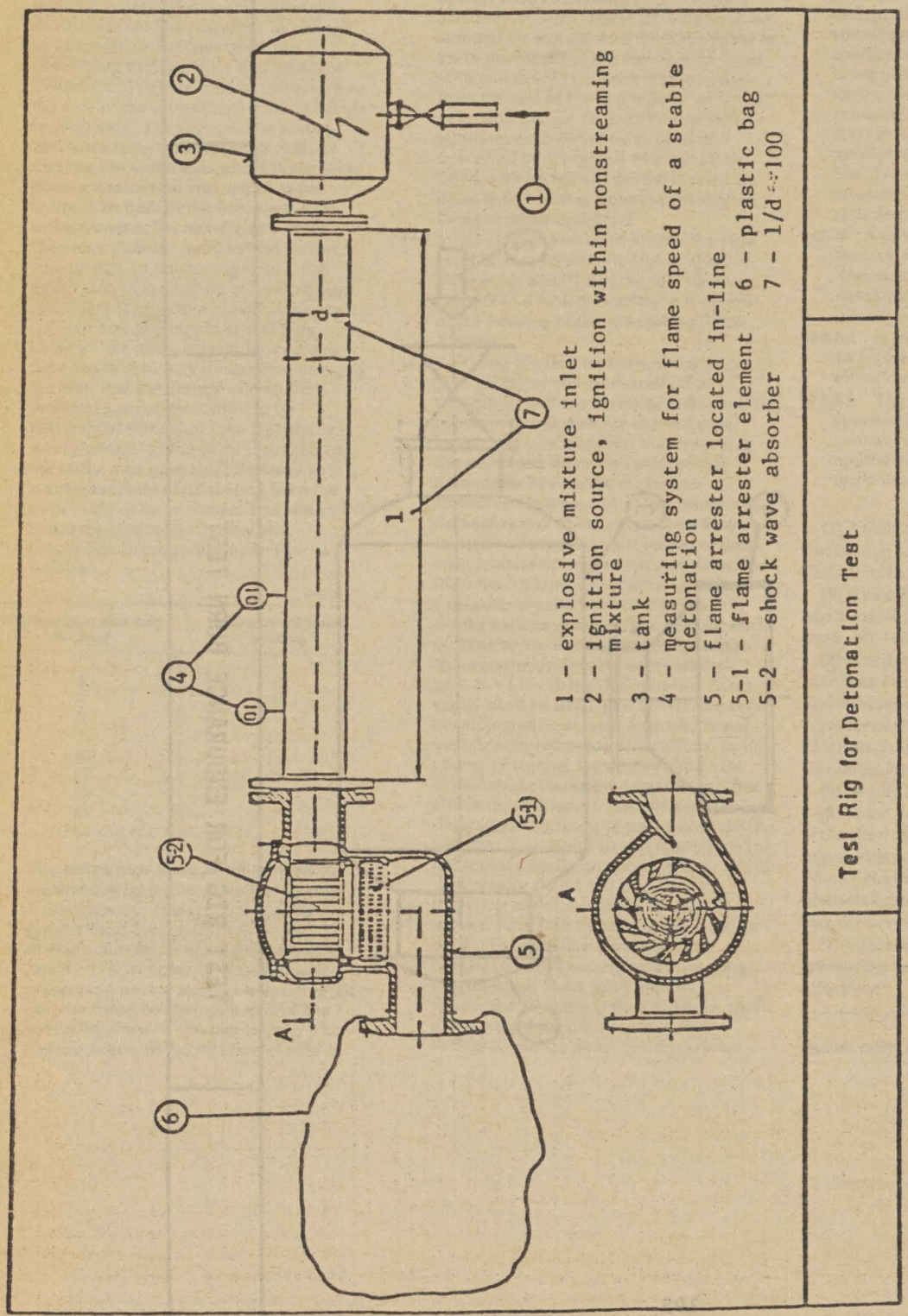

1 - bursting diaphragm (plastic)
2 - explosive mixture inlet
3 - tank
4 - flame arresting element
5 - ignition source
TEST RIG FOR ENDURANCE BURN TEST
195

Figure 2



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ATTACHMENT 1

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	[1] 3.33	[1] 0.133
Ethylene oxide	0.65	0.026
Ethyl nitrite	0.922	0.038

[1] Approximately.

Appendix B to Part 154—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 with a flashpoint that does not exceed 60°C. The test 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.

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.

(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 SEl 7SR, England.

(4) Available from the International Electrotechnical Commission, 1 rue de Varembe, Geneva, Switzerland

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 approximating 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 element 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.

(1) Footnotes appear at the end of this article.

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 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.

8.9 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 vertically 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 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.

(5) See IEC Publication 79–1.

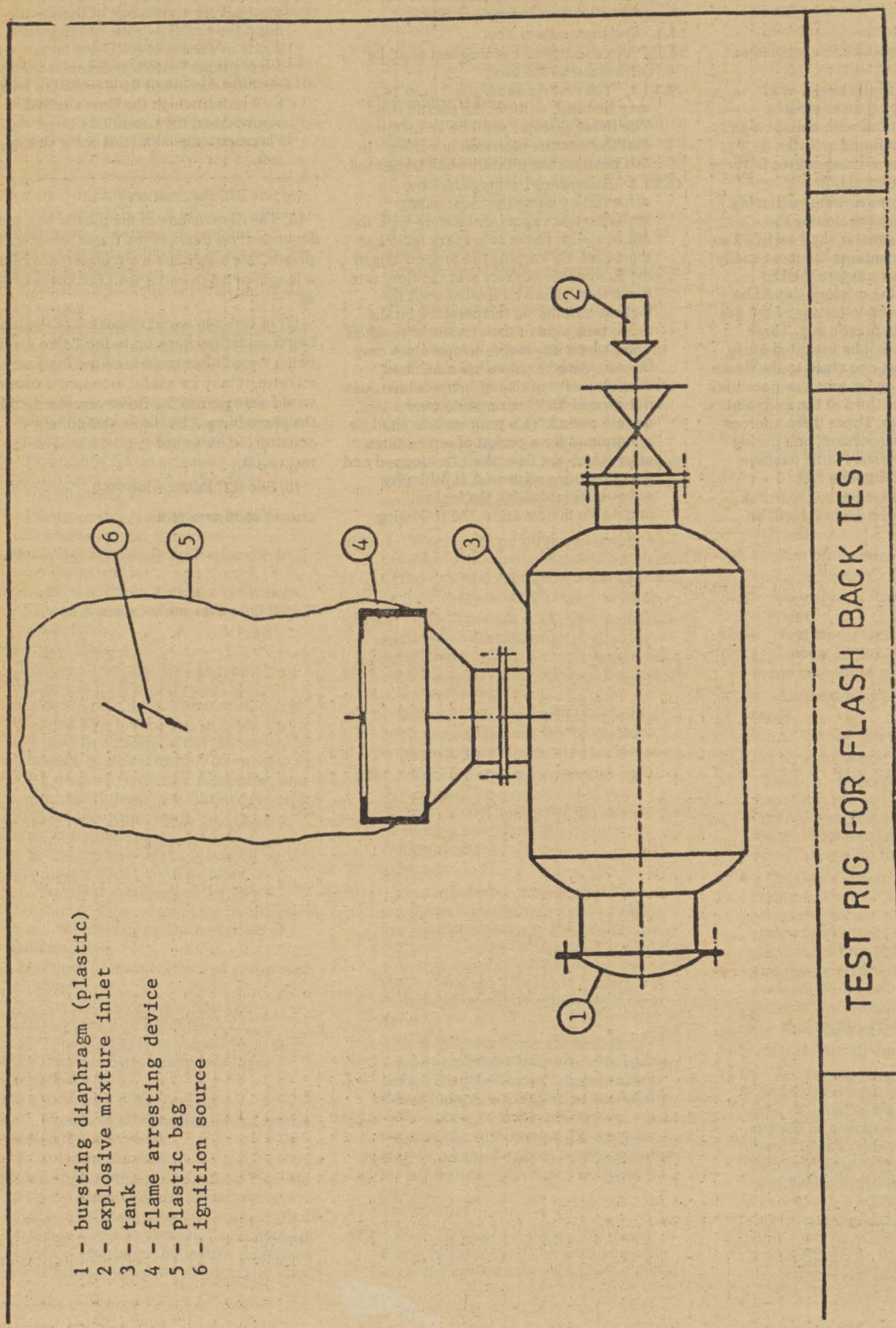
(6) The dimensions of the plastic bag are dependent on those of the flame arrester. The plastic bag may have a circumference of 2 m, a length of 2.5 m and a wall thickness of .05 m.

(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.

BILLING CODE 4910–14–M

FIGURE 1



BILLING CODE 4910-14-C

Inflammable gas or vapor	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	[1] 3.33	[1] 0.133
Ethylene oxide	0.65	0.026
Ethyl nitrite	0.922	0.038

[1] Approximately.

PART 155—[AMENDED]

6. The authority citation for part 155 is revised to read as follows:

Authority: 33 U.S.C. 1231, 1321(j)(1)(C); sec. 2, E.O. 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp., p. 793; 49 CFR 1.46. Sections 155.100 through 155.130, 155.350 through 155.400, 155.430, 155.440, and 155.470 also issued under 33 U.S.C. 1903(b).

7. Section 155.750 is amended by adding paragraph (d) and a parenthetical to the end of the section 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 relief valve, pressure indicator, flame arresters, and detonation arresters, if fitted;

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

(3) The maximum allowable transfer rate determined in accordance with 46 CFR 39.30–1(d) (1) through (d)(3);

(4) The initial transfer rate for each tank that complies with 46 CFR 39.30–1(h);

(5) A table or graph of transfer rates and corresponding vapor collection system pressure drops calculated in accordance with 46 CFR 39.30–1(b);

(6) The relief settings of each spill valve, rupture disk, and pressure-vacuum relief valve; and

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

(i) Pre-transfer equipment inspection requirements;

(ii) Vapor line connection;

(iii) Closed gauging system;

(iv) High level alarm system, if fitted; and

(v) Independent automatic shutdown system, if fitted.

(Approved by the Office of Management and Budget under control number 2115–0120)

PART 156—[AMENDED]

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

Authority: 33 U.S.C. 1231, 1321(j)(1) (C) and (D); sec. 2, E.O. 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp., p. 793; 49 CFR 1.46. Subpart B is also issued under 46 U.S.C. 3715(b).

9. Section 156.120 is amended by adding paragraph (aa) and a parenthetical at the end of the section to read as follows:

§ 156.120 Requirements for oil transfer.

* * * * *

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

(1) Each manual valve in the vapor collection system is correctly positioned to allow the collection of cargo vapor;

(2) A vapor collection hose or arm is connected to the vessel's vapor connection;

(3) The electrical insulating device required by § 154.810(g) of this chapter or 46 CFR 39.40–3(c) is fitted between the facility vapor connection and the vessel vapor connection;

(4) The initial loading rate and the maximum transfer rate are determined;

(5) The maximum and minimum operating pressures at the facility vapor connection are determined;

(6) The tank barge overfill control system, if installed, is connected to the facility, tested, and operating properly;

(7) The following have been performed not more than 24 hours prior to the start of the transfer operation:

(i) Each alarm and automatic shutdown system required by subpart E of part 154 of this chapter and 46 CFR part 39 has been tested and found to be operating properly, and

(ii) Analyzers required by § 154.820(a), § 154.824 (d) and (e) of this chapter or 46 CFR 39.40–3(a) have been checked for calibration by use of a span gas;

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

(9) The oxygen content of the vessel's cargo tanks, if inerted, is at or below 8 percent by volume.

(Approved by the Office of Management and Budget under control number 2115–0506)

10. Section 156.170 is amended by adding new paragraph (g) and a parenthetical at the end of the section to read as follows:

§ 156.170 Equipment tests and inspections.

* * * * *

(g) If a facility or vessel collects vapor emitted from a vessel cargo tank with a vapor control system, the system must not be used unless the following tests and inspections are satisfactorily completed:

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

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

(3) Each detonation arrester required by § 154.820, § 154.826(a), and § 154.828(a) of this chapter or 46 CFR 39.40–3(d), and each flame arrester required by § 154.826(a), § 154.828 (a) and (c) of this chapter has been inspected internally within the last year, or sooner if operational experience has shown that frequent clogging or rapid deterioration is likely; and

(4) Each hydrocarbon and oxygen analyzer required by § 154.820(a) and § 154.824 (d) and (e) of this chapter or 46 CFR 39.40–3(a) is calibrated:

(i) Within the previous two weeks, or

(ii) Within 24 hours prior to operation when the vapor control system is

operated less frequently than once a week.

(Approved by the Office of Management and Budget under control number 2115–0096)

TITLE 46—[AMENDED]

PART 30—[AMENDED]

11. The authority citation for part 30 is revised to read as follows:

Authority: 46 U.S.C. 3306, 3703; 49 U.S.C. App. 1804; 49 CFR 1.45, 1.46; Section 30.01–2 also issued under the authority of 44 U.S.C. 3507.

12. Paragraph (b) of § 30.01–2 is amended by adding the following sections and OMB control numbers to the existing table to read as follows:

§ 30.01–2 OMB control numbers assigned pursuant to the Paperwork Reduction Act.

* * * * *

(b) * * *

§ 32.53–85	2115–0505
§ 35.35–30	2115–0506
§ 39.10–13	2115–0505

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 a vapor collection system required to meet part 39 of this subchapter is connected to the inert gas system, the instruction manual required by paragraph (a) of this section must include procedures relating to vapor collection 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. 3306, 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 a transfer operation includes collection of cargo vapor from a vessel's cargo tanks through a vapor control system not located on the vessel:

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

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

(3) The electrical insulation requirements of 33 CFR 154.810(g) or § 39.40–3(c) of this subchapter are provided between the vessel vapor connection and the facility or service vessel vapor connection;

(4) The maximum cargo transfer rate is determined in accordance with § 39.30–1(d) of this subchapter;

(5) The maximum and minimum operating pressures at the facility vapor connection, or vessel vapor connection if lightering, are determined;

(6) The overfill control system on a tank barge, if fitted in accordance with § 39.20–9(b) of this subchapter, is connected to the facility, tested and operating properly;

(7) Each alarm required by §§ 39.20–7, 39.20–9 and 39.40–3(a) of this subchapter has been tested not more than 24 hours prior to the start of the transfer operation and is 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 gouges, cuts, or slashes that penetrate the first layer of hose reinforcement; and

(9) The oxygen content of the vessel's cargo tanks, if inerted, is at or below 8 percent by volume.

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 a transfer operation includes the collection of cargo vapor from a vessel's cargo tanks 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 vapor to flow to the facility vapor connection or, if lightering, to the other vessel?

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

(3) Are the vessel and facility vapor connections electrically isolated?

(4) Have the initial transfer rate and the maximum transfer rate been determined?

(5) Have the maximum and minimum operating pressures at the facility vapor connection, or the vessel vapor connection if lightering, been determined?

(6) Have all alarms required by §§ 39.20–7, 39.20–9 and 39.40–3(a) of this subchapter been tested within 24 hours prior to the start of the transfer operation and found to be operating properly?

(7) 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?

(8) Has the oxygen concentration of all inerted cargo tanks been verified to be 8 percent or less?

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

PART 39—VAPOR CONTROL SYSTEMS

Subpart 39.10—General

Sec.

Subpart 39.20—Design and Equipment

Subpart 39.30—Operations

Subpart 39.40—Lightering and Topping-Off Operations with Vapor Balancing

Authority: 33 U.S.C. 1231; 46 U.S.C. 3306, 3703, 3715(b); 45 FR 58801, 3 CFR, 1980 Comp., p. 277; 49 CFR 1.46.

Subpart 39.10—General

§ 39.10–1 Applicability—TB/ALL.

(a) Except as specified by paragraph (c) of this section, this part applies to each tank vessel operating in the navigable waters of the United States, when collecting vapors of crude oil, gasoline blends, or benzene emitted

from a vessel's cargo tanks through a vapor control system.

(b) A tank vessel which transfers vapors of flammable or combustible cargoes other than crude oil, gasoline blends, or benzene, to a facility covered by 33 CFR part 154 must meet the requirements prescribed by the Commandant (G–MTH).

(c) A tank vessel with an existing vapor collection system specifically approved by the Coast Guard for the collection of cargo vapor which was operating prior to July 23, 1990, is subject only to § 39.30–1 and § 39.40–5 of this part as long as it transfers cargo vapor only to the specific facilities for which it was approved.

(d) 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 which was operating prior to July 23, 1990.

Facility vapor connection means the point in a facility's fixed vapor collection system where it connects with the vapor collection hose or the base of the vapor collection arm.

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.

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.

Lightering or *lightering operation* means the transfer of a bulk liquid cargo from a tank vessel to a service vessel.

Marine Safety Center means the Commanding Officer, U.S. Coast Guard Marine Safety Center, 400 Seventh Street, SW., Washington, DC 20590–0001.

Maximum allowable transfer rate means the maximum volumetric rate at which a vessel may receive cargo or ballast.

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

Service vessel means a vessel which transports bulk liquid cargo between a facility and another vessel.

Topping-off operation means the transfer of a bulk liquid cargo from a service vessel to another vessel in order to load the receiving vessel to a deeper draft.

Vapor balancing means the transfer of vapor displaced by incoming cargo from the tank of a vessel receiving cargo into a tank of the vessel or facility delivering cargo via a vapor collection system.

Vapor collection system means an arrangement of piping and hoses used to collect vapor emitted from a vessel's cargo tanks and to transport the vapor 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 processing unit means the components of a vapor control system that recovers, destroys, or disperses vapor collected from a vessel.

Vessel vapor connection means the point in a vessel's fixed vapor collection system where it connects with the vapor collection hose or arm.

§ 39.10–5 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, 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 sections affected are:

American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005
- API Standard 2000, Venting Atmospheric and Low-Pressure Storage Tanks (Nonrefrigerated and Refrigerated), Third Edition, January 1982 (reaffirmed December 1987) 39.20–11

American National Standards Institute (ANSI), 1430 Broadway, New York, NY 10018
- ANSI B16.5, Steel Pipe Flanges and Flanged Fittings, 1981 ..... 39.20–1

American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, PA 19103
- ASTM F1271—Standard Specification for Spill Valves for Use in Marine Tank Liquid Overpressure Protection Applications, December 29, 1989 ..... 39.20–9

International Electrotechnical Commission (IEC), Bureau Central de la Commission Electrotechnique Internationale, 1 rue de Varembe', Geneva, Switzerland
- IEC 309–1—Plugs, Socket-Outlets and Couplers for Industrial Purposes: Part 1, General Requirements, 1979 ..... 39.20–9
- IEC 309–2—Plugs, Socket-Outlets and Couplers for Industrial Purposes: Part 2, Dimensional Interchangeability Requirements for Pin and Contact-tube Accessories, 1981 ..... 39.20–9

National Electrical Manufacturers Association (NEMA), 2101 L St. NW., Washington, DC 20036
- ANSI/NEMA WD6—Wiring Devices, Dimensional Requirements, 1988 ..... 39.20–9

National Fire Protection Association (NFPA), Batterymarch Park, Quincy, MA 02269
- NFPA 70—National Electrical Code, 1987 ..... 39.20–9

Oil Companies International Marine Forum (OCIMF), 6th Floor, Portland House, Stag Place, London SWIE 5BH, England
- International Safety Guide for Oil Tankers and Terminals, Third Edition, 1988 .. 39.30–1

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

Each vessel which has a vapor processing unit located on board must meet the requirements of 33 CFR part 154, subpart E to the satisfaction of the Commandant (G—MTH) in addition to complying with the requirements of this part.

§ 39.10.11 Personnel training—TB/ALL.

(a) A person in charge of a transfer operation utilizing a vapor collection system must have completed a training program covering the particular system installed on the vessel. Training must include drills or demonstrations using the installed vapor control system covering normal operations and emergency procedures.

(b) The training program required by paragraph (a) of this subpart must cover the following subjects:

(1) Purpose of a vapor control system;

(2) Principles of the vapor control system;

(3) Components of the vapor control system;

(4) Hazards associated with the vapor control system;

(5) Coast Guard regulations in this part;

(6) Operating procedures, including:

(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 a new vessel vapor collection system must be submitted to the Marine Safety Center for approval prior to installation.

(b) An existing vapor collection system installation not exempted by § 39.10–1(c) of this part must have plans, calculations, and specifications submitted to the Marine Safety Center for approval by January 23, 1991. Modifications required to bring the installation into compliance with this part must be completed July 23, 1992.

(c) An existing vapor collection system installation that has been Coast Guard approved to transfer cargo vapor to specific facilities must be reviewed and approved by the Marine Safety Center prior to transferring vapors to other facilities.

(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 paragraphs (a) and (b) of this section.

(e) Upon satisfactory 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 the vapor from crude oil, gasoline blends, and benzene, or any other vapor it is found acceptable to collect.

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) Except as allowed by paragraph (a)(3) of this section or the Commandant (G–MTH), vapor collection piping must be permanently installed, with the vessel's vapor connection located as close as practical to the loading manifold;

(2) If the vessel collects vapors from incompatible cargoes simultaneously, it must keep the incompatible vapors separate throughout the entire vapor collection system;

(3) A vessel certified to carry cargo listed in Table 151.05 of part 151 or Table 1 of part 153 of this chapter may have vapor connections located in the vicinity of each tank in order to preserve segregation of cargo systems, in lieu of common header piping;

(4) A means must be provided to eliminate liquid condensate which may collect in the system, such as draining and collecting liquid from each low point in the line;

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

(6) An inerted tankship must have a means to isolate the inert gas supply from the vapor collection system. The inert gas main isolation valve required by SOLAS 74, as amended, chapter II–2, Regulation 62.10.8 may be used to satisfy this requirement.

(b) The vapor collection system must not interfere with the proper operation of the cargo tank venting system.

(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, unless the valve position can be readily determined from the valve handle or valve stem.

(d) The last 1.0 meter (3.3 feet) of vapor piping before the vessel vapor connection must be:

(1) Painted red/yellow/red with:

(i) The red bands 0.1 meter (0.33 feet) wide, and

(ii) The middle yellow band 0.8 meter (2.64 feet) wide; and

(2) Labeled "VAPOR" in black letters at least 50 millimeters (2 inches) high.

(e) Each vessel vapor connection flange must have a permanently attached 0.5 inch diameter stud at least 1.0 inch long projecting outward from the flange face. The stud must be located at the top of the flange, midway between bolt holes, and in line with the bolt hole pattern.

(f) Each hose used for transferring vapors must:

(1) Have a design burst pressure of at least 25 psig;

(2) Have a maximum allowable working pressure of at least 5 psig;

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

(4) Be electrically continuous with a maximum resistance of ten thousand (10,000) ohms;

(5) Have flanges with:

(i) A bolt hole arrangement complying with the requirements for 150 pound class ANSI B16.5 flanges, and

(ii) One or more 0.625 inch diameter holes in the flange located midway between bolt holes and in line with the bolt hole pattern;

(6) Be abrasion resistant and resistant to kinking; and

(7) Have the last 1.0 meter (3.3 feet) of each end of the vapor hose marked in accordance with paragraph (d) of this section.

(g) Vapor hose handling equipment must be provided with hose saddles which provide adequate support to prevent kinking or collapse of hoses.

§ 39.20–3 Cargo gauging system—TB/ALL.

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

(1) Provides a closed gauging arrangement as defined in § 151.15.10 of this chapter that does not require opening the tank to the atmosphere during cargo transfer;

(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 location where cargo transfer is controlled; and

(4) If portable, is installed on the tank during the entire transfer operation.

(b) Except when a tank barge complies with § 39.20–9(a) of this part, each cargo tank of a barge must have a high level indicating device that:

(1) Provides a visual indication of the liquid level in the cargo tank when the cargo level is within 1.0 meter (3.28 feet) of the tank top;

(2) Has the maximum liquid level permitted under § 39.30–1(e) of this part at even keel conditions conspicuously and permanently marked on the indicating device; and

(3) Is visible from all cargo control areas on the tank barge.

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

(a) Each cargo tank of a tankship must be equipped with an intrinsically safe high level alarm and a tank overfill alarm.

(b) The high level alarm and tank overfill alarm required by paragraph (a) of this section, if installed after July 23, 1990 must:

(1) Be independent of each other;

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

(3) Be able to be checked at the tank for proper operation prior to each transfer or contain an electronic self-testing feature which monitors the condition of the alarm circuitry and sensor.

(c) The high level alarm required by paragraph (a) of this section must:

(1) Alarm before the tank overfill alarm, but no lower than 95 percent of tank capacity;

(2) Be identified with the legend "High Level Alarm" in black letters at least 50 millimeters (2 inches) high on a white background; and

(3) Have audible and visible alarm indications that can be seen and heard on the vessel where cargo transfer is controlled.

(d) The tank overfill alarm required by paragraph (a) of this section must:

(1) Be independent of the cargo gauging system;

(2) Have audible and visible alarm indications that can be seen and heard on the vessel where cargo transfer is controlled and in the cargo deck area;

(3) Be identified with the legend "TANK OVERFILL ALARM" in black letters at least 50 millimeters (2 inches) high on a white background; and

(4) Alarm early enough to allow the person in charge of transfer operations to stop the transfer operation before the cargo tank overflows.

(e) If a spill valve is installed on a cargo tank fitted with a vapor collection system, it must meet the requirements of § 39.20-9(c) of this part.

(f) If a rupture disk is installed on a cargo tank fitted with a vapor collection system, it must meet the requirements of § 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 which:

(1) Includes a self-contained power supply;

(2) Is powered by generators installed on the barge; or

(3) Receives power from a facility and is fitted with a shore tie cable and a 120 volt 20 amp explosion-proof plug which meets:

(i) ANSI/NEMA WD6;

(ii) NFPA 70, Articles 410-57 and 501-12; and

(iii) § 111.105-9 of this chapter.

(b) An intrinsically safe overfill control system which:

(1) Is independent of the cargo gauging device required by § 39.20-3(a) of this part;

(2) Actuates an alarm and automatic shutdown system at the facility overfill control panel, or on the vessel to be lightered if a lightering operation, 60 seconds before the tank becomes 100 percent liquid full;

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

(4) Consists of components which, individually or in series, will not generate or store a total of more than 1.2 V, 0.1 A, 25 mW, or 20 microjoules;

(5) Has at least one tank overfill sensor switch with normally closed contacts per cargo tank;

(6) Has all tank overfill sensor switches connected in series;

(7) Has interconnecting cabling that meets § 111.105-15(b) of this chapter; and

(8) Has a male plug with a 5 wire, 16 amp connector body meeting IEC 309-1/309-2 which is:

(i) Configured with pins S2 and R1 for the tank overfill sensor circuit, pin G connected to the cabling shield, and pins N and T3 reserved for an optional high level alarm circuit meeting the requirements of this paragraph; and

(ii) Labeled "Connector for Barge Overflow Control System" and with the total inductance and capacitance of the connected switches and cabling.

(c) A spill valve which:

(1) Meets ASTM F1271;

(2) Relieves at a pressure higher than the pressure at which the pressure relief valves meeting the requirements of § 39.20-11 operate;

(3) Limits the maximum pressure at the cargo tank top during liquid overfill, at the maximum loading rate for the tank, to not more than the maximum design working pressure for the tank; and

(4) If the vessel is in ocean or coastwise service, has provisions to prevent opening due to cargo sloshing.

(d) A rupture disk arrangement which meets paragraphs (c)(2), (c)(3) and (c)(4) of this section and is approved by the Commandant (G-MTH).

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

(a) The cargo tank venting system required by § 32.55 of this chapter must:

(1) Be capable of discharging cargo vapor at 1.25 times the maximum transfer rate such that the pressure in the vapor space of each tank connected to the vapor collection system does not exceed:

(i) The maximum design working pressure for the tank, or

(ii) If a spill valve or rupture disk is fitted, the pressure at which the device operates;

(2) Not relieve at a pressure corresponding to a pressure in the cargo tank vapor space of less than 1.0 psig;

(3) Prevent a vacuum in the cargo tank vapor space, whether generated by withdrawal of cargo or vapor at maximum rates, that exceeds the maximum design vacuum for any tank connected to the vapor collection system; and

(4) Not relieve at a vacuum corresponding to a vacuum in the cargo tank vapor space of less than 0.5 psi below atmospheric pressure.

(b) Each pressure-vacuum relief valve must:

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

(2) Have a means to check that the device operates freely and does not remain in the open position, if installed after July 23, 1991.

(c) The relieving capacity test required by paragraph (b)(1) of this section must be carried out with a flame screen fitted at the vacuum relief opening and at the discharge opening if the pressure-vacuum relief valve is not designed to ensure a minimum vapor discharge velocity of 30 meters (98.4 ft.) per second.

§ 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 that senses the pressure in the main vapor collection line, which:

(a) Has a pressure indicator located on the vessel where the cargo transfer is controlled; and

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

(1) Is audible and visible on the vessel where cargo transfer is controlled;

(2) Alarms at a high pressure of not more than 90 percent of the lowest pressure relief valve setting in the cargo tank venting system; and

(3) Alarms at a low pressure of not less than four inches water gauge (0.144 psig) for an inerted tankship, or the

lowest vacuum relief valve setting in the cargo tank venting system for a non-inerted tankship.

Subpart 39.30—Operations

§ 39.30.1 Operational requirements—TB/ALL.

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

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

(2) In the case of a lightering or topping off operation, a vessel which does not have its certificate of inspection or certificate of compliance endorsed as meeting the requirements of this part.

(b) The pressure drop through the vapor collection system from the most remote cargo tank to the vessel vapor connection must be:

(1) Determined for each cargo handled by the vapor collection system at the maximum transfer rate and at lessor transfer rates;

(2) Based on a 50 percent cargo vapor and air mixture, and a vapor growth rate appropriate for the cargo being loaded; and

(3) Included in the vessel's oil transfer procedures as a table or graph showing the liquid transfer rate versus the pressure drop.

(c) If a vessel carries vapor hoses, the pressure drop through the hoses must be included in the pressure drop calculations required by paragraph (b) of this section.

(d) The rate of cargo transfer must not exceed the maximum allowable transfer rate as determined by the lesser of the following:

(1) Eighty (80) percent of the total venting capacity of the pressure relief valves in the cargo tank venting system when relieving at the set pressure required by § 39.20–11(a) of this part;

(2) The total vacuum relieving capacity of the vacuum relief valves in the cargo tank venting system when relieving at the set pressure required by § 39.20.11(a) of this part;

(3) The rate based on pressure drop calculations at which, for a given pressure at the facility vapor connection, or if lightering at the vapor connection of the vessel receiving cargo, the pressure in any cargo tank connected to the vapor collection system exceeds 80 percent of the setting of any pressure relief valve in the cargo tank venting system.

(e) A cargo tank must not be filled higher than:

(1) 98.5 percent of the cargo tank volume; or

(2) The level at which an overfill alarm complying with § 39.20–7 or § 39.20–9(b)(2) of this part is set.

(f) A cargo tank must not be opened to the atmosphere during cargo transfer operations except as provided in paragraph (g) of this section.

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

(1) The cargo tank is not being filled;

(2) Except when 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 of part 151 or Table 1 in part 153 of this chapter; and

(4) For static accumulating cargo, 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 if the tank is not inerted, a period of 30 minutes has elapsed since loading of the tank was completed.

(h) For static accumulating cargo the initial transfer rate must be controlled in accordance with Section 7.4 of the OCIMF, International Safety Guide for Oil Tankers and Terminals, in order to minimize the development of a static electrical charge.

(i) If cargo vapor is collected by a facility that requires the vapor from the vessel to be inerted in accordance with 33 CFR 154.820(a) or (b), the oxygen content in the vapor space of each cargo tank connected to the vapor collection system must not exceed 8 percent by volume at the start of cargo transfer. The oxygen content of each tank must be measured at a point one meter (3.28 feet) below the tanktop and at a point equal to one-half of the ullage. 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 at a point equal to one-half of the ullage.

(j) If the vessel is equipped with an inert gas system, the isolation valve required by § 39.20–1(a)(6) of this part must remain closed during vapor transfer.

(k) Unless equipped with an automatic self-test and circuit monitoring feature, each high level alarm and tank overfill alarm required by § 39.20–7 or § 39.20–9 of this part, on a cargo tank being loaded, must be tested at the tank for proper operation within 24 hours prior to the start of cargo transfer.

Subpart 39.40—Lightering and Topping-Off 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 uses vapor balancing while conducting a lightering or topping-off operation must meet 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 a lightering or topping-off operation which does not use vapor balancing must receive approval from the Commandant (G–MTH).

(c) A vapor balancing operation must not use a compressor or blower to assist vapor transfer without approval from the Commandant (G–MTH).

(d) Vapor balancing is prohibited when the cargo tanks on a vessel discharging cargo are inerted and the cargo tanks on a vessel receiving cargo are not inerted.

(e) A vessel which intends to engage in a lightering or topping. off operation while collecting cargo vapor from other than crude oil, gasoline, or benzene must receive specific approval from the Commandant (G–MTH).

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

(a) If the cargo tanks on a vessel discharging cargo and a vessel receiving cargo are inerted, the service vessel must:

(1) Have a means to inert the vapor transfer hose prior to transferring cargo vapor; and

(2) Have an oxygen analyzer with a sensor or sampling connection fitted within 3 meters (9.74 ft.) of the vessel vapor connection which:

(i) Activates an audible and visible alarm at a location on the service vessel where cargo transfer is controlled when the oxygen content in the vapor collection system exceeds 8 percent by volume;

(ii) Has an oxygen concentration indicator located on the service vessel where the cargo transfer is controlled; and

(iii) Has a connection for injecting a span gas of known concentration for calibration and testing of the oxygen analyzer.

(b) If the cargo tanks on a vessel discharging cargo are not inerted, the vapor collection line on the service vessel must be fitted with a detonation arrester that meets the requirements of

33 CFR 154.822(a) located within 3 meters (9.74 ft.) of the vessel vapor connection.

(c) An electrical insulating flange or one length of non-conductive hose must be provided between the vessel vapor connection on the service vessel and the vapor connection on the vessel being lightered or topped-off.

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

(a) During a lightering or topping-off operation each cargo tank being loaded must be connected by the vapor collection system to a cargo tank which is being discharged.

(b) If the cargo tanks on both the vessel discharging cargo and the vessel receiving cargo are inerted, the following requirements must be met:

(1) Each tank on a vessel receiving cargo which is connected to the vapor collection system must be tested prior to cargo transfer to ensure that the oxygen content in the vapor space 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 at a point equal to one-half of the ullage. 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 at a point equal to one-half of the ullage;

(2) The oxygen analyzer required by § 39.40-3(a) must be tested for proper operation prior to the start of each transfer operation;

(3) The oxygen content of vapors being transferred must be continuously monitored during the transfer operation;

(4) Cargo transfer must be terminated if the oxygen content exceeds 8 percent by volume and must not be restarted until the oxygen content in the tanks of the vessel receiving cargo is reduced to 8 percent by volume or less; and

(5) The vapor transfer hose must be purged of air and inerted prior to starting vapor transfer.

(c) The isolation valve, required by § 39.20-1(c) of this part, located on the service vessel must not be opened until the pressure in the vapor collection system on the vessel receiving cargo exceeds the pressure in the vapor collection system on the vessel receiving cargo.

(d) The cargo transfer rate must be controlled from the vessel discharging cargo, and must not exceed the maximum allowable transfer rate for the vessel receiving cargo.

(e) The pressure in the vapor space of any cargo tank connected to the vapor collection line on either the vessel receiving cargo or the vessel discharging cargo must not exceed 80 percent of the lowest setting of any pressure relief valve during ballasting or cargo transfer.

(f) All impressed current cathodic protection systems must be deenergized during cargo transfer operations.

(g) Tank washing is prohibited unless the cargo tanks on both the vessel discharging cargo and the vessel receiving cargo are inerted or the tank is isolated from the vapor collection line.

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P.A. Yost,

Admiral, U.S. Coast Guard, Commandant.

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