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46 CFR Parts 35 and 39

Marine Vapor Control Systems; Final Rule

## DEPARTMENT OF HOMELAND SECURITY

### Coast Guard

#### 33 CFR Parts 154, 155, and 156

#### 46 CFR Parts 35 and 39

[USCG–1999–5150]

RIN 1625–AB37

### Marine Vapor Control Systems

**AGENCY:** Coast Guard, DHS.

**ACTION:** Final rule.

**SUMMARY:** The Coast Guard is revising existing safety regulations for facility and vessel vapor control systems (VCSs) to promote maritime safety and marine environmental protection. The revisions promote safe VCS operation in an expanded range of activities now subject to current Federal and State environmental requirements, reflect industry advances in VCS technology, and codify the standards for the design and operation of a VCS at tank barge cleaning facilities. They increase operational safety by regulating the design, installation, and use of VCSs, but they do not require anyone to install or use VCSs.

**DATES:** This final rule is effective August 15, 2013, except as additional collection of information requirements that appear in several regulations added or revised by this rule and which have not yet been approved by the Office of Management and Budget (OMB) may not be enforced by the Coast Guard pending OMB approval which, if granted, will be noted by the Coast Guard in a subsequent **Federal Register** document. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of August 15, 2013.

**ADDRESSES:** Comments and material received from the public, as well as documents mentioned in this preamble as being available in the docket, are part of docket USCG–1999–5150 and are available for inspection or copying at the Docket Management Facility (M–30), U.S. Department of Transportation, West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. You may also find this docket on the Internet by going to <http://www.regulations.gov>, inserting USCG–1999–5150 in the “Keyword” box, and then clicking “Search.”

**FOR FURTHER INFORMATION CONTACT:** If you have questions on this rule, call or

email LT Jodi Min, Office of Design and Engineering Standards, U.S. Coast Guard; telephone 202–372–1418, email [Jodi.J.Min@uscg.mil](mailto:Jodi.J.Min@uscg.mil). If you have questions on viewing or submitting material to the docket, call Renee V. Wright, Program Manager, Docket Operations, telephone 202–366–9826.

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#### I. Abbreviations

- API American Petroleum Institute  
 ASTM ASTM International  
 CAA 90 U.S. Clean Air Act Amendments of 1990  
 CE Certifying entity  
 CFR Code of Federal Regulations  
 COTP Captain of the Port  
 CTAC Chemical Transportation Advisory Committee  
 DHS Department of Homeland Security  
 EPA U.S. Environmental Protection Agency  
 IED Inerting, enriching, or diluting  
 MOCC Minimum oxygen concentration for combustion  
 MSC Coast Guard Marine Safety Center  
 NEPA National Environmental Policy Act of 1969  
 NFPA National Fire Protection Association  
 NPRM Notice of proposed rulemaking  
 OMB Office of Management and Budget  
 PIC Person-in-charge  
 SBA Small Business Administration  
 TBCF Tank barge cleaning facility  
 UL Underwriters Laboratories, Inc.  
 USCG United States Coast Guard  
 VCS Vapor control system  
 VOC Volatile organic compound

#### II. Regulatory History, Basis, and Purpose

The Coast Guard published a notice of proposed rulemaking (NPRM) on this subject in the **Federal Register**, 75 FR 65152 (Oct. 21, 2010). The legal basis for this final rule is 42 U.S.C. 7511b(f)(2), 33 U.S.C. 1231, and 46 U.S.C. 3703. Under 42 U.S.C. 7511b(f)(2), enacted as part of the Clean Air Act Amendments of 1990 (CAA 90), the Secretary of the Department in which the Coast Guard is

operating must regulate the safety of equipment and operations used to control vapor emissions. Under 33 U.S.C. 1231, the Secretary may issue regulations to implement port and waterways safety requirements, among which are the requirements in 33 U.S.C. 1225 to act as necessary to prevent damage to land and structures on or along U.S. navigable waters and to protect these navigable waters and their resources. Under 46 U.S.C. 3703, the Secretary must regulate vessels and their liquid bulk dangerous cargo operations to protect life, property, and the marine environment against the risk of casualty or accident involving those operations. The Secretary of Homeland Security has delegated this authority under these statutes to the Coast Guard. Department of Homeland Security Delegation No. 0170.1(70), (86), and (92.b).

The purpose of this rule is to revise our marine vapor control system (VCS) regulations to promote safe VCS operation in an expanded range of activities now subject to current Federal and State environmental requirements, to reflect industry advancements in VCS technology, and to codify the standards for the design and operation of a VCS at tank barge cleaning facilities (TBCFs). These revisions are intended to increase operational safety and marine environmental protection by regulating the design, installation, and use of VCSs, but they do not require anyone to install or use VCSs.

#### III. Background

This final rule amends 1990 Coast Guard regulations for the safety of facilities and vessels that voluntarily engage in vapor control activities, or that do so in compliance with regulatory requirements imposed by the Federal Government or by the States. The Coast Guard regulations themselves do not require any facility or vessel to control vapor or be equipped with a VCS, nor do they require a vessel to take away vapor from facilities.

During marine tank vessel loading and other operations, the liquid loaded into a cargo tank displaces vapors within the tank. Vapors are also generated because of vapor growth from liquid evaporation. The emitted vapors of certain cargoes contain volatile organic compounds (VOCs) and other air pollutants. CAA 90 requires that these vapors be controlled in air quality non-attainment areas. Under CAA 90, the U.S. Environmental Protection Agency (EPA) issues national standards for control of VOCs and other air pollutants emitted during marine tank vessel operations. 40 CFR 63.560–

63.568. CAA 90 also authorizes Federal and State regulations to set vapor emission standards and to require that marine terminals and tank vessels be equipped with VCSs. These systems are used to collect and process VOCs and other air pollutants emitted during loading and other operations of marine tank vessels.

Today, VCS design and technology are more advanced than they were in 1990, and VCSs control more types of vapor than the crude oil, gasoline blend, or benzene vapors to which they were limited in 1990, and the EPA and States now permit or require the control of vapor emissions from many other cargoes. See current EPA regulations in 40 CFR subpart Y, 40 CFR 63.560–63.568. In addition, EPA regulations now require marine tank vessels operating at major terminals that control VOC vapors to be vapor-tight and equipped with vapor collection systems. 40 CFR 63.562.

Current Coast Guard practice is to accommodate these design and technology improvements by using the exemption and equivalency determination provisions of 33 CFR 154.108 and 46 CFR 30.15–1 to approve individual applications by VCS owners or designers who can show that their improvements provide a level of safety at least equivalent to that provided by our regulations. Reliance on individual exemptions or equivalency determinations involves extra risk for VCS owners and designers, and extra review time for the Coast Guard. This rulemaking will reduce the need for individual exemptions and equivalency determinations, and therefore reduce Coast Guard administrative work, by updating our regulations to reflect more recent VCS design and technology. This is consistent with the principles of retrospective review outlined in section 6 of Executive Order 13563, “Improving Regulation and Regulatory Review,” 76 FR 3821 (Jan. 18, 2011).

For cargo types and tank barge cleaning facility VCS applications that have emerged since 1990, we have provided safety guidance in the form of Navigation and Vessel Inspection Circular 1–96 (included in our docket), developed in close consultation with the Chemical Transportation Advisory Committee (CTAC), a Coast Guard advisory committee that operates under the Federal Advisory Committee Act, 5 U.S.C. Appendix 2. However, safety guidance is not legally binding on

industry, and reliance on exemption and equivalency reviews involves extra risk for VCS owners and designers and extra review time for the Coast Guard. Therefore, our goal has been to update our regulations to apply in a wider range of circumstances, and at the same time to eliminate a risk for industry and an administrative burden for ourselves. Our new regulations:

- Reflect the expanded number and scope of Federal and State regulations for VCSs since 1990;
- Reflect advances in VCS technology and operational practices since 1990, particularly in vapor-balancing operations, cargo line clearing operations, and multi-breasted tandem barge-loading operations;
- Incorporate safety guidance and reflect VCS regulatory exemptions and equivalency approvals;
- Provide new regulations for cargoes and operations, such as TBCFs, that have become subject to Federal or State regulatory expansion since 1990;
- Provide for periodic operational reviews to ensure that VCSs are properly maintained and operated after they are certified;
- Provide an alternate test program for analyzers and pressure sensors, in addition to existing 24-hour pre-transfer/cleaning instrument testing requirements, to provide greater regulatory flexibility;
- Require certifying entities (CEs) to be operated by currently licensed professional engineers to ensure that certification is conducted by properly qualified professionals, and clarify the role of the CE in VCS design, installation, and hazard reviews;
- Remove 33 CFR Part 154, Appendix B, which provides specifications for flame arresters and requires flame arresters to meet third-party standards, because of apparent lack of public demand for these devices;
- Attempt to achieve greater clarity through the use of tabular presentation;
- Update industry standards that are incorporated by reference into our regulatory requirements;
- Phase in requirements for existing VCSs to moderate the economic impact of new requirements for those VCSs;
- Make conforming changes in regulations other than 33 CFR Part 154, Subpart E and 46 CFR Part 39; and
- Make nonsubstantive changes in the wording or style of existing regulations, either to improve their clarity or to align

them with current Federal regulatory style guidance.

#### IV. Discussion of Comments and Changes

Except as noted in the following discussion, we are adopting as final all the changes we proposed in our 2010 NPRM.

We received comments on our NPRM from 15 individuals or entities. One commenter submitted two separate comments. We heard from one person whose affiliation was not disclosed, five engineering firms, seven companies that operate equipment or facilities that would be regulated under the proposed rule, and two industry associations. Overall, the comments were of very high quality and specificity, and on engineering questions especially, they were very detailed and difficult to summarize for purposes of this discussion. However, in most cases the comments provided valuable information that resulted in our revising regulatory text to take that information into account. In many cases, commenters offered to provide more information about their concerns and we followed up with them in telephone conversations. Where those follow-ups led to modifications of the regulatory text, we mention this in Table 1 of this preamble.

Table 1 sets out all the substantive changes we have made in this final rule to the NPRM’s proposed regulatory text and indicates whether a change was made in response to a public comment. It excludes minor non-substantive changes we made, on our own, to clarify some of the NPRM’s wording. Where we received a comment on the NPRM regulatory text, Table 1 indicates what each commenter had to say about that section or topic. Commenter numbers (“Commenter 4,” “Commenter 5,” etc.) refer to the docket number assigned to a set of comments by the *regulations.gov* staff; comments from “Commenter 4,” for example, can be found in *regulations.gov* as docket number USCG–1999–5150–0004.<sup>1</sup> When we made a substantive change on our own and without the prompting of a public comment, an “n/a” (not applicable) appears in the “Comment” column.

<sup>1</sup> The first commenter is “Commenter 3,” docket numbers USCG–1999–5150–001 and –002 having been assigned to the NPRM and supporting analysis. Commenter 3 and Commenter 9 are the same person.

TABLE 1—DISCUSSION OF COMMENTS AND CHANGES

Topic	Comment	Coast Guard response or action
General .....	Commenters 4, 5, 6, 10, and 12 expressed general satisfaction with our proposals.	We acknowledge this comment.
More information .....	Commenters 5, 7, 10, 11, 12, 13, and 18 asked to obtain or provide additional detailed information about technical aspects of the NPRM.	In many cases, we followed up with these commenters, and this table indicates where the follow-up contact had a bearing on this final rule. The docket contains memoranda of two such follow-ups.
Phasing-in and grandfathering .....	Commenters 7, 10, and 12 approved of our phasing in new requirements and asked us to clarify whether existing exemption and equivalency approvals will continue in force.	We confirm that existing VCS exemptions, equivalencies, clarifications, and exceptions will continue to be honored.
Tank barge cleaning facilities (TBCFs) .....	Commenters 11, 12, and 13 asked us to recognize factors that are unique to TBCFs.	We agree and reviewed the NPRM with this in mind. We have made some adjustments in our TBCF requirements as a result.
Costs .....	Commenter 5 asked us to recognize that engineering costs during dry runs and witnessed wet loads should take into account the time spent waiting for items to be corrected and for the vessel to dock and prepare for loading.	We have adjusted the cost estimates for certifications and recertifications to reflect labor necessary for dry runs and the witnessing of wet loads.

**33 CFR part 154 (references in the “Topic” column are to sections as they appeared in the NPRM, and brackets are used to identify where the provision appears in this final rule)**

106(d)(6) .....	n/a .....	We substituted the latest available (2007) re-approval of ASTM International (ASTM) 1273–91 for the 1996 reapproval.
106(g)(2), (g)(3). .....	Commenter 4 asked why we incorporate two older versions of the same standard in 33 CFR.	We substituted the latest available (2011) edition for the 2002 edition in 154.106(g)(3). The incorporation of an older edition of the standard in 154.106(g)(2) is beyond the scope of this rulemaking.
310(b)(1)(ii) .....	Commenter 5 said we should clarify our use of “balances” in this paragraph.	We changed “balances vapor” to “balances or transfers vapor” to cover 154.2000(d) and (e).
500 .....	Commenters 12, 13, and 18 asked us to revise the substance of this section.	As noted in the NPRM, the changes in this section were intended only to conform its style to current requirements for incorporation by reference. Substantive changes are beyond the scope of this rulemaking, but the commenters’ suggestions are noted for possible regulatory action in the future.
740(i) .....	n/a .....	We substituted the text “33 CFR 154 2020 through 2025” for “33 CFR 154.2023,” because all those new sections are derived from existing 154.804, not just 154.2023.
2000(b) .....	Commenters 4, 5, 7, and 8 asked for clarification of this paragraph. One of Commenter 5’s questions required follow-up.	We agree that this language requires clarification and have revised it accordingly. After following up with Commenter 5, who said that recertification is necessary only every 5 years, not 3, we clarified that he referred to operational reviews, and because we agree with the comment in that context, we have amended 154.2021(a) accordingly. We also added a sentence to confirm the ongoing validity of existing certifications, approvals of alternatives, and grants of exemption, in accordance with whatever terms they impose.
2000(e) .....	Commenter 5 pointed out that transfer of vapors from a facility to a marine vessel that is not offloading is difficult unless the vessel is under a hard vacuum or is a pressure vessel.	We acknowledge this and, although no change in the wording of this paragraph is needed, this is a factor we would take into account in reviewing requests for approval.
2001—Diluting .....	Commenter 5 said the diluting gas must also be non-reactive.	We agree and revised this definition accordingly.

TABLE 1—DISCUSSION OF COMMENTS AND CHANGES—Continued

Topic	Comment	Coast Guard response or action
2001—Existing VCS .....	Commenter 7 said the definition should apply not only to a complete VCS, but to a portion of a VCS.	We infer that this commenter's concern is with a marine vapor collection system connecting to a facility's main VCS. However, when a system is certified, it is certified as a VCS, not a portion of VCS. A vapor collection system with a facility main vapor processing unit is still a VCS, except that the portion after the connection point is not required to be certified. To address this concern, we added "a marine vapor collection system" in addition to "a marine VCS" in 154.2111(a). We also revised this definition to clarify that it applies to existing TBCF VCSs.
2001—Facility main VCS .....	Commenter 8 said we should replace "refinery" with "facility" to show the definition is not limited to refineries.	We agree and revised this definition accordingly.
2001—Flame arrester .....	Commenter 4 said this definition should include Factory Mutual Research-approved arresters, which we have previously accepted on an exemption basis.	The Factory Mutual Research test procedure has been approved under specific circumstances and on an exemption basis, but as a regulatory standard it would not be adequate by itself because it lacks significant details that are covered by the ASTM and Underwriters Laboratories (UL) standards.
2001—Inerted [now "Inert condition or inerted"].	Commenter 14 said we should change this to "inert condition" which more clearly separates the term from the operation of inerting.	We agree and revised this definition accordingly.
2001—Inerting or padding or purging [now "Inerting," "Padding," and "Purging"].	Commenters 4 and 14 said this definition needs revision. Purging usually means reducing hydrocarbon or other vapor concentrations by introducing air or inert gas, not lowering oxygen content by introducing an inert gas.	We agree and replaced this definition with separate and revised definitions for inerting, padding, and purging.
2001—Line clearing or pigging [now "Line clearing" and "Pigging"].	Commenter 14 said we should break this into separate definitions because some lines are cleared without the use of pigs.	We agree and replaced this with separate definitions.
2001—Padded or partially inerted [now "Padding" and "Partially inerted"].	Commenter 14 said we should break this into separate definitions; they are not interchangeable.	We agree and replaced this with separate definitions.
2010(g) .....	Commenter 15 said that because it typically takes about a year to be certified as a professional engineer, compliance with this paragraph should have a 1-year phase-in; and asked us to clarify that a CE can meet this requirement if the person-in-charge (PIC) is a licensed professional engineer in any one U.S. state or territory, and need not be licensed in all states where the CE does business.	We agree and revised this provision accordingly.
2011 .....	Commenter 10 asked whether a class society can be a CE if it otherwise complies with this section.	Yes. A class society can be a CE provided that it meets the CE qualifications of 154.2010 and is accepted by the Commandant per 154.2011.
2011(e) .....	Commenter 9 said this should be modified to prevent a CE from recertifying or performing operational reviews on systems where the CE had operational or design input. Without referring to this section, Commenter 17 asked us to clarify whether a CE that was responsible for the VCS design may recertify a unit or perform an operational review after its initial certification.	We agree with Commenter 9 and added new paragraph 154.2011(f) and redesignated subsequent paragraphs accordingly. The clarification that Commenter 17 sought is provided by this paragraph (e), which makes it clear that a CE that was responsible for designing a VCS may not recertify or perform operational reviews on that VCS.
2011(e)(1) .....	Commenter 4 said that prohibiting a CE from "performing calculations" is overly broad and restrictive.	We followed up with this commenter and confirmed that by revising this paragraph to specify "system design calculations," we would meet his concern.
2011(f) .....	n/a .....	We added text per comment on 154.2011(e).

TABLE 1—DISCUSSION OF COMMENTS AND CHANGES—Continued

Topic	Comment	Coast Guard response or action	
2020(b) .....	Commenter 10 asked us to confirm that we will continue to recognize existing approvals and that recertification will be required only for VCSs that entered operation after July 23, 1990, and then only if the VCS meets one of the five subparagraphs.	We confirm.	
2020(b)(1) .....	Commenter 16 said TBCFs should undergo a single review, not a separate review for each vapor the TBCF controls.	The TBCF should be reviewed for each new chemical it handles and can, at its option, either recertify all its chemicals at one time or recertify only for the new chemical.	
2020(b)(4) .....	Commenters 13 and 18 said that “multi-breasted loading” is not a barge industry term.	We acknowledge that several terms are used within the industry, but our 154.2001 definition of “multi-breasted loading” is sufficiently comprehensive to embrace all of the suggested terms.	
2020(b)(5), (d)(5) .....	n/a .....	Changed references to cargo line clearance systems so that they clarify their applicability only to those systems that use pigging.	
2020(c) .....	Commenter 11 said this should not apply to TBCFs because the TBCF only extracts liquid and vapors <i>from</i> the vessel and transfers nothing <i>to</i> the vessel; Commenters 13 and 18 proposed revisions for the paragraph to clarify this.	Commenter 11 correctly infers that the paragraph does not apply to TBCFs, and we revised the paragraph in line with the suggestions made by Commenters 13 and 18.	
2020(d) .....	Commenter 4 asked us to revise this paragraph’s reference to suggested guidance.	We revised this paragraph by restating information that appears as a “Note” to existing 154.804(d).	
2020(e)(4) .....	n/a .....	We added this paragraph to emphasize that this section supplements and does not negate the recordkeeping requirements of 154.740.	
2021 .....	Commenter 4 agrees we should require regular operational reviews.	We acknowledge this comment.	
2021(a) .....	Commenters 4, 5, 7, 8, 11, 12, 13, 16, and 18 asked us to lengthen the interval between required operational reviews from 3 years to 5 years due to cost. Some of these commenters said operational reviews should only be needed when major changes are made.	We do not agree that operational reviews are needed only after major changes. Major changes should be the subject of a VCS recertification. Periodic operational review is routine. We are lengthening the interval between operational reviews to 5 years, as requested, and also in response to the comment on 154.2000(b).	
2022 [now 2022 through 2024] .....	Commenter 4 pointed out several areas where the proposed section failed to clarify adequately between requirements for certification, recertification, and operational review.	We followed up with Commenter 4 and have extensively revised these provisions in line with his comments. We have simplified language and divided NPRM 154.2022 into separate final rule sections 154.2022 through 154.2024, each of which covers certification, recertification, or operational review.	
		The following chart shows where provisions of 154.2022, as it appeared in the NPRM, have been placed in this final rule.	
		NPRM section 154.2022	Final rule
		(a)(1) .....	2022(a)
		(a)(2) .....	2022(d)
		(a)(3) .....	2022(b)
		(a)(4) .....	2022(c)
		(a)(5) .....	2023
		(a)(6) .....	2022(d), 2023
		(a)(7) .....	2022(e)
		(a)(8) .....	2022(f)
		(a)(9) .....	2022(g)
		(b) introduction .....	2024
		(b)(1) .....	2024(a)
		(b)(2) .....	2024(e)
		(b)(3) .....	2024(g)
		(c) introduction .....	2022(d)
		(c)(1) .....	2022(d)(2)
		(c)(2) .....	2022(d)(6)

		NPRM section 154.2022	Final rule
		(c)(3) .....	2022(d)(7)
		(c)(4) .....	2022(d)(8)
		(c)(5) .....	2022(d)(10)
		(c)(6) .....	2022(d)(10)
		(c)(7) .....	2022(d)(1)
		(c)(8) .....	2022(d)(4)
		(c)(9) .....	2022(h)
		(c)(10) .....	2022(d)(13)
		(d)(1) .....	2022(c)(1)
		(d)(2) .....	2022(c)(2)
		(d)(3) .....	2022(c)(3)
		(d)(4) .....	2022(c)(4)
		(d)(5) .....	2022(c)(5)
		(e) introduction .....	2022(d), 2023
		(e)(1) .....	2022(d)(5)
		(e)(2) .....	2022(d)(9)
		(e)(3) .....	2022(d)(12)
		(e)(4) .....	2022(d)(11)
		(e)(5) .....	2022(d)(3)
		(e)(6) .....	2022(d)(14)
		(e)(7) .....	2022(g), 2023
		(f)(1) .....	2022(e)(1)
		(f)(2) .....	2022(e)(2)
		(f)(3) .....	2022(e)(3)
		(f)(4) .....	2022(e)(4)
Topic	Comment	Coast Guard response or action	
2022(a)(5) [now 2023(b)] .....	n/a .....	We added the last two sentences to provide better guidance for the recertification of older VCSs.	
2022(b) [now 2024] .....	Commenters 3, 4, and 14 asked us to add additional factors for operational review.	We agree and added new 154.2024(b) through (d) and 154.2024(f). In NPRM section 154.2024(b)(2), now 154.2024(e), we added marking and labeling as items to be verified.	
2022(d)(2) [now (c)(2)] .....	Commenter 4 asked why we would require the maximum vacuum to be maintained during testing of the vacuum breaker.	We revised the paragraph to clarify that the goal of the vacuum breaker testing is to ensure that the maximum vacuum cannot be exceeded instead of maintaining the maximum vacuum at one level.	
2022(e) [now(d) and, for added cargoes, 2023]	Commenter 16 said TBCFs should undergo a single review, not a separate review for each vapor the TBCF controls.	The TBCF should be reviewed for each new chemical it handles and can, at its option, either recertify all its chemicals at one time or recertify only for the new chemical.	
2022(e)(3) [now (d)(12)] .....	Commenter 4 asked us to clarify this provision	After a follow-up with this commenter, we clarified this provision.	
[NEW 2022(i)] .....	n/a .....	We added this paragraph to ensure the VCS training program is reviewed for compliance with 154.2030 and 154.2031. This change responds to Commenter 4's comment on 154.2030 and 154.2031.	
2023 [now 2025] .....	n/a .....	We redesignated this section in light of the subdivision of NPRM section 154.2022 into three sections.	
2030, 2031 .....	Commenter 4 asked if the CE is supposed to check the facility's compliance with section 2030. Commenter 10 asked if a facility can self-certify compliance or must it show other documentation that training requirements have been met. Commenter 11 said section 2030 should not apply to TBCFs. Commenter 12 said that facilities should document the training of their PICs and that, because of fragmentation in the TBCF industry, it may make sense to develop a standardized training program.	In response to these comments, we added 154.2022(i) to require a CE to review the facility's VCS training program for compliance with sections 154.2030 and 154.2031. We also added 154.2030(c) to specify that facility personnel must meet the designation and qualification requirements of 154.710, and that training documentation must be maintained at the facility in accordance to 154.740(b). We added language to these sections to clarify that 154.2030 is for transfer facilities and 154.2031 is for TBCFs. At this time, we have no plan to develop a standardized training program. Instead, we will rely on industry to develop its own training programs that comply with our regulatory requirements.	
2100(f) .....	Commenter 4 said this requirement is essential.	We acknowledge this comment.	

Topic	Comment	Coast Guard response or action
2100(h)(2) .....	Commenter 14 said we should add “must be fitted” to improve clarity.	We agree and revised this provision accordingly.
2100(k) .....	n/a .....	We added “equipment” to this paragraph and specified valves, flanges, and fittings to ensure that the “suitability” requirement extends to equipment that is needed for proper functioning of the VCS but that may not be considered a VCS “component.”
2101(a)(6) .....	Commenter 4 said we should allow a valve to be fire safe in accordance with American Petroleum Institute (API) 607, which is more rigorous than 46 CFR 56.20–15 and more familiar to industry.	46 CFR 56.20–15 was amended in 2008 to incorporate API 607 by reference.
2101(e) .....	Commenters 4 and 14 said that additional safeguards are needed.	We agree and revised this paragraph to make it clear that it prohibits contact with metal either on the facility or on the vessel, and that the purpose of the prohibition is to prevent unintentional electrical bypassing.
2101(g) .....	Commenters 5, 13, and 18 expressed concerns about the installation, inspection, and testing of insulating flanges and hoses.	We added language to this paragraph to address the commenters’ concerns.
2101(h) .....	Commenter 4 said we should change “mechanism” to “means” so as not to preclude use of a shutdown based on negative differential pressure across the detonation arrester (currently used by most facilities).	We agree and revised the provision accordingly.
[NEW 2101(i)] .....	n/a .....	We added this paragraph to make it clear that electrical bonding must comply with 46 CFR 35.35–5.
2102 introductory paragraph .....	Commenter 4 said we should clarify by inserting “and not loading cargo on the vessel” after “while inerting the cargo tanks”.	We agree and revised this provision accordingly. We also added “padding or purging” after “inerting” to reflect the separation of these three definitions in section 2001.
2102(a) .....	Commenter 4 asked if this requirement is necessary, because he has not seen a barge with a 120-volt system.	We think it is necessary because 46 CFR 39.2009(a)(1)(iii) allows a tank barge to have a liquid overfill protection system that receives power from a facility and is fitted with a shore tie cable and a 120-volt, 20-ampere explosion-proof plug.
2102(a)(2) .....	n/a .....	We corrected erroneous references in the NPRM to the relevant sections of the incorporated industry standard.
2102(b) .....	Commenter 5 asked us to review this provision with respect to grounding of the shielded wire in the overfill system.	We reviewed this provision in light of the comment but concluded no changes are needed. However, we revised 46 CFR 35.35–5 to address vessel/shore electrical bonding cable or wire.
2103(a) .....	Commenter 3 said we should rewrite this provision to take variability of vapor pressure into account, and Commenter 5 said we should substitute his recommended formula for our formula, which is too complicated and inaccurate for estimating vapor growth.	We revised this provision in accordance with the suggestions of Commenter 3. Commenter 5’s formula is valid but, we think, more complicated than ours, which is more generally adaptable for VCS design.
2103(f) .....	Commenter 4 said that if this paragraph requires cargo loading to be shutdown on high-high pressure, while allowing the VCS to continue to receive vapors, it is a good change. Commenter 5 raised concerns about accidents that could result from activation of a shutdown system.	Commenter 4 correctly interpreted this paragraph. The equipment and procedures we require should not result in the type of shutdown that concerns Commenter 5. Paragraph (d) of this section requires activating an alarm meeting 154.2100(e), which requires audible and visible alarm. Paragraph (f) of 154.2100 requires only activating the emergency liquid cargo shutdown system required by 154.550, which is for liquid loading.
2103(j)(1) .....	Commenter 3 said we should revise this provision to account for pressure changes at different altitudes.	We agree and revised this provision accordingly.
2103(k) .....	Commenter 14 said we should define “extensive length” more clearly.	We cannot provide a clearer and more specific definition that would be workable, but we added a reference to undersea piping as an example of extensive length.

Topic	Comment	Coast Guard response or action
2103(n), introductory paragraph .....	n/a .....	We expanded the reference to “inerting,” in accordance with the commenter-suggested change in section 2001 definitions.
2103(n)(3) .....	Commenter 5 said we should revise this provision so that the placement of the pressure sensors always allows for sensing the pressure.	We agree and revised the provision accordingly.
2104 .....	n/a .....	We changed references in this section from cargo line clearance to pigging, in accordance with the commenter-suggested change in section 2001 definitions. We also specified that the compressed gas we refer to is inert, and redesignated paragraphs.
2104(c) [now (a)(3)] .....	Commenter 5 said we should require the automatic shutoff valve to close within 2 seconds because the marine vessel can be overpressurized in 4 seconds while pigging.	We revised this provision to specify that it refers to a fast-action automatic shutoff valve like a solenoid valve. We think specifying 2 seconds would be too restrictive.
2104(d) [now (a)(4)] .....	Commenter 5 said a valve position sensor on the manual cargo bloc valve or the automatic cargo block valve would serve the same purpose as the interlock we proposed.	We agree, but an interlock is still needed for the valve position sensor.
2104(e) [now (a)(5)] .....	Commenter 5 said the means to detect the pig arrival must be an automatic detection device as well as specifically trained personnel to operate a manual quick closing valve.	We agree and revised this provision accordingly. Personnel training is covered in sections 154.2030(a)(6) and 154.2150(j)(2).
[NEW 2104(b)] .....	n/a .....	We added this provision to take account of those cargo lines that are cleared without pigging, in response to commenter-suggested change in section 2001 definitions.
2105(a)(1), (b)(1), (f)(1) .....	Commenter 5 said a 6-meter requirement would require nearly all gas injecting facilities to rework vapor piping and perhaps the detonation arrester size.	We disagree with this comment for 154.2105(a)(1). The 6-meter requirement is not new—see current 154.820(a)(2). New 154.2105(a)(1) combines current 154.820(a)(1), 154.820(a)(2), and 154.820(a)(3), and new 154.2105(a)(1) and 154.2105(a)(2) allow for installation of a detonation arrester as an alternative, as recommended by CTAC. We agree with this comment for 154.2105(b)(1), which requires meeting 154.2105(a)(1) and having a detonation arrester installed. We revised 154.2105(b)(1) and 154.2105(f)(1) to allow the oxygen analyzer to be located 4 meters downstream of the detonation arrester.
2105(a)(2), (b)(1), (c)(1), (d)(1), (e), (f)(1), (g)(1), (h)(1).	Commenter 4 said we should base distance on a number of diameters of the vapor line instead of a fixed 18 meters. Commenters 11, 13, and 18 also suggested alternatives to the 18 meter distance, for example requiring items to be placed as close as practicable, as is common industry practice.	Most dock detonation arrester distance exemption requests approved have been for 18 meters or less. The 18 meters distance is less restrictive than Commenter 4’s proposed alternative. An alternative “place items as close as practicable” standard would be too subjective to provide good guidance and would be hard to enforce. We have clarified these provisions by specifying that the vapor piping between the facility vapor connection and the dock detonation arrester must be protected from any possible internal and external ignition source.
2105(d)(2) .....	Commenter 18 said this provision is too restrictive and not always effective.	We disagree. New 154.2105(d)(2) is the same requirement imposed by current 154.820(d)(2), and CTAC recommended against any relaxation of that requirement.
2105(f), (g), (h) .....	Commenter 5 said that for inerted, partially inerted, or combination cargoes, we should require the facility to use the lowest minimum oxygen concentration for combustion (MOCC) of all cargoes being transferred.	Section 154.2105(f) allows an inerting, enriching, or diluting system meeting 154.2107 as an option. Sections 154.2107(k)(3), 154.2107(n), and 154.2107(o)(1) already specify the use of either the cargo’s MOCC or the enriching gas’s MOCC, whichever is lower. Alternatively, the mixture’s MOCC may be used.
2105(h) .....	Commenter 3 asked if (h)(3) is an alternative only to (h)(2) or to (h)(1) and (h)(2) combined.	The former. We inserted “either” and combined 154.2105(h)(2) and 154.2105(h)(3) to make this clearer.

Topic	Comment	Coast Guard response or action
2105(j)(2) [now (j)(2) and (j)(3)] .....	Commenter 5 said we should insert “end-of-line” before “flame arrester,” because an in-line flame arrester may not be effective.	We agree and revised 154.2105(j)(2) and new 154.2105(j)(3) accordingly.
2105(j)(2)(i) [now (j)(3)(i)] .....	Commenter 4 said that a flame arrester meeting ASTM F-1273 does not need a proving device, and Commenter 5 proposed revisions to this provision.	We agree and split 154.2105(j)(2) into 154.2105(j)(2) and 154.2105(j)(3) and revised this paragraph accordingly.
2105(j)(2)(ii) [now (j)(3)(ii)] .....	Commenter 5 proposed a revision to this paragraph.	We agree and revised this paragraph accordingly.
former 2106(a) .....	Commenters 3, 4, and 14 raised questions about the meaning of this provision.	We removed this paragraph as it appeared in the NPRM because it was confusing. As we think was clear from the NPRM’s 154.2106(b) [now 154.2106(a)], the questions raised by these comments should be answered by guidelines outlined in the arrester manufacturer’s Coast Guard acceptance letter.
2106(c) [now (b)] .....	Commenters 3 and 14 asked if the reference is to components upstream of the detonation arresters, downstream, or both.	This paragraph is intended to apply on either side of the detonation arrester, because there may be a potential ignition source on either side; we revised it to make that clearer.
2107 .....	Commenter 13 said we should apply gas inerting and enriching requirements only to loading facilities and not to TBCFs.	CTAC recommended no relaxation of this general requirement, which is taken from NVIC 1–96. We acknowledge that under some conditions and with suitable alternative arrangements (see 154.107 and 154.108 with respect to alternatives and exemptions), it may not be necessary to apply it to all TBCFs.
2107(a) .....	Commenter 5 proposed a clarifying revision ....	We agree and changed “vapor collection line” to “vapor collection system” and specified “two system volume exchanges” accordingly.
2107(b) .....	Commenters 4, 5, 13, and 18 suggested various alternatives for the 22 meter provision of this paragraph, with Commenter 4 suggesting a specific pipe-diameter standard, and Commenter 18 saying we need to provide flexibility for existing methods of operation like systems equipped with detonation arresters at the facility vapor connection and vapor destruction unit.	With respect to Commenter 18, we think the regulations as drafted provide the necessary flexibility. The gas injection point should be after the dock detonation arrester, and this paragraph provides that while also allowing the use of 154.2105(a), which requires an analyzer at 6 meters from the facility vapor connection, as an exception. With respect to these comments in general, this provision is in line with currently approved exemptions and is less restrictive than the pipe-diameter standard suggested by Commenter 4. We have clarified these provisions by specifying that the vapor piping between the facility vapor connection and the dock detonation arrester must be protected from any possible internal and external ignition source.
2107(b) .....	n/a .....	In addition to the changes made in this paragraph to respond to Commenters 4, 5, 13, and 18, we have also clarified the location of the gas injection and mixing arrangement relative to the vapor processing unit or the vapor-moving device, as recommended by CTAC in 1997 to maintain a minimum size of non-flammable vapor slug in the vapor piping (to prevent a flashback from an ignition source). The minimum piping distance is also approximately the difference between the maximum piping length of the arrangement from the facility vapor connection as required by this paragraph and the minimum distance of a vapor destruction unit from any tank vessel berth as required by 154.2109(c).
2107(c)(2) .....	Commenter 4 proposed clarifying what must be “downstream.”.	We agree and revised the provision accordingly.

Topic	Comment	Coast Guard response or action
2107(d) .....	Commenter 18 said we should add calorimeters as approved devices.	In general, a calorimeter is a device used to measure heat, while what we want analyzed is oxygen or hydrocarbon concentrations. A facility wishing to use a calorimeter can submit an alternative or exemption request with information for review.
2107(d)(2), (d)(4), (d)(6) .....	Commenters 4 and 14 asked us to define what we mean by “majority pair”.	The “majority pair” requirement is from NVIC 1–96, Enclosure (1), Part A, Sec 9, and we have used “voting system” language from a draft of that NVIC to revise our text for clarity.
2107(h)(3), (i)(3), (j)(2), (k)(2)(ii), (l)(3), (m)(4) .....	Commenter 4 said the vapor moving device should not be shut down for high-high oxygen or low-low hydrocarbons, and Commenters 5 and 14 proposed revisions to these paragraphs.	We agree with the changes offered by Commenters 5 and 14 and deleted “shut down any vapor moving device” accordingly. With respect to Commenter 4, a vapor mover is considered an ignition source, but it can continue to operate so that multi-dock operations will not be disrupted and so that the vapor mover can help draw more inerting, enriching, or diluting (IED) gas into the VCS.
2107(o) .....	Commenter 4 proposed allowing an alternative for simultaneously controlling inert and non-inert vapors, where the inerted vapor stream is lowered by 1% from normal levels.	We followed up with Commenter 4 on this and learned of his interest in a specific vapor, for which an exemption could be the appropriate solution. In general, the more conservative approach of this provision is appropriate.
2109(b)(2)(i) .....	Commenter 4 said that if this requires quick closing valves at the vapor destruction device or where the VCS connects to a facility’s main VCS to close on any dock shutdown, it is not necessary.	In light of this comment, we revised this provision to clarify that it applies only when a condition is detected that requires the closing of the quick-closing stop valves, and not under other VCS shutdown conditions like overpressurization.
2109(b)(2)(iv) .....	Commenter 4 said that quick closing valves should be fire resistant.	We agree and accordingly specified that the valve must also be a Category A valve as defined in 46 CFR 56.20–15.
2109(b)(3)(i) .....	Commenter 4 said we should substitute “accepted” for “approved”.	We agree and revised the provision accordingly.
2110(a)(1) .....	Commenter 4 asked if the tank high level alarm system and overfill control system are required to have independent level sensing systems.	We have revised the provision to clarify that these should be independent, like other alarm and shutdown systems.
2110(a)(2) .....	Commenter 4 said we should base distance on a number of diameters of the vapor line (e.g. 40 pipe diameters) instead of setting it at 18 meters, and Commenters 11, 13, and 18 proposed other alternatives to the 18-meter distance, for example, requiring items to be placed as close as practicable, as is common industry practice. Commenter 7 asked if this paragraph merely repeats 2105(a)(2).	The 18-meter or less distance has been approved for most dock detonation arrester distance exemption requests, and 18 meters is less restrictive than Commenter 4’s proposed alternative. An alternative “place items as close as practicable” standard would be too subjective to provide good guidance and would be hard to enforce. We clarified these provisions by specifying that the vapor piping between the facility vapor connection and the dock detonation arrester must be protected from any possible internal and external ignition source. The two provisions are not duplicative; see the different introductory language in 154.2105(a) and 154.2110(a)(2).
2110(a)(4) .....	Commenter 4 said that there is no need for an oxygen analyzer for vapor balancing of inert cargo systems when loading a vessel.	We agree and revised this provision so that inert cargo systems can comply with either 154.2105(a)(1) or 154.2110(a)(2).
2110(b)(1) .....	Commenter 4 said we should change “mechanism” to “means,” so as not to preclude use of a shutdown based on negative differential pressure across the detonation arrester (currently used by most facilities).	We agree and revised the provision accordingly.
2111(a), introductory paragraph .....	n/a .....	We added “a marine vapor collection system” in response to the comment on 154.2001’s definition of “existing VCS.”

Topic	Comment	Coast Guard response or action
2111(a)(2) .....	Commenter 4 said that if this requires quick closing valves at the vapor destruction device or where the VCS connects to a facility's main VCS to close on any dock shutdown, it is not necessary.	We agree with this comment and revised this provision by substitute "a VCS shutdown condition occurs" for "vapor back flow to the marine vapor line is detected" and split 154.(a)(2) into 154.(a)(2) and 154.(a)(2)(i)-(iii).
2111(a)(3) .....	Commenter 4 said we should change "mechanism" to "means," so as not to preclude use of a shutdown based on negative differential pressure across the detonation arrester (currently used by most facilities).	We agree and revised the provision accordingly.
2111(c) [now 2111(d)] .....	Commenter 5 asked if this provision would require a facility to get an exemption if it wanted to pass vapors to the dock flare from a truck or railcar loading, and used the flare antiflashback burner part of the marine VCS.	We do not think an exemption would be necessary. After contacting the commenter and discussing this provision with him, we clarified it by adding a new paragraph 154.2111(d) to allow for sharing a marine vapor destruction unit as an exception to 154.2111(c).
2111(d) .....	n/a .....	We added new paragraph 154.2111(d) in response to Commenter 5's comment on 154.2111(c).
2112(a) .....	Commenter 5 said that after loading is complete, the system that controlled polymerizing vapors must purge/clean the VCS, including hoses or vapor arms, with at least two system-volumes of non-reactive gas or air. This should be a standard procedure for all cargoes so that the VCS is left in a safe condition for any potential maintenance or incompatible cargoes.	We agree with this comment. However, this is an operational requirement. Incompatible cargoes are addressed in 154.2150(p). For maintenance and other concerns, we added a new 154.2150(q) so that after each transfer operation, the VCS piping and equipment must be purged with at least two system volume exchanges of non-reactive gas or air so the VCS is left in a safe condition.
2112(a)(3) .....	Commenter 4 said we should also require the differential pressure instrument to alarm on high differential pressure across the detonation arrester, to warn of polymerization.	We agree and revised the provision accordingly.
2113 .....	Commenter 18 provided circumstances under which special requirements for alkylene oxides are not needed.	We agree that special requirements are not needed for pressure cargoes and added language in the introductory paragraph to make that clear.
2113(b) [now 2113(a)(2)] .....	Commenter 13 said that this requirement is unnecessary for safety and will likely have the effect of shutting down some facilities and forcing others to perform expensive retrofits.	We revised this section to exclude pressure cargoes. In addition, instead of complying with what was (in the NPRM) 154.2113(b) and is now 154.2113(a)(2), a facility can comply with what was (in the NPRM) 154.2113(c) and is now 154.2113(b).
2113(c) [now 2113(b)] .....	Commenter 5 said that in addition to the CE, a marine chemist or properly trained third-party surveyor should be allowed to determine if the VCS has been adequately cleaned. Commenter 13 said that this requirement is unnecessary for safety and will likely have the effect of shutting down some facilities and forcing others to perform expensive retrofits.	We agree with Commenter 5 and have revised this provision accordingly. With respect to Commenter 18, we have revised this section to exclude pressure cargoes. In addition, instead of complying with what was (in the NPRM) 154.2113(b) and is now 154.2113(a)(2), a facility can comply with what was (in the NPRM) 154.2113(c) and is now 154.2113(b).
2150(c) .....	Commenter 7 said we should clarify that the required system testing does not extend to shutdown of operating systems that may be serving other portions of the facility.	The point made by Commenter 7 is in line with the guidance we currently provide to CEs. We do not agree and the regulatory text does not need to be changed in this respect because we are not changing that guidance.
2150(c)(1) .....	Commenter 14 said we had misstated where exceptions to this paragraph are provided. Commenter 7 said electronic testing should be permitted for complying with this paragraph.	We agree with Commenter 14 and revised this provision accordingly. Commenter 7 already uses electronic testing under existing exemptions that remain in place; it is appropriate for the unique characteristics of Commenter 7's VCS but would not be appropriate for VCSs in general.

Topic	Comment	Coast Guard response or action
2150(c)(4) .....	Commenter 4 said that if this requires testing of the flammability analyzer required by 154.2105(j)(2)(i), the combustible gas indicator used for this application does not usually have the means to check with a sample gas and does not need calibration as often as an oxygen or hydrocarbon analyzer. Commenter 5 said that to properly calibrate an analyzer, a “zero gas” must be used in addition to a span gas.	After following up with Commenter 4, we agree with his point and with Commenter 5’s point, and we revised 154.2150(c)(4) and 154.2150(c)(5) accordingly.
2150(c)(5) .....	n/a .....	We revised this paragraph per the comment on section 154.2150(c)(4).
2150(c)(6) .....	Commenters 4 and 5 said that this provision is impracticable. Commenter 7 said we should modify it so that checking requires only visual checking, not an operational check of the relief devices, which should be allowed annually, consistent with present practice.	We agree in part with Commenters 4 and 5 and revised this provision to clarify our intent, which is not to conduct technical capacity or lift pressure testing of the valves, but rather to make sure the valve travel is not constrained and that the flame arrester is not damaged. Under an existing exemption suiting the unique characteristics of Commenter 7’s VCS, visual-only testing is permitted, but it would be inappropriate for VCSs in general.
2150(f) .....	Commenter 14 asked us to clarify whether this applies upstream or downstream of the facility vapor connection.	It applies downstream and we clarified this provision accordingly. Note that 154.2103(h) requires pressure sensors to be located in the vapor line between the facility vapor connection and any isolation valve.
2150(g) .....	Commenters 13 and 18 said many facilities lack the ability to make an accurate determination of liquid cargo transfer rates and that therefore we should require instrumentation.	We agree in part but do not think it is necessary to require instrumentation in this provision. Existing regulations (154.525, 156.120(aa)) require monitoring devices under certain conditions and verification that the initial loading rate and the maximum transfer rate are determined, and provide adequate control of the problem cited by these commenters.
2150(i) .....	Commenters 13 and 18 said we should clarify what is meant by “gas”.	We agree with these commenters and revised this provision to clarify that a compressed inert gas such as nitrogen can be used to clear cargo lines if a pigging system that meets 154.2104 is provided.
2150(j) .....	n/a .....	We revised this paragraph to take account of those cargo lines that are cleared without pigging, in response to commenter-suggested change in 154.2001 definitions.
[New 2150(q)] .....	n/a .....	To address the comment on 154.2112(a), we added this new paragraph. After each transfer operation, the VCS piping and equipment must be purged with at least two-system volume exchanges of non-reactive gas or air so the VCS is left with a safe condition.
2150(q) [now 2150 (r)] .....	n/a .....	We added “or 156.170(i),” to take account of this rule’s addition of that alternative to 156.170(g).
2180(b)(4) .....	Commenter 3 said we should revise this to refer to placement at “or near” the sampling probe.	We agree and revised the provision accordingly.
2180(c), (d) .....	Commenter 4 asked what “safety system function tested” means.	The relevant tests are in 154.2181. We revised these paragraphs to make that clearer.
2180(e)(3), (e)(4) .....	Commenter 4 asked us to clarify these standards.	We agree and revised these provisions accordingly.
2180(g) .....	n/a .....	We inserted “zero gas” in light of the comment on 154.2150(c)(4).
2181(b), (c), (d), (e) .....	Commenter 7 said that annual calibration should be sufficient.	We disagree. This section and 154.2180 provide a compliance alternative to the 24-hour pre-transfer or pre-tank cleaning testing of 154.2150 and 154.2250. Also, 156.170(g)(4) requires analyzers to be calibrated either within the previous 2 weeks or within 24 hours prior to operation when the VCS is operated less frequently than once a week.

Topic	Comment	Coast Guard response or action
2181(d)(4)(i) .....	Commenter 4 said that most existing systems inject the span gas at the analyzer box and do not use sample tubing, and asked if those systems would need to be modified.	We revised this provision to make it clear that we do not intend for those systems to need modification.
2200 .....	Commenter 4 said that because proposed 154.6001(f)(3) references the requirement of proposed 46 CFR 39.2009 to have a connection with the facility for the overfill control system, 154.2200 should require the facility to be able to accept the barge connection if they are using liquid displacement.	After following up with Commenter 4, we agree and added new 154.2200(b) accordingly.
2200(b) .....	n/a .....	We added this paragraph in response to the comment we received on 154.2200 and on 46 CFR 39.6001(f)(3).
2200(c) [now (d)] .....	Commenter 13 said we should eliminate gas inerting and enriching requirements for TBCFs.	We disagree. These IED requirements are from NVIC 1–96 and are based on recommended safety standards developed by CTAC in 1994 and 1995. In 1998, CTAC reviewed NVIC 1–96 and did not recommend eliminating the IED requirement for TBCFs.
2203(c), (d) .....	Commenter 4 asked why we would require correcting for a pressure drop from the cargo tank to the pressure sensor at the gas injection point, when it is more conservative not to correct and correction could allow for a higher alarm set point than 80% of the relief valve set point and a higher shutdown set point than 90% of the relief valve set point.	We agree and modified 154.2203(d) to clarify that the remotely operated shutoff valve required by 154.2203(c) must be closed when the pressure at the fluid injection connection reaches a corresponding 90% of the lowest setting of any pressure relief valve on the barge.
2203(g) .....	Commenter 18 said that tank barges do not need individual cargo tank pressure sensors because one sensor can detect pressure throughout the barge via the common vapor system.	We agree and modified this provision to allow for the use of a common vapor sensor as an alternative.
2204 .....	Commenter 18 said we should remove the distance requirement or allow existing facilities to maintain current locations as long as the detonation arrester is located as close as practicable to the facility connection.	Most dock detonation arrester distance exemption requests approved have been for 18 meters or less. An alternative “place items as close as practicable” standard would be too subjective to provide good guidance and would be hard to enforce. We have clarified this section by specifying that the vapor piping between the facility vapor connection and the dock detonation arrester must be protected from any possible internal and external ignition source.
2204(a)(2), (b)(2), (d)(2) .....	Commenter 13 said we should eliminate gas inerting and enriching requirements for TBCFs.	We disagree for the reasons given in our discussion of the commenter’s remarks on 154.2200(c).
2250(c)(1) .....	Commenter 4 asked us to clarify our wording about exemptions.	We agree and revised the provision accordingly.
2250(c)(4), (f) .....	Commenter 13 said we should eliminate gas inerting and enriching requirements for TBCFs.	We disagree for the reasons given in our discussion of the commenter’s remarks on 154.2200(c). However, we revised 154.2250(c)(4) per the comment on 154.2250(c)(5).
2250(c)(5) .....	Commenter 4 said that if this requires testing of the flammability analyzer required by 154.2105(j)(2)(i), the combustible gas indicator used for this application does not usually have the means to check with a sample gas and does not need calibration as often as an oxygen or hydrocarbon analyzer. Commenter 13 said we should eliminate gas inerting and enriching requirements for TBCFs.	After following up with Commenter 4, we agree with his point and revised 154.2250(c)(4) and 154.2250(c)(5) accordingly, as we did in 154.2150(c)(4) and 154.2150(c)(5). With respect to Commenter 13’s comment, we disagree for the reasons given in our discussion of the commenter’s remarks on 154.2200(c).
2250(c)(6) .....	Commenter 5 said that this provision is impracticable.	We agree in part with Commenter 5 and revised this provision to clarify our intent, which is not to conduct technical capacity or lift pressure testing of the valves, but rather to make sure the valve travel is not constrained and that the flame arrester is not damaged.

Topic	Comment	Coast Guard response or action
2250(d)(5) .....	Commenter 4 asked us to clarify this provision so that the gas-freeing rate may not exceed the maximum allowable rate during—but not before—operations.	We agree and revised the provision accordingly.
2250(e) .....	Commenter 12 said that annual inspection of detonation arresters may be difficult for some facilities, and asked us to specify whether compliance documentation is required.	Exemptions may be available to facility operators for whom annual inspection is difficult. We revised 154.2250(e) so that it is worded like 154.2150(q) [now 154.2150(r)] and makes clear how documentation requirements are established.
<b>33 CFR part 156</b>		
170(g)(3) .....	n/a .....	We added two more references that need updating to the amendatory instruction for this paragraph.
170(g)(4) .....	n/a .....	We updated the reference to 46 CFR 39.40–3(a) so that it now refers to 46 CFR 39.4003.
170(i) .....	Commenter 8 said that approval by the local Captain of the Port (COTP) is adequate and less burdensome than approval by the Commandant.	You may propose alternative arrangements under 156.107, but generally the Commandant and not the COTP will have the necessary expertise.
<b>46 CFR part 35</b>		
35.35–4 .....	n/a .....	We added this section per the discussion of the comments on 35.35–5.
35.35–5 .....	Commenter 5 said the shielded wire in the overfill system of 33 CFR 154.2102(b) is attached to a ground connection pin which is grounded by the facility but should not be grounded to the marine vessel; this would then comply with the proposed requirement in 46 CFR 35.35–5 for not grounding the marine vessel to the dock. Commenter 11 said the prohibition against using external bonding cables or straps to achieve electrical bonding is unnecessary, and the rule should allow barge-to-dock cable bonding as is the current and safe industry practice. Commenter 13 said we should continue allowing the use of bonding cables between a barge and a dock. Commenter 18 asked us to clarify that this section does not apply to ship-to-barge and barge-to-barge transfers.	We agree with these commenters and added new 35.35–4 and rewrote this section. Together, the two sections take into account all of these commenters' remarks.
<b>46 CFR part 39</b>		
1005(h)(1) .....	n/a .....	In line with the comment on 33 CFR 154.106(g)(3), we revised this paragraph to incorporate the latest available (2011) edition of the National Fire Protection Association's National Electric Code (NFPA 70).
1013(b) .....	Commenter 4 said our proposed language could be interpreted as requiring the vessel VCS to have been operational by July 23, 1990.	We agree and revised this provision so that it applies only to VCSs that began operating on or after that date.
1017 .....	Commenter 4 said the Coast Guard Marine Safety Center (MSC) may not be able to review all the vessels that conduct multi-breasted loading operations or gas-freeing or cleaning operations between the publication of the final rule and its effective date.	Vessels currently conducting multi-breasted loading operations are already approved by MSC and Commandant (CG–ENG–5) and will not need reapproval. Section 39.1001(a)(2) allows a tank barge conducting gas-freeing or cleaning operations to comply at the time of its next inspection but no later than 5 years after the effective date.
1017(b)(1), (b)(2) .....	n/a .....	We revised these paragraphs per the comment on section 39.1017(c).
1017(c) .....	Commenter 18 said existing VCSs should not be required to apply for new approval when the final rule takes effect.	We agree and revised 39.1017(b)(1) and 39.1017(b)(2) to exclude those already approved by the MSC.
2001(m) .....	Commenter 4 pointed out a miscited reference	We agree and changed the citation at the end of the provision.

Topic	Comment	Coast Guard response or action
2007(b)(4) .....	Commenter 4 said we should continue to require checking, or testing, but not inspection.	We agree and changed “be inspected” to “be verified.”
2009(a)(1)(iii)(B) .....	n/a .....	In line with the comment on 33 CFR 154.106(g)(3), we revised this paragraph to reference provisions in the latest available (2011) edition of NFPA 70.
2009(a)(2)(ii), (a)(2)(iii) .....	Commenters 13 and 18 said this is unattainable because accurate flow rate instrumentation is not available on unmanned barges and some facilities do not have calibrated instrument flow rates available for use during their cargo transfer to vessels.	We disagree. This is not a new requirement but is the same as appears in 46 CFR 39.20–9(b)(2). Barges and facilities have successfully complied with this requirement since 1990. However, we did correct an erroneous reference in 39.2009(a)(2)(iii): the alarm and shutdown system needs to be activated on the cargo discharging vessel, not the cargo receiving vessel.
2009(b) .....	Commenter 4 pointed out a miscited reference	We agree and corrected the citation at the end of this provision.
2011(d) .....	Commenter 4 asked what methods are approved by the Coast Guard for calculating vapor growth.	We revised this provision to identify where guidance is available for free and to specify that, alternatively, submitters may calculate the vapor growth rate using any recognized standard and following good engineering practice.
2013, introductory paragraph .....	Commenter 4 asked why we would require the pressure sensor to be located as close as practicable to the vessel vapor connection, when it is more accurate to have the sensor located closer to the tanks.	We do not disagree that the pressure sensing devices could be located at the cargo tanks. However, to prevent over-pressurization of cargo tanks, current prevention guidance includes submittal of pressure drop calculations from the cargo tank to the vapor connection. Pressure drop calculations coupled with the location of the pressure sensing device should be provided such that the operator is made aware of the actual tank pressure and can ensure the safety of the system. With sensors located at the vapor connection additional calculations would not be necessary.
2014(b) .....	Commenter 18 said that annual inspection is not needed for pressure valves; they are already checked frequently and the test lever is sufficient for determining proper operation.	We disagree. This requirement was recommended by CTAC. Pressure-vacuum valves used with polymerizing cargoes are subject to polymer buildup on the internal structure of the valve which would reduce the flow capacity of the valve. This could cause a potentially dangerous situation should the tank be overpressurized and the valve not be able to handle the required flow rate due to polymer buildup. Annual inspections are already conducted by many operators.
2015 .....	Commenters 13 and 18 asked us to clarify whether multiple pressure indicating devices will be required on tank barges to deal with the multiple cargo tank valves that control cargo transfer on unmanned tank barges.	Multiple devices are not required. We have revised the section to clarify that a pressure sensing device, not a pressure indicator, is required. A sensor takes the measurement, whereas the indicator provides a visual indication of what that measurement is. Therefore, the indicator should be located at the location from which the cargo can be controlled. For a vessel that does not have a pump room, this would typically be where the cargo pump shutdown controls are located. We have refrained from mandating a specific location because barges come in a wide variety of designs and the current language provides discretion for the vessel owner or operator to place the pressure indicating device in the most practical location.
3001(g) .....	Commenters 13 and 18 asked us to include a requirement for accurate flow rate instrumentation to be provided at facilities and on manned tank vessels.	The industry standard incorporated by reference in this provision provides the requirement.

Topic	Comment	Coast Guard response or action
Subpart 5000 .....	Commenter 4 said it was not clear how to deal with the extra pressure drop from multi-breasted vapor control. The transfer procedures should have the means to determine the additional pressure drop from the in-board vessel's vapor header.	We currently require calculations for multi-breasted loading that take the additional pressure drop into consideration, and the calculations must be approved by the MSC. We added a new 39.5001(e) to clarify these requirements.
5001(a) .....	Commenters 13 and 18 objected to the proposed language requiring both barges engaged in two barge doubled-up loading to be owned and operated by the same entity, saying this is not relevant to safe tank barge loading or safe use of marine VCSs.	The proposed language was recommended by CTAC. We acknowledge that some barges can be owned by one company and operated by another company, and have changed "and" to "or" in this provision. Most of the barges currently approved for this operation are owned and operated by the same company. Several are owned by one company but operated by another company. There are specific calculation, equipment, and operational requirements for this operation.
5001(b) .....	Commenters 13 and 18 said that a hose length limitation in 39.5001(b)(3) is not needed and that hoses longer than 25 feet present little additional risk.	The 25-foot length is standard and, for safety, these hoses should be as short as possible. However, we revised 39.5001(b)(3) to permit use of longer hoses with MSC approval, and we made other (non-substantive) changes in 39.5001(b).
[New 5001(e)] .....		We added new 39.5001(e) in response to Commenter 4's comment on subpart 39.5000.
5001(e) [now (f)] .....	Commenters 13 and 18 said that requiring compliance with additional COTP conditions and requiring identification and certification of facilities at which doubled-up cargo transfer loading operations will be conducted is unnecessary, and also that if additional safety precautions are needed, they should be specified in the initial documents.	Both of these requirements are standard conditions of our current dual barge loading exemption approval letters, and align with CTAC recommendations. We agree that the identification of specific facilities is not necessary and have revised this paragraph to delete that proposed requirement.
6001(c) .....	Commenters 13 and 18 said that complying with the proposed labeling requirement will be costly and difficult, and that it is not needed because stripping lines already are identified in easily accessible barge piping diagrams.	We disagree. The labeling requirement for individual stripping lines comes from NVIC 1-96, is based on CTAC recommendations, and is important for safety reasons because it prevents confusion with cargo lines. Facilities can use stencils and spread-paint the lines.
6001(f)(1) .....	Commenter 4 asked for clarification of this provision.	We have revised this provision to explain that "flanged flexible hoses" are "flexible hoses flanged to a connection." This is provided as an alternative to a fixed vapor header or fixed liquid cargo header.
6001(f)(3) .....	Commenter 4 made an observation with respect to the joint interpretation of this provision and 39.2009.	We followed up with Commenter 4. Because this paragraph requires overfill protection according to 39.2009, we added new 33 CFR 154.2200(b) to address his comments.
6003(a) .....	Commenter 4 said this sounds like an operational requirement because it does not make sense for a cargo tank venting system's design pressure to be less than that of cargo tank.	We followed up with Commenter 4. We have revised this paragraph to clarify that this is an operational requirement and that it does not require a cargo tank venting system's design pressure to be less than that of cargo tank.
6003(b) .....	Commenter 18 said that tank barges do not need individual cargo tank pressure sensors because one sensor can detect pressure throughout the barge via the common vapor system.	We agree and revised this provision as we did for 39.2015. We also specified the relevant paragraphs of the referenced section in 33 CFR, and changed the wording of the required label to avoid confusion between sensors and indicators.

## V. Incorporation by Reference

The Director of the Federal Register has approved the material in 33 CFR 154.106 and 46 CFR 39.1005 for incorporation by reference under 5 U.S.C. 552 and 1 CFR part 51. Copies of

the material are available from the sources listed in those sections.

## VI. Regulatory Analyses

We developed this final rule after considering numerous statutes and executive orders related to rulemaking.

Below we summarize our analyses based on 13 of these statutes or executive orders.

### A. Regulatory Planning and Review

Executive Orders 12866 ("Regulatory Planning and Review") and 13563

(“Improving Regulation and Regulatory Review”) direct agencies to assess the costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order (E.O.) 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. This final rule is not a significant regulatory action under section 3(f) of E.O. 12866, Regulatory Planning and Review, and does not require an assessment of potential costs and benefits under section 6(a)(3) of that Order. The Office of Management and Budget (OMB) has not reviewed it under that E.O.

A final Regulatory Analysis and Regulatory Flexibility Analysis is available in the docket as indicated under **ADDRESSES**. A summary of the Regulatory Analysis follows:

The final rule revises the existing regulations (33 CFR parts 154, 155, and 156, 46 CFR parts 35 and 39) regarding the safety of facility and vessel VCSs. The final rule amends the regulations to make VCS requirements more

compatible with other Federal and State environmental requirements and reflect industry advances in VCS technology, and codifies the voluntary standards for VCSs at TBCFs. The final rule increases the safety of operations by regulating the design, installation, and use of VCSs, but will not require anyone to install or use VCSs.

The final rule provides additional requirements for VCS equipment, compliance documentation, training, and operations. In general, the final rule:

- Adds new requirements for certifications, recertifications, periodic operational reviews, and approval processes for certain operations concerning VCSs to promote maritime safety and marine environmental protection. These various requirements mainly affect facilities with VCSs, including TBCFs;
- Requires new training or amends training requirements to improve safety. These training requirements affect facilities with VCSs (including TBCFs) and tank barge owners and operators;
- Permits pigging; however, there will be some requirements to receive Coast Guard permission to do so;
- Provides foreign-flagged tank barges some flexibility for certification procedures;

- Adds new requirements for certain equipment on U.S.-flagged tank barges and at TBCFs and other facilities with VCSs to improve safety and environmental protection; and

- Removes certain requirements in order to offer cost savings. This change mainly impacts facilities with VCSs.

The final rule is necessary to reflect the expansion of Federal and State regulations for VCSs since the current regulations were adopted in 1990, and to reflect technological advances over that period. Without revisions to these regulations by the Coast Guard, market failures persist in creating situations of uncompensated risk. In the case of this final rule, the uncompensated risks accrue to the public, maritime commerce, and mariners in the form of safety and environmental hazards and potential losses to equipment and cargo as well as the opportunity cost resulting from equipment, parts of facilities, or vessels being temporarily out of operation due to accidents.

The Regulatory Analysis provides an evaluation of the economic impacts associated with this final rule. Table 2 below provides a summary of the final rule’s costs and benefits.

TABLE 2—SUMMARY OF THE FINAL RULE’S IMPACTS

Category	Summary
Applicability .....	Owners of U.S.-flagged tank barges and foreign-flagged tank barges as defined by 46 CFR Subchapter D; CEs for VCSs; TBCFs.
Affected Population .....	280 facilities with VCSs, 24 CEs, 15 TBCFs, 216 U.S.-flagged tank barge owners, and owners of 338 foreign-flagged tank barges.
10-Year Costs (7% discount rate) .....	\$6.86 million.
10-Year Quantified Benefits and Cost Savings (7% discount rate).	Benefits: \$2.79 million. Additional Cost Savings: \$5.956 million (regulated public). Additional Cost Savings: \$0.164 million (Government). Total Benefits and Other Savings: \$8.914 million.
10-year Net Benefits of Final Rule (7% discount rate).	\$8.914—\$6.86 = \$2.054 million.
Unquantified Benefits .....	* Update industry practices. * Aid to quality control. * Preclusion of diminution of safety. * Provide for an opportunity for more competition.

The costs, quantified benefits, and cost savings are the totals for the 10-year period of analysis. These costs include industry costs plus the Government’s costs.

Table 3 shows the changes in costs, benefits, and additional cost savings from the NPRM to the Final Rule. As can be seen, costs have been reduced,

benefits increased and cost savings increased as a result of the changes delineated in Table 1. Few comments questioned cost estimates from the

NPRM, and thus the original regulatory assessment is largely retained.

TABLE 3—COMPARISON OF FINAL RULE AND NPRM IMPACTS (7% DISCOUNT RATE)

	Cost	Benefits	Additional cost savings
NPRM .....	\$8,822,113	\$1,944,359	\$5,228,965
Final Rule .....	6,864,404	2,791,303	6,120,064

The final rule amends several existing regulations and these amendments permit cost savings to the regulated public. Cost savings would result from the removal of the requirement on standards for flame arresters (33 CFR part 154, Appendix B). Additionally, the various changes preclude the need for the regulated public to continue to file exemption requests, which saves administrative labor and research. The final rule removes the requirement for a separate overfill control panel on the dock (33 CFR 154.2102, 46 CFR 39.2009). The provisions include an alternative test program for compliance with the VCS analyzer and pressure sensor safety testing requirements. The

final rule allows an alternative method of compliance with testing and inspection requirements of 33 CFR 156.170. The final rule's changes on enrichment requirements would benefit the regulated public by necessitating the use of less enriching gas. As well, the Coast Guard estimates the final rule would benefit the public by preventing marine casualties.

**Affected Population**

Based on Coast Guard data, we estimate that this final rule affects 280 facilities with VCSs, 24 CEs, 15 TBCFs, 216 U.S.-flagged tank barge owners, and owners of 338 foreign-flagged tank barges.

**Costs**

The final rule requires several actions by affected parties. These actions include training, periodic operational reviews, and recertifications. Over a 10-year period of analysis, we estimate the total present value cost of the final rule to be \$6.86 million at a 7 percent discount rate, and \$8.08 million at a 3 percent discount rate. Over the same 10-year period of analysis, we estimate the annualized cost of the final rule to be \$977,000 (rounded to nearest thousand) at 7 percent and \$947,000 (rounded) at 3 percent. The following table presents, by year, the costs of the final rule.

**TABLE 4—ESTIMATED COSTS OF FINAL RULE**

Year	Discounted 7%	Discounted 3%	Undiscounted
1	\$2,219,312	\$2,305,498	\$2,374,663
2	657,334	709,380	752,581
3	614,330	688,718	752,581
4	574,141	668,659	752,581
5	548,859	664,039	769,803
6	512,952	644,698	769,803
7	479,394	625,920	769,803
8	448,032	607,689	769,803
9	418,722	589,990	769,803
10	391,329	572,806	769,803
<b>Total</b>	<b>6,864,404</b>	<b>8,077,397</b>	<b>9,251,224</b>
<b>Annualized</b>	<b>977,337</b>	<b>946,917</b>	<b>925,122</b>

We estimate the requirements for facilities as the primary cost driver throughout the 10-year period of analysis. The requirements for facilities range from certifications, recertifications, and periodic operational reviews. Table 5 shows a summary of annualized costs by requirement category.

**TABLE 5—SUMMARY OF THE ANNUALIZED COSTS OF THE FINAL RULE**

Category	Annualized*	
	7%	3%
Facility Costs	\$751,190	\$ 738,358
TBCF Costs	110,926	103,646
Tank Barge Costs	111,390	101,524
Government Costs	3,831	3,389
<b>Total</b>	<b>977,337</b>	<b>946,917</b>

\* Rounded to the nearest dollar.

The final rule's changes that require the regulated public to follow operational changes such as certifications, recertifications, and periodic operational reviews comprise

approximately 58 percent of the costs throughout the 10-year period of analysis. The final rule's changes to require training, including amendments to PIC training, amount to 20 percent of the total costs. Table 6 presents a summary of the costs by requirement as a percentage of the total annualized costs of the final rule.

**TABLE 6—SUMMARY OF COSTS BY REQUIREMENT OF THE FINAL RULE [As a percentage of annualized cost]**

Requirements	Annualized cost (percent)
Operations Cost	58
Protection Equipment	10
Training including PIC	20
Misc other including government and pigging	12
<b>Total (rounded to the nearest one)</b>	<b>100</b>

**Benefits**

The final rule amends existing regulations regarding VCSs in marine activities. We are issuing these amendments to existing standards to

reflect technological improvements and to promote maritime safety and marine environmental protection. The final rule offers provisions for more practicable and efficient management of hazardous materials, and contains some provisions that offer facilities the opportunity to reduce maintenance costs.

The final rule provides several benefits. Benefits of the final rule include (1) Energy savings which would accrue from the use of less enriching gas, (2) avoided costs associated with the elimination of existing standards on liquid seal and (3) prevented casualties. Other benefits that USCG describes qualitatively include operational efficiency and enhanced safety. USCG estimates the 10-year quantified benefits to be at least \$2.79 million (7 percent discount rate).

In addition to these benefits, we estimate that the final rule will result in additional cost savings to the regulated public and the Government. These cost savings derive from tasks which would no longer have to be performed due to the final rule's changes and changes to various operational requirements which result in less resources being used. For regulated entities, the cost savings over

a 10-year period are estimated to be \$5.96 million (7 percent discount rate) and Government cost savings are estimated to be \$164,000 (7 percent discount rate, rounded to the nearest thousand).

See the final Regulatory Analysis available in the docket for a detailed analysis of the costs and benefits of this rulemaking.

The Coast Guard considered the following alternatives when developing the final rule:

1. Take no action.
2. Adopt all CTAC recommendations.
3. Issue a new policy letter or NVIC.
4. Require annual certifications.
5. Develop a different timetable for small entities.
6. Provide an exemption for small entities (from the rule or any part thereof).

Alternatives 1 and 2 are not preferred because they do not offer solutions to issues identified earlier in the preamble. They also do not allow for cost savings opportunities that arise from changes in the final rule. Alternative 3 communicates information to the regulated public, and although it would potentially increase public safety, it would not allow for cost savings opportunities outlined in the final rule, nor would it update the regulatory text. As such, it offers no assurance of compliance and no enforcement mechanism. Alternative 4 is feasible but costly. It is not anticipated to increase benefits or to increase cost savings despite its higher cost. Alternative 5 offers all benefits and cost savings of the final rule, albeit at a later date. Because of the benefits and cost savings, a delay serves no useful purpose to the regulated public. For some regulated entities such as facilities and tank barge owners, the final rule offers a delayed effective date and some provisions do not accrue costs immediately; also, other provisions do not apply unless specific changes to VCSs warrant them (e.g., recertifications). Alternative 6 is feasible. The Coast Guard notes that many final provisions do not apply to some small entities since they are either already in compliance or will benefit from the changes in the final rule. The final changes are low in cost on the individual level and have a low implementation burden. An exemption would preclude small entities from pursuing cost savings that would be provided by the final rule. A small business exemption would cause both costs and benefits as well as cost savings to decline in total for the regulated public. These small entities face many of the same environmental and safety hazards other business entities face; and

these final requirements would address these hazards. Without them, there would be an uncompensated risk to small entities and their employees. Because this is a safety regulation and because of the continued safety hazards, such an alternative represents a disproportionate tolerance of risks to safety, and the Coast Guard could not pursue this option.

#### *B. Small Entities*

Under the Regulatory Flexibility Act (5 U.S.C. 601–612), we have considered whether this final rule would have a significant economic impact on a substantial number of small entities. The term “small entities” comprises small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

A combined final Regulatory Analysis and Regulatory Flexibility Analysis discussing the impact of this final rule on small entities is available in the docket as indicated in the **ADDRESSES** section of this preamble.

Based on our analysis, we estimate that small entities affected by this final rule are primarily small businesses consisting of CEs, owners and operators of TBCFs, tank barges, and facilities with VCSs. We did not find data to suggest small not-for-profit organizations or small government entities will be directly affected by this final rule. In addition, CEs will incur no additional costs due to this final rule because no additional tasks or equipment are required of them; therefore, they are not analyzed further. We evaluated the impact on small entities for each segment of industry that incur additional costs, since this final rule requires different provisions for owners and operators of TBCFs, tank barges, and facilities with VCSs.

Based on our assessment, 54 percent of tank barge owners affected by this final rule will be considered small by Small Business Administration (SBA) size standards. We estimate 100 percent of these small entities will incur cost impacts that are 1 percent or less than their annual revenues during the highest cost year (implementation year), as well as annually.

We estimate 15 percent of facilities with VCSs will be considered small by SBA size standards. We estimate that almost 86 percent of these small entities will incur annual cost impacts that are 1 percent or less than their annual revenues during the highest cost year (implementation year), as well as annually. Another 14 percent will have

cost impacts between 1 to 3 percent of their annual revenue.

We estimate that all of the TBCFs are considered small by SBA size standards. We estimate 60 percent of these TBCFs will incur cost impacts that are potentially greater than 3 percent of their annual revenues during the highest cost year (implementation year). It should be noted that the final rule will codify existing voluntary standards for TBCFs. Consequently, we anticipate the cost impacts to TBCFs may be overestimates.

Consequently, we believe there will be no significant economic impacts for CEs, facilities with VCSs, and owners/operators of tank barges. However, there may be economic impacts for some TBCFs.

#### *C. Assistance for Small Entities*

Under section 213(a) of the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104–121), we offered to assist small entities in understanding this final rule so that they could better evaluate its effects on them and participate in the rulemaking. If the final rule will affect your small business, organization, or governmental jurisdiction and you have questions concerning its provisions or options for compliance, please consult Ms. Sara Ju at the address listed under **ADDRESSES**. The Coast Guard will not retaliate against small entities that question or complain about this final rule or any policy or action of the Coast Guard.

Small businesses may send comments on the actions of Federal employees who enforce, or otherwise determine compliance with, Federal regulations to the Small Business and Agriculture Regulatory Enforcement Ombudsman and the Regional Small Business Regulatory Fairness Boards. The Ombudsman evaluates these actions annually and rates each agency’s responsiveness to small business. If you wish to comment on actions by employees of the Coast Guard, call 1–888–REG–FAIR (1–888–734–3247).

#### *D. Collection of Information*

This final rule requires an amendment to an existing collection of information (1625–0060) as defined by the Paperwork Reduction Act of 1995 (44 U.S.C. 3501–3520). As defined in 5 CFR 1320.3(c), “collection of information” comprises reporting, recordkeeping, monitoring, posting, labeling, and other similar actions. The title and description of the information collections, a description of those who must collect the information, and an estimate of the total annual burden follow. The estimate covers the time for

reviewing instructions, searching existing sources of data, gathering and maintaining the data needed, and completing and reviewing the collection.

*Title:* Vapor Control Systems for Facilities and Tank Vessels.

*OMB Control Number:* 1625–0060.

*Summary of the Collection of Information:* This collection of information ensures industry compliance with safety standards for VCSs. The final rule requires recordkeeping and reporting on the design and use of VCSs. The final rule contains collection of information requirements which include: Certifications, recertifications, periodic operational reviews, approval requests, reviews of operating manuals, failure analyses, operational review letters, and relabeling. The collection of information will aid the Coast Guard and industry in assuring safe practices associated with VCSs.

*Need for Information:* The Coast Guard needs this information to ensure industry use of VCS requirements are compatible with new Federal and State environmental requirements, to reflect industry advances in VCS technology, and to ensure the safe design and operation of a VCS at a TBCF.

*Final Use of Information:* The Coast Guard will use this information to determine whether an entity meets the statutory requirements.

*Description of the Respondents:* The respondents are owners/operators of TBCFs, facilities, and tank vessels with vapor control systems. Reporting and recordkeeping requirements will be completed by facility and vessel owners/operators, PICs, engineers, maintenance workers, and operations managers of affected tank barges, TBCFs, facilities, and CEs.

*Number of Respondents:* The burden change of this collection of information includes certifications, recertifications, approval requests, reviewing operating manuals, preparing operational review letters, and relabeling. This collection of information applies to various owners and operators of tank barges, facilities, TBCFs, and CEs. We estimate the total number of respondents is 535.

*Frequency of Responses:* This final rule will vary the number of responses each year by requirement. Some actions are one time only and others are required more frequently.

*Burden of Response:* This collection of information applies to CEs, tank barge owners/operators and owners/operators of facilities with VCSs. The Coast Guard estimates the total number of respondents is 535. The burden of

response varies by collection of information requirement.

*Estimate of Total Annual Burden:* The total annual burden is estimated to increase as a result of the final rule by 8,041 hours from the previously approved 2,789 hours.

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), we will submit a copy of this final rule to OMB for its review of the collection of information.

You are not required to respond to a collection of information unless it displays a currently valid control number from OMB. Before the Coast Guard can enforce the collection of information requirements in this final rule, OMB must approve the action.

#### *E. Federalism*

A rule has implications for federalism under E.O. 13132, Federalism, if it has a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. In our NPRM, found at 75 FR 65152, we previously stated that this rule had no implications for federalism. We have re-evaluated this rule under E.O. 13132 and under the authorities granted to the Coast Guard to promulgate regulations concerning marine vapor control systems and now conclude that certain provisions of these regulations do have implications for federalism. Our analysis follows.

For those regulations promulgated under the authority of 46 U.S.C. 3306, there are no implications for federalism. It is well settled that States may not regulate in categories reserved for regulation by the Coast Guard. It is also well settled, now, that all of the categories covered in 46 U.S.C. 3306, 3703, 7101, and 8101 (design, construction, alteration, repair, maintenance, operation, equipping, personnel qualification, and manning of vessels) are within the fields foreclosed from regulation by the States. (See the decision of the Supreme Court in the consolidated cases of *United States v. Locke* and *Intertanko v. Locke*, 529 U.S. 89, 120 S.Ct. 1135 (March 6, 2000).) Under 46 U.S.C. 3703, Congress directed the Secretary to prescribe equipment regulations for tank vessels necessary to protect against hazards to life, property, and the marine environment, as well as to navigation and vessel safety. Provisions of these regulations, promulgated under the authority of 46 U.S.C. 3703, increase operational safety and the protection of the marine environment by setting the standards for

the use, design, and installation of vapor control systems on inspected vessels. Because States may not promulgate rules within this category, there are no implications for federalism under Executive Order 13132.

For those regulations promulgated under the authority of 42 U.S.C. 7511b(f)(2), these provisions do have implications for federalism. It is clear that Congress intended these regulations to have limited preemptive effect over state or local law based on the language found in 42 U.S.C. 7511b(f)(2). In this section, Congress mandated the Coast Guard to issue regulations to “ensure the safety of the equipment and operations which are to control emissions from the loading and unloading of tank vessels, under section 3703 of title 46 and section 1225 of title 33.” Congress further explained that any standards for the emission of VOCs established by a “State or political subdivision regarding emissions from the loading and unloading of tank vessels shall be consistent with the regulations regarding safety of the Department in which the Coast Guard is operating.” In choosing this language, and specifically including section 1225 of title 33, Congress expressly intended Coast Guard regulations to preempt State or local laws or regulations regarding emission control equipment and procedures for waterfront facilities transferring oil or hazardous materials, but only in so far as a State or local law or regulation conflicts with the federal regulation.

#### *F. Unfunded Mandates Reform Act*

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531–1538) requires Federal agencies to assess the effects of their discretionary regulatory actions. In particular, the Act addresses actions that may result in the expenditure by a State, local, or Tribal government, in the aggregate, or by the private sector of \$100,000,000 (adjusted for inflation) or more in any 1 year. Though this final rule will not result in such an expenditure, we do discuss the effects of this final rule elsewhere in this preamble.

#### *G. Taking of Private Property*

This final rule will not cause a taking of private property or otherwise have taking implications under E.O. 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights.

#### *H. Civil Justice Reform*

This final rule meets applicable standards in sections 3(a) and 3(b)(2) of E.O. 12988, Civil Justice Reform, to

minimize litigation, eliminate ambiguity, and reduce burden.

#### *I. Protection of Children*

We have analyzed this final rule under E.O. 13045, Protection of Children from Environmental Health Risks and Safety Risks. This final rule is not an economically significant rule and will not create an environmental risk to health or risk to safety that might disproportionately affect children.

#### *J. Tribal Governments*

This final rule does not have Tribal implications under E.O. 13175, Consultation and Coordination with Indian Tribal Governments, because it does not have a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes.

#### *K. Energy Effects*

We have analyzed this final rule under E.O. 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. We have determined that it is not a “significant energy action” under that E.O. because it is not a “significant regulatory action” under E.O. 12866 and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The Administrator of the Office of Information and Regulatory Affairs has not designated it as a significant energy action. Therefore, this final rule does not require a Statement of Energy Effects under E.O. 13211.

#### *L. Technical Standards*

The National Technology Transfer and Advancement Act (15 U.S.C. 272 note) directs agencies to use voluntary consensus standards in their regulatory activities unless the agency provides Congress, through the Office of Management and Budget, with an explanation of why using these standards would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., specifications of materials, performance, design, or operation; test methods; sampling procedures; and related management systems practices) that are developed or adopted by voluntary consensus standards bodies.

This final rule uses voluntary consensus standards from the following organizations: American Petroleum Institute, American National Standards Institute, ASTM, International

Electrotechnical Commission, National Electrical Manufacturers Association, National Fire Protection Association, Oil Companies International Marine Forum, and Underwriters Laboratories, Inc. This final rule also uses technical standards other than voluntary consensus standards from the International Maritime Organization. The sections that reference these standards and the locations of these standards are listed in 33 CFR 154.106 and 46 CFR 39.1005.

#### *M. Environment*

We have analyzed this final rule under Department of Homeland Security Management Directive 023–01 and Commandant Instruction M16475.ID, which guide the Coast Guard in complying with the National Environmental Policy Act of 1969 (42 U.S.C. 4321–4370f), and have concluded that this action is one of a category of actions that do not individually or cumulatively have a significant effect on the human environment. This final rule is categorically excluded under section 2.B.2, figure 2–1, paragraph (34)(d) of the Instruction and under section 6(a) of the “Appendix to National Environmental Policy Act: Coast Guard Procedures for Categorical Exclusions, Notice of Final Agency Policy” (67 FR 48244, July 23, 2002). This final rule involves regulations concerning vessel operation safety standards and safety equipment. An environmental analysis checklist and a categorical exclusion determination are available in the docket where indicated under **ADDRESSES**.

#### **List of Subjects**

##### *33 CFR Part 154*

Alaska, Fire prevention, Hazardous substances, Incorporation by reference, Oil pollution, Reporting and recordkeeping requirements.

##### *33 CFR Part 155*

Alaska, Hazardous substances, Oil pollution, Reporting and recordkeeping requirements.

##### *33 CFR Part 156*

Hazardous substances, Oil pollution, Reporting and recordkeeping requirements, Water pollution control.

##### *46 CFR Part 35*

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

##### *46 CFR Part 39*

Cargo vessels, Fire prevention, Hazardous materials transportation,

Incorporation by reference, Marine safety, Occupational safety and health, Reporting and recordkeeping requirements.

For the reasons discussed in the preamble, the Coast Guard amends 33 CFR parts 154, 155, and 156, and 46 CFR parts 35 and 39 as follows:

#### **Title 33**

#### **PART 154—FACILITIES TRANSFERRING OIL OR HAZARDOUS MATERIAL IN BULK**

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

**Authority:** 33 U.S.C. 1225, 1231, 1321(j)(1)(C), (j)(5), (j)(6), and (m)(2); sec. 2, E.O. 12777, 56 FR 54757; Department of Homeland Security Delegation No. 0170.1. Subpart F is also issued under 33 U.S.C. 2735. Vapor control recovery provisions of Subpart P are also issued under 42 U.S.C. 7511b(f)(2).

■ 2. Revise § 154.106 to read as follows:

##### **§ 154.106 Incorporation by reference.**

(a) Certain material is incorporated by reference (IBR) into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the Coast Guard must publish a notice of change in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Coast Guard, Office of Design and Engineering Standards (CG–ENG), 2100 2nd Street SW., Stop 7126, Washington, DC 20593–7126, telephone 202–372–1418 and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to [http://www.archives.gov/federal-register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal-register/code_of_federal_regulations/ibr_locations.html). Also, it is available from the sources indicated in this section.

(b) American National Standards Institute (ANSI), 25 West 43rd Street, 4th floor, New York, NY 10036.

(1) ANSI B16.5, Steel Pipe Flanges and Flanged Fittings, 1988, IBR approved for §§ 154.500(d), 154.2100(b), 154.2101(d), 154.2202(d), and Appendix A, 7.3 to part 154.

(2) ANSI B16.24, Bronze Pipe Flanges and Flange Fittings Class 150 and 300, 1979, IBR approved for §§ 154.500(d) and 154.2100(b).

(3) ANSI B31.3, Chemical Plant and Petroleum Refinery Piping, 1987 (including B31.3a–1988, B31.3b–1988, and B31.3c–1989 addenda), IBR

approved for §§ 154.510(a) and 154.2100(b).

(c) American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005.

(1) API Standard 2000, Venting Atmospheric and Low-Pressure Storage Tanks (Non-refrigerated and Refrigerated), Third Edition, January 1982 (reaffirmed December 1987) (“API 2000”), IBR approved for §§ 154.2103(j) and 154.2203(e), (k), and (l).

(2) API Recommended Practice 550, Manual on Installation of Refinery Instruments and Control Systems, Part II—Process Stream Analyzers, Section 1—Oxygen Analyzers, Fourth Edition, February 1985 (“API 550”), IBR approved for § 154.2107(f).

(d) American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016.

(1) ASME B16.34 -2004, Valves—Flanged, Threaded, and Welding End, issued September 2, 2005, IBR approved for § 154.2100(b).

(2) [Reserved]

(e) ASTM International (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

(1) ASTM F631-93, Standard Guide for Collecting Skimmer Performance Data in Controlled Environments (“ASTM F631”), IBR approved for Appendix C, 6.3 to part 154.

(2) ASTM F715-95, Standard Test Methods for Coated Fabrics Used for Oil Spill Control and Storage (“ASTM F715”), IBR approved for Appendix C, 2.3.1 to part 154.

(3) ASTM F722-82 (Reapproved 2008), Standard Specification for Welded Joints for Shipboard Piping Systems (“ASTM F722”), approved November 1, 2008, IBR approved for Appendix A, 8.4, 8.6 to part 154.

(4) ASTM F1122-87 (Reapproved 1992), Standard Specification for Quick Disconnect Couplings (“ASTM F1122”), IBR approved for § 154.500(d).

(5) ASTM F1155-98, Standard Practice for Selection and Application of Piping System Materials (“ASTM F1155”), IBR approved for Appendix A, 7.1, 8.4 to part 154.

(6) ASTM F1273-91 (Reapproved 2007) Standard Specification for Tank Vent Flame Arresters (“ASTM F1273”), approved December 1, 2007, IBR approved for §§ 154.2001 and 154.2105(j).

(f) International Electrotechnical Commission (IEC), Bureau Central de la Commission Electrotechnique Internationale, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland.

(1) IEC 60309-1 Plugs, Socket-Outlets and Couplers for Industrial Purposes—

Part 1: General Requirements, Edition 4.2 2012-06, IBR approved for § 154.2102(b).

(2) IEC 60309-2 Plugs, Socket-Outlets and Couplers for Industrial Purposes—Part 2: Dimensional Interchangeability Requirements for Pin and Contact-tube Accessories, Edition 4.2 2012-05, IBR approved for § 154.2102(b).

(g) National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Suite 1752, Rosslyn, VA 22209.

(1) ANSI NEMA WD-6—Wiring Devices, Dimensional Requirements, 1988 (“NEMA WD-6”), IBR approved for § 154.2102(a).

(2) [Reserved]

(h) National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471.

(1) NFPA 51B, Standard for Fire Prevention in Use of Cutting and Welding Processes, 1994, IBR approved for § 154.735(l).

(2) NFPA 70, National Electrical Code, 1987 (“NFPA 70 (1987)”), IBR approved for § 154.735(q).

(3) NFPA 70, National Electrical Code, 2011 (“NFPA 70 (2011)”), IBR approved for §§ 154.2100(c) and 154.2102(a).

(i) Oil Companies International Marine Forum (OCIMF), 29 Queen Anne’s Gate, London, SW1H 9BU, England.

(1) International Safety Guide for Oil Tankers and Terminals, Fifth Ed., 2006 (“ISGOTT”), IBR approved for §§ 154.735(s), 154.2101(g), and 154.2203(m).

(2) [Reserved]

(j) Underwriters Laboratories, Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062.

(1) UL 525 Standard for Flame Arresters, 8th Edition, May 9, 2008, IBR approved for §§ 154.2001 and 154.2105(j).

(2) [Reserved]

■ 3. In § 154.310, revise paragraph (b) to read as follows:

**§ 154.310 Operations manual: Contents.**

\* \* \* \* \*

(b)(1) The operations manual must contain a description of the facility’s vapor control system (VCS), if the facility—

(i) Collects vapor emitted from vessel cargo tanks for recovery, destruction, or dispersion; or

(ii) Balances or transfers vapor to or from vessel cargo tanks.

(2) The VCS description required by paragraph (b)(1) of this section must include a line diagram or simplified piping and instrumentation diagram (P&ID) of the facility’s VCS piping, including the location of each valve, control device, pressure-vacuum relief

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

(3) The VCS description required by paragraph (b)(1) of this section must describe the design and operation of its—

(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.

(4) The VCS description required by paragraph (b)(1) of this section must include all test procedures and a checklist for use during the testing of the VCS required by 33 CFR 156.170(g). The test procedures must specify—

(i) All tests required for initial certification under 33 CFR 154.2022(d);

(ii) All components that are to be tested; and

(iii) Procedures for testing each component.

(5) The VCS description required by paragraph (b)(1) of this section must include—

(i) A list of all cargoes the VCS is approved to control; and

(ii) Copies of any Coast Guard letters exempting the VCS from regulatory requirements.

(6) The VCS description required by paragraph (b)(1) of this section must include detailed operating instructions for a cargo line clearance system as described in 33 CFR 154.2104, if such a system is used by a facility;

(7) The VCS description required by paragraph (b)(1) of this section must include the following for a tank barge cleaning facility:

(i) A physical description of the facility and facility plan showing mooring areas, locations where cleaning operations are conducted, control stations, and locations of safety equipment;

(ii) The sizes, types, and number of tank barges from which the facility can conduct cleaning operations simultaneously; and

(iii) The minimum number of persons required to be on duty during cleaning operations and the duties of each.

\* \* \* \* \*

■ 4. Revise § 154.500 to read as follows:

**§ 154.500 Hose assemblies.**

Each hose assembly used for transferring oil or hazardous material must meet the following requirements:

(a) The minimum design burst pressure for each hose assembly must be at least four times the sum of the pressure of the relief valve setting (or four times the maximum pump pressure when no relief valve is installed) plus the static head pressure of the transfer system, at the point where the hose is installed.

(b) The maximum allowable working pressure (MAWP) for each hose assembly must be more than the sum of the pressure of the relief valve setting (or the maximum pump pressure when no relief valve is installed) plus the static head pressure of the transfer system, at the point where the hose is installed.

(c) Each nonmetallic hose must be usable for oil or hazardous material service.

(d) Each hose assembly must either have—

- (1) Full threaded connections;
- (2) Flanges that meet ANSI B16.5 or ANSI B16.24 (both incorporated by reference, see 33 CFR 154.106); or
- (3) Quick-disconnect couplings that meet ASTM F1122 (incorporated by reference, see 33 CFR 154.106).

(e) Each hose must be marked with one of the following:

- (1) The name of each product for which the hose may be used; or
- (2) For oil products, the words "OIL SERVICE"; or
- (3) For hazardous materials, the words "HAZMAT SERVICE—SEE LIST" followed immediately by a letter, number or other symbol that corresponds to a list or chart contained in the facility's operations manual or the vessel's transfer procedure documents which identifies the products that may be transferred through a hose bearing that symbol.

(f) Each hose also must be marked with the following, except that the information required by paragraphs (f)(2) and (3) of this section need not be marked on the hose if it is recorded in the hose records of the vessel or facility, and the hose is marked to identify it with that information:

- (1) Maximum allowable working pressure;
- (2) Date of manufacture; and
- (3) Date of the latest test required by 33 CFR 156.170.

(g) The hose burst pressure and the pressure used for the test required by 33 CFR 156.170 must not be marked on the hose and must be recorded elsewhere at the facility as described in paragraph (f) of this section.

(h) Each hose used to transfer fuel to a vessel that has a fill pipe for which containment cannot practically be provided must be equipped with an automatic back pressure shutoff nozzle.

■ 5. In § 154.735—

- a. In paragraph (q), remove the term "NFPA 70" and add, in its place, the words "NFPA 70 (1987) (incorporated by reference, see 33 CFR 154.106)"; and
- b. Revise paragraph (s) to read as follows:

§ 154.735 Safety requirements.

\* \* \* \* \*

(s) Tank-cleaning or gas-freeing operations conducted by the facility on vessels carrying oil residues or mixtures must be conducted in accordance with sections 11.3 and 11.4 of OCIMF ISGOTT (incorporated by reference, see 33 CFR 154.106), except that—

(1) Prohibitions in ISGOTT against the use of recirculated wash water do not apply if the wash water is first processed to remove product residues;

(2) The provisions in ISGOTT section 11.3.6.10 that removal of sludge, scale, and sediment do not apply if personnel use breathing apparatuses which protect them from the tank atmosphere; and

(3) Upon the request of the facility owner or operator in accordance with 33 CFR 154.107, the COTP may approve the use of alternate standards to ISGOTT if the COTP determines that the alternative standards provide an equal level of protection to the ISGOTT standards.

\* \* \* \* \*

§ 154.740 [Amended]

■ 6. In § 154.740—

- a. In paragraph (g), remove the words "subpart E" and replace them with the words "subpart P"; and
- b. In paragraph (i), remove the words "\$ 154.804 of this part" and add, in their place, the citation "33 CFR 154.2020 through 154.2025".

Subpart E [Removed]

■ 7. Remove subpart E, consisting of §§ 154.800 through 154.850.

Subparts J through O [Reserved]

■ 8. Add reserved subparts J through O.

■ 9. Add subpart P to read as follows:

Subpart P—Marine Vapor Control Systems

General

- Sec.
- 154.2000 Applicability.
- 154.2001 Definitions.

Certifying Entities

- 154.2010 Qualifications for acceptance as a certifying entity.
- 154.2011 Application for acceptance as a certifying entity.

Certification, Recertification, and Operational Review

- 154.2020 Certification and recertification—owner/operator responsibilities.
- 154.2021 Operational review—owner/operator responsibilities.
- 154.2022 Certification, recertification, or operational review—certifying entity responsibilities, generally.
- 154.2023 Recertification—certifying entity responsibilities, generally.
- 154.2024 Operational review—certifying entity responsibilities, generally.
- 154.2025 Certification, recertification, or operational review—certifying entity documentation.

Personnel

- 154.2030 Transfer facilities.
- 154.2031 Tank barge cleaning facilities.

Transfer Facilities—VCS Design and Installation

- 154.2100 Vapor control system, general.
- 154.2101 Requirements for facility vapor connections.
- 154.2102 Facility requirements for vessel liquid overflow protection.
- 154.2103 Facility requirements for vessel vapor overpressure and vacuum protection.
- 154.2104 Pigging system.
- 154.2105 Fire, explosion, and detonation protection.
- 154.2106 Detonation arresters installation.
- 154.2107 Inerting, enriching, and diluting systems.
- 154.2108 Vapor-moving devices.
- 154.2109 Vapor recovery and vapor destruction units.
- 154.2110 Vapor balancing requirements.
- 154.2111 Vapor control system connected to a facility's main vapor control system.
- 154.2112 Vapors with potential to polymerize or freeze—Special requirements.
- 154.2113 Alkylene oxides—Special requirements.

Transfer Facilities—Operations

- 154.2150 General requirements.

Alternative Analyzer and Pressure Sensor Reliability Testing

- 154.2180 Alternative testing program—Generally.
- 154.2181 Alternative testing program—Test requirements.

Tank Barge Cleaning Facilities—VCS Design and Installation

- 154.2200 Applicable transfer facility design and installation requirements.
- 154.2201 Vapor control system—General requirements.
- 154.2202 Vapor line connections.
- 154.2203 Facility requirements for barge vapor overpressure and vacuum protection.
- 154.2204 Fire, explosion, and detonation protection.

Tank Barge Cleaning Facilities—Operations

- 154.2250 General requirements.

## General

### § 154.2000 Applicability.

(a) Except as specified by paragraphs (b) through (g) of this section, this subpart applies to—

(1) Each facility that controls vapors emitted to or from vessel cargo tanks;

(2) A vessel, other than a tank vessel, that has a vapor processing unit located onboard for recovery, destruction, or dispersion of vapors from a tank vessel's cargo tanks;

(3) Certifying entities that review, inspect, test, and certificate facility vapor control systems (VCSs); or

(4) A facility VCS that receives cargo vapor from a vessel when the VCS is connected to a facility's main VCS that serves plant processing areas, such as tank storage areas or tank truck or railcar loading areas, unrelated to tank vessel operations. The requirements of this subpart apply between the vessel vapor connection and the point where the VCS connects to the facility's main VCS.

(b) Each facility VCS that began operating on or after July 23, 1990, and that is certified as in compliance with 33 CFR part 154, subpart E on August 15, 2013, or each existing tank barge cleaning facility VCS that meets the safety Standards of Navigation and Vessel Inspection Circular No. 1–96, must comply with 33 CFR part 154, subpart P by August 15, 2016. Certifications, approvals of alternatives, and grants of exemption in effect on August 15, 2013, remain in effect after that date and as specified in the certification, approval, or grant.

(c) A facility with a Coast Guard-approved VCS operating prior to July 23, 1990, must comply with 33 CFR 154.2150 but otherwise need not comply with this subpart so long as it does not have any design or configuration alterations after its approval and receives cargo vapor only from the specific vessels for which it was originally approved.

(d) A facility that uses a vapor balancing system to transfer vapor from a railcar or a tank truck to a vessel cargo tank while offloading the vessel must obtain approval in writing from the Commandant and make that approval available for Coast Guard inspection upon request.

(e) A facility that transfers vapor from a facility tank to a cargo tank of a vessel which is not offloading cargo must obtain approval in writing from the Commandant and make that approval available for Coast Guard inspection upon request.

(f) A tank vessel that has a permanent or portable vapor processing unit

located onboard must comply with applicable requirements of this subpart and 46 CFR part 39.

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

(h) This subpart does not require a facility or a vessel to control vapor, or a vessel to take away vapor from facilities; however, if a facility operates a VCS to control vapor to or from vessels, the facility must comply with the requirements of this subpart.

(i) In this subpart, regulatory measurements, whether in the metric or English system, are sometimes followed by approximate equivalent measurements in parentheses, which are given solely for the reader's convenience. Regulatory compliance with the regulatory measurement is required.

### § 154.2001 Definitions.

As used in this subpart only:

*Ambient temperature* means the temperature of the environment in which an experiment is conducted or in which any physical or chemical event occurs.

*Barge cargo connection* means the point in a barge's cargo system where it connects with the hose assembly or loading arm used for cargo transfer.

*Barge vapor connection* means the point in a barge's piping system where it connects to a vapor collection hose or arm. This may be the same as the barge's cargo connection as it controls vapors during barge cargo tank-cleaning operations.

*Base loading* means a method of inerting, enriching, or diluting such that sufficient inerting, enriching, or diluting gas, for the worst concentration of vapor coming from the vessel, is injected into the vapor line during the entire loading operation so that the vapor mixture is inerted, enriched, or diluted at the maximum loading rate. For inerting and enriching systems, “worst concentration” means the vapor stream contains no cargo vapor. For a diluting system, “worst concentration” means the vapor stream is saturated with cargo vapor.

*Captain of the Port (COTP)* means the Coast Guard Captain of the Port as defined in 33 CFR 154.105.

*Certifying entity* means an individual or organization accepted by the Commandant to review plans, data, and calculations for vapor control system designs and to conduct inspections and observe tests of vapor control system installations.

*Cleaning operation* means any stripping, gas-freeing, or tank-washing

operation of a barge's cargo tanks conducted at a cleaning facility.

*Combustible liquid* means any liquid that has a flashpoint above 80 °F (as determined from an open-cup tester, as used to test burning oils) and includes Grade D and Grade E combustible liquids defined in 46 CFR 30.10–15.

*Commandant* means Commandant (CG–ENG), U.S. Coast Guard, 2100 2nd St. SW., Stop 7126, Washington, DC 20593–7126.

*Detonation arrester* means a device that is acceptable to the Commandant and includes a detonation arrester that is designed, built, and tested in accordance with Appendix A of this part or by another method acceptable to the Commandant for arresting flames and detonations.

*Diluting* means introducing a non-flammable, non-combustible, and non-reactive gas with the objective of reducing the hydrocarbon content of a vapor mixture to below the lower flammable limit so that it will not burn.

*Drip leg* means a section of piping that extends below piping grade to collect liquid passing through the vapor line and that has a diameter no more than the diameter of the pipe in which it is installed.

*Elevated temperature* means the temperature that exceeds 70 percent of the auto-ignition temperature, in degrees Celsius, of the vapors being collected.

*Enriching* means introducing a flammable gas with the objective of raising the hydrocarbon content of a vapor mixture above the upper flammable limit so that it will not burn.

*Existing vapor control system* means a vapor control system that satisfies the requirements of 33 CFR part 154, subpart E as certified by a certifying entity, or a tank barge cleaning facility vapor control system that meets the safety Standards of Navigation and Vessel Inspection Circular No. 1–96 as certified by a certifying entity or approved by the U.S. Coast Guard, and that began operating prior to August 15, 2013.

*Facility main vapor control system* means a vapor control system that primarily serves facility processing areas unrelated to tank vessel operations, such as the plant process, tank storage areas, or tank truck or railcar loading areas.

*Facility operations manual* means the manual required by 33 CFR 154.300, the contents of which are described in 33 CFR 154.310.

*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 and is located at the dock as close as possible to the tank vessel to minimize the length of the flexible vapor collection hose, thus reducing the hazards associated with the hose.

*Fail-safe* means a piece of equipment or instrument that is designed such that if any element should fail, it would go to a safe condition.

*Fixed stripping line* means a pipe extending to the low point of each cargo tank, welded through the deck and terminating above the deck with a valve plugged at the open end.

*Flame arrester* means a device that is designed, built, and tested in accordance with ASTM F 1273 or UL 525 (both incorporated by reference, see 33 CFR 154.106) for use in end-of-line applications for arresting flames.

*Flame screen* means a fitted single screen of corrosion-resistant wire of at least 30-by-30 mesh, or two fitted screens, both of corrosion-resistant wire, of at least 20-by-20 mesh, spaced apart not fewer than 12.7 millimeters (0.5 inch) or more than 38.1 millimeters (1.5 inches).

*Flammable liquid* means any liquid that gives off flammable vapors (as determined by flashpoint from an open-cup tester, as used to test burning oils) at or below a temperature of 80°F, and includes Grades A, B, and C flammable liquids defined in 46 CFR 30.10–22.

*Fluid displacement system* means a system that removes vapors from a barge's cargo tanks during gas freeing through the addition of an inert gas or other medium into the cargo tank.

*Fluid injection connection* means the point in a fluid displacement system at which the fixed piping or hose that supplies the inert gas or other medium connects to a barge's cargo tanks or fixed piping system.

*Gas freeing* means the removal of vapors from a tank barge.

*Grade A, B, C, D, or E* means any Grade A, B, or C flammable liquid defined in 46 CFR 30.10–22 or any Grade D or E combustible liquid defined in 46 CFR 30.10–15.

*High flash point cargoes* means Grade E cargoes and cargoes having a closed-cup flash point higher than 60°C (140°F), carried at a temperature no higher than 5°C (9°F) below their flash points.

*Inert condition* or *inerted* means the oxygen content of the vapor space in a tank vessel's cargo tank is reduced to 60 percent or less by volume of the vapor's minimum oxygen concentration for combustion, or to 8 percent by volume or less for the vapor of crude oil, gasoline blends, or benzene, by addition of an inert gas, in accordance with the

inert gas requirements of 46 CFR 32.53 or 46 CFR 153.500.

*Inerting* means introducing an inert gas into a tank and/or piping system to lower the oxygen content of a vapor mixture.

*Line clearing* means the transfer of residual cargo from a cargo loading line toward a cargo tank by using compressed inert gas.

*Liquid knockout vessel* means a device, other than a drip leg, used to separate liquid from vapor.

*Maximum allowable gas-freeing rate* means the maximum volumetric rate at which a barge may be gas-freed during cleaning operations.

*Maximum allowable stripping rate* means the maximum volumetric rate at which a barge may be stripped during cleaning operations prior to the opening of any hatch and/or fitting in the cargo tank being stripped.

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

*Minimum oxygen concentration for combustion* or *MOCC* means the lowest level of oxygen in a vapor or a vapor mixture that will support combustion.

*Multi-breasted barge-loading operations* are those in which barges load side by side with the outboard barge's vapor collection system connected to a facility vapor connection through the inboard barge, as opposed to single-breasted operations involving a single barge, and may also be known as "two barge, double-up" loading operations.

*Multiple facility vapor collection system junction* means the point in the vapor collection system where two or more branch lines originating from separate facility vapor connections are connected.

*New vapor control system* means a vapor control system that is not an existing vapor control system.

*Padding* means introducing into a tank and associated piping system with an inert gas or liquid which separates the cargo from air, and maintaining the condition.

*Partially inerted* means the oxygen content of the vapor space in a tank is reduced to below what is normally present in the atmosphere by the addition of an inert gas such as nitrogen or carbon dioxide, but not to the concentration that meets the definition of "inert condition or inerted" in this section.

*Pig* means any device designed to maintain a tight seal within a cargo line while being propelled by compressed inert gas towards a cargo tank, for the purpose of transferring residual cargo

from the cargo loading line to the cargo tank.

*Pigging* means the transfer of residual cargo from a cargo loading line by using compressed inert gas to propel a "pig" through the line toward a cargo tank.

*Pre-transfer conference* means the conference required by 33 CFR 156.120(w).

*Purging* means introducing an inert gas into a tank and/or piping system to further reduce the existing hydrocarbon and/or oxygen content to a level below which combustion cannot be supported if air is subsequently introduced into the tank or piping system.

*Stripping* means the removal, to the maximum extent practicable, of cargo residue remaining in the barge's cargo tanks and associated fixed piping system after cargo transfer or during cleaning operations.

*Tank barge cleaning facility* or *TBCF* means a facility used or capable of being used to conduct cleaning operations on a tank barge.

*Transfer facility* means a facility as defined in 33 CFR 154.105, excluding tank barge cleaning or stripping facilities.

*Vacuum displacement system* means a system that removes vapors from a barge's cargo tanks during gas freeing by sweeping air through the cargo tank hatch openings.

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

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

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

*Vapor destruction unit* means a vapor processing unit that destroys cargo vapor by a thermal destruction method.

*Vapor dispersion unit* means a vapor processing unit that releases cargo vapor into the atmosphere through a venting system not located on the tank vessel.

*Vapor processing unit* means the components of a vapor control system that recover, destroy, or disperse vapor collected from a vessel.

*Vapor recovery unit* means a vapor processing unit that recovers cargo vapor by nondestructive means.

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

### Certifying Entities

#### § 154.2010 Qualifications for acceptance as a certifying entity.

To qualify for acceptance as a vapor control system (VCS) certifying entity, the entity must demonstrate to the satisfaction of the Commandant that it possesses the following minimum qualifications:

(a) The ability to review and evaluate design drawings and failure analyses for compliance to this subpart;

(b) The knowledge of the applicable regulations of this subpart, including the standards incorporated by reference;

(c) The ability to monitor and evaluate test procedures and results for compliance with the operational requirements of this subpart;

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

(e) The applicant must not be controlled by an owner or operator of a vessel or facility engaged in controlling vapor emissions;

(f) The applicant must not be dependent upon Coast Guard acceptance under this section to remain in business; and

(g) The person in charge of VCS certification must be a licensed professional engineer in a U.S. State or territory by August 15, 2014.

#### § 154.2011 Application for acceptance as a certifying entity.

(a) An applicant seeking Coast Guard acceptance as a certifying entity of vapor control systems (VCSs) must submit a signed, written application to the Commandant containing the information described in paragraph (b) of this section. The applicant's signature certifies that the information in the application is true and that the applicant is not dependent upon Coast Guard acceptance under this section to remain in business and constitutes consent for the Coast Guard to verify any information contained in the application, through personal examination of persons named in the application, or otherwise. If an applicant knowingly and willfully provides any false statement or misrepresentation, or conceals a material fact in the application, the application may be denied or terminated, and the applicant may be subject to prosecution under the provisions of 18 U.S.C. 1001.

(b) An application must include the following general information:

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

(2) A description of the experience and qualifications of any person who would review or test systems on behalf of the applicant, showing that the person is familiar with or otherwise qualified to implement Coast Guard VCS regulations; and

(3) A letter from a facility owner or operator stating his or her intent to use the services of the applicant to certify VCS installations.

(c) The Commandant reviews each application and either issues a letter of acceptance as a certifying entity to the applicant, or notifies the applicant that it is not accepted, and maintains a list of currently accepted certifying entities that is available to the public at <http://homeport.uscg.mil>.

(d) The acceptance of a certifying entity may be terminated by the Commandant for failure to review, inspect, or test a system properly in accordance with this subpart.

(e) A certifying entity may not certify a facility VCS if that certifying entity was involved in the design or installation of the system. "Design or installation" includes, but is not limited to—

(1) Performing system design calculations;

(2) Providing chemical data;

(3) Developing plans, specifications, and drawings;

(4) Conducting failure analysis; and

(5) Installing systems or components.

(f) A certifying entity may not recertify a VCS design, configuration, or operational change if it was involved in that change, and may not conduct an operational review of a VCS if it has been involved in the design, installation, or operation of the VCS.

(g) A certifying entity may not conduct the failure analysis of a facility VCS it is certifying. The certifying entity may only point out shortcomings shown by the failure analysis and may not propose changes to correct the shortcomings.

(h) A certifying entity may not certify the VCS of any vessel or facility owner or operator that owns or has a controlling interest in the certifying entity.

### Certification, Recertification, and Operational Review

#### § 154.2020 Certification and recertification—owner/operator responsibilities.

(a) Prior to operating, a new vapor control system (VCS) installation must be certified under 33 CFR 154.2023 by

a certifying entity as meeting the requirements of this subpart.

(b) A certified VCS or a Coast Guard-approved VCS that was operating prior to July 23, 1990 must be recertified by a certifying entity under 33 CFR 154.2023 before it can—

(1) Control vapors other than those for which it was originally certified;

(2) Receive vapors from vessels other than those for which it was approved, if the VCS was in operation prior to July 23, 1990;

(3) Operate under any changed design or configuration;

(4) Operate as part of multi-breasted barge-loading operations, if the VCS was not originally approved or certified for such operations; or

(5) Be connected to a tank vessel if a pigging system is used to clear cargo in the cargo line back to the tank vessel.

(c) For a transfer facility, prior to operating a VCS to control vapor from a tank vessel during cargo loading line pigging to clear cargo in the cargo loading line back to the tank vessel, the cargo loading line pigging system must be reviewed by a certifying entity as meeting the requirements of 33 CFR 154.2104.

(d) To apply for certification, the owner or operator of a facility VCS must submit plans, calculations, specifications, and other related information, including a qualitative failure analysis, to the certifying entity. Suggested, but not mandatory, guidance for preparing a qualitative failure analysis can be found in the American Institute of Chemical Engineers publication "Guidelines for Hazard Evaluation Procedures," and in Military Standard MIL-STD-882B for a quantitative failure analysis. For assistance in locating those publications, contact the Coast Guard, Office of Design and Engineering Standards (CG-ENG), 2100 2nd Street SW., Stop 7126, Washington, DC 20593-7126, telephone 202-372-1418 or via email at [Hazmatstandards@uscg.mil](mailto:Hazmatstandards@uscg.mil). The analysis must demonstrate that—

(1) The VCS can operate continuously and safely while controlling cargo vapors to or from tankships or tank barges over the full range of transfer rates expected at the facility;

(2) The VCS has the proper alarms and automatic shutdown systems required by this subpart to prevent an unsafe operation;

(3) The VCS has sufficient automatic or passive devices to minimize damage to personnel, property, and the environment if an accident were to occur;

(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 VCS; and

(5) If a facility uses a cargo line pigging system to clear cargo in the cargo line back to the tank vessel with the VCS connected, the qualitative failure analysis must demonstrate that the cargo line pigging system has at least the same levels of safety required by paragraphs (d)(1), (2), and (3) of this section to prevent overpressure of the vessel's cargo tanks and account for the probability that the pig is destroyed during line-pigging operations.

(e) The VCS owner or operator must maintain at the facility—

(1) A copy of VCS design documentation, including plans, drawings, calculations, and specifications for the VCS;

(2) The facility operations manual, including the list of cargoes that the facility is approved to vapor control;

(3) Any certification or recertification letter issued under 33 CFR 154.2023; and

(4) Other records as required by 33 CFR 154.740.

**§ 154.2021 Operational review—owner/operator responsibilities.**

(a) Each facility vapor control system (VCS) must undergo an operational review by a certifying entity within five years of its initial certification or last operational review, to ensure its proper operation and maintenance.

(b) The VCS owner or operator must coordinate with the certifying entity and provide the entity with all necessary documentation and records to conduct the operational review.

(c) The VCS owner or operator must notify the Captain of the Port (COTP) of a scheduled operational review. The COTP, at his or her discretion, may observe the operational review.

(d) The VCS owner or operator must maintain, at the facility, the latest operational review letter issued under 33 CFR 154.2023.

**§ 154.2022 Certification, recertification, or operational review—certifying entity responsibilities, generally.**

Before the initial certification of a facility vapor control system (VCS), the certifying entity must perform each of the tasks specified in this section.

(a) Review all VCS design documentation, including plans, drawings, calculations, specifications, and failure analysis, to ensure that the VCS design meets the requirements of this subpart.

(b) Conduct an initial onsite inspection to ensure that the VCS installation conforms to the VCS plans, drawings, and specifications reviewed.

(c) Conduct onsite reviews and observe tests to ensure the VCS's proper operation in accordance with its design and compliance with applicable regulations and the facility's operations manual and to ensure that—

(1) Each alarm and shutdown shown on the piping and instrumentation diagrams (P&IDs) and reviewed in the hazard analysis as part of the system responds properly, through simulation of emergency conditions to activate the alarm or shutdown;

(2) Maximum vacuum cannot be exceeded at the maximum operating conditions of any vapor-moving device, through testing of the vacuum breaker;

(3) VCS shutdown occurs correctly, through the startup of the VCS and tripping of each shutdown loop while the VCS is not connected to a vessel;

(4) VCS startup, normal operation, and shutdown occur properly, through observing the relevant portions of a test loading or unloading of one vessel, or a test cleaning of one tank barge at a tank barge cleaning facility; and that

(5) The automatic liquid block valve successfully stops flow of liquid to the vessel during a system shutdown, through observing the relevant portions of a test loading or test cargo tank cleaning.

(d) Review, for each cargo vapor the VCS will control, the cargo's chemical data and the VCS design to ensure that—

(1) Each vapor-controlled chemical is either specified in writing by the Commandant or listed in 46 CFR 30.25–1, 46 CFR 151.05, or Table 1 or Table 2 of 46 CFR 153;

(2) Each chemical's maximum experimental safe gap, minimum oxygen concentration for combustion (MOCC), and upper and lower limits of flammability have been correctly determined (this may but need not be in compliance with Coast Guard guidance available at <http://homeport.uscg.mil>);

(3) Vapor properties and characteristics are addressed, including freezing point, polymerization potential, solubility, and cargo compatibility;

(4) The flash point for any cargo with a closed-cup flash point of 60°C (140°F) or higher is properly determined;

(5) The cargo's vapor growth rate has been correctly determined and the VCS complies with 33 CFR 154.2103(a) and (b) or 33 CFR 154.2203(a) or (b);

(6) Each detonation arrester used in the VCS is correct for each chemical's maximum experimental safe gap;

(7) Setpoints for each oxygen analyzer used in the VCS are correct for each chemical's MOCC;

(8) Setpoints for each oxygen or hydrocarbon analyzer used in the VCS

are correct for each chemical's upper or lower flammability limit;

(9) The inerting, enriching, or dilution system used is adequate;

(10) Each vapor-controlled chemical is compatible with all VCS components and with other chemicals and with inerting, enriching, or diluting gases added to the VCS per 46 CFR part 150, Table I and Table II;

(11) The VCS's mechanical equipment and system are suitable;

(12) The VCS's vapor recovery or destruction unit has adequate capacity and is safe for each chemical;

(13) Any calculation to determine the duration of purging required by 33 CFR 154.2150(p) is correct; and that

(14) The VCS's failure analysis addresses any hazards presented with each chemical.

(e) Review the VCS prior to certifying it to control vapors from barge cargo tanks during multi-breasted barge loading operations, to confirm that—

(1) The overfill control system required by 33 CFR 154.2102 will process a liquid overfill condition within any one cargo tank on each barge;

(2) If multi-breasted loading is conducted using more than one liquid transfer hose from the shore facility, the facility is capable of activating the emergency shutdown system required by 33 CFR 154.550, and can automatically stop the cargo flow to each transfer hose simultaneously, in the event an upset condition occurs that closes the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a);

(3) The facility operations manual has been modified to include the procedures for multi-breasted barge-loading operations; and

(4) The facility operations manual describes how to make proper connections, on the facility side, between the alarm and shutdown systems of the VCS and of each barge being loaded.

(f) Review a cargo line pigging system that will be used to clear cargo in the cargo line back to a tank vessel for compliance with 33 CFR 154.2104.

(g) Review the facility operations manual for compliance with 33 CFR 154.310(b).

(h) Review any test program used for instrument testing and calibration for compliance with 33 CFR 154.2180 and 33 CFR 154.2181.

(i) Review the facility's VCS training program for compliance with 33 CFR 154.2030 and 154.2031.

**§ 154.2023 Recertification—certifying entity responsibilities, generally.**

(a) Before the recertification of a facility vapor control system (VCS) the certifying entity must perform the reviews specified in 33 CFR 154.2022, except paragraphs (a) through (c).

(b) The certifying entity must review, inspect, and observe tests of a facility VCS's design or configuration alteration before recertifying a VCS that was certified or approved for operation prior to July 23, 1990, to ensure that the altered system complies with applicable regulations. In general, the certifying entity should perform the review, inspection, and observe tests as specified in 33 CFR 154.2022(a) through (c). However, depending on the extent of the alteration, the review, inspection, or test observing may not need to be as comprehensive as those for an initial certification.

**§ 154.2024 Operational review—certifying entity responsibilities, generally.**

In conducting an operational review the certifying entity must ensure that the vapor control system (VCS) is properly operating and maintained by performing the tasks specified in this section.

(a) Ensure the completeness, currency, and accuracy of the facility operations manual, training plans, and VCS test procedures.

(b) Confirm through training records that the current listed available facility persons in charge have been trained in compliance with 33 CFR 154.2030 or 154.2031.

(c) Confirm that recordkeeping and testing and inspection comply with 33 CFR 154.740 and 156.170.

(d) Verify that there has been no change to the VCS equipment or instrumentation since the last certification, recertification, or operational review to ensure that the certification letter is current.

(e) Verify proper marking, labeling, maintenance, and operation of VCS components, through visual inspection.

(f) Confirm that the originally certified liquid cargo transfer rate can still be attained in compliance with 33 CFR 154.2103 and 154.2107.

(g) Ensure that cargo transfer or tank-cleaning barge operational procedures are properly followed and the VCS operates properly, through observation of the initial stages of transfer or cleaning, including 24-hour pre-transfer tests required by 33 CFR 154.2150(b) or 33 CFR 154.2250(b), the pre-transfer conference, and initial system startup procedures.

**§ 154.2025 Certification, recertification, or operational review—certifying entity documentation.**

(a) If the certifying entity is satisfied that the facility's vapor control system (VCS) has successfully undergone the reviews, inspections, and tests required by 33 CFR 154.2022(a) for certification or recertification, and that the VCS will operate properly and safely, the certifying entity must certify or recertify the VCS by issuing a certification letter to the facility owner or operator, and by sending copies of the letter to the Captain of the Port (COTP) and the Commandant. The certification letter must refer by date to the certifying entity's letter of acceptance issued under 33 CFR 154.2011(c), and must—

(1) State that the facility complies with applicable regulations and with its operations manual, and list any exemptions to the applicable regulations that have been approved by the Coast Guard;

(2) Report on all reviews, inspections, and tests undergone by the VCS in accordance with 33 CFR 154.2022(a);

(3) List all plans and drawings that were reviewed by the certifying entity;

(4) State if the VCS may control vapors from tank barges that are required to have a shore-side, explosion-proof receptacle or an overfill control system required by 33 CFR 154.2102(a) and (b); and

(5) List all cargoes that the certifying entity approves for control by the VCS.

(b) If the certifying entity is satisfied that the facility's VCS has successfully undergone the operational review required by 33 CFR 154.2022(b), the certifying entity must issue an operational review letter to the facility owner or operator, and send copies of the letter to the COTP and the Commandant. The operational review letter must—

(1) List each item reviewed and inspected;

(2) Describe the transfer or cleaning operation observed; and

(3) Summarize the review's results.

**Personnel****§ 154.2030 Transfer facilities.**

(a) Personnel in charge of a transfer operation using a vapor control system (VCS) must have completed a training program covering the particular VCS installed at the facility. As part of the training program, personnel must be able to demonstrate, through drills and display of practical knowledge, the proper VCS operational procedures for normal and emergency conditions. The training program must cover the following subjects:

- (1) Purpose of the VCS;
- (2) Principles of the VCS;
- (3) Components of the VCS;
- (4) Hazards associated with the VCS;
- (5) Coast Guard regulations in this subpart;
- (6) Operating procedures, including:
  - (i) Transfer, testing, and inspection requirements;
  - (ii) Pre-transfer procedures;
  - (iii) Chemicals approved for collection;
  - (iv) Material safety data sheet review;
  - (v) Connection procedures;
  - (vi) Startup procedures;
  - (vii) Normal operating conditions and how to handle deviations from normal conditions;
  - (viii) Normal shutdown procedures;

and

(ix) Operating procedures for cargo line clearing if a cargo line clearance system is installed in accordance with 33 CFR 154.2104; and

(7) Emergency procedures.

(b) Personnel overseeing VCS maintenance must be familiar with—

- (1) Inspection of detonation arresters; and

(2) Procedures for equipment and instrumentation testing required by 33 CFR 156.170(g).

(c) Facility personnel in charge of a transfer operation using a VCS must be designated and qualified in compliance with 33 CFR 154.710 and the facility must maintain the training documentation required by 33 CFR 154.740(b).

**§ 154.2031 Tank barge cleaning facilities.**

(a) In addition to complying with 33 CFR 154.2030, a tank barge cleaning facility (TBCF) person-in-charge (PIC) of a barge cargo tank-cleaning operation that uses a vapor control system (VCS) must complete a training program covering the particular systems installed at the facility and on the barge. As part of the training program, personnel must be able to demonstrate, through drills and practical knowledge, the proper VCS operation procedures for normal and emergency conditions. The training program must—

(1) Satisfy the requirements of 33 CFR 154.2030(a)(1) through (7), except (a)(6)(i), (ii), and (ix), and 33 CFR 154.2030(b) and cover—

(i) Purpose, principles, components, and hazards associated with stripping and gas-freeing;

(ii) Special hazards associated with the accumulation and discharge of static electricity; and

(iii) Operating procedures, including cleaning, testing, and inspection requirements; pre-cleaning procedures; and safeguards to prevent static electricity discharge.

(b) In addition to the requirements contained in 33 CFR 154.710, no person may serve, and the facility operator may not use the services of anyone, as a facility PIC of a cleaning operation unless the person has been properly trained and certified by the facility with a minimum of 60 hours of experience in cleaning operations.

#### Transfer Facilities—VCS Design and Installation

##### § 154.2100 Vapor control system, general.

(a) Vapor control system (VCS) design and installation must eliminate potential overpressure and vacuum hazards, overflow hazards, sources of ignition, and mechanical damage to the maximum practicable extent. Each remaining hazard source that is not eliminated must be specifically addressed in the protection system design and system operational requirements.

(b) Vapor collection system pipe and fitting components must be in accordance with ANSI B31.3 (incorporated by reference, see 33 CFR 154.106) with a maximum allowable working pressure (MAWP) of at least 150 pounds per square inch gauge (psig). Valves must be in accordance with ASME B16.34, 150 pound class (incorporated by reference, see 33 CFR 154.106). Flanges must be in accordance with ANSI B16.5 or ANSI B16.24, 150 pound class (both incorporated by reference, see 33 CFR 154.106). The following components and their associated equipment do not have a minimum specified MAWP, but must be constructed to acceptable engineering standards and have the appropriate mechanical strength to serve the intended purpose: knockout drums, liquid seals, blowers/compressors, flare stacks/incinerators, and other vapor processing units.

(c) All VCS electrical equipment must comply with NFPA 70 (2011) (incorporated by reference, see 33 CFR 154.106).

(d) Any pressure, flow, or concentration indication required by this part must provide a remote indicator on the facility where the cargo transfer system and VCS are controlled, unless the local indicator is clearly visible and readable from the operator's normal position at the control stations.

(e) Any condition requiring an alarm as specified in this part must activate an audible and visible alarm where the cargo transfer and VCSs are controlled.

(f) For a VCS installed after August 15, 2013, an alarm or shutdown must be activated if electrical continuity of an alarm or shutdown sensor required by this subpart is lost.

(g) The VCS piping surface temperature must not exceed 177°C (350 °F) or 70 percent of the auto-ignition temperature in degrees Celsius of the vapors being transferred, whichever is lower, during normal operations. This must be achieved by either separating or insulating the entire VCS from external heat sources.

(h) The VCS must be equipped with a mechanism to eliminate any liquid condensate from the vapor collection system that carries over from the vessel or condenses as a result of an enrichment process.

(1) If a liquid knockout vessel is installed to eliminate any liquid condensate, it must have—

(i) A mechanism to indicate the level of liquid in the device;

(ii) A high liquid level sensor that activates an alarm, meeting the requirements of paragraph (e) of this section;

(iii) A high-high liquid level sensor that closes the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a), and shuts down any vapor-moving devices before carrying liquid over from the vessel to the vapor-moving device. One sensor with two stages may accomplish both this requirement and the requirement of paragraph (h)(1)(ii) of this section; and

(2) If a drip leg is used to eliminate any liquid condensate, it must be fitted with a mechanism to remove liquid from the low point.

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

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

(k) All VCS equipment and components, including piping, hoses, valves, flanges, fittings, and gaskets, must be suitable for use with the vapor in the VCS.

##### § 154.2101 Requirements for facility vapor 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 30 seconds after detection of a shutdown condition of any component required by this subpart;

(2) Close automatically if the control signal or electrical power to the system is interrupted;

(3) Activate an alarm meeting 33 CFR 154.2100(e) when a signal to shut down is received from a component;

(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, be a Category A valve as defined by 46 CFR 56.20–15 and not allow appreciable leakage when the resilient material is damaged or destroyed.

(b) Except when a vapor collection arm is used, the first 1 meter (3.3 feet) of vapor piping downstream of the facility vapor connection must be—

(1) Painted in the sequence of red/yellow/red. The width of the red bands must be 0.1 meter (0.33 foot) and the width of the middle yellow band must be 0.8 meter (2.64 feet); and

(2) Labeled with the word “VAPOR” painted in black letters at least 50.8 millimeters (2 inches) high.

(c) Each facility vapor connection flange face must have a permanent stud projecting outward that is 12.7 millimeters (0.5 inch) in diameter and is at least 25.4 millimeters (1 inch) long. The stud must be located at the top of the flange face, midway between boltholes, and in line with the bolthole pattern.

(d) Each hose that transfers vapors must—

(1) Have a design burst pressure of at least 25 pounds per square inch gauge (psig);

(2) Have a maximum allowable working pressure no less than 5 psig;

(3) Be capable of withstanding at least a 2 pounds per square inch (psi) vacuum without collapsing or constricting;

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

(5) Have flanges with—

(i) A bolthole arrangement complying with the requirements for 150 pound class flanges, ANSI B16.5 (incorporated by reference, see 33 CFR 154.106); and

(ii) One or more 15.9 millimeter (0.625 inch) diameter holes in the flange face, located midway between boltholes, and in line with the bolthole pattern;

(6) Be resistant to abrasion and kinking;

(7) Be compatible with vapors being controlled; and

(8) Have the last 1 meter (3.3 feet) of each end of the vapor hose marked in accordance with paragraph (b) of this section.

(e) Vapor hoses must be adequately supported to prevent kinking, collapse,

or contact with any metal of the vessel or facility to prevent unintentional electrical bypassing of the insulating flange or the single length of non-conducting hose required by paragraph (g) of this section.

(f) Fixed vapor collection arms must—

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

(2) Have the last 1 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 OCIMF ISGOTT section 17.5

(incorporated by reference, see 33 CFR 154.106). In order to prevent electrical arcing during connection and disconnection of the transfer hose/arm, the transfer hose/arm must be fitted with an insulating flange or a single length of non-conducting hose to ensure electrical discontinuity between the vessel and facility. The insulating flange/hose should be inserted at the jetty end and must not be electrically bypassed. The installation, inspection, and testing of the insulating flange/hose must be in accordance with 46 CFR 35.35–4. For each vapor hose, only one insulating flange or non-conductive hose must be provided. See 46 CFR 35.35–4.

(h) A vapor collection system, fitted with a gas injection system that operates at a positive gauge pressure at the facility vapor connection, must be fitted with a means to prevent backflow of vapor to the vessel's vapor collection system during loading.

(i) Electrical bonding between vessel and shore must be in accordance with 46 CFR 35.35–5.

**§ 154.2102 Facility requirements for vessel liquid overfill protection.**

This section does not apply to facilities collecting vapors emitted from vessel cargo tanks while inerting, padding, or purging the cargo tanks with an inert gas and not loading cargo into the cargo tank.

(a) Each facility that receives cargo vapor from a tank barge that is fitted with overfill protection, in accordance with 46 CFR 39.2009(a)(1)(iii), must provide a 120-volt, 20-amp explosion-proof receptacle for the overfill protection system that meets—

(1) ANSI NEMA WD–6 (incorporated by reference, see 33 CFR 154.106);

(2) NFPA 70 (2011), Articles 406.9 and 501.145 (incorporated by reference, see 33 CFR 154.106); and

(3) 46 CFR 111.105–9.

(b) Each facility that receives cargo vapor from a tank barge that is fitted with an intrinsically safe cargo tank

level sensor system complying with 46 CFR 39.2009(a)(2), as a means of overfill protection, must have an overfill control system 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 33 CFR 154.2101(a) and activates the emergency shutdown system required by 33 CFR 154.550 when—

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

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

(2) Activates an audible and visible alarm that warns barge 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 mechanism to test the alarms and automatic shutdown systems electrically and mechanically before operating the vapor control system (VCS);

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

(5) Is labeled at the dock with the maximum allowable inductance (in millihenrys) and capacitance (in microfarads) to be connected to the facility overfill protection system as specified by the equipment manufacturer; and

(6) Has a female connecting plug for the tank barge level sensor system with a five-wire, 16-ampere connector body meeting IEC 60309–1 and IEC 60309–2 (both incorporated by reference, see 33 CFR 154.106), that is—

(i) Configured with pins S2 (N) and R1 (L3) for the tank overfill sensor circuit, pin G connected to the cabling shield, and pins N (L2) and T3 (L1) reserved for an optional high-level alarm connection;

(ii) Labeled “Connector for Barge Overfill Control System”; and

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

**154.2103 Facility requirements for vessel vapor overpressure and vacuum protection.**

In this section, the requirements of having a flame arrester or a flame screen at the opening of a pressure relief valve or a vacuum relief valve apply only to facilities collecting vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) A facility's vapor control system (VCS) must have the capacity for collecting cargo vapor at a rate of not less than the facility's maximum liquid transfer rate for cargoes that are vapor controlled plus the vapor growth for the cargoes and any inerting, diluting, or enriching gas that may be added to the system. Vapor growth must be considered as 25 percent of the cargo's saturated vapor pressure in pounds per square inch absolute (psia) at 115 °F, divided by 12.5 psia (the vapor pressure of gasoline at 115 °F), times the facility's maximum liquid transfer rate, unless there is experimental data for actual vapor growth for turbulent transferring under the most severe conditions for vapor growth. If the cargo is transferred at temperatures above 115 °F, the cargo's true vapor pressure (in psia) at the transferring temperature must be used when determining the vapor growth.

(b) A facility VCS must be designed to prevent the pressure in a vessel's cargo tanks from going below 80 percent of the highest setting of any of the vessel's vacuum relief valves or exceeding 80 percent of the lowest setting of any of the vessel's pressure relief valves for a non-inerted tank vessel. A facility VCS also must be designed to prevent the pressure in a vessel's cargo tanks from going below 0.2 pounds per square inch gauge (psig) or exceeding 80 percent of the lowest setting of any of the vessel's pressure relief valves for an inerted tank vessel. The system must sustain 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.

(c) The pressure measured at the facility vapor connection must be corrected for pressure drops across the vessel's vapor collection system, vapor collection hose or arm, and vapor line up to the location of the pressure sensor.

(d) The facility vapor connection must have a pressure-sensing device that meets the installation requirements of paragraph (h) of this section, which activates an alarm that meets 33 CFR 154.2100(e) when the pressure at the facility vapor connection exceeds either—

(1) The pressure corresponding to the upper pressure determined in paragraph (b) of this section; or

(2) A lower pressure agreed upon at the pre-transfer conference.

(e) If a facility draws vapor from a vessel with a vapor-moving device, the facility vapor connection must have a pressure-sensing device, which activates an alarm meeting 33 CFR 154.2100(e)

when the pressure at the facility vapor connection falls below either—

(1) The pressure corresponding to the lower pressure determined in paragraph (b) of this section; or

(2) A higher pressure agreed upon at the pre-transfer conference.

(f) The facility vapor connection must have a pressure-sensing device, independent of the device used to activate the alarm required by paragraph (d) of this section, meeting the installation requirements of paragraph (h) of this section, which activates the emergency shutdown system required by 33 CFR 154.550 when the pressure at the facility vapor connection exceeds the lower of the following:

(1) A pressure corresponding to 90 percent of the vessel's lowest pressure relief valve setting, corrected for pressure drops across the vessel's vapor collection system, the vapor collection hose or arm, and any vapor line up to the point where the pressure sensor is located;

(2) A pressure corresponding to 90 percent of the setting of the pressure relief valve at the facility vapor connection, if the facility vapor connection is installed with a pressure relief valve; or

(3) A lower pressure than the pressure in paragraphs (f)(1) and (f)(2) of this section that is agreed upon at the pre-transfer conference.

(g) If a facility draws vapors from a vessel with a vapor-moving device, the facility vapor connection must have a pressure-sensing device, independent of the device used to activate the alarm required by paragraph (e) of this section, which closes the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) when the vacuum at the facility vapor connection is more than the higher (lesser vacuum) of the following:

(1) A vacuum corresponding to 90 percent of the vessel's highest vacuum relief valve setting;

(2) A vacuum corresponding to 90 percent of the setting of the vacuum relief valve at the facility vapor connection, if the facility vapor connection is installed with a vacuum relief valve; or

(3) A lesser vacuum than the vacuum in paragraphs (g)(1) and (g)(2) of this section that is agreed upon at the pre-transfer conference.

(h) The pressure-sensing devices required by paragraphs (d) and (f) of this section must be located in the vapor collection line between the facility vapor connection and the following:

(1) Any isolation valve, unless an interlock is provided that prevents

operation of the system when the isolation valve is closed; and

(2) Any components that could plug and cause a blockage in the vapor line.

(i) A pressure-indicating device must be provided that displays the pressure in the vapor collection line between the facility vapor connection and any isolation valve or any devices which could cause a blockage in the vapor line.

(j) If a facility draws vapor from the vessel with a vapor-moving device capable of drawing more than 1 pound per square inch (psi) vacuum, a vacuum relief valve must be installed in the vapor collection line between the vapor-moving device and the facility vapor connection, which—

(1) Relieves at a predetermined pressure such that the pressure at the facility vapor connection is maintained at  $-1.0$  psig (1.0 psig vacuum) or less vacuum;

(2) Has a relieving capacity equal to or greater than the capacity of the vapor-moving device;

(3) Has a flame arrester or 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 (incorporated by reference, see 33 CFR 154.106) with a flame arrester or flame screen fitted.

(k) When a facility collects cargo vapor through an extensive length of vapor piping, such as an undersea pipeline from a vessel moored offshore, before reaching the first pressure sensor and vacuum relief valve, the vacuum relief valve may be set at a vacuum greater than 1 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 vapor piping as a function of the actual transfer rate.

(l) If the pressure in the vapor collection system can exceed 1.5 psig during a malfunction of a pressure regulator or control valve in an inerting, enriching, or diluting system, a pressure relief valve must—

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

(2) Relieve at the higher of the following two pressures:

(i) A pressure such that the pressure at the facility vapor connection does not exceed 1.5 psig; or

(ii) The lowest pressure relief valve setting of vessels that control vapors at the facility;

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

diluting gas source flowing through the failed pressure regulator or control valve, taking into account the pressure drops across any flame arrester or discharge piping fitted at the relief valve's discharge;

(4) Have a flame arrester or flame screen fitted at the discharge opening, if the design does not secure a minimum vapor discharge velocity of 30 meters (98.4 feet) per second; 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) of this section must be carried out with a flame screen fitted at the discharge opening if—

(1) The design of the pressure relief valve does not secure a minimum vapor discharge velocity of 30 meters (98.4 feet) per second; and

(2) The discharge is not fitted with a flame arrester.

(n) A facility that collects vapors emitted from vessel cargo tanks while inerting, padding, or purging cargo tanks must—

(1) Provide a pressure-sensing device that activates an alarm meeting 33 CFR 154.2100(e) when the pressure of the inerting, padding, or purging gas exceeds either the pressure corresponding to the higher pressure determined in paragraph (b) of this section or a lower pressure agreed upon at the pre-transfer conference;

(2) Provide a pressure-sensing device, independent of the device required by paragraph (n)(1) of this section, which automatically stops the flow of inerting, padding, or purging gas to the vessel when the pressure of the inerting, padding, or purging gas exceeds 90 percent of the lowest setting of any pressure relief valve on the vessel; and

(3) Locate the pressure-sensing devices required by paragraphs (n)(1) and (n)(2) of this section in the inerting, padding, or purging gas piping downstream of any devices in the gas piping that could potentially isolate the vessel from the sensing devices.

#### § 154.2104 Pigging system.

(a) If a pigging system is used to clear cargo in the cargo lines to the tank vessel while the vessel is connected to the facility vapor control system (VCS), the pigging system must be designed with the following safety features:

(1) A bypass loop installed in the main liquid cargo line that contains the pig-receiving device, through which all the liquid flow is channeled during pigging operations. The pig must act as a seal to separate the vessel from the compressed inert gas that is used to

propel it as the pig travels from the pig launcher to the pig-receiving device;

(2) A mechanism for restricting liquid and gas flow so that the vessel, personnel, and environment are not endangered. The compressed inert gas flow capacity that this mechanism secures must not be more than 95 percent of the combined capacity of all vessel and facility VCS relief valves located upstream of the facility's remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a);

(3) A fast-action automatic shutoff valve such as a solenoid valve, which closes on a high-pressure signal from the pressure sensor required by 33 CFR 154.2103(f), located in the liquid bypass loop downstream of the pig-receiving device;

(4) An interlock with the main cargo line manual block valve so that line-clearing operations cannot begin unless the main cargo line manual block valve is closed; and

(5) An automatic means to detect arrival of the pig at the pig-receiving device.

(b) If a cargo line clearance system without using pigging is used to clear cargo in the cargo lines to the tank vessel while the vessel is connected to the facility VCS, the cargo line clearance system must be approved by the Commandant.

#### **§ 154.2105 Fire, explosion, and detonation protection.**

This section applies only to facilities that control vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) A vapor control system (VCS) with a single facility vapor connection that receives inerted cargo vapor from a vessel and processes it with a vapor recovery unit must—

(1) Be capable of inerting the vapor collection line in accordance with 33 CFR 154.2107(a) before receiving the vessel's vapor and have at least one oxygen analyzer, which satisfies the requirements of 33 CFR 154.2107(f)(1) and (2), (g), and (h)(2) and (3), sampling the vapor concentration continuously at a point as close as practicable to the facility vapor connection. The total pipe length between the analyzer and the facility vapor connection must not exceed 6 meters (19.7 feet); or

(2) Have a detonation arrester located as close as practicable to the facility vapor connection. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any

potential internal or external ignition source.

(b) A VCS with a single facility vapor connection that receives only inerted cargo vapor from a vessel and processes it with a vapor destruction unit must—

(1) Satisfy the requirements of paragraph (a)(1) of this section and have a detonation arrester located as close as practicable to the facility vapor connection. The oxygen analyzer required by paragraph (a)(1) can be located 4 meters (13.1 feet) downstream of the detonation arrester. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; or

(2) Have an inerting system that meets the requirements of 33 CFR 154.2107.

(c) A VCS with a single facility vapor connection that receives vapor from a vessel with cargo tanks that are not inerted or are partially inerted, and processes it with a vapor recovery unit must—

(1) Have a detonation arrester located as close as practicable to the facility vapor connection. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; or

(2) Have an inerting, enriching, or diluting system that meets the requirements of 33 CFR 154.2107.

(d) A VCS with a single facility vapor connection that receives vapor from a vessel with cargo tanks that are not inerted or are partially inerted, and processes the vapor with a vapor destruction unit must—

(1) Have a detonation arrester located as close as practicable to the facility vapor connection. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; and

(2) Have an inerting, enriching, or diluting system that satisfies the requirements of 33 CFR 154.2107.

(e) A VCS with multiple facility vapor connections that receives vapor from vessels with cargo tanks that carry inerted, partially inerted, non-inerted, or combinations of inerted, partially

inerted, and non-inerted cargoes, and processes them with a vapor recovery unit, must have a detonation arrester located as close as practicable to each facility vapor connection. The total pipe length between the detonation arrester and each facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source.

(f) A VCS with multiple facility vapor connections that receives only inerted cargo vapor from vessels and processes it with a vapor destruction unit must—

(1) Satisfy the requirements of paragraph (a)(1) of this section for each facility vapor connection and have a detonation arrester located as close as practicable to each facility vapor connection. The oxygen analyzer required by paragraph (a)(1) can be located 4 meters (13.1 feet) downstream of the detonation arrester. The total pipe length between the detonation arrester and each facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; or

(2) Have an inerting, enriching, or diluting system that meets the requirements of 33 CFR 154.2107.

(g) A VCS with multiple facility vapor connections that receives vapor from vessels with non-inerted or partially inerted cargoes, and processes the vapor with a vapor destruction unit must—

(1) Have a detonation arrester located as close as practicable to each facility vapor connection. The total pipe length between the detonation arrester and each facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; and

(2) Have an inerting, enriching, or diluting system that meets the requirements of 33 CFR 154.2107.

(h) A VCS with multiple facility vapor connections that simultaneously receives vapor from vessels with inerted, partially inerted, and non-inerted cargoes, and processes the vapor with a vapor destruction unit must—

(1) Have a detonation arrester located as close as practicable to each facility vapor connection. The total pipe length between the detonation arrester and each facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation

arrester and the facility vapor connection must be protected from any potential internal or external ignition source; and

(2) Have either an inerting, enriching, or diluting system that meets the requirements of 33 CFR 154.2107, or a base loading system that meets the requirements of 33 CFR 154.2107(m).

(i) A VCS that uses a vapor balancing system in which cargo vapor from a vessel or facility storage tank is transferred through the facility vapor collection system to facility storage tanks or a vessel must meet the requirements of 33 CFR 154.2110.

(j) Each outlet of a VCS that vents to the atmosphere, except for a discharge vent from a vapor destruction unit or relief valve installed to comply with 33 CFR 154.2103(j) and (k) or 33 CFR 154.2203(e), (k), and (l), must have one of the following located at the outlet:

(1) A detonation arrester;

(2) An end-of-line flame arrester that meets ASTM F 1273 (incorporated by reference, see 33 CFR 154.106); or

(3) An end-of-line flame arrester that meets UL 525 (incorporated by reference, see 33 CFR 154.106) if—

(i) The discharge vent stream's total flammable concentration is proven to be less than 50 percent of the lower flammable limit, or the stream's oxygen concentration is proven to be less than 70 percent by volume of the MOCC, at all times by an outlet concentration analyzer for carbon beds, proof of correct operating temperature for refrigeration systems, or proof of scrubbing medium flow for scrubbers; and

(ii) The proving devices in paragraph (j)(2)(i) of this section close the remotely operated cargo vapor shutoff valve required in 33 CFR 154.2101(a) and close the automatic liquid cargo loading valve if operating outside the conditions necessary to maintain the discharge vent non-combustible.

#### **§ 154.2106 Detonation arresters installation.**

This section applies only to facilities collecting vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) Detonation arresters must be installed in accordance with the guidelines outlined in the arrester manufacturer's acceptance letter provided by the Coast Guard.

(b) On either side of a detonation arrester, line size expansions must be in a straight pipe run and must be no closer than 120 times the pipe's diameter from the detonation arrester unless the manufacturer has test data to show the expansion can be closer.

#### **§ 154.2107 Inerting, enriching, and diluting systems.**

This section applies only to facilities that control vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) Before receiving cargo vapor, a vapor control system (VCS) that uses a gas for inerting, enriching, or diluting must be capable of inerting, enriching, or diluting the vapor collection system, at a minimum of two system volume exchanges of inerting, enriching, or diluting gas, downstream of the injection point.

(b) A VCS that uses an inerting, enriching, or diluting system must be equipped, except as permitted by 33 CFR 154.2105(a), with a gas injection and mixing arrangement located as close as practicable to the facility vapor connection and no closer than 10 meters (32.8 feet) upstream from the vapor processing unit or the vapor-moving device that is not protected by a detonation arrester required by 33 CFR 154.2108(b). The total pipe length between the arrangement and the facility vapor connection must not exceed 22 meters (72.2 feet). The arrangement must be such that it provides complete mixing of the gases within 20 pipe diameters of the injection point. The vapor piping between the arrangement and the facility vapor connection must be protected from any potential internal or external ignition source.

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

(1) There are no vacuum relief valves or other devices that could allow air into the vapor collection system downstream of the injection point, and pipe connections are flanged, threaded, or welded so no air can leak into the VCS; or

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

(d) A VCS 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 two analyzers. The analyzers must be connected so that—

(1) When two 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 voting systems using more than two oxygen analyzers are used, the majority pair 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;

(3) When two 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) of this section;

(4) When voting systems using more than two hydrocarbon analyzers are used, the majority pair controls the enriching system and activates the alarm and automatic shutdown system required by paragraph (i) of this section;

(5) When two 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; and

(6) When voting systems using more than two hydrocarbon analyzers are used, the majority pair controls the diluting system and activates the alarm and automatic shutdown system required by paragraph (l) of this section.

(e) A VCS that uses volumetric measurements to control the amount of inerting, enriching, or diluting gas injected into the vapor collection line must be equipped, except as permitted by paragraph (m) of this section, 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 550 (incorporated by reference, see 33 CFR 154.106);

(2) Have a system response time of not more than one minute from sample input to 95 percent of final stable value as tested per 33 CFR 154.2180 and 33 CFR 154.2181; and

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

(g) A VCS must not use oxygen analyzers that operate at elevated temperatures (i.e., zirconia oxide or thermomagnetic).

(h) An inerting system must—

(1) Supply sufficient inert gas to the vapor stream to ensure that the oxygen concentration downstream of the injection point is maintained at or below 60 percent by volume of the minimum oxygen concentration for combustion (MOCC) for the specific combination of cargo vapors and inert gas being processed, which may be determined by using Coast Guard

guidance available at <http://homeport.uscg.mil>;

(2) Activate an alarm that satisfies the requirements of 33 CFR 154.2100(e) when the oxygen concentration in the vapor collection line exceeds 60 percent by volume of the MOCC for the specific combination of cargo vapors and inert gas being processed, which may be determined by using Coast Guard guidance available at <http://homeport.uscg.mil>;

(3) Close the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) when the oxygen concentration in the vapor collection line exceeds 70 percent by volume of the MOCC for the specific combination of cargo vapors and inert gas being processed, which may be determined by using Coast Guard VCS guidance available at <http://homeport.uscg.mil>;

(4) Have a detonation arrester and a mechanism to prevent the backflow of flammable vapors installed between the combustion device and the inert gas injection point, if a combustion device is used to produce the inert gas; and

(5) Have an alarm value in paragraph (h)(2) of this section that is at least one percentage point less than the shutdown value in paragraph (h)(3) of this section. If the analyzers used to measure oxygen concentrations cannot accurately differentiate between the alarm value and the shutoff value, the alarm value must be lowered until the analyzers become operable.

(i) An enriching system must—

(1) Supply sufficient compatible hydrocarbon vapor to the vapor stream to make sure that the total flammable concentration downstream of the injection point is maintained either at or above 170 percent by volume of the upper flammable limit or above the upper flammable limit plus 10 percentage points, whichever is lower;

(2) Activate an alarm that satisfies the requirements of 33 CFR 154.2100(e) when the total flammable concentration in the vapor collection line either falls below 170 percent by volume of the upper flammable limit or below the upper flammable limit plus 10 percentage points, whichever is lower;

(3) Close the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) when the total flammable concentration in the vapor collection line either falls below 150 percent by volume of the upper flammable limit or below the upper flammable limit plus 7.5 percentage points, whichever is lower; and

(4) Have an upper flammable limit listed in paragraphs (i)(1), (i)(2), and (i)(3) of this section which is either the cargo's upper flammable limit or the

enriching gas's upper flammable limit, whichever is higher. Alternatively, the mixture's upper flammable limit, which may be determined by using methods found in Coast Guard guidance available at <http://homeport.uscg.mil>, may be used.

(j) Oxygen analyzers may be used instead of hydrocarbon analyzers in a VCS using an enriching system that receives cargo vapor only from a vessel with non-inerted cargo tanks, providing that the analyzers—

(1) Activate an alarm satisfying the requirements of 33 CFR 154.2100(e) when the oxygen concentration in the vapor collection line exceeds a level corresponding to either a total flammable concentration of 170 percent by volume of the upper flammable limit or the upper flammable limit plus 10 percentage points, whichever yields a higher oxygen concentration;

(2) Close the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) when the oxygen concentration in the vapor collection line exceeds a level corresponding to either a total flammable concentration of 150 percent by volume of the upper flammable limit or the upper flammable limit plus 7.5 percentage points, whichever yields a higher oxygen concentration;

(3) Have an alarm value in paragraph (j)(1) of this section that is at least one percentage point less than the shutdown value in paragraph (j)(2) of this section. If the oxygen analyzers used to measure oxygen concentrations cannot accurately differentiate between the alarm value and the shutdown value, the alarm value must be lowered until the analyzers become operable; and

(4) Have an upper flammable limit listed in paragraphs (j)(1) and (j)(2) of this section which is either the cargo's upper flammable limit or the enriching gas's upper flammable limit, whichever is higher. Alternatively, the mixture's upper flammable limit, which may be determined by using methods found in Coast Guard VCS guidance available at <http://homeport.uscg.mil>, may be used.

(k) An enriching system may be used in a VCS that receives inerted cargo vapor from a vessel if—

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

(2) Oxygen analyzers are used, in which case the analyzers must—

(i) Activate an alarm meeting 33 CFR 154.2100(e) when the oxygen concentration in the vapor collection line exceeds 60 percent by volume of the MOCC for the specific combination of cargo vapors and gases; and

(ii) Close the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) when the oxygen concentration exceeds 70 percent by volume of the MOCC for the specific combination of cargo vapors and gases; and

(3) The MOCC in paragraphs (k)(2)(i) and (k)(2)(ii) of this section is either the cargo's MOCC or the enriching gas's MOCC, whichever is lower. Alternatively, the mixture's MOCC, which may be determined using Coast Guard VCS guidance available at <http://homeport.uscg.mil>, may be used.

(l) An air dilution system must—

(1) Supply a sufficient amount of additional air to the vapor stream to keep the total flammable concentration downstream of the injection point below 30 percent by volume of the lower flammable limit;

(2) Activate an alarm that satisfies the requirements of 33 CFR 154.2100(e) when the total flammable 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 33 CFR 154.2101(a) when the total flammable concentration in the vapor collection line exceeds 50 percent by volume of the lower flammable limit.

(m) An enriching system may use a base loading method to control the amount of enriching gas in a vapor collection system if—

(1) The flow rate of enriching gas is determined by assuming the vapor entering the facility vapor connection consists of 100 percent air;

(2) Two independent devices are used to verify the correct enriching gas volumetric flow rate. One of the two devices must be a flow meter;

(3) One of the devices activates an alarm that satisfies the requirements of 33 CFR 154.2100(e) when the amount of enriching gas added results in a total flammable concentration in the vapor collection line either below 170 percent by volume of the upper flammable limit or below the upper flammable limit plus 10 percentage points, whichever is lower;

(4) The second device activates closure of the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) when the amount of enriching gas added results in a total flammable concentration in the vapor collection line either below 150 percent by volume of the upper flammable limit or below the upper flammable limit plus 7.5 percentage points, whichever is lower; and

(5) The upper flammable limit in paragraphs (m)(3) and (4) of this section

is either the cargo's upper flammable limit or the enriching gas's upper flammable limit, whichever is higher. Alternatively, the mixture's upper flammable limit, which may be determined using Coast Guard guidance available at <http://homeport.uscg.mil>, may be used.

(n) For controlling vapors of different cargoes at multiple berths while using enriching gas, the highest upper flammable limit or the lowest MOCC of the cargo or enriching gas, whichever is applicable, is used to determine the analyzer alarm and shutdown setpoints. Alternatively, the mixture's upper flammable limit or MOCC, which may be determined by using Coast Guard guidance available at <http://homeport.uscg.mil>, may be used.

(o) For controlling vapors of inert and non-inert cargoes at multiple berths while using enriching gas—

(1) The lowest MOCC of the cargo or enriching gas is used to determine the analyzer alarm and shutdown setpoints at all berths. Alternatively, the mixture's MOCC, which may be determined using Coast Guard guidance available at <http://homeport.uscg.mil>, may be used; or

(2) A base loading method meeting the requirements of paragraph (m) of this section is used for all berths.

#### § 154.2108 Vapor-moving devices.

(a) Paragraphs (b) and (e) of this section apply only to facilities collecting vapors of flammable, combustible, or non-high flash point liquid cargoes.

(b) Each inlet and outlet to a vapor-moving device that handles vapor that has not been inerted, enriched, or diluted in accordance with 33 CFR 154.2107 must be fitted with a detonation arrester; however, the outlet detonation arrester may be omitted if the vapor-moving device is within 50 times the pipe's diameter of the detonation arrester required by 33 CFR 154.2109(a).

(c) If the vapor is handled by a reciprocating or screw-type compressor in the vapor collection system, the compressor must be installed with indicators and audible and visible alarms to warn against the following conditions:

- (1) Excessive gas temperature at the compressor outlet;
- (2) Excessive cooling water temperature;
- (3) Excessive vibration;
- (4) Low lube oil level;
- (5) Low lube oil pressure; and
- (6) Excessive shaft bearing temperature.

(d) If the vapor is handled by a liquid ring-type compressor in the vapor

collection system, it must be installed 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 the 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.

(e) If the vapor is handled by a centrifugal compressor, fan, or lobe blower in the vapor collection system, construction of the blades or housing must be 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;
- (5) Nonferrous blades and ferrous housing with one-half inch or more design tip clearance; or
- (6) Blades of aluminum or magnesium alloy and a ferrous housing with a nonferrous insert sleeve at the periphery of the impeller.

#### § 154.2109 Vapor recovery and vapor destruction units.

Paragraphs (a), (b), and (e) of this section apply only to facilities collecting vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) The inlet to a vapor recovery unit that receives vapor that has not been inerted, enriched, or diluted in accordance with 33 CFR 154.2107 must be fitted with a detonation arrester.

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

- (1) Have a liquid seal that meets the requirements of paragraph (e) of this section, except as specified by paragraph (b)(3) of this section; and
- (2) Have two quick-closing stop valves installed in the vapor line. One of them must be installed upstream of the detonation arrester required by paragraph (c)(2) of this section. The quick-closing stop valves must—

(i) Close within 30 seconds after detection of a condition that requires the closing of these two quick-closing stop valves by a control component required by this subpart for a vapor control system (VCS) with a vapor destruction unit;

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

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

(iv) If the valve seat is fitted with resilient material, be a Category A valve as defined by 46 CFR 56.20–15 and not allow appreciable leakage when the resilient material is damaged or destroyed; and

(3) Instead of a liquid seal as required by paragraph (b)(1) of this section, have the following:

(i) An anti-flashback burner accepted by the Commandant and installed at each burner within the vapor destruction unit; and

(ii) A differential pressure sensor that activates the quick-closing stop valves as required by paragraph (b)(2) of this section upon sensing a reverse flow condition.

(c) A vapor destruction unit must—

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

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

(3) Activate an alarm that satisfies the requirements of 33 CFR 154.2100(e) and shut down when a flame is detected on the detonation arrester.

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

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

(2) Close the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a); and

(3) Automatically shut down any vapor-moving devices installed in the VCS.

(e) If a liquid seal is installed at the inlet to a vapor destruction unit, then—

(1) The liquid used in the liquid seal must be compatible with the vapors being controlled;

(2) For partially or totally soluble cargoes that can polymerize in solution, there must be an adequate amount of inhibitor in the liquid seal;

(3) The liquid seal must be compatible with the design of the VCS and must not contribute to the flammability of the vapor stream; and

(4) The liquid seal must have a low-level alarm and a low-low level shutdown.

#### § 154.2110 Vapor balancing requirements.

Paragraphs (a)(2) and (4), (b), and (c) of this section apply only to facilities transferring vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) A vapor control system (VCS) that uses a vapor balancing system in which cargo vapor is transferred from a vessel cargo tank or facility storage tank through the facility vapor collection system to a facility storage tank or vessel cargo tank must—

(1) Have facility storage tank high-level alarm systems and facility storage tank overfill control systems, independent of the high-level alarm system, arranged to prevent the cargo from entering the vapor return line;

(2) Have a detonation arrester located within the storage tank containment area and a detonation arrester located as close as practicable to the facility vapor connection. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source;

(3) Meet the overpressure and over-vacuum protection requirements of 33 CFR 154.2103; and

(4) As an alternative to paragraph (a)(2) of this section, inert cargo systems can meet the requirements of 33 CFR 2105(a)(1).

(b) A vapor balancing system, while in operation to transfer vapor to or from a vessel cargo tank and connected by way of the facility storage tank vent to a facility's main VCS with a vapor destruction unit, must have—

(1) A means to prevent backflow of vapor from the facility's main VCS to the marine vapor line; and

(2) Two fail-safe, quick-closing valves installed in the marine vapor line at the facility storage tank that automatically close when—

(i) Flame is detected on the facility storage tank; or

(ii) The temperature of the facility storage tank's vapor space reaches 177°C (350 °F) or 70 percent of the vapor's auto-ignition temperature in degrees Celsius, whichever is lower.

(c) Transferring vapor from a non-inerted facility storage tank to a vessel cargo tank that is required to be inerted in accordance with 46 CFR 32.53, 153.500, or Table 151.05, is prohibited.

(d) A vapor balancing system that transfers vapor to a vessel cargo tank must not use a vapor-moving device to assist vapor transfer or inject inerting, enriching, or diluting gas into the vapor line without approval from the Commandant.

**§ 154.2111 Vapor control system connected to a facility's main vapor control system.**

(a) When a marine vapor control system (VCS), or a marine vapor collection system, is connected to a facility's main VCS serving other facility processing areas that are not related to tank vessel operations, the marine vapor line, before the point where the marine VCS connects to the facility's main VCS, must be fitted with—

(1) A detonation arrester, unless both the marine VCS and the facility's main VCS only control vapors of cargoes that are non-flammable, non-combustible, or that have high flashpoints;

(2) Two fail-safe, quick closing valves, one on each side of any detonation arrester required by paragraph (a)(1) of this section, which automatically close when—

(i) A flame is detected on the detonation arrester;

(ii) The facility's marine VCS is not in operation; or

(iii) Vapor back flow to the marine vapor line is detected; and

(3) A means to prevent backflow of vapors to the marine vapor line.

(b) Vapors from facility processing areas unrelated to tank vessel operations must not enter the vapor line of a marine VCS before the devices required by paragraph (a) of this section.

(c) Except as specified by paragraph (d) of this section, a facility that wants to connect a facility vapor line, which collects vapor from other facility processing areas that are not related to tank vessel operations, to a marine VCS before the devices required by 33 CFR 154.2109(b)(1) and (2) and (c)(2), must receive approval in writing from the Commandant.

(d) A facility may connect a facility vapor line, which collects vapor from other facility processing areas that are not related to tank vessel operations, to a marine vapor line downstream of the devices required by 33 CFR 154.2109(b)(1) and (2) and (c)(2) to share the marine vapor destruction unit.

**§ 154.2112 Vapors with potential to polymerize or freeze—special requirements.**

(a) A vapor control system (VCS) that controls vapors with the potential to polymerize at a normal ambient condition must—

(1) Be designed to prevent condensation of monomer vapor. Methods such as heat tracing and insulation are permitted if they do not result in an increased risk of polymerization;

(2) Be designed so that polymerization can be detected. Any points suspected of being sites for potential

polymerization buildup must be equipped with inspection openings; and

(3) Include devices to measure the pressure drop across detonation arresters due to polymerization. The devices should activate an alarm on high pressure drop to warn of polymerization. Any device used for this purpose, including differential pressure monitors, must not have the capability of transmitting a detonation across the detonation arrester.

(b) A VCS that controls cargo vapors that potentially freeze at ambient temperature must have a design that prevents the freezing of vapors or condensate at ambient temperature or that detects and removes the liquid condensate and solids to prevent accumulation.

**§ 154.2113 Alkylene oxides—special requirements.**

A vapor control system (VCS) that controls vapors of an alkylene oxide, except for carriage under 46 CFR part 151 (listed in Table 151.05 with "Pressure" entry in the "Cargo identification, Pressure, b" column), must comply with paragraphs (a) and (b) of this section.

(a)(1) The VCS's equipment, hoses, piping, and all piping components, including valves, flanges, and fittings, must be of a type and constructed out of materials suitable for use with alkylene oxide;

(2) The VCS used for collecting an alkylene oxide vapor must not be used for collecting other vapors and must be separated from any other VCS, except as specified by paragraph (b) of this section; and

(b) The VCS must be adequately cleaned in accordance with 33 CFR 154.2150(p) and either recertified by a certifying entity or approved by a marine chemist if—

(1) The VCS is used to control other vapors; or

(2) The VCS is returned to alkylene oxide service after being used to control other cargo vapors.

**Transfer Facilities—Operations**

**§ 154.2150 General requirements.**

(a) No transfer operation using a vapor control system (VCS) may be conducted unless the facility operator has a copy of the facility operations manual, with the VCS addendum, marked by the local Coast Guard Captain of the Port (COTP) as required by 33 CFR 154.325(d).

(b) Personnel in charge of a facility must ensure that—

(1) The facility controls vapor only from cargoes that are properly authorized for vapor control in the facility's certification letter;

(2) The facility transfers vapor only to or from a vessel that has its certificate of inspection or certificate of compliance endorsed in accordance with 46 CFR 39.1013 or 46 CFR 39.1015 for each cargo intended for transfer; and

(3) If the vessel tanks to be vapor controlled contain vapor from previous cargo transfers other than the cargo or cargoes intended for transfer, the facility and vessel must be authorized to control the additional vapor from the previous cargo transfers. Any oxygen or hydrocarbon analyzer alarm and shutdown setpoints must be set to accommodate all of the cargo vapors.

(c) The facility personnel in charge must ensure that safety system testing is conducted as follows:

(1) Pressure sensors, alarms, and automatic shutdown systems required by 33 CFR 154.2103, 154.2107, and 154.2110, except as exempted by paragraph (c)(2) or specified by paragraph (c)(3) of this section, must be tested by applying altering test pressures at the sensors not more than 24 hours before each transfer;

(2) The pressure sensors required by 33 CFR 154.2103 may meet the requirements of the test program contained in 33 CFR 154.2180 and 33 CFR 154.2181 instead of the current program, which mandates tests within 24 hours before each transfer as required by paragraph (c)(1) of this section;

(3) Visible and audible alarm indicators must be tested not more than 24 hours before each transfer;

(4) The analyzers, except for flammability analyzers, required by 33 CFR 154.2105, 154.2107, and 154.2110, except as exempted by paragraph (c)(5) of this section, must be checked for calibration response by using a zero gas and a span gas not more than 24 hours before each transfer;

(5) The analyzers required by 33 CFR 154.2105, 154.2107, and 154.2110 may be checked for calibration response by use of a zero gas and a span gas as defined by the test program contained in 33 CFR 154.2180 and 33 CFR 154.2181, and comply with the minimum requirements as defined in 33 CFR 154.2180 and 33 CFR 154.2181, instead of the test required by paragraph (c)(4) of this section; and

(6) The vacuum and pressure relief valves required by 33 CFR 154.2103 must be manually checked per manufacturers' instructions to verify that the valves unseat easily and then reset to the closed position without constraint. Any required flame screens or flame arresters must also be visually checked to ensure that they are not damaged.

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

(e) A tank barge overfill control system that meets the requirements of 46 CFR 39.2009(a)(2) must—

(1) Not be connected to an overfill sensor circuit that exceeds the system's rated inductance and capacitance; and

(2) Be tested for proper operation after connection is made with the vessel by simulating liquid high level and overfill at each tank.

(f) When receiving vapor from a vessel with cargo tanks that are required to be inerted in accordance with 46 CFR 32.53, 46 CFR 153.500, or 46 CFR Table 151.05, the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) must not be opened until the pressure at the facility vapor connection, downstream of the facility vapor connection, exceeds 0.2 pounds per square inch gauge (psig).

(g) The initial cargo transfer rate must not exceed the rate agreed upon at the pre-transfer conference and 46 CFR 39.3001(g).

(h) 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 VCS, as specified in the facility operations manual; or

(2) The vessel's maximum transfer rate in accordance with 46 CFR 39.3001(d).

(i) While transferring cargo to a vessel connected to a VCS, compressed air or gas may be used to clear cargo hoses and loading arms, but must not be used to clear cargo lines. However, compressed inert gas such as nitrogen can be used to clear cargo lines if a pigging system that meets 33 CFR 154.2104 is provided.

(j) If a pigging system is used to clear cargo lines to the tank vessel while the vessel is connected to the facility VCS, the following operational requirements apply:

(1) The VCS must be in operation, with all of the high-pressure alarms and shutdowns required by 33 CFR 154.2103 active, before and during pigging operations;

(2) Personnel performing the pigging operation must be adequately trained on the specific pigging system being used. Accurate written procedures that address event sequence, equipment, safety precautions, and overpressurization hazards must be made available to all personnel involved in the pigging operations;

(3) Pigging procedures must be reviewed by both the vessel and facility personnel in charge as part of the pre-transfer conference. Topics of discussion during the pre-transfer conference must include, but need not be limited to—

(i) Event sequence;

(ii) Equipment;

(iii) Safety precautions;

(iv) Overpressurization hazards;

(v) Personnel roles;

(vi) Gas volumetric flow rates;

(vii) Gas pressures;

(viii) Volume of residual cargo in the line;

(ix) Amount of ullage space that is available for line displacement and connections;

(x) Valve alignment;

(xi) Units of measure;

(xii) Terminology; and

(xiii) Anticipated duration of the evolution;

(4) The pig must be inspected to ensure that it is of sufficient durability and condition; be of an appropriate size, type, and construction for the intended operation; and be inspected for defects before each use and replaced if necessary;

(5) Personnel performing pigging operations must monitor pig movement at all times. The facility and vessel manifold valves must be closed immediately after the pig reaches the pig-receiving device; and

(6) If the pigging system contains pressure-sensing, relieving, or alarming components in addition to those required by 33 CFR 154.2103, the components must be periodically tested in accordance with paragraphs (c) and (q) of this section.

(k) If one or more analyzers required by 33 CFR 154.2107(d) or (e) or 154.2110 become inoperable during a transfer operation, the operation may continue, provided that at least one analyzer remains operational; however, no further transfer operations may start until all inoperable analyzers are replaced or repaired.

(l) Whenever a condition results in a shutdown of the VCS, the emergency shutdown system required by 33 CFR 154.550 must be automatically activated to terminate cargo loading into tanks which are being vapor controlled.

(m) If it is suspected that a flare in the VCS has had a flashback, or if a flame is detected on a detonation arrester required by 33 CFR 154.2109(c)(2), the transfer operation must stop and cannot restart until that detonation arrester and any quick-closing stop valves downstream of the detonation arrester are inspected and found to be in satisfactory condition.

(n) Before each transfer operation, the freezing point of each cargo must be determined. If there is a possibility that the ambient air temperature during transfer operations will be at or below the freezing point of the cargo, adequate precautions must be taken to prevent freezing of vapor or condensate, or to detect and remove the frozen liquid and condensation to prevent accumulation.

(o) Before each transfer operation, the cargo vapor must be evaluated to determine its potential to polymerize, and adequate precautions must be taken to prevent and detect polymerization of the cargo vapors.

(p) Mixing of incompatible vapors is prohibited. The VCS piping, equipment, hoses, valves, and arresters must be purged between vapor control operations that involve incompatible chemical vapors in accordance with the following:

(1) Chemical compatibility must be determined by using the procedures contained in 46 CFR part 150;

(2) Purge gas must be an inert gas, air, or enriching gas, and must be adequate to reduce the level of residual vapor to a level at which reaction with the subsequent vapor cannot occur; and

(3) The required duration of purge time must be calculated and approved by the certifying entity during the certification or recertification.

(q) After each transfer operation, the VCS piping, equipment, hoses, valves, and arresters must be purged with at least two-system volume exchanges of non-reactive gas or air so the VCS is left with a safe condition.

(r) VCS equipment and instrumentation must be tested in compliance with 33 CFR 156.170(g) or (i), with the COTP or designated representative invited to observe these tests. The test procedure and a checklist must be approved by the certifying entity during the initial certification of the system and incorporated into the facility operations manual.

(s) A transfer operation that includes collection of vapor emitted to or from a vessel's cargo tanks must meet the transfer requirements of 33 CFR 156.120(aa), and a declaration of inspection meeting the requirements of 33 CFR 156.150 must be completed before each transfer.

#### Alternative Analyzer and Pressure Sensor Reliability Testing

##### § 154.2180 Alternative testing program—generally.

(a) As an alternative to complying with the vapor control system (VCS) analyzer and pressure sensor safety testing requirements provided by 33

CFR 154.2150(c) and 33 CFR 154.2250(c), the facility person in charge may administer a reliability assurance test program in accordance with this section and 33 CFR 154.2181.

(b) As used in this section—

(1) *Calibration drift* or *CD* means the difference in the analyzer output readings from the established reference value after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place;

(2) *Calibration error* or *CE* means the difference between the gas concentration exhibited by the gas analyzer and the known concentration of the cylinder gas;

(3) *Response time* or *RT* means the time interval between the start of a step change in the system input (e.g., change of calibration gas) and the time when the data recording system displays 95 percent of the final stable value; and

(4) *Sampling system bias* or *SSB* means the difference between the gas concentrations indicated by the measurement system when a known cylinder gas is introduced at or near the sampling probe and when the same gas is introduced directly to the analyzer.

(c) All analyzers used in a VCS must be tested for safety system functions, CE, CD, RT, and SSB, in accordance with 33 CFR 154.2181.

(d) All pressure sensors/switches used in a VCS must be tested for safety system functions, CE and CD, in accordance with 33 CFR 154.2181.

(e) The facility person in charge must ensure the following:

(1) Calibration of instrumentation using standard procedures provided by the manufacturer or service provider;

(2) Monitoring of all interlocks, alarms, and recording devices for proper operation while instrumentation is being calibrated;

(3) Use of a certified gas standard that is within plus or minus two (2) percent of its certified concentration to calibrate the analyzers; and

(4) Use of a certified secondary standard that is standardized against a primary standard to calibrate the pressure sensors/switches.

(f) Upon failing any test under 33 CFR 154.2181, the facility person in charge must ensure that all monthly and quarterly tests, including CE, CD, RT, and SSB, are conducted; and until all quarterly tests are completed, the person in charge must ensure that the vapor control alarms and automatic shutdown system are tested no more than 24 hours prior to any transfer or tank barge cleaning operation.

(g) Analyzers required by 33 CFR 154.2105(a) and (j) and 154.2107(d) and

(e) must be checked for calibration using a zero gas and a span gas.

(h) The facility operator must maintain and make available upon the request of the Commandant and the certifying entity that certifies the VCS the following reliability assurance test program documents for two years:

- (1) All test procedures;
- (2) The dates of all tests, type of tests made, and who conducted the tests;
- (3) Results of the tests, including the "as found" and "as left" conditions; and
- (4) A record of the date and time of repairs made.

##### § 154.2181 Alternative testing program—test requirements.

(a) The safety system function test required by 33 CFR 154.2180 must be performed once every two weeks and test for the proper operation and interaction of the analyzer or pressure sensor/switch with shutdown interlocks, and audible and visible alarm devices.

(b) The calibration error (CE) test required by 33 CFR 154.2180 must be performed once every month and documented as shown in Forms 154.2181(b)(2) and 154.2181(b)(3) of this section, to document the accuracy and linearity of the monitoring equipment for the entire measurement range.

(1) The CE test must expose the measurement system, including all monitoring components (e.g., sample lines, filters, scrubbers, conditioners, and as much of the probe as practicable), to the calibration gases, introduced through an injection port located so as to allow a check of the entire measurement system when calibration gases are introduced;

(2) The CE test must check the calibrated range of each analyzer using a lower (zero) and upper (span) reference gas standard. Three measurements must be taken against each standard and recorded as shown in Form 154.2181(b)(2) of this section, with the average of the three values in each case then used to calculate the CE according to this equation (where CE = percentage calibration error based upon span of the instrument, R = reference value of zero or high-level calibration gas introduced into the monitoring system, A = actual monitoring system response to the calibration gas, and S = span of the instrument):

$$CE = \frac{|R - A|}{S} \times 100$$

Form 154.2181(b)(2): Calibration error determination.

	Calibration value	Monitor response	Difference	
			Zero	Span
1-Zero .....				
1-Span .....				
2-Zero .....				
2-Span .....				
3-Zero .....				
3-Span .....				
Mean Difference =				
Calibration Error =			%	%

(3) The CE test must check each pressure sensor/switch for upscale (activate) and downscale (deactivate) hysteresis around the sensor/switch set pressure. The calibration error must be calculated and recorded as shown in Form 154.2181(b)(3) of this section. Test the pressure sensor/switch three times

and record the desired setting and the as-found set pressure. Calculate and record the difference of the two settings. Calculate the error percentage using this equation (where CE = percentage calibration error based upon span of the instrument, R = reference setting of the instrument, A = actual response as

recorded on the test instrument, and S = span of the instrument):

$$CE = \frac{|R - A|}{S} \times 100$$

Record sensor "as-left" setting only if an adjustment is made.

Form 154.2181(b)(3): Switch calibration error.

QUALITY ASSURANCE DATA SHEET SWITCH DATA RECORD					
DATE. _____		F.I. NO. _____			
MANUFACTURER _____					
MODEL NO. _____		SERIAL NO. _____			
SERVICE _____					
CR = CLOSES ON RISE			OR = OPENS ON RISE		
CF = CLOSES ON FALL			OF = OPENS ON FALL		
TEST EQUIPMENT	MODEL NO.	SERIAL NO.			
FUNCTION	DESIRED	AS FOUND	DIFFERENCE	ERROR %	AS LEFT
Test #1 Set					
Reset					
Test #2 Set					
Reset					
Test #3 Set					
Reset					
SPEC NO. _____		TEST PERFORMED BY: _____			
DATE: _____		ACCEPTED BY: _____			
REMARKS: _____ _____ _____ _____ _____					

(c) The calibration drift (CD) test required by 33 CFR 154.2180 must be

performed once every quarter and documented as shown in Form

154.2181(c)(3) of this section, to verify

the ability of the instrument to conform to the established calibration.

(1) The CD measurement must be conducted once daily for 7 consecutive days without making any adjustments to the instruments.

(2) Conduct the CD test at zero level (between 0 and 20 percent of the instrument span) and at high level (between 75 and 95 percent of the instrument span).

(3) Calculate and record the CD for 7 consecutive days using the equations in paragraphs (b)(2) and (3) of this section and Form 154.2181(c)(3) of this section. Form 154.2181(c)(3): Calibration drift determination.

Day	Day/time	Reference value (RV)	Monitor value	Difference	Percent of RV
Low-Level:					
High-Level:					

(d) The response time (RT) test required by 33 CFR 154.2180 must be performed once every quarter and documented as shown in Form 154.2181(d) of this section, to determine the RT which is the largest average response time in the upscale or downscale direction.

(1) For systems that normally operate below 20 percent of calibrated range, only a span (upscale) test is required.

(2) Record the span (upscale) value, zero (downscale) cylinder gas value, and stable, initial process-measured variable value.

(3) Determine the step change, which is equal to the average difference between the initial process-measured variable value and the average final stable cylinder gas-measured value.

(4) To determine both upscale and downscale step change intervals—

(i) Inject span (or zero) cylinder gas into the sample system as close to the sample probe as possible. Existing systems that inject the gas at the

analyzer box do not need to be modified. However, the gas transit time between the analyzer box and the sample probe must be taken into account;

(ii) Allow the analyzer to stabilize and record the stabilized value. A stable reading is achieved when the concentration reading deviates less than 6 percent from the measured average concentration in 6 minutes or if it deviates less than 2 percent of the monitor's span value in 1 minute;

(iii) Stop the span (or zero) gas flow, allow the monitor to stabilize back to the measured variable value, and record the stabilized value; and

(iv) Repeat this procedure a total of three times and subtract the average final monitor reading from the average starting monitor value to determine the average upscale (or downscale) step change.

(5) Determine the response time, which is equal to the elapsed time at

which 95 percent of the step change occurred.

(i) To find this value, take 5 percent of the average step change value and subtract the result from the cylinder gas analyzed value as shown in the following equation:

$$95\% \text{ step change value} = \text{cylinder gas value} - (0.05 \times \text{avg. step change})$$

(ii) Inject span (or zero) cylinder gas into the sample system as close to the sample probe as possible, and measure the time it takes to reach the 95 percent step change value.

(iii) Repeat the previous step (paragraph (d)(5)(ii) of this section) a total of three times each with span and zero cylinder gas to determine average upscale and downscale response times.

(iv) Compare the response times achieved for the upscale and downscale tests. The longer of these two times equals the response time for the analyzer.

## Form 154.2181(d): Response time.

Date of test \_\_\_\_\_  
 Component/system ID#: \_\_\_\_\_  
 Analyzer type \_\_\_\_\_  
 Serial Number \_\_\_\_\_  
 High-level gas concentration: \_\_\_ ppm / %  
 Zero-level gas concentration: \_\_\_ ppm / %  
 Analyzer span setting: \_\_\_ ppm / %  
 Upscale:  
 Stable starting monitor value: \_\_\_\_, \_\_\_\_, \_\_\_\_;  
 Avg. \_\_\_ ppm / %  
 Stable ending monitor reading: \_\_\_\_, \_\_\_\_, \_\_\_\_;  
 Avg. \_\_\_ ppm / %  
 Step change interval: \_\_\_ ppm; 95%  
 Step change value: \_\_\_ ppm / %  
 Elapsed time: \_\_\_\_, \_\_\_\_, \_\_\_\_; Avg. \_\_\_\_\_ seconds  
 Downscale:  
 Stable starting monitor value: \_\_\_\_, \_\_\_\_, \_\_\_\_;  
 Avg. \_\_\_ ppm / %  
 Stable ending monitor reading: \_\_\_\_, \_\_\_\_, \_\_\_\_;  
 Avg. \_\_\_ ppm / %  
 Step change interval: \_\_\_ ppm; 95%  
 Step change value: \_\_\_ ppm / %  
 Elapsed time: \_\_\_\_, \_\_\_\_, \_\_\_\_;  
 Avg. \_\_\_ seconds  
  
 System response time = \_\_\_ seconds

(e) The sample system bias (SSB) test required by 33 CFR 154.2180 must be performed once every quarter and documented, to establish that the system has no additional influence on the measurement being made by the analyzer.

(1) Conduct a close CE test in accordance with paragraph (b) of this section, by injecting calibration gas as close as possible to the analyzer, eliminating as much of the sample system components as possible, while still simulating the normal source operating conditions.

(2) If system integrity is maintained, and it has not become contaminated, the difference between the close and standard CE tests should be the same.

(f) For CE and CD tests, analyzers and pressure sensors must meet the following minimum compliance requirements:

(1) Oxygen analyzers must not deviate from the reference value of the zero- or

high-level calibration gas by more than 0.5 percent of full scale;

(2) Total hydrocarbon analyzers must not deviate from the reference value of the zero- or high-level calibration gas by more than 1 percent of full scale; and

(3) Pressure sensors/switches must not deviate from the reference value of the zero- or high-level calibration gas by more than 1.5 percent of full range.

(g) For RT tests, each oxygen or hydrocarbon analyzer must respond, in less than 1 minute, to 95 percent of the final stable value of a test span gas.

(h) For SSB tests, the analyzer system bias must be less than 5 percent of the average difference between the standard CE test and the close CE test, divided by the individual analyzer span.

#### Tank Barge Cleaning Facilities—VCS Design and Installation

##### § 154.2200 Applicable transfer facility design and installation requirements.

A tank barge cleaning facility's (TBCF's) vapor control system (VCS) must meet the following design and installation requirements of this subpart for a transfer facility's VCS:

(a) 33 CFR 154.2100(b), (c), (f), (g), (i), (j), and (k); general design and installation requirements;

(b) 33 CFR 154.2102: facility requirements for vessel liquid overflow protection, if a TBCF receives vapor from a tank barge that is required by 46 CFR 39.6001(f)(3) to be equipped with a liquid overflow protection arrangement and meet 46 CFR 39.2009;

(c) 33 CFR 154.2106: detonation arrester installation;

(d) 33 CFR 154.2107: inerting, enriching, and diluting systems;

- (e) 33 CFR 154.2108: vapor-moving devices;
- (f) 33 CFR 154.2109: vapor recovery and vapor destruction units;
- (g) 33 CFR 154.2111: VCS connected to a facility's main VCS;
- (h) 33 CFR 154.2112: special requirements for vapors with the potential to polymerize or freeze; and
- (i) 33 CFR 154.2113: special requirements for alkylene oxides.

**§ 154.2201 Vapor control system—general requirements.**

(a) Vapor control system (VCS) design and installation must eliminate potential overpressure and vacuum hazards, sources of ignition, and mechanical damage to the maximum practicable extent. Each remaining hazard source that is not eliminated must be specifically addressed in the protection system design and system operational requirements.

(b) Any pressure, flow, or concentration indication required by this part must provide a remote indicator on the facility where the VCS is controlled, unless the local indicator is clearly visible and readable from the operator's normal position at the VCS control station.

(c) Any condition requiring an alarm as specified in this part must activate an audible and visible alarm where the VCS is controlled.

(d) A mechanism must be developed and used to eliminate any liquid from the VCS.

(e) A liquid knockout vessel must be installed between the facility vapor connection and any vapor-moving device in systems that have the potential for two-phase (vapor/liquid) flow from the barge or the potential for liquid condensate to form as a result of the enrichment process. The liquid knockout vessel must have—

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

(2) A high liquid level sensor that activates an alarm that satisfies the requirements of 33 CFR 154.2100(e); and

(3) A high-high liquid level sensor that closes the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a) and shuts down any vapor-moving device before liquid is carried over to the vapor-moving device. One sensor with two stages may be used to meet this requirement as well as paragraph (e)(2) of this section.

**§ 154.2202 Vapor line connections.**

(a) 33 CFR 154.2101(a), (e), and (g) apply to a tank barge cleaning facility's (TBCF's) vapor control system (VCS).

(b) The remotely operated cargo vapor shutoff valve required by 33 CFR

154.2101(a) must be located upstream of the liquid knockout vessel required by 33 CFR 154.2201(e).

(c) A fluid displacement system must have a remotely operated shutoff valve installed in the fluid injection supply line between the point where the inert gas or other medium is generated and the fluid injection connection. The valve must comply with 33 CFR 154.2101(a)(1) through (6).

(d) Each hose used for transferring vapors must—

(1) Have a design burst pressure of at least 25 pounds per square inch gauge (psig);

(2) Have a maximum allowable working pressure (MAWP) no less than 5 psig;

(3) Be capable of withstanding at least the maximum vacuum rating of the vapor-moving device without collapsing or constricting;

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

(5) Have flanges with a bolthole arrangement complying with the requirements for Class 150 ANSI B16.5 flanges (incorporated by reference, see 33 CFR 154.106);

(6) Be abrasion and kinking resistant; and

(7) Be compatible with vapors being transferred.

(e) Fixed vapor collection arms must meet the requirements of paragraph (d) of this section.

**§ 154.2203 Facility requirements for barge vapor overpressure and vacuum protection.**

In this section, the requirements of having a flame arrester or a flame screen at the opening of a pressure relief valve or a vacuum relief valve apply only to facilities collecting vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) A facility vapor collection system must have a capacity for collecting cleaning facility vapors at a rate of no less than 1.1 times the facility's maximum allowable gas-freeing rate, plus any inerting, diluting, or enriching gas that may be added to the system.

(b) A facility vapor control system (VCS) must be designed to prevent the pressure in a vessel's cargo tanks from going below 80 percent of the highest setting of any of the barge's vacuum relief valves or exceeding 80 percent of the lowest setting of any of the barge's pressure relief valves. The VCS must be capable of maintaining the pressure in the barge's cargo tanks within this range at any gas-freeing rate less than or equal to the maximum gas-freeing rate determined by the requirements in 46 CFR 39.6007(c).

(c) A fluid displacement system must provide a pressure-sensing device that

activates an alarm that satisfies the requirements of 33 CFR 154.2100(e) when the pressure at the fluid injection connection exceeds either the pressure corresponding to the upper pressure determined in paragraph (b) of this section or a lower pressure agreed upon by the facility and barge persons in charge. The pressure-sensing device must be located in the fluid displacement system's piping downstream of any devices that could potentially isolate the barge's vapor collection system from the pressure-sensing device. The pressure measured by the sensing device must be corrected for pressure drops across any barge piping, hoses, or arms that are used to inject the fluid.

(d) A fluid displacement system must provide a pressure-sensing device that is independent of the device required by paragraph (c) of this section. This pressure-sensing device must activate the fluid displacement system emergency shutdown and close the remotely operated cargo vapor shutoff valve required by 33 CFR 154.2101(a). It must also close the remotely operated shutoff valve required by 33 CFR 154.2202(c) when the pressure at the fluid injection connection reaches a corresponding 90 percent of the lowest setting of any pressure relief valve on the barge. The pressure-sensing device must be located in the fluid displacement system's piping downstream of any device that could potentially isolate the barge's VCS from the pressure-sensing device. The pressure measured by the sensing device must be corrected for pressure drops across any barge piping, hoses, or arms that are used to inject the fluid.

(e) If a vapor-moving device capable of drawing more than 0.5 pounds per square inch gauge (psig) vacuum is used to draw vapor, air, inert gas, or other medium from the barge, a vacuum relief valve must be installed on the facility's fixed vapor collection system piping between the facility vapor connection and the vapor-moving device. The vacuum relief valve must—

(1) Relieve at a pressure such that the pressure at the facility vapor connection is maintained at or above 14.2 pounds per square inch absolute (psia) (–0.5 psig);

(2) Have a relieving capacity equal to or greater than the maximum capacity of the vapor-moving device;

(3) Have a flame arrester or flame screen fitted at the vacuum relief opening;

(4) Have been tested for relieving capacity in accordance with paragraph 1.5.1.3 of API 2000 (incorporated by

reference, see 33 CFR 154.106), with a flame arrester or flame screen fitted; and

(5) Be constructed of materials compatible with the vapors being gas-freed.

(f) The vacuum relief valve requirements of paragraph (e) of this section may include a valve to isolate it from the facility vapor collection piping, provided—

(1) The isolation valve must be interlocked with any vapor-moving device such that the vapor-moving device cannot activate unless the isolation valve is in the full open position (i.e., the vacuum relief valve is not isolated); and

(2) The isolation valve can only be closed after the facility person in charge has acknowledged that the hatch opening required by 33 CFR 154.2250(i) is open and secured.

(g) If a vapor-moving device capable of drawing more than 0.5 psig vacuum is used to draw vapor, air, inert gas, or other medium from the barge, the facility must install portable, intrinsically safe, pressure-sensing devices on any cargo tank, or on the common vapor header, at the connection required by 46 CFR 39.6003(b) before any cleaning operation begins on the tank. A pressure-sensing device must be provided that—

(1) Activates an alarm that satisfies 33 CFR 154.2100(e) when the pressure in the cargo tank being cleaned falls below 80 percent of the highest setting of any of the barge's vacuum relief valves, or a higher pressure agreed upon by the facility and barge persons in charge; and

(2) Activates the emergency shutdown system for the vapor-moving device and closes the remotely operated cargo vapor shutoff valve described in 33 CFR 154.2101(a) when the pressure in the cargo tank being cleaned falls below 90 percent of the highest setting of any of the barge's vacuum relief valves, or a higher pressure agreed upon by the facility and barge persons in charge. This pressure-sensing device must be independent of the device used to activate an alarm required by paragraph (g)(1) of this section.

(h) The pressure-sensing devices required by paragraph (g) of this section must—

(1) Have suitable means, such as approved intrinsic safety barriers that are able to accept passive devices, so that the under-pressure alarm circuits of the barge side of the under-pressure control system, including cabling, normally closed switches, and pin and sleeve connectors, are intrinsically safe;

(2) Be connected to the under-pressure alarm system by a four-wire, 16-ampere shielded flexible cable; and

(3) Have cable shielding grounded to the under-pressure alarm system.

(i) A pressure-indicating device must be provided within 6 meters (19.7 feet) of the facility vapor connection which displays the pressure in the vapor collection line upstream of any isolation valve and any devices, such as strainers, that could cause a blockage in the vapor line.

(j) A fluid displacement system must include a pressure-indicating device that displays the pressure in the fluid displacement system injection line. This device must be within 6 meters (19.7 feet) of the fluid injection connection.

(k) If a fluid displacement system used to inject inert gas or another medium into the cargo tank of a barge being gas-freed is capable of producing a pressure greater than 2 psig, a pressure relief valve must be installed in the fluid displacement system injection line between the fluid injection source and the fluid injection connection that—

(1) Relieves at a predetermined pressure such that the pressure in the fluid displacement system at the fluid injection connection does not exceed 1.5 psig;

(2) Has a relieving capacity equal to or greater than the maximum volumetric flow capacity of the fluid displacement system;

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

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

(l) When using the fluid displacement system, if the pressure in the facility's fixed vapor collection system can exceed 2 psig during 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 added to the facility's fixed vapor collection system piping and the facility vapor connection;

(2) Relieve at a predetermined pressure such that the pressure at the facility vapor connection does not exceed 1.5 psig;

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

(4) Have a flame screen or flame arrester fitted at the relief opening;

(5) Have been tested for relieving capacity in accordance with paragraph 1.5.1.3 of API 2000, when fitted with a flame screen or flame arrester; and

(6) Be constructed of materials compatible with the vapors being gas-freed.

(m) For fluid displacement systems, the fluid injection connection must be electrically insulated from the fluid injection source in accordance with OCIMF ISGOTT section 17.5 (incorporated by reference, see 33 CFR 154.106).

(n) If the pressure relief valve is not designed with a minimum vapor discharge velocity of 30 meters (98.4 feet) per second, the relieving capacity test required by paragraphs (k)(4) and (l)(5) of this section must be carried out with a flame screen or flame arrester fitted at the discharge opening.

(o) A pressure indicating device must be provided by the facility for installation at the connection required by 46 CFR 39.6003(b).

#### § 154.2204 Fire, explosion, and detonation protection.

This section applies to tank barge cleaning facilities (TBCFs) collecting vapors of flammable, combustible, or non-high flash point liquid cargoes.

(a) A vapor control system (VCS) with a single facility vapor connection that processes vapor with a vapor recovery unit must—

(1) Have a detonation arrester located as close as practicable to the facility vapor connection. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; or

(2) Have an inerting, enriching, or diluting system that meets the requirements of 33 CFR 154.2107.

(b) A VCS with a single facility vapor connection that processes vapor with a vapor destruction unit must—

(1) Have a detonation arrester located as close as practicable to the facility vapor connection. The total pipe length between the detonation arrester and the facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; and

(2) Have an inerting, enriching, or diluting system that meets the requirements of 33 CFR 154.2107.

(c) A VCS with multiple facility vapor connections that processes vapor with a vapor recovery unit must have a detonation arrester located as close as practicable to each facility vapor

connection. The total pipe length between the detonation arrester and each facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source.

(d) A VCS with multiple facility vapor connections that processes vapor with a vapor destruction unit must—

(1) Have a detonation arrester located as close as practicable to each facility vapor connection. The total pipe length between the detonation arrester and each facility vapor connection must not exceed 18 meters (59.1 feet) and the vapor piping between the detonation arrester and the facility vapor connection must be protected from any potential internal or external ignition source; and

(2) Have an inerting, enriching, or diluting system that meets the requirements of 33 CFR 154.2107.

(e) 33 CFR 154.2105(j) applies to a TBCF's VCS.

#### **Tank Barge Cleaning Facilities—Operations**

##### **§ 154.2250 General requirements.**

(a) No tank barge cleaning operation using a vapor control system (VCS) may be conducted unless the facility operator has a copy of the facility operations manual, with the VCS addendum, marked by the local Coast Guard Captain of the Port (COTP) as required by 33 CFR 154.325(d).

(b) The facility person in charge must ensure that a facility can receive vapors only from a barge with a VCS that has been approved by the Coast Guard Marine Safety Center as meeting the requirements of 46 CFR 39.6000.

(c) The facility person in charge must ensure that safety system tests are conducted as follows:

(1) Pressure sensors, alarms, and automatic shutdown systems required by 33 CFR 154.2203, except as exempted by paragraph (c)(2) or as specified by paragraph (c)(3) of this section, must be tested by applying altering test pressures at the sensors not more than 24 hours before each cleaning operation;

(2) The pressure sensors required by 33 CFR 154.2203 may meet the test program in accordance with 33 CFR 154.2180 and 33 CFR 154.2181 instead of the test within 24 hours before each cleaning operation as required by paragraph (c)(1) of this section;

(3) Visible and audible alarm indicators must be tested not more than 24 hours before each cleaning operation;

(4) The analyzers, except for flammability analyzers, required by 33 CFR 154.2105(j) and 154.2107, except as exempted by paragraph (c)(5) of this section, must be checked for calibration response by use of a zero gas and a span gas not more than 24 hours before each cleaning operation;

(5) The analyzers required by 33 CFR 154.2105(j) and 154.2107 may be checked for calibration response by use of a zero gas and a span gas as defined by the test program contained in 33 CFR 154.2180 and 33 CFR 154.2181, and comply with the minimum requirements as defined in 33 CFR 154.2180 and 33 CFR 154.2181, instead of as provided by paragraph (c)(4) of this section; and

(6) The vacuum and pressure relief valves required by 33 CFR 154.2203 must be manually checked per manufacturers' instructions to verify that the valves unseat easily and then reset to the closed position without constraint. Any required flame screens or flame arresters must also be visually checked to ensure that they are not damaged.

(d) The facility person in charge must verify the following before beginning cleaning operations:

(1) Each valve in the vapor collection system between the barge's cargo tank and the facility vapor collection system is correctly positioned to allow the collection of vapors;

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

(3) The electrical insulating devices required by 33 CFR 154.2101(g) and 154.2203(m) are installed;

(4) The maximum allowable gas-freeing rate as determined by the lesser of the following:

(i) A gas-freeing rate corresponding to the maximum vapor processing rate for the tank barge cleaning facility's (TBCF's) VCS, as specified in the facility operations manual; or

(ii) The barge's maximum gas-freeing rate determined in accordance with 46 CFR 39.6007(c);

(5) The gas-freeing rate will not exceed the maximum allowable gas-freeing rate as determined in paragraph (d)(4) of this section;

(6) The maximum allowable stripping rate is determined and does not exceed the volumetric capacity of the barge's vacuum relief valve at the valve's setpoint for the cargo tank being stripped;

(7) The barge's maximum and minimum operating pressures;

(8) Each vapor collection hose has no unrepaired or loose covers, kinks, bulges, soft spots, or any other defects

that 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;

(9) The freezing point of each cargo. If there is a possibility that the ambient air temperature during cleaning operations will be at or below the freezing point of the cargo, adequate precautions have been taken to prevent freezing of vapor or condensate, or to detect and remove the frozen liquid and condensate to prevent accumulation; and

(10) The cargo vapor is evaluated for the potential to polymerize, and adequate precautions have been taken to prevent and detect polymerization of the cargo vapors.

(e) VCS equipment and instrumentation must be tested in compliance with 33 CFR 156.170(g) or (i), with the COTP or designated representative invited to observe these tests. The test procedure and a checklist must be approved by the certifying entity during the initial certification of the system and incorporated into the facility operations manual.

(f) If one or more analyzers required by 33 CFR 154.2107(d) or (e) become inoperable during gas-freeing operations, the operation may continue, provided that at least one analyzer remains operational; however, no further gas-freeing operations may be started until all inoperable analyzers are repaired or replaced.

(g) Whenever a condition results in a shutdown of the VCS, the cleaning operations must be immediately terminated. The operation may not resume until the cause of the shutdown has been investigated and corrective action taken.

(h) If it is suspected that a flare in the VCS has had a flashback, or if a flame is detected on a detonation arrester required by 33 CFR 154.2109(c)(2), the cleaning operation must be stopped and may not resume until the detonation arrester and any quick-closing stop valves downstream of the detonation arrester have been inspected and found to be in satisfactory condition.

(i) If a vacuum displacement system is used for gas-freeing, the facility person in charge of the cleaning operation must verify the following items:

(1) The minimum amount of open area for air flow on the barge has been determined so that the pressure in the cargo tank cannot be less than 14.5 pounds per square inch absolute (psia) (–0.2 pounds per square inch gauge (psig)) at the maximum flow capacity of the vapor-moving device;

(2) Any hatch or fitting providing the minimum open area has been secured open so that accidental closure is not possible; and

(3) The hatch and/or fitting must be opened before the pressure in the cargo tank falls below 10 percent of the highest setting of any of the barge's vacuum relief valves.

(j) 33 CFR 154.2150(p) and (q) apply to a TBCF's VCS.

#### Appendix A to part 154 [Amended]

■ 10. In Appendix A, 7.3, after the words "ANSI B16.5", add the words "(incorporated by reference, see 33 CFR 154.106)".

#### Appendix B to part 154 [Removed and Reserved]

■ 11. Remove and reserve Appendix B to part 154.

### PART 155—OIL OR HAZARDOUS MATERIAL POLLUTION PREVENTION REGULATIONS FOR VESSELS

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

**Authority:** 33 U.S.C. 1225, 1231, 1321(j), 1903(b); 46 U.S.C. 3703; E.O. 11735, 3 CFR, 1971–1975 Comp., p. 793; Department of Homeland Security Delegation No. 0170.1. Section 155.490 also issued under section 4110(b) of Pub. L. 101–380.

#### § 155.750 [Amended]

- 13. In § 155.750—
- a. In paragraph (d)(3), remove the citation "46 CFR 39.30–1(d)(1) through (d)(3)" and add, in its place, the citation "46 CFR 39.3001(d)(1) through (3)";
- b. In paragraph (d)(4), remove the citation "46 CFR 39.30–1(h)" and add, in its place, the citation "46 CFR 39.3001(g)"; and
- c. In paragraph (d)(5), remove the citation "46 CFR 39.30–1(b)" and add, in its place, the citation "46 CFR 39.3001(c)".

### PART 156—OIL AND HAZARDOUS MATERIAL TRANSFER OPERATIONS

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

**Authority:** 33 U.S.C. 1225, 1231, 1321(j); 46 U.S.C. 3703, 3703a, 3715; E.O. 11735, 3 CFR 1971–1975 Comp., p. 793; Department of Homeland Security Delegation No. 0170.1.

- 15. In § 156.120—
- a. Revise paragraph (aa) introductory text;
- b. In paragraph (aa)(4), remove the word "loading" and add, in its place, the word "transfer";
- c. In paragraph (aa)(7) introductory text, after the words "the transfer operation", add the words "or in accordance with 33 CFR 154.2150(b)";

■ d. In paragraph (aa)(7)(ii), remove the words "§ 154.820(a), § 154.824(d) and (e) of this chapter" and add, in their place, the words "33 CFR 154.2105(a) and (j) and 154.2107(d) and (e)";

■ e. Revise paragraph (aa)(9); and

■ f. Add paragraphs (aa)(10) through (12).

The revisions and additions read as follows:

#### § 156.120 Requirements for transfer.

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

(9) The oxygen content in the vapor space of each of the vessel's cargo tanks connected to the vapor collection system, if inerted, is—

(i) At or below 60 percent by volume of the cargo's minimum oxygen concentration for combustion; or

(ii) At or below 8 percent by volume, at the start of cargo transfer, for vapor of crude oil, gasoline blends, or benzene;

(10) The freezing point of each cargo has been determined. If there is a possibility that the ambient air temperature during transfer operations will be at or below the freezing point of the cargo, adequate precautions have been taken to prevent freezing of vapor or condensate, or to detect and remove the liquid condensate and solids to prevent accumulation;

(11) If the cargo has the potential to polymerize, adequate precautions have been taken to prevent and detect polymerization of the cargo vapors; and

(12) The VCS has been cleaned, in accordance with 33 CFR 154.2150(p), between transfers of incompatible cargoes.

■ 16. In § 156.170—

■ a. In paragraph (g) introductory text, after the words "collects vapor emitted", add the words "to or";

■ b. In paragraph (g)(3), remove the words "§ 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" and add, in their place, the words "33 CFR 154.2105, 154.2108(b), 154.2109, 154.2110, 154.2111, and 154.2204, or 46 CFR 39.4003, and each flame arrester required by 33 CFR 154.2103, 154.2105(j), and 154.2203";

■ c. In paragraph (g)(4) introductory text, remove the words "§ 154.820(a)

and § 154.824(d) and (e) of this chapter or 46 CFR 39.40–3(a)" and add, in their place, the words "33 CFR 154.2105(a) and (j), 154.2107(d) and (e), and 154.2110 or 46 CFR 39.4003"; and

■ d. Add paragraph (i) to read as follows:

#### § 156.170 Equipment tests and inspections.

(i) Notwithstanding the general provisions of 33 CFR 156.107(a) relating to the authority of the Captain of the Port to approve alternatives, the owner or operator may request the written approval of the Commandant (CG–ENG), U.S. Coast Guard, 2100 2nd St. SW., Stop 7126, Washington, DC 20593–7126, for alternative methods of compliance to the testing and inspection requirements of paragraph (g)(3) of this section. The Commandant (CG–ENG) will grant that written approval upon determination that the alternative methods provide an equivalent level of safety and protection from fire, explosion, and detonation. Criteria to consider when evaluating requests for alternative methods may include, but are not limited to: operating and inspection history, type of equipment, new technology, and site-specific conditions that support the requested alternative.

### Title 46—Shipping

#### PART 35—OPERATIONS

■ 17. The authority citation for part 35 is revised to read as follows:

**Authority:** 33 U.S.C. 1225, 1231, 1321(j); 46 U.S.C. 3306, 3703, 6101; 49 U.S.C. 5103, 5106; E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; E.O. 12777, 56 FR 54757, 3 CFR, 1991 Comp., p. 351; Department of Homeland Security Delegation No. 0170.1.

■ 18. Add § 35.35–4 to read as follows:

#### § 35.35–4 Insulating flange joint or nonconductive hose—TB/ALL.

(a) A vessel's cargo hose string or vapor recovery hose must use an insulating flange or one continuous length of nonconductive hose between the vessel and the shore transfer facility. For each vapor recovery hose or cargo hose string, only one insulating flange or non-conductive hose must be provided. See 33 CFR 154.2101(g).

(b) The insulating flange must be inserted at the jetty end and take all reasonable measures to ensure the connection will not be disturbed. The hose must be suspended to ensure the hose-to-hose connection flanges do not rest on the jetty deck or other structure that may render the insulating flange

ineffective or short circuited by contact with external metal or through the hose handling equipment.

(c) The insulating flange must be inspected and tested at least annually, or more frequently if necessary due to deterioration caused by environmental exposure, usage, and damage from handling. After installation, the insulation reading between the metal pipe on the shore side of the flange and the end of the hose or metal arm when freely suspended must not be less than 1,000 ohms. A suitable DC insulation tester must be used.

■ 19. Revise § 35.35–5 to read as follows:

**§ 35.35–5 Electrical bonding—TB/ALL.**

The use of a vessel/shore bonding cable or wire is permissible only if operationally necessary and only in compliance with the requirements of paragraphs (a) and (b) of this section.

(a) A switch on the jetty that is in series with the bonding cable must be provided. The switch must be listed or certified by a Coast Guard accepted independent laboratory and approved for use in a Class I Zone 1 or Class I, Division 1 location, and the appropriate Gas Group of the cargo authorized for the vessel.

(b) The connection point for the bonding cable system must be at least 20 feet from the cargo manifold area, the cargo hose string, or the vapor recovery connection. The switch must be in the off position before connecting or disconnecting the bonding cable. The bonding cable must be attached before the cargo hoses or arms, or the vapor recovery connections are connected. The bonding cable must be removed only after the cargo hoses or arms, or the vapor recovery connections have been disconnected.

■ 20. In § 35.35–20—

■ a. In paragraph (m) introductory text, after the words “collection of cargo vapor”, add the words “to or”;

■ b. In paragraph (m)(1), after the words “vapor to flow to”, add the words “or from”;

■ c. Revise paragraph (m)(9) to read as follows:

**§ 35.35–20 Inspection before transfer of cargo—TB/ALL.**

\* \* \* \* \*

(m) \* \* \*

(9) The oxygen content in the vapor space of each of the vessel’s inerted cargo tanks connected to the vapor collection system is—

(i) At or below 60 percent by volume of the cargo’s minimum oxygen concentration for combustion at the start of cargo transfer; or

(ii) At or below 8 percent by volume, at the start of cargo transfer, for vapor of crude oil, gasoline blends, or benzene.

■ 21. In § 35.35–30—

■ a. In paragraph (c) introductory text, after the words “collection of cargo vapor”, add the words “to or”;

■ b. In paragraph (c)(1), after the words “vapor to flow to”, add the words “or from”;

■ c. Revise paragraph (c)(8) to read as follows:

**§ 35.35–30 “Decaration of Inspection” for tank vessels—TB/ALL.**

\* \* \* \* \*

(c) \* \* \*

(8) Has the oxygen content in the vapor space of each of the vessel’s inerted cargo tanks connected to the vapor collection system been verified to be—

(i) At or below 60 percent by volume, at the start of cargo transfer, of the cargo’s minimum oxygen concentration for combustion; or

(ii) At or below 8 percent by volume, at the start of cargo transfer, for vapor of crude oil, gasoline blends, or benzene.

■ 22. Revise part 39 to read as follows:

**PART 39—VAPOR CONTROL SYSTEMS**

**Subpart 39.1000—General**

Sec.

39.1001 Applicability—TB/ALL.

39.1003 Definitions—TB/ALL.

39.1005 Incorporation by reference—TB/ALL.

39.1009 Additional tank vessel vapor processing unit requirements—TB/ALL.

39.1011 Personnel training requirements—TB/ALL.

39.1013 U.S.-flagged tank vessel certification procedures for vapor control system designs—TB/ALL.

39.1015 Foreign-flagged tank vessel certification procedures for vapor control system designs—TB/ALL.

39.1017 Additional certification procedures for a tank barge vapor collection system design—B/ALL.

**Subpart 39.2000—Equipment and Installation**

39.2001 Vapor collection system—TB/ALL.

39.2003 Cargo gauging system—TB/ALL.

39.2007 Tankship liquid overflow protection—T/ALL.

39.2009 Tank barge liquid overflow protection—B/ALL.

39.2011 Vapor overpressure and vacuum protection—TB/ALL.

39.2013 High and low vapor pressure protection for tankships—T/ALL.

39.2014 Polymerizing cargoes safety—TB/ALL.

39.2015 Tank barge pressure-vacuum indicating devices—B/ALL.

**Subpart 39.3000—Vapor Collection Operations During Cargo Transfer**

39.3001 Operational requirements for vapor control systems during cargo transfer—TB/ALL.

**Subpart 39.4000—Vessel-to-Vessel Transfers Using Vapor Balancing**

39.4001 General requirements for vapor balancing—TB/ALL.

39.4003 Design and equipment for vapor balancing—TB/ALL.

39.4005 Operational requirements for vapor balancing—TB/ALL.

**Subpart 39.5000—Multi-breasted Loading Using a Single Facility Vapor Connection**

39.5001 General requirements for multi-breasted loading—B/CLBR.

39.5003 Additional requirements for multi-breasted loading using inboard barge vapor collection system—B/CLBR.

39.5005 Additional requirements for multi-breasted loading using a “dummy” vapor header—B/CLBR.

**Subpart 39.6000—Tank Barge Cleaning Operations with Vapor Collection**

39.6001 Design and equipment of vapor collection and stripping systems—B/ALL.

39.6003 Overpressure and underpressure protection during stripping and gas-freeing operations—B/ALL.

39.6005 Inspection prior to conducting gas-freeing operations—B/ALL.

39.6007 Operational requirements for tank barge cleaning—B/ALL.

39.6009 Barge person in charge: Designation and qualifications—B/ALL.

*Authority:* 33 U.S.C. 1225, 1231; 42 U.S.C. 7511b(f)(2); 46 U.S.C. 3306, 3703, 3715(b); E.O. 12234, 45 FR 58801, 3 CFR, 1980 Comp., p. 277; Department of Homeland Security Delegation No. 0170.1.

**Subpart 39.1000—General**

**§ 39.1001 Applicability—TB/ALL.**

(a) This part applies to tank vessels that use a vapor control system (VCS) to collect vapors emitted to or from a vessel’s cargo tanks while operating in the navigable waters of the United States, except—

(1) Tank vessels with an operating vapor collection system approved by the Coast Guard prior to July 23, 1990, for the collection and transfer of cargo vapor to specific facilities. Such tank vessels are only subject to 46 CFR 39.1013, 39.3001, and 39.4005; and

(2) A tank barge that collects vapors emitted from its cargo tanks during gas-freeing or cleaning operations at a cleaning facility. This type of tank barge is only subject to 46 CFR part 39, subparts 39.1000 and 39.6000, and must comply with requirements of these two subparts at the time of its next inspection for certification required by 46 CFR 31.10–15, but no later than August 15, 2018.

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

(c) In this part, regulatory measurements, whether in the metric or English system, are sometimes followed by approximate equivalent measurements in parentheses, which are given solely for the reader's convenience. Regulatory compliance with the regulatory measurement is required.

### § 39.1003 Definitions—TB/ALL.

As used in this part only:

*Barge vapor connection* means the point in a barge's piping system where it connects to a vapor collection hose or arm. This may be the same as the barge's cargo connection while controlling vapors during tank barge cargo tank-cleaning operations.

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

*Cargo tank venting system* means the venting system required by 46 CFR 32.55.

*Certifying entity* means a certifying entity accepted by the Coast Guard as such pursuant to 33 CFR part 154, subpart P.

*Cleaning facility* means a facility used or capable of being used to conduct cleaning operations on a tank barge.

*Cleaning operation* means any stripping, gas-freeing, or tank-washing operation of a barge's cargo tanks conducted at a cleaning facility.

*Commandant* means the Commandant (CG–ENG), U.S. Coast Guard, 2100 2nd St. SW., Stop 7126, Washington, DC 20593–7126.

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

*Fixed stripping line* means a pipe extending to the low point of each cargo tank, which is welded through the deck and terminated above deck with a valve, and plugged at the open end.

*Flammable liquid* means a liquid as defined in 46 CFR 30.10–22.

*Fluid displacement system* means a system that removes vapors from a barge's cargo tanks during gas freeing through the addition of an inert gas or other medium into the cargo tank.

*Fluid injection connection* means the point in a fluid displacement system at which the fixed piping or hose that supplies the inert gas or other medium connects to a barge's cargo tanks or fixed piping system.

*Gas freeing* means the removal of vapors from a tank barge.

*Independent as applied to two systems* means that one system will operate when there is a failure of any part of the other system.

*Inerted* means the oxygen content of the vapor space in a cargo tank is reduced in accordance with the inert gas requirements of 46 CFR 32.53 or 33 CFR 153.500. If a cargo vapor in a cargo tank that is connected to the vapor collection system is defined as inerted at the start of cargo transfer, the oxygen content in the vapor space of the cargo tank must not exceed 60 percent by volume of the cargo's minimum oxygen concentration for combustion, or 8 percent by volume for vapor of crude oil, gasoline blends, or benzene.

*Marine Safety Center (MSC)* means the Commanding Officer, U.S. Coast Guard Marine Safety Center, 2100 2nd Street SW., Stop 7102, Washington, DC 20593–7102.

*Maximum allowable gas-freeing rate* means the maximum volumetric rate at which a barge may be gas-freed during cleaning operations.

*Maximum allowable stripping rate* means the maximum volumetric rate at which a barge may be stripped during cleaning operations prior to the opening of any hatch and/or fitting on the cargo tank being stripped.

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

*Minimum oxygen concentration for combustion (MOCC)* means the lowest level of oxygen in a vapor or vapor mixture that will support combustion.

*New vapor collection system* means a vapor collection system that is not an existing vapor collection system.

*Service vessel* means a vessel that transports bulk liquid cargo between a facility and another vessel.

*Set pressure* means the pressure at which the pressure or vacuum valve begins to open and the flow starts through the valve.

*Stripping* means the removal, to the maximum extent practicable, of cargo residue remaining in the barge's cargo tanks and associated fixed piping system after cargo transfer or during cleaning operations.

*Vacuum displacement system* means a system that removes vapors from a barge's cargo tanks during gas-freeing by sweeping air through the cargo tank hatch openings.

*Vapor balancing* means the transfer of vapor displaced by incoming cargo from the tank of a vessel or facility 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 to or from a vessel's cargo tanks and to transport the vapor to a vapor processing unit or a tank.

*Vapor control system (VCS)* means an arrangement of piping and equipment used to control vapor emissions collected to or from a vessel. It includes the vapor collection system and vapor processing unit or a tank.

*Vapor processing unit* means the components of a VCS that recover, destroy, or disperse vapor collected from a vessel.

*Vessel-to-vessel transfer (direct or through a shore loop)* means either—

(1) The transfer of a bulk liquid cargo from a tank vessel to a service vessel; or

(2) 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.

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

### § 39.1005 Incorporation by reference—TB/ALL.

(a) Certain material is incorporated by reference (IBR) into this part with the approval of the Director of the **Federal Register** under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the Coast Guard must publish notice of change in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Coast Guard, Office of Design and Engineering Standards (CG–ENG) 2100 2nd Street SW., Stop 7126, Washington, DC 20593–7126, telephone 202–372–1418 and at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030 or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). Also, it is available from the sources indicated in this section.

(b) American National Standards Institute (ANSI), 25 West 43rd Street, 4th floor, New York, NY 10036.

(1) ANSI B16.5, Steel Pipe Flanges and Flanged Fittings, 1981, IBR approved for §§ 39.2001(i) and 39.6001(k).

(2) [Reserved]

(c) American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005.

(1) API Standard 2000, Venting Atmospheric and Low-Pressure Storage Tanks (Non-refrigerated and

Refrigerated), Third Edition, January 1982 (reaffirmed December 1987) (“API 2000”), IBR approved for § 39.2011(b).

(2) [Reserved]

(d) ASTM International (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428–2959.

(1) ASTM F1122–87 (Reapproved 1992)—Standard Specification for Quick Disconnect Couplings (“ASTM F1122”), IBR approved for § 39.2001(k).

(2) ASTM F1271—Standard Specification for Spill Valves for Use in Marine Tank Liquid Overpressure Protection Applications (“ASTM F1271”), December 29, 1989, IBR approved for § 39.2009(a).

(e) International Electrotechnical Commission (IEC), Bureau Central de la Commission Electrotechnique Internationale, 3, rue de Varembe, P.O. Box 131, CH—1211 Geneva 20, Switzerland.

(1) IEC 60309–1 Plugs, Socket-Outlets and Couplers for Industrial Purposes—Part 1: General Requirements, Edition 4.2 2012–06, IBR approved for § 39.2009(a).

(2) IEC 60309–2 Plugs, Socket-Outlets and Couplers for Industrial Purposes—Part 2: Dimensional Interchangeability Requirements for Pin and Contact-tube Accessories, Edition 4.2 2012–05, IBR approved for § 39.2009(a).

(f) International Maritime Organization (IMO), 4 Albert Embankment, London SE1 7SR, United Kingdom.

(1) International Convention for the Safety of Life at Sea, Consolidated Text of the 1974 SOLAS Convention, the 1978 SOLAS Protocol, the 1981 and 1983 SOLAS Amendments (1986) (“SOLAS”), IBR approved for § 39.2001(e).

(2) [Reserved]

(g) National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Suite 1752, Rosslyn, VA 22209.

(1) ANSI NEMA WD–6—Wiring Devices, Dimensional Requirements, 1988 (“NEMA WD–6”), IBR approved for § 39.2009(a).

(2) [Reserved]

(h) National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169–7471.

(1) NFPA 70—National Electrical Code, 2011, IBR approved for § 39.2009(a).

(2) [Reserved]

(i) Oil Companies International Marine Forum (OCIMF), 29 Queen Anne’s Gate, London SW1H 9BU, England.

(1) International Safety Guide for Oil Tankers and Terminals, Fifth Edition, 2006 (“ISGOTT”), IBR approved for

§§ 39.3001(g), 39.5001(c), 39.6001(g), and 39.6005(a).

(2) [Reserved]

**§ 39.1009 Additional tank vessel vapor processing unit requirements—TB/ALL.**

(a) Vapor piping, fitting, valves, flanges, and pressure vessels comprising the construction and installation of a permanent or portable vapor processing unit onboard a tank vessel must meet the marine engineering requirements of 46 CFR chapter I, subchapter F.

(b) Electrical equipment comprising the construction and installation of a permanent or portable vapor processing unit onboard a tank vessel must meet the electrical engineering requirements of 46 CFR chapter I, subchapter J.

(c) In addition to complying with the rules of this part, tank vessels with a permanent or portable vapor processing unit must comply with applicable requirements of 33 CFR part 154, subpart P.

(d) When differences between the requirements for vessels contained in 46 CFR chapter I, subchapters F and J and requirements for facilities contained in 33 CFR part 154, subpart P need to be resolved, the requirements of 46 CFR chapter I, subchapters F and J apply, unless specifically authorized by the Marine Safety Center.

**§ 39.1011 Personnel training requirements—TB/ALL.**

Personnel responsible for operating the vapor control system (VCS) must complete a training program prior to the operation of the system installed onboard the tank vessel. As part of the training program, personnel must be able to demonstrate, through drills and practical knowledge, the proper VCS operation procedures for normal and emergency conditions. The training program must cover the following subjects:

- (a) Purpose of a VCS;
- (b) Principles of the VCS;
- (c) Components of the VCS;
- (d) Hazards associated with the VCS;
- (e) Coast Guard regulations in this part;

(f) Vapor control operation procedures during cargo transfer or tank barge cleaning, including:

- (1) Testing and inspection requirements;
- (2) Pre-transfer or pre-cleaning procedures;
- (3) Connection sequence;
- (4) Startup procedures; and
- (5) Normal operations; and
- (g) Emergency procedures.

**§ 39.1013 U.S.-flagged tank vessel certification procedures for vapor control system designs—TB/ALL.**

(a) For an existing Coast Guard-approved vapor control system (VCS) that has been operating before July 23, 1990, the tank vessel owner or operator must submit detailed engineering drawings, calculations, and specifications to the Marine Safety Center (MSC) for review and approval before modifying the system or transferring vapor to a facility that was not approved by the Coast Guard for that kind of vapor transfer.

(b) For a Coast Guard-approved vessel VCS that began operating on or after July 23, 1990, the tank vessel owner or operator must submit plans, calculations, and specifications to the MSC for review and approval before modifying the system.

(c) A tank vessel owner or operator must submit plans, calculations, and specifications for a new tank vessel VCS to the MSC for review and approval before installing the system. A permanent or portable vapor processing unit onboard a tank vessel will be reviewed, together with the tank vessel, as a complete and integrated system.

(d) Once the plan review and inspection of the tank vessel VCS satisfy the requirements of this part, the Officer in Charge, Marine Inspection (OCMI) will endorse the Certificate of Inspection for the U.S.-flagged tank vessel.

**§ 39.1015 Foreign-flagged tank vessel certification procedures for vapor control system designs—TB/ALL.**

As an alternative to meeting the requirements in 33 CFR 39.1013(a), (b), and (c), the owner or operator of a foreign-flagged tank vessel may submit certification by the classification society that classifies vessels under their foreign flags to the Marine Safety Center. Upon receipt of the certification stating that the vapor control system (VCS) meets the requirements of this part, the Officer in Charge, Marine Inspection (OCMI) will endorse the vessel’s Certificate of Compliance for foreign-flagged tank vessels.

**§ 39.1017 Additional certification procedures for a tank barge vapor collection system design—B/ALL.**

(a) For a tank barge vapor collection system intended for operation in multi-breasted loading using a single facility vapor connection, the tank barge owner or operator must submit plans, calculations, and specifications to the Marine Safety Center (MSC) for review and approval before beginning a multi-breasted loading operation.

(b) For a tank barge intended for collecting vapors emitted from its cargo tanks during gas-freeing or cleaning operations at a cleaning facility, the barge owner or operator must submit the following items to the MSC for review and approval:

(1) Stripping system plans and specifications, except those approved by the MSC on or before the August 15, 2013; and

(2) Stripping and/or gas-freeing rate calculations, except those approved by the MSC on or before the August 15, 2013.

(c) Once the vapor collection system satisfies the requirements of this part, the Officer in Charge, Marine Inspection (OCMI) will endorse the Certificate of Inspection that the tank barge is acceptable for collecting vapors during cleaning operations.

### Subpart 39.2000—Equipment and Installation

#### § 39.2001 Vapor collection system—TB/ALL.

(a) Vapor collection piping must be fixed piping and the vessel's vapor connection must be located as close as practicable to the loading manifold, except—

(1) As allowed by the Commandant; and

(2) A vessel certificated to carry cargo listed in 46 CFR, part 151, Table 151.05 or part 153, Table 1 may use flexible hoses no longer than three meters (9.84 feet) for interconnection between fixed piping onboard the vessel to preserve segregation of cargo systems. These flexible hoses must also meet the requirements in paragraph (i) of this section, excluding paragraph (i)(5), and meet the following additional requirements:

(i) The installation of flexible hoses must include an isolation valve mounted on the tank side of the connection; and

(ii) Hose connections permitted under paragraph (a)(2) of this section are exempt from the requirements of paragraph (h) of this section.

(b) When collecting incompatible vapors simultaneously, vapors must be kept separate throughout the entire vapor collection system.

(c) Vapor collection piping must be electrically bonded to the hull and must be electrically continuous.

(d) The vapor collection system must have a mechanism to eliminate liquid condensation, such as draining and collecting liquid from each low point in the line.

(e) For a tankship that has an inert gas system, a mechanism must be in place

to isolate the inert gas supply from the vapor control system (VCS). The inert gas main isolation valve required by chapter II-2, Regulation 62.10.8 of SOLAS (incorporated by reference, see 46 CFR 39.1005), may be used to satisfy this requirement.

(f) The vapor collection system must not interfere with the proper operation of the cargo tank venting system.

(g) The tank vessel owner or operator must install an isolation valve capable of manual operation. It must be located at the vessel vapor connection and must clearly show whether the valve is in the open or closed position via an indicator, valve handle, or valve stem.

(h) The last 1.0 meter (3.3 feet) of vapor piping upstream of the vessel vapor connection and each end of a vapor hose must be—

(1) Painted in the sequence of red/yellow/red. The width of the red bands must be 0.1 meter (0.33 foot) and the width of the middle yellow band must be 0.8 meter (2.64 feet); and

(2) Labeled with the word "VAPOR" painted in black letters at least 50.8 millimeters (2 inches) high.

(i) Hoses that transfer vapors must meet the following requirements:

(1) Have a design burst pressure of at least 25 pounds per square inch gauge (psig);

(2) Have a maximum allowable working pressure no less than 5 psig;

(3) Be capable of withstanding at least a 2.0 pounds per square inch (psi) vacuum without collapsing or constricting;

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

(5) Have flanges with—

(i) A bolthole arrangement complying with the requirements for 150 pound class ANSI B16.5 flanges (incorporated by reference, see 46 CFR 39.1005); and

(ii) One or more 15.9 millimeter (0.625 inch) diameter hole(s) located midway between boltholes and in line with the bolthole pattern; and

(6) Be abrasion and kinking resistant.

(j) Each vessel vapor connection flange face must have a permanent stud projecting outward that has a 12.7 millimeter (0.5 inch) diameter and is at least 25.4 millimeters (1 inch) long. It must be located at the top of the flange face, midway between boltholes, and in line with the bolthole pattern.

(k) Quick disconnect couplings (QDCs) may be used instead of flanges at the flexible hose connection and fixed piping on tankships provided they meet ASTM F1122 (incorporated by reference, see 46 CFR 39.1005) and are designed as "Standard Class QDC."

(l) Hose saddles that provide adequate support to prevent kinking or collapse

of hoses must accompany vapor hose handling equipment.

(m) For cargoes that have toxic properties, listed in 46 CFR Table 151.05 with the "Special requirements" column referring to 46 CFR 151.50-5, an overfill alarm and shutdown system that meet the requirements of 46 CFR 39.2007(a), 39.2009(a), or 39.2009(b) must be used for primary overfill protection. If the vessel is also equipped with spill valves or rupture disks, their setpoints must be set higher than the vessel's pressure relief valve setting as required by 46 CFR 39.2009(a)(3).

#### § 39.2003 Cargo gauging system—TB/ALL.

(a) A cargo tank of the tank vessel connected to a vapor collection system must be equipped with a permanent or portable cargo gauging device that—

(1) Is a closed type as defined in 46 CFR 151.15.10(c) that does not require opening the tank to the atmosphere during cargo transfer;

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

(3) Has an indicator for the level of liquid in the tank that is located where cargo transfer is controlled; and

(4) If portable, is installed on the tank during the entire transfer operation.

(b) Each cargo tank of a tank barge must have a high-level indicating device, unless the barge complies with 46 CFR 39.2009(a). The high-level indicating device must—

(1) Indicate visually the level of liquid in the cargo tank when the liquid level is within a range of 1 meter (3.28 feet) of the top of the tank;

(2) Show a permanent mark to indicate the maximum liquid level permitted under 46 CFR 39.3001(e) at even keel conditions; and

(3) Be visible from all cargo control areas.

#### § 39.2007 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) If installed after July 23, 1990, the high-level alarm and tank overfill alarm required by paragraph (a) of this section must—

(1) Be independent of each other;

(2) Activate an alarm in the event of loss of power to the alarm system;

(3) Activate an alarm during the failure of electrical circuitry to the tank level sensor; and

(4) Be able to be verified at the tank for proper operation prior to each transfer. This procedure may be achieved with the use of an electronic

self-testing feature that monitors the condition of the alarm circuitry and sensor.

(c) The high-level alarm required by paragraph (a) of this section must—

(1) Activate an alarm once the cargo level reaches 95 percent of the tank capacity or higher, but before the tank overflow alarm;

(2) Be identified with the legend “High-level Alarm” in black letters at least 50.8 millimeters (2 inches) high on a white background; and

(3) Activate a visible and audible alarm so that it can be seen and heard on the vessel where cargo transfer is controlled.

(d) The tank overflow alarm required by paragraph (a) of this section must—

(1) Be independent of the cargo gauging system;

(2) Be identified with the legend “TANK OVERFILL ALARM” in black letters at least 50.8 millimeters (2 inches) high on a white background;

(3) Activate a visible and audible alarm so that it can be seen and heard on the vessel where cargo transfer is controlled and in the cargo deck area; and

(4) Activate an alarm early enough to allow the person in charge of transfer operations to stop the cargo transfer before the 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 46 CFR 39.2009(c).

(f) If a rupture disk is installed on a cargo tank fitted with a vapor collection system, it must meet the requirements of 46 CFR 39.2009(d).

**§ 39.2009 Tank barge liquid overflow protection—B/ALL.**

(a) Each cargo tank of a tank barge must have one of the following liquid overflow protection arrangements:

(1) A system meeting the requirements of 46 CFR 39.2007 that—

(i) Includes a self-contained power supply;

(ii) Is powered by generators on the barge; or

(iii) Receives power from a facility and is fitted with a shore tie cable and a 120-volt, 20-ampere explosion-proof plug that meets—

(A) ANSI NEMA WD-6 (incorporated by reference, see 46 CFR 39.1005);

(B) NFPA 70, Articles 406.9 and 501-145 (incorporated by reference, see 46 CFR 39.1005); and

(C) 46 CFR 111.105-9;

(2) An intrinsically safe overflow control system that—

(i) Is independent of the cargo-gauging device required by 46 CFR 39.2003(a);

(ii) Activates an alarm and automatic shutdown system at the facility overflow

control panel 60 seconds before the tank is 100 percent liquid-full during a facility-to-vessel cargo transfer;

(iii) Activates an alarm and automatic shutdown system on the vessel discharging cargo 60 seconds before the tank is 100 percent liquid-full during a vessel-to-vessel cargo transfer;

(iv) Can be inspected at the tank for proper operation prior to each loading;

(v) Consists of components that, individually or in series, will not generate or store a total of more than 1.2 volts (V), 0.1 amperes (A), 25 megawatts (MW), or 20 microjoules ( $\mu$ J);

(vi) Has at least one tank overflow sensor switch per cargo tank that is designed to activate an alarm when its normally closed contacts are open;

(vii) Has all tank overflow sensor switches connected in series;

(viii) Has interconnecting cabling that meets 46 CFR 111.105-11(b) and (d), and 46 CFR 111.105-17(a); and

(ix) Has a male plug with a five-wire, 16-A connector body meeting IEC 60309-1 and IEC 60309-2 (both incorporated by reference, see 46 CFR 39.1005), that is—

(A) Configured with pins S2 and R1 for the tank overflow 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

(B) Labeled “Connector for Barge Overflow Control System” and labeled with the total inductance and capacitance of the connected switches and cabling;

(3) A spill valve that meets ASTM F1271 requirements (incorporated by reference, see 46 CFR 39.1005), and—

(i) Relieves at a predetermined pressure higher than the pressure at which the pressure relief valves meeting the requirements of 46 CFR 39.2011 operate;

(ii) Limits the maximum pressure at the top of the cargo tank during liquid overflow to not more than the maximum design working pressure for the tank when at the maximum loading rate for the tank; and

(iii) Has a means to prevent opening due to cargo sloshing while the vessel is in ocean or coastwise service; or

(4) A rupture disk arrangement that meets paragraphs (a)(3)(i), (ii), and (iii) of this section and is approved by the Commandant.

(b) A tank barge authorized to carry a cargo having toxic properties, meaning they are listed in 46 CFR Table 151.05 with the “Special requirements” column referring to 46 CFR 151.50-5, must comply with the requirements of 46 CFR 39.2001(m).

**§ 39.2011 Vapor overpressure and vacuum protection—TB/ALL.**

(a) The cargo tank venting system required by 46 CFR 32.55 must—

(1) Be capable of discharging cargo vapor at the maximum transfer rate plus the vapor growth for the cargo such that the pressure in the vapor space of each tank connected to the vapor control system (VCS) 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) Relieve at a pressure corresponding to a pressure in the cargo tank vapor space not less than 1.0 pounds per square inch gauge (psig);

(3) Prevent a vacuum, which generates in any tank connected to the vapor collection system during the withdrawal of cargo or vapor at maximum rates, in a cargo tank vapor space from exceeding the maximum design vacuum; and

(4) Not relieve at a vacuum corresponding to a vacuum in the cargo tank vapor space between 14.7 pounds per square inch absolute (psia) (0 psig) and 14.2 psia (–0.5 psig).

(b) Each pressure-vacuum relief valve must—

(1) Be of a type approved under 46 CFR 162.017, for the pressure and vacuum relief setting desired;

(2) Be tested for venting capacity in accordance with paragraph 1.5.1.3 of API 2000 (incorporated by reference, see 46 CFR 39.1005). The test 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 feet) per second; and

(3) If installed after July 23, 1991, have a mechanism to check that it operates freely and does not remain in the open position.

(c) A liquid filled pressure-vacuum breaker may be used for vapor overpressure and vacuum protection if the vessel owner or operator obtains the prior written approval of the Commandant.

(d) Vapor growth must be calculated following the Marine Safety Center guidelines available in Coast Guard VCS guidance at <http://homeport.uscg.mil>, or as specifically approved in writing by the Commandant after consultation with the Marine Safety Center.

**§ 39.2013 High and low vapor pressure protection for tankships—T/ALL.**

Each tankship with a vapor collection system must be fitted with a pressure-

sensing device, located as close as practicable to the vessel vapor connection, that measures the pressure in the main vapor collection line, which—

(a) Has a pressure indicator located on the tankship where the cargo transfer is controlled; and

(b) Has a high-pressure and a low-pressure alarm that—

(1) Gives an audible and a visible warning on the vessel where the cargo transfer is controlled;

(2) Activates an alarm when the pressure-sensing device measures a high pressure of not more than 90 percent of the lowest pressure relief valve setting in the cargo tank venting system; and

(3) Activates an alarm when the pressure-sensing device measures a low pressure of not less than 0.144 pounds per square inch gauge (psig) for an inerted tankship, or the lowest vacuum relief valve setting in the cargo tank venting system for a non-inerted tankship.

**§ 39.2014 Polymerizing cargoes safety—TB/ALL.**

(a) Common vapor headers for polymerizing cargoes must be constructed with adequate means to permit internal examination of vent headers.

(b) Vapor piping systems and pressure-vacuum valves that are used for polymerizing cargoes must be inspected internally at least annually.

(c) Pressure-vacuum valves and spill valves which are used for polymerizing cargoes must be tested for proper movement prior to each transfer.

**§ 39.2015 Tank barge pressure-vacuum indicating device—B/ALL.**

A fixed pressure-sensing device must be installed as close as practicable to the vessel vapor connection on a tank barge with a vapor collection system. The pressure-sensing device must measure the pressure vacuum in the main vapor collection line and have a pressure indicator located where the cargo transfer is controlled.

**Subpart 39.3000—Vapor Collection Operations During Cargo Transfer**

**§ 39.3001 Operational requirements for vapor control systems during cargo transfer—TB/ALL.**

(a) Vapor from a tank vessel may not be transferred to a facility in the United States, or vapor from a facility storage tank may not be transferred to a tank vessel, unless the facility's marine vapor control system (VCS) is certified by a certifying entity as meeting the requirements of 33 CFR part 154, subpart P and the facility's facility

operations manual is marked by the local Coast Guard Captain of the Port (COTP) as required by 33 CFR 154.325(d).

(b) Vapor from a tank vessel may not be transferred to a vessel that does not have its certificate of inspection or certificate of compliance endorsed as meeting the requirements of this part and for controlling vapor of the cargo being transferred.

(c) For each cargo transferred using a vapor collection system, the pressure drop through the vapor collection system from the most remote cargo tank to the vessel vapor connection, including vapor hoses if used by the vessel, must be—

(1) Calculated at the maximum transfer rate and at lesser transfer rates;

(2) Calculated using a density estimate for the cargo vapor and air mixture, or vapor and inert gas mixture, based on a partial pressure (partial molar volumes) method for the mixture, assuming ideal gas law conditions;

(3) Calculated using a vapor growth rate as stated in 46 CFR 39.2011(d) for the cargo being transferred; and

(4) Included in the vessel's transfer procedures as a table or graph, showing the liquid transfer rate versus the pressure drop.

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

(1) Eighty percent of the total venting capacity of the pressure relief valves in the cargo tank venting system when relieving at the set pressure.

(2) The total vacuum relieving capacity of the vacuum relief valves in the cargo tank venting system when relieving at the set pressure.

(3) For a given pressure at the facility vapor connection, or if vessel-to-vessel transfer at the vapor connection of the service vessel, then the rate based on pressure drop calculations at which 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) Cargo tanks must not be filled higher than—

(1) 98.5 percent of the cargo tank volume; or

(2) The level at which an overflow alarm complying with 46 CFR 39.2007 or 39.2009(a)(2) is set.

(f) A cargo tank should remain sealed from the atmosphere during cargo transfer operations. The cargo tank may only be opened temporarily for gauging or sampling while the tank vessel is connected to a VCS as long as the following conditions are met:

(1) The cargo tank is not being filled or no vapor is being transferred into the cargo tank;

(2) For cargo loading, any pressure in the cargo tank vapor space is first reduced to atmospheric pressure by the VCS, except when the tank is inerted;

(3) The cargo is not required to be closed or restricted gauged by 46 CFR part 151, Table 151.05 or part 153, Table 1; and

(4) For static accumulating cargo, all metallic equipment used in sampling or gauging must be electrically bonded to the vessel and remain bonded to the vessel until it is removed from the tank, and if the tank is not inerted, 30 minutes must have elapsed after any cargo transfer to the tank is stopped, before the equipment is put into the tank.

(g) For static accumulating cargo, the initial transfer rate must be controlled in accordance with OCIMF ISGOTT Section 11.1.7 (incorporated by reference, see 46 CFR 39.1005), in order to minimize the development of a static electrical charge.

(h) If cargo vapor is collected by a facility that requires the vapor from the vessel to be inerted in accordance with 33 CFR 154.2105, the oxygen content in the vapor space of each cargo tank connected to the vapor collection system must not exceed 60 percent by volume of the cargo's minimum oxygen concentration for combustion (MOCC), or 8 percent by volume for vapor of crude oil, gasoline blends, or benzene, at the start of cargo transfer. The oxygen content of each tank, or each area of a tank formed by each partial bulkhead, must be measured at a point 1.0 meter (3.28 feet) below the tank top and at a point equal to one-half of the ullage.

(i) If the vessel is equipped with an inert gas system, the isolation valve required by 46 CFR 39.2001(e) must remain closed during vapor transfer.

(j) Unless equipped with an automatic self-test and circuit-monitoring feature, each high-level alarm and tank overflow alarm on a cargo tank being loaded, required by 46 CFR 39.2007 or 39.2009, must be tested at the tank for proper operation within 24 hours prior to the start of cargo transfer.

**Subpart 39.4000—Vessel-to-Vessel Transfers Using Vapor Balancing**

**§ 39.4001 General requirements for vapor balancing—TB/ALL.**

(a) Vessels using vapor balancing while conducting a vessel-to-vessel transfer operation, directly or through a shore loop, must meet the requirements of this subpart in addition to the requirements of 46 CFR part 39,

subparts 39.1000, 39.2000, and 39.3000. Arrangements other than vapor balancing used to control vapor emissions during a vessel-to-vessel transfer operation must receive approval from the Commandant.

(b) A vapor balancing operation must receive approval from the Commandant to use a compressor or blower to assist vapor transfer.

(c) 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.

(d) A vessel that intends to collect vapors (during a vessel-to-vessel transfer operation) from cargoes not previously approved must receive specific approval from the Commandant before beginning transfer operations.

**§ 39.4003 Design and equipment for vapor balancing—TB/ALL.**

(a) During transfer operations, if the cargo tanks are inerted on a vessel discharging cargo to a receiving vessel with inerted cargo tanks, the service vessel must—

(1) 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 feet) of the vessel vapor connection that—

(i) Activates a visible and an audible alarm on the service vessel where cargo transfer is controlled when the oxygen content in the vapor collection system exceeds 60 percent by volume of the cargo's minimum oxygen concentration for combustion (MOCC), or 8 percent by volume for vapor of crude oil, gasoline blends, or benzene;

(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 are not inerted on a vessel discharging cargo during transfer operations, and the cargo is flammable or combustible, the vapor collection line on the service vessel must be fitted with a detonation arrester that meets the requirements of 33 CFR 154.2106, and be located within 3 meters (9.74 feet) 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 each vessel operating a vessel-to-vessel cargo transfer.

**§ 39.4005 Operational requirements for vapor balancing—TB/ALL.**

(a) During a vessel-to-vessel transfer operation, each cargo tank being loaded must be connected by the vapor collection system to a cargo tank that 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 60 percent by volume of the cargo's minimum oxygen concentration for combustion (MOCC), or 8 percent by volume for vapor of crude oil, gasoline blends, or benzene. The oxygen content of each tank, or each area of a tank formed by each partial bulkhead, must be measured at a point 1 meter (3.28 feet) below the tank top and at a point equal to one-half of the ullage;

(2) Prior to starting transfer operations, the oxygen analyzer required by 46 CFR 39.4003(a) must be tested for proper operation;

(3) During transfer operations the oxygen content of vapors being transferred must be continuously monitored;

(4) Cargo transfer must be terminated if the oxygen content exceeds 60 percent by volume of the cargo's MOCC, or 8 percent by volume for vapor of crude oil, gasoline blends, or benzene;

(5) Transfer operations may resume once the oxygen content in the tanks of the vessel receiving cargo is reduced to 60 percent by volume or less of the cargo's MOCC, or 8 percent by volume or less for vapor of crude oil, gasoline blends, or benzene; and

(6) Prior to starting vapor transfer operations, the vapor transfer hose must be purged of air and inerted.

(c) The isolation valve located on the service vessel required by 46 CFR 39.2001(g) 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 discharging cargo.

(d) The vessel discharging cargo must control the cargo transfer rate so that the transfer rate does not exceed—

(1) The authorized maximum discharge rate of the vessel discharging cargo;

(2) The authorized maximum loading rate of the vessel receiving cargo; or

(3) The processing rate of the approved vessel vapor processing system, if one is used to process the vapor collected during the transfer operations.

(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) Impressed current cathodic protection systems must be de-energized 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.

**Subpart 39.5000—Multi-breasted Loading Using a Single Facility Vapor Connection**

**§ 39.5001 General requirements for multi-breasted loading—B/CLBR.**

(a) Each barge must be owned or operated by the same entity and must have an approved vapor control system (VCS).

(b) There must be only one crossover vapor hose and it must—

(1) Comply with 46 CFR 39.2001(h) and (i);

(2) Have a diameter at least as that of the largest pipe in the outboard barge's VCS, and

(3) If it extends more than 25 feet (7.62 meters) between the two barges during the transfer operation, it must be as short as is practicable, safe for the conditions, supported off the vessels' decks, and its pressure drop calculations must be approved for its length by the Marine Safety Center (MSC), or reapproved by the MSC if existing approval was based on a 25-foot hose.

(c) The hazards associated with barge-to-barge or barge-to-shore electric currents must be controlled in accordance with sections 11.9 or 17.5 of OCIMF ISGOTT (incorporated by reference, see 46 CFR 39.1005).

(d) The cargo transfer procedures must reflect the procedures to align and disconnect a facility VCS to and from an inboard barge, and alternately, to and from an outboard barge through the vapor cross-over hose and the inboard barge's vapor header, or "dummy" header. This must include proper connections for the facility VCS's alarm/shutdown system to the alarm/shutdown system of the barge being loaded at the time.

(e) Calculations for multi-breasted loading must consider additional pressure drops across the barges' vapor collection systems and the cross vapor hose and must be reviewed and approved by the MSC per 46 CFR 39.1017(a).

(f) Barge owners and operators must comply with any additional operational requirements imposed by the local Captain of the Port (COTP) in whose zone the shore facility is located. These facilities' VCSs must be certified for conducting such an operation.

**§ 39.5003 Additional requirements for multi-breasted loading using an inboard barge vapor collection system—B/CLBR.**

(a) Each barge must have at least one liquid overfill protection system that fulfills the requirements of 46 CFR 39.2009.

(b) The vapor header of an inboard barge that is used during outboard barge loading must—

(1) Be aligned with the vapor header of the outboard barge;

(2) Have a diameter at least as large as the diameter of the largest pipe in the vapor collection system of the outboard barge; and

(3) Be marked in accordance with 46 CFR 39.2001(h).

(c) A licensed tankerman, trained in and familiar with multi-breasted loading operations, must be onboard each barge during transfer operations. The tankerman serves as the barge person-in-charge (PIC). During transfer operations, the barge PICs must maintain constant communication with each other as well as with the facility PIC.

(d) If multi-breasted loading will be conducted using more than one liquid transfer hose from the shore facility, the facility must be capable of activating the emergency shutdown system required by 33 CFR 154.550. This will automatically stop the cargo flow to each transfer hose simultaneously, in the event an upset condition occurs that closes the remotely operated cargo vapor shutoff valve in the facility's vapor control system. Multi-breasted loading is prohibited unless the shore facility can comply with this requirement.

**§ 39.5005 Additional requirements for multi-breasted loading using a "dummy" vapor header—B/CLBR.**

(a) Each inboard barge "dummy" header used during outboard barge loading must—

(1) Be aligned with the vapor header of the outboard barge;

(2) Have a diameter at least as large as the diameter of the largest pipe in the vapor collection system of the outboard barge;

(3) Be marked in accordance with 46 CFR 39.2001(h); and

(4) Meet the same design and installation requirements for the vapor collection piping onboard the same barge.

(b) Flanges must meet the same design and installation requirements for flanges in the vapor collection system onboard the same barge.

(c) A stud must be permanently attached, as required in 46 CFR 39.2001(j), to the vapor connection flange on the "dummy" header.

**Subpart 39.6000—Tank Barge Cleaning Operations with Vapor Collection**

**§ 39.6001 Design and equipment of vapor collection and stripping systems—B/ALL.**

(a) Each barge engaged in cleaning operations at an approved cleaning facility must have a conductive fixed stripping line installed in each cargo tank. The line must extend to the low point of each cargo tank, extend through and be welded to the top of the cargo tank, and terminate above deck with a full port valve plugged at the open end.

(b) An existing fixed stripping system may be used instead of the stripping line required in paragraph (a) of this section.

(c) Each stripping line must be labeled at an on-deck location with the words "Stripping Line-Tank" followed by the tank's number, name, or location.

(d) Vapors may be collected from the barge's cargo tanks through a common fixed vapor header, through the fixed liquid cargo header, or through flanged flexible hoses located at the top of each cargo tank.

(e) The vapor collection system must not interfere with the proper operation of the cargo tank venting system.

(f) A barge being gas-freed by a fluid displacement system must fulfill the following requirements:

(1) If the fluid medium is a compressible fluid, such as inert gas, it must be injected into the barge's cargo tanks through a common fixed vapor header, through the fixed liquid cargo header, or through a flexible hoses flanged to a connection located at the top of each cargo tank;

(2) If the fluid medium is a non-compressible fluid, such as water, it must be injected into the barge's cargo tanks through the fixed liquid cargo header only; and

(3) If the fluid medium is a non-compressible fluid, such as water, the barge must be equipped with a liquid overfill protection arrangement and fulfill the requirements for tank barge liquid overfill protection contained in 46 CFR 39.2009.

(g) The barge vapor connection must be electrically insulated from the facility vapor connection and the fluid injection connection must be electrically insulated from the fluid injection source, if fitted, in accordance with

OCIMF ISGOTT section 17.5 (incorporated by reference, see 46 CFR 39.1005).

(h) Vapor collection piping must be electrically bonded to the barge hull and must be electrically continuous.

(i) All equipment used on the barge during cleaning operations must be electrically bonded to the barge and tested to ensure electrical continuity prior to each use.

(j) Hoses used for the transfer of vapors during cleaning operations must meet the requirements of 46 CFR 39.2001(i) and have markings as required in 46 CFR 39.2001(h).

(k) Hoses used for the transfer of liquids during cleaning operations must—

(1) Have a designed burst pressure of at least 600 pounds per square inch gauge (psig);

(2) Have a maximum allowable working pressure of at least 150 psig;

(3) Be capable of withstanding at least the maximum vacuum rating of the cleaning facility's vapor-moving device without collapsing or constricting;

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

(5) Have flanges with a bolthole arrangement complying with the requirements for 150 pound class ANSI B16.5 flanges (incorporated by reference, see 46 CFR 39.1005); and

(6) Be abrasion and kinking resistant and compatible with the liquids being transferred.

(l) If a hose is used to transfer either vapor or liquid from the barge during cleaning operations, hose saddles that provide adequate support to prevent the collapse or kinking of hoses must accompany hose handling equipment.

**§ 39.6003 Overpressure and underpressure protection during stripping or gas-freeing operations—B/ALL.**

(a) The volumetric flow rates during stripping or gas-freeing operations must be limited within a range such that the cargo tank venting system required by 46 CFR 32.55 will keep the cargo tank within its maximum design working pressure or the maximum design vacuum.

(b) Each barge must be fitted with a means for connecting the pressure-sensing and pressure-indicating devices required by 33 CFR 154.2203(g) and (o) on each cargo tank top, or on the common vapor header provided that pressures measured by the devices are adjusted to compensate for the pressure drop across the vapor piping from the cargo tank to the devices. The valve for the connection point must be labeled "Pressure Sensor/indicator Connection."

(c) For stripping operations with closed cargo tanks, the maximum stripping rate must not exceed the volumetric flow capacity of the vacuum relief valve protecting the cargo tank.

**§ 39.6005 Inspection prior to conducting gas-freeing operations—B/ALL.**

(a) The following inspections must be conducted by the barge person in charge prior to commencing gas-freeing operations, and show that—

- (1) Each part of the barge’s vapor collection system is aligned to allow vapor to flow to a cleaning facility’s vapor control system (VCS);
- (2) If a fluid displacement system is used to conduct gas-freeing operations—
  - (i) The fluid supply line is connected to the fluid injection connection; and
  - (ii) The maximum fluid injection rate is determined in accordance with 46 CFR 39.6007(c)(2);
- (3) The maximum stripping or gas-freeing rate is determined in accordance with 46 CFR 39.6003(c) or 39.6007(c), respectively, and adequate openings required by 46 CFR 39.6007(c)(1) are available and identified;
- (4) The pressure-sensing and pressure-indicating devices required by 33 CFR 154.2203 are connected as required by 46 CFR 39.6003(b);
- (5) The maximum and minimum operating pressures of the barge being cleaned are determined;
- (6) Unrepaired loose covers, kinks, bulges, gouges, cuts, slashes, soft spots, or any other defects which would permit the discharge of vapors through the vapor recovery hose material must be detected during inspection and repaired prior to operation;
- (7) The facility vapor connection is electrically insulated from the barge vapor connection and the fluid injection connection is electrically insulated from the fluid injection source, if fitted, in accordance with OCIMF ISGOTT

section 17.5 (incorporated by reference, see 46 CFR 39.1005); and  
 (8) All equipment is bonded in accordance with 46 CFR 39.6001(h).

**§ 39.6007 Operational requirements for tank barge cleaning—B/ALL.**

- (a) During cleaning operations, vapors from a tank barge cannot be transferred to a cleaning facility which does not have a marine vapor control system (VCS) certified by a certifying entity, and its facility operations manual endorsed by the Captain of the Port (COTP) as meeting the requirements of 33 CFR part 154, subpart P.
- (b) Prior to commencing stripping operations, the maximum allowable stripping rate must be determined. The maximum allowable stripping rate must not exceed the volumetric flow capacity of the vacuum relief valve protecting the cargo tank.
- (c) The maximum gas-freeing rate is determined by the following:
  - (1) For a vacuum displacement system—
    - (i) The maximum allowable gas-freeing rate is a function of the area open to the atmosphere for the cargo tank being gas-freed. The area open to the atmosphere must be large enough to maintain the pressure in the cargo tank being gas-freed at or above 14.5 pounds per square inch absolute (psia) (–0.2 pounds per square inch gauge (psig));
    - (ii) The maximum allowable gas-freeing rate must be calculated from Table 1 of this section, using the area open to the atmosphere for the cargo tank being gas-freed as the entering determination;
  - (2) For a fluid displacement system, the maximum allowable gas-freeing rate is determined by the lesser of the following:
    - (i) Eighty percent of the total venting capacity of the pressure relief valve in

- the cargo tank venting system when relieving at its set pressure;
- (ii) Eighty percent of the total vacuum relieving capacity of the vacuum relief valve in the cargo tank venting system when relieving at its set pressure; or
- (iii) The rate based on pressure drop calculations at which, for a given pressure at the facility vapor connection, the pressure in the cargo tank being gas-freed exceeds 80 percent of the setting of any pressure relief valve in the cargo tank venting system.
- (d) Any hatch and/or fitting used to calculate the minimum area required to be open to the atmosphere must be opened and secured in such a manner as to prevent accidental closure during gas freeing. All flame screens for the hatch and/or fitting opened must be removed in order to allow for maximum airflow. The hatch and/or fitting must be secured open before the pressure in the cargo tank falls below 10 percent of the highest setting of any of the barge’s vacuum relief valves.
- (e) “Do Not Close Hatch/Fitting” signs must be conspicuously posted near the hatch and/or fitting opened during gas-freeing operations.
- (f) To minimize the dangers of static electricity, all equipment used on the barge during gas-freeing and cleaning operations must be electrically bonded to the barge and tested to ensure electrical continuity before each use.
- (g) If the barge is equipped with an inert gas system, the inert gas main isolation valve must remain closed during cleaning operations.
- (h) Vapors from incompatible cargoes that are collected simultaneously must be kept separated throughout the barge’s entire vapor collection system. Chemical compatibility must be determined in accordance with the procedures contained in 46 CFR part 150, part A.

TABLE 1—MINIMUM OPEN AREA FOR BARGE CLEANING HATCHES

Air flow (CFM) (cubic feet/minute)	Air flow (CFS) (cubic feet/ second)	Open area (square inches)	Diameter opening (inches)	Square opening (inches)
500	8.3	10.7	3.7	3.3
600	10.0	12.8	4.0	3.6
700	11.7	15.0	4.4	3.9
800	13.3	17.1	4.7	4.1
900	15.0	19.3	5.0	4.4
1000	16.7	21.4	5.2	4.6
1100	18.3	23.6	5.5	4.9
1200	20.0	25.7	5.7	5.1
1300	21.7	27.8	6.0	5.3
1400	23.3	30.0	6.2	5.5
1500	25.0	32.1	6.4	5.7
1600	26.7	34.3	6.6	5.9
1700	28.3	36.4	6.8	6.0
1800	30.0	38.5	7.0	6.2
1900	31.7	40.7	7.2	6.4

TABLE 1—MINIMUM OPEN AREA FOR BARGE CLEANING HATCHES—Continued

Air flow (CFM) (cubic feet/minute)	Air flow (CFS) (cubic feet/ second)	Open area (square inches)	Diameter opening (inches)	Square opening (inches)
2000 .....	33.3	42.8	7.4	6.5
2100 .....	35.0	45.0	7.6	6.7
2200 .....	36.7	47.1	7.7	6.9
2300 .....	38.3	49.3	7.9	7.0
2400 .....	40.0	51.4	8.1	7.2
2500 .....	41.7	53.5	8.3	7.3
2600 .....	43.3	55.7	8.4	7.5
2700 .....	45.0	57.8	8.6	7.6
2800 .....	46.7	60.0	8.7	7.7
2900 .....	48.3	62.1	8.9	7.9
3000 .....	50.0	64.2	9.0	8.0
3100 .....	51.7	66.4	9.2	8.1
3200 .....	53.3	68.5	9.3	8.3
3300 .....	55.0	70.7	9.5	8.4
3400 .....	56.7	72.8	9.6	8.5
3500 .....	58.3	75.0	9.8	8.7
3600 .....	60.0	77.1	9.9	8.8
3700 .....	61.7	79.2	10.0	8.9
3800 .....	63.3	81.4	10.2	9.0
3900 .....	65.0	83.5	10.3	9.1
4000 .....	66.7	85.7	10.4	9.3

**§ 39.6009 Barge person in charge:  
Designation and qualifications—B/ALL.**

The designation and qualification requirements contained in 33 CFR

155.700 and 33 CFR 155.710(a)(2) apply to the barge person in charge.

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**J.G. Lantz,**

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